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THE IMPACT OF SUSTAINABLE LOGISTICS POLICIES ON ROAD TRANSPORTATION IN THE UNITED KINGDOM

A master's thesis

Supervisor

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TABLE OF CONTENTS

INTRODUCTION.....6

1. LITERATURE REVIEW 9

1.1 Sustainability Concept..... 9

1.2 Logistics Concept and Its Scope 13

1.3 From Logistics to Green Logistics..... 15

1.4 Sustainable Logistics Policies..... 29

1.5 Digitalization 30

1.6 The Relationship Between Sustainability Strategy and Logistics Performance..... 32

1.7 The Relationship Between Green Logistics and Logistics Performance 38

1.8 Impact of Sustainable Logistics Policies 40

1.9 Major Sustainable Factors And Their Impact On Road Transportation 41

1.10 Summary of Literature Review 43

2. RESEARCH MODEL AND METHODOLOGY 45

2.1 Research Model..... 45

2.2 Method of the Research..... 46

2.2.1 Purpose of the Research..... 46

2.2.2 Research Method and Data Collection Tool..... 47

2.2.3 Population and Sample of the Research 47

2.2.4 Limitations of the Research 48

2.2.5 Descriptive Statistics on People 48

2.2.6 Correlation and Regression Analysis..... 48

3. EMPIRICAL ANALYSIS OF GREEN LOGISTICS POLICIES ON ROAD TRANSPORT IN THE UK 50

3.1 Road Transport in UK 50

3.2 UK's 2040 Mission 51

3.3 Choosing the Right Road Transport Option: Understanding the Challenge..... 53

3.4 Reducing the Fleet of Conventional Vehicles 55

3.5 Zero-Emission Heavy Goods Vehicles 55

3.6 Infrastructure Network for Electric Vehicles 56

3.7 Analysis of Findings 56

3.7.1 Reliability of the Research..... 57

3.7.2 Descriptive Statistics on Demographic Variables 57
3.7.3 Descriptive Statistics of the Institution 58
3.7.4 Findings on Sustainability Strategy 59
3.7.5 Findings Regarding Green Transport Transactions 59
3.7.6 Findings on Green Transport Procurement 59
3.7.7 Findings on Logistics Performance 60
3.7.8 Findings Based on Correlations 61
CONCLUSION 65
REFERENCES 67
ABSTRACT 84
SUMMARY 86
ANNEX 87

TABLES

TABLE 1: Reliability Analysis Results of the Scales Included in the Study 57

TABLE 2: Logistics Performance 60

TABLE 3: Regression Analysis Findings 1..... 63

TABLE 4: Regression Analysis Findings 2..... 63

FIGURES

Figure 1:Three Pillars of Sustainability..... 11

Figure 2:Sustainability Logistics Framework 12

Figure 3:Research Model Framework 45

INTRODUCTION

Rapid growth in the use of technologies in manufacturing is unavoidable. In today's globalized and highly interconnected world, companies have to cope with a growing number of constraints (Soysal & Bloemhof-Ruwaard, 2017). Companies and their supply chains as a whole need to foster initiatives that boost efficiency and sustainability in logistics and transportation to compete in today's highly competitive, volatile, and global marketplace. Since the benefits it offers, managing goods more efficiently has become a urgent action in terms of corporations and governments, especially as a means of lowering costs and improving services, as well as reducing environmental impact by reducing carbon emissions and traffic congestion (García-Arca et al., 2020). Consequently, academicians, industrialists and policy makers are focusing on sustainability dimensions (economic, environment and social) to take competitive advantage by reducing pollution as well.

The **novelty** of this study is to analyse the impact of environmental sustainable logistics policies on road transport in UK. In UK, a significant increase has been observed in green logistics practices in recent years. In both global and local competitive environment, companies aim to take their place at the top of the sector by adding prominent developments to their business policies. The concept of green logistics is also an issue that the world's leading logistics companies attach importance to. Companies that try to minimize the environmental damage of logistics in UK include green logistics in their supply chain processes. A sustainable, smart mobility strategy is being planned by the UK government, offering an opportunity never seen before. By improving energy efficiency or utilizing alternative fuels, such as hydrogen fuel cells, roadways will be able to figure out many of their current problems in the near future (Cai & Choi, 2020). The **research problem** for this study is to figure out the extent to which these sustainable policies and legislations will create and impact on UK's road transport sector. **The research questions** are: What is the impact of UK government's sustainable logistics policies on UK's road transport sector? Are there good examples of green logistics practices in another countries? What are the practices of companies claiming to implement green logistics?

The **aim of this study** is to investigate the effects of green logistics on logistics performance and is to figure out the potential impact of UK's green sustainable logistic policies on transport in general

The **research objectives** are respectively:

- To identify theoretical aspects of sustainable logistics concept and assess the impact of sustainable logistics policies.
- To provide a methodology of empirical analysis for impact of sustainable logistic policies on road transport sector in the UK.
- To analyse the relationship of sustainable logistics policy on road transportation through qualitative systematic analysis.

The **methodology** is based on review, questionnaire and analysis of the already existing data available in form of research journals and studies available on the credible sources. In the study, the data and indicators were prepared by presenting a literature review, and a questionnaire including questions about activities through online interviews with companies within the scope of field research. Additionally, sustainability reports of the green logistics sector, and related articles and news on the internet were used. The study will be on sustainable green logistics practices and green logistics indicators in UK. The research area of the surveys is limited to the companies operating in UK and where green logistics practices are observed. With the research, the status of green logistics practices in UK, how much and how companies include green logistics in their activities will be revealed.

The study will **contribute** to make the application of sustainable logistics policies by UK government smooth. By smooth it means it will elaborate the outcomes and consequence it might create on the end of direct stakeholders. These direct stakeholders may include logistics, company owners and the people directly under influence of them. The study will offer a realistic view of what can be good or bad impacts of these policies on road transport system as a whole.

The **structure of the thesis** is that after introduction section, the rest of thesis is arranged as in chapter 1, literature review on potential impact of UK's sustainable logistic policies on road transport are presented. In order to reveal the effect of logistics on climate change, firstly, the basic concepts of logistics are included. Then, the effect of logistics on climate change is mentioned in order to reveal the effects of logistics on the environment, especially on greenhouse gas emissions, at which stages of logistics activities. In addition, the role of green logistics in sustainable development has been mentioned because of its similarity in terms of dimensions and indicators. In this context, the definition of green logistics is given and the similarities and differences between green logistics and reverse logistics, green logistics indicators and the role of green logistics in sustainable development are investigated. Further on in 2nd chapter, using the quantitative approach and researched with the help using the quantitative approach and the data collected through the survey conducted through online interviews are presented as the methodology adopted for the present thesis. In this context, the situation of green logistics in UK, how much and how it is applied, is revealed based on the results of the questionnaire made with companies claiming to implement green logistics. After this chapter, in third chapter analysis will be done on the bases of review of literature and questionnaire results made with employees of road logistics companies in the UK. Lastly, conclusion based on review of the theoretical aspects and outcome of the empirical findings will be represented.

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1. LITERATURE REVIEW

The transport of people and goods is an essential part of today's economies, but there has been a growing awareness that more must be done to address the environmental impacts. A growing number of items are being produced, sold, and consumed across borders as economic globalization and regional economic integration become prevalent across the world (He et al., 2018). A major part of logistics' responsibility in bridging the gap between producers and the markets they service is to act as a catalyst for economic growth. Transporting things from one location to another is known as logistics. Basic transportation, storage, loading and unloading, handling, packaging, distribution and processing as well as recycling and information processing tasks are organically merged based on actual demands. and distribution processing. It is an economic phenomena that occurs when a certain industry combines the spatial distribution of its products with that industry's presence in a particular country or region.

Logistical space is a type of industrial space that relates to the geographic projection of urban logistical activities (professional marketplaces and markets, logistical enterprises, logistical nodes, and logistical infrastructure). Many logistical facilities were developed by the government in order to speed up urbanisation. To put it another way, this has generated a waste of logistics resources on the one hand and a rising contradiction in urban land usage on the other.

In cities like Athens and Madrid, where air quality is severely polluted by diesel trucks and bus exhaust fumes, 27% of wide greenhouse gas emissions came from transportation; 71% came from road traffic, while 44% was mostly from private cars (Chen et al., 2021).

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1.1 Sustainability Concept

The term "sustainability" was first used in the context of sustainable forestry, where it refers to never taking more from a forest than it can replace every year. In 1713, this concept of Nachhaltigkeit (the German word for sustainability) was first recorded. Preserving natural resources for the future is an integral part of conserving them (Kuhlman & Farrington, 2010).

Our Palaeolithic ancestors probably worried about their prey going extinct, and the first farmers probably worried about keeping the soil fertile. There have always been two schools of thought on how humanity should relate to nature: one that prioritises cooperation and harmony, and another that regards nature as an enemy to be defeated. It has been difficult for Western society to separate this perspective from its opposing viewpoint over the last few decades (Etzion, 2018).

Adapting to green logistics means incorporating advanced technologies and approaches that reduce fuel emissions and carbon footprints into policies and management. Chang and Qin (2009) argue that green logistics require innovative policies and management to achieve. Management has to make policies according to the requirement of sustainability keeping their competitors and environment in mind. Green logistics planning is not just about making your environment healthy it’s also about utilizing maximum resources and eliminating irrational planning.

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By incorporating environmental and social factors into policies, organizations gain a competitive advantage through green logistics, according to Sbihi and Eglese (2010). However, green policies need thorough strategic policy making along with setting long term organizational goals.

The lack of a universally accepted definition of sustainability and the widespread adoption of overlapping concepts as substitutes for the original are two of the field's most fundamental difficulties. Researchers struggle to operationalize and quantify sustainability without a common, agreed-upon concept. Clarifying sustainability-related terms and concepts was a top priority for Proctor and his colleagues when they developed their study agenda in the field. The widespread use of varying definitions of sustainability-related concepts hampers the advancement of this field and prevents duplication of efforts (Mulligan, 2017).

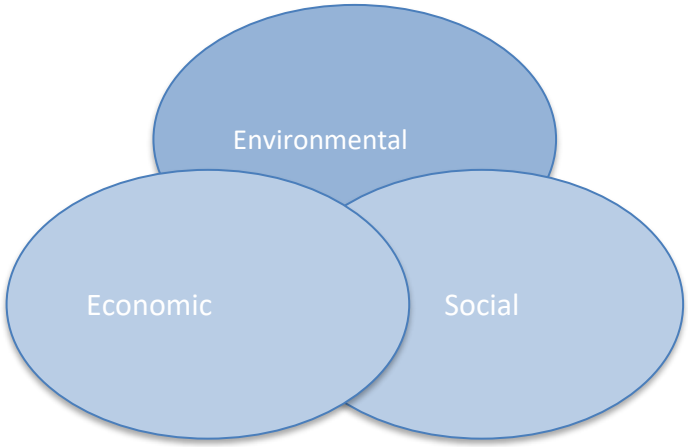
The word "sustainability" comes from the Latin sustinere, which means "to hold up" (tenere) and "sus" (up). Sustain can mean "maintain," "support," or "endure," among many other things, according to various definitions. The term "sustainability" was first defined in a United

Nations study in 1987. This document is known as the Brundtland Report, formerly known as Our Common Future (1987). A previous article discussed the environmental effects of corporate social responsibility. In the 1972 Club of Rome report Limits to Growth, the Club of Rome also argued that the world's finite resources cannot sustain the current levels of economic and population growth (Peattie, 1995).

In other words, sustainability means keeping things running well long-term. Environment sustainability differs from environmental sustainability. The triple bottom line of sustainability, however, focuses mainly on the environmental component (Moore et al., 2017).

Pillars of sustainability

The economy, society, and the environment are the three pillars upon which sustainability stands. The three parts shown in Figure 1 interact with one another. Kuhlman et al. (2010) discovered that the two are complementary and can work together. The primary goal of sustainability is to determine a method to moderate use of resources without causing irreparable harm to the environment, social systems, and economic viability. In addition to money and ignorance, uncooperative behaviour, and refusal to change, many systemic challenges hinder sustainability (Moore et al., 2017).



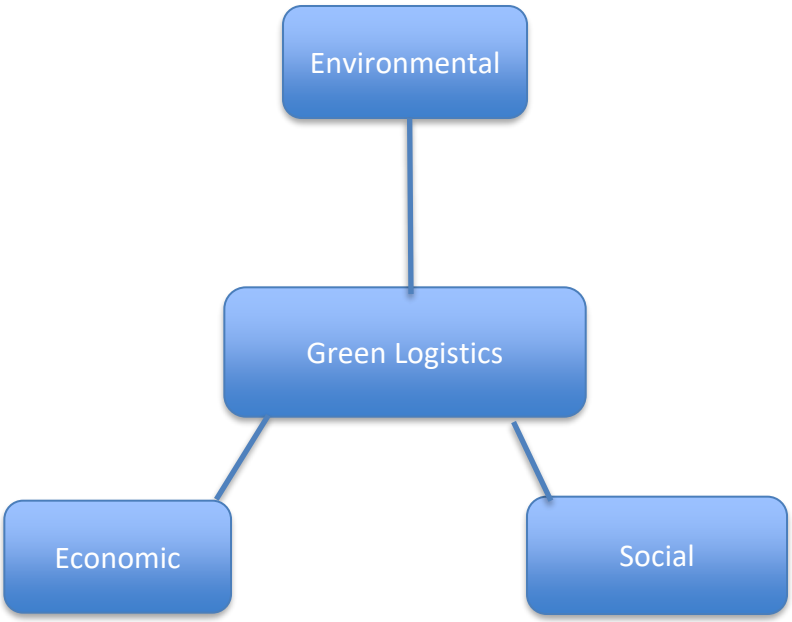
Source: Purvis, B., Mao, Y., & Robinson, D. (2019). Three pillars of sustainability: In search of conceptual origins. Sustainability Science, 14(3), 681–695.

Figure 1: Three pillars of sustainability

It can be also understood that, using systems thinking, understand that the environment is the most comprehensive system. The human system, which comprises the socioeconomic system, is a part of this larger system. When people of any size choose to organise themselves into a government, from a tribe to a nation, they are entering into a social compact designed to further their collective well-being.

This agreement solidifies the cohesiveness of the community's social and economic structures. The people (the social subsystem) are cooperating under a governing body to enhance the productivity of the economic system. The ecosystem's carrying capacity determines how much of a social good can be provided by the political system and how much economic production can be generated, hence protecting the environment must be prioritised above all else.

Applying the three tenets of sustainability to green logistics is depicted in Figure 3. Companies formerly coordinated logistical tasks such freight transport, warehousing, packaging, materials handling, and data collecting and administration to satisfy client needs at least cost (purely monetary). The environment is a major concern nowadays. It is taken into account as part of the cost. Some businesses already include in the hidden costs of logistics, including those related to climate change, pollution, and noise. Using sustainable logistics, Purvis et al. (2019) describes how environmental, economic, and social objectives can be balanced.



Source: Purvis, B., Mao, Y., & Robinson, D. (2019). Three pillars of sustainability: In search of conceptual origins. Sustainability Science, 14(3), 681–695.

Figure 2: Sustainability logistics Framework

1.2. Logistics Concept and Its Scope

Logistics is defined as the effective and efficient planning and implementation of the transportation of all kinds of products, services and information flows from the origin to the destination in order to meet the needs of individuals. The definition made by CSCMP, Council of Supply Chain Management Professionals, which is accepted as the most obvious and valid today, is as follows: 'To meet the consumer needs, all product, service and information flow from the origin (production place) to the end point (end final consumer) during the supply chain. Two-way movement is effectively and efficiently planned, implemented, transported, stored, and controlled (MEGEP, 2011).

An ecosystem of logistics activities includes the manufacturer, the manufacturer's customers, and the customer's customers of the manufacturer (Kanalcı, 2005). It is said that many global brands are able to continue their activities by preserving their presence in global markets by focusing on an effective logistics management targeting customer satisfaction and low cost. Their convenience has been maximized (Sezgin, 2008).

Logistics activities are in an important position in terms of both added value and sectoral share in GNP. This is an imperative task in marketing since it contributes to improving the business and welfare of consumers while directing products and services to many markets (Kayabaşı, 2007).

Logistics marketing, which enables to find an item or service that is sought around the world 24 hours a day, in a ready position to meet the need, is effective in achieving success in production and international trade. In societies with developed industries, logistics competence is of great importance and it is said that consumers have a desire to receive the products they buy as promised. A party making the most effective logistics planning in extraordinary situations is

likely to benefit significantly from the advantages provided by logistic necessity (Yardimcioglu et al., 2012; Akiş, 2016).

Sustainability Practices in Logistics

Logistics has an unavoidable influence on the environmental world. Logistics is a term used to describe the chain of events beginning with the procurement of raw materials and ending at the point of sale. Furthermore, Logistics is the management of resources, including inventory, equipment, and personnel. In corresponds to the procedure of ensuring an efficient movement of goods, services, and data from point of origin to point of consumption in response to market demand.

There are several points throughout the supply chain when logistical activities may have an impact on the environment. Air and noise pollution, increased risk of accidents, and increased greenhouse gas emissions are only some of the foreseeable consequences. As a standard part of the logistics process, waste products and packages are now repurposed, recycled, and disposed of (McKinnon, 2010). In today's world, forward logistics isn't the only environmental factor to consider. Reverse logistics must also be assessed (Martins et al., 2019).

Based on Ballou & Srivastava (2007), logistics systems can be categorized into key activities (such as the management of customer service levels, transportation, inventory, and information flow management). As part of support activities, warehouses are used for material handling, purchasing, packaging, and information management. Successful businesses recognise the strategic importance of logistics activities. Improving operational performance, integrating different parts of the organisation, and delivering high-quality logistics services are all essential components of any successful logistics plan. Additionally, businesses should take into account how logistics processes affect sustainability (McKinnon, 2010).

Using the intention of highlighting the significance of sustainability in logistics systems for business competitiveness, Eroglu et al., (2016) examined how the stock market reacted to the achievements of sustainability awards in logistics by select organizations. According to the data, the presentation of these kinds of rewards elicits a favourable response from the stock market.

This favourable response was also shown to be more significant than the response to other scenarios. This illustrates that investors see sustainability as a strategic aspect in a company's success.

According to Lu et al., (2016), incorporating sustainable practices into logistics operations has potential benefits. The influence of internal practises (related to communication) and the collaboration of external practices (regarding suppliers, customers and subcontractors) on sustainable performance of operations was investigated experimentally. The results showed that internal practises and external collaboration favourably impacted the business' long-term viability. A review of various types of transportation and their effects on sustainable management is also provided by Lu, Shang, et al., (2016). The results reinforced the assumption that external collaboration is positively connected with internal management, and that this positively improves the performance of sustainable logistics.

1.3. From Logistics to Green Logistics

There are many meanings associated with logistics, and it may be seen as an array of activities that ensure that certain goods are readily available on the market or at a specific location (Canıtez and Tümer, 2005).

Logistics, by its nature, is seen as the most important service activity wherever there is production and trade. For enterprises to carry out production activities, the company must purchase raw materials, store them in the right conditions, control stock, deliver the goods after production, and organize customs and insurance transactions. Logistics activities also include planning the transportation process, arranging for customs and insurance transactions, and even returning the goods to the final consumer.

Production and trade processes become more efficient with the help of logistics. However, on the other hand, logistics causes many externalities such as air pollution, noise pollution, accidents, vibration and visual invasion.

The issue of climate change is gaining momentum due to global warming, which has caused it to develop. In particular, freight transportation contributes to greenhouse gas emissions. Logistics activities, which make up 24% of global greenhouse gas emissions, contribute negatively to climate change. CO2 is a major greenhouse gas (Zengin, 2017). Environmental harm is caused by a wide range of activities around the world. Further, increasing the importance of green logistics is the fact that logistics activities account for a significant share of emissions (24%).

Due to the gradual reduction in raw material resources and environmental pollution, sustainable development has been able to be achieved. In 1987, the United Nations World Commission on Environment and Development published a report titled "Our Common Future" which introduced the concept of sustainability to the global public. WCED defines sustainability in this report as: "the ability of individuals and societies to ensure that the present can meet their needs without compromising the future generation's ability to meet their own" (WCED, 1987).

We must take some legal, economic, and environmental measures in response to the concept of sustainable development. Prior to discussing logistics, the supply chain concept should be discussed. An organization's supply chain consists of raw materials, auxiliary materials, labour, natural resources, capital, and technology that are brought together for the purpose of production, and they are delivered to production points at the best price and conditions. As a result of ensuring their inclusion in the production process, they must be delivered to the final customer at a cost and condition that are acceptable to them (Timur M. N. et al., 2013). Ensuring the continuity of processes by giving the least damage to the environment in the process from raw material to delivery to the final customer has revealed the concept of green supply chain. According to van Hock and Erasmus, environmental impacts occur during the product life cycle of a product. Consequently, green supply chain management is becoming an essential tool for companies to reduce their environmental risks and impacts as they increase market share and profits (van Hoek and Erasmus, 2000).

Green supply chain management includes green purchasing as well as integrated lifecycle management, which involves moving from suppliers to manufacturers to customers (Zhu, Sarkis, Lai K., 2008). The concept of green supply chain has also brought the green logistics phenomenon. Green logistics refers to maintaining supply chain activities in an eco-friendly way. Green logistics encompasses a variety of activities, including product destruction, returned products, and reverse logistics (Keskin, 2017).

When we look at the literature, it is seen that there are many different studies on green logistics. Several studies have been conducted on the Malaysian production sector. Chin, Tat, and Sulaidman found positive correlations between sustainability and green supply chain management (Chin, Tat, and Sulaidman, 2015). Zhu, Sarkis and Lai addressed on the five aspects of a green supply chain: internal environmental management, green purchasing, working with clients who have environmental protection demands, ecological design, and investment recovery. This company determined whether these five dimensions were applicable to their study, using a survey method. Also, they assessed whether implementing the proposed changes would have a negative impression on the business economic and operational performance. (Zhu and Sarkis Lai K., 2008). As a result of Lin Taiwan's study, logistics service providers in Taiwan have identified the factors that influence the adoption of green innovation in their operations. Using the survey method he applied, he determined that the factors were technological, managerial, and environmental (Lin, 2008). Based on Holt's study, it was found that internal dynamics such as legal regulations, management, and company culture significantly influenced green supply chain practices. This was applicable to manufacturers in England. This led to the conclusion that social pressure had the least impact. In their studies, Zhu, Sarkis, and Geng concluded that legal, competitive, and sectoral pressure has resulted in a significant increase in environmental awareness for the Chinese manufacturing sector, but that awareness has not yet been widely applied in practice (Zhu Q., Sarkis J. and Geng Y., 2005).

Using purchasing, performance management and collaborative activities Handson et al. (2015) examined green supply chain management. However, van Hoek and Erasmus concluded in their study that: Increasing the ecological efficiency of an organization and its stakeholders while minimizing environmental risks and impacts can help companies achieve their profit

margin and market share targets by using green sustainable (green) supply chain management (van Hoek and Erasmus, 2000).

Green Logistics Activities and Components

Green logistics is a concept about protecting the environment and, in general terms, it means conserving natural resources and finding renewable resources, minimizing carbon emissions and waste, and reducing a company's overall carbon emissions. It is essential to organize and coordinate all logistics activities in a way that respects the environment to achieve green logistics effectiveness. In this way, businesses aim for reduction in CO2 emissions, significant cost savings, increased supply chain optimization and increased operating performance.

When green logistics activities are planned and implemented effectively, they strengthen the control mechanism of the companies and play a key role in achieving the strategic goals of the organizations. Recycling, however, improves the image of the environment and makes better use of resources. Aside from reducing environmental risk, green logistics activities make businesses more competitive and increase their market share (Güvercin, 2018).

Green Supply Chain

Since environmental mismanagement has resulted in negative financial results, increased consumer awareness, and increased environmental application demands resulting from laws implemented by the state, businesses are now required to create an environmental strategy and adopt green procurement practices (İnce, 2013).

It is said to be a new broad-based innovation that enables businesses to reach their targets set in profits and market shares, by minimizing their environmental risks and impacts, as well as

Increasing environmental (ecological) efficiency while assisting in the creation of "win-win" tactics. In a green supply chain, the ecological balance is advocated, harmful effects of development are reduced, and value is created simultaneously (İnce, 2013).

According to researchers, green supply chains can increase profits for businesses and boost their competitive position (Zhu and Sarkis, 2004; Rao and Holt, 2005, Atrek and Özdağoğlu, 2014). Despite the benefits of integrated green supply chains in enhancing customer relationships, they can adversely affect the performance of companies (Chan et al., 2012; Atrek & Özdağoğlu, 2014).

Green Production Logistics

In green production, natural resources are not consumed, and pollutants are avoided. In addition to saving energy through reproduction, it also reduces production costs through waste reduction (Yangınlar et al., 2014, Bakan et al., 2017).

The number of resources consumed by businesses in their production facilities is on the rise today as a result of many significant agreements being signed. Namely, it has been said that these investments made in the production phase provide efficiency in the use of resources, reduce the production cost of the enterprise and have an advantage by paying for itself in a short time. While it enables businesses to make gains while producing, it also reduces the carbon footprints caused by the use of resources in the name of sustainability and environmental awareness, which is accepted as a social responsibility (https://www.capital.com.tr/. 2019).

Green Transportation Logistics (Logistics Management)

A key objective of this exhibition is to highlight efforts being made to minimize air pollution and carbon emissions caused by the increasing use of fossil fuels in recent years. To achieve this, alternative logistics models should be used, and the distance from the road should be kept as short as possible (https://www.tanktasima.com/, 2019)

Green Distribution Logistics

In the distribution process, it was stated that the products produced within the supply chain are of utmost importance in order to reach the consumer correctly. During this process,

customers have expectations of businesses, and interactions with the environment continue as in other processes (Tüfekçi, 2018).

Choosing the most effective and appropriate method of distribution is essential for a green distribution process to be successful. As a result, environmental damage will be minimized. Numerous products should be transported at one time, packaging space should be saved, and fuel consumption should be reduced during distribution (Turhan, 2010, Tüfekçi, 2018).

It can be said that distribution and transportation operations are the most effective and closest to each other on logistics networks. According to this theory, both the logistics network and the reverse logistics network are affected by decisions regarding transportation, control systems, and 'just in time' policies. In order for distribution to be as efficient and effective as possible, it is imperative that customers participate in the process of designing and developing it (Sarkis, 2003). From this point of view, it can be said that a system that has reached efficiency and effectiveness causes the least damage to the environment it interacts with while performing its activities.

Green Packaging Logistics (Handling)

We can say that it is also expressed in the form of green packaging. Using abundant natural resources, recycling materials, and conserving energy during production are required to protect materials against external influences (Tayfun and Öçlü, 2015).

Reports indicate that "green" packaging will gain traction in the future due to its emphasis on reducing packaging use and recycling packaging. In addition to consumers who are environmentally aware, attitudes and behaviours that suggest environmentalist tendencies are on the rise (Küçük, 2002, Tayfun and Öçlü, 2015).

The shape and size of packaging are critical factors to consider when packaging environmentally friendly products. Packaging made from recyclable materials can also be reused

multiple times. As a result, warehouses and trucks become more efficient, and the amount of transport required is reduced (Sarkis, 2003). In this way, the optimum number of products will be loaded on the trucks and the number of transport trips will be reduced and therefore carbon emissions will also decrease. Likewise, an environmentally friendly stance will be displayed with biodegradable or recyclable labels.

Green Marketing

As discussed above, green marketing can be defined according to a number of different names by different researchers (Soonthonsmai, 2001; Chamorro, et al., 2006; Çabuk, et al., 2008). In 1975, the American Marketing Association held a seminar called ecological marketing that introduced the concept of green marketing. In general, environmental marketing takes into account both the positive and negative effects of marketing activities on the environment (Erbaşlar, 2007; Çabuk, et al., 2008).

It is said that green marketing covers many activities such as product transformation, alternative production processes, changes in packaging, and changing advertising strategies. The increasing concern and interest people have in the environment indicates the importance of today (Pezikoğlu, 2010; http://apelasyon.com/, 2019).

According to Erbaşlar (2012), green marketing is marketing that takes into account the environment. According to him, it involves environmentally friendly and nature-friendly marketing activities to meet consumer needs and desires. Making positive contributions to the environment and meeting the economic needs of an organization will help the company gain social acceptance. Hence, sustainability is also assured for the company. As much as possible, the environment and society should not be harmed while meeting demands.

Additionally, Warner's 1996 paper (Erbaşlar, 2012) determined that green marketing encompasses four stages: sustainability targeting, sustainability strategies, sustainability products, and social responsibility promotion.

Phase 1: Green Targeting; products that are thought to cause minimum harm to the environment are designed.

Phase 2: Developing Green Strategies; It can be expressed as taking measures to minimize the damage to the environment as an outcome of the enterprise production.

Phase 3: Green Product Production; At this stage, the production of products that will have the least damage to the environment, which is called green, is ensured.

Stage 4: At this stage, the enterprise has reached social responsibility awareness in every field, in addition to green or environmentalism.

Waste Material Logistics (Reverse Logistics)

Lambert and Stock were the first to define reverse logistics, which is defined differently throughout the literature (Rogers and Tibben-Lembke, 2001; Karaçay, 2005).

As the name suggests, reverse logistics; It has been defined as the importance of a product going forward on a one-way street and going in the wrong direction. In the 1980s, it was stated that reverse logistics was only in a journey from the customer to the manufacturer. Based on Stock's 1998 definition of reverse logistics, the function of logistics is to reduce resource consumption, recycle, substitute materials, repurpose materials, remove waste and incinerate waste, repair, and remanufacture (Karaçay, 2005).

Reverse logistics was first defined in the 1990s by the Council of Supply Chain Management Professionals (CSCMP). An indirect logistics process is defined, in this context, as the process of reclaiming raw materials, inventory in the process, finished goods, and information about them. It also includes controlling the flow from consumption to production in order to properly dispose of them or reclaim them. In this way, the inputs subject to production are recycled from the outputs that have completed their life, and it is possible to sustain natural resources.

Recycling activities give companies that use them a competitive advantage in some cases, particularly when it comes to protecting the environment worldwide. It is increasingly imperative to realize this application through reverse logistics activities (Fettahlıoğlu and Birin, 2016).

Stock Management and Storage

In logistics activities, stock represents one of the largest cost items. By maintaining an optimal level of stock, you will reduce costs and increase efficiency. As well as reducing raw material and finished product stocks, reasonable stock levels will also reduce employee heating and cooling costs (Dey et al., 2011). Cross-shipping will also provide positive results when applied to products that enter and exit quickly. Energy savings can also be achieved through lighting. In other words, it is recommended that natural light is incorporated more effectively in buildings, as well as the use of energy-saving lighting (Çamlıca and Akar, 2014).

Green Transport Operations

The necessity of transporting millions of products every day and the fact that transportation vehicles work mostly with fossil fuels increase the emission of greenhouse gases such as CO2, and this emission problem causes problems that threaten the environment and human health, especially global warming and climate change. (Erol and Özmen, 2008). Businesses are trying to reduce fuel consumption and gas emissions in order to both reduce costs and create an environmentalist perception in the eyes of consumers. (Figliozzi, 2010). In addition, agreements signed on the international platform also have sanctions on companies.

This threat requires the selection of transportation vehicles, routing, maintenance, repair, and inspection that are appropriate for the situation. As a way to mitigate fossil-oil consumption and carbon emissions, carrying out activities efficiently, minimizing transportation distances, and reducing traffic around the store are practical ways to reduce fuel consumption and carbon emissions. It is possible to develop measures (Erol and Özmen, 2008).

Millions of tons of goods are transported every day by the transportation sector, which is essential to economic and industrial growth. While it plays an integral part in our lives, it also contributes significantly to air pollution due to its high consumption of petroleum products (Salimifard, et al. 2012).

Bjorklund describes "Green Transport" as having a less or lesser impact on human health and the environment as compared to its competitors (Bjorklund, 2011).

Today, the environmental damage of motor vehicles, in general terms, the automotive industry, is being reduced day by day. The most influential factor in this regard is the exhaust emissions released by motor vehicles to the environment, in this context, efforts to reduce greenhouse gas and emission rates bring positive developments. One-fourth of the world's carbon dioxide emissions are attributed to the transportation sector, according to the study. In this regard, transportation is of crucial importance (Gültaş and Yücel, 2015)..

Although it is wrong that green transportation imposes all the responsibility on trucks and lorries, which are the backbone of transportation processes and which are constantly in sight in our daily lives, today, automotive companies that produce environmentally friendly vehicles are expected to replace their vehicles with new ones in old models with high carbon emissions, reduce carbon emissions, as well as reduce fuel consumption, which is the need and energy source of vehicles. In addition to changing vehicles, the drivers who use these vehicles should be provided with training on "eco driving". If we look at maritime transport, we can say that while the amount of product carried on the rail has increased, the rate of "transported product / emission release" has decreased thanks to the ships produced in modern shipyards and with advanced engineering. In air transportation, on the other hand, thanks to the developing technology, the production of aircraft that can consume less fuel reduces the emission rate and increases the profitability of the companies. In the warehouses in the logistics processes, electricity, water, natural gas, etc. Increasing the use of environmentally friendly and renewable applications such as wind, solar energy, geothermal energy in the consumption of resources, replacing the transportation vehicles used in the warehouse with vehicles based on electricity consumption instead of carbon-emitting derivatives show that green transportation is supported. Additionally, the use of intermodal and multimodal transportation and railways for transportation are factors that affect green transport (https://www.emreipekci.com/, 2019).

In economics and social development, green transportation has become an irreplaceable sector, according to Salimifard et al. (2012). The scientific community, states, and communities

have taken action despite the negative impact of carbon emissions on the environment. They stressed, however, that more work needed to be done.

Green Transport Procurement

Transportation is an important turning point in the formation of urban design and livable cities, thus laying the foundations of a livable world. These green transport options make our lives easier, reduce congestion, reduce our dependence on cars and oil, are safer and less costly, help save the planet and make life more enjoyable. The greenest and most sustainable forms of transport are trains, bicycles and walks. Some of the best and fastest trains in the world have been operating in Europe for over 25 years and in Japan for over 40 years. These include Eurostar, French TGV, Japanese bullet train; and also regional trains, monorails, light rail, trams, and public transport. Many countries use electric trains for transportation on a daily basis. They are also the most powerful transport options available today, solving mobility problems, energy problems, environmental problems, and health problems (http://www.urbandesign.org/, 2019).

We can name the concept that we will call green transportation procurement as the provision of services such as the services provided by the companies that will be provided by the companies, such as the services provided by the 3rd party logistics service providers, the companies performing the transportation operations.

For instance, Nestle, can achieve many advantages by purchasing transportation services from logistics companies in Turkey, while also contributing to green transportation (www.lojistikhatti.com/, 2019).

Green Logistics Operation Examples in the Efficiency of International Transport and Country Assessments

Especially in developed countries, green logistics practices have an influential place when examining examples from around the world. A transportation infrastructure plan is also part of their planning process. Green logistics has become a major market for European countries

among developed nations. Switzerland uses cargo trams as an example of an environmentally friendly vehicle. The Netherlands uses city distribution systems for electric vehicles. In collaboration with private and public partners in Germany and Sweden, the Freight Transport Platform offers coordinated transportation and logistics services.

A "silent night distribution system" was implemented in Barcelona using trucks with a maximum capacity of 40 tons. From 11 a.m. to 5 a.m., these trucks were permitted to drive twice since they were equipped with noise-cancelling systems. A cold air chain transfer of short-lived goods took place at 5 o'clock in the morning, while transfers of long-lived goods took place at 11 o'clock at night (Güvercin, 2018).

With a law enacted in Paris in 1999, vehicles longer than 12 meters were prohibited from entering the city from 7 am to 7 pm. In Rome, on the other hand, since there is a historical region in the city centre where distribution works are concentrated, most of the distribution works in the region are carried out by making illegal parks. Under an agreement, trucks over 3.5 tons are allowed to drive within the city from 8 p.m. to 7 a.m. Dublin and London, among many other cities, have night distribution systems (Zengin and Öcalır Akunal, 2017).

The use of technology is important in green logistics applications. Depending on the development of technology, information systems are also used in logistics applications, in order to carry out the cargo transport activities faster, the entrance and exit of the ships to the ports are made over the internet. An Italian traffic management support system transported by water was used for a green logistics application in the Netherlands (Güvercin, 2018).

When we look at the practices specific to the company, it is seen that many logistics companies implement green logistics activities and ensure the effectiveness of transportation activities. For example, DHL, one of the largest logistics companies in the world, has important studies in the field of green logistics.

DHL is an international company founded in USA in 1969, was acquired by Deutsche Post in 1998-2002 and operates in 220 countries worldwide. Providing express delivery, freight

transportation and storage services by plane, truck, ship and train, the company employs more than 285,000 people. The company has projects called 'Go Green' within the scope of green logistics. In this context, one of its most important strategies is to reduce carbon emissions by 30 percent in 2020. Additionally, the effects of harmful carbon dioxide gas emissions on the environment are reduced during the transportation and storage of goods with optimized transportation routes, alternative vehicles, energy efficient warehouses. On the other hand, detailed carbon reports are prepared to show where customers stand in terms of gas emissions. Although the environment is mostly affected by carbon dioxide gas emissions in the logistics sector, information is also given about the emissions of other greenhouse gases such as methane and nitrogen oxide. In addition to reducing greenhouse gas emissions, the green optimization service guides customers in finding improvement areas (Keskin, 2017).

CEVA Logistics Inc. Founded in the UK in 1976 and headquartered in the Netherlands, CEVA Logistics opened its Turkey branch in 2006. CEVA, serving with more than 41.000 employees in more than 1,000 locations in 160 countries, periodically prepares sustainability reports within the scope of green logistics. The company has certifications on quality management and environmental compliance. The reduction of carbon dioxide emissions has resulted in a reduction of over 52,700 tons since 2014. The organization's structure is trained on environmental issues to strengthen its green perspective and provides the Consumer Satisfaction Survey to its customers, which allows them to gain an understanding of the company's economic, social, and environmental approach from a consumer perspective (Zengin, 2017).

Mars Logistics Inc., a company in Turkey with green logistics activities founded in 1998. Mars Logistics has a fleet of 500 vehicles with automatic transmission with Euro 5 engines, which are less harmful to the environment. With the tire fleet management system, fuel consumption is reduced by using longer-lasting tires. Along with the number of waste tires, carbon dioxide emissions are also reduced. On the other hand, wastes generated from company activities are also disposed of within the company. Packaging wastes are given for recycling. Wastewater is discharged and left to the city sewerage network. After the intermodal transportation system, which was put into practice in 2012, which provides approximately 75%

less carbon emissions compared to road transportation, 2 million 374 thousand trees and 5.9 hectares of forest area were saved. Although Mars Logistics' fleet has grown and the number of trips has risen, it reduced carbon emissions by 7.7 percent in 2016 (Transmedia, 2017).

Ekol Lojistik A.Ş. started its operations in 1990 and has become to be one of Turkey's most respectable logistics enterprises. In addition to international transportation activities, it provides services in contract logistics, national distribution, forwarding services, customs clearance and foreign trade management. The company has important activities within the scope of green logistics. The first of these is the block train project, which was developed in 2008 in order to minimize carbon emissions. A round trip of 7,000 kilometres on the highway on this project will take just 2,000 kilometers. A green office program, implemented by WWF (World Wildlife Fund) in 2010, helps Ekol Logistics conserve electricity and water. Meanwhile, its waste management practices reduce the impact of its activities on the environment (DOĞAKA, 2018; Zengin, 2017).

The green logistics activities and projects of OMSAN Logistics have made the company one of the most prominent in Turkey. In the logistics field for 36 years, the company was founded in 1976 and has its headquarters in Istanbul.

OMSAN Logistics has invested in 51 tractors and 50 semi-trailers that are environmentally friendly, produced with the latest technologies, and have low fuel consumption. Since the weight of the semi-trailers is lower than the existing trailers, higher tonnage loads can be transported, and the damage to the environment due to transportation is minimized. Environment and Energy Friendly Driving Techniques Trainings were held for a total of 200 OMSAN drivers. Considering the results of the first group of drivers who were trained, the fuel consumption rate of the vehicles decreased from 0.3451 lt/km to 0.3322 lt/km, resulting in a 4% improvement. The amount of CO2 emission was reduced from 832 gr/km to 801 gr/km, and a 4% improvement rate was achieved.

OMSAN is the only company authorized to collect, transport, and deliver waste oils within the Waste Oil Control Regulation to PETDER (Petroleum Industry Association). OMSAN

works in full compliance with International Health-Safety and Environment rules with 15 tankers that have ADR norms. Moreover, it aims to establish a clean environment for future generations by promoting environmental awareness. By arrangement with an Austrian company, Ökombi, the company used rail transport instead of the road on the Hungary (Szeged)-Austria (Wels) line instead of road. In this way, the release of approximately 2000 tons of carbon dioxide to the environment has been prevented. In addition, OMSAN has added zero carbon emission electric vehicles to its fleet and established charging stations in its building. In addition to reducing energy consumption, the automated sorting technology has also resulted in high efficiency in sorting the goods in its largest warehouse (Zengin, 2017).

1.4. Sustainable Logistics Policies

More than half the world's population now lives in cities. As urban populations grow and economies expand, innovative approaches to logistics are needed for urban logistics (UL). They also negatively affect traffic, the environment, safety, and amenity, despite contributing to the preservation and maintenance of urban lifestyles (Zawawi et al., 2018). The growing importance of sustainability, the demand for faster supply chains, and the expansion of e-commerce and the sharing economy are all factors that raise the importance of urban logistics.

Freight transport in metropolitan areas is notoriously difficult because of the many relevant stakeholders, sometimes their competing interests, the complexities of the routes used, and the wide variety of items involved. Urban logistics as a field of study focuses on sustainable solutions to urban freight transport challenges. In order to achieve long-term sustainability, policies and practices must be implemented (Melo et al., 2014).

In McKinnon et al.'s (2012) study, organizations can make their logistics more sustainable by following three strategies. The researcher distributes these three ways into three levers to decrease organization’s carbon footprint. First lever is consisting of all the operations that include freight transport intensity in this lever organizations have to consider their oil emission as cost, so to decrease it they have to lay low on fast delivery and insisted on bundling up a bit so deliveries can be done when they have enough delivery for a particular area. As an

alternative to McDonough and Baumgart, (2002), this part includes their reverse logistics/recycling approach which emphasizes zero waste. Second lever is about fright modal split which includes all the larger scale modes for transportation.

Using large-scale transportation modes, such as railways and ships, can reduce transportation costs and carbon footprints, according to a study by Woodburn & Whiting (2012). Additionally, the lever stresses that vehicle utilization is low in Europe at below 50% (EEA, 2010). Mostly, after deliveries vehicle rides back empty. This can be eliminated by providing a logo on the vehicle so they can be visible, and customers can approach for cargo so they may carry one or two parcels which is better than empty.

Sustainable transportation is a vital aspect of the construction industry, according to Marcucci & Danielis, (2008). As per their research Urban Consolidation Centre Scheme (UCCs) is one of the best policy construction organizations should use to increase sustainability in their transportation activities. They will act as a bridge between the Plant and the construction site. The UCCs will hold material for future use as well as un-used materials can be sent back easily instead of being discarded.

1.5. Digitalization

The digitalisation of mobility has the potential to be both an enabler and a catalyst for creating more sustainable road networks. Artificial intelligence (AI), sensors, cameras, and connected vehicles all help generate data that can then be accessed by online apps that allow users to provide feedback about their experience with these new technologies in order to create better options going forward as well. Especially with regard to automated features within cars, 5G corridors will offer great prospects, especially if they are developed, as you could operate your car autonomously in certain situations, such as during an emergency or accident (Tao et al., 2020).

Solutions like data and digital tools can provide valuable assistance to sustainable road transport. Smart traffic management systems, for instance, could contribute to combating climate

change by improving logistics across the entire transportation system and multimodal mobility (for example, gas/electric cars, seamless connectivity between modes of transportation) (Chen et al., 2021).

Connected Car Systems provide users with greater insight into how much fuel was used per mile driven based on GPS tracking information from their vehicle's computer chip; this allows passengers to not only know where all members are but also how much fuel was used per mile driven. The introduction of automated mobility could revolutionise how we commute and reduce car dependence by providing greener options that are more accessible. As a result of a life-cycle assessment, we can also obtain a more accurate understanding of the impacts our motorized vehicles have on the environment, as well as a more comprehensive understanding of sustainable alternatives to motoring, such as bike sharing and electric cars (Tao et al., 2020).

The digitalization of mobility is an enabler for sustainable road transport. As a consequence of the lack of data and coordination required to create seamless experiences across modes and regions, local apps and multimodal solutions fail to inform users about other options, resulting in unnecessary fragmentation and duplication (Tao et al., 2020). The digitalization and there are so many factors involved, such as climate impacts plus what people might need when switching from one form over another process made more complicated by having. As part of this strategy, drivers may be encouraged to walk around town on low-accident days (Li et al., 2021).

Using an analysis of why organizations and individuals need AI in their transportation, Wang (2020) outlined the necessity of AI in vehicles. It will enable users to analyse their fuel emissions and organizations can keep a track on their footprint. This technology can enable the logistic organization on how much they spend on their fuel at a single transportation route. It will also shed a light on the phenomena of empty returning truck. When a truck return empty by delivering all the goods they were still adding a cost of fuel which is usually not included in expenses.

An automated engine can gauge the amount of fuel that is wasted on empty trucks returning to the refuelling station, according to Chen et al., (2021). It will provide a road map for

sustainable logistics and pinpoints where the change is required and what is needed to be change first. However, it can also help during transportations by providing weather forecasting and infrastructure issues of the route. By this information transportation can be done efficiently with more reliability. It will give benefits to the management driver and customer by providing relative information about their logistics. Furthermore, GPS will enable the driver what route is best for a particular delivery in a particular area.

1.6. The Relationship Between Sustainability Strategy and Logistics Performance

There has been a rise in interest in sustainability and environmental issues in logistics and operations literature, according to Dey et al., (2011), BCG, (2009), Rao and Holt, (2005), Porter and Van der Linde, (1995) (Parizandeh and Jafari, 2013).

According to Gürül, sustainability can be seen as combining three dimensions: environmental (ecological), social, and economic (Tuna, 2014; Gürül, 2016).

The concept of sustainability was described by Basiago (1995) on the basis of economics, ecological sciences, social sciences, and ethics. In addition to future-oriented, justice-based, global environmentalist, and biodiversity-based perspectives on sustainability, four key elements have also been identified (Bayraktutan and Uçak, 2011).

Today, it is seen that some strong international companies give importance to green supply chain and green logistics by looking at the methods they apply. Companies have increased their efforts to ensure the sustainability of their products and services through all production stages in parallel with the development of society's consciousness levels (MÜSİAD, 2015).

In his study titled “Sustainability and Sustainable Development: A Literature Review”, Yeni examined sustainability and sustainable development concepts and evaluated the convergence, strengths and weaknesses of neo-classical and ecological economic movements with these concepts within the framework of sustainability. Accordingly, it has been said that the sustainability problem of neo-classical economics focuses on how sustainable it can be by

consuming limited natural resources, but it has never been understood that it has never addressed the environmental and social dimensions in detail. Neo-classical economics began to change its view of the environment with regard to sustainability after the negative effects of environmental problems on human life and economies became apparent (Yeni, 2014).

Fettahlıoğlu and Birin (2016) discussed reverse logistics, sustainability, and sustainable marketing, three concepts that have become increasingly popular around the world in recent years because they raise economic and environmental consciousness. Reverse logistics plays an instrumental role in enabling companies to gain cost and competitive advantages through recycling activities.

A research agenda by Dey et al. (2011) concluded that companies need to create sustainable strategies due to factors such as resource constraints, global warming, greenhouse gas emissions, and consumer health.

The study by Beken (2016), “Is Green Logistics the Road to Sustainability and Competitiveness?” point out that the concept of sustainability is at critical levels and is expected to affect competition as environmental consciousness becomes increasingly significant as a result of the harsh competitive environment in today's market and its changing shape on a daily basis.

Corporate sustainability, as defined by Turhan and colleagues (2018), is an assessment of firm performance in light of organizational theories. Using each theory's analysis and methodology, this paper advises that using corporate sustainability as a strategic tool.

In his study Mangır (2016) evaluated the sustainability impact of fast fashion on textiles and other supply chain industries as it pertains to the fashion industry and textile industries together. Companies must change mass production and consumption habits to become more environmentally friendly and focus on sustainability.

In their study, Fettahlıoğlu and Birin (2016) used the analytical hierarchy method to regulate the sustainable marketing activities and reverse logistics activities of an enterprise in the

plastic manufacturing sector in Kahramanmaraş by recycling packaging waste. According to the study's subjects, even though they don't earn a specific income, they cannot implement environmental initiatives since they don't earn an income. It is possible to reduce the damage to energy and natural resources while reducing the material costs of the company through recycling.

The relationship examined during the case study was detected by Sharma and Vredenburg (1998) using an online survey. As a result of the study, it was found that proactive strategies against uncertainties arising at the interface between business and ecological issues were associated with the emergence of unique organizational capabilities.

Holton (1999) describes performance classification as bias in every appraisal model. Performance cannot be interpreted in a single way. The dimension of performance requires an integrated model encompassing multiple performance levels, indicators, and subsystems (Altun and Memişoğlu, 2008).

The performance measurement system is focused on providing a balanced way of producing information that is essential for companies to reach their goals and achieve success. According to the article, performance management activities can help identify and improve problematic activities by implementing them in areas that play a critical role in the company's success. As a result, logistics activities should be designed to ensure effective and efficient implementation in order to enhance the company's competitive capability (Kayabaşı, 2007).

According to Lau (2011), the World Bank created the logistics performance index in 2010 to enable comparisons across industries and nations. It sheds light on the difficulties of green logistics practices in developing countries such as China, despite the fact that he did it in order to overcome the challenges. These difficulties are:

- The demand on producers to become more eco-friendly has diminished as a result of the inadequate perception of sustainability and environmental preservation.
- Due to unclear environmental laws, legislation, and guidelines, such as the European Community's directives on the disposal of electrical and electronic waste and on the limitation of

toxic chemicals.
- R&D and clean tech spending should be controlled in terms of enhancing capacity and generate scale economies.
- Intense attention on fairly low-cost manufacturing and its reward in the short time frame rather than the rewards in the long time period in order to maintain competitiveness in global marketplaces.
- Lack of resources, expertise and management experience in green supply chain management, especially for small producers.

Based on a case study at DHL, Cosimato and Troisi (2015) examined how logistics organizations deal with ecological challenges and how developing green technologies enable them to be "green and competitive". Developing a sustainable and environmentally friendly approach to supply chain management, quality, safety, performance, and energy efficiency, coupled with a reduction in costs, has been suggested to increase the ecological impact of the core activities using green technologies, emerging in logistics innovation. As a result, it was stated that green logistics management not only improves operational and economic performance, but also improves long-term competitiveness.

According to Buysse and Verbeke (2003), 197 Belgian businesses manage stakeholders effectively. As a result of the findings, it has been revealed that companies need more efficient resources to increase their proactivity in a meaningful way. Secondly, they suggested a role for voluntary cooperation between firms and government, where the presence of more proactive environmental strategies provided deep and comprehensive assurance to stakeholders, and finally, the growing importance of environmental regulation and environmental leadership did not converge.

The authors of the study (2013) used an online questionnaire to collect data from logistics managers at Swedish service companies using a Likert scale with five options (with extremes such as strongly disagree and strongly agree). As part of their study, Pazirandeh and Jafari (2013) evaluated the effects of greening efforts on logistics efficiency and efficiency, as well as whether greening efforts were related to the implementation of high-level sustainability

strategies throughout the organization. As a result of their research, they have reached the conclusion that companies acting with a sustainability strategy increase their logistics efficiency and productivity by making their logistics activities such as transportation and purchasing environmentally friendly. They also said sustainable strategies enhance supply chain performance. Enhanced vehicle use is considered a good way to harmonize economic and environmental performance, as resources are used more efficiently. In other words, improving environmental performance leads to increased productivity.

It is revealed that Lieb and Lieb (2010) analyse the sustainability objectives of third-party logistics companies and their impact on their customers as a result of these initiatives. They also examine how third-party logistics services were affected by the recession in 2008-2009. The findings reveal that almost all of the companies surveyed have made significant commitments to environmental sustainability goals over the past few years and have initiated a wide variety of related projects that have had a very positive impact on these companies. Also, despite the recession, none of the third-party logistics service providers reduced their commitment to these goals. This period is said to have been filled with sustainability projects. Customers using third party logistics service providers are increasing their interest in the environmental sustainability capabilities of third-party logistics service providers.

A company's performance can be measured through logistics, as it helps them understand what they have accomplished and what they need to improve (Akdoğan and Durak, 2016).

Using carrier transit time performance, Tyworth and Zeng (1998) measured logistics costs. Unlike existing approaches, this method allows users to develop accurate measures when non-normal shapes characterize the probability distribution of both demand and lead time. In the study, it is stated that the performance of logistics companies is measured in seven dimensions and the dimensions are value, finance, promotion, people, growth potential, compensation for commercial damage and bureaucracy. Lead time, inventory maintenance, and shipment were performance indicators (Akdoğan and Durak, 2016).

The performance of the logistics network and the shipper was evaluated by Aziz, et al. (2010). The study examined factors that affect third-party logistics performance, how these factors impact third-party logistics performance, and how these factors affect relationship performance. The five factors that affect inter-organizational performance in third-party logistics are as follows.

- Trust (Commitment): knowledge sharing, purpose alignment, power-based imbalance in favour of carrier and trust.
- Adaptation: Based on supplier dependencies and learning orientations.
- Conflict resolution: According to control and relational norms.
- Compatibility: Based on planning capabilities, use of "Information Technologies" and management structure.
- Communication: Based on quality and formality.

They identified five sections that affect traditional handling performance in Bowersox et al. (1989). Asset management, costs, productivity, and quality are among the factors they consider (Fawcett and Cooper, 1998; Mutlu and Lalmez, 2017).

An eco-friendly logistics concept was considered in Rad and Gülmez (2017) study in order to ensure sustainability. In this context, with the increase of factors such as intensified carbon emissions and global warming, businesses have also increased their efforts to ensure environmental sustainability, and many companies are forced to reduce these emission values. For businesses that want to bring their strategies to the forefront as environmentally friendly, green logistics processes come across as important points and ultimately provide a competitive advantage to businesses. Operations that will provide social, economic and environmental sustainability are closely related to the logistics sector. Minimizing the damage caused by the sector to the environment can only be achieved by adopting effective strategies for sustainability. In this context:

- Environmentally friendly and efficient distribution and transportation systems should be utilized.
- Packaging processes should be reduced by the processes used here

- Recyclable materials should be preferred in packaging
- Staff should be trained
- Inform customers and consumers
- Reverse logistics program should be encouraged
- Environmentally friendly technologies should be preferred for vehicles and engines
- Vehicle emissions should be checked on a routine basis
- Processes such as stopping the use of vehicles with high emission values should be implemented.

Green logistics procedures have been argued to be critical for providing a competitive edge for companies implementing them sustainably. From this point of view, it is seen that our research supports the hypothesis of "Sustainability Strategies of Firms Affects Logistics Performance Significantly and Positively" and it also affects the logistics performance of firms. In a study by Akdoğan and Durak (2016) estimated marketing and logistics performance of 153 German and Turkish logistics companies the Logistics Performance Index created by the World Bank was used. Thus, it was stated that the performances of these two countries were compared. German companies are said to have a better infrastructure. They provide high-quality services, low logistics costs, and competitive advantages for companies. It has been determined that some expressions reduce the variable explained in the marketing performance scale.

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1.7. The Relationship Between Green Logistics and Logistics Performance

According to Martinsen and Bjorklund (2012), the green logistics market structure contains gaps among customers and suppliers. These spaces are consumer expectations - marketers' perception management gap, marketer's inner emptiness; management perception, service quality specification gap, marketer's internal gap, service quality specifications-service delivery gap, marketer's internal gap, service delivery-external communication gap, consumer internal gap, expected service-expected service gap. In this regard, by examining the positive and negative aspects between both points, potential new opportunities in the market were evaluated

National and international challenges include reducing harmful environmental impacts. Sustainable development concepts and principles, as well as green logistics methods and principles worldwide, are essential to solving this problem (Rakhmangulov et al., 2017).

Tao (2001) suggests seven components of green logistics: green supply chain logistics, green production logistics, green transportation logistics, green packaging, and green distribution logistics.

According to Dey et al. (2011), sustainable transportation, storage, information flow, and protective packaging design are critical tasks (Özkök and Yardimci, 2016).

Green logistics practices were examined in Korucuk's study (2018). It was emphasized that green logistics practices are of great importance in determining competitiveness and performance. He found that green procurement practices improve competitiveness in addition to green logistics, packaging, and reverse logistics (Korucuk, 2018).

As part of Shang's (2004) study, he analysed the financial and logistics performance of 1200 Taiwanese manufacturing companies. As a result of the study, overall measurement capability (functional measurement, total cost analysis, and customer-oriented measurement) significantly impacts benchmarking ability and logistics performance, and benchmarking capability is regarded as the most critical factor in logistics performance. In addition, it has been defined that the general measurement capability also indirectly affects financial performance as it affects logistics performance and benchmarking ability, and there is also a positive relationship between benchmarking ability and financial performance.

This study produced the following results as a result of the conceptual framework and literature review:

- Green Logistics significantly and positively affects logistics performance.
- Green transportation operations, one of the sub-dimensions of the Green Logistics variable, affect logistics performance significantly and positively.
- The purchase of green transportation, one of the sub-dimensions of the Green Logistics variable, affects logistics performance significantly and positively.

1.8. Impact of Sustainable Logistics Policies

The impact of introducing policies which emphasis on choosing sustainable transportation techniques will provide wide range of benefits for the organization. Various studies have shown that customers prefer companies that are concerned about the environment over those that harm it (Smokers et al, 2014). It will provide a competitive edge over the competitors along with providing cost reduction in some areas. By implementing policies like recycling companies can eliminate tons of waste along with decreasing their raw material cost.

As well as reducing energy consumption, bundling goods will decrease costs and carbon footprint, according to WEF (2009). However, in fright transport intensity package design places an important role, by making eliminating excess air from the package, the parcel space can be reduced which will impact on the capacity of transport.

Researchers found that sustainable logistics policies have positive long-term effects on an organization, according to Smokers et al. (2014). Initially, companies can face some amount of set back while changing their practices from normal to sustainable transportation. However, after some time these policies will provide positive impact on profits and brand image. .

According to ALICE (2013), a combination of modes of transportation is preferable to using a single mode of transportation in freight transportation. In their research paper the author has emphasise on the impact of using the strategy on day-to-day unit emission cost. As per the research, introducing a mix of larger scale of transportation like railway and ship, companies can lower the per unit cost.

Many research has shown that organizations considering increasing sustainability in their operations are now more focus towards railway and waterway infrastructure transportations. By doing so, they are using term synchronization in their transport related operations. This approach is showing some positive results on both scales increasing profits and decreasing carbon footprint. Researchers associate this approach of synchro-modality (ALICE, 2013).

Changes in vehicle usage are common when policies change from normal to sustainable. In many countries transport vehicles are sent out to deliver the cargo or parcels however, mostly or all the time they return empty, and organizations are not calculating a cost of an empty returning truck. Besides, it is considered as an achievement that the truck is returning empty. Whereas no one is calculating an emission cost on an empty truck. Using transportation systems to avoid returning empty exchanged products or materials that need to be delivered to another warehouse will lead to improved profit margins and sustainable transportation initiatives (Chen et al., 2012).

Sustainable policies have a considerable effect on organizations, according to Lan et al. (2020). In addition, they demonstrate how policies benefit organizations and the environment. These sustainable policies also significantly effect organizations by providing a competitive edge in the market. Customer will start to trust those organizations that are more sensitive in their approach towards environment. Besides, all the changes company have to go through to introduce sustainable logistics it will provide a more stable and emerging company in the market.

Organization management can benefit from implementing sustainable logistics policies, including decreasing costs, increasing profit margins, improving customer brand recognition, reducing wastage, enhancing material, and reducing fuel emissions (Qaiser et al., 2016).

1.9. Major Factors and Their Impact on Road Transportation

Road transportation is affected by many factors. Over the years these factors have change and evolve with the time. Some major factors that influence road transportation include individual, economic, environmental, vehicle and social factors. Research conducted by Melo et al. (2011) found that road transportation offers the most flexibility, efficiency, user-friendliness, and reliability compared to other modes of transportation. In this research we will emphasis on economic, environment and social factors and their impact on road transportation

Economy plays a vital role in road transportation as it can determine the cost and fare of transporting goods and services in a particle country. Studies have shown that a strong economy can boost any business, but especially the logistics industry (N. Langvinienė and G. Sližienė, 2012). Consequently, road transportation is vital part of transportation in every economy. Well established road transportation system ensures providing efficient, fast and high quality of transportation which will eventually increase national economy.

Furthermore, cost is one of the main factors impacting transportation. Prices can be based on social, environmental and economic factors. Companies set their price based on these three factors and the impact of these factors on the process of logistics. These factors must be considered when setting prices for services (Lazauskas, 2012).

A company's profit margin and smooth transportation services can also be affected by social factors in road transportation. Every logistic company wants to gain competitive edge by providing more advance, efficient, rapid and safe transportation at a very competitive fare. However, organizations need to set their goals and tasks according with the social requirements of the country and community they are operating in. In today’s era organizations are focusing build strategies based on many factors so they can gain competitive advantage, organizations not only need to assess their internal and external environment but also changing trends and requirements. The controversial and discussed topic in logistic industry is how to decrease carbon footprint. In order to remain in the recent demand chart of the world, logistics companies are now adapting policies for sustainable logistics (Meidutė, I., & Raudeliūnienė, J. 2011).

Organizations have to consider many aspects in social factors they have to create trust from their organization by providing safety, competitive price, reliability and accessibility. When customers trust a company with their products, they expect them to arrive safely and on time, so safety plays an instrumental role in the logistics business. As a result, companies need to take safe delivery routes and use reliable vehicles (Boicov, 2012).

Environment of the country that organization is working plays a critical role in impacting its road transportation services. Organizations have to consider all the environmental aspects

while determining their route. Price, safety, duration all somehow depend on the route organization choose for transportation. Climate changes also impact on the organizations policy for a particular country. By considering all these aspects organizations have make a policy based on not only economy of the country but also on the infrastructure of the country or city they are working and transporting.

According to the research done by Melo et al. (2014), organizations must reduce their carbon footprint with electronic vehicles. The environment will be benefited from electronic vehicles. Social and environmental factors are essential to a sustainable policy. It is difficult to implement electronic vehicles in many countries. Road transportation is positively impacted by countries with advanced infrastructure.

1.10. Summary of the Literature Review

Logistics, which is a necessity of all economic activities, has an adverse effect on the environment, since transportation activities have a remarkable portion in logistics services and vehicles that consume fossil fuels are generally used. The realization of this situation necessitated the organization of logistics activities in an environmentally compatible manner and the concept of green logistics emerged. Within the scope of green logistics, which aims to produce and distribute goods in a sustainable way, taking into account environmental and social factors, all logistics activities are tried to be carried out in a way that causes the least damage to the environment and at the least cost. Therefore, it aims to reduce air pollution and noise pollution, as well as to prevent the increase in greenhouse gas emissions caused by international transportation activities.

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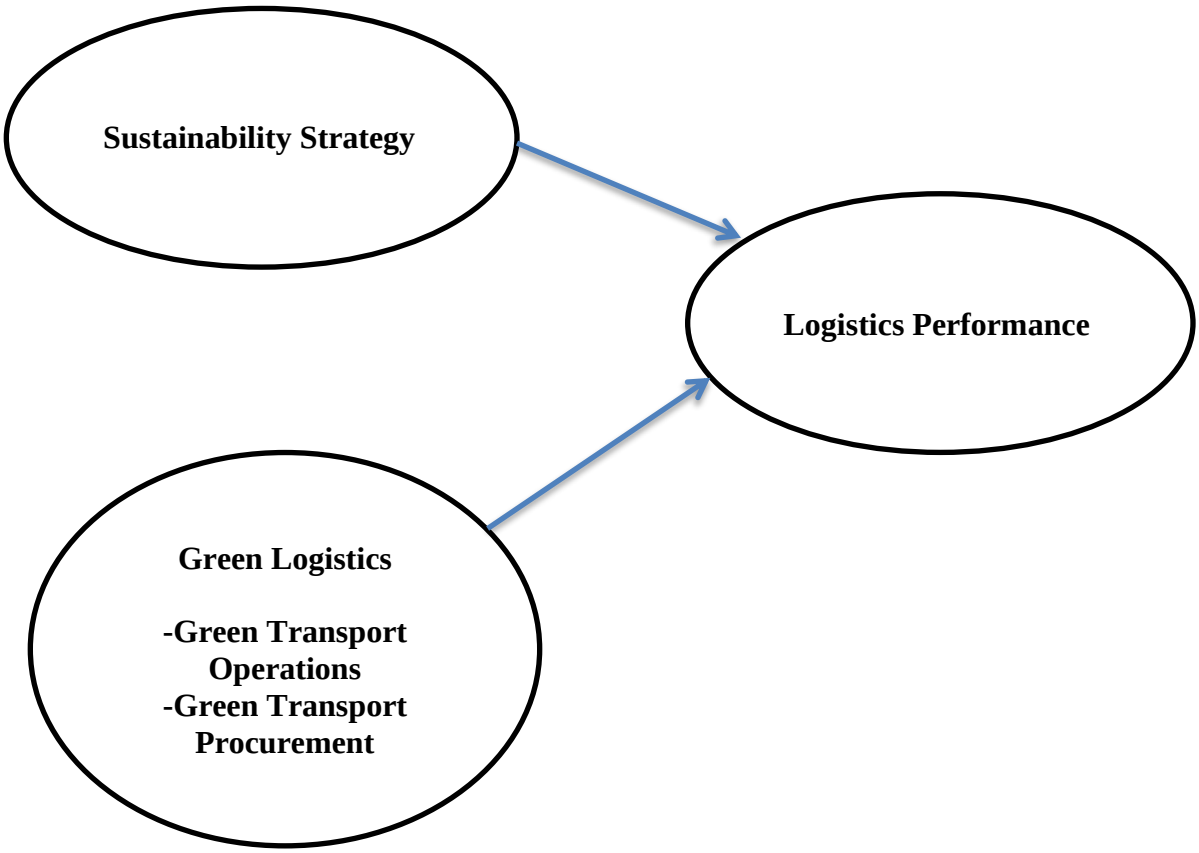
Developing sustainable policies and practices will reduce logistics' negative environmental impacts. An application set that can create a solution in this regard is green logistics, a link to green supply chain management. Considering the pollution caused by recycling and waste, companies can both reduce the damage they cause to the environment with green logistics practices. This includes using recycled paper and plastic materials. In addition, they provide economic gains through waste management and reuse. Green logistics practices

also enable companies to gain recognition and preference in the market. As a result, the company becomes more efficient. The logistics sector, which is an invaluable service in the establishment of urban relations networks, causes significant environmental problems such as urban transportation problems, environmental and noise pollution, and resource depletion. Green logistics practices, on the other hand, are based on policies and strategies aimed at increasing the cost, efficiency, and reliability of supply chains; it is not directly related to environmental issues, but to cost, time, reliability, storage, and information technologies. In this context, green logistics practices are a means of reducing the costs of logistics and the environment. In addition, they increase the importance of the environment in the logistics service processes of companies. Green logistics applications give different interactions and results in terms of transportation, the environment, and the economy in cities. Logistics companies reduce the damage to the environmental values of the cities they live in by reducing the formation and recycling of packaging and waste, and by conducting online paperwork instead of paper consumption. By providing larger and more diverse raw materials and energy, they can access wider markets and increase their productivity.

2. RESEARCH MODEL AND METHOD

2.1. Research Model

As a research model, a relational research model was applied as follows to determine the relationship between the sustainability strategies and green logistics practices of logistics companies and logistics performance in United Kingdom.



Source: Composed by author

Figure 3: Research Model Framework

The following hypotheses were formed regarding the variables used:

- 1: Sustainability strategies of companies affect logistics performance significantly and positively.
- 2: Green Logistics significantly and positively affects logistics performance.
- 2a: Green transportation processes, one of the sub-dimensions of the Green Logistics variable, affect logistics performance significantly and positively.
- 2b: The purchase of green transportation, one of the sub-dimensions of the Green Logistics variable, affects logistics performance significantly and positively.

2.2. Method of the Research

2.2.1. Purpose of the Research

Green logistics practices also enable companies to gain recognition and preference in the market. As a result, the company becomes more efficient. As concrete proofs of this, we can say that the global trade is increasing gradually, and this increase has a number of positive and negative effects on all stakeholders in the chain of supply. In this context, the damage caused to the nature by enterprises with inputs such as natural resources and energy with the aim of maximum profit continues to increase.

At the same time, situations such as fierce competition, pressure from environmental non-governmental organizations, and the increase in customers' preferences for green products and green processes require companies to adjust their strategies in line with changing conditions. In addition, situations such as fierce competition, corporate pressures, and customer preferences have motivating effects in creating and maintaining green logistics practices, thereby increasing logistics performance. In this study, the relationships between sustainability strategies, green logistics and logistics performance of companies will be investigated. By trying to determine the relationship between the findings to be obtained in the results of the research and the sustainability strategies, green logistics and logistics performance in the companies, it will be

tried to make a scientific contribution to bring the companies to a more effective and efficient level, especially in terms of logistics operations.

2.2.2. Research Method and Data Collection Tool

Questionnaire method was used as data collection tool in the research. While the questions used in the survey were being created, they were made comprehensible for the people to whom the survey would be administered. In order for the data to be obtained to be correct, no specific descriptive information was requested from the respondents, and it was stated to the participants that the survey results would not be accessible to third parties. The survey consists of 3 parts. In the first part, the demographic characteristics of the participants are measured, in the second part there are questions about the sustainability strategy and green logistics of the companies and in the third part there are questions to measure the logistics performance of the companies. And questionnaire was conducted on September-October of 2022. The variables in the research were examined under 4 headings: sustainability strategy, green transportation operations, green transportation procurement, and logistics performance. For each proposition that measures the variables, the participants said, they were asked to choose one of the options “1. Strongly Disagree, 2. Disagree, 3. Undecided, 4. Agree, 5. Strongly Agree”. As a result of the analysis, it is understood that as the average value approaches 5, participants agree with the stated proposition. As it approaches 1, they do not agree. (Likert, R. 1932).

2.2.3. Population and Sample of the Research

As a result of various research, it has been determined that in the United Kingdom, 98% of consumer products and machinery are transported by road freight. A total of 2.54 million people work in logistics (RHA, 2022). As a result of inquiries and the studies carried out in this context, data were obtained by applying a questionnaire to 253 out of 300 people that invitation was sent through emails of the participants. Participants vary from lower, middle-level and manager-level employees working in logistics companies in the United Kingdom.

2.2.4. Limitations of the Research

Research limitations can be defined as:

- The research used the questionnaire method for data collection. Authorities answered the questionnaires in online interviews. It was thought that the participants would answer truthfully, impartially and sincerely in their answers.
- The time constraint of the participants in the samples, the intensity of their work, constitute the most important constraint as a company principle.
- In the study in question, the biggest limitation is that this kind of model is found in a limited number in the literature, especially in UK, in determining the relationship between variables.
- The study covers a number of issues within the logistics sector.

2.2.5 Descriptive Statistics on People

Descriptive information about individuals consists of demographic data of the participants and data belonging to the institution they work for. Demographic data of individuals consist of data such as gender, age, marital status, educational status, duty, position, management task, and working time in the profession. Information about the institution he/she works for can be retrieved from the period of activity in the sector, the exported country groups, the logistics area in which the company operates (road transportation, sea transportation, air transportation, railway transportation, pipeline transportation, combined transportation), the number of branches and the standard documents of the enterprise (quality management systems, environmental management systems, occupational health, and safety management systems).

2.2.6 Correlation and Regression Analysis

- The range of values for the Pearson correlation coefficient is -1 to +1 (-1 r +1). The R coefficient shows the relationship's strength and direction. The inversely proportional nature of the link between the variables is represented by the negative values of the r coefficient. The strength of the association grows as the r value near 1, whereas the closer it comes to zero, the weaker the relationship is. (Durmuş et al., 2011). If there is no link between the two events, the

value for the correlation coefficient will be zero. The correlation coefficient will be near to +1 if the link between two occurrences is such that when one grows, so does the other. The correlation coefficient will be close to -1 if one grows and the other declines along with this rise. The correlation coefficient will take (+1) or (-1) values if the growth or drop rates are equal between the two occurrences (Durmuş et al., 2011).

- Regression analysis was applied to see the effect of sustainability strategy on logistics performance. The main objective of this study is to examine the effects of green logistics on logistics performance.

3. EMPIRICAL ANALYSIS OF GREEN LOGISTICS POLICIES ON ROAD TRANSPORT IN THE UK

3.1. Road Transport in UK

Road transportation is key to the UK economy for getting goods, people, and services. Over 60% of UK journeys are made by car (DfT, 2017). Trucks and vans transport 75% of the UK's goods (DfT, 2016). In the UK, consumer policies are central to all decisions. The UK is also committed to maximizing the industry benefits of the transition. UK and DfT (Defra & DfT, 2017; BEIS, 2017) have integrated it into the Industrial Strategy and Automotive Sector Deal for reducing nitrogen dioxide concentrations on roads (Defra & DfT, 2017).

The government is trying to leave behind a better environment than it inherited in order to develop conditions of life and the environment. Although cars today use more fuel, greenhouse gas emissions from transport are only 2% lower than they were in 1990 (CCC, 2018; BEIS, 2018). Road transport is the main source of UK greenhouse gas emissions (27%). Poor air quality affects some UK towns and cities (Defra and DfT, 2017). As one of the most successful developed nations, the UK has grown its economy while reducing emissions. UK greenhouse gas emissions have decreased by 41% since 1990 as the economy has grown by two-thirds. Investing in low-emission technologies and expanding the economy in the UK have changed because of this progress. In addition to reducing consumers' bills and improving the environment, road transport emissions can foster clean economic growth and create high-paying jobs (HM Government, 2017). A reported 14,000 public charging stations and over 150,000 ultra-low emission vehicles exist throughout the UK (SMMT, 2018).

There has been rapid change, however. Increasingly, ultra-low-emission vehicles are being sold, and cities, regions, and countries are committing to cleaner road transport in the long term. The global market will be half ultra-low emission vehicles by 2040 (Bloomberg New Energy Finance, 2018). To advance global economic trends and strengthen competitiveness, the UK has a comprehensive Industrial Strategy.

The UK has experienced progress in the automotive industry, however there is still much more to do. In order to reach the defined target, there is a strong necessity in vehicle supply, the right market conditions, and a reliable infrastructure. Transition strategy demonstrates how reduction in conventional vehicle emissions will be achieved. A total of nearly £1.5 billion has been invested in the measures outlined, making them among the most comprehensive packages in the world (Greener Journeys, 2017).

3.2. UK’s 2040 Mission

The UK's 2040 mission is a core part of the Industrial Strategy's Grand Challenges for the Future of Mobility and Clean Growth. It is expected by then that most new cars and vans will be zero-emission vehicles and that many will be capable of generating significant amounts of zero-emission electricity. In 2050, most cars and vans should be zero emissions (DfT, 2018). The measures in this strategy will assist the industry and consumers in leading this transition. Technology hasn't been a problem in the UK. Technologies cannot yet predict the UK's long-term ambitions. 30-70% of new car sales in 2030 could come from ultra-low emission vehicles (based on the Clean Growth Strategy). Increasing these ranges is the objective. By 2030, the UK aims to have at least 50% and even 70% of new cars sold have ultra-low emissions in order to improve air quality, meet future carbon budgets, and create a new market for zero-emission vehicles (SMMT, 2018).

The goal is to have 15% of cars with zero or low emissions by 2025 (less than 50g CO2 per kilometre). UK ambitions are lower. The UK should set long-term ambitions and communicate its direction to industry and consumers. Innovations in battery technology and mobility services will drive the transition in the coming years. The UK's progress toward 2025's goals will be reviewed. Efforts to make new cars and vans zero emissions as soon as possible have been made by the government as a clear statement of intent to consumers and industry. Action is needed to match the UK's aimed policies. In order to reach the defined targets, this should be followed:

- As a result of an insufficient supply of vehicles, there is a shortage in the market. 38 plug-in cars qualify for the grant, compared with hundreds of conventional vehicles. Many of the recently announced electrification plans do not specify how many ultra-low emission vehicles they will produce. Commercial vehicles have particular supply challenges. Nine van models must be 3.5 tonnes or fewer to qualify for the plug-in grant. HGVs with zero emissions are less advanced than cars and vans. Investing in innovation and technology is necessary for sustainable and affordable ultra-low-emission vehicles. There are billions invested in this industry. Ultra-low emission options are expected to become more available in the UK (BEIS, 2018).

- Under the appropriate market conditions, 38% of consumers would consider electric vehicles (Go Ultra Low, 2017). The market share of ultra-low emission cars is currently 2%. Several surveys found that infrastructure and costs are barriers to adoption (Kantar Public, 2017). The right incentives and policy framework will increase sales of ultra-low emission vehicles (SMMT, 2018).

- In order to meet the demands of ultra-low emission vehicles, the UK needs a fit-for-purpose infrastructure network, and it wants to improve consumer satisfaction with the process. There will be a reliable, cost-friendly, and efficient electric vehicle charging infrastructure for motorists with electric vehicles (BEIS, 2018).

In order to address these challenges, the government must play a role. By implementing this strategy, the UK sets out its plans for providing consumer incentives, support for research and development (R&D), and innovation, as well as assistance in developing one of the world's most advanced infrastructure networks. The energy system must also be prepared for future demand if steps are taken to ensure it is prepared. Almost £1.5 billion will be invested, making this the world's most comprehensive package for supporting the transition to zero-emission vehicles. However, a zero-emission future cannot be achieved by the British Government alone. There is an extensive partnership between UK businesses, universities, environmental groups, governments, and local authorities (Greater London Authority, 2017).

3.3. Choosing the Right Road Transport Option: Understanding the Challenge

A technology-neutral policy and incentive framework remain the Government's top priority. It is vital to comprehend various technologies of relative environmental performance. Diesel scandals have undermined public confidence, as well as the emissions gap between labs and real-world emissions. Consumers find it difficult to make informed decisions about automobile environmental impact (Greater London Authority, 2017). Vehicles powered by batteries emit no tailpipe emissions and are highly energy efficient. However, electric vehicles emit far fewer greenhouse gases than conventional vehicles, despite the fact that the electricity used to build the batteries contributes to that. Compared with other driving fuels or energy sources, battery electric vehicles emit fewer greenhouse gases. Automobiles of any type can be operated with it.

Electric vehicles powered by hydrogen fuel cells emit no emissions at all. Batteries with lithium-ion batteries emit greenhouse gases regardless of how they are charged. It is recognized that range extenders, plug-ins, and non-plug-in hybrids have some of the cleanest emissions on the market, and their environmental performance varies depending on their use. Their use makes them useful for alternative fuel motorists (Go Ultra Low, 2017). There are higher greenhouse gas emissions from petrol cars and vans compared to diesel cars and vans, but significantly lower Nitrogen oxides (NOx) emissions from petrol cars and vans. In real-world conditions, petrol cars and vans emit different levels of particulate matter. Particulate matter is produced more by petrol cars and vans (especially those with direct injection engines) than by diesel cars and vans. Standards to address Real Driving Emissions (RDE) will be developed (ONS, 2018).

Real-world diesel engines with poor RDE standards produce more NOX than petrol engines. As zero-emission vehicles become more prevalent, air quality standards must improve. Road transport CO2 emissions can be reduced by clean diesel cars and vans. In order for diesel vehicles to play a meaningful role, they must reduce their air quality impacts. Keeping a brand-new vehicle clean and fast is paramount. RDE standards are more challenging, but the UK welcomes them and encourages manufacturers to innovate. Thus, road NOx emissions will be drastically reduced (Nissan, 2018). In comparison to diesel vehicles, liquid petroleum gas (LPG)

vehicles have comparable emissions, but less air pollution. The LPG fuel tank may offer a suitable alternative to diesel vehicles in urban environments, despite being a niche market. Compared with diesel vehicles, vehicles powered by natural gas generally emit fewer air pollutants. It is vital that heavy vehicles have more efficient engines to reduce greenhouse gas emissions (DfT, 2018).

It is now possible to develop zero-emission heavy goods vehicles (HGVs). Despite their availability, these technologies have not yet been widely adopted, and regulations have not led to significant reductions in emissions from newly manufactured diesel cars. While zero-emissions and low-emission options are in development, diesel can still be a reasonable choice in the short term. In the UK, evidence will be sought on tire, brake, and road wear emissions. As a result, it can be understood these emissions better and consider possible methods for reducing them. 150,000 low-emission cars are on the British road network estimated. Vehicles with zero emissions offer the highest environmental performance and are often cheaper to operate compared to vehicles with high emissions. By the government the future of vehicles will require minimal pollution (SMMT, 2018).

Currently, zero-emission technologies are not practical for consumers and businesses, so the vehicle technology that works best for them will depend on their location and habits. It is likely that petrol hybrids, alternatively fuelled and newly built conventional petrol cars will be the most suitable cars for urban areas. Their shorter length and slower movement contribute to this. Long-distance drivers and heavy-duty vehicles are better suited to diesel. For emissions to be reduced, older, dirty vehicles must be replaced with newer, cleaner models. When it comes to air pollution, a new conventional vehicle produces less pollution than an older conventional vehicle (Defra, 2018). An emissions advisory group will be formed in partnership with industry, consumer groups, and motoring organizations. Different vehicles and fuel options will be reviewed by this group. These two groups will work together to provide consumers with clear and consistent messages (DfT & Defra, 2018).

3.4. Reducing the Fleet of Conventional Vehicles

UK roads could still be crowded with cars purchased today in 2030. Traditionally, British roads have been home to 14-year-old conventional vehicles. By reducing vehicle emissions already on UK roads, air pollution and greenhouse gases can be reduced. In the UK, conventional vehicles will also contribute largely to new vehicle purchases. This means that conventional vehicles will also be as clean as possible in the near future (CCC, 2018). Heavy vehicles and conventional cars will continue to require low-carbon fuels. The UK government is working on increasing the supply and sustainability of low-carbon fuels, which is expected to double by 2020 (DfT, 2017). An array of policy and funding incentives will be used to encourage low-carbon fuel production. Further expansion of bioenergy use in transport will be considered by the government as demand increases. The potential importance of this sector can be seen in heat (BEIS, 2018). By retrofitting existing vehicles with new technologies, instead of buying a new vehicle, emissions can be reduced. Low Carbon Vehicle Partnership's Clean Vehicle Retrofit Accreditation Scheme has now been extended to buses, lorries, vans, and black cabs. As soon as the UK leaves the EU, vehicle emissions regulations will be ambitious (DfT, 2018).

3.5. Zero-Emission Heavy Goods Vehicles

It is imperative to develop zero-emission options for all types of HGVs, even though the new emission standards have improved air quality significantly. In this regard, Highways England and the UK government are conducting a research project to evaluate zero-emission HGV technologies on UK roads. In order to enhance R&D activities and ensure emission standards, the UK will develop ultra-low emission trucks (ULET) standards in collaboration with industry. Plug-in van grants are now available for vehicles weighing over 3.5 tonnes (Bloomberg, 2017). It is also essential to reduce HGV emissions. An industry-wide voluntary target will reduce HGV emissions by 15% in the UK by 2025. Providing support and collaboration to the industry is UK's goal. A freight portal will provide accurate data on how to reduce fuel consumption and emissions using the Energy Saving Trust. A levy increase for HGVs in the UK contributes to addressing long-term air quality issues (DfT, 2018).

3.6. Creating a World-Class Infrastructure Network for Electric Vehicles

Vehicle availability and affordability are not the only factors affecting the transition to zero-emission cars. There is a need for an infrastructure network that is easy to locate and use by current and potential drivers, affordable, efficient, and reliable. As part of the UK's economic plan, high-quality infrastructure must be provided across the country. Using hydrogen fuel cell technology and electric vehicles powered by electricity, the UK will develop infrastructure. The market is smaller due to early development (DfT, 2017). Electric vehicles in the UK will continue to receive grants to encourage overnight charging at home. The UK envisages most charging taking place in this manner. Whenever feasible, the UK intends to provide charging points for all new homes. In the UK, a consultation will be held on hydrogen applications beyond transportation. The UK government is investing £23 million to maintain its leadership in hydrogen transportation (HM Government, 2017).

3.7. Analysis of Survey Data

SPSS (Statistical Package for the Social Sciences) program was used for data entry and data analysis. Descriptive statistical analyses were made of the demographic characteristics of the participants, and the results were tabulated and reported. To test the reliability of the scales used to measure the variables, a reliability analysis was performed, and Cronbach's Alpha values were included. The arithmetic mean and standard deviation values for each proposition were interpreted based on the answers given by the participants to the propositions measuring the independent and dependent variables of the study and their sub-dimensions. Correlation (Pearson Correlation) analysis was used to test whether there were significant statistical relationships between the variables. After determining the significant relationships between the variables by correlation analysis, regression analyses were performed to test the effect of the independent variable on the dependent variables and the direction of the effect (positive, negative).

3.7.1. Reliability of the Research

Cronbach's Alpha was used to test the scales' reliability. Based on the literature, if the alpha value is 0.70 or above ($0.70 \leq \alpha \leq 1$), the scale is considered reliable. It is considered highly reliable when the alpha coefficient is between 0.80 and 1. Instead of being expressed as a percentage, the confidence level is expressed as a proportion by the confidence coefficient.

The results of the reliability analysis are as follows. As a result of the reliability analysis of the questions consisting of 5 questions about the sustainability strategy, the alpha (α) value was 0.934. As a result of the reliability analysis of the questions consisting of 6 questions about green transportation, the alpha (α) value is 0.853, the result of the reliability analysis of the questions consisting of 6 questions about the purchase of green transportation is the alpha (α) value of 0.881, the reliability analysis of the questions consisting of 22 questions about logistics performance, the alpha value (α) was found to be 0.883. In the study, all scales were found to be highly reliable as they were above the reliability limit of 0.70 and above 0.80.

Table 1. Reliability Analysis Results of the Scales Included in the Study

Scales	**Number of Propositions**	**Confidence Coefficient (α)**
Sustainability Strategy	5	0.934
Green Transport	6	0.853
Green Transport Procurement	6	0.881
Logistics Performance	22	0.883

3.7.2 Descriptive Statistics on Demographic Variables

The results revealing the demographic information of the individuals participating in the research are as follows. It was observed that 27.3% of the participants were female and 72.7% were male. 62.5% of the participants were married and 37.5% were single. 28.1% of the

participants are operations managers, 12.3% are managers, 9.5% are accounting, 10.3% are employers, 8.3% are assistants, and 13.0% are in transportation. It was observed that 8.7% of them were in sales and marketing, 3.2% were customs officers and 6.7% were in other duties.

It was observed that 28.9% of the participants were in management positions as senior managers, 16.2% as mid-level managers, 7.9% as lower-level managers, and 47.0% did not have a management task. Considering the age of the participants, 11.1% of them are 24 and below, 37.2% of them 25-34, 27.3% of them 35-44, 17.0% of them 45-54, and 7.5% of them 55 and above age groups were determined. 12.6% of the participants are in primary school, 35.2% are in high school or equivalent, 6.7% are in vocational school, 43.9% are university-bachelor, 1.2% are postgraduate, and 0% It was observed that 4 of them had a doctorate degree. There are 8.7% of participants in the profession who have worked less than 1 year, 28.5% for 1-5 years, 22.5% for 6-10 years, and 40.3% for 11 years or more.

3.7.3 Descriptive Statistics of the Institution

The results, which reveal information about the institution where the participants work, are given in detail below. When the sector activity period of the institution is examined, it has been revealed that 46.6% of them have 15 years or more operating periods, 7.9% of them are 0-3 years, 11.5% is 4-7 years, 20.6% is 8-11 years, 13.4% is 12-15 years. Among the country groups exported by the institution, 11.4% are EU countries, 12.7% are markets outside of the EU, and 75.9% are third countries and EU countries.

84.2% of the logistics area in which the companies operate is land transport, 41.1% is sea transport, 15.4% is air transport, 10.3% is railway transport, and 1.6% is pipeline transport. It has been observed that 7.1% of them are engaged in combined transportation activities. It has been seen that the most used type of transport is road transport. It has been determined that 51.8% of the branches of the companies have fewer than 2 employees, while 48.2% have 2 or more. According to the documents owned by the companies, 37.2% of the companies have quality management systems certificate, 18.2% have environmental management systems certificate, and

30.8% have occupational health and safety management systems. Looking at the companies with other documents, it was determined that 56.3% of the other documents were T1 documents.

3.7.4. Findings on Sustainability Strategy

Among the propositions given regarding the "Sustainability Strategy", the proposition "Based on environmental performance criteria in the evaluation of employees" was 4.15, The average percentage for the statements "Training staff on environmental concerns" and "Perform the life cycle assessments of our products" were 4.15 and 4.15 respectively. There are no notable differences in the arithmetic mean and the proposition averages all have significant values of above 4.00.

3.7.5. Findings Regarding Green Transport Transactions

The proposal "Applied horizontal cooperation with other transport companies" and "Used information technology tools to analyse transport (transportation) efficiency" had the highest average participation rates and the lowest, respectively, among the suggestions made about "Green Transport Operations." In comparison to the other suggestions, the one titled "Increasing the contribution of railway transportation in our logistics system" had a lower participation percentage (3.66). It is clear that there is a very high level of engagement in the suggestions given the average of 4.05.

3.7.6. Findings on Green Transport Procurement

The statement of "Demands drivers educated in eco-driving," average is 4.23 and "Demands our transportation (transportation) providers be attentive to the environment," statement’s mean is 4.24. The mean result of the third statement related to green transport procurement is "Demands advanced European class cars" with an average participation rate of 4.21, it was discovered that the proposition "Climate compensation pays additional costs for our transporters (vehicles)" had the lowest participation with the rate of 3.85. The overall mean value

for the green transport procurement is 4.13, it can be observed that involvement in the suggestions is positive in general/

3.7.7. Findings on Logistics Performance

Among the propositions given about "Logistics Performance", the proposition "Customs procedures are carried out transparently in our company" is the proposition with the highest participation rate with an average of 4.64. Among the propositions, the proposition "Our company's domestic transportation costs are high" has been found to have lower participation with an average of 3.53. In general, it is seen that the participation in the propositions is high with an average of 4.36.

Table 2. Logistics Performance

Logistics Performance Propositions	**Average**	**Standard Deviation**
Logistics Performance	**4.36**	**0.47**
LP1: Our company's domestic transportation costs are high.	**3,53**	**1.18**
LP2: Our company's domestic storage costs are high.	**3.60**	**1.21**
LP3: Our company acts rationally and economically in transportation decisions.	**3.89**	**1.08**
LP4: Our company strives to reduce logistics costs.	**3.87**	**1.12**
LP5: The warehouse providers of our company carry out their activities in accordance with European standards	**4.39**	**0.92**
LP6: Our company follows customs legislation very well.	**4.62**	**0.62**
LP7: Customs procedures are carried out transparently in our company.	**4.64**	**0.58**
LP8: In our company, transactions are carried out quickly in the customs areas	**4,61**	**0,60**
LP9: Our company's customs legislation meets our needs	**4.61**	**0.64**
LP10: We report all possible problems to the customer while tracking orders in our company	**4.62**	**0.66**

Logistics Performance Propositions	Average	Standard Deviation
Logistics Performance		
LP11: Continuously with the customer until the orders are delivered to our company, we stay in touch.	**4.57**	**0.74**
LP12: The application of electronic stock tracking systems in our company is unnecessary because it is very expensive	**4,13**	**1,14**
LP13: Shipment error rates are low in our company.	**4.36**	**0.95**
LP14: The ports of our country are very suitable for logistics activities.	**4.37**	**1.00**
LP15: Airports in the United Kingdom are very suitable for logistics activities	**4,25**	**1,14**
LP16: Physical and technological infrastructure investments are very significant for the logistics sector	**4.47**	**0.83**.
LP17: Delivery security is high in our company.	**4.53**	**0.75**
LP18: Timely delivery of the products we ship in our company is critical	**4.61**	**0.60**
LP19: Our delivery speed is better than our competitors.	**4.61**	**0.64**
LP20: Our customers are not satisfied with our service quality. When we find out, we take corrective action immediately.	**4.59**	**0.68**
LP21: Having a large transport fleet is critical in our industry.	**4.57**	**0.78**
LP22: We can offer different sales options to our customers.	**4.55**	**0.73**

3.7.8. Findings Based on Correlations

Correlation Analysis

The correlation test aims to determine whether there is a relationship between the variables, the severity, and the direction of the relationship. In the research, a correlation test was applied to determine whether the research variables consisting of "sustainability strategy", "green logistics" sub-dimensions, "green transportation operations", "green transportation purchase" and

"logistics performance" are related to each other and to determine the direction of the relationship.

It was observed that the variables had a statistically significant and positive relationship with each other ($p \leq 0.01$). A positive correlation with a coefficient of 0.476 was found between the sustainability strategy and green transport operations. A positive correlation with a coefficient of 0.521 was found between the sustainability strategy and the purchase of green transportation. A positive correlation was found between sustainability strategy and logistics performance, with a coefficient of 0.529. A positive correlation with a coefficient of 0.627 was found between green transportation transactions and green transportation purchases. A positive correlation with a coefficient of 0.489 was found between green transport operations and logistics performance. A positive correlation was found between green transportation transactions and green transportation purchases, with a coefficient of 0.484.

From this point of view, we can say that there is a strong and significant relationship between sustainable strategies and green logistics. This is the independent variable. In addition, there is a positive, significant relationship between sustainable strategies and performance. Finally, and finally, there is a positive significant relationship between green logistics and logistics performance. At the same time, some studies in the literature were examined, and similar results were found. Pazirandeh and Jafari (2013) stated in their study that implementing sustainable strategies has a positive effect on green logistics and logistics performance. In the study of Rad and Gülmez (2017), it was revealed that the implementation of sustainable strategies by companies affected the logistics performance of the company positively and significantly. In their study, Miroshnychenko et al. (2017) stated that some studies conducted as a result of the literature review have concluded that the sustainable strategies of companies positively affect their corporate performance. Rao and Holt (2005), in their study, found that as a result of greening studies carried out at some stages of the supply chain, it has a positive effect on the economic performance of the companies in the supply chain.

Regression Analysis

In the regression analysis conducted to examine the effect of the sustainability strategy independent variable on logistics performance, it was revealed that the sustainability strategy had a statistically significant and positive effect on logistics performance. According to the regression analysis findings, sustainability strategy explains 27.7% of the logistics performance variable. Based on these findings, the hypothesis that the sustainability strategies of the companies affect the logistics performance significantly and positively has been accepted.

Table 3. Regression Analysis Findings 1

Regression Analysis of the Effect of Sustainability Strategy on Logistics Performance

Variable	Adjusted R^2	F	Beta	t	p
Sustainability Strategy	,277	97,673	,251	9,883	,000

Table 4. Regression Analysis Findings 2

Regression Analysis of the Effect of Green Transport Operations and Green Transport Purchase on Logistics Performance

Variable	Adjusted R^2	F	Beta	t	p
Green Transport Operations			,161	4,490	,000
	,285	51,319			
Green Transport Procurement			,163	4,263	,000

In the regression analysis carried out to examine the effect of green transport operations and green transport purchase independent variables, which are sub-dimensions of the green logistics variable, on logistics performance, it was revealed that green transport operations and green transport purchase had a statistically significant and positive effect on logistics performance. According to the regression analysis findings, green transportation operations and green transportation purchases explain 28.5% of the logistics performance variable. Based on

these findings, the hypothesis that "green logistics affects logistics performance significantly and positively" was accepted. Accordingly, the hypothesis is that green transportation operations, one of the sub-dimensions of the green logistics variable, affect logistics performance significantly and positively, and the purchase of green transportation, one of the sub-dimensions of the green logistics variable, affects logistics performance significantly and positively.

CONCLUSION

In the present world, while the world is said to have become a global village, global trade has been the most significant aspect. Developing foreign trade requires concepts like industry, technology, banking, and insurance to facilitate the exchange of goods, services, and information between countries. We can say that the concept of logistics, which demonstrates the interconnectedness between certain points with different equipment and methods, is just as significant as the concept of "logistics", which transfers products, services, and information between each link. Furthermore, technological advancements have increased interactions between companies in the supply chain. Integrated systems are being used more often with environmental awareness growing.

1- In terms of analysis based on sustainable logistics policies in the United Kingdom it can be said that sustainable strategies are implemented by companies in the concepts such as sustainability and green consciousness, which are supported by various policies and sanctions by countries in the national and international arena, and which are preferred by every company and even individual. In the light of various literature analysis regarding to green logistics, it can be understood that future of road transportation in the United Kingdom in terms of sustainable logistics policies generally focusing on the electrification of the vehicles and transport as well as reducing the fuels dependency in the daily life. However the implementation and the integration of these policies requires subsidies from government as well as assistance.

2- Based on the conclusion of conducted survey, it can be addressed that first hypothesis of the research was established based on the study findings: "Sustainability strategies of companies affect logistics performance significantly and positively." According to this study, correlation analysis and regression analysis between sustainability strategy, an independent variable in this study, and logistics performance, the dependent variable, a positive correlation was found between sustainability strategy and logistics performance. A coefficient figures also indicates that the relationship

between logistics performance and sustainability strategy is significant. By creating environmental awareness in enterprises and integrating sustainability into their strategies, logistics performance has increased. Literature analysis shows that sustainable strategies implemented by companies affect logistics performance. Similarly, it can be seen from some studies that sustainable strategies implemented by businesses directly affect their performance.

3- In the light of analysis in terms of conducted survey, The second hypothesis of this study is the effectiveness of logistics is improved through green logistics. Regression and correlation analysis show a favourable association between logistics performance and green logistics. In order to assess the second hypothesis, "logistics performance," we looked at the correlations and regressions between "green logistics," "green transportation operations," and "green transportation procurement." The findings revealed a strong relationship between efficient logistics and green transportation operations. Additionally, green transportation sales benefit the environment. Green transportation operations can have a good and considerable impact on logistics performance. As we examine the company's propositions, we can see that the company's tendency to green transportation operations not only contributes to the environment but also offers economic benefits. Thus, the companies have an advantage over their competitors because they have more efficient logistics. As a result, they are preferred over their competitors. By purchasing green transportation, one of the sub-dimensions of green logistics, companies decrease their workload, increase their efficiency by concentrating on their main business, develop different strategies, gain cost advantage and flexibility, and improve their logistics performance by focusing on their main business. In the literature, we find similar results when looking at studies in this direction.

In conclusion, this study outlined theoretical aspects of sustainable logistic policies on road transportation in the United Kingdom as well as hypothesis was tested and confirmed based on empirical findings and it can be concluded that these logistics policies have positive effects on road transportation.

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ABSTRACT

Around the world, mass production was transformed by the industrial revolution. Therefore, a rise in the number of factories that provide income for individuals and, consequently, are used at almost every stage of life, as well as producing all kinds of materials, has been witnessed. Naturally, this trend brought many processes with it. Positively, the increase in factories, production, employment, economic development, growth, and development showed the concepts. To leave a livable world for future generations, the concept of sustainability has come to the fore as a result of these processes. As logistics operations increase carbon emissions, ecological damage is exacerbated. By implementing green logistics practices into the operational processes of the companies, ecological destruction will be reduced, and logistics performance will be improved, giving the companies a competitive advantage. This study consists of 3 parts. In the first part, there is an introductory section in which preliminary information is given by defining the general lines of the research. As a result of literature reviews, it has also been attempted to provide information about sustainability strategy, green logistics, and logistics performance in the United Kingdom. The second part explains the research methodology. An evaluation of the results of the analyses is presented in the third chapter. Following the evaluation of the results, the literature review and bibliography are presented.

Key Words: Green logistics, sustainability strategy, logistics performance, sustainability.

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ANOTACIJA

Visame pasaulyje masinę gamybą pakeitė pramonės revoliucija. Todėl daugėja gamyklų, kurios teikia pajamas asmenims, todėl yra naudojamos beveik kiekviename gyvenimo etape, taip pat gamina visas medžiagas. Natūralu, kad ši tendencija atnešė daug procesų. Teigiamai koncepcijas parodė gamyklų, gamybos, užimtumo, ekonomikos plėtros, augimo ir plėtros padidėjimas. Norint ateities kartoms palikti gyventi tinkamą pasaulį, dėl šių procesų išryškėjo tvarumo samprata. Kadangi logistikos operacijos didina anglies dvideginio išmetimą, didėja žala aplinkai. Diegiant žaliosios logistikos praktikas į įmonių veiklos procesus, bus mažinamas ekologinis naikinimas, gerinami logistikos rezultatai, suteikiant įmonėms konkurencinį pranašumą. Šis tyrimas susideda iš 3 dalių. Pirmoje dalyje yra įvadinė dalis, kurioje pateikiama preliminari informacija, apibrėžiant bendrąsias tyrimo kryptis. Remiantis literatūros

apžvalgomis, taip pat buvo bandoma pateikti informacijos apie tvarumo strategiją, ekologišką logistiką ir logistikos rezultatus Jungtinėje Karalystėje. Antroje dalyje paaiškinama tyrimo metodika. Analizės rezultatų įvertinimas pateikiamas trečiajame skyriuje. Įvertinus rezultatus, pateikiama literatūros apžvalga ir bibliografija.

Raktiniai žodžiai: Žalioji logistika, tvarumo strategija, logistikos rezultatai, tvarumas.

SUMMARY

In order to play a beneficial role in the future of global geography, sustainability is crucial, which has a common denominator with many living species, and to leave a liveable world for future generations. In order to provide a sustainable ecological balance in question, the logistics activities used by every individual in the world, albeit indirectly, come to the fore. It can be said that the logistics sector, which has become popular recently, is one of the sectors that penetrates the natural, economic and social environment most rapidly and directly with the services and products it provides. Today, green logistics, which carries out its operations with environmentally friendly activities, not only helps sustainability, but also positively affects the logistics performance, which helps companies to gain competitive advantage. As logistics performance has a significant economic impact on firms, both internal and external stakeholders are indirectly impacted. In the current era, companies have become more eco-conscious and use environmentally friendly products as a strategy to increase their environmental awareness. A major issue with its various operations and wide network across the globe has been the concept of green logistics, which has a high environmental sensitivity. From this point of view, in this study, the relationship between the sustainability strategies of companies in the United Kingdom and their green logistics and logistics performances has been examined.

In this study data were collected using the questionnaire method. A questionnaire was administered to managers and other employees of logistics companies identified in the UK, which was the universe of the study. The SPSS statistical program was used to analyse these data. It was determined how correlations, regressions, and propositions relate to descriptive statistics of the variables. Based on the correlation and regression analysis, sustainability strategies and logistics performance of the firms exhibited a significant and positive relationship. Green logistics and green logistics performance, which are sub-dimensions of green logistics, are significant and positively correlated with green transportation and green transportation processes. Logistics performance was also significantly correlated with performance in other areas. Based on the findings of the research, companies' sustainability strategies contribute to logistics performance and green logistics as well. Companies' strategies for sustainability, green logistics applications, and operations will ultimately result in improved logistics performance as they implement their strategies.

ANNEX 1

Distribution of Participants by Demographic Variables

General Information	Number	%	General Information	Number	%
Gender			Age		
Female	69	27.3	24 and below	28	11.1
Male	184	72.7	25-34	94	37.2
			35-44	69	27.3
			45-54	4	17.0
			55 and above	19	7.5
Total	**253**	**100.0**	**Total**	**253**	**100.0**
Marital Status Educational Status			**Educational Status**		
Married	158	62.5	Primary education	32	12.6
Single	95	37.5	High and equivalent schools	89	35.2
			Vocational school	17	6.7
			University-Bachelor Degree	111	43.9
			Master	3	1.2
			Doctorate	1	0.4
Total	**253**	**100.0**	**Total**	**253**	**100.0**
Task					
Operations Manager	71	28.1			
Manager	31	12.3			
Accounting	24	9.5			
Employer	26	10.3			
Assistant	21	8.3			
Transportation	33	13.0			
Sales and marketing	22	8.7			
Customs officer	8	3.2			
Other	17	6.7			
Total	**253**	**100.0**			

Management Duty			**Working Time in the Profession**		
Senior manager	73	28.9	less than 1 year	22	8.7
Middle manager	41	16.2	1-5 year	72	28.5
Lower-level manager	20	7.9	6-10 year	57	22.5
I have no administrative duties	119	47.0	11 years and above	102	40.3
Total	**253**	**100.0**	**Total**	**253**	**100.0**

Green Transport Procurement Proposals	**Average**	**Std. Deviation**
Green Transport Procurement	**4.13**	**0.84**
GTP1: It demands from our transport (transportation) providers to be sensitive to the environment .	**4.23**	**0.88**
GTP2: It has determined environmental criteria in the evaluation of transportation providers.	**4.17**	**1.05**
GTP3: Transport procurement e-tools (transport tenders) were used to create environmental pressure on suppliers.	**4.03**	**1.18**
GTP4: Requires drivers trained in eco-driving**.**	**4.29**	**0.98**
GTP5: Demands advanced European class vehicles.	**4.21**	**0.97**
GTP6: It pays an additional fee for climate compensation for our transports (vehicles).	**3.85**	**1.25**

Logistics Performance Propositions	**Average**	**Standard Deviation**
Logistics Performance	**4.36**	**0.47**
LP1: Our company's domestic transportation costs are high.	**3,53**	**1.18**
LP2: Our company's domestic storage costs are high.	**3.60**	**1.21**
LP3: Our company acts rationally and economically in transportation decisions.	**3.89**	**1.08**
LP4: Our company strives to reduce logistics costs.	**3.87**	**1.12**
LP5: The warehouse providers of our company carry out their activities in accordance with European standards	**4.39**	**0.92**
LP6: Our company follows customs legislation very well.	**4.62**	**0.62**
LP7: Customs procedures are carried out transparently in our company.	**4.64**	**0.58**
LP8: In our company, transactions are carried out quickly in the customs areas	**4,61**	**0,60**
LP9: Our company's customs legislation meets our needs	**4.61**	**0.64**
LP10: We report all possible problems to the customer while tracking orders in our company	**4.62**	**0.66**
LP11: Continuously with the customer until the orders are delivered to our company, we stay in touch.	**4.57**	**0.74**
LP12: The application of electronic stock tracking systems in our company is unnecessary because it is very expensive	**4,13**	**1,14**
LP13: Shipment error rates are low in our company.	**4.36**	**0.95**
LP14: The ports of our country are very suitable for logistics activities.	**4.37**	**1.00**
LP15: Airports in the United Kingdom are very suitable for logistics activities	**4,25**	**1,14**
LP16: Physical and technological infrastructure investments are very significant for the logistics sector	**4.47**	**0.83**.
LP17: Delivery security is high in our company.	**4.53**	**0.75**
LP18: Timely delivery of the products we ship in our company is critical	**4.61**	**0.60**

Logistics Performance Propositions	**Average**	**Standard Deviation**
Logistics Performance		
LP19: Our delivery speed is better than our competitors.	**4.61**	**0.64**
LP20: Our customers are not satisfied with our service quality. When we find out, we take corrective action immediately.	**4.59**	**0.68**
LP21: Having a large transport fleet is critical in our industry.	**4.57**	**0.78**
LP22: We can offer different sales options to our customers.	**4.55**	**0.73**