International Symposium on Sustainable

LOGISTICS

TOROS UNIVERSITY FACULTY OF ECONOMICS, ADMINISTRATIVE, AND SOCIAL SCIENCES

DEPARTMENT OF INTERNATIONAL TRADE AND LOGISTICS

THE INTERNATIONAL SYMPOSIUM OF SUSTAINABLE LOGISTICS

PROCEEDING BOOK

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Toros University   April 30, 2021

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Publication Policy Toros University

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Preface

Dear All,

Mersin, which is called the pearl of the Eastern Mediterranean, has a strategic importance for our region and our country. This port city; It is of critical importance not only for Cukurova, but also for the import and export of industrial facilities located in the Southeastern Anatolia and Central Anatolia Region. Mersin Port is an important transportation point for the cities in the hinterland and is the immersive locomotive of our city's economy.

In our university, we have an International Trade and Logistics department in our Faculty of Economics, Administrative and Social Sciences, and a logistics department in our vocational school. In addition, our Graduate Education Institute has master's programs in International Trade and Logistics with and without thesis.

As an institution that believes in the importance of foreign language, the language of instruction of the Department of International Trade and Logistics is English. This gives our students serious advantages when they graduate. As it is known, Logistics has gained a global dimension, not a national one. The way to compete in this area is to speak the language of the world.

Here today we will discuss a very important issue for Our World: "Sustainability".

According to the data: 6% of the world's greenhouse gas emissions are caused by commercial goods transport and logistics activities. If we want to make our world more livable, we must heed the call of the "Green Deal." It seems difficult for us to decrease these rates with green trucks with less carbon dioxide emissions. We must fight this problem completely, make the necessary improvements.

We must do this!

Because we're guilty of the world we live in. That responsibility rests on all of us. If we want nature to respond to the needs of future generations, we must take the necessary steps today. We must not forget that the trust we receive from our natural past is our legacy to the future. It is our primary duty to protect this legacy.

I want to emphasize the importance of the work contained in this proceeding book and the call for the "Green Deal", I want to note that I support the steps taken on transformative policies. I once again thank all our stakeholders who contributed to the formation of this symposium in front of you, and I thank you very much in advance for the valuable contributions you will make.

Ömer ARIÖZ

Toros University Rector

Preface

Dear all,

It is my great honor to hold the International Sustainable Logistics Symposium as one of the organizers of this symposium. This symposium is an international symposium co-hosted by Toros University, the Turkish Logistics Association (LODER), and the Department of Logistics and Information Engineering at Tokyo University of Marine Science and Technology (TUMSAT). I would like to express my sincere gratitude to all those who contribute. I especially thank Ayhan Demirci for his great collaboration. I also thank Mehmet Tanyas, the president of LODER, for his continued support of the friendly relationship between the Japan Logistics Society and LODER.

As you know, Japan and Turkey have been building a friendly relationship for many years; despite the long distance between the eastern and western ends of Asia. It has been 131 years since the Turkish warship "Ertugrul" was lost in 1890 off the coast of Kushimoto City in southern Japan. The desperate rescue of the Turkish crew by coastal residents has created a strong bond through the ocean. As Mersin City, where the Toros University is located, has a sister city relationship with Kushimoto City, I am very pleased to be able to hold this symposium here.

The Sustainable Development Goals (SDGs) are the international goals for the period from 2016 to 2030, which were included in the 2030 Agenda for Sustainable Development adopted at the United Nations Summit in September 2015 as the successor to the Millennium Development Goals (MDGs) formulated in 2001. The SDGs consist of 17 goals and 169 targets to realize a sustainable world and pledge to leave no one behind.

TUMSAT has published "Vision 2027 Version 2" based on the results of various studies, taking into consideration that the "Vision 2027", which is a medium- to a long-term action plan, should take into account SDGs. To achieve the SDGs, each researcher at TUMSAT is posting their research achievements on our website to show what they can contribute among the 17 goals.

While TUMSAT has a long history since 1875, the Department of Logistics and Information Engineering established in 1978 is a relatively young department and is characterized by its professional education in logistics with an engineering approach. Therefore, the theme of this symposium, Sustainable Logistics is also a very important research topic for our department.

As governments, companies, and universities around the world are working on SDGs, I sincerely hope that this symposium will deepen the international academic exchange on Sustainable Logistics.

Thank you.

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Daisuke WATANABE

Tokyo University of Marine Science and Technology

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Preface

Dear all,

Today we have come together for the International Sustainable Logistics Symposium. This symposium is hosted by Toros University, with the Corporation of Tokyo University of Marine Science and Technology and also supported by Turkish Logistics Association. I would like to express my gratitude to all those who contribute. I also especially thank to Daisuke Watanabe for his great collaboration.

Sustainability is an increasingly crucial concept in recent few decades. The Covid-19 Pandemic, which has made its mark especially during the last year, once again revealed the importance of a sustainable structure in logistics processes. The Covid-19 breakout strengthened the governments' recognition of the importance of logistics in all over the world, while also placing the focus of the policymakers and the industry on green recovery in the coming years. Indeed, the focus on the concept of sustainability has come to the fore with the call for The Green Deal of the Horizon 2020 program of the European Union as well.

There is a major issue setting the tone among supply chain's current challenges: achieving sustainable logistics.

As is well known, achieving efficiency in the supply chain mainly involves improving customer service and decreasing costs. To do this, the distribution and transport activities – which are part of the chain's last stage – face risks directly related to the speed in deliveries demanded by clients and to the impact of transport on the environment.

Both aspects require a focus on sustainability considering a logistics system that promotes the optimal design of routes and shorter trips to lower the emissions that pollute the environment. Consumers and companies from all sectors are increasingly developing an environmental awareness, which is put into practice in their operations and daily lives, is also demanded from their direct suppliers.

We were excited about some of the scientific studies to be presented at the symposium within this scope.

Sustainable logistics aims to decrease the ecological footprint of its tasks, such as CO2 emissions, noise pollution, and accidents. In this sense, logistics suppliers must look for a balance between financial growth, environment care, and the health of society.

In any case, continuity of a business is much more important than beginning. For this reason, the theme of the symposium has been determined as sustainability and brought together all of us, valuable participants.

There are well-known keynote speakers from Turkey, Japan and the United States, and also numerous valuable scientific studies will be presented at this organization, I hope it to be fruitful and efficient for everyone.

I would like to thank everybody contributing to all processes of the symposium from the beginning of the preparation phase to the end.

　　　Thank you.

Ayhan DEMİRCİ

Head of Department of International Trade and Logistics

ABSTRACTS PRESENTED AT THE SYMPOSIUM

USING GRAY RELATIONAL ANALYSIS AND MOORA METHODS BASED ON FUZZY AHP IN THE PROCUREMENT PROCESS OF DEFENCE INDUSTRY PROJECTS: Example of Air Defence Missiles

Kenan ORÇANLI[1] Murat GÖRMEN[2]

Today, the development of technological weapon systems makes it necessary for a country to take air defence precautions against threats that may come from the airspace. The basic principle in the creation of the air defence system is to plan from far to close, in other words, to take air defence precautions from far threat to near threat in the planning. Weapon systems with varying ranges are used in the planning of a country's air defence. Strategic air defence weapon systems have very important roles in the planning, since the threat must be fired from the longest distance. However, it is not an easy task for deciders in a country to procure and purchase an air defence weapon systems. Because air defence weapon systems are costly and therefore can not contain errors. It is necessary to consider more than one criterion at the same time in the selection process. In this context, we can consider the selection process of air defence weapon systems as a multi-criteria decision-making problem. In this study, it has been tried to show that strategic air defence weapon system selection process is a multi-criteria decision making problem and how this problem should be solved with Gray Relational Analysis and MOORA Methods based on Fuzzy AHP. In the comparison made with Fuzzy AHP-based Gray Relational Analysis and MOORA Methods, a comparison was made regarding the selection of four strategic air defence weapons. In the comparison, S-400, MEADS, HQ-9 and ASTER air defence systems were selected as alternatives and these alternatives were compared according to cost, maximum altitude, maximum distance and radar range criteria. At the end of the study; the best air defence system is S-400 air defence system in both Gray Relational Analysis and MOORA method. It is considered that the study will be beneficial for the enterprises, governments and strategic level decision makers who import weapons system.

Keywords: Fuzzy AHP, Gray Relational Analysis, MOORA, Air Defence Missiles.

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COPRAS AND EDAS METHODS FOR SELECTION OF GREEN SUPPLIER

Ayhan DEMİRCİ[3]

Sustainability as a concept; includes economic, social and environmental approaches in relation to each other and also supply chain components. In this context, the right suppliers were selected, which is the most important component for the integration of a sustainable supply chain process. The right selection of the suppliers, which is the first step of the production processes, at the beginning stage, is the critical success key to the smooth functioning of the entire process. The right suppliers that focus on green practices are important for sustainability. However, such decisions, which should be made under the influence of a wide variety of criteria, are too critical to be left to the intuition of decision makers. At this point, multi-criteria decision making techniques, which provide the most important decision support opportunity, also provide rationality and convenience for decision makers in the selection of green suppliers. In this context, firstly a literature search was conducted in the study and the criteria used in the selection of green suppliers, which could be discussed in three sub-headings, were determined. At this stage; Resource Utilization and Green Competence (C1-Green Storage, C2-Green Recycling, C3-Green Production Capacity, C4-Green Packaging, C5-Resource Consumption, C6-Pollution Control), Economic Criteria (C7-Logistics Costs, C8-Product Costs, C9-Delivery Time) and Quality (C10-Error Rate, C11-Warranty and Rights Policies, C12-Environmental Competencies and Documents). Then, the determined criteria were weighted and finally, green suppliers were selected using COPRAS and EDAS, which are the multi-criteria decision making techniques that have made significant improvements in recent years. As a result, the most suitable supplier was selected among the determined 7 alternative suppliers. Although there is a difference in the ranking made according to the selections by using both methods, the supplier C2 took the first places and came to the fore.The reason for choosing two different techniques in the study is that the techniques give similar results with each other and thus the strengths of the techniques are determined. In addition, it is to contribute to the correctness of a decision to be made at the strategic level at the first time, especially by preventing possible mistakes.

Keywords: Green Supplier, Logistics, Multi-Criteria Decision-Making, COPRAS, EDAS.

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EVALUATION OF LOGISTICS PERFORMANCE INDEX (LPI) CONSISTENCY USING ORDERED LOGISTIC REGRESSION MODEL

Gökçe MANAVGAT[4]

The role of effective logistics activities has increased significantly with the development of international trade. Therefore, the success of countries in trade is also closely related to the well direction of the processes different logistics activities. Moreover, a strong logistics performance contributes to the expansion of trade, diversification of exports, the success of attracting foreign direct investments and economic growth. Developed and low-cost logistics services have serious effects on countries' trade, income and sustainable growth levels. Therefore, global logistics performance has an important role for countries to evaluate their position relative to their competitors. The Logistics Performance Index (LPI) declared by the World Bank is a comprehensive indicator used to compare and rank the logistics activities of countries. In this study, the score of Logistics Performance Index of 112 countries was divided into three quintile as low, medium and high, and the variables that could be effective in the logistics performance score were determined for the years 2014, 2016 and 2018 using the ordered logistic regression method. Thus, the determinants of the logistics performance index of the countries were estimated on macro scale and the ranking and classification success of the countries' Logistics Performance Index was determined. In other words, the consistency of the ranking of the Logistics Performance Index of the countries with the classification obtained from the ordered logistic model was revealed with a different dimension.

Keywords: LPI, ordered logistic model, logistics, classification.

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CIRCULAR SUPPLY CHAIN EFFICIENCY MEASUREMENT METHOD

Aleksandra LASKOWSKA–RUTKOWSKA[5]

The main purpose of this paper is to present an idea of circular supply chain and the measurement method of its efficiency. Circular supply chain is understood as "supply chain that takes into consideration its impact on the environment and the attention increases for opportunities to create value by reducing, maintaining and recovering natural resources. "Paper consists of: theoretical part concerning environmental regulations, impacting supply chain management, and supply chain efficiency measures, methodology concept for measuring the efficiency of the circular supply chain, results of research done in the group of 265 of Polish enterprises, employing over 150 employees, from FMCG sector. The research focus was on the usefulness of the proposed measures. Research methods used in this paper are: literature review and CATI based interview. The contribution of this paper consists ~~in~~ of providing ~~a~~ methodology for measuring the efficiency of the circular supply chain and presentation of research results. The research findings are: the proposed methodology can be used to measure of circular supply chain efficiency; the survey results, confirm the applicability of presented methodology in the sector; the limitation of the study is the research sample.

Keywords: Circular Supply Chain

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A STUDY OF THE IMPACT OF POSITION OF CENTER OF GRAVITY ON ROLLOVER BASED UPON DETECTION OF THREE-DIMENSIONAL CENTER OF GRAVITY

Kailun YU[6], Yutaka WATANABE[7]

Preventing truck rollover accidents is of great significance to ensure traffic safety by which No.9 of SDGs is forwarded. When a truck passes through a curve, if the centrifugal force moment is greater than the gravitational moment, the truck will tend to roll over. Even if the truck's speed is low and the load is not heavy, but the center of gravity is high, the centrifugal torque will still be large. Therefore, how to find the position of the center of gravity is a very important issue. Detection of Three-Dimensional Center of Gravity (D3DCG) can determine the position of the center of gravity in a short time when the truck is moving. This paper firstly introduces the principle of truck rollover which finds that whether the truck rolls over is related to the curve radius, speed, height of the center of gravity and the distance between the wheels on both sides. Secondly, the paper demonstrates the theory of D3DCG which can calculate the position of center of gravity based upon the natural frequency of the moving truck. Then, the authors use a truck scale model to verify the accuracy of D3DCG and conducts a contrast experiment to prove that even if the load remains the same, the truck with higher center of gravity is easier to roll over. The achievement of this paper provides a new possibility to prevent rollover accidents and can also contribute to the sustainable development in transportation industry.

Keywords: Rollover accident, D3DCG, Traffic safety, Natural frequency

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NETWORK-BASED OPTIMIZATION OF LNG TRANSPORTATION ROUTES

Shan TENG[8*], Yutaka WATANABE[9]

In recent years, as the representative of affordable and efficient clean energy, liquefied natural gas (abbreviated to LNG) emits less carbon dioxide during combustion than oil and coal, entering a period of rapid development. LNG has been not only widely used in power generation, urban gas, industry but also the field of automotive fuels, which has led to the rapid growth of LNG trucks. However, safety issues of LNG truck transportation have become increasingly prominent. As LNG is flammable and explosive, once the accident occurred it is prone to cause fire, explosion. In previous studies, the dangerous goods transportation route was simplified to the shortest path problem. However, this method does not easily reflect the actual situation in which rescue capabilities in the accidents also need to be considered. Therefore, it is essential to optimize the LNG transportation route, which is premised on ensuring transportation efficiency, with low accidents risk, secure the rescue facilities with little impact on the environment. Firstly, collect 81 cases of LNG truck transportation accidents in the past ten years, and analyze the accidents from three aspects: accident characteristics, accident causes and accident consequences, to get the general rules and characteristics of LNG truck transportation accidents. Secondly, the truck transportation of LNG risk analysis model is built and is put forward the improved multipurpose LNG transportation analytical model with taking multiple constraints into consideration such as the travel time, the accidents risk, the efficiency, access to the rescue facilities. Finally, Dalian, a medium-scale city in China, is applied to LNG truck transportation as an example, to study the risk analysis. With the multipurpose transportation system achieved on ArcGIS, the Network Analysis extension module will be used to calculate the optimal route and evaluate the visible results.

Keywords: LNG transport; Risk analysis; Route selection; Accident simulation

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WHEN BLOCKCHAIN MEETS MODERN SUPPLY CHAIN – A BLUEPRINT OF FUTURE GREEN LOGISTICS TOWARDS ACHIEVEMENT OF THE SDGS

Enna HIRATA[10]

This study provides a framework for future green logistics, which incorporates Physical Internet (PI), Blockchain (BC), Artificial Intelligence (AI) and Internet of Things (IoT). Supply chain sustainability is critical to the achievement of UN's Sustainable Development Goals (SDGs) by ensuring making global business local, reducing costs and enhancing profitability. In the past, the output of logistics is the delivery of goods. Now it has been changed to also consider environmental, social and governance of suppliers. In the era of Industry 4.0, Logistics entities evolving in sustainability require a broader prospective and a deep understanding of the integration of breakthrough technologies like PI, AI, IoT and BC to achieve sustainability. This study reviews the latest progress of each technology and proposes a blueprint of future sustainable logistics. Apart from the integration of those innovative technologies, it also discusses the application of economics and business administration theories, which altogether represents the novelty of the study.

Keywords: Blockchain, Artificial Intelligence (AI), Internet of things (IoT), Physical Internet (PI), Sustainable Logistics, Green Logistics, SDGs

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PRIORITIES IN SUSTAINABLE AND LOW CARBON CITY TRANSFORMATION: AHP METHODOLOGY

Özgür Uğur ARIKAN[11]

Cities are the largest producers of global carbon emissions, despite being significant centers of industrial prosperity. Rapid urbanization, in combination with global warming, is posing an increasing concern to environmental health, social well-being, and life quality. However, a holistic approach to sustainable development is required by the 2030 Agenda. Thus, it must be considered a variety of factors, including the rate of carbon emission, the economic and socio-political situation of cities, and environmental legislation. Sustainable city models are proposed as a potential solution to possible environmental degradation and mass poverty. The Sustainable and low-carbon city concept has surfaced over the past decade and has been increasingly integrated with urban planning. The purpose of this study is to prioritize the criteria that should be focused on the transformation of Mersin into a sustainable and low-carbon city. The analytical hierarchical process approach, one of the multi-criteria decision-making methods, gives consistent and reliable results when prioritizing the determined criteria, according to the literature review. As a result, the AHP approach was used in the study. As a result, criteria determined by the literature and expert opinions, such as Primary Health Care, Education Facility, Sustained Population Growth, Saving Potential, Entrepreneurship, Reduced Pollution (including noise), Mass Transportation, Non-Motorized Transport, Smart Housing, Human Talent Management, Renewable Energy Use, Waste and Water Management, were prioritized and listed with the Analytical Hierarchical Process. Education Facility, Human Talent Management, Renewable Use, Waste and Water Management is decided to be the most important criteria. Considering the AHP analysis, initial steps have been explicitly stated for a sustainable and low-carbon city transformation of the province of Mersin. The limitation of the study is that it is measured based on a biased expert opinion.

Keywords: AHP, Low-Carbon City, Multi-Criteria Decision-Making, Sustainable City

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THE POSSIBLE ENVIRONMENTAL EFFECTS OF RAILWAY TRANSPORT FROM CHINA TO EUROPE

Köksal HAZIR[12]

Ships departing from China can reach Turkish ports in approximately 30-35 days and European ports in approximately 40-50 days. This duration is the long time for products to reach the market. Railway transportations provide various advantages in terms of delivery time compared to sea transport. Other hand, provide costs advantage compared to air and road transport. Railway transportation is developing from the line called the middle corridor (Trans-Russia-China-Europe Route) as an alternative transportation route from China to Europe or vice versa. Trains from this line can carry the load in about two weeks. In addition, China, Kazakhstan, the Caspian transition, Azerbaijan, Georgia, Turkey, carrying out up to London this is possible and even begun block train applications. By train, freight can arrive in Izmit Köseköy from Xi'an city of China in 12 days. Considering the shipments by ship between these two points, it takes more than 30 days. As a result, service is obtained that provides 1/5 of the air transportation cost and 1/3 of the sea transportation delivery times. In addition, goods can arrive safely and on time with cost efficiency without being much affected by meteorological conditions. The main purpose of this study is to predict by comparing seaway and railway and what kind of change will occur in the damage to the environment in freight transportation by considering the trends emerging in China and Europe. In this context, by reviewing the literature, the developments in the block train applications and the harmful gases emitted per km / ton in the seaway and railway will be determine. On the other hand, the expected changes in freight transport on new routes will be revealed by conducting trend analyzes and predictions will be made by calculating the effects of this on global pollution.

Key Words: Middle Corridor, Railway Transportation, Block Train, Air Pollution

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SUSTAINABLE MARKETING

Aslıhan YAVUZALP MARANGOZ[13]

World faces environmental problems such as decreasing natural resources, increasing population and air pollution, global warming and climate changes. And they all raise environmental awareness. In this context the concept sustainability comes to the fore. Sustainability can be defined as a system that manages environmental, social and ecoomic issues in a holistic view. Sustainability has also entered marketing literature like many business fields. Sustainable marketing is defined as the process of planning, implementing, and controlling the development, pricing, promotion, and distribution of products that based on satisfying customer needs, achieving organizational goals and being compatible with ecosystems. In other words it is building and maintaining sustainable relationships with customers, the social environment and the natural environment. For transition to sustainable marketing, managers, employees, marketing information system and sustainable mission are required. The purpose of the study is to examine sustainable marketing. The relationship between sustainability and marketing are explained. Definition, historical development, dimensions, components, benefits, the process and examples of sustainable marketing and sustainable consumption are identified.

Keywords: Sustainability, sustainable marketing, sustainable consumption

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ZONE-BASED VEHICLE ASSIGNMENT MODEL IN URBAN FREIGHT MANAGEMENT

Aysegul TAKIMOGLU[14], Umut Rifat TUZKAYA[15]

The quality of life in the cities is affected by increasing logistics and transportation activities due to new consumption habits, the economic and social structures of the society. We should operate the freight transport processes more efficient and manageable by taking into consideration the characteristics of the city. This responsibility is critical for next generations. The purpose of this study is to design a zone-based vehicle assignment and transportation model in freight transportation, considering the geographical, historical, environmental, social and economic characteristics of the city. In accordance with this purpose, the criteria which affect the transportation activities are determined for identification of zones. Then, four zones for Istanbul are created by using hierarchical cluster analysis. The characteristics of each zone related to logistics activities are detailed. Also, the features of freight transportation vehicles are identified for the model. In the last step, a vehicle assignment model is designed according to product demand and production of those zones. The aims of the model are maximizing the convenience of the vehicle to the zone, minimizing transportation cost, transportation time and environmental harm. The freight transport activities are modelled on zone basis and an optimum model proposal is created related the compatibility of the zone and vehicle type.

Keywords: vehicle assignment, urban logistic, zone-based freight transport, clustering analysis

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THE IMPACT OF AUTONOMOUS VEHICLE ON TRAFFIC SAFETY LEGAL COMPLIANCE AND ITS EFFECT IN LOGISTIC SECTOR

Bilal ŞEKER[16], Atiye TÜMENBATUR[17]

Autonomous vehicles, also called autonomous, driverless or robotic vehicles, are intelligent machines that integrate vehicle mechanical systems and information technologies, utilize highly advanced control systems, analyze and combine independent and in-vehicle data with environmental data. The existence and level of development of these machines will revolutionize software technologies and pave the way for the emergence of smart cities. All these developments will make human life easier and minimize the risks of traffic accidents caused by human factors such as fatigue, distraction, radio channel change and mobile phone talk with the spread of driverless vehicles. Although these developments make human life easier, they will bring some problems. In the event that a human emotion-free decision-making system is involved in a fatal or injured accident, it is not clear what the legal responsibility will be and to what extent this will affect traffic safety. This study will focus on how driverless vehicles will affect traffic safety and legal compliance in Turkey.

Keywords: Autonomous vehicles, Legal compliance, Traffic safety

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GROWING POTENTIAL FOR FOOD LOGISTICS IN TURKEY

İbrahim BOZ [18], Mustafa BEKMEZCİ [19]

Nowadays as human beings in the globe have been suffering significantly from the Covid-19 pandemic, we have been also searching for new lifestyles to survive and overcome the life threating pandemic. On the one side, people look for more isolated lifestyles and keeping social distancing among them, on the other side they also want to improve their physical and mental health conditions. In order to fight with pandemic related viruses, better health conditions play key role, thus people tend to pay more attention for better food consumptions, in return demand for good, natural and organic food has increased in general. At the same time, we have been witnessing that small scale food producers have marketing themselves and their products in social media tools using information technologies. For example, some small-scale food producers such as honey, olive oil, cheese, and similar producers are using quite well Facebook and WhatsApp tools to market their products in the national retail market. As a result of the Covid 19 pandemic, it is noticed that consumers reduced their food demand from industrial producers, shopping centers or outlets, and they have tended to increase their demand toward good quality food which are sold by electronic sales tools and delivered independently to consumer' residence. As the number of consumers and their order numbers have increased, then it has been also noticed that average costs have declined due to the scale of economics which is very basic principle of economics that higher number of sales reduce average costs of daily operation. Afterwards we can also notice that as long as price paid for food sold is good enough for example as for honey, olive oil and cheese, then the producers may cover delivery costs and saying to costumers that buying these type of foods does not require to pay shipping costs. Thus, one can say that there is a now growing potential for door-to-door food delivery between small scale food producers and consumers who may live in big cities in Turkey.

Keywords: Food Logistics**.**

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TURKEY'S COMPETITIVENESS IN THE LOGISTICS SECTOR: AN EMPIRICAL PRACTICE IN G-20 COUNTRIES

Cuneyt CATUK[20]

In a globalized world, the growing volume of trade with the development of transport systems has increased the importance of the logistics sector for countries. Turkey's achievement of production and export targets in all sectors will be possible with the correct and efficient planning and management of its logistics infrastructure. In this context, the aim of the study was to emphasize the importance of logistics in the development of the Turkish economy and its relationship with global competitiveness. In order to measure the competitiveness of Turkey in the logistics sector, the effect of the Global Competitiveness Index (GCI) and sub-components of the G-20 countries on the Logistics Performance Index (LPI) and sub-components was tried to be measured by regression analysis. LPI was taken as a dependent variable, and the effect of GCI and its subcomponents was measured. As a result of the analysis, it was concluded that there is a high correlation between GCI and LPI (R=0.961) and the model is descriptive (R2=0.923), and it is holistically significant because the Anova test is at the level of F=6,033 ($p < 0.05$). As a result of the regression analysis, sub-factor of GCI which is Innovation capability has an effect on countries' LPI. Therefore Turkey should focus on this factor in order to increase its competitiveness. The relationship of the LPI with the GCI is important in terms of emphasizing the authenticity of the study.

Keywords: Logistics, Logistics Performance Index, Global Competitiveness Index

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AN INVESTIGATION OF THE FACTORS AFFECTING THE SHARE RETURNS OF COMPANIES IN THE LOGISTICS SECTOR: THE XULAS EXAMPLE

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The purpose of this study is to examine the effects of changes in the dollar rate, which is one of the main macroeconomic factors, the oil price, which is an important input cost for the transportation sector, and the returns of the Borsa Istanbul 100 index, on the stock returns of companies traded on the Borsa Istanbul Transport Index (XULAS). The sample of the study consists of 7 companies operating in the Borsa Istanbul Transport Index (XULAS). These companies are Beyaz Filo Oto Kiralama A.Ş. (BEYAZ), Çelebi Hava Servisi A.Ş. (CLEBI), DO & CO AG (DOCO), GSD Denizcilik Gayrimenkul İnşaat Sanayi &Ticaret A.Ş. (GSDDE), Pegasus Hava Taşımacılığı A.Ş. (PGSUS), Reysaş Taşımacılık & Lojistik A.Ş. (RYSAS) and Türk Hava Yolları Anonim Ortaklığı (THYAO). The scope of this study has been determined as March 1, 2019 - April 1, 2021, in order to observe the impact of the COVID-19 global epidemic, which has affected the whole world in the last year, on the financial markets and to present up-to-date information on the sector to users and investors. In this study, simple linear regression and correlation analysis were used. According to the results of the analysis, the change in the dollar exchange rate (USDTRY) has been found to have a significant explanatory power on DOCO, but no significant explanatory power over other companies has been detected. On the other hand, it has been observed that the change in BIST100 returns has a significant explanatory power on all companies in the index. On the other hand, while the change in crude oil barrel prices (WTI) has a significant explanatory power on the yields of WHITE and GSDDE; No significant explanatory power was detected on CLEBI, DOCO, PGSUS, RYSAS and THYAO. A negative correlation was found between WHITE, GSDDE and WTI. A positive correlation has been detected between BIST100 and all companies in the index.

Keywords: Borsa Istanbul, Transportation Index, Share

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DATA ANALYSIS OF HIGH-CAPACITY VEHICLES BY MACHINE LEARNING FOR SUSTAINABLE LOGISTICS IN JAPAN

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In recent years, the Japanese logistics industry has been facing an increase in freight transportation demand and a serious shortage of truck drivers. To address the labor problems and improve efficiency for sustainable logistics, trucks with double trailers whose length is over 21 meters were introduced. They are called longer and heavier vehicles (LHV) or high capacity vehicles (HCV). In this study, the driving characteristics of the high capacity vehicles will be studied by applying k-means clustering algorithm in machine learning and geographic information system. The data used in this study were obtained from the experimental runs between October 2017 and July 2018, conducted by the Ministry of Land, Infrastructure, Transport and Tourism. Before k-means clustering algorithm is applied, the elbow method is applied to find the optimal number of clusters and the silhouette coefficient is calculated to evaluate the quality of clusters which indicates how well the data are clustered. By k-means clustering, the data are grouped into different clusters. The resultant clusters are visualized in the geographic information system. The clusters are studied and compared how the driving characteristics of the trucks differ in each cluster and how the characteristics correlate to each other. This study is focused on the heart rates and the fluctuations throughout the trip. The outliers of high heart rates and the associated characteristics are identified how they occur and in which areas the drivers can suffer stress.

Keywords: high capacity vehicles, k-means clustering, heart rate, truck speed

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INVESTIGATION OF THE FACTORS THAT AFFECT THE STOCK RETURNS OF COMPANIES LISTED IN THE BORSA ISTANBUL TRANSPORTATION INDEX

Ecem ÖZHAN[25]

The aim of this study is to investigate the factors on the share stock returns of companies in the BIST Transport Index. The sample of the study; Beyaz Filo Oto Kiralama A.Ş. (BEYAZ), Çelebi Hava Servisi A.Ş. (CLEBI), Do & Co Aktiengesellschaft (DOCO), GSD Denizcilik Gayrimenkul İnşaat Sanayi ve Ticaret A.Ş. (GSDDE), Pegasus Hava Taşımacılığı A.Ş. (PGSUS), Reysaş Taşımacılık ve Lojistik Ticaret A.Ş. (RYSAS) and Turkish Airlines A.O. (THYAO). The working period was determined by taking into account the continuity of the data of the companies included in the specified index and in this context, Trabzon Liman İşletmeciliği A.Ş. (TLMAN) could not be included in the analysis. Simple regression method was used in the study conducted between 2013:06-2021:02 using monthly data. In the regression model used in the study, while share stock returns of the relevant companies are dependent variables, exchange rate, the golden ounce price and BIST 100 Index returns are determined as independent variables. According to the analysis results, while BIST 100 index returns are found important in all regression models; It has been determined that exchange rate and the ounce golden returns have less effect on share stock returns. Also when the F statistic value was examined, the regression model belonging to CLEBI was found to be meaningless and the analysis result of this model was not evaluated.

Keywords: Borsa Istanbul Transport Index, Macroeconomic Variables, Linear Regression Analysis.

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RESEARCH ON SUSTAINABLE CRITERIA AFFECTING THE LOGISTICS SECTOR

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The understanding of sustainability can be applied in almost every sector, and has a very wide impact in the logistics sector. Today, taking into account the sustainability criteria is among the basic conditions of doing business for companies in the supply chain, and it is becoming more and more important. In this study, 15 articles that studied with sustainable logistics criteria between 2006 and 2020 are reviewed and the sustainable logistics criteria included in each study are determined. These 103 logistics criteria, which are determined, are ranked in importance by Pareto analysis, in consultation with expert academicians and logistics sector employees, and it is concluded that 33 criteria can be more important than others. These criteria are transport optimization, energy and fuel efficiency, production and distribution planning, environmental conditions, well-connected information and goods flows, internal resources efficiency, effectiveness, and utilization, selection of fuel type to be used, choice of mode of transport and intermodal transport, energy use, waste management, recycle efficiency, vehicle selection and efficiency, logistics cost optimization, using advanced technology and software in logistics activities, minimum energy consumption, economic factors, greenhouse gas emissions, reduced packaging, supply chain integration, consumer awareness studies, social factors, logistics competence, reverse logistics applications, government rules and regulations, sustainability behavioral cautiousness, use of recycled material, increasing awareness, organizational support, employee benefits, green packaging, consumer behavior, infrastructure, product value. With the understanding that it is possible to minimize the damage caused by the sector to the environment with an effective sustainability strategy, if these sustainable logistics criteria are given importance, logistics companies will reach a competitive level in the field of sustainability.

Keywords: Sustainable logistics, logistics criteria, sustainability, sustainable logistic literature review, pareto analysis

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AN ANALYSIS OF THE REVEALED COMPETITIVE ADVANTAGES OF MERSIN PROVINCE FOR FRUIT AND VEGETABLE MARKET IN FOREIGN TRADE

Esra MEŞTEK[27]

Different approaches have been put forward to measure the competitive advantage of countries among themselves in international trade. The approaches put forward help determine the sectors of the countries where they are strong and in determining their place in the world markets. One of the widely used approaches in the international system is the "Revealed Competitive Advantage" index. In the study, according to both the world and the Middle East market, Turkey's competitive advantage on "Consumable vegetables and certain roots and tubers (section 07)" and "Consumable fruit and nuts, and the peels of citrus fruits and melons and watermelons (section 08)" have been analysed. Because of being neighbouring of Turkey and nearby export partners in the Middle East region, 12 Middle East countries selected to be analysed. Additionally, it is considered that Mersin province has an important place in the market share of the 07 and 08 section groups. That's why the competitive advantage of Mersin, sections 07 and 08, is analysed as regards both Turkey and the Middle East countries. In the study, calculations were made according to the Revealed Competitive Advantages published by the United Nations, and secondary data were obtained from Turkstat and Trademap websites. As a result of the study, Turkey's situation in the world and The Middle East market is analyzed according to section groups. Whether the market of Mersin has a strong competitive power by considering both the market situation of Turkey and the Middle East is discussed.

Keywords: Mersin Province, Competitive Advantage and the Middle East

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THE ROLE OF THE CONSUMERS IN SUSTAINABLE LOGISTICS: WILLINGNESS TO PAY FOR ECO-FRIENDLY PACKAGING

Esra ÖZTÜRK[28] Didem DEMİR[29]

In the 21st century, economic, social and environmental problems caused by overproduction and overconsumption have led individuals to display pro-social behaviors in their consumption processes. Therefore, businesses have become increasingly aware that sustainability efforts benefit the environment, society and their brands. With the growing tendency of sustainability, green packaging has received increasing concern in the logistics industry. With the transition from linear economy to circular economy, businesses have started to use environmentally friendly materials in their packaging to support sustainability. However, the point that businesses overlook is that eco-friendly packaged products will not achieve their purpose unless consumers buy. The main purpose of this study is to examine the effect of the influential factors on the consumers' willingness to pay for green packaging and assess consumer preferences for the types of eco-friendly packaging. In this context, a delicately designed online survey was conducted in Turkey of 210 respondents in order to explore their willingness to pay for green packaged products. The principal factor analysis results indicate that four influential factors affecting consumers' willingness to pay are found out: (1) functionality and practicality of packaging, (2) social environmental impact of packaging, (3) design and price of packaging and (4) external environment factors. Additionally, the results show that consumers would like to attach greater importance to the protective capability and environmental impact of packaging compared with the external factors such as impact from others, packaging appearance and packaging price. Moreover, it was observed that the most preferred eco-packaging type is glass, followed by biodegradable plastic and paper respectively, and the least preferred type of package is wood. Recognizing the consumers as the agent of sustainable logistics, this study will provide important implications for companies and decision-makers for a more sustainable world.

Keywords: sustainable logistics, sustainable consumer behavior, eco-friendly packaging, green packaging, willingness to pay.

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FREIGHT TRANSPORTATION AND THE COVID-19 OUTBREAK: FRESH INSIGHTS FROM THE US ECONOMY

Esranur YILMAZ[30], Mehmet Aldonat BEYZATLAR[31]

The outbreak of coronavirus (COVID-19) have changed the whole world completely. The virus was first detected in December 2019 in China and later spread from one country to another and became a pandemic. The increasing number of cases and deaths has obliged governments to take some important precautions and apply policies in many areas to control the outspread of the virus. The pandemic affects many parts of societies including education, lifestyle of citizens, and international interactions. While households and firms trying to adapt to pandemic conditions, economies have also affected and changed considerably because of the preventative policies. Moreover, transportation is especially affected by pandemic conditions, and freight transportation become more vital in economic activities. This study aims to reveal the Granger-causality between freight transportation and COVID-19 measures for the United States with monthly time-series data for the period January 2020 and January 2021. Freight transportation and COVID-19 measures were obtained from Federal Reserve and World Health Organization databases, respectively. The empirical results indicate unidirectional causality running from COVID-19 cases to freight transportation services index; to air freight revenues; to rail freight traffic. While no causality is detected between COVID-19 cases and Cass freight index, bidirectional causality is detected between COVID-19 deaths and freight transportation services index, and rail freight traffic. Lastly, unidirectional causality is running from COVID-19 deaths to Cass freight index, and to air freight revenues. The majority of these results provide considerable evidence for the Granger-causality relationship between COVID-19 measures and freight transportation in the US economy. These results show that the contagion deserves much more attention from public and private transportation professionals, who are responsible from the governance and the regulation of the transportation market.

Keywords: Freight transportation, COVID-19, Granger-causality, United States

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REVERSE LOGISTICS FOR DRINK BOTTLES SOLD IN TURKEY

İbrahim BOZ[32], Mustafa BEKMEZCİ [33]

Since 1987 sustainable development has been widely discussed in the world and tried to be adapted to many branches of economic industries including logistics. The concept's coverage is inherently very wide, and thus many application field of the concept can be offered for logistic industry which became very important particularly after the Covid 19 pandemic in 2020. The slogan of reduce, reuse and recycle (3r) is one simple and practical form of sustainable development, which can make good sense for the consumers of final goods. Thus members of households can reduce, reuse and recycle the final goods that they purchased which may be delivered by a logistic company. We all notice that our life has been changing recently, so that we need to protect our resources (sustainable development), and we also tend to buy more from logistic companies instead of shopping malls, due to the pandemic. Then why not we apply to the slogan of reduce, reuse and recycle of the goods we purchased. One form of 3s is to apply depository payment by market pricing system for the bottles we purchased throughout logistic supply chain by which the original bottle supplier can collect the bottles that they sold in the past. As household consumers we all observe that most of the bottles of drinks we purchased that go to garbage currently as of the end of 2020. The number of those bottles, which can be plastic, glass or can, might be millions (or billions) in Turkey only. At the most, the half of those bottles are collected back in the garbage process stations, and the remaining half is left in the outside, streets, or in the nature, compare to the nationwide campaign has been initiated in Turkey so called "zero waste project". Now there is a good news from the Ministry of Environment and Urbanization that any bottle sold to consumers would include some depository payments in order to cover the cost of bottle say 0.25 or 0.50TL (just as an example). Thus we can say that many household members would tend to keep the bottles that they purchased instead of throwing away them compare to the past. It can be claimed that consumers are going to save the bottles and take back to the store or to collection stations and sell them back. Thus the number of bottles used in total is expected to decline, which eventually help us to keep our natural environment better.

Keywords: Reverse logistics, Depository, Bottle.

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HOW CAN BUSINESS WORLD LEARN FROM HUMANITARIAN ORGANIZATIONS FOR AGILITY?

Qing LU[34], Jie WU[35]

This study applies lessons learned from the humanitarian field for agility into the business world. Agility is an important business strategy to deal with great uncertainties in demand or supply. During the Covid-19 pandemic, some industries such as healthcare have experienced demand surges while others like airlines a severe recession. As the business environment is going to experience more changes in the post-Covid world, new thinking and approaches are needed. As humanitarian organizations have frequently experienced demand surges due to natural and man-made disasters under a limited budget, their experiences in dealing with such an environment would be of value for the business world. We summarize their approaches in human resource management and rapid network configuration based on both literature review and field study and apply them to the business world. A humanitarian organization with more development programs would rely more on internal staff with ambidextrous capabilities rather than external manpower when a sudden onset disaster occurs. In the business world, it means preparing an emergency-ready team to deal with unexpected events such as public-relation disasters while working in other positions in normal times. On collaborating with the local partners, an international humanitarian organization would prefer an inclusive partnership with many local partners to expand its network in the field. Similarly, in industries with lots of uncertainties, single sourcing for critical supplies can be risky and firms should develop more diversified supply networks with some redundancy for higher chain resilience. This study applies humanitarian practices to the business world, a direction opposite to more humanitarian studies. While the humanitarian world has benefited greatly in recent years from borrowing business theories and practices, the opposite application could be valuable when more firms are moving from a lean strategy to greater emphasis on agility and resilience in a more turbulent post-Covid era.

Keywords: Humanitarian organizations, emergency preparedness, agility strategy, business strategy for uncertainty

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THE IMPORTANCE OF HUMAN RESOURCES IN SUSTAINABLE LOGISTICS

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The concept of sustainability in management science is described with two interrelated perspectives. The first is to create a permanent competitive advantage in order to ensure the long-term continuity of companies. The second is to fulfill the responsibilities of the society in which it operates regarding the sustainable development goal. In this context; if businesses manage the supply chain, which is defined as the process of converting raw materials into products and distributing them to the end customer, and logistics defined as the positioning of resources in the supply chain depending on time, they can achieve sustainable competitive advantage, gain above average profit and continue their existence. With this point of view, today, due to scarce resources, logistics has to be designed to meet the needs of future generations, in other words, the concept of "Sustainable Logistics" has come to the fore. Sustainability consists of many factors that are related to each other. These; are environmental, social, cultural and economic factors. In general, it is believed that social sustainability should be provided first in order to ensure sustainability in all disciplines. Social sustainability focuses on social relationships, interactions and meeting human needs that affect sustainable development. The social and cultural aspects of human beings, which are the most important actors in ensuring sustainability, have an important role in shaping economic and environmental factors. Therefore, the need for trained and qualified people, who are becoming increasingly important in terms of sustainability in the logistics sector as in other sectors, and who form a social element in logistics businesses, is increasing day by day. The most important source of achieving a sustainable competitive advantage by increasing the performance of supply chain and logistics is to employ qualified people. In this context, sustainable human resources principles that can ensure the longevity of logistics businesses were mentioned. Also, the duties and responsibilities of HR managers in the issues of selecting, training, measuring, rewarding employees in sustainability-oriented human resources management were discussed. Along this line the occupational health and safety of employees were scrutinized. Finally, some differences as well as similarities between the concepts of strategic human resources management and sustainable human resources management are discussed.

Keywords: Sustainability, logistics, human resources.

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COLD CHAIN LOGISTICS OPERATION IN TURKEY AND SOLUTION SUGGESTIONS

Tolga ÖZ[38]

In the logistics of perishable food products the first concept that comes to mind is the cold chain.

Cold chain process is the process which can be described as the low temperature storage of food products starting from the production phase including the shipment, storage and consumption stages. The equipment and process used to preserve chilled and frozen food are also an integral part of cold chain logistics operations. In addition, the cold chain enables the product to be transported from the place of production to other needed places and to provide the product for a longer period of time, in other words, it provides the product to be sold at a higher price because it adds value to the product. The cold chain requires caution and application without mistakes at all successive stages. In cold chain logistics operations food safety requires fragile applications. The purpose of food safety is to prevent spoilage and loss of quality with the measures taken to eliminate physical, chemical, biological and other hazardous agents in foods offered for consumption, and to extend the shelf life of foods. In order not to damage the physical, sensory and chemical structures of the products, the cold chain should not be broken at all stages from production to consumption and the entire operation should be carried out under hygienic conditions. Significant proportion of food perishment in Turkey is considered to be caused by incorrect application of cold chain operations. This situation harms both human health and the national economy. Domestic and international cold chain logistics operations are of great importance in terms of the national economy as well as food health and safety issues. Turkey ranks as 15th at the export of vegetables and 9th at fruit in the world according to 2018 statistics. With this production capacity, an average of 46 million tons of fresh vegetables and fruits are produced annually in our country and it is reflected in the statistics that an average of 25% of these perish each year. In order Turkey to reach her 55 billion dollars food export target for 2023, it is inevitable to set a road map for improvement of cold chain logistics operations. With this qualitative study by preventing food losses it is aimed to produce suggestions for more effective cold chain logistics operations to achieve the 2023 targets of Turkey.

Key Words: Cold chain, Logistics, Perishable food, Food safety, Added value

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DETERMINATION OF FACTORS THAT AFFECT USE OF E-COMMERCE IN EASTERN TURKEY THROUGH CATEGORICAL DATA ANALYSIS

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E-commerce can be defined as carrying out, handling and facilitating commercial activities over computer networks. E-commerce is an output of the latest technological developments witnessed in recent years that further facilitate free trade on a global scale as well as communication of information. This study aimed to investigate the differences in the use of e-commerce by individuals living in eastern part of Turkey and determine the relationship between demographic, economic and personal characteristics of individuals and use of e-commerce. Microdata set obtained from Household Information Technologies Use Survey was used in the study. Sampling method employed in the study was stratified 2-stage cluster sampling. Binary logistic regression analysis was used to determine factors associated with the individuals' use of e-commerce. According to the study, the likelihood of an individual with an income level of ₺6001 and above in the eastern region to use e-commerce was found to be 54.5% higher compared to the reference group (₺2000 and below). As a result of the study, variables such as income level, age, gender, occupation, use of social media, searching for information on goods and services on the internet, selling goods or services on the internet, use of internet banking, use of e-government, number of information equipment available in the household and household size were found to be associated with the use-of e-commerce. Considering the findings of the study, it is necessary to make internet use widespread by facilitating development of e-commerce in less developed regions and improving infrastructure for information and communication technology in these regions. Therefore, interventions specific to region need to be taken into consideration for access to information on e-commerce.

Keywords: Electronic commerce; online shopping; online purchase; e-commerce; Turkey; binary logistic regression.

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NEXT STATION WILL COME GREEN

Semih SAYGIN[41]

In the globalizing world, with the rapidly increasing population and developing technology, products, services, capital and people need to move around the world in the face of unlimited needs increasing day by day with limited resources. In today's world where borders are eliminated and competition is increasing, fossil fuel vehicles used unconsciously to ensure transportation, which is the most important part, are rapidly killing the habitable environment, nature and leaving huge carbon footprints for future generations. In this context, a series of environmentally friendly measures are taken to prevent environmental pollution with agreements such as the Kyoto Protocol, the European Union 2006 Rail Energy project and the Green Deal convention. The literature review has shown that new technologies to be developed around the world and trains using renewable energy sources come to the fore. In the future, railways have the potential to come to the fore in meeting the increasing needs, with their energy efficiency and minimal damage to the environment, compared to other transport modes. This qualitative research aims to clarify the transformations to be experienced in rail transport, which will shine in the framework of the goal of neutral carbon emission and zero environmental pollution by 2050 within the scope of the Green Deal convention. New technologies and studies were grouped by making a literature review. In particular, India's 100% green rail network project in 10 years has been examined as an example. In this context, new technologies such as high-speed trains and maglev (magnetic levitation), projects planned for railway development, new traffic management systems and technical infrastructure, personnel training were determined.

Keywords: Green Deal, Magnetic Levitation, Fast Train, Green Transport, Green Future

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