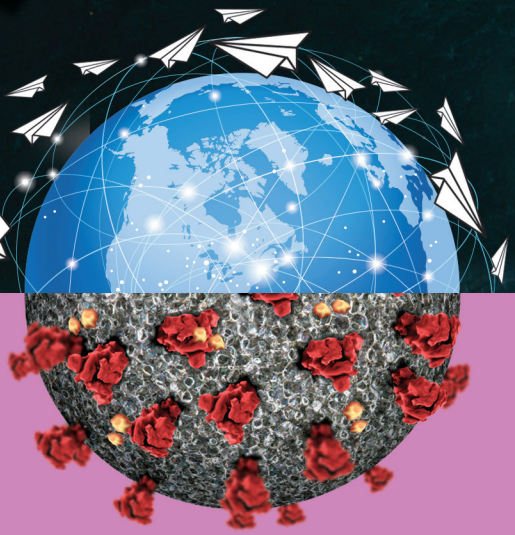

From the People of Japan

REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY AND TECHNOLOGY

UNDP

COVID-19
Crisis Response
and Resilience Project

LOGISTICS SECTOR ANALYSIS REPORT AND GUIDELINES

TRA2 REGION

(Ağrı, Ardahan, Iğdır, Kars)

LOGISTICS SECTOR ANALYSIS REPORT AND GUIDE

TRA2 Region (Ağrı, Ardahan, Iğdır, Kars)

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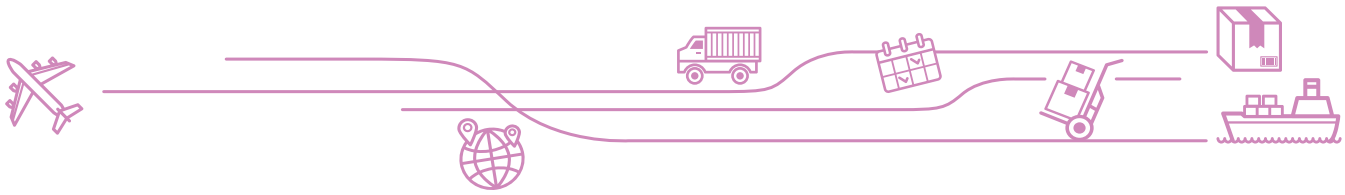

COVID-19 Crisis Response and Resilience Project

LOGISTICS SECTOR ANALYSIS REPORT AND GUIDELINES

TRA2 REGION

(Ağrı, Ardahan, Iğdır, Kars)

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ABBREVIATIONS

21CMSR	21st Century Maritime Silk Road
EU	European Union
R&D	Research and Development
UN	United Nations
HBM	Hot Bituminous Mixture
DHMİ	General Directorate of State Airports Authority
WTO	World Trade Organization
SWOT	Strengths, Weaknesses, Opportunities and Threats Analysis
GDP	Gross Domestic Product
IATA	International Air Transport Association
NUTS	Nomenclature of Units for Territorial Statistics
IRU	International Road Transporters Union
SREB	Silk Road Economic Belt
KGM	General Directorate of Highways
SME	Small and Medium Enterprises
BRI	Belt and Road Initiative
LPİ	Logistics Performance Index
MÜSİAD	Independent Industrialists' and Businessmen's Association
NACE	Statistical Classification of Economic Activities in the European Community
OIZ	Organized industrial Zone
PESTEL	Political, Economic, Social, Technological, Environmental and Legal
RFID	Radio Frequency Identification
TCDD	Turkish State Railways
TEN-T	Trans-European Transport Network
TEPAV	Economic Policy Research Foundation of Turkey
TOBB	Union of Chambers and Commodity Exchanges of Turkey
TRACECA	Europe-Caucasus-Asia Transport Corridor
TSKB	Industrial Development Bank of Turkey
CCI	Chamber of Commerce and Industry
TURKSTAT	Turkish Statistical Institute
UIC	International Union of Railways
UNCTAD	United Nations Conference on Trade and Development
UND	International Transporters Association
UNDP	United Nations Development Program
UTİKAD	International Transport and Logistics Service Providers Association

FOREWORD

The COVID-19 pandemic has gone beyond a health crisis and turned into a global problem, due to its impacts felt in all areas of life and all over the world. It is obvious that the problems caused by the pandemic, which has turned into a serious threat to all humanity, can be solved with a sustainable and fair understanding that requires international solidarity, cooperation, and common solution ideas.

The restrictions applied as a necessity of the pandemic led to slowdown in production, decrease in labor supply, delay in the supply of intermediate goods and raw materials, and increased logistics costs in our country as well as all over the world. Therefore, it is essential for sustainable development that policies should focus on the fragile sectors most affected by the pandemic in order to ensure the continuity of economic activities and accelerate the recovery.

By closely following the changes observed in the global system, Turkey carries out a comprehensive transformation in every field from education to health, from manufacturing industry to tourism, from industrial zones to research infrastructures.

Our development agencies, which perform their activities under the coordination of the Ministry of Industry and Technology, carry out studies at the regional level in order to reduce the negative impacts of COVID-19 on the national and regional economies and to identify the sectors most affected by the pandemic. One of our works in this field is the Government of Japan funded COVID-19 Resilience and Response Project, which we have implemented together with the United Nations Development Program (UNDP), the General Directorate of Development Agencies, and our development agencies.

Within the scope of the project, 25 region-based “fragile sector analysis reports” were prepared in the textile, logistics, food, machinery, and automotive sectors, which are of key importance for the Turkish economy. These reports, taking into account global developments and trends, offer new policy recommendations that will increase the resilience of the relevant sectors against crises. In addition, the “New Market Analysis” and “Product Space Analysis” reports, which cover studies to increase the export potential of enterprises operating in fragile sectors, were also completed within the project. These reports aimed to create road maps to support the business continuity of fragile sectors and to prevent supply chain disruptions.

We believe that the policy recommendations in these reports, which are in line with the targets within the framework of our national technology move, will support inclusive and sustainable development; it will carry Turkey to a more strategic point in the international trade and investment decisions that will be reshaped in the post-COVID-19 period and will contribute to our country's 2023 goals.

I would like to thank the Government of Japan for their generous contribution to mitigating the economic impact of the COVID-19 crisis, ensuring economic recovery, strengthening sectors, and transforming SMEs in this process.

I congratulate all our stakeholders, particularly UNDP Turkey management and project team, and the employees of the Development Agencies General Directorate and development agencies, who have made these studies realised and turn them into concrete outputs, and I hope that the reports will contribute to the future of our country.

Mustafa Varank

Republic of Turkey Minister of Industry and Technology

FOREWORD

The global context for development has fundamentally changed with the COVID-19 pandemic. The pandemic created many new obstacles to overcome as well as new problems to be solved. Although COVID-19 started as a health crisis, it has turned into both a humanitarian crisis and a development crisis.

This unprecedented crisis is pushing millions of people into extreme poverty, changing and widening existing inequalities, and disrupting progress towards the Sustainable Development Goals (SDGs). Therefore, the SDGs are now more important than ever. The 2030 Agenda remains the only option for a more prosperous future for people and planet.

The COVID-19 pandemic has also shaken the global trade and development landscape. The global health emergency turned into a global economic shock with its impacts on growth, international trade, investments, global production, value chains, employment and eventually livelihoods of people.

UNDP is responding to a growing volume of requests from countries to help them prepare for, respond to, and recover from the COVID-19 pandemic with a particular focus on the most vulnerable. As of now our focus is to help decision-makers look beyond COVID-19 recovery, towards 2030, making choices and managing complexity and uncertainty in four key areas: governance, social protection, green economy, and digital disruption.

UNDP's COVID-19 Resilience and Response Project, which is funded by the Government of Japan is a part of our rapidly developed integrated response to the COVID-19 health, humanitarian, and development crisis. Being complementary with the efforts of the Government of Turkey and other development partners and fully aligned with the country-specific needs, UNDP aims to tackle the impacts of the pandemic under three priority areas: Health system support; Inclusive and integrated crisis management and response; Social and economic impact needs assessment and response.

I am pleased to present these 25 region-based sectoral analysis reports that provide policy recommendations and action plans for key economic sectors in Turkey that are most impacted by COVID-19 pandemic. These reports, which were developed within the COVID-19 Resilience and Response Project in cooperation with Ministry of Industry and Technology and Development Agencies, formulated in the light of recent global context and trends as well as UNDP's response to COVID-19 crisis. Through this work, our aim is to support national capacities for an integrated and inclusive crisis management, ensure business continuity and prevent supply chain disruptions and speed up the development of the key economic sectors -automotive, textile, food, machinery, and logistics in different regions of Turkey and to increase competitiveness on a regional basis.

Our recovery efforts focus on rebuilding more inclusive economies and societies, moving towards a low-carbon and climate-resilient world where no one is left behind.

We believe that these reports will provide a pathway for economic recovery of sectors and development of regional competitiveness. In the reports the review of the pandemic crisis impact is accompanied by a set of policy recommendations targeting both the interventions in response to the negative effects of the pandemic and the post-COVID-19 social and economic recovery support measures. Overcoming the challenges faced by the sectors and society and ensuring better recovery can only be possible with joint efforts of the entire private sector, authorities, and the society as a whole.

In this regard, we appreciate the cooperation of Ministry of Industry and Technology, Development Agencies, and all experts for the preparation of these reports. We believe that these reports will also enable better cooperation in key economic sectors and help to accelerate the implementation of the Sustainable Development Goals in Turkey.

Louisa Vinton

UNDP Turkey Resident Representative

EXECUTIVE SUMMARY

This study was prepared within the scope of the "Covid-19 Resilience and Response Project" funded by the Government of Japan and conducted by the United Nations Development Program (UNDP) in cooperation with the Ministry of Industry and Technology of the Republic of Turkey and Development Agencies. Covid-19 Resilience and Response Project focuses on 5 fragile sectors (Food, Logistics, Machinery, Automotive and Textile) in the post-pandemic period. This study, focusing on the logistics sector, makes a current situation analysis by considering how SMEs in the sector are affected by the pandemic in TRA2 Region and suggests policies, strategies and actions to move the sector to a better point.

When we look at the logistics industry in the world, the three continents with the highest share regionally are America, Asia and Europe, respectively. Particularly in Turkey, the logistics sector has a market structure dominated by road transport. This is confirmed by the data of the World Economic Forum, and in the parameters related to the road infrastructure, Turkey achieves higher rankings compared to the parameters of other transport types worldwide. However, although this type of transport has advantages such as flexibility and door-to-door transport, it falls behind other types of transport in terms of factors such as unit logistics cost and environmental impacts. As a matter of fact, governments underline the necessity of restructuring the road-dominated transport-logistics system in a way to give more weight to other modes of transport, especially rail transport. In this context, looking at the distribution of public investments between transport types in the past period, it is seen that the share received by road investments has decreased and the share received by rail infrastructure investments has increased. In the World Bank's Logistics Performance Index, the most well-known Logistics Performance Indicator worldwide, Turkey follows a fluctuating course, and after the peak in 2012, Turkey appears to have entered a downward trend based on the LPI score and world ranking. For 2018, when the latest LPI report was published, Turkey's LPI score was 3.15 and its world ranking was 47. Looking at the sub-components, it is noticeable that Turkey has been relatively successful in terms of infrastructure, while it has lagged slightly in terms of customs performance.

Various data collection methods were applied within the scope of the study. At the first stage some basic statistics were compiled using databases and reports of domestic and foreign institutions / organizations such as the Ministry of Transport and Infrastructure, Turkish Statistics Institute, World Bank, United Nations Conference on Trade and Development and World Economic Forum and relevant academic studies in the literature have been examined.

After the aforementioned desk research, the opinions of sector representatives were collected through surveys and meetings. The most large-scale data collection method in this scope has been the survey work applied to companies in the sector throughout Turkey. In this survey, in which a total of 98 enterprises participated, 28 of which are from TRA2 Region, questions were asked about the situation of the logistics sector, the impact of the COVID-19 outbreak on the sector, and future expectations and strategies and the points where TRA2 Region diverges from Turkey in general has been tried to be determined. In addition, the progress of the project was monitored and comments were shared with the Working Groups, which met regularly with the participation of the Ministry of Industry and Technology, Development Agencies and UNDP representatives. Finally, with the focus group meeting held on December 16, 2020 with the participation of representatives from logistics companies, relevant sector umbrella organizations, public institutions / organizations, development agencies and industry / trade chambers in TRA2 Region, first-hand information about the situation of the logistics sector in the region was obtained. Apart from these efforts, an additional survey study was applied to make a Value Chain Analysis specific to the logistics sector, which is actually a part of the value chain, and information on the value chain of the sector was compiled.

The information obtained through the data collection methods summarized above constituted inputs for Simplified Value Chain Analysis, SWOT, PESTEL, Gap and Porter's Five Power Analyzes. The following factors are considered in these analyzes: (i) strengths and weaknesses of the industry and opportunities and threats in front of the industry, (ii) political, economic, social, technological, environmental and legal trends affecting the sector, (iii) problems and shortcomings in the sector,

and (iv) the effects of customers, market entry conditions, substitution services and the general level of competition in the market on the industry.

Answers to the questions about the impact of the COVID-19 pandemic on the logistics sector in the survey study show that logistics costs increased in the TRA2 Region with the pandemic. In other words, the logistics companies in the region had lower revenues in 2020 compared to 2019, but their costs increased and their profitability decreased as a result. The survey participants indicated the shrinkage in demand, the increase in operating costs and collection as the three most important problems experienced with the pandemic in the region.

The evaluations within the scope of the gap analysis show that fuel prices and bridge tolls (as in Turkey) are the most problematic areas in TRA2 Region. Another result obtained within the scope of the gap analysis is that air cargo infrastructure and services are the least competitive area in the region.

When looking at the situation of the logistics industry in terms of gender equality, Logistics companies in the TRA2 region employ female personnel below the Turkish average in blue collar and total employment classifications. However, the proportion of white-collar female employees is higher than the Turkish average.

Taking into account the results of the analyses outlined above, various investment, financial and organizational actions have been proposed to bring the logistics sector in TRA2 region to a better point.

From the infrastructure perspective, it is proposed to build a rail line to Ağrı and Iğdır provinces and connect the region to the national rail network, to build a logistics center in Ağrı and Iğdır provinces, to invest in the logistics center(s)and the OIZs, to connect the region to the Black Sea ports by rail, to eliminate bottlenecks in the main rail connection of the region, and to complete the Trabzon-Aşkale State Road.

From a financial point of view, it is recommended to develop low-interest loan programs for logistics companies and to provide exemption from certain taxes in order to reduce the financing problems of logistics companies. In this way, the competitiveness of Turkish logistics companies against foreign companies will be improved and Turkish goods will be transported faster and cheaper to foreign markets.

Customs services constitute a very important pillar of the logistics system, and improvements in this area will have a significant impact on the overall performance of the sector. In this context, it is recommended that customs start to work on a 24-hour basis, to increase the capacity of customs administrations and improve business processes, to switch to a single window system and to complete the infrastructure needs that arise after COVID-19.

Finally, it is recommended to develop sectoral training programs and to establish technical schools in industrial zones in order to meet the need for trained staff as underlined in the relevant focus group meeting.

Finally, it is of great importance to solve the problem of passage documents in cooperation with surrounding countries, to open the border crossings closed after the pandemic and to develop an action plan for the Caspian corridor.

1. INTRODUCTION

The COVID-19 pandemic, emerging in the first months of 2020 in Turkey, continues to affect the whole of economic and social life without exception and intensively. The restrictions imposed along with the pandemic have led to a deceleration of production in Turkey, a decrease in labor supply due to quarantine measures, an increase in risks and delays in the supply of intermediate goods and raw materials across the border, and an increase in logistics costs, as has been the case all over the world. It is expected that this environment of uncertainty, which has consequences such as low demand and production, a weak investment environment, declining public revenues and increasing public spending, will continue in the future on a global basis.

Within the scope of the "Covid-19 Resilience and Response Project" financed by the Government of Japan and implemented by the United Nations Development Program (UNDP) in cooperation with the Ministry of Industry and Technology of Turkey and Development Agencies; a wide range of new markets research, sectoral impact analysis studies and training/consulting activities are carried out in five fragile sectors (food, logistics, machinery, automotive and textile industries) that are key to the Turkish economy and are expected to be highly affected by pandemic impacts. With the results of the sector analysis, it is aimed to create a roadmap to support the business continuity of these sectors and to prevent supply chain disruptions in the crisis.

In this context, a study was conducted in which future strategies of these sectors were defined in line with possible scenarios and global trends during and after the COVID-19 impact, and current situation analyses were carried out and strategy and policy proposals were determined in order to contribute to the development of more inclusive and sustainable business models for operations involved in the sector.

Under the scope of this regional assessment report prepared for industrial facilities in the South and Southeastern Anatolia Regions and for TRA2 Region (Ağrı, Ardahan, Iğdır, Kars), which has an important position in international logistics networks, especially in trade with Middle Eastern countries; a current analysis of the situation of enterprises and the sector operating in the logistics sector in the region was conducted, the effects of the pandemic on the logistics sector in the region were examined and what measures were taken to reduce the effects of the epidemic, and what support and incentives were provided have been investigated. Thus, the short, medium and long-term strategies, policies and measures on a sectoral and regional basis have been shaped in line with the expectations and solutions of the sector, as well as global trends and regional opportunities.

This study consists of 10 chapters in total. In the second chapter following the introduction, the methodology followed within the scope of the project is explained. While chapter 3 summarizes the profile of the sector, Chapter 4 deals with the effects of the pandemic on the sector. Chapter 5 examines trends specific to the logistics sector in terms of the world, Turkey and TRA2 Region, while chapter 6 includes the analysis of the information obtained as a result of the survey study and focus group meetings. While Chapter 7 covers developments for the sector and the region on issues that are prioritized by UNDP such as crisis management, resource efficiency and gender equality, Chapters 8 and 9 refer to the relevant policies in order to improve the current situation of the logistics sector in TRA2 Region and to properly meet the new necessities emerging in the post-COVID-19 pandemic, and detail the proposed strategies and actions on a calendar and budget basis. The final chapter summarizes the results of the study.

2. METHODOLOGY

2.1. Data Collection

Both primary and secondary research methods were used for collecting the data to be used for reports.

1. Primary Research Data

a) Surveys: Data specific to enterprises in the sector, which cannot be collected from secondary sources, has been compiled with a survey study. This online survey study, which is applied jointly for "Fragile Sectors Analysis" and "New Markets Analysis" studies, has been announced by different institutions and organizations, especially Development Agencies. Since the announcement prepared to increase the participation of SMEs in the relevant sectors to the survey was made through many channels, the sample selection for the companies to fill out the survey could not be possible during the implementation phase of the survey.

A total of 98 people/companies answered the survey questions throughout Turkey. 87 of these responses came from the regions subject to analysis, and 11 from logistics companies operating in other provinces. A total of 28 participants from the TRA2 Region (Ağrı, Ardahan, Iğdır, Kars) participated in the survey, while there were 36 participants from TRA2 Region consisting of TR42 (Bolu, Düzce, Kocaeli, Sakarya, Yalova), TR10 (Istanbul) and TR21 (Edirne, Kırklareli, Tekirdağ) regions, 9 from TRA2 Region (İzmir) and 14 from TRA2 Region (Hatay, Kahramanmaraş, Osmaniye).

The survey was conducted between December 8, 2020 and January 17, 2021. The survey, designed to provide data for region-based sectoral reports, also received participants from provinces other than the focused regions. Such answers were not taken into account during regional analyses, but were included in the assessment in analyses conducted throughout the country. To be more specific, the answers of 6 different logistics companies that participated in the survey from Şanlıurfa were not included in the regional analysis, but were taken into account during the analysis for the whole of Turkey.

b) Focus Group Meetings: Focus Group Meetings have been an important source of information during the project. The meetings were attended primarily by the representatives of logistics companies (in addition to the members of the relevant working group), as well as by public institutions/organizations operating directly or indirectly in this field (Customs Directorates, Provincial Directorates of Industry and Technology, Provincial Trade Directorates, Regional Directorates of Turkish Railways, Regional Directorates of Highways) as well as chambers of industry and commerce, organized industrial zones, local administrations and umbrella organizations of the logistics sector. The participant list of the TRA2 Region Logistics Sector Focus Group Meeting held on December 16, 2020 is included in Annex 1.

In the focus group meetings, the main topics such as the effects of the Covid-19 pandemic on the logistics sector in the region, general and regional trends in the logistics sector and the expectations of the sector and solution proposals were discussed and answers to the following questions were sought in detail:

Effects of the COVID-19 Pandemic on the Logistics Sector in the Region

1. What are the effects of the pandemic on logistics activities in the region?
   - » Demand
   - » Income
   - » Logistics costs
   - » Capacity utilization rate
   - » Change in service delivery (mode shift, cargo type change, freight consolidation, etc.)
   - » Employment
   - » Service interruption
   - » Bankruptcy

2. What measures have been taken and what support and incentives have been implemented to reduce the impact of the pandemic on the logistics sector in the region?
   - » By companies
   - » By the central government
   - » By local governments
   - » By sector organizations
   - » By other actors

3. How successful have these measures, supports and incentives been?

General and Regional Trends in the Logistics Sector

1. What new trends and fundamental changes do you expect in the logistics sector in the world?
2. What new trends and fundamental changes do you expect in the logistics sector in Turkey?
   What new trends and fundamental changes do you expect in the logistics sector in the region?
3. Which province stand out in the region with which Logistics Services ?
4. What are your predictions for the development of the logistics sector in your region in light of new developments?
5. What are the strengths and weaknesses of the sector in the region?
6. What are the opportunities and threats facing the sector in the region?
7. What are the aspects open to development in terms of competitiveness in the region?
8. What are your ideas about the following horizontal issues in the sector? (Pandemic Crisis
9. Management, Energy Efficiency, Climate Change, Gender Equality)

Sector's Expectations and Solution Proposals

1. What are the national and regional short, medium and long term strategy recommendations?
   - » Steps to be taken by logistics companies
   - » Steps to be taken by the beneficiaries of the logistics service
   - » Steps to be taken by the central administration
   - » Steps to be taken by local authorities
   - » Steps to be taken by sector organizations
   - » Steps to be taken by other actors
2. What are the sectoral actions that can be taken in the region and how much can the estimated budgets of these actions be?

A total of 4 focus group meetings were organized within the scope of the project, and Table 1 shows the dates of these meetings.

Table 1: *Logistics Focus Group Meeting Dates*

Focus Group Meeting	Date
Logistics Sector Focus Group Meeting for Region TRA2 (Ağrı, Ardahan, Iğdır, Kars)	December 16, 2020 14:00
Logistics Sector Focus Group Meeting for Region TR63 (Hatay, Kahramanmaraş, Osmaniye)	December 23, 2020 14:00
Logistics Sector Focus Group Meeting for Region TR21 (Edirne, Kırklareli, Tekirdağ), TR10 (İstanbul) and TR42 (Bolu, Düzce, Kocaeli, Sakarya, Yalova) (TRA2 Region)	January 6, 2021 14:00
Logistics Sector Focus Group Meeting for Region TR31 (İzmir)	January 7, 2021 14:00

c) Working Groups: One of the most important sources of information for the reports has been the Working Groups established by the Ministry of Industry and Technology. For 25 reports prepared in 5 sectors, many experts from the Ministry of Industry and Trade and related Development Agencies were assigned within the 5 Working Groups. Experts participating in the Logistics Sector Working Group meetings are presented in Table 2.

Table 2: *Logistics Sector Working Group Members*

Name-Surname	Title / Institution
Mr. Dr. Mehmet Emin Özsan	Ministry of Industry and Technology
Mr. Onur Karakurt	Ministry of Industry and Technology
Mr. Barış Ayhan	Serhat Development Agency
Mr. Ramazan Mutlu Doğaner	Serhat Development Agency
Mr. Hayri Yearsmaz	Eastern Mediterranean Development Agency
Ms. Erva Zeynep Budak	Eastern Mediterranean Development Agency
Mr. Murat Özkan	Eastern Marmara Development Agency
Mr. Serkan Korkmaz Arslan	Istanbul Development Agency
Mr. Ahmet Taner Aydın	Trakya Development Agency
Mr. Dr. Saygın Can Oğuz	İzmir Development Agency
Ms. Arzu Karaarslan Azizoğlu	UNDP Turkey
Ms. Aslı Aygün	UNDP Turkey
Mr. Tamer Öztin	Fragile Sector Analysis Team Leader, UNDP Turkey
Mr. Cihat Gök	Fragile Industry Analysis Industry Analysts, UNDP Turkey
Mr. Dr. İsmail Çağrı Özcan	Fragile Sector Analysis Logistics Sector Specialist, UNDP Turkey

During the 14 weeks following the preparation of the initial report, the Working Group met a total of 5 times, every 2 weeks, to monitor the ongoing processes of the project. The following issues were discussed in these 5 working group meetings including the progress program and systematics of the project, survey questions to be applied within the scope of the project, possible agenda items and participant lists of focus group meetings; and steps to increase survey participation and opinions, suggestions and criticisms about the draft reports were brought to the agenda.

2. Secondary Research Data

a) Institutional Data Sources: For the purpose of analyzing the trends around the world and determining the current situation in Turkey and the region; the data compiled from institutions such as the World Bank, United Nations Conference on Trade and Development (UNCTAD), Turkish Statistical Institute (TURKSTAT) and the Ministry of Transport and Infrastructure provided an important input to the analysis.

b) Reports Prepared by the Ministry of Industry and Technology and Development Agencies: Many reports on the logistics sector have been prepared by the Development Agencies, and the aforementioned logistics reports have been benefited during the preparation of this report.

c) Other Research, Publications, Reports: Reports prepared by professional organizations, umbrella organizations, etc. have been examined.

2.2. Data Analysis and Interpretation

The following methods have been used for the general analysis of the logistics sector: SWOT (Strengths, Weaknesses, Opportunities, and Threats) Analysis, which addresses the strengths and weaknesses of the sector and the opportunities and threats related to the sector, PESTEL (Political-Economic-Social-Technological-Environmental-Legal) Analysis, which examines the political, economic, social, technological, environmental and legal factors affecting the sector, Simplified Value Chain Analysis, which addresses the value chain in the sector and the added value created at each step in the value chain, and Porter's Five Forces Model.

Among the above analyzes, "Value Chain Analysis" and "Porter's Five Forces Model" are generally analysis methods designed for companies operating in the manufacturing sector and there are some problems in their adaptation to the logistics sector, which is a part of the service sector. For example, in Value Chain Analysis, two of the five main activities of companies are defined as "Inward Logistics" and "Outward Logistics" and these activities do not have a specific counterpart within the logistics sector. In other words, logistics services are considered as a very important part of the value chains of companies operating in the fields of manufacturing, wholesale and retail, and a value chain analysis is not frequently used in the logistics sector. On the other hand, "Bargaining Power of Suppliers", one of the five powers included in "Porter's Five Forces Model", does not have an exact equivalent in the logistics sector. For these reasons, in the "Value Chain Analysis" and "Porter's Five Forces Model" applications for the logistics sector, it was necessary to go beyond the systematic of equivalent studies.

In the applied survey, some questions were included within the scope of "PESTEL Analysis" and "Porter's Five Forces Model", and individual questions were asked to the participants in the focus group meetings for SWOT Analysis. Unlike the surveys applied for other sectors; in addition to the companies operating in the logistics sector, a specially prepared survey was applied to companies operating in other sectors and purchasing logistics services. The analysis of the answers given to this second survey study is included in Annex-2.

Finally an independent survey was conducted with the participation of logistics companies together with the support of Chamber of Shipping (DTO), Turkish Port Operators Association (TÜRKLİM), International Transport and Logistics Service Providers Association (UTIKAD) and International Transporters Association (UND) which are umbrella organizations of the logistics sector and a Sectoral Added Value Table was prepared within the scope of "Value Chain Analysis", which has a very limited application in the logistics sector and the "Simplified Value Chain Analysis" was completed within the framework of the peculiarities of the logistics industry.

2.3. Reporting

After examining the analysis of the relevant sector on the basis of the region, the effects of COVID-19 (Crisis Management) and other horizontal issues with 4 reports specific to the logistics sector; the short, medium and long term strategies and policy recommendations are presented in each report; and the steps to be taken were tried to be budgeted within the framework of certain assumptions.

3. Logistics Sector Profile

3.1. General Outlook of the Logistics Sector in the World

Logistics, which has developed as a function of international trade with increasing globalization, is nowadays defined as a set of activities including transportation, storage, packaging, customs clearance, handling, procurement and marketing sub-processes. In this context it is noteworthy that; in the numerical analyzes made on the size of the logistics sector, which consists of quite different sub-components in terms of nature, and its share in the economy; the results are reached by making sole assumptions and that the results in the literature differ from each other.

The size of the global logistics industry is assumed to be around US $ 8-12 trillion (Maiden, 2020). The estimation in question is made with the assumption that the size of the logistics sector is approximately 10-12% of the global gross domestic product (GDP). In this context, it is estimated that the size of the global logistics industry in 2018 is around USD 9.6 trillion. Estimated sizes based on sub-components such as road transport, stock movements, storage, logistics management, air, rail, transport affairs organization and sea, inland waters and other are presented in Figure 1. It is noteworthy that the share of transportation services in the sub-service types listed is around 56%. Transportation systems are one of the main determinants of logistics activities at the point of increasing the productivity of firms at micro level, decreasing input costs and increasing competitiveness. On the other hand, the share of maritime transport in international trade is around 80% and international maritime transport increased from 2.6 billion tons in 1970 to 11.1 billion tons in 2019 (UNCTAD, 2021; UNCTAD, 2020a: 3). In addition, with the consolidation and intensification in international maritime transport, the trend towards increasing ship sizes continues.

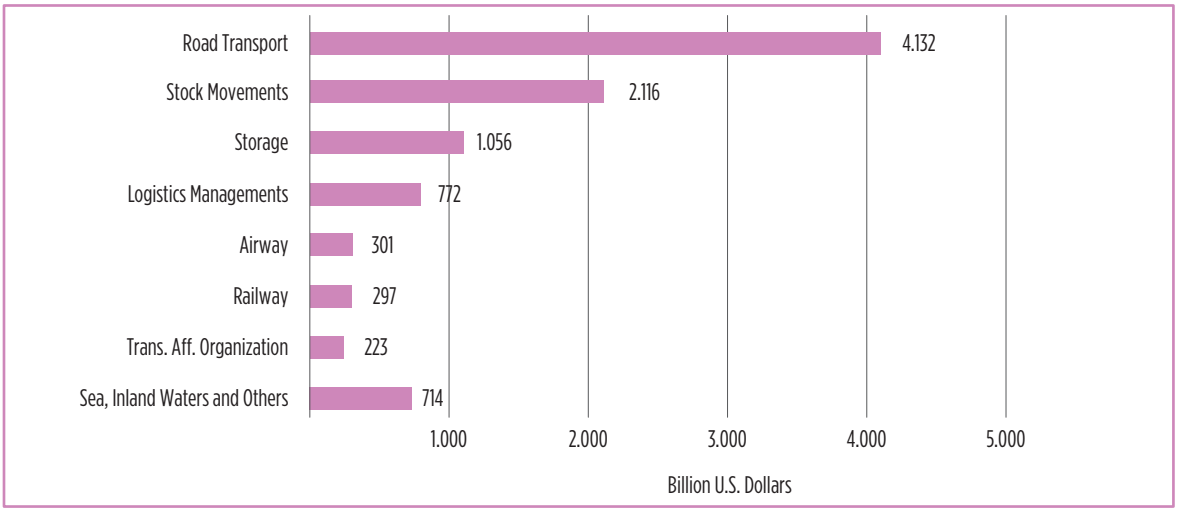

Figure 1: *Global Logistics Sector Subcomponents and Economic Size (Armstrong & Associates Inc, 2020)*

The share of transportation, storage and communication activities in global GDP was 8.7% in 2018 and the said ratio has been 10.2% for the North America region; 7.1% for the Asian region; 9.7% for the European region; 6.9% for developing countries; 8.2% for transition economies; and 10% for developed countries (UNCTAD, 2020b). In addition, the size of transportation, storage and communication activities on a global scale was approximately 7 trillion USD in 2018 with 2015 prices and the shares of regions and developed / developing countries within this size are presented in Table 3 (UNCTAD, 2020b).

Table 3: Regional Shares in Global Transport, Storage and Communication Activities (%) (UNCTAD, 2020b)

Region	Share (%)	Share (%)	Country Group
Africa	3,4	32,4	Developing countries
America	38,4	2,3	Transition Economies
Asia	30,7	65,2	Developed countries
Europe	25,8		
Oceania	1,7		

The trade volume of transport services on a global scale was USD 2.2 trillion in 2019 and the share of transport services in total service trade was 18.7%. (UNCTAD, 2020b). On the other hand, the average annual growth rate of the trade volume of transport services between 2010 and 2019 was 2.07% and the rate of increase in the last five years decreased and remained at 1.28%. With the developments in communication technologies, the improvement of transportation infrastructures and the spread of modern applications; the share of transportation and logistics in final product prices became 10-12%, and its share in production costs decreased to the levels of 10-30% (Svitlana, 2019:8). In addition, the share of transportation expenditures in household consumption expenditures on a global scale varies between approximately 10% and 15% on average (Rodrigue, Comtois and Slack, 2013).

3.2. General Outlook of the Logistics Sector in Turkey

The share of transport services in GDP ranges from approximately 6% to 12% in developed countries while it is estimated that the size of the logistics sector in Turkey was over 500 billion TL in 2019 (Rodrigue et al., 2013: 227; UTIKAD, 2020). In line with the aforementioned situation, according to TURKSTAT's classification within the scope of economic activity branches (A21); the development of transportation and storage services in Turkey and its share in GDP are shown in Figure 2.

It is noteworthy that the share of transportation and storage services in GDP reached a relatively high level, especially in 2002 while it is seen that after the decrease between 2002-2011, it entered an increasing trend again and reached 8.6% in 2019. With the effect of efficient transportation investments that increased rapidly between 2002-2011; it is considered that there has been a decrease in logistics costs within the final product costs in parallel with the decrease in the share of transportation and storage services in GDP. However, the share of transportation and storage services in total between 1998 and 2019 is approximately 9.0% on average. When the shares of other sectors in GDP are analyzed, it is observed that transportation and storage services rank third after the "manufacturing industry" and "wholesale and retail trade and repair of motor vehicles and motorcycles".

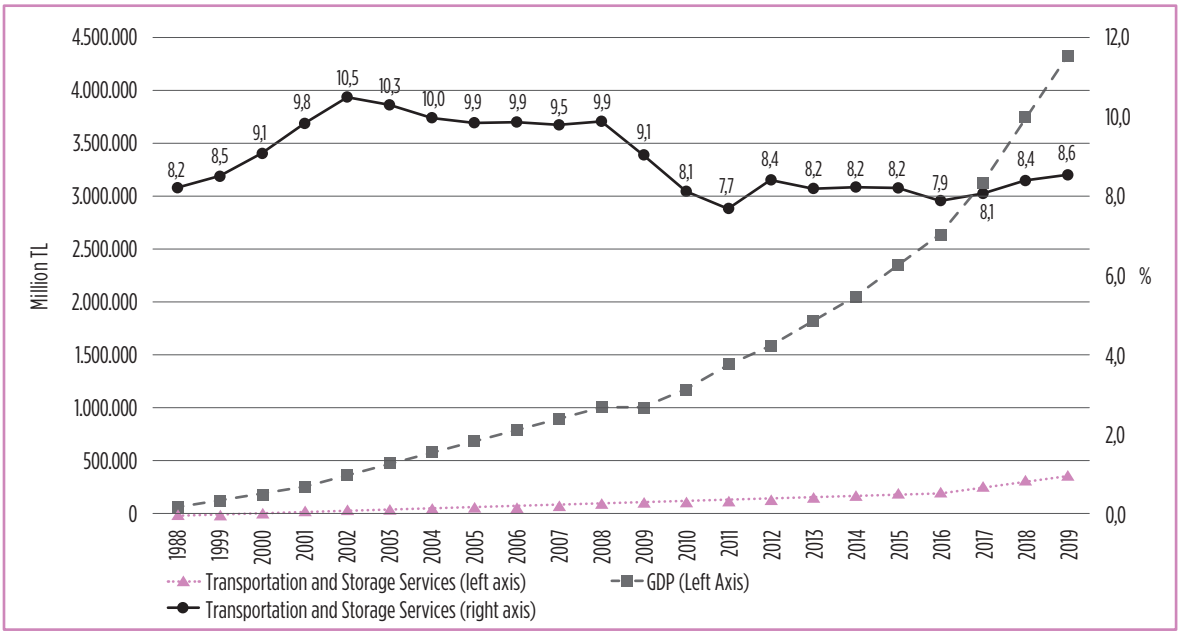

Figure 2: *Development of Transportation and Storage Services and Their Share in GDP (TURKSTAT, 2020a)*

When the changes in transportation and storage services and GDP are examined together, it is seen that similar trends are observed and transportation with derivative demand structure follows the changes in economic activities.

The share of transportation expenditures in household consumption expenditures in Turkey is presented in Figure 3. It can be observed from Figure 3 that the share of transportation expenditures in total is in an increasing trend. In addition, the share of transportation expenditures in total between 2002-2019 is approximately 14.8%. Factors such as income level, land use and urbanization, regional socio-economic concentrations, mobility, population and car ownership are effective in changes in the share of transportation expenditures in total. When the shares of other expenditures in household expenditures are analyzed, it is observed that transportation expenditures ranked third, after expenditures for "housing and rent" and "food and non-alcoholic beverages".

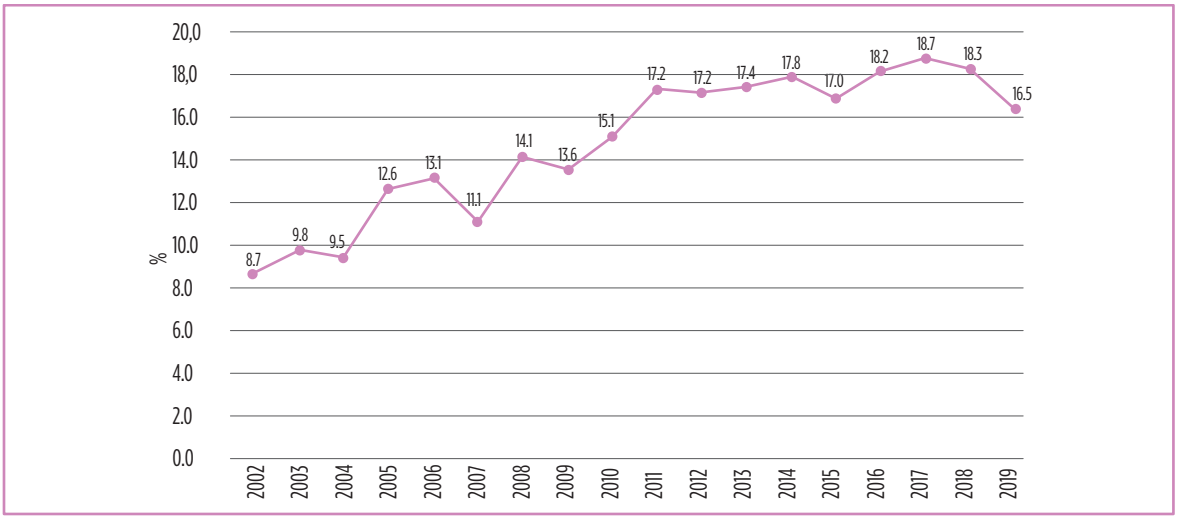

Figure 3: *Share of Transportation Expenditures in Household Consumption Expenditures (TURKSTAT, 2020b)*

Logistics sector, which is a subcomponent of the services sector, has an important place especially in export transportation. The total export of Turkey in 2019 was 180.8 billion USD and its import was 210.3 billion USD (Ministry of Trade, 2020a). On the other hand, service exports for 2019 were 33.8 billion USD and service imports were 23.9 billion USD. The share of the services sector in total exports was 18.7% and its share in imports was 11.4% (TURKSTAT, 2020c). The transport export which is calculated as a subcomponent of service trade is 24.2 billion USD and transport import is 9.6 billion USD. The share of transportation in exports of services is calculated as 71.7% and its share in imports of services is calculated as 40.1% (TURKSTAT, 2020c).

When the foreign trade sizes are examined according to the transportation types presented in Table 4; it is noteworthy that the maritime has the largest share. Besides, when compared to 2018, the highest increase in export transportation has been realized in the rail with 28.8%, and the highest increase in import transportation has been realized under the title "other" with 17%.

Table 4: *Foreign Trade by Transport Types (Ministry of Trade, 2020b)*

	Export		Import	
	2018	2019	2018	2019
Maritime (milion USD)	108.803	109.114	136.737	112.968
Share (%)	61,41	60,34	59,15	53,71
Road (milion USD)	52.222	54.462	39.129	37.177
Share (%)	29,48	30,12	16,93	17,67
Air (milion USD)	14.128	14.849	28.757	29.238
Share (%)	7,97	8,21	12,44	13,90
Rail (milion USD)	754	971	1.299	1.448
Share (%)	0,43	0,54	0,56	0,69
Other* (milion USD)	1.262	1.436	25.230	29.514
Share (%)	0,71	0,79	10,91	14,03
Toplam	**177.169**	**180.832**	**231.152**	**210.345**

**This includes pipeline, mail transport, electric power transmission and self-propelled vehicles.*

Unlike the typical distinction in foreign trade transports, the dominant structure of the road transport in domestic freight transportation in Turkey is striking. In this framework, in Table 5, which shows the modal distribution in transportation sub-sectors for 2019, the dominant structure of the road transport draws attention. Ensuring a more balanced modal distribution in the road-dominant growing transportation sector under the effect of short-term policies is considered to be very critical in terms of cost effectiveness and sustainability.

Table 5: *Modal Distribution in Transportation Sub-Types (Strategy and Budget Directorate, 2020: 232)*

	Freight Transport Amount (million-ton-km)	Share (%)
Maritime(1)	20.520	6,8
Road(2)	267.579	88,6
Rail(3)	13.830	4,6

1- Shows the cabotage transports.

2- Transports carried out on the road network under the responsibility of the General Directorate of Highways.

3- Administrative freight shipments are excluded.

The increase in transportation sector investments, which stand out among other sectors in the economy in terms of forward and backward connections and multiplier effects, positively stimulates total production, added value, growth and employment (Çetin, 2019: 147). Within this framework, the share of transportation investments, which have very important effects in the economy, in total and public sector fixed capital investments are presented in Figure 4. The share of transportation in total fixed capital investments in the 1998-2019 period was 28.4% on average while its share in public sector investments was 35.2% on average.

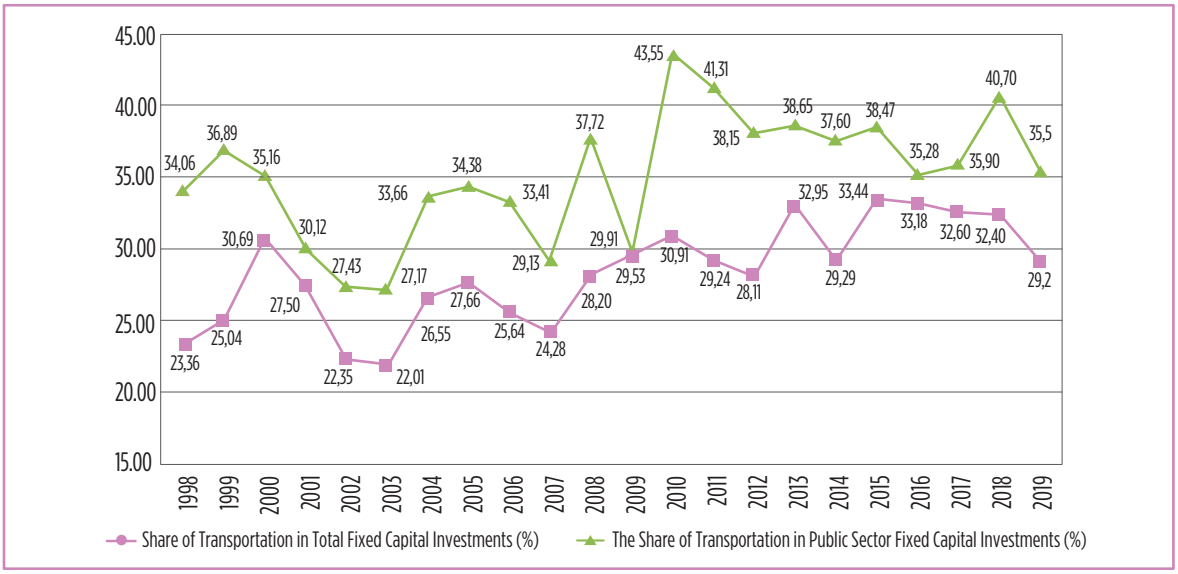

Figure 4: *Share of Transportation Sector Fixed Capital Investments in Total Investments (Strategy and Budget Directorate, 2021)*

The Logistics Performance Index (LPI), which is used to compare the logistics performance of countries on an international scale, is reported by the World Bank and stands out as the most generally accepted criterion for logistics. The LPI prepared for the years 2007, 2010, 2012, 2014, 2016 and 2018 until today, consists of six sub-components: customs, infrastructure, international shipping, quality of logistics services, timeliness and tracking and monitoring. In this framework, the development of Turkey on the basis of LPI and six LPI sub-components for the years 2010, 2012, 2014, 2016 and 2018 is presented in Figure 5.

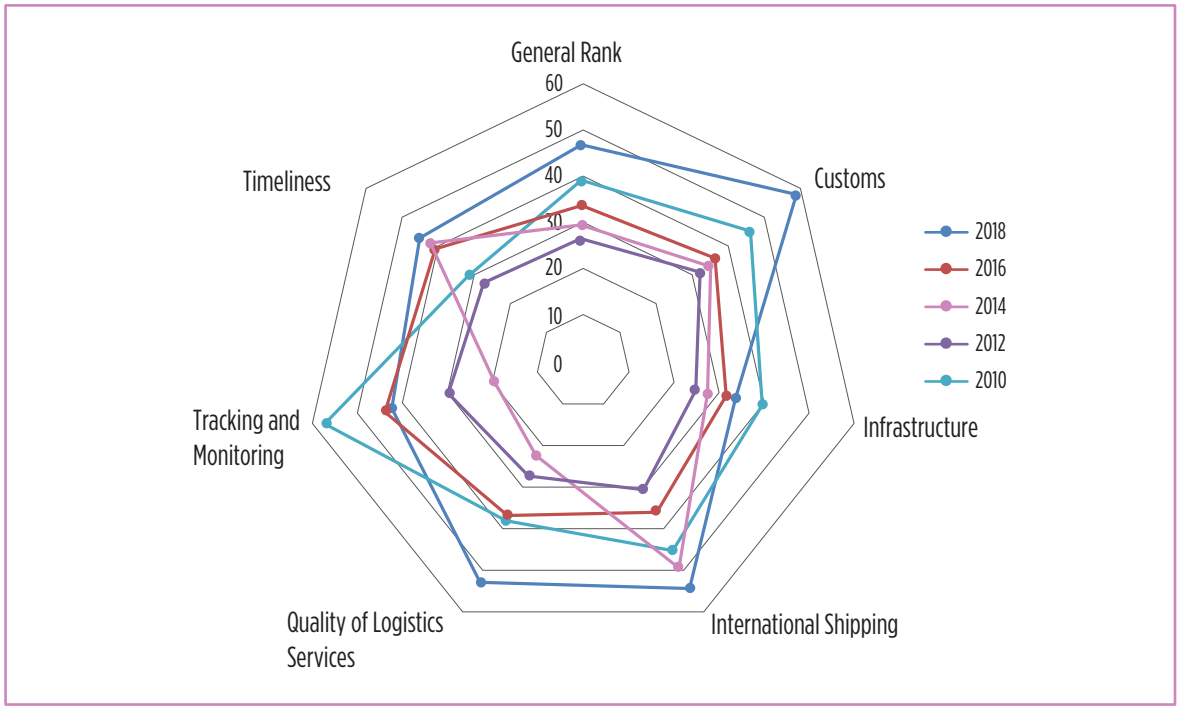

Figure 5: *Status of Turkey in Logistics Performance Index (World Bank, 2019)*

Despite the large-scale transportation investments made in recent years, Turkey cannot make progress in LPI due to the configuration of a road-oriented growing transport system and the inadequate use of intermodal and synchro-modal transport opportunities. In this context, Turkey was 39th in 2010 according to the index ranking in question, but it rose to 27th place in 2012, and then it became 30th in 2014, 34th in 2016, and dropped to 47th among 160 countries in 2018. When the status of Turkey in terms of subheadings is examined, it is noteworthy that it has a better performance especially in logistics infrastructure. However, performance in customs and other operational parameters has remained relatively low, and Turkey has been declining in these areas in recent years.

3.3. General Outlook of the Logistics Sector in TRA2 Region

Within the scope of the study, the share of TRA2, TR63, TR42, TR21, TR10 and TRA2 Regions within the total GDP of Turkey, analyzed at Level 2 of Nomenclature of Units for Territorial Statistics (NUTS) is around 49.22% in 2018. In this context, the share of GDP produced in the said regions and the share of these GDPs within Turkey total for 2018 is presented in Table 6. The GDP produced in the TRA2 region is the lowest with 22.5 billion TL, while the GDP produced in the TR10 region has the highest value among the regions included in the analysis with 1.1 trillion TL.

Table 6: *GDP of Regions ,2018 (TURKSTAT, 2020c)*

Region	GDP*	Share in Total GDP
TRA2 (Ağrı, Kars, Iğdır, Ardahan)	22.489.625	0,60
TR63 (Hatay, Kahramanmaraş, Osmaniye)	95.857.452	2,57
TR42 (Kocaeli, Sakarya, Düzce, Bolu, Yalova)	235.991.883	6,34
TR21 (Tekirdağ, Edirne, Kırklareli)	90.130.800	2,42
TR10 (İstanbul)	1.155.254.285	31,02
TR31 (İzmir)	233.514.796	6,27
Total	**1.833.238.841**	**49,22**

**At current prices in 2009 (thousand TL)*

Although there is no data on the share of transportation and storage services in GDP at the regional scale; the size of the transportation and storage services for the regions covered in the analysis is estimated to be around 165 billion TL assuming that the share of transportation and storage in Turkey total is approximately 9%.

The 2019 import and export sizes of the regions included in the analysis are shown in Table 7. The total export of the five regions is 123.6 billion USD, while the total import is 138.3 billion USD. However, when the foreign trade volumes of the regions within the scope of the analysis are examined; it is seen that the foreign trade volume is highest in TR10 region with 198.1 billion USD and lowest in TRA2 region with 230 million USD. In addition, it is seen that the TR42, TR21 and TRA2 Regions examined within the scope of the analysis have foreign trade surpluses. On the other hand, although there is no data on transport exports and imports on a regional scale; considering that the share of transportation in total exports in Turkey is 13.4% and its share in total imports is 4.6%, it is estimated that the total transport export of the regions covered by the analysis is approximately 16.5 billion USD and the transport import is 6.3 billion TL.

Table 7: *Foreign Trade in the Regions (TURKSTAT, 2020d)*

Region	Export	Import
TRA2 (Ağrı, Kars, Iğdır, Ardahan)	114.907.574	115.044.266
TR63 (Hatay, Kahramanmaraş, Osmaniye)	4.260.398.759	5.497.274.468
TR42 (Kocaeli, Sakarya, Düzce, Bolu, Yalova)	16.014.264.223	12.801.550.778
TR21 (Tekirdağ, Edirne, Kırklareli)	2.196.397.835	1.920.177.321
TR10 (İstanbul)	88.827.639.699	109.280.925.933
TR31 (İzmir)	12.168.871.669	8.676.072.243
Total	**123.582.479.759**	**138.291.045.009**

**At current prices in 2009 (thousand TL)*

Thanks to the transportation services that differ from other sub-sectors in the economy with its derivative demand structure, freight and passengers engage in relocation activities for travel purposes and the demand for transportation services is met by providing transportation services through transportation networks and infrastructures. The figures for 2020 regarding the transportation and logistics infrastructure in the regions covered by this study are presented in

Table 8. In the regions covered by the analysis, there are a total of 11,055 km road and 2,688 km rail network, as well as 10 airports and 3 logistics centers built by TCDD. Kars Logistics Center, which is located in the TRA2 region and is in the process of being put into service, has an area of 400 thousand m2 and its load capacity is 412 thousand tons. The capacity of Kahramanmaraş (Türkoğlu) Logistics Center, established on an area of 805 thousand square meters in the TRA2 Region, is 1.9 million tons. İzmit (Köseköy) Logistics Center operated by TCDD, similar to Kars and Kahramanmaraş (Türkoğlu) Logistics Centers is established on an area of 694 thousand m2 and its load capacity is 2 million tons.

Table 8: *Transport and Logistics Infrastructure in Regions (General Directorate of Highways (KGM), 2020; Turkish State Railways (TCDD), 2020; General Directorate of State Airports Authority (DHMİ), 2020)*

Region	Road (km)		Rail (km)	Airport (Number)	Logistics Center (Number)
	State and Provincial Road	Highway			
TRA2 (Ağrı, Kars, Iğdır, Ardahan)	2.065	-	271	3	1
TR63 (Hatay, Kahramanmaraş, Osmaniye)	1.893	194	374	2	1
TR42 (Kocaeli, Sakarya, Düzce, Bolu, Yalova)	1.837	525	578	1	1
TR21 (Tekirdağ, Edirne, Kırklareli)	1.771	165	492	1	-
TR10 (İstanbul)	446	534	402	2	-
TR31 (İzmir)	1.270	355	571	1	-
Total	**9.282**	**1.773**	**2.688**	**10**	**3**

4. The Impact of the COVID-19 Pandemic on the Logistics Sector

The COVID-19 pandemic that led to a new economic fluctuation that deeply affected the global economy after the 2008 financial crisis has brought along important changes and transformations and changed the way of doing business of the logistics sector. With the spread of the pandemic, very critical problems have emerged in the global supply chain and especially in China, the country where the pandemic first appeared, production has decreased rapidly with the restrictions applied at the beginning of 2020, and as a result, disruptive effects have occurred on the supply chain and logistics processes.

In the later stages of the COVID-19, the pandemic has spread rapidly on a global scale, and as a result, restriction measures have been taken in many countries, and with the increase of measures, economic activities have decreased and demand and supply shocks have been experienced worldwide. In addition, in parallel with the decline in public revenues in the said period, public expenditures increased due to grants and supports, primarily health expenditures. However, consumer behavior changed in a short time by adapting to the developments experienced, and the demand for basic consumption products increased with the effect of increasing uncertainties. On the other hand, although the activities in the global supply chain declined except for basic consumption goods, the tendency towards e-commerce increased and economic activities were reshaped in relation to the changing travel behavior and load movements.

With the first wave of the pandemic being partially overcome restrictions were loosened on a global scale in the third quarter of 2020. However due to the continuation of the pandemic, new activity chains have emerged, where social and economic activities have changed radically. As a matter of fact, with the second wave that emerged as a result of the increase in the number of cases all over the world in the last quarter of 2020, harsh measures have come to the agenda again.

Negative effects have emerged on the growth paths of countries as a result of supply and demand shocks experienced during the pandemic process, businesses closed due to restrictions and slowing sectoral activities. In this context, according to research conducted by the World Bank, the global economy is expected to contract by 4.3% in 2020, and the Turkish economy is expected to grow by 0.5% in 2020 (World Bank, 2020).

The income elasticity of global trade has been in a decreasing trend in recent years, but the contraction in the global economy has a direct interaction with global trade. According to the estimates of the World Trade Organization (WTO), global trade is expected to contract by 9.2% in 2020 and grow by 7.2% in 2021 (WTO, 2020). On the other hand, it is noteworthy that the expected improvement in global trade in 2021 is behind the pre-pandemic level. In this context, it is considered that the negative effects of the pandemic on global trade will continue in 2021.

One of the biggest reasons of the negative developments in global trade and economy, which are directly related to each other, is the disruptions in the global supply chain after the pandemic. Due to the problems in the supply chain, companies are faced with important problems in terms of procurement of production inputs and delivery of products to end users compared to the pre-pandemic period. The most important reasons for the problems experienced are border crossing restrictions applied by countries against the pandemic and the customs.

4.1. Comparison of Before and After the Pandemic

Problems arising in logistics activities, which are also defined as the supply planning of goods and services have caused the entire supply chain from production processes to the end consumer to be affected. Restrictions imposed by governments during the pandemic have caused waiting times to increase at ports, formation of long vehicle queues at border gates, and halting of airline flights. In this context, it is very important to examine the transportation of the most critical components of the logistics processes in terms of types in order to effectively examine the effects of the pandemic on the logistics sector.

The maritime transport, where about 80% of global trade is made, is one of the sectors most affected by the pandemic, and there have been long waiting times at ports as part of the restriction measures. Social distance rules and quarantine measures applied to personnel on duty at ports and ships slowed down the customs clearance and handling processes. In addition, the weakening of international trade stands out as the most important reason for the decrease in maritime transportation. According to research conducted by the United Nations Conference on Trade and Development (UNCTAD) maritime trade volume is expected to contract by 4.1% in 2020, and maritime trade is expected to grow by 4.8% in 2021 (UNCTAD, 2020a:xvii).

The scenarios regarding the changes in the volume of maritime transportation in 2020 due to the pandemic are shown in Figure 6 under the pre-COVID-19, 2020 normal effect and 2020 severe impact groups. According to the pessimistic scenario where the pandemic will have a severe impact, the volume of maritime transportation is expected to decrease by 7.3% in 2020 compared to 2019. In the normal scenario where the impact of the pandemic is considered more optimistically, it is estimated that the sector will contract by 1.1%. In the pre-COVID-19 scenario, a growth of 3.1% is expected in the sector.

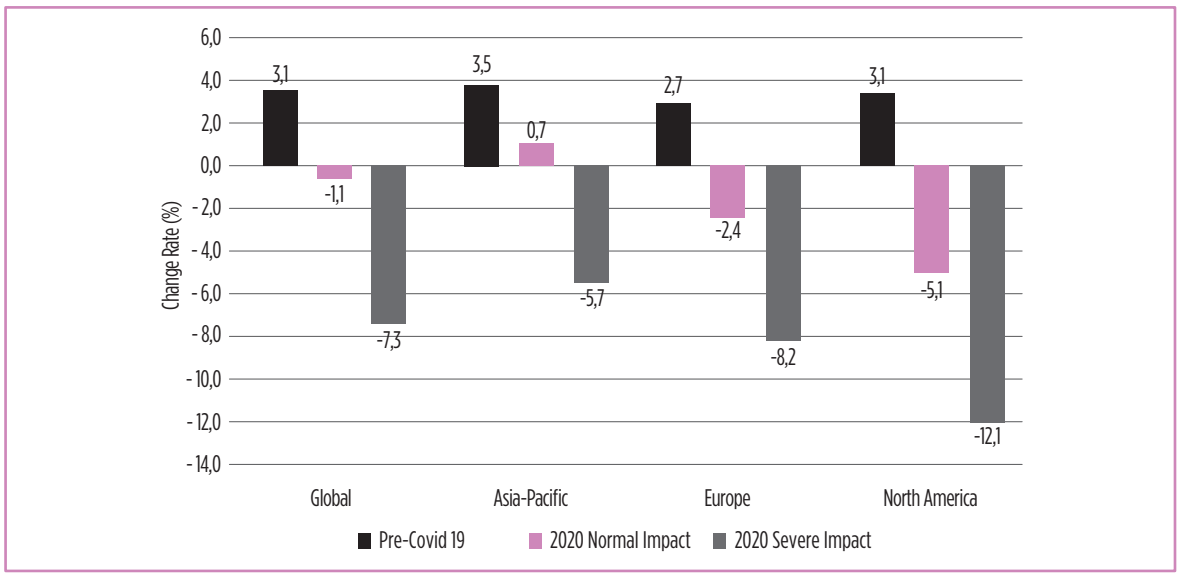

Figure 6: *The Impact of the Pandemic on Maritime Transportation (Statista, 2020)*

Despite the negative scenarios, it is observed that maritime transportation is affected on a more limited scale by the pandemic compared to other transportation types. The fact that the problems caused by COVID-19 in road and air transportation have more comprehensive effects results in an increase in the tendency towards maritime and especially rail transportation types. It is observed that 443 million tons of cargo was handled in January-November 2019 period and 452 million tons of cargo in January-November 2020 period in all ports of Turkey (Ministry of Transport and Infrastructure, 2020). The problems experienced at road border gates, especially with the pandemic, have led companies that currently use road transportation to use maritime transportation instead.

Unlike maritime transport, air transport is among the sectors most affected by the pandemic. The airline industry provides jobs to 65 million people worldwide, directly and indirectly, and the global size of the industry is estimated to be 2.7 trillion USD (IATA, 2020a). Although there was a partial improvement in air transportation, which came to a standstill except for cargo flights, especially in the second quarter of 2020, with the reduction of restrictions in the third quarter of 2020, large-scale losses are still encountered during the pandemic process.

According to the International Air Transport Association (IATA) estimates, it is calculated that the net loss in the aviation sector due to the pandemic in 2020 is around 118 billion USD and the industry is expected to lose another US $ 39 billion in 2021 (IATA, 2020b). Flights canceled due to

travel restrictions and international departure prohibitions are among the most important reasons for losses in air transportation. In this context, the weekly number of commercial flights for 2019 and 2020 is presented in Figure 7 and it is noteworthy that the total number of commercial flights in 2020 decreased by 58% compared to 2019.

Uluslararası Hava Taşımacılığı Birliği (IATA) tahminlerinde 2020 Yearsında havacılık sektöründe salgından dolayı yaşanan net kaybın 118 milyar ABD doları düzeyinde olduğu hesaplanırken, 2021 Yearsında sektörün 39 milyar ABD doları daha kayıp yaşaması beklenmektedir (IATA, 2020b). Havayolu ulaştırmasında yaşanan kayıpların en önemli sebepleri arasında seyahat kısıtlamaları ile yurtdışı çıkış yasakları gibi nedenlerden dolayı iptal edilen uçuşlar yer almaktadır. Bu çerçevede Şekil 7'de 2019 Yearsı ve 2020 Yearsları için haftalık ticari uçuş saYearsarı sunulmakta olup 2020 Yearsında gerçekleşen toplam ticari uçuş sayısının 2019 Yearsına kıyasla %58 düzeyinde azaldığı dikkati çekmektedir.

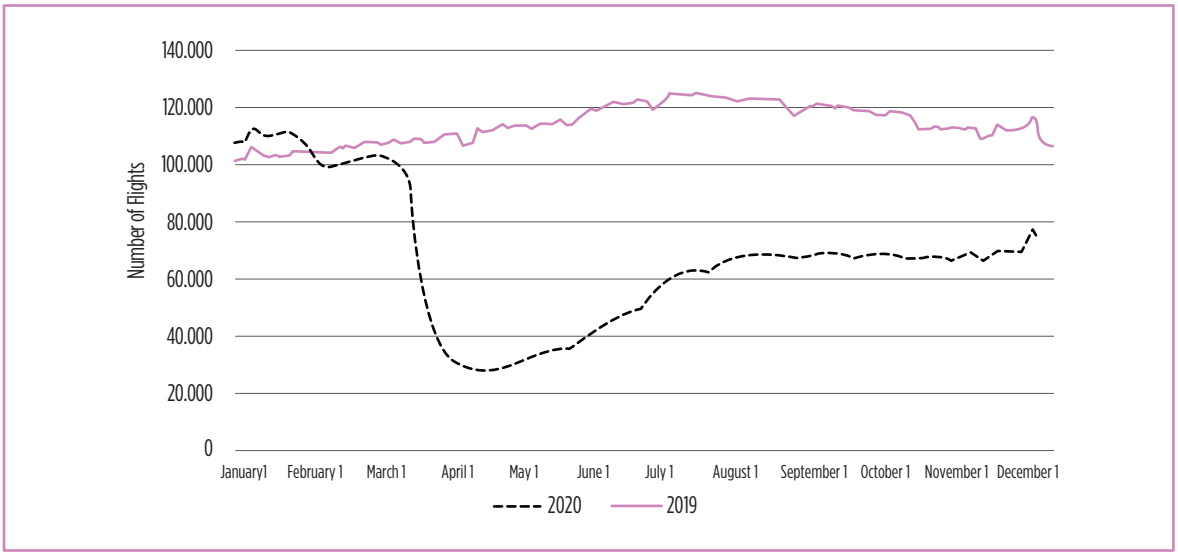

Figure 7: *Number of Commercial Flights (Flightradar24, 2020)*

Considering that most of the cargo transported in air transportation is carried by scheduled passenger aircrafts, the decrease in passenger flights has directly been reflected on air freight transportation as well. This shrinkage in the airline industry has created significant pressure on airport operators and many countries prepared incentives and support packages in order to close the fiscal deficits in the airline transportation sector. In this context, as of August 2020, the support of countries to the airline sector has reached 160 billion USD (OECD, 2020).

One of the sectors negatively affected by the pandemic is the road transport sector. International road transport came to a halt because the first measure that countries took during the period when the pandemic emerged was the closure of the borders. On the other hand, the fourteen-day quarantine period applied to the drivers and the increase in the problems experienced by the drivers during the visa application also negatively affected road transportation. During the pandemic, the vehicle queues at the customs gates caused great losses in the road transport sector, where timely and sensitive goods were mainly transported. According to the estimates by the International Road Transporters Union (IRU) the road transport industry is expected to contract by about 18% in 2020 compared to 2019 and it is estimated that the revenues in the sector will decrease by 40% compared to the previous year and the number of transportation contracts signed will decrease by 60%. In road passenger transportation, an average 70% revenue loss is expected when compared to the previous year (IRU, 2020:3-8).

The contraction and loss of income experienced in the road sector negatively affect the companies in the sector as well. Financial sustainability problems arise due to the bottlenecks caused by the pandemic in small and medium-sized companies that make up the majority of the sector. In the

pandemic, many existing roads have been closed as a result of countries closing their borders or taking strict measures at border crossings. Companies in the sector face various risks in determining alternative new routes and realizing their plans according to new routes. These problems and risks increase the cost of road transportation and suppress the profitability rates in the sector. In this context, the tendency towards the maritime and rail sectors is increasing due to the problems and bottlenecks in the road transportation sector.

Supply and demand fluctuations on a global scale have also adversely affected the rail freight transportation. According to the estimates made by the International Union of Railways (UIC), the total loss to be experienced globally in 2020 and 2021 in rail freight and passenger transport due to the pandemic is USD 128 billion according to the pessimistic scenario and USD 78 billion according to the optimistic scenario (UIC, 2020: 7-24). It is considered that a significant part of the said losses stemmed from urban and intercity passenger transportation.

Rail and maritime transportation sectors have been among the prominent sectors in the pandemic process due to the transportation of more cargo on a unit scale and less physical contact compared to other transportation types, and the losses remained at a more reasonable level. In this context, it has been revealed that rail transportation can be an important alternative to road transportation, especially in periods when border gates are closed or crossings are restricted.

Similar developments have been experienced in Turkey in parallel with the global trends in the rail transportation sector. When the data compiled by the TCDD General Directorate are examined it is seen that in the period of January-November 2020, rail passenger transportation decreased by 41.1% compared to January-November 2019 period, and rail freight transportation increased by 4.3% compared to the previous year (TCDD, 2021). In this context, it is concluded that rail freight transportation was preferred more due to the problems experienced in air and road transportation during the pandemic period.

On the other hand, the distribution of Turkey's foreign trade for the January-November period of 2019 and 2020 is presented in Table 9. In this context, there was a significant decrease in maritime and air transportation in exports during the pandemic period and even though the volume of road transport has decreased, its share in the total has increased. On the other hand, both the volume and share of rail transportation has increased. Besides, while the shares of road and air increased in import transportation, there was a decrease in maritime and rail transportation.

Table 9: *Foreign Trade by Transport Types (Ministry of Trade, 2020b)*

	Export		Import	
	2019	2020	2019	2020
Maritime (million USD)	99.645	90.135	102.699	102.820
Share (%)	60,23	59,42	53,97	52,18
Road (million USD)	50.011	47.561	33.460	37.046
Share (%)	30,23	31,35	17,58	18,30
Air (million USD)	13.568	11.457	26.056	35.790
Share (%)	8,20	7,55	13,69	18,16
Rail (million USD)	895	1.177	28.806	19.461
Share (%)	0,54	0,77	14,09	9,88
Other* (million USD)	1.327	1.379	1.270	1,930
Share (%)	0,80	0,91	0,67	0,98
Total	**165.446**	**151.704**	**190.291**	**197,047**

**This includes pipeline, mail transport, electric power transmission and self-propelled vehicles.*

4.2. Possible Changes in the Sector After the Pandemic

The COVID-19 pandemic, which has gradually become the main agenda on a global scale since the beginning of 2020 has directly affected social and economic activities and caused the emergence of new ways of doing business and new trade and life models. It is seen that some of the vaccination efforts that started in many countries since the first periods of the pandemic ended in the last quarter of 2020, and vaccination efforts started in some countries at the end of 2020. Considering the production processes and storage conditions of vaccines and the world's population it is expected that the vaccination process will not be completed in 2021. As a matter of fact, according to the vaccination calendars published by the countries that started the vaccination process, it is foreseen that the process will only be completed by the end of 2022 or 2023. On the other hand, it is considered that the vaccination process will take longer in countries with significant deficiencies in access to health services.

There is a risk that the pandemic process will continue in the medium term because the vaccination processes cannot be completed in the following 1-2 years and the virus mutates. In this context, it is expected that the new ways of doing business that emerged with the pandemic will become permanent on some business lines. Although changes occur in all components of the supply chain with the pandemic, production processes have adapted to the measures taken within the scope of the pandemic, and it has been observed that the concepts of productivity and self-sufficiency become more prominent in this process. It is also noteworthy that companies tend to produce locally and in a more controlled manner due to the problems experienced in remote and partial production during the pandemic.

Another part of the change experienced during the pandemic process is taking place on the consumption side. The uncertainty brought about by the pandemic process and the restrictions applied caused changes in consumer behaviors. While consumers turned towards basic consumption goods and services, especially during the periods of rapid spread of the pandemic, demand for other goods and services decreased significantly. On the other hand, mobility in cities has decreased with the limitation of travel, and thus consumers have started to use their preferences in favor of electronic commerce rather than physical one. In this context, in the face of increasing demand in many countries including Turkey, significant disruptions have been experienced in e-commerce logistics. Demand for electronic commerce is expected to increase rapidly during and after the pandemic and it is anticipated that the logistics industry, especially third party carriers, will quickly adapt to this situation in the coming period and the importance of digitalization will increase.

The new business processes that resulted from minimizing physical contact and social distance measures with the pandemic have increased the importance of digitalization and automation in all business lines. In this context, it is considered that the issues of focusing on digitalization and automation and reducing dependence on people in the logistics sector, which suffered disruptions during the peak periods of the pandemic, will maintain its importance in the coming period. It is evident that the digitalization of the processes that are subject to the logistics sector is also very critical regardless of the pandemic. It is considered that progress in terms of making ports autonomous, improving customs processes and modernizing infrastructure, increasing the share of rail transportation, making service contracts and customs declarations in digital environments is very important in terms of increasing the resilience of the sector to crises. Also, in the medium and long term, stakeholders in the public and private sectors need to increase their cooperation, and to redefine competitive priorities in areas that can be listed as transportation time, cost components, insurance, banking, inter-modality and syncodality level, infrastructure and customs services.

During the pandemic, many countries have taken very strict measures, which has put significant pressure on road transport companies in Turkey. It is observed that the relevant public institutions cooperate directly and more closely with non-governmental organizations and companies in the logistics sector in order to overcome the bottlenecks in the logistics processes. It is also considered that the continuation of the collaborations that emerged in order to resolve the instant crises and uncertainties in the coming period, is an important opportunity for the sector to come out stronger from the pandemic.

It is considered that, as a result of the bottlenecks and mandatory route changes in the logistics sector, the trend towards more cost-effective and economical means of transport has created an important window of opportunity. On the other hand, the integration and synchronization between transportation types such as road, rail, maritime and air must be provided in order to make the sector more resilient against the crises that may arise in the upcoming periods. In this way, it is considered that bottlenecks in any transportation type or route can be solved in a more flexible, fast and low-cost way as a result of the use of transportation modes together.

New ways of doing business and new social life trends that emerged with the pandemic brought important changes in all business lines. Although the level of measures taken by countries under the pandemic is reduced, it is expected that measures to reduce social distance and physical contact will continue until the pandemic ends and flexible working models will become widespread. In this context it is assessed that the size of the logistics sector management and transportation affairs organization, which reaches a level of approximately 1 trillion USD per year, may decrease significantly with flexible working, digitalization and activation of business processes. In addition, companies in the logistics sector are expected to improve their digital infrastructures and make their infrastructures more suitable for flexible working methods.

5. Trends Specific to the Logistics Sector

5.1. Special Trends in the Logistics Sector around the World

5.1.1. Industry 4.0

Industry 4.0 is a business model that integrates smart production processes with logistics services, based on advanced information and communication technologies. The main purpose of the Industry 4.0 idea which was first put forward in Germany is to achieve a faster, more flexible, more efficient operation structure with the help of the internet of objects and services and cloud technology, and to help developed countries maintain their competitive advantage.

In a world where consumer needs differ and tailor-made products come to the fore, it is increasingly becoming difficult to manage supply chains with traditional planning and control methods. Instead, a logistics system is emerging where robots are used in resource planning and storage, inventory management is carried out using smart sensors, and transports are monitored instantly with the help of radio frequency identification (RFID). These developments are to minimize the dependence on manpower in production and logistics.

From the perspective of Turkey Industry 4.0 it brings various opportunities and threats. Industry 4.0, which will reduce the importance of the human factor, will reduce the low cost manpower advantage of Turkish logistics companies against their European competitors. On the other hand, considering that with Industry 4.0, efficiency in value chains will be much more prominent, Turkey, which is geographically located on international trade corridors, will be able to attract a much higher level of freight traffic if it can integrate into global logistics systems.

5.1.2. Belt and Road Initiative

The Belt and Road Initiative (BRI) is a very large-scale infrastructure program that was initiated under the leadership of China and was financed to a large extent by China and including cooperating countries. The BRI consists of two sub-corridors, the Silk Road Economic Belt (SREB) and the 21st Century Maritime Silk Road (21CMSR).

SREB is a road-based route that passes through the historical Silk Road. Thanks to SREB, which connects China to the European market via the rail line, it is planned to save about 50% in the transportation time of products that are traditionally transported to Europe by sea. 21CMSR, on the other hand, is a maritime route connecting China with Indonesia, India, Sri Lanka, Kenya (Africa) and finally Europe (Figure 8).

Figure 8: *Silk Road Economic Belt and 21st Century Maritime Silk Road (Xinhua News Agency, 2020)*

BRI brings together some of the opportunities and threats for Turkey. According to Kadılar and Ergüney (2017) by integrating into the BRI initiative, Turkey will be able to strengthen its regional integration with neighbors with whom it is in dispute. In addition, as Turkey is a part of the BRI initiative, it will prevent alternative corridors that do not pass through Turkey and will facilitate its exports to Asia. The first example of the threats that BRI brings with it for Turkey is the increased access of Chinese products to the Turkish market and the possibility of increasing the share of these products in the Turkish market as a result. Secondly as Chinese products will reach Europe, Africa and West Asia faster after BRI, the effect of the speed factor, which is the main competitive tool of Turkish products compared to Chinese products, will decrease in these markets. Finally, the increasing traffic of Piraeus Port, which is an important location of 21CMSR and operated by a Chinese company will adversely affect the development of Turkish ports that aim to become an important transfer center in the Eastern Mediterranean Basin.

5.1.3. Increasing Importance Attached to Sustainability

The transportation sector is the second largest CO2 emission source in the world, after electricity and heating, and road transport is the second largest source of CO2 emission in international trade. In order to reduce these negative effects, various regulatory, economic and technological measures are taken.

From a regulatory perspective, especially developed countries impose some restrictions on the engine standards for carriers operating within their borders and force logistics companies to use newer and more environmentally friendly vehicles. Likewise, in some corridors, important restrictions are imposed on road transportation and it is made obligatory to transport loads by rail. From an economic point of view, more environmentally friendly modes of transport are promoted using a variety of pricing and taxation methods. From a technological point of view, certain R&D activities are being accelerated in order to develop engines with high energy efficiency and lightweight composite materials and to use alternative energy sources.

5.1.4. E-Commerce

The increase in e-commerce significantly affects both the retail sector and the structure of logistics services. Developments in fast delivery and product return applications that increase consumer satisfaction in e-commerce both increase the growth rate of e-commerce and force logistics companies to invest in regional delivery centers, order tracking systems, and more efficient handling and transportation infrastructure.

With the shift of commerce to the electronic environment, the market shares of shopping malls and large retail companies are decreasing. Unable to keep up with this trend, Sears, once the largest department store chain in the United States, went bankrupt, and Macy's, another department store chain, had to close some of its branches. On the other hand, Amazon, an E-commerce company, has become one of the largest companies in the world in terms of market value. Considering next-day delivery as one of its most important strategic goals, the company has established operations centers all over the world and launched its own air cargo company.

5.1.5. Arctic Ocean Route

The melting of the glaciers in the Arctic Ocean with the effect of global warming highlights this sea as a very important alternative for maritime transportation between the Far East and Europe. This route shortens the transport distance between China and Europe by about 40% compared to the Suez Canal, and therefore has the potential to save significant time and money (fuel, manpower, depreciation). However, the reflection of this 40% shortening in distance on costs is at a lower rate for various reasons. These reasons can be listed as the high construction costs of ice-classed ships that will navigate on this route, slower cruising speed, problems in navigation, higher operational risks and the need to receive ice-breaker service (Liu & Kronbak, 2010). It is necessary to add to these factors the insurance premiums that increase with the increasing risks and the fact that transportation cannot be carried out throughout the year due to weather conditions.

With the emergence of the Arctic Ocean route, academic studies have been carried out on the economic level of this route. Liu and Kronbak (2010) calculated that if ice crushing costs remain

at current levels, the Arctic Ocean route offers a lower financial return than the Suez Canal. Schøyen and Bråthen (2011) stated that the Arctic route may initially be an ideal alternative for bulk carriers but underlined that due to the fact that large-scale vessels cannot operate here due to vessel draft restrictions on the route such ships will still have to use the Suez Canal. Bekkers et al. (2018) discussed the new situation that would arise if the glaciers in the Arctic Sea continue to melt. According to the estimates of Bekkers et al. (2018), if the obstacles created by the glaciers disappear; approximately 2/3 of the Suez Canal traffic, which serves about 8% of the world trade, will shift to the Arctic Ocean route, and with reduced transportation costs, trade between East Asia and Western Europe will increase by about 10% and countries like Singapore and Egypt, which are on the old route and have made great economic gains from this situation, will suffer considerably. Based on this prediction, it is possible to say that maritime trade in the Mediterranean basin will be adversely affected if the new route is activated, and Turkey's maritime transportation will take its share from this decline.

5.1.6. Containerization and Increasing Ship Sizes

Containerization is a recent development that has fundamentally affected not only maritime transportation, but all international supply chains. Carrying loads in containers greatly reduces the likelihood of the transported cargo being damaged on the move, and reduces handling costs in transitions between types of transport (such as from road to rail, from rail to sea, from road to rail). Coşar and Demir (2018), in their study comparing the costs of transporting goods in bulk and by container, show that it is less costly to transport goods as bulk cargo for short distances and by container for long distances. When the results of the study are considered for Turkey, it is predicted that in a scenario where container transportation is not carried out, Turkey's total exports to an average export point will be 2/3 of the current situation and exports with maritime will decrease by 14-21%.

The high rate of increase in global trade volume and in transoceanic transport pushes logistics companies to seek lower-cost maritime transportation, and increasing the ship sizes stands out as one of the alternative solutions in this regard.

The basic approach here is to reduce the transportation costs of the unit load through economies of scale. According to the results of studies conducted by Hassel et al. (2016) that address the effect of using larger container ships on supply chain costs, as the scale of the container ship increases, the cost of the supply chain decreases, and the magnitude of this reduction in cost (consisting of maritime transportation, port operations and hinterland operations) is directly proportional to the share of maritime transportation in the supply chain. When viewed from this angle, Hassel et al. (2016) predict that the economic benefits of using larger container ships will be higher for long-distance transportation between the Far East and Europe. However, the growth trend of the ships especially used in intercontinental transportation is a development that should be evaluated carefully. Although it is aimed to reduce the unit transportation costs through economy of scale with increasing ship sizes this practice brings some drawbacks. A study prepared by the OECD draws attention to the risks arising in this regard (Busquet and Aronietis, 2015). The aforementioned report states that the unit costs have decreased in the shipments made by large ships, but underlines that this decrease is mainly due to more efficient engines rather than scale. Apart from this, the report draws attention to the fact that increasing ship sizes have created new large-scale investment needs in port infrastructures and a large number of orders for large ships may cause oversupply in the market, and that transporting a very large amount of cargo with a single ship increases the amount of economic loss that will occur in the event of a possible accident, and that it reduces the flexibility of international supply chains.

5.2. Special Trends in the Logistics Sector in Turkey

5.2.1. General Frame

The change in infrastructure investments made by the public in different modes of transport in the past years is one of the most effective ways to monitor changes in policies and trends in a country. From this point of view, Figure 9, which shows the shares of transport types within the total transport investment budget for the period 1999-2019, is important in analyzing public policy

changes over the past two decades[1]. Road transport traditionally takes a very large share (more than 90%) in both passenger and freight transport. Although road transportation has an important advantage in point-to-point transportation, in many public strategy documents, it was stated that steps should be taken to reduce the share of road transportation and especially to increase the share of rail transportation. This trend is noted concretely in Figure 9 and looking at Figure 9 it is observed that the allowances reserved for rail transportation investments have an increasing trend over time, unlike other transportation types, especially road investments. Having a share of approximately 7% within total transportation investment budget in 1999, rail investments increased this rate to 37% in 2019. On the other hand, the dominancy of road investments, which took the lion's share from the budget for many years, has gradually decreased and the share, which was 72% in 1999, decreased to 35% in 2019. Another prominent result of Figure 9 is the fact that the share of public investments made for air and maritime transportation tends to decrease. The main reason for this is the liberalization and privatization tendencies in these sub-sectors. As a result of the transfer of the operating rights of a very large part of the ports belonging to the General Directorate of Turkish Maritime Organization and TCDD to the private sector and application of Build-Operate-Transfer method in large-scale airports owned by DHMI; the public investment expenditures in the maritime and air transportation sectors have declined over time. In addition, the increase in private sector port investments, apart from privatization, further reduced the need for public investment.

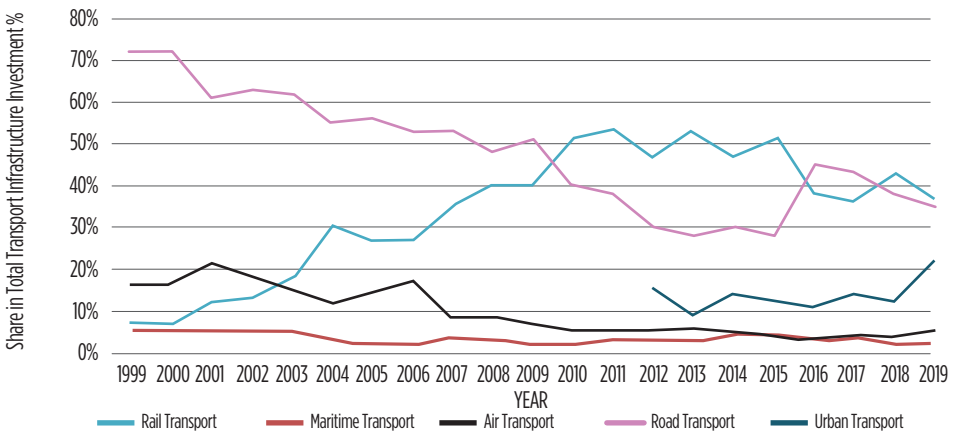

Figure 9: *Distribution of Public Transportation Investments by Mode (Yearly Allowances) (1999-2019) (Özcan & Hewings, 2019)*

International comparisons (indexes) are important reference sources in order to measure how the performance of transportation and logistics infrastructure and services in our country has changed over time. The first of these international comparisons is the measurements in the Global Competitiveness Reports published regularly by the World Economic Forum. In the Global Competitiveness Report, the most recent of which was issued in 2019, Turkey ranked 61st among a total of 141 countries. While calculating this overall ranking; a total of 12 subtitles consisting of security, social capital, transparency, corporate governance and property rights, institutions, transportation infrastructure and public service were evaluated. Ranking 61st in total, Turkey had the 49th place in infrastructure and 33rd place in transportation infrastructure. Transport infrastructure, on the other hand, consists of eight sub-components and the ranking of Turkey on the basis of these subcomponents ranges from 14th (airport connection) to 56th (efficiency of train services). The

1- Figure 9 has been prepared on the basis of the allowances announced in the Public Investment Programs at the beginning of the year and the allowance transfers made between institutions and sectors during the year are not included in the calculation.

relevant rankings shown in Table 10 indicate that the transportation infrastructure of Turkey is at a better level than the overall competitiveness performance. On the basis of transportation types, Turkey performs relatively less in terms of rail transportation indicators, but its ranking is higher in the world, especially in terms of air and road transport indicators.

Table 10: *Rank of Turkey in terms of Transport-Logistics Sector in the 2019 Global Competitiveness Report (World Economic Forum, 2019)*

Variable	Türkiye'nin Aldığı Değer	Türkiye'nin Sıralaması
Competitiveness	-	61/141
Infrastructure	-	49/141
Transport Infrastructure	-	33/141
Road Connectivity (0-100)	87,1	34/141
Quality of Road Infrastructure (1-7)	5,5	31/141
Railroad Density (km / 1.000km2)	13,3	52/141
Efficiency of Train Services (1-7)	3,5	56/141
Airport Connectivity (score)	558.459,1	14/141
Efficiency of Air Transport Services (1-7)	5,4	31/141
Liner Shipping Connectivity Index (0-100)	59,7	27/141
Efficiency of Seaport Services (1-7)	4,7	44/141

As explained in Section 3.2, Compared to the Global Competitiveness Reports, the Logistics Performance Index (LPI), which is more focused on the logistics sector, is reported by the World Bank every 2-3 years and stands out as the most generally accepted criterion for logistics globally. Table 11 shows the scores of Turkey on the basis of LPI and six LPI sub-components in 2007, 2010, 2012, 2014, 2016 and 2018. Values in parentheses indicate the worldwide ranking of Turkey on the basis of the relevant parameter and year. The second sub-lines in the main lines shown for each year show the country with the highest score and the score that country has achieved on the basis of the relevant parameter. The values in the last bottom line correspond to the world average on the basis of the relevant parameter.

Turkey ranked 34th in global logistics performance with an LPI score of 3.15 in 2007. Despite increasing the LPI score in 2010, Turkey dropped to the 39th place in the ranking, and achieved its best performance in 2012 both in LPI score and ranking. It is seen that after the peak in 2012, Turkey entered a downward trend on the basis of LPI score and world rankings. For 2018, when the most recent LPI report was published, Turkey's LPI score was 3.15, and the world ranking was 47.

Table 11: Turkey's Logistics Performance Index Scores by Year (World Bank, 2018)

		LPI Score	Customs	Infrastructure	International Shipment	Logistics Competence	Tracking & Tracing	Timeliness
2007	Turkey	3.15 (34)	3.00 (33)	2.94 (39)	3.07 (41)	3.29 (30)	3.27 (34)	3.38 (52)
	#1 Country	4.19 (Singapore)	3.99 (Netherlands)	4.29 (Netherlands)	4.05 (Netherlands)	4.25 (Netherlands)	4.25 (Singapore)	4.53 (Singapore)
	World Average	2.74	2.56	2.58	2.72	2.71	2.73	3.17
2010	Turkey	3,22 (39)	2,82 (46)	3,08 (39)	3,15 (44)	3,23 (37)	3,09 (56)	3,94 (31)
	#1 Country	4,11 (Germany)	4,04 Luxembourg	4,34 (Germany)	3,86 (Singapore)	4,32 (Switzerland)	4,27 (Switzerland)	4,58 (Luxembourg)
	World Average	2.87	2.59	2.64	2.85	2.76	2.91	3.41
2012	Turkey	3.51 (27)	3.16 (32)	3.62 (25)	3,38 (30)	3,52 (26)	3,54 (29)	3.87 (27)
	#1 Country	4.13 (Singapore)	4.10 (Singapore)	4.26 (Germany)	4.18 (Hong Kong)	4.14 (Finland)	4.14 (Finland)	4.39 (Singapore)
	World Average	2.87	2.66	2.76	2.82	2.82	2.88	3.26
2014	Turkey	3.50 (30)	3.23 (34)	3.53 (27)	3.18 (48)	3.64 (22)	3.77 (19)	3.68 (41)
	#1 Country	4.12 (Germany)	4.21 (Norway)	4.32 (Germany)	3.82 (Luxembourg)	4.19 (Norway)	4.17 (Germany)	4.71 (Luxembourg)
	World Average	2.89	2.73	2.77	2.86	2.85	2.90	3.25
2015	Turkey	3.42 (34)	3.18 (36)	3.49 (31)	3.41 (35)	3.31 (36)	3.39 (43)	3.75 (40)
	#1 Country	4,23 (Germany)	4,18 (Singapore)	4,44 (Germany)	4.24 (Luxembourg)	4.28 (Germany)	4.38 (Sweden)	4.80 (Luxembourg)
	World Average	2.88	2.71	2.75	2.87	2.82	2.86	3.27
2016	Turkey	3.15 (47)	2.71 (58)	3.21 (33)	3.06 (53)	3.05 (51)	3.23 (42)	3.63 (44)
	#1 Country	4.20 (Germany)	4.09 (Germany)	4.37 (Germany)	3.99 (Belgium)	4.31 (Germany)	4.32 (Finland)	4.41 (Belgium)
	World Average	2.87	2.67	2.72	2.83	2.82	2.90	3.24

Looking at the subtitles of the LPI, it is seen that Turkey has a successful performance especially on the basis of logistics infrastructure. As shown in Table 10, this situation confirms the relatively high performance of Turkey in transportation infrastructure in terms of competitiveness. On the other hand, the performance in customs and operational parameters is relatively lower, and there has been a decline in these areas in recent years. Germany, Singapore and Luxembourg stand out as the top performing countries in the world.

The predictions in the 11th Development Plan covering the 2019-2023 period are guiding as to how the trends in the field of transportation and logistics in Turkey will continue. First of all, the mentioned plan differs from previous Development Plans as the weight given to the logistics sector has increased. The first of the issues highlighted in the plan regarding logistics is the geographical advantage of Turkey in the context of international transport corridors such as TEN-T (Trans-European Transport Network), TRACECA (Transport Corridor Europe-Caucasus-Asia), VIKING and the Middle Corridor.

It is possible to briefly summarize the basic logistics-related strategies in the 11th Development Plan as follows: increasing the share of rail transportation in freight and passenger traffic, developing the port infrastructure by considering the scale and location, increasing competitiveness and efficiency in logistics operations, increasing combined transportation and reducing logistics costs. Table 12 shows some of the main goals regarding logistics and transportation in the 11th Development Plan.

Table 12: *Logistics and Transportation Targets in the 11th Development Plan (Strategy and Budget Directorate, 2019)*

Parameter	2018	2023
The Rank of Turkey in Logistics Performance Index	47	25
Share of Railway in Total Freight Transport (in modes of national territorial transport, %)	5,15	10
Railway Line Efficiency (Passenger-Km+Tonne-Km)/(Lenght of Main line)	1,48	2,77
Railways Freight Transport (Billion, Nettonne-km)	14,5	32,4
Electrified Line (%)	43	77
Signalled Line (%)	45	77
Length of Railway Branch Line (km, cumulative)	433	727
Total Container Handling (Million TEU)	10,8	13,5
Transit Load Ratio in Maritime Cargo Handling (%)	15,5	17,3
Turkish Owned Maritime Merchant Fleet of 1,000 GRT and Over (Million DWT)	28,6	36,0
Airways International Total Cargo Traffic (Thousand Tons)	1.355	1.529
Share of Double-Track Railway Length in Total Main Line (%)	12,4	26,3
Share of Cargo Handled in Cabotage Line in Total Handling (%)	12,9	18
Multi-Lane Divided Highways (motorways included)	26.642	29.514
Motorways (km , cumulative)	2.842	3.779
Bituminous Hot Mix Coated Road Network (km, cumulative)	25.215	31.478

5.2.2. Performance in Customs Transactions

Customs services are a very important pillar of the logistics industry. Customs services, which is one of the six sub-titles within the scope of LPI, is also considered as a separate topic by the World Economic Forum. In the study conducted with at least 10,000 participants from more than a hundred countries, participants rate the quality of the customs in their country from one to seven. One corresponds to the lowest productivity level and seven to the highest efficiency level.

Figure 10 shows the change in the scores of Turkey in the 2007-2017 period and gives the world averages for comparison. As can be seen from the figure, Turkish customs, which scored slightly above the world average in 2007, displayed a performance below the world average in the following period. This picture indicates that customs services must be improved in order to move the Turkish logistics sector to a better point.

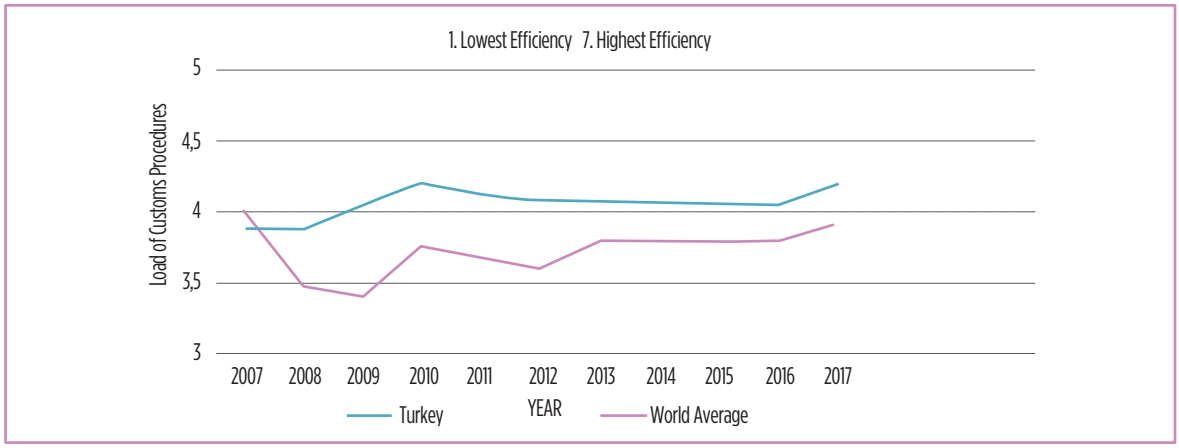

Figure 10: *Burden of Customs Procedures (2007-2017) (World Bank, 2020)*

5.2.3. Road Transport

Compared to other modes of transport, road transport is the most liberalized mode in freight transport. All entrepreneurs who obtain the necessary permits from the relevant public administrations especially the Directorate General for Regulation of Transport Services, which is within the central organization of the Ministry of Transport and Infrastructure, may carry passengers and freight on the road. This free market structure has enabled a large number of small-scale companies in the sector to transport freight, which is an obstacle to maximizing economies of scale.

One of the important parameters in road freight transportation is the changes in the number of trucks and vans used in transportation (Figure 11). While 31,462 vans were registered against 47,931 trucks in 1966, the number of vans reached the number of trucks in 1980. In 2019, 844,481 trucks were registered, compared to 3,796,919 vans. Although the use of vans in freight transportation brings advantages in terms of flexibility, the unit cost of van transports is higher. The table presented in Figure 11 indicates a situation where the scale of the sector is decreasing.

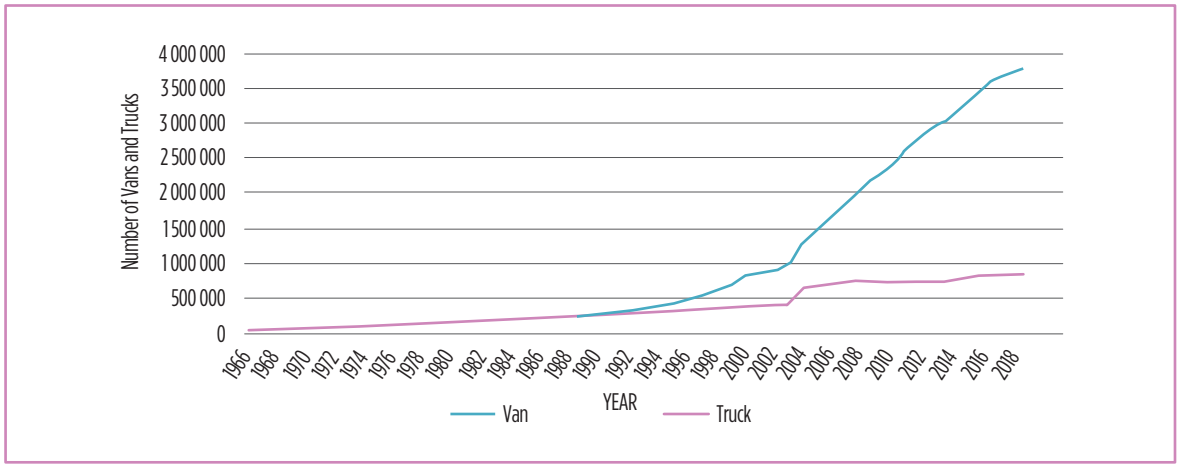

Figure 11: *Number of Registered Vans and Trucks (1966-2019 Period) (TURKSTAT, 2020e)*

Figure 12 shows the changes in vehicle and freight traffic on the road during 2001-2019. Vehicle traffic shown in the figure is measured as vehicle-km, and freight traffic is measured as ton-km. In the 2001-2019 period, vehicle traffic increased by approximately 157%, freight traffic increased by approximately 77% and passenger traffic by approximately 102% (Not shown in the figure). This means that economies of scale are declining in both freight and passenger transport. In other

words, for each trip made in 2019, less freight and passengers were carried compared to 2001. This result confirms a higher rate of increase in the number of vans than the number of trucks shown in Figure 11. This trend can also be interpreted as the occupancy rate in transports made by logistics companies is decreasing. This shows that the economic and financial feasibility of freight transport on the road has been decreasing over time.

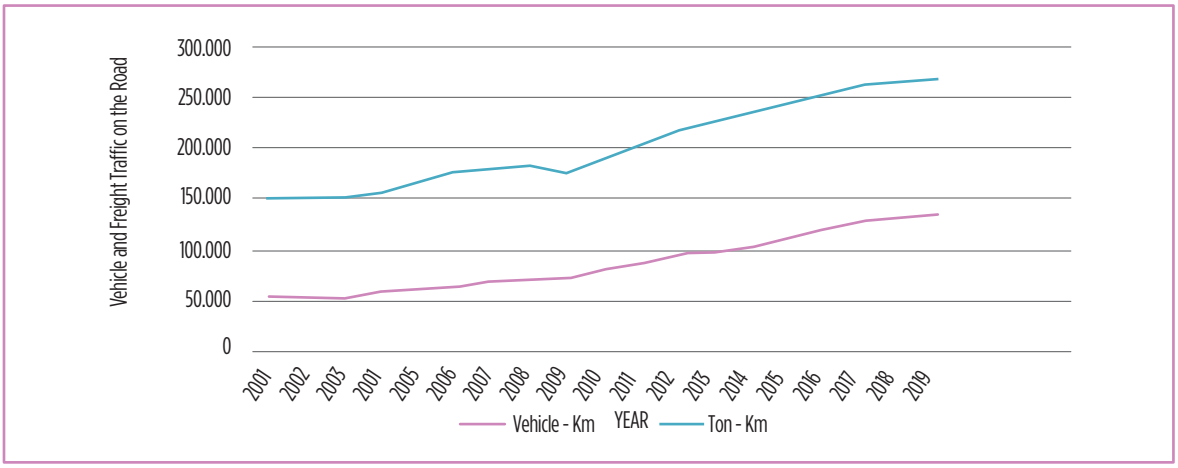

Figure 12: *Vehicle and Freight Traffic on Road (2001-2019 Period) (TURKSTAT, 2020e)*

Figure 13 shows the changes in the divided road and motorway network over the period 1984-2019. As can be seen from the figure, initially both road networks grew at rates close to each other. However, subsequently, the divided road network expanded at a higher rate, and the difference grew much more rapidly in the following period. The first reason for this is that governments have determined the expansion of the divided road network as one of their priority areas after 2002. Within the framework of the target for constructing 15.000 kilometers of divided road, significant resources have been allocated to these investments. Second, it has been preferable to improve the overall accessibility of the country with the divided road network, as divided road construction can be completed cheaper and faster than motorway construction.

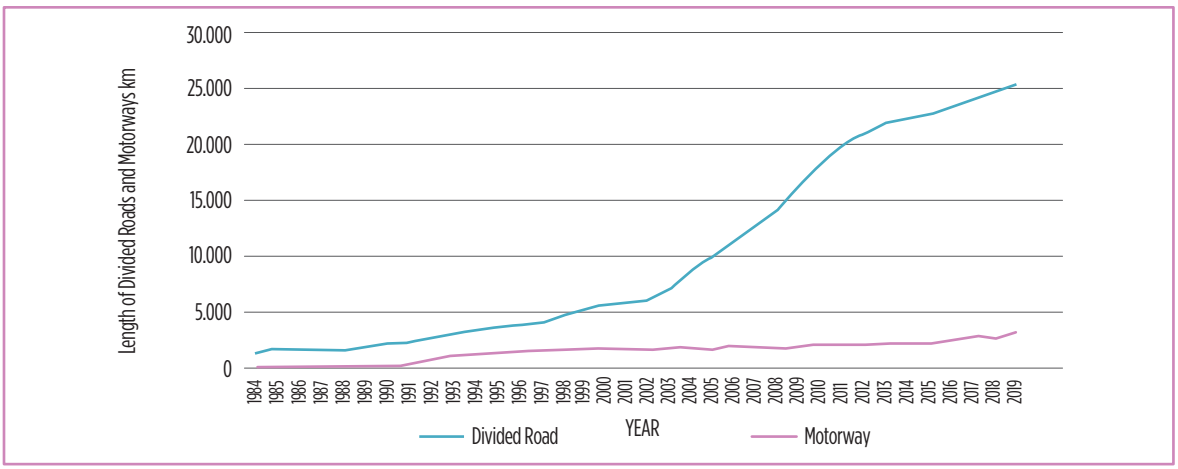

Figure 13: *Changes in Divided Roads and Motorway Networks (1984-2019) (TURKSTAT, 2020e)*

5.2.4. Maritime Transport

After the rapid wave of privatization in maritime transportation, the share of the public in the sector has decreased to a low level. From a transportation perspective, the public enterprises operating in this field, namely "Maritime Transport Turkish Incorporated Company" was privatized in 2000 and "DİTAŞ Marine and Tanker Operations" was privatized in 2006 (through the privatization of

TÜPRAŞ). Similarly, the operating rights of most of the ports of General Directorate of Turkish Maritime Organization have been transferred to the private sector. Finally, the ports operated by TCDD, where most of the Turkey's maritime freight traffic takes place and which have a rail connection and are the only profitable operational units of TCDD, were included in the scope of privatization and five of the seven ports were transferred to the private sector (Table 13).

Table 13: *Privatized TCDD Ports (TCDD, 2017)*

TCDD Port	Privatization Date	Term of Contract	Revenues
Mersin Port	11 May 2007	36 years	755.000.000 U.S. Dollars
İskenderun Port	30 December 2011	36 years	372.000.000 U.S. Dollars
Samsun Port	31 March 2010	36 years	125.200.000 U.S. Dollars
Bandırma Port	18 May 2010	36 years	175.500.000 U.S. Dollars
Derince Port	2 March 2015	36 years	543.000.000 U.S. Dollars

Figure 14 shows the change in the Turkish Merchant Marine fleet by ship types in terms of DWT and number (with regard to ships of 150GT and above) for the period 2010-2019. Ship types used in freight transportation are classified under four headings: dry cargo, bulk cargo, container and tankers carrying liquid / gas. The first point that stands out in Figure 14 is the shrinkage in dry cargo and bulk cargo fleet in terms of units and DWT. In the mentioned period, the number of dry cargo ships decreased from 500 to 298, and the number of bulk cargo ships from 106 to 56. In parallel with this change, capacity in DWT has decreased by approximately 34% in dry cargo ships and approximately 47% in bulk carriers. In the same period, although the number of container ships decreased from 70 to 57, the capacity in terms of DWT increased by approximately 26%. It is considered that containerization and the increase in the capacity of container ships have been effective in this. Regarding the tankers carrying liquid / gas, the number of vessels decreased from 223 to 178 and the capacity in terms of DWT increased by approximately 11%. In other words, Turkish companies have started to use larger-scale container ships and larger tankers for carrying liquid and gas.

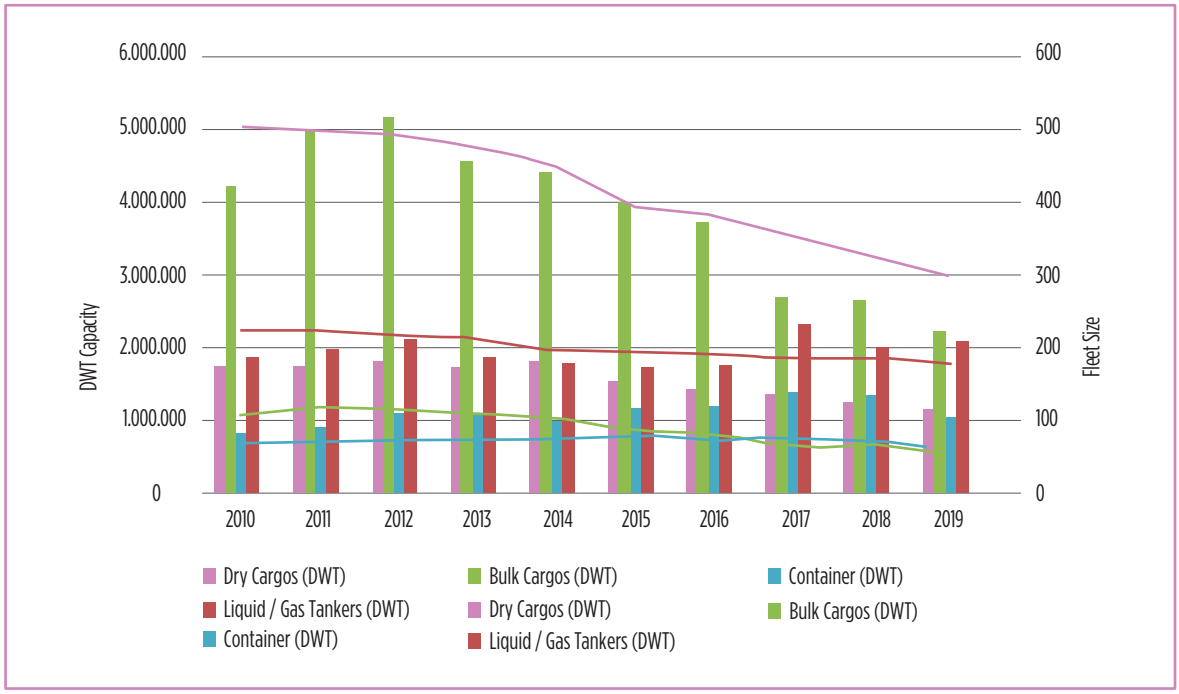

Figure 14: *Change of Ship Types in terms of DWT and Number in Turkish Maritime Merchant Fleet (With regard to vessels of 150GT and above; for 2010-2019 Period) (Ministry of Transport and Infrastructure, 2020)*

Figure 15 shows the changes in total freight and container traffic at Turkish ports during the 2004-2019 period. Total freight traffic increased by about 127% in the mentioned period and container traffic increased by about 243% in terms of weight and by about 248% in terms of TEU. The higher traffic growth in containers is in line with the trend of containerization in international trade.

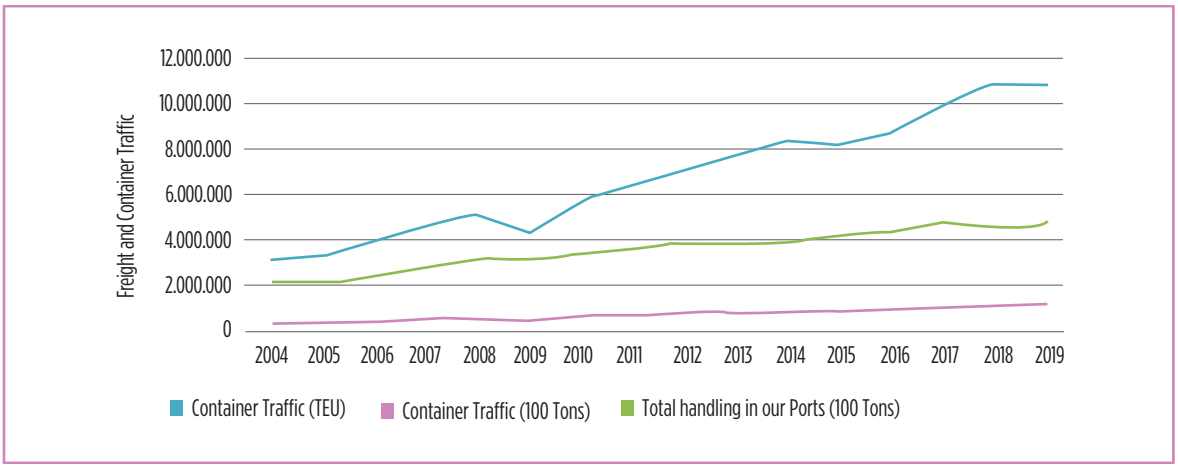

Figure 15: *Changes in Total Freight and Container Traffic at Turkish Ports (2004-2019) (Ministry of Transport and Infrastructure, 2020)*

Another international performance criterion used in maritime transportation is the Liner Shipping Connectivity Index, prepared by the United Nations Conference on Trade and Development. Figure 16 shows that during the period of 2006-2019, the Liner Shipping Connectivity Index value of Turkey was higher than the world average. This performance is remarkable, especially when considering the shrinkage experienced in the ship fleet owned by Turkey.

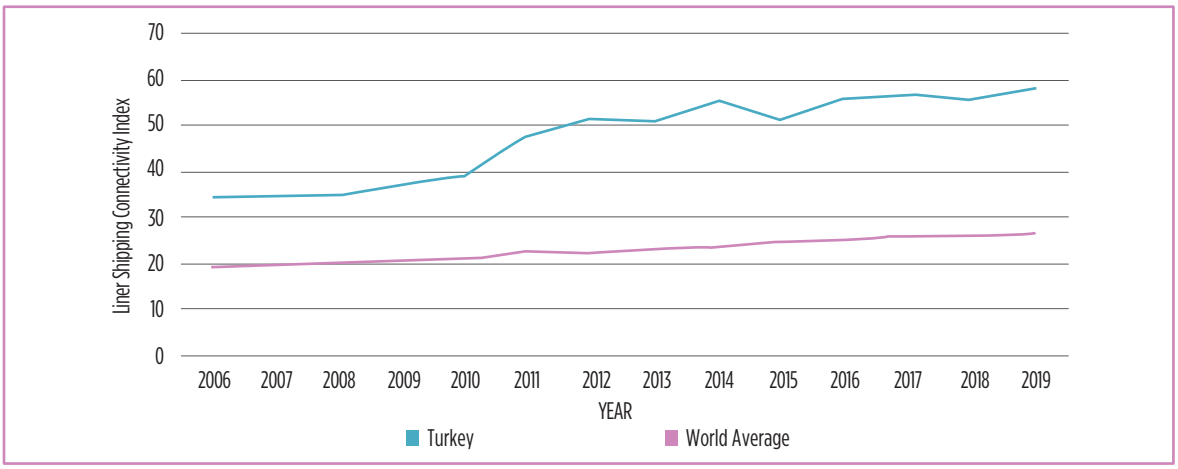

Figure 16: *Liner Shipping Connectivity Index (2006-2019) (UNCTAD, 2020)*

5.2.5. Rail Transport

Since rail transportation is a sector that is generally making loss, especially in terms of passenger transport, the Turkish Rail sector (in line with the general practice in the world) has been a sector operating under the public monopoly for many years. However, reduced passenger traffic and increased financial losses caused the necessary improvement investments to be delayed and the declining infrastructure quality as a result of not making investments on time had a negative effect on the service quality and caused a further decrease in demand. The liberalization of the

sector has been seen as a way out of this vicious cycle and after the enactment of the "Law on Liberalization of Rail Transport in Turkey No. 6461" on May 1, 2013; the way has been paved for the private sector to perform rail passenger and freight transport activities. In the new system, Turkish State Railways (TCDD) serves as the rail infrastructure operator and the affiliates including "TCDD Transportation Co.", a subsidiary of TCDD, perform rail transportation on the infrastructure operated by TCDD. It is observed that private enterprises have been reluctant to enter rail business in the post-liberalization period. At the end of 2017, OMSAN Logistics became the first private company to enter this business (NTV, 2017).

There are 3 projects directly related to logistics in the 2020 Public Investment Program (Table 14). The cost of the first project "Establishing Logistics and Freight Centers" is 1.785.038.000 Turkish Liras and 115,006,000 Turkish Liras was allocated to the project in 2020. Within the scope of the project, logistics center investments are made in Kars, Sivas, İstanbul, Karaman, Mardin, Tatvan, Boğazköprü and Bozüyük and freight center investments are made in Niğde Andaval and also completion investments are made in the logistics centers in Erzurum, Kahramanmaraş, Konya and Mersin. Within the scope of the second project "Branch Line Construction" with a cost of 2.428.068.000 Turkish Liras; the branch line line investments are still continuing in Diyarbakır-Mazıdağı, Biçerova, Gelemen-Tekkeköy, Malıköy OIZ, Afyonkarahisar OIZ, Adana OIZ-Yakapınar, Boğazköprü-Kayseri Free Zone, Demirağ OIZ, İscehisar OIZ, İskenderun OIZ, İzmit Bay Industrial Plants and Ports, Manisa OIZ, Osmaniye-Toprakkale- Erzin, Suluova, Ulukışla Mining Field, Yeni Taşkent Region and Mersin-Tarsus OIZ. The cost of the last project "Adapazarı-Karasu Ports and Sakarya Industrial Facilities Rail Connection and Station Construction" is approximately 1.1 Billion Turkish Liras. Within the scope of the project, it is planned to complete the rail connection of Karasu Port, which is of great importance for Sakarya.

Table 14: *Rail Projects directly related to Logistics within 2020 Public Investment Program (Thousand TL) (Strategy and Budget Directorate, 2020)*

Project No	Project Name	Start-End Date	Project Cost	2020 Budget
2007E01-151187	Establishment of Logistics and Freight Centers	2007-2023	1 785 038	115 006
2017E01-150938	Connection Line Constructions	2017-2022	2 428 068	167 270
2009E01-999	Adapazarı-Karasu Ports and Sakarya Industrial Facilities Rail Connection and Station Construction	2009-2023	1 135 635	1 909

Figure 17 shows the changes in rail line length and traffic in Turkey during 1977-2019 period. Accordingly, rail line length has increased a little over the last 42 years. The rail network length, which was 8,139 km in 1977, increased to 10,378 kilometers in 2019. A part of this increase is due to the investments made in the high speed train line, but the main network length remained almost constant until the mid-2000s. In the same period, the increase in passenger and freight traffic on the rail is remarkable.

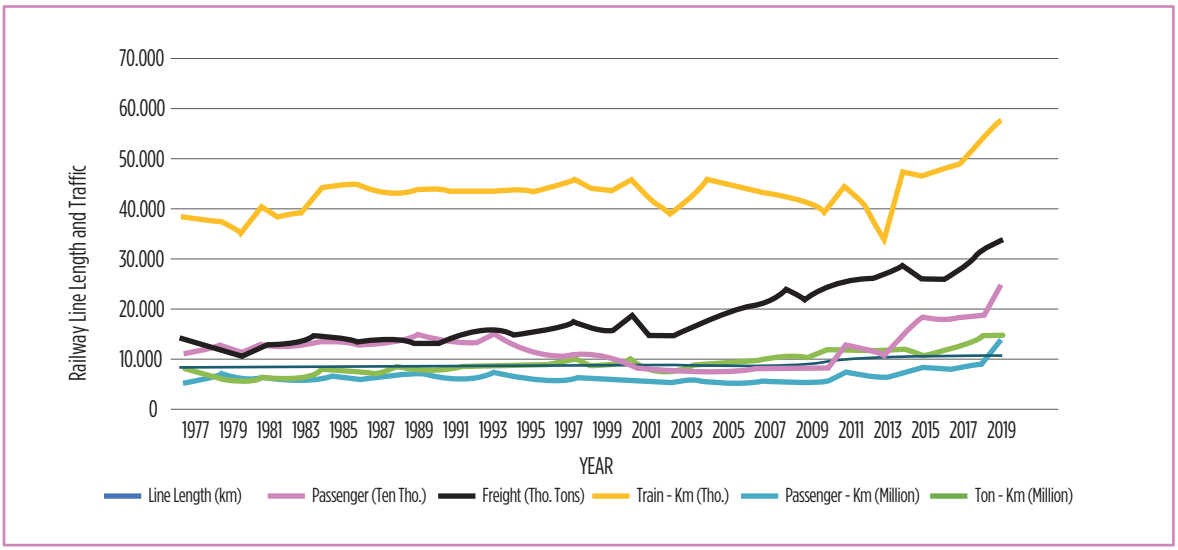

Figure 17: *Rail Length and Traffic (1977-2019) (TURKSTAT, 2020e)*

Figure 18 shows the change in the number of locomotives and wagons used on railways between 2004-2019. In the mentioned period, the number of diesel locomotives increased from 525 to 556, the number of electric locomotives from 73 to 125, and the number of freight wagons from 160,000 to 213,000. Considering that the amount of freight transported increased approximately by 86% in tons for the 2004-2019 period, it is possible to say that the increase in the number of locomotives and freight wagons is insufficient.

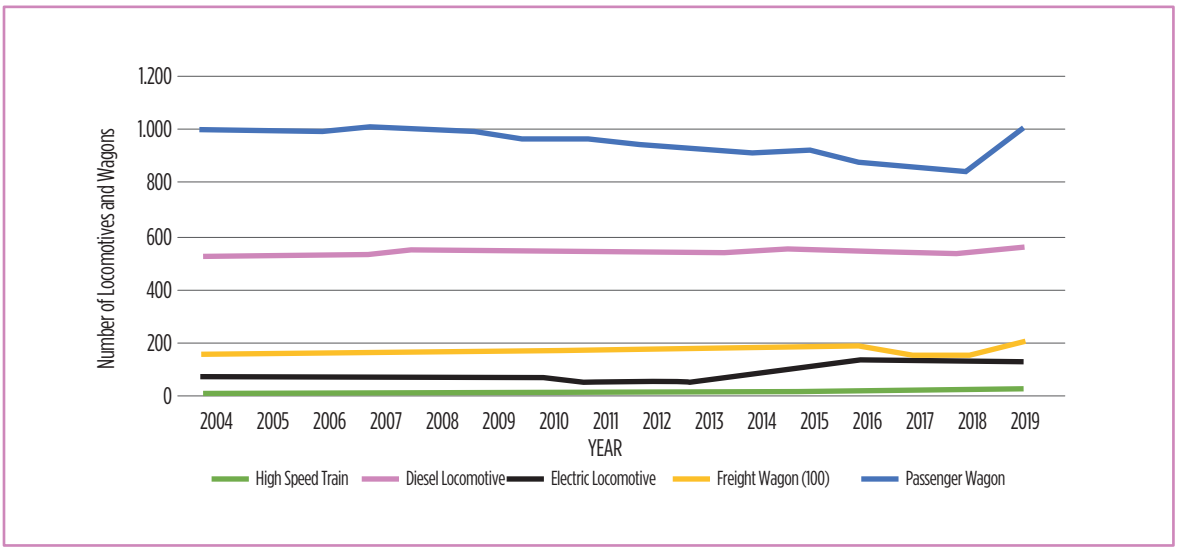

Figure 18: *Changes in the Locomotive and Wagon Fleet (2004-2019) (TURKSTAT, 2020e)*

5.2.6. Air Transport

The Turkish aviation sector has made a significant progress in the last two decades. After the removal of certain taxes on airline tickets in 2003, private airline companies entered the market and the competition increased. The increase in the competition has resulted in a decrease in ticket prices and an increase in the number of destinations and flight frequency, and eventually has led to the economic development of the sector. Along with the increasing competition, there has been a significant increase in the number of aircrafts in the fleets. Figure 19, which shows the change of

aircraft numbers in the fleets of Turkish airline companies in the period of 2008-2019, reveals this situation indeed. The reason why passenger planes are included in the figure besides cargo planes is that more than half of the air freight transports are carried by scheduled passenger flights (under the fuselage). The number of passenger aircrafts, which was 233 in 2008, increased to 516 in 2019. The number of aircrafts used only in freight transportation followed a fluctuating course in the same period. The number of cargo aircrafts, which was 29 in 2008, increased to 53 in 2012, but decreased to 24 in 2019. In other words, while the number of passenger aircrafts increased by approximately 121% during the period 2008-2019, the number of cargo aircrafts decreased by approximately 18%.

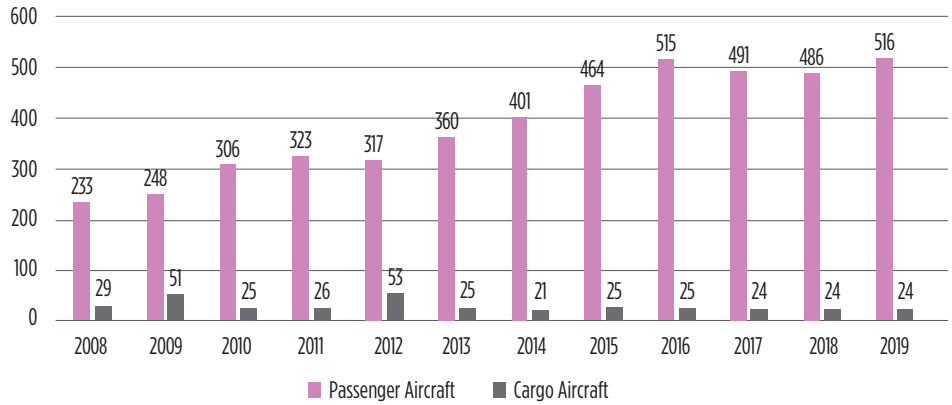

Figure 19: *Change in the Number of Passenger and Cargo Aircrafts (2008-2019) (TURKSTAT, 2020e)*

Table 15 shows the capacity of cargo aircrafts and their distribution by company. When we look at the data of 2019, Turkish Airlines has approximately 55% of the total air cargo carrying capacity.

Table 15: *Cargo Capacity of Turkish Airline Companies (2019) (General Directorate of Civil Aviation, 2020)*

Airline Company	Aircraft Type	Aircraft Number	Air Cargo Capacity (kg)	Total Air Cargo Capacity (kg)
Turkish Airlines A.O.	B777-F	6	102.000	612.000
Turkish Airlines A.O.	A330-200F	10	69.000	690.000
MNG Airlines	A300	5	47.000	235.000
MNG Airlines	A330	1	70.000	70.000
ACT Airlines	B747-400	5	113.575	567.875
ULS Airlines	A310-F	3	40.525	121.575
Total				**2.296.450**

As of December 31, 2020, a total of 56 airports in 53 provinces across the country are used in civil air traffic and there are two airports each in İstanbul, Antalya and Muğla. It should be underlined that the number of airports serving in 2003 was 26 (General Directorate of Civil Aviation, 2020). According to the statistics of the General Directorate of DHMI, air cargo traffic takes place at only 47 airports. The freight traffic is less than 10 tons per year in 14 of these 47 airports and less than 2 tons per year in 8 of them. Figure 20 shows the airline freight traffic in Turkey between 1990-2019. As can be seen from the figure; although domestic, international and total freight traffic increased significantly in the mentioned period, the degree of increase in international traffic was higher.

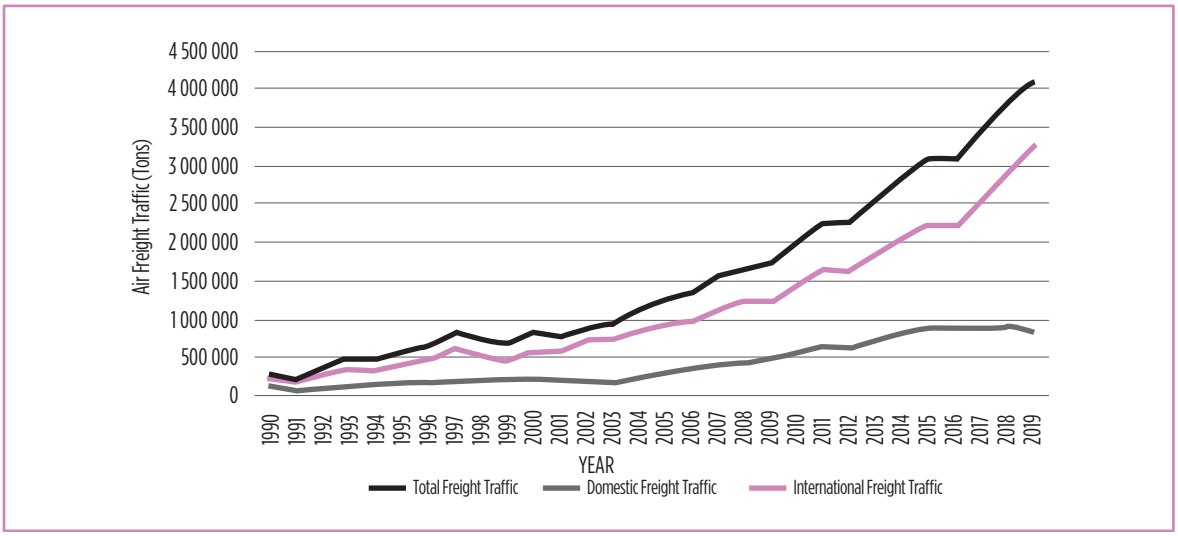

Figure 20: *Air Freight Traffic (1990-2019) (General Directorate of Civil Aviation, 2020)*

5.3. Sectoral Trends in TRA2 Region

The provinces of Ağrı, Ardahan, Iğdır and Kars are located in TRA2 region. Statistics of the area, population and GDP per capita of these provinces are shown in Table 16. Ağrı is the largest province in terms of area and population, and Ardahan ranks first in terms of GDP per capita.

Table 16: *Area, Population and GDP Data of Ağrı, Ardahan, Iğdır and Kars Provinces (TURKSTAT, 2020f & General Command of Mapping, 2020)*

Province	Area (km²)	Population (2019)	GDP per capita (2019, $)
Kars	10.193	285.410	4.626
Ağrı	11.099	536.199	2.946
Ardahan	4.934	97.319	6.101
Iğdır	3.664	199.442	5.413

From the point of view of road transport, there are no motorways in the region, and the total length of the motorway and divided road networks, as well as the density of these networks based on the area, population and economic size, are shown in Table 17. The longest road and divided road network in the region is in Kars. Kars and Ardahan provinces stand out in terms of density.

Table 17: *Road Network Length and Density in Ağrı, Ardahan, Iğdır and Kars (TURKSTAT, 2020e & General Directorate of Highways, 2020)*

	Road Network Length (km)			Road Network Density (km/km²)			Road Network Density (km/person)			Road Network Density (km/(GDP, (Million $))		
	Total Road Network	Divided Road Network	Motor-way Net-work	Total Road Network	Divided Road Network	Motorway Network	Total Road Network	Divided Road Network	Motorway Network	Total Road Network	Divided Road Networkı	Motorway Network
Kars	945	243	0	0,093	0,024	0,000	0,00331	0,00085	0,00000	0,716	0,184	0,000
Ağrı	523	374,655	0	0,047	0,034	0,000	0,00098	0,00070	0,00000	0,331	0,237	0,000
Ardahan	385	104,9	0	0,078	0,021	0,000	0,00396	0,00108	0,00000	0,648	0,177	0,000
Iğdır	212	172,14	0	0,058	0,047	0,000	0,00106	0,00086	0,00000	0,196	0,159	0,000

Three of the four provinces in the region have scheduled commercial flights. The oldest of these airports is Kars Harakani Airport, which entered service in 1988. Ağrı Ahmed-i Hani Airport was opened in 1997 and Iğdır Şehit Bülent Aydın Airport was opened in 2012. Figure 21 shows the total (domestic + international) commercial aircraft traffic that took place at these three airports during the period 2000-2019. As can be seen from Figure 21, Kars Harakani Airport is the airport with the highest commercial aircraft traffic in the region.

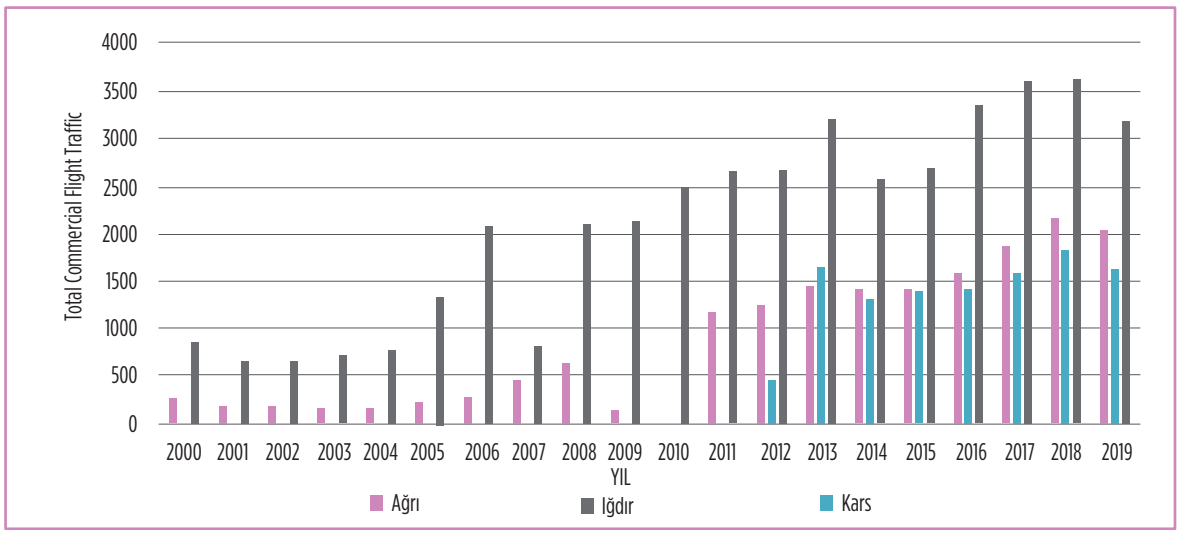

Figure 21: *Total Commercial Aircraft Traffic at the Airports in the Region (2010-2020)*[2]

Figure 22 shows air cargo traffic in tons at airports in the region during the period 2004-2019. Kars Harakani Airport was the airport with the highest air cargo traffic in the region until 2016, and in the following period, the first place was left to Iğdır Şehit Bulent Aydın Airport. Here, the relatively high performance of Iğdır Şehit Bülent Aydın Airport in terms of air cargo is noteworthy. Looking at 2019, although Iğdır Şehit Bülent Aydın Airport has about half the commercial aircraft traffic of Kars Harakani Airport as shown in Figure 20 and the population of Iğdır province is approximately 70% of the population of Kars province, the air cargo traffic served by the airport was higher.

2- Compiled from the Statistical Annuals of the General Directorate of State Airports Authority.

Figure 22: *Total Air Cargo Traffic at the Airports in the Region (Tons, 2000-2019)*[3]

Almost all of the rail network in the region is concentrated in Kars province, and there is no rail infrastructure in Ağrı and Iğdır. As of 2019, there is a 13 km long rail line in Ardahan and 258 km long in Kars. The rail line in Ardahan is not a separate line, but is limited to the part of the Baku-Tbilisi-Kars rail line passing through Ardahan. In Figure 23, which shows rail freight traffic in the period 2011-2018, it is seen that only a limited rail freight traffic happened in Ardahan in 2017, and all freight traffic in the region except this occurred in Kars. With the full commissioning of the Baku-Tbilisi-Kars rail, it is expected that there will be a significant increase in rail traffic in the region.

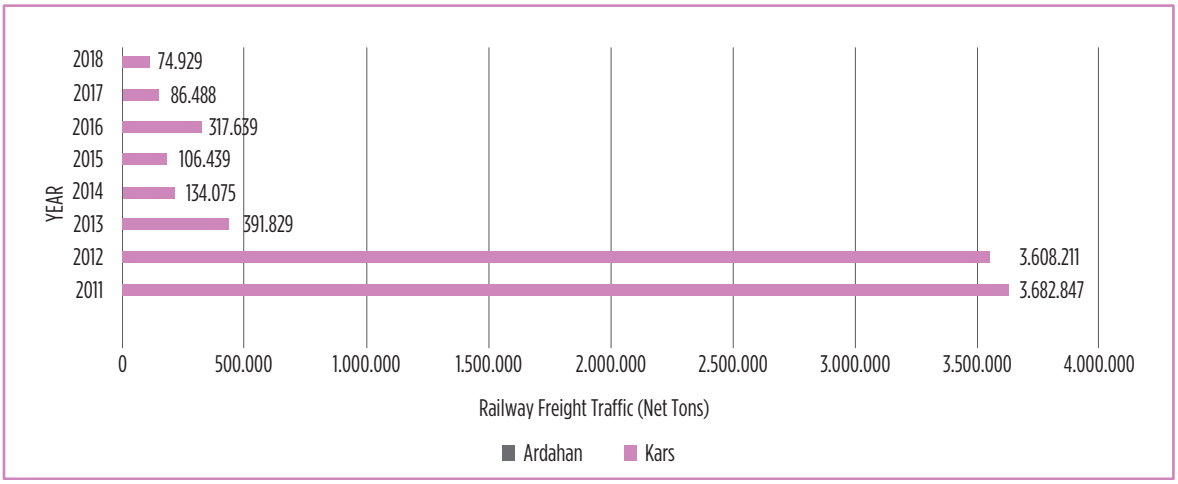

Figure 23: *Change in Rail Freight Traffic in the Region (Net Tons, 2010-2018) (TCDD, 2019)*

TRA2 region is home to important border crossings due to its location and plays an important role in Turkey's foreign trade. Two of the 3 active border gates between Turkey and Georgia (Türkgözü and Aktaş border gates) are located in Ardahan province. Similarly, the Gürbulak border gate, one of the 3 active border gates between Turkey and Iran, is located in Ağrı, and the Dilucu Border Gate, the only border crossing between Turkey and Azerbaijan (Nakhichevan), is located in Iğdır.

3- Compiled from the Statistical Annuals of the General Directorate of State Airports Authority.

6. Current Status of the Logistics Sector

6.1. Primary Research Results

6.1.1. Surveys

According to statistics compiled with the support of the Serhat Development Agency, a total of 253 companies operate in the logistics sector in the TRA2 region, some of which are not active. A total of 28 people/companies from the region participated in the survey study. Although these 28 individuals/companies participating in the survey do not have a homogeneous distribution on a provincial basis, they account for about 11% of the 253 logistics companies in the TRA2 region, some of which are not active, based on the number of companies. From this perspective, a 11% participation rate is considered quite high for a survey conducted in a virtual environment and not directly accessible to all logistics companies, and it is considered that the ability of the responses received to represent the entire region is at an acceptable level. The distribution of respondents by regional provinces is shown in Table 18.

Table 18 : *Distribution of the Companies Participating in the Survey by Provinces*

Province	Ağrı	Ardahan	Iğdır	Kars	Total
Number of Companies in the Sector	24	8	166	55	253
Number of Participants	6	-	21	1	28

In the first stage of the survey, questions were asked to identify a number of explanatory characteristics of the individuals and companies surveyed. In this context, the Department/Division in which the survey participants worked was first asked. Of the 22 people who answered the question, 18 were in senior management, 1 was in finance/accounting, and the remaining 3 were in other departments (Figure 24). In parallel, from the answers given to this question throughout Turkey, it is seen that most of the respondents worked in the senior management of the company. From this point of view, it is possible to say that the respondents from the TRA2 region and the respondents from Turkey have a close department/division distribution. On the other hand, the fact that a very large part of the participants work in senior management shows that the majority of the participants have the general information of the company and are qualified to answer the questions in the survey.

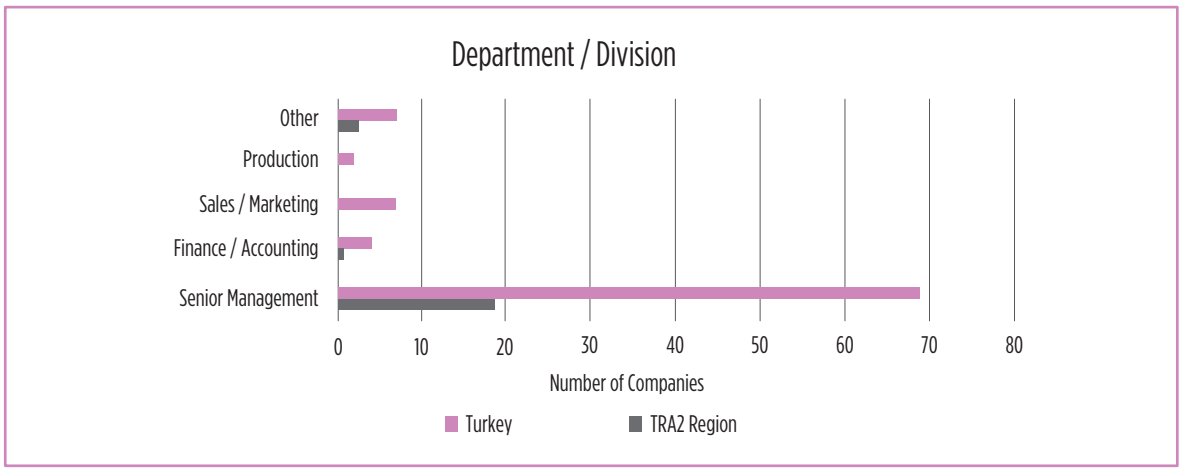

Figure 24: *Department / Division where the Participants Work in Their Companies*

When the positions / titles of the respondents were asked; 18 of 27 participants stated that they were company owners, 7 were general managers and 2 were manager / chief (Figure 25). The highest participation in the survey from the TRA2 Region was at the level of manager / chief. Again, the fact that a very large part of the participants work in senior management shows that the majority of the participants have the general information of the company and are qualified to answer the questions in the survey.

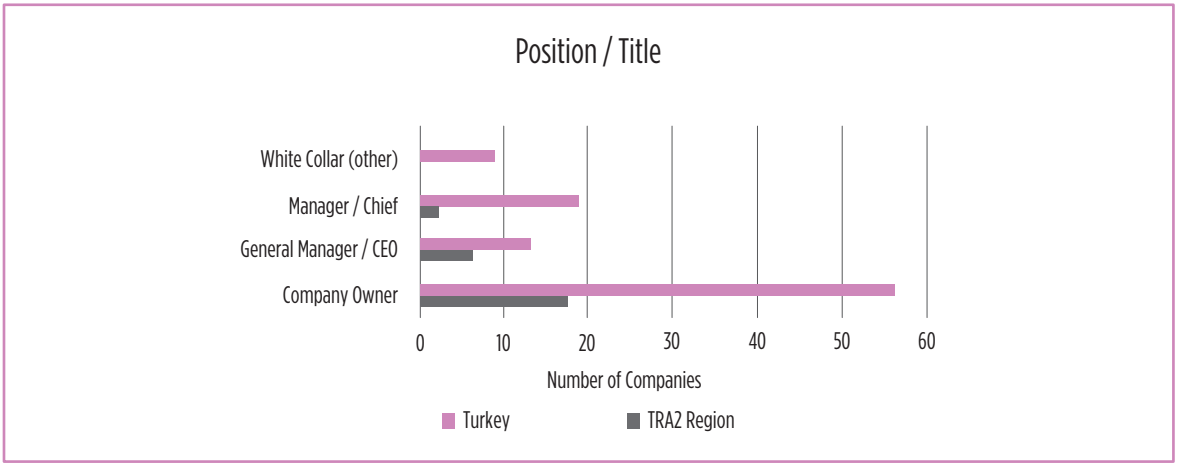

Figure 25: Positions / Titles of the Participants in Their Companies

In the next step, in order to determine the size of the logistics companies participating in the survey, their average annual gross sales were asked. In order to classify the company sizes, 3 different company size ranges have been created. Accordingly the enterprises with a gross sales of less than 3 Million Turkish Liras were considered as "Micro Enterprises" while enterprises higher than 3 Million Turkish Liras but less than 25 Million Turkish Liras were considered as "Small Enterprises", enterprises higher than 25 Million Turkish Liras but less than 125 Million Turkish Liras were considered as "Medium Enterprises" and enterprises more than 125 million Turkish Liras were considered as "Large Enterprises". Accordingly, Figure 26 shows the distribution of answers given to the question of company size and out of the enterprises that answered the question from TRA2 Region, 4 are micro enterprise, 9 are small enterprises and 4 are medium enterprises. It is noteworthy that the distribution of the answers obtained from the TRA2 Region has a similar structure with the distribution of answers across Turkey. Because in both groups, small enterprises constitute the largest cluster of companies surveyed.

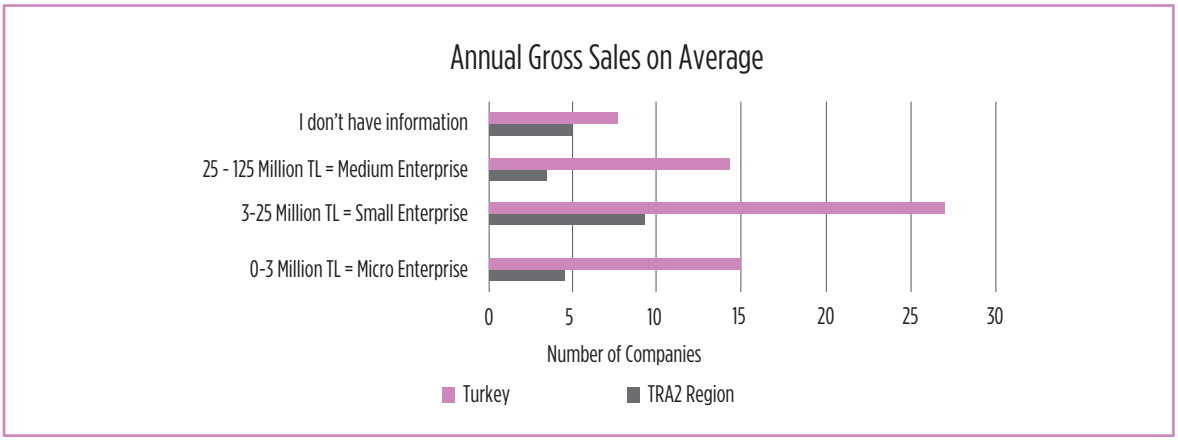

Figure 26: *Scales of Companies Participating in the Survey*

In the following stage, the number of personnel working in the companies was asked in order to measure the size of the company through the number of employees (Table 19). The lowest value of the 13 responses regarding the number of employees from the TRA2 Region was 2 and the highest value was 32. The average number of employees of logistics companies in the region was 18.85, the median number of employees was 20, and the standard deviation of the number of employees was 7,85. Looking at the average of Turkey for comparison, it is seen that the number of employees of 54 logistics companies that answered the relevant question in the survey varied between 2 and 1650 and the average number of employees was 132.37, the median number of employees was 25, and the standard deviation of the number of employees was 326.17. When the two groups are compared, it is seen that the companies surveyed from the TRA2 region are much smaller in scale than the companies surveyed from all of Turkey. This supports the fact that logistics companies in the region are small-scale and show a family business characteristic, as revealed in both the relevant focus group meeting and the GZTF analysis results. On the other hand, looking at the standard deviations, it is understood that the scales of logistics companies surveyed in the TRA2 region vary within a smaller band than the average in Turkey.

Table 19: *Summary Statistics for Number of Employees of the Companies Participating in the Survey*

	Number of Companies	Lowest Number of Employees	Highest Number of Employees	Average	Median	Standard Deviation
TRA2 Region	13	2	32	18,85	20	7,85
Turkey	54	2	1650	132,37	25	326,17

The scale of the markets that companies serve has been one of the questions in the survey. To be able to measure it; competing markets have been divided into four main groups as i) Local, ii) Regional, iii) National and iv) International and the survey participants were asked to choose among these options. While answering the question, participants were given the opportunity to tick more than one option. According to the results shown in Figure 27, it is worth noting that the main market in which logistics companies surveyed both from the TRA2 region and from across Turkey are the International Logistics Market. This indicates that companies in the region receive a share from the transports made to other countries, especially in Central Asian countries. On the other hand, companies in the region are operating at a lower national level than Turkish average. It is possible to link this result to the fact that the region is located quite far from the centers of gravity of the country in terms of geography and population and that the region has a border gate so that companies can focus their attention on foreign markets.

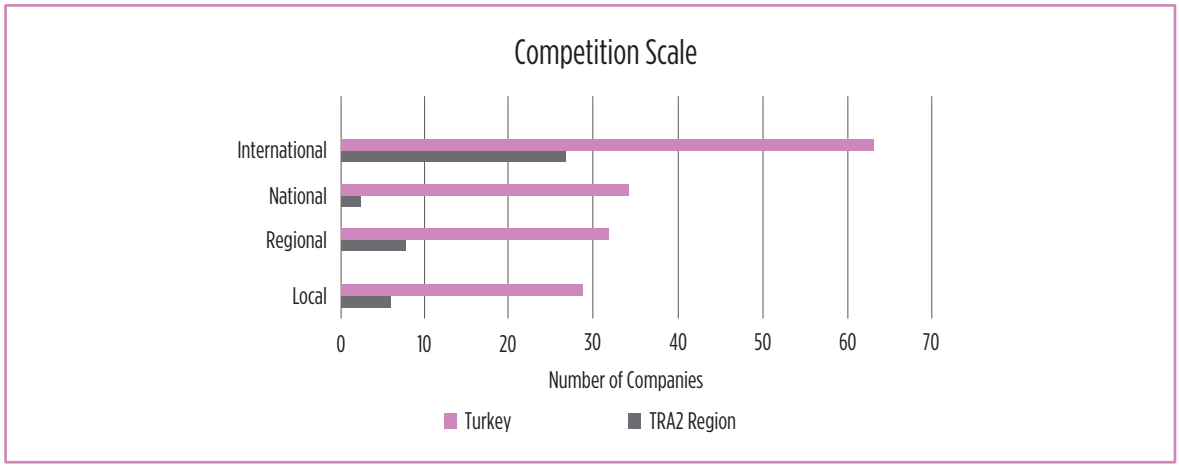

Figure 27: *Competitive Scales of the Companies Participating in the Survey (Markets)*

Another question asked to address the market position of companies and trends in the sector is the capacity utilization rates in the past month. In this context, the most marked option in Turkey was that the capacity utilization rate is 76% and above while companies from the TRA2 Region

marked the options of 51-65% at most (Figure 28). Considering the distribution of answers in both groups, it is seen that the logistics companies participating in the survey from the TRA2 Region have lower capacity utilization rates than the Turkey average. It is possible to attribute this situation to the fact that companies in the region are focused on Central Asia and neighboring countries, and that these companies are very negatively affected by the fact that some countries have imposed restrictions on border crossings due to the covid-19 pandemic.

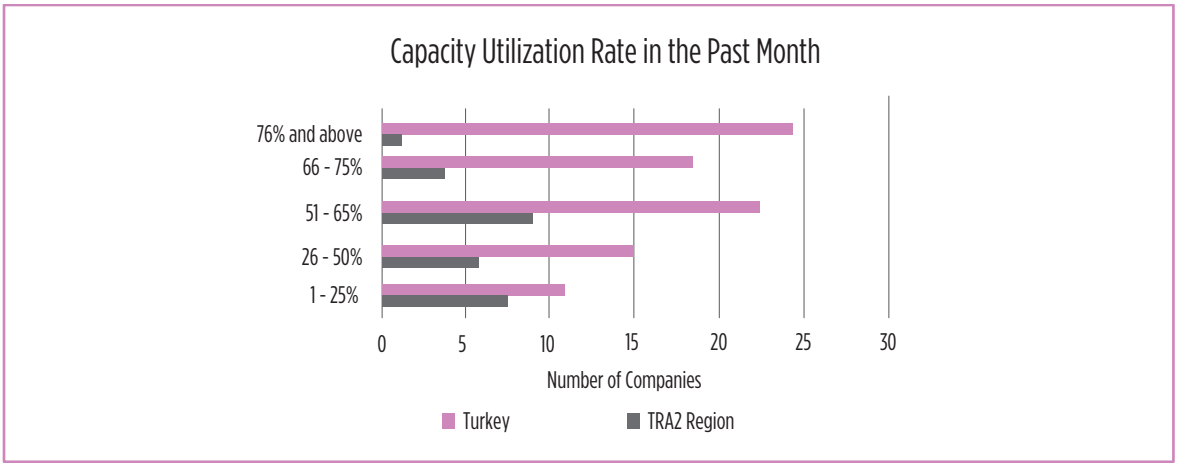

Figure 28: *Capacity Utilization Rates of the Companies Participating in the Survey in the Past Month*

Finally, in order to determine the structural characteristics of the companies, a question was asked about the logistics services offered by the participating companies, and the participants were asked to mark one or more of the options. As can be seen from Figure 29, All enterprises from the TRA2 region provide transport services, and customs services are also prominent due to the fact that companies are based in border cities. Customs services are followed by Warehouse Services, Distribution Services and insurance services respectively. Looking at Turkey averages, it is seen that all companies answering the question offer transportation services, followed by distribution and customs services, respectively. It is noteworthy that there are no logistics companies (among the respondents) in the TRA2 region that provide packaging services, which is a relatively more value-added service than others.

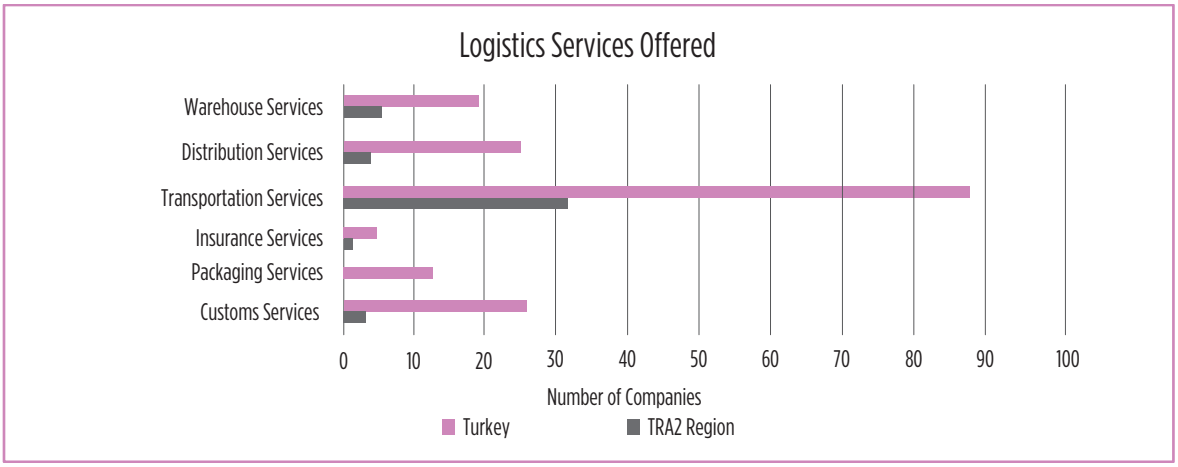

Figure 29: *Logistics Services Offered by Companies Participating in the Survey*

After the descriptive characteristics of the survey participants and the logistics companies participating in the survey, questions were asked aimed at analyzing the effects of the COVID-19 pandemic on the sector and companies. In the first question, it was asked how the turnover of

2020 changed compared to 2019. Accordingly, it is seen that most of the logistics companies participating in the survey from the TRA2 Region experienced a loss of turnover in 2020 compared to 2019. Out of a total of 24 responses, only 2 indicated that turnover has increased while 4 indicated that turnover has not changed, and 18 of them indicated that turnover has decreased (Figure 30). The option, which indicates a decrease in turnover by 26-50%, was chosen 9 times and became the most marked option. Looking at the answers across Turkey, it is seen that the most preferred option was the one stating that showing that the turnover increased by 1-25%. From this point of view, the TRA2 region is quite different from Turkey. The answers to this question show that the TRA2 region, which mainly transports Central Asian countries by road, experienced a much higher turnover loss than the Turkish average as a result of the closure of border gates with the pandemic.

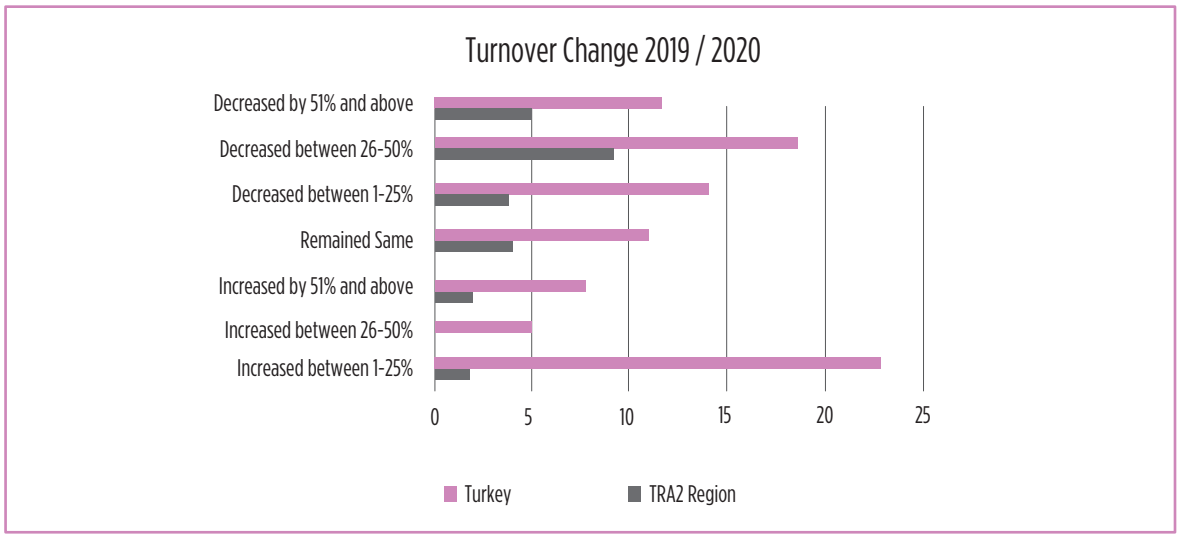

Figure 30: *Turnover Changes of the Companies Participating in the Survey in 2019/2020*

Another possible effect of the COVID-19 pandemic besides the loss of turnover is that it caused an increase in the costs of logistics companies. In the survey, a total of 26 companies from the TRA2 Region answered the question "How have the costs of your company changed as a result of the COVID-19 pandemic" 15 companies stated that costs had increased, 1 stated that costs had not changed, and 10 stated that costs had decreased (Figure 31).. Looking at Turkey as a whole, it seems that the most marked answer (in parallel with the result in the region) is that costs have increased at a very high level.

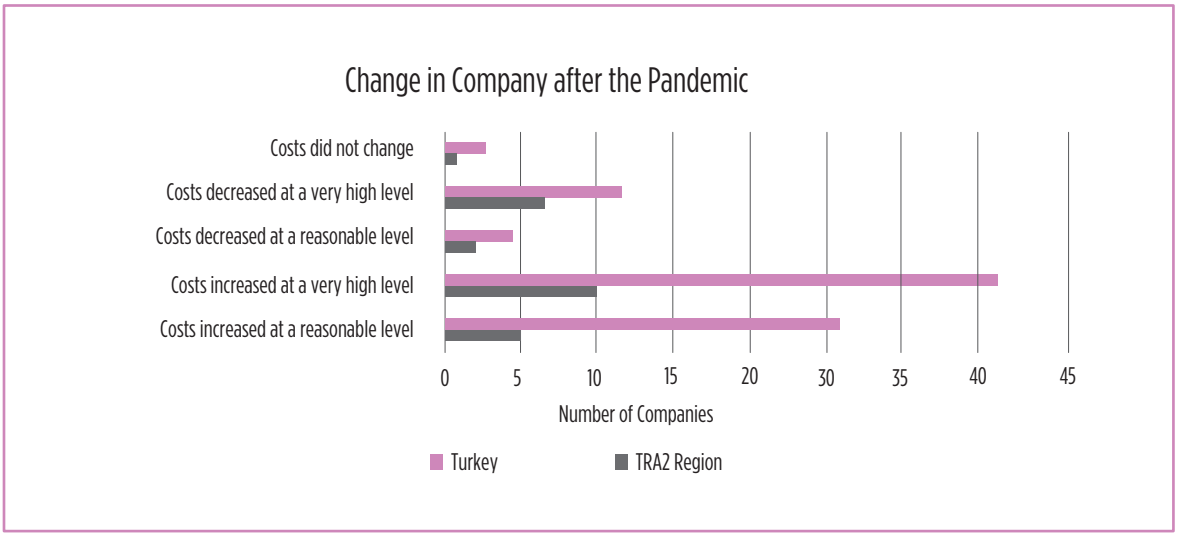

Figure 31: *Change in Costs of Companies Participating in the Survey After Pandemic*

In the following part of the survey, the participants were asked to list the five biggest problems they experienced during the pandemic among the alternative options offered to them. While ranking, they were asked to move the biggest problem to the first place and the smallest problem to the last. In order to make a comparison, the answers from all Turkey have been reported in addition to the TRA2 Region (Table 20). The upper part of Table 20 shows the distribution of the answers from the TRA2 Region, and the lower part shows the distribution of the answers received from Turkey in general. As a result of weighting the marked options by using the number of answers, the average scores were calculated and the rankings were determined according to the average scores. In both groups, "Contraction in Demand" stands out as the biggest problem that arises together with the pandemic. In the answers of the TRA2 Region, problems such as " problem in funding " and "increase in operating costs " have come to the fore compared to Turkey in general, and it is believed that this is largely due to the small scale of enterprises in the region. When the answers given by both groups were statistically compared, the average scores of the “contraction in demand“ and “problem in funding” problem areas, which were 1.61 and 2.46 respectively in the TRA2 region, were lower than the average scores of the answers given by the rest of Turkey, and the difference between the two groups is statistically significant in the 90% confidence range. In more concrete terms, the problems of “contraction in demand“ and “problem in funding” are seen as bigger problems in the TRA2 region than in the rest of Turkey.

Table 20: Ranking of Problems Encountered by Companies Participating in the Survey After Pandemic

	Problem	1	2	3	4	5	Average Score	Problem Rank
TRA2 Region	Contraction in Demand*	20	3	2	2	1	1,61	1
	Problems in Funding*	4	12	6	2	2	2,46	2
	Collection Problem	1	5	7	4	2	3,05	3
	Increase in Operating Costs	2	7	1	11	5	3,38	4
	Problems in Finding Personnel	1	0	1	3	2	3,71	5
	Low Predictability*	0	0	9	6	5	3,80	6
	Insufficiency of Technological Infrastructure	0	1	2	0	11	4,50	7
Turkey	Contraction in Demand	45	16	10	10	9	2,13	1
	Collection Problem	9	19	22	9	8	2,82	2
	Low Predictability	15	9	28	16	11	2,99	3
	Problems in Funding	10	29	16	13	19	3,02	4
	Increase in Operating Costs	12	20	8	32	13	3,16	5
	Problems in Finding Personnel	7	1	7	14	7	3,36	6
	Insufficiency of Technological Infrastructure	0	4	7	4	31	4,35	7

*(*): Within the scope of this question, when the answers from the TRA2 Region and the rest of Turkey are compared using the t-test, the difference between the mean scores of the options marked with * was found to be statistically significant at 90% confidence interval.*

The next question focused on supply chains, and participants were asked to rank among the alternatives offered to them, the five biggest problems they face in the supply chain due to the COVID-19 pandemic. While ranking, participants were asked to move the biggest problem to the first place and the smallest problem to the last. As in the previous question, the distribution of the answers received from both TRA2 Region and Turkey in general was reported for comparison (Table 21).

The most noticeable result in Table 21 is that the problems associated with the closure of border gates are at the beginning of supply chain problems in the TRA2 region. The main reason for this is that the TRA2 region, which is a border region and does most of its trade with Central Asian countries, is one of the regions most affected by the pandemic-caused border closures. In particular, Turkmenistan's closure of border gates and other countries' temporary closures have had a very negative impact on logistics activities in the region. After this development, carriers were forced to turn to alternative routes that were more expensive, while some companies ' trucks were stranded in countries whose borders were closed.

Table 21 : *Ranking of Problems Experienced by Companies Participating in the Survey Regarding Supply Chain After Pandemic*

	Sorun	1	2	3	4	5	Ortalama Skor	Sorun Sıralaması
TRA2 Region	Changes in Routes due to Countries' Closing Their Borders*	6	6	5	0	1	2,11	1
	Interruption in Port Services	10	7	1	3	4	2,36	2
	Changes in Type of Transport (road, rail) due to Countries' Closing Their Borders	9	3	2	3	6	2,74	3
	Health Inspections at Borders	1	9	12	1	2	2,76	4
	Road Traffic Restrictions*	0	1	7	11	4	3,78	5
	Increasing Logistics Costs*	2	2	1	9	9	3,91	6
	Interruption of Air Cargo Operations*	0	0	0	1	2	4,67	7
Turkey	Iınterruption in Port Services	26	15	13	15	13	2,68	1
	Changes in Routes due to Countries' Closing Their Borders	10	16	11	5	10	2,79	2
	Increasing Logistics Costs	25	17	6	26	13	2,83	3
	Health Inspections at Borders	8	25	30	15	9	2,91	4
	Interruption of Air Cargo Operations	5	0	4	5	5	3,26	5
	Road Traffic Restrictions	4	12	28	26	9	3,30	6
	Changes in Type of Transport (road, rail) due to Countries' Closing Their Borders	20	13	6	6	39	3,37	7

*(*): Within the scope of this question, when the answers from the TRA2 Region and the rest of Turkey are compared using the t-test, the difference between the mean scores of the options marked with * was found to be statistically significant at 90% confidence interval.*

In the next question, participants were asked in which logistics services they experienced the most problems during the COVID-19 pandemic. According to Table 22, which shows the distribution of the answers, The ranking of logistics services with most problems in the TRA2 region and Turkey is the same. The top four logistics services with the most problems in both groups were “Customs Services”, “Transport Services”, "Packaging services” and “Insurance Services” respectively. Looking at the average scores of "Customs Services" on the basis of both groups, it stands out that the score which is 1.57 in TRA2 region is 1.91 in Turkey. In other words, although both groups put the problems experienced in customs services first as the most important problem, the impact of this problem is felt more severely in the TRA2 region which is a border region.

Table 22 : *Ranking of Problems Experienced by Companies Participating in the Survey Regarding Logistics Services After Pandemic*

	Problem	1	2	3	4	5	Average Score	Rank
TRA2 Region	Customs Services	18	6	2	2	0	1,57	1
	Transport Services	10	4	2	11	1	2,61	2
	Packaging Services*	0	12	7	4	2	2,84	3
	Insurance Services	0	2	13	7	3	3,44	4
	Warehouse Services	0	2	2	2	3	3,67	5
	Distribution Services*	0	2	2	2	19	4,52	6
Turkey	Customs Services	45	27	10	6	5	1,91	1
	Transport Services	38	14	10	30	5	2,48	2
	Packaging Services	2	33	24	22	9	3,03	3
	Insurance Services	5	5	37	23	16	3,47	4
	Warehouse Services	1	5	6	7	14	3,85	5
	Distribution Services	7	14	11	10	49	3,88	6

*(*): Within the scope of this question, when the answers from the TRA2 Region and the rest of Turkey are compared using the t-test, the difference between the mean scores of the options marked with * was found to be statistically significant at 90% confidence interval.*

A question was added to the survey to address the effects of the COVID-19 pandemic on the basis of the sectors served. In the question directed to the participants, answers were received regarding what kind of changes happened in the logistics services provided to various sectors after the pandemic. Looking at the situation in question on the basis of the TRA2 region and comparing the total increases and decreases, it seems that logistics services provided to all listed sectors tend to decrease overall (Table 23). A close result has been achieved for the whole of Turkey, and it is noticeable that logistics services provided to all other sectors listed, except for the Transport and Warehouse sector, tend to decrease. When a cross-sector assessment is made, the decrease in logistics services provided, especially for manufacturing and accommodation and food service activities, is noteworthy.

Table 23: *Changes in Logistics Services Provided to Different Sectors by the Companies Participating in the Survey After the Pandemic*

	Problem	Agricul-ture	Mining and Quarries	Manufac-turing	Construc-tion	Wholesale and Retail Trade	Transport and Storage	Accommo-dation and Food
TRA2 Region	There was a significant increase	0	0	1	1	1	1	0
	There was a slight increase	2	1	3	3	3	3	1
	There was no change	7	6	3	6	4	4	5
	There was a slight decrease	1	0	4	2	2	2	0
	There was a significant decrease	6	5	8	7	6	6	9
Turkey	There was a significant increase	10	0	3	1	7	13	6
	There was a slight increase	19	3	16	6	16	17	3
	There was no change	22	32	17	25	15	17	16
	There was a slight decrease	9	11	19	17	14	14	11
	There was a significant decrease	12	10	19	20	12	13	31

In the last part, two questions were asked to the participants about what kind of changes they will make in their operations after Covid-19. In the first of these questions, participants were asked which investment strategies they would follow in the medium and long term after the pandemic and were asked to list these strategies in order of priority. It is remarkable that the rank of the answers given by both groups to this question was exactly the same (Table 24). Accordingly, both groups stated that they will primarily increase digital transformation, automation and similar technological investments. The increase in the value of contact-free transactions after the pandemic and the fact that the human factor remained in the background as much as possible forces the companies to strengthen their technological infrastructures. On the other hand, some countries' closing their border gates and / or creating extra difficulties in crossings have led Turkish logistics companies to search for new markets. In addition, it should be underlined that both groups will focus on urban logistics investments. The increase in distance shopping due to the pandemic pushes logistics companies to make new investments in this direction.

Table 24: Ranking of Strategies to be Followed by Companies Participating in the Survey After Pandemic

	Strategy to Follow After the Pandemic	1	2	3	4	5	Average Score	Rank
TRA2 Bölgesi	We will increase Digital Transformation, Automation and Similar Technological Investments	18	2	3	3	1	1,78	1
	We will enter new markets	3	2	2	0	1	2,25	2
	We will develop our partnerships and establish new partnerships	0	17	5	3	1	2,54	3
	We will focus on Urban Logistics Investments	0	3	1	0	1	2,80	4
	We will switch to new transport routes	6	3	1	13	4	3,22	5
	We will focus on Mergers and / or Acquisitions	0	1	14	6	5	3,58	6
	We will give more weight to railways in transportations.	1	0	1	0	3	3,80	7
	We will increase the quality of our Human Resources*	0	0	1	3	12	4,69	8
Türkiye	We will increase Digital Transformation, Automation and Similar Technological Investments	68	10	9	6	3	1,60	1
	We will enter new markets	11	14	12	8	3	2,54	2
	We will develop our partnerships and establish new partnerships	1	42	15	13	12	2,92	3
	We will focus on Urban Logistics Investments	1	7	1	3	4	3,13	4
	We will switch to new transport routes	10	9	13	43	10	3,40	5
	We will focus on Mergers and / or Acquisitions	3	7	37	10	19	3,46	6
	We will give more weight to railways in transportations.	1	1	3	5	9	4,05	7
	We will increase the quality of our Human Resources*	3	8	8	10	38	4,07	8

*(*): Within the scope of this question, when the answers from the TRA2 Region and the rest of Turkey are compared using the t-test, the difference between the mean scores of the options marked with * was found to be statistically significant at 90% confidence interval.*

Finally, it is addressed whether logistics companies will make a change in the types of transportation they use with the COVID-19 pandemic. After the difficulties experienced by employees in supply chains, especially at border crossings due to the pandemic, it is possible to expect a tendency towards the rail and maritime transport which operate with less people rather than the human-intensive road transport. On the other hand, the decrease or complete cessation of passenger flights caused significant interruptions in the traffic of air cargo carried by passenger aircrafts. As can be seen in Table 25, it is noteworthy that most of the answers given in Turkey in general

indicate that there will be no change in the use of transportation modes. Looking at the TRA2 region in particular, there is a trend towards less use of rail, sea and air transport, unlike Turkey in general. This can be explained by the road-based logistics sector structure of the region.

Table 25: *Changes to be Made by Companies Participating in the Survey in Types of Transport Used after Pandemic*

		Road Transport	Rail Transport	Maritime Transport	Air Transport
TRA2 Region	We will use less	6	7	6	6
	We will use more	4	1	2	1
	Will not change	17	4	4	4
Turkey	We will use less	16	16	12	16
	We will use more	24	19	20	14
	Will not change	50	26	31	29

6.1.2. Focus Group

The problems experienced by the logistics sector as a result of the fact that the region is a border region and trade with surrounding countries is interrupted as a result of the closure of the borders with the pandemic was the most prominent issue at the focus group meeting in the TRA2 region. Since logistics activities in the region are mainly based on road transport, the impact of the covid-19 pandemic was felt much more severe in the region than Turkey in general. On the other hand, the fact that logistics companies in the region are generally small-scale family-owned enterprises has made it more difficult for these companies to access funding during the crisis. In order to reduce the disadvantages caused by the outbreak, a tendency from road to rail was experienced and works were started to install disinfection tunnels at border gates and numerous unconventional methods were implemented, including changing drivers at the border.

The lack of an industrial infrastructure supporting the development of logistics activities in the region is one of the obstacles to the sector. For this reason, transportation is dominated by agricultural products. Competition of foreign logistics companies with low cost advantages negatively affects logistics companies in the region.

Despite these disadvantages, there are also positive expectations for the future in the region. First of all, the large fleet of trucks concentrated in the region, especially in Iğdır, is an important strong area for cargo transport. From the point of view of infrastructure, the Baku-Tbilisi-Kars rail project, completed with some shortcomings, offers significant opportunities. With the project, it is expected that the region will become an important rail center and logistical activities will be revived. On the other hand, the resolution of the Karabakh conflict and the realization of a new transport corridor connecting Turkey and Azerbaijan through Nakhichevan will strengthen the logistics potential of the region.

6.2. Sectoral Analysis

6.2.1. Value Chain Analysis of the Logistics Sector in TRA2 Region

In order to map the value chain of the logistics sector and to determine the share of its sub-components in the total, an independent survey study was conducted. In the survey study, where a total of 28 participants from various companies participated, the sub-components in the logistics value chain and the shares of these sub-components in the total were asked to the participants and also they were asked questions about the level of local, national and international services they provide to their customers with regard to the mentioned sub-components. In other words, the shares of expenses related to sub-components of logistics processes in total added value and production cost and the way of doing business regarding the relevant sub-components

were asked to the participants. 32% of the participants consisted of companies in Mersin, 29% in Istanbul, 7% in Adana, 7% in Bursa and 7% in Kocaeli while the remaining 18% were distributed to various provinces.

With the Logistics Value Chain survey, participants were first asked about their companies' methods of supplying subcomponents in their logistics processes, in other words, their way of doing business. Participants expressed the methods by which they carry out these processes and the relevant answers are presented in Table 26. Nearly half of the participants who responded to the survey stated that they do not use air transportation services while almost all of the users stated that they perform this component with outsource national stakeholders. On the other hand, it was stated that almost half of the participants do not use rail transportation and half of the participants use company's own means while the other half are in cooperation with national stakeholders. It is seen that the majority of companies using maritime transportation are in cooperation with foreign capital / international stakeholders. It is concluded that logistics processes such as storage, handling and ordering are generally performed with companies' own means.

Table 26: *How Firms Do Business in Logistics Processes*

	Not Available	Own Means	Local Outsource	National Outsource	Foreign / International Outsource
Packaging Services	12	8	3	5	0
Customs Clearance Services	12	6	2	7	1
Insurance Services	13	1	5	8	1
Road Transport and Distribution Services	6	7	8	7	0
Rail Transport and Distribution Services	14	5	2	6	1
Air Transport and Distribution Services	12	0	0	15	1
Maritime Transport and Distribution Services	8	7	1	3	9
Warehouse Services	5	15	6	2	0
Handling Services	7	13	3	5	0
Order Processing and Information Management	11	14	2	1	0

In the next stage, the survey participants were asked about the share of logistics sub-components in the added value produced by the companies. In this framework, the data on the number of answers to the question and the average share of the sub-components in the total added value of logistics are presented in Table 27. According to the distribution in Table 27 the share of maritime transportation in total production cost is 24.9% while the share of road services is 22.1%, the share of air services is 10.6%, the share of warehouse services is 10.9%, and the share of handling services is 8.9%. On the other hand, the share of transportation services consisting of road, rail, air and maritime components in logistics service production cost is approximately 65%.

Table 27: *Number of Answers and Average Shares of Sub-Components in Total Added Value of Logistics*

	0%	1-10%	11-20%	20-30%	30-40%	40-50%	50-60%	60% and above	Average Share (%)
Packaging Services	12	16	0	0	0	0	0	0	**2,4**
Customs Clearance Services	12	9	6	1	0	0	0	0	**4,8**
Insurance Services	13	13	2	0	0	0	0	0	**2,9**
Road Transport and Distribution Services	6	6	0	8	2	0	2	4	**22,1**
Rail Transport and Distribution Services	14	6	2	4	1	1	0	0	**7,3**
Air Transport and Distribution Services	12	8	2	2	2	0	0	2	**10,6**
Maritime Transport and Distribution Services	8	6	1	3	1	0	2	7	**24,9**
Warehouse Services	5	11	8	2	0	0	1	1	**10,9**
Handling Services	7	11	6	2	0	1	1	0	**8,9**
Order Processing and Information Management	12	13	2	0	0	0	0	1	**5,3**

In the last stage, the share of logistics sub-components in the logistics production cost was asked to the survey participants. In this framework, the data regarding the number of answers and the average shares of the subcomponents in the total service production costs of logistics are presented in Table 28. According to the distribution in Table 28 the share of maritime transportation in total production cost is 26.9% while the share of road services is 22.8%, the share of air services is 10.8%, the share of warehouse services is 9.3%, and the share of handling services is 8.9%. On the other hand, the share of transportation services consisting of road, rail, air and maritime components in logistics service production cost is approximately 67%.

Table 28: Number of Answers and Average Shares of Sub-Components in Total Production Costs of Logistics

	0%	1-10%	11-20%	20-30%	30-40%	40-50%	50-60%	60% and above	Average Share (%)
Packaging Services	12	15	0	0	1	0	0	0	**3,3**
Customs Clearance Services	12	9	7	0	0	0	0	0	**4,4**
Insurance Services	14	10	4	0	0	0	0	0	**3,3**
Road Transport and Distribution Services	6	4	3	5	3	1	2	4	**22,8**
Rail Transport and Distribution Services	14	7	1	4	1	1	0	0	**6,8**
Air Transport and Distribution Services	11	9	2	2	1	1	0	2	**10,8**
Maritime Transport and Distribution Services	8	5	2	0	3	0	2	8	**26,9**
Warehouse Services	6	12	8	0	0	0	1	1	**9,3**
Handling Services	8	10	5	3	0	1	1	0	**8,9**
Order Processing and Information Management	12	13	2	1	0	0	0	0	**3,6**

6.2.2. PESTEL Analysis of Logistics Sector in TRA2 Region

Within the scope of PESTEL analysis under this title, the responses of the participants to the survey questions aiming to measure the political, economic, social, technological, legal and environmental trends in the logistics sector are addressed. In order to make a comparison, both the answers received from the TRA2 Region and the answers obtained from Turkey in general are shown separately while reporting the results (Table 29).

The first column in Table 29 shows the main areas of PESTEL analysis. These questions are listed separately in both key areas, as some questions / predictions cross more than one key area. Within the scope of PESTEL analysis, a total of 16 questions were asked to the participants. As can be seen from Table 29, it was seen that both groups reached a consensus in most of the questions in total and gave answers in the same direction. In this context, the issues that participants from TRA2 Region and across Turkey could not reach agreement were focused on during the examination of the results within the scope of the PESTEL analysis.

While 63% of respondents from the TRA2 region expect global protectionism to increase through tariffs, quotas or subsidies, this figure is about 32% for Turkey in general. Another issue in which both groups diverge is block-chain applications in the logistics sector. While the majority of responses received from the TRA2 region indicate that the expansion of block-chain application, especially in the field of logistics, is not expected in the next 3-5 years (52.6%), about 71% of participants across Turkey predict an increase in block-chain applications in the sector. Another issue on which the responses of both groups do not agree is the free return of products and the ease of shipping. Only 33.3% of TRA2 region participants expected progress in this direction, while looking at Turkey as a whole, this figure was 64.7%.

Looking at environmental trends related to the logistics sector, survey participants across Turkey expect tighter regulations on emission control and support shifting freight traffic from road to rail with environmental concerns. However, the expectations across Turkey for these two predictions were not accepted by respondents from the TRA2 region. Half of those surveyed from the TRA2 region expect tougher regulations on emissions control, and only 11% supported a road-to-rail shift[4]. In addition to these two different results, both survey participants across Turkey and

4-When analyzing this result, it would be useful to consider that a very large proportion of the respondents from the TRA2 region engaged in road transport.

survey participants from the TRA2 region do not expect environmental regulations to reduce the profitability of the sector and believe that growth in the reverse logistics market is not enough.

Table 29: *Distribution of Answers Given by Participating Companies to Questions within the Scope of PESTEL Analysis*

Key Area	Questions	TRA2 Region		Turkey	
		Yes	No	Yes	No
Political, Legal	Do you expect global protectionism to increase through tariffs, quotas or subsidies?	7 (36,8%)	12 (63,2%)	47 (68,1%)	22 (31,9%)
Political	Do you see a high probability of deteriorating political stability with events such as terrorist attacks, regional conflict, and war?	15 (78,9%)	4 (21,1%)	44 (61,1%)	28 (38,9%)
Economic	Do you expect that the trend of global investments, exports and growth in GDP to shift to emerging economies will continue?	11 (57,9%)	8 (42,1%)	53 (74,6%)	18 (25,4%)
Economic	Do you expect the speed of localization of production to increase globally?	10 (50%)	10 (50&)	46 (63,9%)	26 (36,1%)
Economic, Social	Do you think that the transformation from sharing economy and goods production economy to service economy will accelerate or remain within the current trend (Yes: It will accelerate - No: The current trend will continue)	5 (25%)	15 (75%)	34 (48,6%)	36 (51,4%)
Economic, Technological	Do you expect a significant increase in the growth rate of electronic commerce?	10 (52,6%)	9 (47,4%)	57 (80,3%)	14 (19,7%)
Technological	Do you expect a significant increase in the growth rate of contact-free transaction and payment volume?	11 (57,9%)	8 (42,1%)	58 (81,7%)	13 (18,3%)
Social, Economic	Do you expect an increase in the rate of urbanization in Turkey?	11 (57,9%)	8 (42,1%)	39 (54,9%)	32 (45,1%)
Social	Do you expect the growth rate of consumer culture/society for Turkey to increase in the next 3-5 years?	10 (50%)	10 (50%)	50 (69,4%)	22 (30,6%)
Technological	Do you expect block-chain application to become widespread, especially in the field of logistics, in the next 3-5 years?	9 (47,4%)	10 (52,6%)	50 (71,4%)	20 (28,6%)
Economic, Technological, Legal	Do you expect significant progress in the next 3-5 years regarding free return and ease of shipping of products?	6 (33,3%)	12 (67,7%)	44 (64,7%)	24 (35,3%)
Technological, Legal	Do you expect increased legal and technical measures for data security?	10 (58,8%)	7 (41,2%)	55 (79,7%)	14 (20,3%)
Environmental	Do you expect tighter regulations on emissions control?	9 (50%)	9 (50%)	49 (71%)	20 (29%)
Environmental, Economic	Do you expect environmental regulations to reduce the profitability of the sector?	7 (38,9%)	11 (61,1%)	32 (46,4%)	37 (53,6%)
Environmental	Is the growth in the reverse logistics market sufficient for you?	5 (27,8%)	13 (72,2%)	16 (23,2%)	53 (76,8%)
Environmental	Do you support shifting freight traffic from road to rail with environmental concerns?	2 (11,1%)	16 (88,9%)	37 (53,6%)	32 (46,4%)

6.2.3. SWOT Analysis of Logistics Sector in TRA2 Region

Another analysis conducted to evaluate the situation of the logistics sector in the region is the SWOT analysis that identifies the strengths and weaknesses of the sector and addresses the opportunities and threats in the region. SWOT analysis, in which the strengths and weaknesses as well as opportunities and threats of the region are determined, was created on the basis of two different approaches. First of all, the strengths and weaknesses expressed by the participants in the region as a result of the interviews held at the focus group meetings and the opportunities and threats in the region's agenda were included in the analysis. Secondly, within the scope of the survey conducted with the focus group meeting participants, questions were asked about the strengths and weaknesses as well as the opportunities and threats in the region. In this framework, the data obtained by two different methods were given in Table 30 by eliminating similar answers.

The first group that stands out in strengths is related to the geographical advantages of Turkey in general and the region in particular. The geographical advantage of the region is that, on the one hand, it is directly neighboring countries such as Georgia, Azerbaijan, Armenia and Iran, and on the other hand, it serves as a bridge for transport to Central Asia. On the other hand, Turkey's position in relation to the European, Asian and African continents gives both our country and the region a geographically central position.

Another group that stands out in strengths is putting an emphasis on the region's transport and logistics infrastructure. Since the region is primarily home to the Baku-Tbilisi-Kars rail, it is on a logistics corridor that connects not only Turkey, Georgia and Azerbaijan, but also a large number of countries on the east-west axis. On the other hand, the new highway investments in the region, mainly in the area of freight transport, provide logistics companies with advantages such as faster, reliable and predictable operation and lower vehicle operating costs. Especially the truck fleet concentrated in Iğdır has a positive impact on the region's trade with the Middle East and Central Asia. Finally, having airports in three of the 4 provinces in the region has a facilitating effect on air cargo traffic.

Another main topic that stands out in strengths is the activities in the field of agriculture and industry. The production of natural agricultural products in the region and especially the variety of products resulting from micro-climate in Iğdır support logistics activities at the point of transporting these products to both domestic and foreign markets. Although the industrial infrastructure in the region is limited, the developed industrial infrastructure, which is concentrated especially in the western regions of the country, indirectly affects the logistics activities in the region positively. The fact that the provinces in the region are located in the 6th Region, where the most comprehensive incentives are offered according to the incentive legislation, increases the attractiveness of investments in the region and offers the potential to develop the logistics sector of the region in the long term.

With regard to the weaknesses shown in Table 30, the small scale of logistics companies, the weak financing structures resulting from this small scale and the fact that a small number of companies operate in the sector stand out as the weaknesses directly related to the logistics sector. On the other hand, long waiting times at border gates, which constitute the core of logistics activities in the region, are another weakness expressed by sector representatives. The lack of a logistics database is another factor that negatively affects logistics operations in the region.

In addition to these weaknesses directly and/or indirectly related to the logistics sector, the weaknesses affecting the overall region were also expressed by the participants in the study. Lack of trained human resources in the region, high input costs and harsh climate conditions in the region, lack of partnership culture in the business world, inability to adequately adapt to developing technologies, especially information technologies, and lack of industrial infrastructure that will contribute to the production of goods subject to logistics are listed among other weaknesses in the sector. Another point of note here is the position of the region in the incentive legislation. As described earlier, the fact that the provinces in the region are located in the 6th Region, where the most comprehensive incentives are offered according to the incentive legislation, is considered a strong direction, while a representative of the sector participating in the studies stressed that a large number of provinces are covered by the 6th Region in the incentive legislation, and therefore the attractiveness of incentives is decreasing.

Looking at the opportunities in Table 30, possible positive changes in Turkey's relations with neighboring countries are highlighted. The increase in the importance of the region with the settlement of the Karabakh conflict and the construction of a new corridor (Zangezur pass) that will pass through Armenia and connect Nakhichevan and Azerbaijan will undoubtedly increase the logistical mobility in the region. On the other hand, the active opening of the Borualan border crossing in Ağrı and opening to Iran will have an effect on increasing trade in the region. As for infrastructure, the completion of preliminary studies of the Kars Logistics Center and Kars-Iğdır-Nakhichevan rail line, which will be opened in 2021, gives positive signals for the future of logistics activities in the region. Finally, it is expected that the increase in demand for natural product consumption in the world will have an increasing effect on transport in the region which has a significant potential for these products.

Looking at the threats with the SWOT analysis, the risks posed by pandemic and political uncertainties stand out. Although the impact of the COVID-19 pandemic tends to decrease, the pandemic may have negative effects on the logistics sector in the medium and long term. On the other hand, since the logistics mobility of the region is based on trade with the surrounding countries, the upheavals that may arise in these countries may lead to disruptions in the activities of the sector. Increasing tolls and/or closing of border gates continues to be a major obstacle for the sector. In addition, increasing costs in the sector, low cost structure of Iran companies, increasing the weight of large-scale foreign firms in the domestic market, and the possibility of providing Asian and European connection bypassing Turkey over the Black Sea are other prominent threats.

Table 30: SWOT Table of TRA2 Region (Ağrı, Ardahan, Iğdır, Kars)

STRENGTHS	OPPORTUNITIES
• Being a neighbor to 4 different countries and having a large number of border crossings in the region • Gateway to Central Asia and the Caucasus • Geographical location of Turkey • Baku-Tbilisi-Kars rail • Located on important corridors in terms of highway route • Improved road logistics performance thanks to new roads • Large investments in logistics infrastructure (railways, tunnels, high-standard land routes) • Logistics and storage potential with truck fleets owned by the region (especially Igdir) • Presence of airports in Ağrı, Iğdır and Kars provinces in TRA2 region • Micro-climate (Iğdır) • Potential of (natural) agricultural products to be exported • Industrial infrastructure of the country, especially concentrated in the Thrace region • High-level incentives given to investors due to the fact that the provinces in the region are located in the 6th Region according to the incentive legislation • Located on the crossroads of the region's energy corridors	• Increasing the importance of the region with the solution of the Karabakh problem • New corridor (Zangezur Pass) that will pass through Armenia and connect Nakhichevan and Azerbaijan • Active opening of the Borualan Border Gate • Planning to open Kars Logistics Center in 2021 • Completion of the preliminary studies of Kars-Iğdır-Nakhichevan rail line, which started in 2018. • Increase in demand for natural product consumption in the world • Significant transport infrastructure investments in the region
WEAKNESSES	**THREATS**
• Poor financial structure of logistics companies in the region • Small scale of logistics companies in the region • Having a small number of logistics companies • Lack of logistics database • Inefficiency of customs and border crossing procedures and long waiting times at customs (partly due to not hiring enough staff) • Insufficient skilled human resources to be employed in the region (both in production and logistics) • The (harsh) climatic conditions of the region • High input costs in the region • Lack of partnership culture • Decreasing of the attractiveness of the 6th region incentives in the Incentive Law (including the provinces of the region) • Industrial infrastructure is not developed enough in the region (insufficiency of OIZs, R&D and Technology Centers) • Lack of information technologies and not being able to adapt adequately to developing technology	• The COVID-19 pandemic that affected the whole world as of 2020 and the uncertainty brought about by the pandemic • Emergence of unexpected new threats such as a pandemic • Changing policies followed by neighboring countries • Political and economic instability in neighboring countries • Other countries taking advantage of the pandemic and increasing their tolls (such as Iran) • Turkmenistan keeping its border gates closed since March 21 • Possibility of bypassing Turkey by starting RO-RO cruises between Georgia (Batumi) and Romania (Constanta) within the scope of the Belt and Road Initiative • Competitor countries, especially Iran, using low input costs, especially low-cost human resources, as a means of competition in logistics • Large-scale foreign logistics companies begin to dominate the Turkish market • Increase in exchange rates, high inflation and economic shrinkage • Cost increases

6.2.4. Five Forces Analysis of Logistics Sector in TRA2 Region

Within the scope of Porter's Five Forces Analysis under this title, the answers to the questions included in the survey study are analyzed regarding the dimensions of i) Entry Potential of New Competitors, ii) Competition in the Sector, iii) Bargaining Power of Customers and iv) Threat from Substitute Products and Services. Since the logistics sector is a service sector, the "bargaining power of suppliers", which is the last part of Porter's Five Forces Analysis, has not been included in the analyzes here. Table 32 shows the answers of the participants from the TRA2 Region, together with the answers of those who participated in the survey from all Turkey. In this way, it can be revealed how the answers received from the TRA2 Region differ from Turkey in general.

7 questions were asked regarding the Market Entry Potential of New Competitors. In all questions, a consensus has been achieved between the TRA2 Region participants and the participants from all Turkey, and the majority in both groups responded in the same direction. From the answers, it can be seen that there are some obstacles for new companies to enter the market. This is because high initial investment is required to enter the market, there are dissuasive licenses and fees, startup costs are high due to the learning curve, new entrepreneurs have difficulty in acquiring customers and there are big players dominating the market. While the answers given to 6 of the 7 questions

asked under this heading show that companies will experience some difficulties in entering the market, it is seen that the only thing that does not prevent entry to the market is the possibility of using the assets for alternative business.

7 questions were posed regarding the competition in the sector, and in six of these, a consensus was achieved between TRA2 Region participants and participants from Turkey in general, and the majority in both groups gave the same answers. It is observed that both groups express the same opinion regarding the high number of competitive logistics companies, the presence of major players in the sector, the rapid growth of the market, high fixed costs, excess capacity for the sector, and high exit costs from the sector. However, with regard to the growth rate of the logistics market, participants in the TRA2 region argued that the growth rate is low, while participants across Turkey claimed that the growth rate is high. The answers to the questions asked under this heading give clues that competition in the sector is generally high.

Table 31: Distribution of Answers of Companies Participating in the Survey to Questions within the Scope of 5 Forces Analysis

	Questions	Region		Turkey	
		Yes	No	Yes	No
Entry Potential of New Competitors	Is economies of scale effective in your industry?	12 (54,5%)	10 (45,5%)	53 (66,3%)	27 (33,8%)
	Is high initial investment required?	11 (52,4%)	10 (47,6%)	60 (73,2%)	22 (26,8%)
	Are there big players dominating the market?	11 (52,4%)	10 (47,6%)	72 (86,7%)	11 (13,3%)
	Are there high initial costs due to the learning curve?	12 (57,1%)	9 (42,9%)	57 (70,4)	24 (29,6%)
	Is it possible to use assets for alternative businesses?	11 (52,4%)	10 (47,6%)	42 (52,5%)	38 (47,5%)
	Are there any difficulties for new players entering the market to acquire customers?	14 (77,8%)	4 (22,2%)	59 (76,6%)	18 (23,4%)
	Are there high licenses and fees that are a deterrent to market entry?	13 (72,2%)	5 (27,8%)	48 (63,2%)	28 (36,8%)
Competition in the Sector	Are the number of logistics companies that you are competing with high?	16 (94,1%)	1 (5,9%)	69 (89,6%)	8 (10,4%)
	Is there a prominent market leader in the logistics sector?	10 (58,8%)	7 (41,2%)	53 (71,6%)	21 (8,4%)
	Do you see a rapid growth in the logistics market?	5 (27,8%)	13 (72,2%)	44 (57,9%)	32 (42,1%)
	Are your fixed costs high?	13 (76,5%)	4 (23,5%)	67 (87%)	10 (13%)
	Does the logistics service you offer differ from the service offered by your competitors?	10 (58,8%)	7 (41,2%)	46 (62,2%)	28 (37,8%)
	Is overcapacity high in the sector?	13 (76,5%)	4 (23,5%)	51 (69,9%)	22 (30,1%)
	Is the cost of exiting the sector high?	14 (77,8%)	4 (22,2%)	47 (61%)	30 (39%)
Bargaining Power of Customers	Do you have enough customer portfolio for not being affected critically by any loss of customers?	6 (35,3%)	11 (64,7%)	41 (55,4%)	33 (44,6%)
	Is price flexibility high?	9 (50%)	9 (50%)	39 (52%)	36 (48%)
	Is it difficult for any buyer to compete directly with you by purchasing a competitor in the supply chain?	4 (25%)	12 (75%)	26 (37,1%)	44 (62,9%)
	Can your customers easily leave you and switch to another logistics company?	13 (68,4%)	6 (31,6%)	63 (81,8%)	14 (18,2%)
Threat from Substitute Products and Services.	Is the number of substitution services too high?	11 (57,9%)	8 (42,1%)	52 (68,4%)	24 T(31,6%)
	Does the service you offer stand out significantly positively compared to possible substitutes?	12 (66,7%)	6 (33,3%)	51 (68%)	24 (32%)
	Is it a high cost for your customer to receive a different service?	12 (66,7%)	6 (33,3%)	37 (49,3%)	38 (%50,7%)
	Is customer loyalty high?	7 (36,8%)	12 (63,2%)	38 (49,4%)	39 (50,6%)

4 questions were asked regarding the bargaining power of the customers. In two of these 4 questions, a consensus was achieved between TRA2 Region participants and those from Turkey in general and the majority in both groups gave the same answers. The issues that both groups agree on are that customers can easily switch to a rival company and that customers can enter into competition with survey participants by purchasing another company in the logistics sector. In the question where consensus cannot be reached, it is necessary to emphasize that the yes and no answers given by the participants of the TRA2 region show an equal distribution.

More than half of those surveyed in both TRA2 region and Turkey believe that it is not difficult for any customer to compete directly by purchasing a competitor in the supply chain, and that customers can easily switch to another logistics company which indicates that the bargaining power of the customers is relatively high. Close answers were given in both groups to the question about price flexibility in the sector. 50% of respondents from the TRA2 region and 52% of respondents across Turkey argued that price flexibility is high (which means that customers have high bargaining power). As for whether any loss of customers has a critical impact on commercial success, it seems that participants in the TRA2 region do not have a portfolio of customers at a level that will not be affected by this situation. However, respondents throughout Turkey express that they have a sufficient customer portfolio.

4 questions were asked about the Threats from Substitute Products and Services, and in 3 of these, a consensus was achieved between the TRA2 Region participants and the participants from Turkey and the majority in both groups gave the same answers. In this context, a consensus was reached among the participants in the TRA2 Region and Turkey that the number of substitution services is high and the customer loyalty was low. However, the fact that the service offered stands out significantly positively when compared to possible substitutes somewhat reduces the degree of this threat. On the other hand, a consensus could not be reached between participants of the TRA2 region and participants throughout Turkey on whether the cost of customers receiving a different service would be high. The first group believes that the said cost is high, while the second group of participants believes that the said cost is low.

6.3. Gap Analysis of Logistics Sector in TRA2 Region

Within the scope of the survey; the problems faced by the sector and the areas that stand out in terms of competition were asked, and the answers given to these questions have been used in the Sector Gap Analysis both in TRA2 Region and across Turkey. In this context, the participants were first asked to select and prioritize the first five areas where they experience the most problems in logistics processes among alternative options (Among the prioritized areas: 1 is the biggest problem, 5 is the smallest problem). The following 8 alternative answers were presented to the participants with regard to the question:

- Fuel Prices / Bridge-Highway Toll Fees
- Customs
- Insurance / Bank
- Document Fees and Numbers
- Storage / Warehouse Costs
- Ro-Ro Toll Fees
- Security-Related Issues in Neighboring Countries
- Trouble in Finding Personnel

The answers given for each alternative above were then weighted and the average scores of the problem areas and their rankings according to these scores were determined. Table 32 shows the distribution of the answers received from the TRA2 Region and all Turkey for this question.

Table 32: Ranking of Most Problematic Areas in Logistics Processes of Companies Participating in the Survey

	Problem Area	1	2	3	4	5	Average Score	Rank
TRA2 Region	Fuel Prices / Bridge-Highway Toll Fees*	20	5	2	1	0	1,43	1
	Customs	5	13	5	2	1	2,27	2
	Security-Related Issues in Neighboring Countries	1	0	7	0	1	3	3
	Insurance / Bank	0	6	10	8	0	3,08	4
	Trouble in Finding Personnel	1	2	0	3	1	3,14	5
	Ro-Ro Toll Fees	1	1	1	1	3	3,57	6
	Document Fees and Numbers*	0	1	2	10	11	4,29	7
	Storage / Warehouse Costs*	0	0	1	3	11	4,67	8
Türkiye	Fuel Prices / Bridge-Highway Toll Fees	49	17	11	14	4	2,02	1
	Customs	14	32	16	9	7	2,53	2
	Trouble in Finding Personnel	10	10	7	7	5	2,67	3
	Security-Related Issues in Neighboring Countries	2	4	10	3	5	3,21	4
	Insurance / Bank	5	13	29	21	13	3,3	5
	Document Fees and Numbers	9	13	12	32	21	3,49	6
	Ro-Ro Toll Fees	4	2	4	3	10	3,57	7
	Storage / Warehouse Costs	5	7	9	9	33	3,92	8

*(*): Within the scope of this question, when the answers from the TRA2 Region and the rest of Turkey are compared using the t-test, the difference between the mean scores of the options marked with * was found to be statistically significant at 90% confidence interval.*

In Table 32, "Fuel Prices / Bridge-Highway Toll Fees" and "Customs" became the first two problem areas, respectively, both in the TRA2 Region and across Turkey. While “security-related problems in surrounding countries” and “Insurance/Bank” ranked third and fourth respectively in TRA2 region, “trouble in finding personnel” and “security-related problems in surrounding countries” ranked third and fourth respectively in all of Turkey. From this comparison, it is seen that “Customs”, “security problems in surrounding countries” and “Insurance/Bank” in TRA2 region constitute a more important problem area than in Turkey. In particular, the prominence of “Customs” and “security-related problems in surrounding countries” is an understandable result for the provinces of the TRA2 region, located on the border and whose logistics sector is mainly based on trade with neighboring countries. In addition, although it is shown as the biggest problem area in both groups, the average score received by fuel prices/bridge-highway tolls in TRA2 region is statistically lower in the 90% confidence range than the average score calculated according to the answers received from other regions of Turkey. So, Fuel prices/Bridge-highway tolls can be called another gap area where improvements need to be made for the TRA2 region.

In addition to the problems faced by the sector, a competition-related question was also posed. As in the previous section, participants were asked to select the top five areas / services in which the Turkish logistics industry is the most competitive and prioritize these five areas (among the

prioritized areas: 1 is the most competitive area / service, 5 is the least competitive area / service). The following 7 alternative answers were presented to the participants with regard to the question:

- Karayolu Altyapısı
- Customs Services
- Road Infrastructure
- Rail Infrastructure and Services
- Port Infrastructure and Services
- Air Cargo Infrastructure and Services
- Transport Services
- Warehouse Services

The answers given for each alternative above were then weighted and the average scores of the problem areas and their rankings according to these scores were determined. Table 33 shows the distribution of the answers received from the TRA2 Region and all Turkey for this question.

Table 33: *Ranking of the Most Competitive Areas of the Sector*

	Competitive Areas	1	2	3	4	5	Average Score	Rank
TRA2 Region	Transport Services	8	3	1	0	1	1,69	1
	Customs Services	13	5	8	1	1	2,00	2
	Road Infrastructure	4	15	4	2	1	2,279	3
	Rail Infrastructure and Services	1	1	13	3	5	3,44	4
	Warehouse Services	0	2	0	5	2	3,778	5
	Port Infrastructure and Services	2	1	1	15	4	3,783	6
	Air Cargo Infrastructure and Services	0	1	1	2	14	4,61	7
Turkey	Transport Services	39	12	4	3	7	1,88	1
	Road Infrastructure	18	45	12	13	7	2,43	2
	Customs Services	28	13	21	12	6	2,44	3
	Rail Infrastructure and Services	3	3	34	14	11	3,42	4
	Port Infrastructure and Services	7	13	11	35	19	3,54	5
	Warehouse Services	1	7	8	12	11	3,64	6
	Air Cargo Infrastructure and Services	2	5	8	9	37	4,21	7

For the Sector Gap Analysis, the rankings specified in Table 33 will be analyzed in reverse. In other words, the areas / services that the participants of the TRA2 Region stated as the least competitive will be considered as the gaps in the region. In Table 33, it is an expected situation that the participants of the TRA2 region will specify “air cargo infrastructure and services” and “port infrastructure and services”as the least competitive area for the region. On the one hand, although the TRA2 region is home to 3 airports, the air cargo traffic of these airports is quite low. On the other hand, the lack of a coastal zone does not allow the region to directly benefit from the advantages of maritime transport. "Warehouse Services“, in which TRA2 region participants place at the end in terms of competitiveness, draws attention to the need in this area in the region.

Finally, the situation of the factors directly affecting the performance of the logistics sector in

the region will be discussed within the scope of the sector gap analysis. In this context, Table 34 shows the status of some basic transport and logistics infrastructures in the provinces in the TRA2 region. In this framework, if the logistics infrastructure is located within the provincial borders, the situation in question is shown in Table 34 with the "√" sign. As can be seen from table 34, Kars province, which has both an airport and a rail connection, stands out in terms of transport infrastructure compared to other provinces in the region. Ağrı and Iğdır have airports and Ardahan has rail access. Considering the population size and demand potential of Ardahan, which is the only province that does not have an airport, it is considered that an airport in the province is not a necessary priority. There are no highways in any province in the region. But the region's divided road network connection largely compensates the lack of highways. The most notable lack of transportation infrastructure in the region is the lack of rail lines in Iğdır and Ağrı provinces. But this problem will disappear if a new rail investment that will connect Nakhichevan to the Turkish rail system is raised within the framework of a new transport corridor that will pass through Armenia and connect Nakhichevan and Azerbaijan.

One of the most important competitive advantages of the region is that there is at least one border gate in all provinces. On the other hand, at the focus group meeting, it was stated that the logistics sector can only grow at a limited pace due to the limited industrial infrastructure in the region. There is at least one OIZ in all provinces in the region, and the OIZ infrastructure is seen to be at least formally sufficient. However, it has been learned that some OIZs in the region have infrastructure deficiencies. For the development of the logistics sector, it is of great importance to implement an organized industrial zone in these provinces. On the other hand, the presence of a logistics center only in Kars in the region is an obstacle to the development of logistics activities. It is considered that the logistics center infrastructure can be implemented economically in Ağrı and Iğdır as well.

Table 34: *Current Status of Provinces in TRA2 Region in Terms of Certain Basic Logistics/Industrial Infrastructures*

	Ağrı	Ardahan[5]	Iğdır	Kars
Rail Connection	-	√	-	√
Airport	√	-	√	√
Motorway	-	-	-	-
Port	-	-	-	-
Road Border Gate	√	√	√	√[6]
Logistics Center	-	-	-	√
OIZ	√	√	√	√

5- Although the rail line passes through Ardahan, there is no station that will allow freight and passenger transport.
6- The Akyaka border gate, located on the border of Kars province between Turkey and Armenia, is not active in the current situation.

Gaps in the logistics sector of the TRA2 Region are listed below under the light of the analyzes summarized above, the opinions expressed by the participants in the relevant focus group meetingS and the answers given to the question 'Do you think there are any factors (legal, institutional, operational, financial, infrastructure and similar) that negatively affect the development of the sector?" at the end of the survey study.

» Difficulties in accessing funding / loans

» High operating costs (especially leading to weakness in competition with low-cost logistics companies in neighboring countries)[7]

» Small scale business structure (lack of institutionalization, family business structure)

» Poor industrial infrastructure (far from supporting logistics activities)

» Lack of trained staff

» Problems at customs

» Passage document issues

» Lack of rail infrastructure

» Lack of logistics center

6.4. The Impact of the COVID-19 Pandemic on Logistics Activities in the Region

Under this heading, the effects of the COVID-19 pandemic on the logistics activities in the TRA2 Region and the changes it caused will be summarized within the framework of the survey study.

Looking at the capacity utilization rates in the past month, it is seen that logistics companies in the TRA2 Region have lower capacity utilization rates than Turkey average, but it is not possible to associate this situation directly with the pandemic. It is also possible that capacity utilization rates will remain at low levels regardless of the pandemic due to an excess supply in the logistics sector in the region. However, this result has been presented to the attention of the reader as a situation existing in the region.

The effect of the COVID-19 pandemic, which can be revealed more clearly than the capacity utilization rates, is the change in the costs of companies. In TRA2 Region, the costs of logistics companies have increased with the pandemic as in Turkey. However, although there are few answers indicating that the costs were reduced or not changed in the answers collected from all over Turkey, all of TRA2 Region answers pointed to a cost increase. The problem of cost increase in the region has been confirmed by the answers to the other two questions in the survey. When asked to list the problems experienced after the pandemic, TRA2 Region entrepreneurs cited the increase in operating costs as the second biggest problem, while this problem was the fifth biggest problem in the responses received from Turkey in general. Similarly, when asked to list the problems related to the supply chain, the increasing logistics costs has been the biggest supply chain problem in TRA2 Region while the same problem has taken the third place across Turkey. Regarding the supply chain, it is important that the route change due to the countries that have closed their borders has been ranked as bigger problems in TRA2 Region when compared to Turkey in general. Because TRA2, a border region, has been one of the areas most affected by the closure of borders.

Another important result that stands out in the surveys regarding the Covid-19 pandemic is that in the post-pandemic period, logistics companies in the TRA2 region will avoid rail, sea and air transport at a much higher rate than Turkey in general. This can be explained by the fact that logistics companies in the region rely heavily on road transport.

7- This situation is also highlighted in the five forces analysis. Logistics companies in the region have stated that their fixed costs and excess capacity in the sector are at a high level.

7. Horizontal Issues

Transportation, which is the basic element of logistics activities, contributes 5 of 17 basic objectives directly and 7 of them indirectly within the scope of the United Nations 2030 Sustainable Development Agenda, which is a continuation of the Millennium Development Goals and takes into account all aspects of sustainability while ensuring economic and social development. The areas that transportation contributes directly and indirectly are as follows: road safety, energy efficiency, sustainable infrastructure, adaptation to climate change, climate change mitigation, urban access, fossil fuel subsidies, agricultural efficiency, air pollution, access to clean fresh water, sustainable cities and prevention of food losses. Under this heading, transportation infrastructure and services, one of the most fundamental elements of logistics activities, are covered under the following topics: crisis management, energy efficiency and circular economy, climate change and gender equality.

7.1. Crisis Management

Increasing resilience is regarded as one of the basic requirements of sustainable growth and development, and within this framework, this concept is highly emphasized in the fields of economy, social structure, environment and infrastructure among the Sustainable Development Goals. Many new concepts and ways of doing business are heavily discussed in order to make supply chains more resistant to crises. In this context, new production models, industry 4.0 and automation, locality and self-sufficiency, nearby production and production according to demand come to the fore in the production aspect of supply chains. While flexible working methods and qualified workforce stand out on the employment side, diversification of resources, nearby supply, more effective planning and digitalization are the prominent concepts on the supply side. The issues that come to the fore on the logistics side are as follows: development of new routes and trade channels and mode choices / changes, more intensive use of intermodal transport, synchro-modality, contact-free applications, development of end-user logistics infrastructure, port automations.

The logistics processes, which mainly consist of activities such as transportation and distribution as well as storage and customs, and have a derivative demand structure, have been the areas directly affected by the COVID-19 pandemic. The pandemic in China, which is the heart of the global manufacturing industry, has hit the global supply chains due to the restrictions imposed. In the later stages of the Covid-19 process, these restriction measures have been implemented in many other countries.

Many countries have introduced new social distance rules at customs and warehouses, and developed new protocols for disinfecting workplaces, protective clothing, and limiting the workforce. A significant portion of international cargo traffic is carried out by passenger aircrafts, therefore, as a response to the reduced cargo capacity, some of the passenger aircrafts have been redesigned according to the cargo needs and especially between China and Europe, a part of the air cargo transportation has shifted to rail. Most of the companies in the warehouse management and retail trade segment focused on nondurable consumer goods such as food, in line with the increase in demand and distribution companies have turned to contact-free delivery methods. Many existing roads have been closed as a result of countries' closing their borders or applying strict measures at border crossings. Firms in the sector face various risks in determining alternative new routes and realizing their plans according to new routes. The tendency towards maritime and rail sectors has increased due to relatively less physical contact and economies of scale. In addition, the demand for digital freight platforms, which facilitates the maximum utilization of economies of scale and scope, has also increased during this period.

With the pandemic, the minimization of physical contact and new business processes resulting from social distance measures have increased the importance of digitalization and automation in all business lines. In this context, it is expected that the tendency towards the internet of things, cloud technologies, automation and data analytics issues will increase in the short and medium term, and to robot and drone technologies and autonomous vehicle technologies in the long term.

It is considered that making progress in terms of making ports autonomous, improving customs processes and modernizing infrastructure, increasing the share of rail transportation, making service contracts and customs declarations through digital media is very important in terms of increasing the resilience of the sector to crises.

On the other hand, the integration and synchronization between transport types such as road, rail, maritime and air should be provided in order to make the sector more resilient against the crises that may arise in the upcoming periods, In this way, it is considered that bottlenecks in any transportation type or route can be solved in a more flexible, fast and low-cost way as a result of the use of transportation modes together.

There is no significant difference between the measures implemented all over the world and the measures taken in our country. Due to the closure of the borders and the problems experienced in the cargo plane capacities, there have been changes in the mode preferences in our country as well. Similar developments have been experienced in Turkey in parallel with the global trends in rail transportation. According to the statistics of TCDD General Directorate; during the January-November 2020 period, rail passenger transportation decreased by 41.1% compared to the January-November 2019 period while the rail freight transportation increased by 4.3% compared to the previous year (TCDD, 2021). Rail freight transport has been preferred more due to the problems experienced in air and road transport. On the other hand, in addition to the contraction in demand in Turkey, it is observed that there are significant weaknesses especially in financing ability and collection.

7.2. Resource Efficiency

The logistics sector still relies heavily on fossil fuels and yet no significant progress has been achieved in terms of clean and sustainable energy resources. This situation negatively affects the environmental sustainability, transportation costs and economic sustainability, and weakens predictability. Greenhouse gas and air pollution caused by fossil fuel consumption remain one of the most controversial issues in logistics and transportation and are at the center of climate change discussions. The effects of the transport sector on climate change are recognized by the United Nations Framework Convention on Climate Change and the role to be played by the transport sector in achieving the goals of the Paris Convention is highlighted.

In terms of unit energy consumption, in road freight transportation, an average of 921 kcal / ton-km of energy is needed for trucks, while 61 kcal / ton-km is needed for trains and 25 kcal / ton-km is needed for vessels (TMMOB, 2016: 67). In order to increase energy efficiency in the transportation sector and reduce the energy density and emissions, it is important to develop and encourage especially rail and maritime infrastructure. As a matter of fact, while the share of rail freight transport in total in the EU-27 is 18.7%, this rate is 4.6% in Turkey. This increases unit transportation costs, causes more harmful gas emissions to the environment, increases the time required for logistics activities, and weakens predictability and planning ability. Transportation has a 25.5% share in final energy consumption in our country and 92.4% of this stems from road , 5.2% from air and 8.7% from rail (Ministry of Environment and Urbanization, 2019).

It is observed that transportation and land use decisions are integrated and spatial development models with high density and suitable for mixed use are encouraged in countries with efficient, integrated, predictable, safe and sustainable logistics and transportation systems In our country, road-based policies have been adopted especially since the 1950s, and this preference has led to dispersed land use decisions and urban expansion, sustainable transport infrastructures have been neglected and an inefficient transport system has emerged. Although important policies and measures have been developed in recent years by identifying this inefficient structure in policy documents, the targeted level in the implementation of these measures could not be achieved yet.

On the other hand, another important issue at the point of resource efficiency is the unit construction cost and life cycle cost of the said infrastructures for a capacity at the same level. Although the unit construction cost varies according to the type of the project, the topographic and geological characteristics of the land, the expropriation needs, The unit costs of conventional electric and signaled rail are considerably lower than the motorway unit costs on average. In addition, the land use needed on railways is much lower compared to roads. Countries that want to make their

transportation and logistics systems more efficient and sustainable take into account parameters such as unit energy costs, life cycle costs, the demand for mobility, and the need for land use, and try to develop their policies from a holistic perspective.

Economic pressures and environmental concerns about efficiency in resource use have led to a more intense discussion of the concept of reverse logistics, especially in recent years. In many countries, companies increase their reverse logistics activities due to value creation, customer loyalty, environmental and social responsibilities. A similar understanding is now seen in our country as well. Therefore, matters such as designing the products in accordance with recycling, disassembly, and re-production, arranging the production planning so as to cover the recovered elements and designing of the reverse logistics system are important.

Considering the road-based logistics network and the small-scale structures of the companies in the sector; it can be said that the TRA2 Region needs some improvements in resource efficiency. In this context, strengthening the rail infrastructure, shifting a part of transports from road to rail and increasing the scale of small companies through partnerships and similar methods are the precautions that can be applied primarily to increase their resource efficiency performance.

7.3. Climate Change

The issue of adaptation to climate change and reducing its effects is among the highest priority agendas of many international and supranational organizations as well as the United Nations. CO2 emission from the transportation sector is around 30% in developed countries and has a share of 23% in the CO2 emissions produced by human all around the world (UNECE, 2021). In this context, there is a broad consensus to reduce transport-related CO2 emissions by at least 50% by 2050. CO2 is not only a pollutant but a greenhouse gas that causes global warming. Although most of this emission is caused by cars and buses for passenger transportation (45.1%), 29.4% is caused by vehicles used for freight (IEA, 2019). Policies that stand out in this context are as follows: more advanced and efficient engine technologies, gradual banning of diesel-fueled vehicles, development of electric vehicle infrastructures, emission standards, widespread use of biofuels, more efficient intermodal transportation and logistics systems with AUS and integrated infrastructures, encouragement of more efficient and sustainable modes, traffic demand management systems and optimization of logistics processes. The road-dominant transportation system in our country moves transportation and logistics activities to a highly controversial position in terms of climate change and other environmental impacts (approximately 89% of freight transports are performed on roads), because approximately 93% of the greenhouse gas emission originating from transportation originates from the roads. On the other hand, the average age of heavy vehicles (trucks) in our country has also increased continuously especially after 2011 and reached 17.8 years. The high average age of the vehicle stock makes this structure more negative.

Many measures have been developed in this direction in policy documents, especially the 11th Development Plan, Climate Change Action Plan and Presidency Program. On the other hand, within the scope of the Directive on Energy Efficiency in Transportation, regulations have been made for the following issues: improving transportation infrastructures, urban transportation planning, practices to reduce the use of vehicles in city centers, informing and training drivers, freight transportation, public transportation, traffic management and information system, signaling systems, smart transportation systems and fuel consumption tracking.

7.4. Gender Equality

According to the Global Gender Inequality Report published by the World Economic Forum in 2020, Turkey ranks 130th among 153 countries according to the general index; 136th in economic participation and opportunities; 113th in participation in education; 64th in health and life; 135th in participation in the workforce; and 106th in wage inequality for similar jobs (World Economic Forum, 2020: 343). Accordingly, although Turkey is relatively good in health and living conditions, it performs poorly in business and economic activities. According to the report prepared by the Economic Policy Research Foundation of Turkey (TEPAV) under the leadership of the Union of Chambers and Commodity Exchanges (TOBB) and the Industrial Development Bank of Turkey (TSKB); the most egalitarian provinces of Turkey are Muğla, İzmir, Yalova, İstanbul, Kırklareli, Çanakkale, Sinop, Tunceli, Aydın and Balıkesir. On the other hand, Muş is the province with the highest gender inequality. Muş is followed by Bingöl, Bayburt, Şırnak, Batman, Bitlis, Kırıkkale, Siirt, Çankırı and Erzurum provinces, respectively. Although there are many goals in this direction within the scope of Sustainable Development Goals (SDG); the SDG number 5 "Ensuring Gender Equality and Empowering All Women and Girls" focuses on gender equality and includes 9 goals within this scope. Numerous policies, measures and activities have been included in this direction within the policy documents including Development Plans, Annual Programs, National Action Plan on Gender Equality, National Action Plan on Employment Strategy, National Action Plan on Women's Empowerment in Rural Areas, National Action Plan on Combating Domestic Violence Against Women and National Action Plan on Combating Violence Against Women

When looked specifically in the logistics sector, it is seen that the sector generally shows a male-dominated structure. Academic studies on the subject are very limited. According to the results of the study using data from 139 countries and addressing the impact of gender inequality in countries (measured by the Gender Inequality Index prepared by UNDP) on the logistics performance index values of countries; as the gender inequality increases in a country, the LPI value of that country decreases (Larson, 2019). In the conclusion part of the same study the following recommendations are made based on the empirical results: attention should be paid to gender equality in the sector, companies and public institutions should treat men and women employees equally in terms of wages and working conditions, governments should pass legal regulations that strengthen gender equality, trainers who provide training on logistics should emphasize the moral problems of gender inequality and the negative effects on logistics companies Table 35 shows the shares of female employees in employment in the companies surveyed as white collar, blue collar and total. In order to be able to look at the relative position of the TRA2 Region in Turkey, the averages revealed for Turkey in the survey study were also shown as percentage.

Table 35: *Employment Shares of Female Employees in Companies Participating in the Survey*

	Share of Female Employees	Average	Minimum	Maximum	Median	Standard Deviation
TRA2 Region	Percentage of Female Employees in White Collar Jobs	34,57%	5,88%	100,00%	16,20%	38,51%
	Percentage of Female Employees in Blue Collar Jobs	8,06%	2,78%	20,00%	6,98%	5,34%
	Percentage of Female Employees in Total Jobs	6,67%	5,00%	8,33%	6,67%	1,67%
Turkey	Percentage of Female Employees in White Collar Jobs	16,74%	0%	100,00%	20%	25,96%
	Percentage of Female Employees in Blue Collar Jobs	13,64%	0%	89,21%	3,23%	21,64%
	Percentage of Female Employees in Total Jobs	16,73%	0%	86,35%	5,13%	22,63%

According to table 35, logistics companies in the TRA2 region employ female personnel below the Turkish average in blue collar and total employment classifications. However, the proportion of white-collar female employees is higher than the Turkish average.

8. Policy Recommendations

Policies on Transport and Logistics, Industry and Customs Infrastructure

» It is important to strengthen transport and logistics, industrial and customs infrastructures and make them more efficient in order for improving the physical, human and technological opportunities in the region, competitively integrating the region into value chains and economic activities around Turkey and diversification of production capabilities and export opportunities

» Developing the road infrastructure between north-south, modernizing the main rail line, starting construction works on new routes, building branch lines to OIZs and industrial facilities, and building logistics centers on critical corridors in terms of freight transport are important for increasing the accessibility and connectivity of the region and reducing the logistics costs

» Projects that will increase the efficiency of the existing industrial infrastructure should be developed in cooperation with universities and industry; technological innovation investments that shall make the productivity growth more dynamic should be accelerated; specialized industrial zones should be developed and branding strategies should be prepared to ensure that the region can produce more competitive products.

» The capacity of the customs authorities in the region, which is a transit point for Turkey's access to Central Asia and Russia, should be increased and business processes improved, customs gates should be built at Cambaz Rail Station, as well as coordination with neighboring countries should be increased in order to accelerate the functioning of land customs gates.

Facilitating Access to Finance and Lowering Operational Costs

» Financial support should be provided through methods such as tax reductions, insurance supports, low-interest loans and export incentives in order for Turkish logistics companies to compete effectively with their foreign competitors.

Human Resources Policies

» An education ecosystem should be created for increasing the quality and sustainability of human resources, which are the main elements of businesses and processes related to industrial and logistics infrastructures and for strengthening the human structure of the region.

» The qualified human resources needed in the region should be trained in cooperation with the university and the sector, an education curriculum should be developed in line with the needs of the sector, participation in training programs should be encouraged and certification should be provided.

» The use of technology in education should be increased and programs should be developed to learn the languages spoken by the countries with which the region has intensive commercial relations.

Developing Bilateral and Multilateral Relations

» Necessary coordination should be provided for the opening of border gates with foreign countries.

» It should be ensured that the necessary agreements are prepared, signed and implemented within the framework of regional and bilateral relations regarding the passage document and visa problems of road transporters.

» Necessary initiatives to end the barriers other than tariffs imposed on Turkish companies should be continued.

9. Short, Medium and Long Term Strategiesı

In order to improve the current situation of the logistics sector in the TRA2 Region and to meet the necessities that emerged after the COVID-19 pandemic, a total of 6 main strategies and various actions under these strategies have been determined (Table 36) based on the results obtained from the analysis of secondary sources and the survey studies applied and the assumptions made from the discussions in the focus group meetings.

Table 36: *Short, Medium and Long Term Strategies and Actions*

STRATEGY	ACTION
Development of Transport and Logistics Infrastructure	Rail Line Construction in Ağrı and Iğdır Provinces
	Logistics Center Construction in Ağrı and Iğdır Provinces
	Connection Line Investments for Logistics Center (s)
	Branch Line Investments in OIZs
	Connecting the Region to the Black Sea Ports by Rail
	Elimination of Bottlenecks in the Main Rail Connection of the Region
	Completion of Trabzon-Aşkale State Road
Facilitating Access to Finance and Lowering Operational Costs	Developing Low Interest Loan Programs
	Tax Exemptions
	Developing Incentive Programs
Increasing Efficiency in Customs Services (Border Gates)	Customs Available on a 24-Hour Basis
	Increasing the Capacity of Customs Authorities and Improving Business Processes
	Switching to Single Window System
	Completing Infrastructure Needs Emerging After COVID-19
Human Resources Development	Development and Implementation of Sectoral Training Programs
Improving Cooperation with Surrounding Countries in the Field of Logistics	Solving the Passage Document Problem
	Opening of Border Gates Closed After the COVID-19 Pandemic
	Developing an Action Plan for the Caspian Corridor

The actions listed in Table 36 are intended to draw a general framework. Before the final decision-making processes, detailed feasibility studies are required for actions involving infrastructure investments, and comprehensive impact assessment studies are required for actions involving financial incentives and training programs.

Table 37 details these strategies and actions. During the preparation of the draft budgets, the costs of similar projects were taken as a basis. Draft budgeting of infrastructure projects has been made, and similar projects included in the Public Investment Programs have been reviewed for comparison and estimated project costs have been calculated within this framework. The final approximate costs of the projects proposed in this study, especially infrastructure projects, can only

be calculated after detailed technical studies and certain ranges were used in the draft budgeting within the scope of the study. Accordingly, four ranges have been determined for project costs:

- **Micro Investment:** Projects with costs less than 100 Million TL
- **Meso Investment:** Projects with costs higher than 100 Million TL and less than 1 Billion TL
- **Macro Investment:** Projects with costs higher than 1 Billion TL and less than 5 Billion TL
- **Mega Investment:** Projects with costs higher than 5 Billion TL

Among the actions in Table 38; actions that can be implemented for the region in line with the national trends / developments are shown in blue and actions that can be implemented for the region in line with global / international trends / developments are shown in green.

Table 37: *Details of Short, Medium and Long Term Strategies and Actions*

Strategy	Action	Explanation	Estimated Budget	Term
Strategy 1: Development of Transport and Logistics Infrastructure	**Action 1.1** Rail Line Construction in Ağrı and Iğdır Provinces	There are no rail lines in Ağrı and Iğdır provinces. By connecting these provinces to the rail network with new rail lines, the logistics activities of the region will be able to be continued in a more economical way. In addition, if a new rail connection is established to Ağrı and especially Iğdır province, the Zangezur Corridor, which will connect Nakhichevan and Azerbaijan through Armenia, will also be connected to the rail network and an alternative rail corridor will be created between Turkey and Azerbaijan. On the other hand, given that with the covid-19 pandemic, there is a shift from the road to the rail, where there is less human factor in freight transport, these projected investments are in line with new trends in the post-COVID-19 period.	Mega Investment (>5 Billion TL)	3-10 Years (Long Term)
	Action 1.2 Logistics Center Construction in Ağrı and Iğdır Provinces	By building logistics centers in Ağrı and Iğdır provinces, it is aimed to reduce logistics costs and increase the quality of logistics services. The logistics center is located only in Kars in the region, and the need for a logistics center in Ağrı and Iğdır should be evaluated after a feasibility study and the necessary investment should be implemented if necessary.	Meso Investment (>100 Million & <1 Billion TL)[8]	3-10 Years (Long Term)
	Action 1.3 Connection Line Investments for Logistics Center (s)	By connecting logistics centers in the region to the rail network with branch lines, it is aimed to reduce logistics costs and increase the quality of logistics services. The logistics center is located only in Kars in the region, and if a decision is made to invest in a logistics center in Ağrı and Iğdır, these centers should be connected to the main rail network by branch lines. On the other hand, given that with the covid-19 pandemic, there is a shift from the road to the rail, where there is less human factor in freight transport, these projected investments are in line with new trends in the post-COVID-19 period.	Meso Investment (>100 Million & <1 Billion TL)[9]	3-10 Years (Long Term)

8- Numerous logistics center investments are continuing within the scope of the project named "Establishment of Logistics and Freight Centers" with project number 2007E01-151187 among the projects of TCDD General Directorate in the 2021 Investment Program. The costs of these logistics center projects range from 82,500,000 TL (Mardin Logistics Center) to 629,311,000 TL (Bozüyük Logistics Center). Therefore, it is possible to take these lower and upper limits for the estimated cost of each proposed logistics center.
9- Numerous branch line investments are continuing within the scope of the project named "Branch Line Constructions" with project number 2017E01-150938 Among the projects of TCDD General Directorate in the Investment Program of 2021. In the sub-titles of the project, a total of 195.8 km of branch line investment is under construction and the total cost of these projects is 2.936.692.900 TL. Therefore, the cost per km is approximately 14.998.432 TL. Therefore, it is possible to take this figure as a basis for the approximate cost per km for the proposed branch line investments.

Strategy	Action	Explanation	Estimated Budget	Term
	Action 1.4 Branch Line Investments in OIZs	By connecting Organized Industrial Zones in the region to the rail network with branch lines, it is aimed to reduce logistics costs and increase the quality of logistics services. As part of this action, the following investments will be implemented: • Connecting the Organized Industrial Zone in Kars to the rail network with branch line in short term. • Connecting organized industrial zones located in Ağrı and Iğdır with a branch line to a new rail line that will pass through Ağrı and Iğdır in the Medium-Long term. On the other hand, given that with the covid-19 pandemic, there is a shift from the road to the rail, where there is less human factor in freight transport, these projected investments are in line with new trends in the post-COVID-19 period.	Macro Investment (>1 Billion TL & <5 Billion TL)	3-10 Years (Long Term)
	Action 1.5 Connecting the Region to the Black Sea Ports by Rail	By connecting the region to ports in the Black Sea by rail, it will be possible to transport the cargo carried to international markets in a much more economical way. Due to the lack of a coast to the sea, there is no possibility to directly benefit from the advantages of maritime transport in the region. Connecting the region by rail to one or more ports in the Black Sea will allow the transport of goods to international markets in a much more economical way. On the other hand, this rail line will facilitate the access of neighboring countries, especially Iran, not only to the region but also to the Black Sea ports and improve international logistics activities in the region. On the other hand, given that with the covid-19 pandemic, there is a shift from the road to the rail, where there is less human factor in freight transport, these projected investments are in line with new trends in the post-COVID-19 period.	Mega Investment (>5 Billion TL)	3-10 Years (Long Term)
	Action 1.6 Elimination of Bottlenecks in the Main Rail Connection of the Region	Bottlenecks on the main rail network, which serves as the single line, will be eliminated and the capacity of the line will be increased. By making modernization investments on the Kars-Erzurum-Erzincan-Sivas line, the connection of the region with both the western regions and the Mediterranean ports should be strengthened.	Macro Investment (>1 Billion TL & <5 Billion TL)	3-10 Years (Long Term)
	Action 1.7 Completion of Trabzon-Aşkale State Road	The road connection of the region with the Black Sea ports will be strengthened. With the completion of the Trabzon-Aşkale highway, the provinces of the region will be able to access the Black Sea ports more economically and quickly.	Macro Investment (>1 Billion TL & <5 Billion TL)	1-3 Years (Medium Term)

Strategy	Action	Explanation	Estimated Budget	Term
Strategy 2: Facilitating Access to Finance and Lowering Operational Costs	**Action 2.1** Developing Low Interest Loan Programs	It is aimed that logistics companies that conduct operations abroad gain a competitive advantage against their foreign competitors by introducing low-interest loans. Logistics firms in the TRA2 region have a significant cost disadvantage compared to their competitors in neighboring countries (especially Iran). For this reason, Iranian companies take the lion's share of the market in the transportation between Iran and Turkey. Offering low-interest loans to Turkish logistics companies that compete with foreign companies will help reduce the competitive disadvantage by reducing financing costs.	Micro Investment (<100 Million TL)	0-1 Years (Short Term)
	Action 2.2 Tax Exemptions	It is aimed that logistics companies that conduct operations abroad gain a competitive advantage against their foreign competitors by introducing exemptions from certain taxes. Logistics firms in the TRA2 region have a significant cost disadvantage compared to their competitors in neighboring countries (especially Iran). For this reason, Iranian companies take the lion's share of the market in the transportation between Iran and Turkey. Introducing some tax exemptions to Turkish logistics companies competing with foreign companies will help reduce the competitive disadvantage by creating a new source of financing.	Micro Investment (<100 Million TL)	0-1 Years (Short Term)

Strategy	Action	Explanation	Estimated Budget	Term
Strategy 3: Increasing Efficiency in Customs Services (Border Gates)	**Action 3.1** Customs Starting to Work on a 24-Hour Basis	It is aimed to reduce the delays in cross-border transports, with all customs operating on a 24-hour basis. Today, although some customs work on a 24-hour basis, the remaining customs offices serve at certain hours. This causes delays and interruptions in supply chains, and these are reflected in logistics companies as time loss and extra costs. With all customs operating on a 24-hour basis, logistics shipments will be made faster, predictable and cost-effective.	Micro Investment (<100 Million TL)	0-1 Years (Short Term)
	Action 3.2 Rehabilitation of Border Gates	It is aimed to rehabilitate Gürbulak and Türkgözü Customs Gates. It is aimed to accelerate the customs procedures by rehabilitating the Gürbulak (Ağrı) and Türkgözü (Ardahan) Customs Gates in the region.	Meso Investment (>100 Million & <1 Billion TL)	3-10 Years (Long Term)
	Action 3.3 Switching to Single Window System	Logistics companies will save time and money by switching to a single window system in customs procedures. Electronic hardware and software infrastructure studies required for the efficient operation of the single window system will be completed. In addition, the necessary legislative changes for paper-free customs procedures will also be implemented.	Micro Investment (<100 Million TL)	0-1 Years (Short Term)
	Action 3.4 Completing Infrastructure Needs Emerging After COVID-19	The aim of this action is to minimize the interruptions in logistics flows by completing the health testing and disinfection investments needed after COVID-19. By establishing a Disinfection Tunnel and PCR Test Center at all border gates, the queues will be avoided.	Micro Investment (<100 Million TL)	0-1 Years (Short Term)
Strategy 4: Human Resources Development	**Action 4.1** Developing Sectoral Education Programs and Establishing Technical Schools in Industrial Zones	It is aimed to provide the qualified workforce that the sector needs. A secondary benefit of this sub-strategy is to contribute to employment in the region. In order to achieve this, it is recommended to provide trainings on the following subjects for the areas needed by the enterprises and to certify the participants of the training. • Logistics Training • Transportation Trainings • Customs and Foreign Trade Trainings • Computer and Information Technology Trainings • Foreign Language Education	Mikro Investment (<100 Milyon TL)	0-1 Years (Short Term)

Strategy	Action	Explanation	Estimated Budget	Term
Strategy 5: Improving Cooperation with Surrounding Countries in the Field of Logistics	**Action 5.1** Solving the Passage Document Problem	BThere are always some obstacles to the provision of passage documents required for road transporters to pass through other countries. The purpose of this action is to develop bilateral and regional cooperation with countries and take the necessary steps towards the solution of this problem. This situation causes delays in deliveries and if there is a shift to alternative routes, it causes longer and more costly transportation and causes the competitive advantages of the transported Turkish products in foreign markets to be lost. With the solution of the passage document problem, Turkish logistics companies will be able to organize more predictable, planned and low-cost operations and transport Turkish goods to foreign markets more economically.	Micro Investment (<100 Million TL)	0-1 Years (Short Term)
	Action 5.2 Opening of Border Gates Closed After the COVID-19 Pandemic	The aim of this action is to ensure the reopening of borders by establishing dialogue with countries (such as Turkmenistan) that closed border gates in Central Asia after the Covid-19 pandemic. With the Covid-19 pandemic, some countries have closed their border gates completely. Therefore, Turkish logistics companies were forced to use alternative routes and suffered losses in terms of time and cost. With the reopening of the border gates, Turkish logistics companies will be able to carry Turkish goods to foreign markets in a more economical way by organizing more predictable, planned and low-cost operations.	Micro Investment (<100 Million TL)	0-1 Years (Short Term)
	Action 5.3 Developing an Action Plan for the Caspian Corridor	An action plan for the Caspian corridor will be prepared under the leadership of Turkey, making the Middle Corridor attractive.	Meso Investment (>100 Million & <1 Billion TL)	1-3 Years (Medium Term)

10. Conclusion and Evaluation

This study was prepared within the scope of the "Covid-19 Resilience and Response Project" funded by the Government of Japan and conducted by the United Nations Development Program (UNDP) in cooperation with the Ministry of Industry and Technology of the Republic of Turkey and Development Agencies. Within the scope of the project, 5 fragile sectors, namely food, logistics, machinery, automotive and textile, were determined and it was aimed to address the effects of the pandemic on these sectors. 4 different reports were prepared for 4 different regions specific to the logistics sector and this report has been prepared for the TRA2 Region.

This study has been finalized using data obtained from many different sources. First, open sources were scanned and statistics that can be used in analysis were compiled and trends in the world, Turkey and the region were analyzed. Qualitative information from the field was compiled through the focus group meeting and included in the analysis. Finally, the answers given to the survey conducted throughout Turkey, including the TRA2 Region, constituted a very valuable input in order to take a picture of the current situation of the sector, especially the problems caused by the COVID-19 pandemic, and to formulate future strategies. The Working Group formed within the scope of the project took part in the coordination of the focus group meetings and in delivering the survey to the local logistics companies, and made an important contribution to finalizing the survey and the report.

Studies conducted within the scope of the project show that the TRA2 region is one of the most affected regions in the logistics sector. It is possible to summarize the main causes of this severe impact as follows: road-weighted transport structure in the region (which is the most affected type of transport), neighboring and nearby countries', which are the target markets of logistics companies in the region, closing the border gates due to the pandemic and taking very intensive measures and the financial fragility of logistics companies in the region due to their small scales.

Although the logistics sector in the region has suffered greatly with the pandemic, some developments indicated that the sector has a potential. The end of the crisis in Karabakh, the fact that a new transport corridor that will pass through southern Armenia will connect Turkey and Azerbaijan, the possibility of opening the Armenian border if political normalization progresses further, and the fact that the Baku-Tbilisi-Kars rail project will be fully operational very soon increases the likelihood that the region will become an important logistical center in the future. A number of strategies, actions and projects proposed at the end of this report aim to capture this potential to a large extent.

According to the results of the survey, the COVID-19 pandemic had significant effects on the logistics sector in the region:

- The costs of the logistics companies in the region have increased with the pandemic, as is the case across Turkey.
- When the problems experienced after the pandemic are ranked, the top three problems are: contraction in demand (the biggest problem in Turkey), problems in funding (the fourth biggest problem in Turkey) and the collection problem (the second biggest problem in Turkey).
- When the problems experienced in the supply chain after the pandemic are ranked; the top three issues are: changing routes due to countries closing their borders (the second biggest problem in Turkey), interruption of Port Services (the biggest problem in Turkey) and change of transport type due to countries closing their borders (the seventh biggest problem in Turkey).
- Looking at the strategies to be implemented after the COVID-19 pandemic, the first three strategies are: increasing digital transformation, automation and similar technological investments (the first strategy across Turkey), entering new markets (the second strategy across Turkey) and developing partnerships and establishing new partnerships (third strategy in Turkey).
- Looking at the possible change in the transport modes used after the covid-19 pandemic, it seems that logistics companies in the TRA2 region will continue to transport mainly by road.

As a result of the analysis of the data collected by various methods, especially the survey study and the focus group meeting, it is recommended to implement the following actions.

• **Rail lines should be built in Ağrı and Iğdır provinces and the region should be connected to the national rail network** in order to reduce the logistics costs in the region, shorten the travel times and distances and create an alternative rail corridor between Turkey andAzerbaijan through Nakhichevan in the future.

• **Logistics centers should be built in Ağrı and Iğdır provinces** in order to reduce logistics costs and facilitate intermodal operations.

• **Branch line investments should be made in logistic centers** in order to increase the share of railways in freight transportation, to reduce logistics costs and to increase the quality of logistics service.

• **Branch line investments should be made in OIZ and production facilities** in order to increase the share of railways in freight transportation, to reduce logistics costs and to increase the quality of logistics service.

• **The connection of the region to the Black Sea ports by rail should be provided** in order to ensure that the transported cargo is delivered to international markets in a much more economical way and to improve international logistics activities in the region.

• T**he bottlenecks on the main rail line of the region should be eliminated** in order to reduce waiting times and delays in freight transport.

• **Trabzon-Aşkale State Road should be completed** in order to strengthen the road connection of the region with the Black Sea ports.

• **Low-interest loan programs should be developed** in order for logistics companies that conduct operations abroad to gain competitive advantage against their foreign competitors and to increase exports.

• **Tax exemptions should be introduced** in order for logistics companies that conduct operations abroad to gain competitive advantage against their foreign competitors and to increase exports.

• **Incentive programs should be developed** in order for logistics companies that conduct operations abroad to gain competitive advantage against their foreign competitors and to increase exports considering that logistics companies cannot benefit from some export incentives.

• **Customs should start working on a 24-hour basis** in order to reduce delays and costs in cross-border transport.

• **Gürbulak and Türkgözü Customs Gates should be rehabilitated** in order to speed up customs procedures.

• **A single window system should be adopted** in order to save time and resources for logistics companies by standardizing the documents required for customs procedures and digitizing the processes.

• **The infrastructure needs that arise after COVID-19 should be completed** in order not to slow down customs procedures after the pandemic and to prevent delays.

• **Sectoral training programs should be developed and technical schools should be established** in industrial zones in order to provide the qualified workforce that the sector needs.

• **Passage document problem should be solved** in order to mitigate problems such as delays in deliveries, switching to alternative routes, longer times and more costly transports and the decreasing competitive advantage of Turkish products in foreign markets as a result of the obstacles experienced by road carriers.

• **The border gates closed after the covid-19 pandemic should be reopened** in order to solve these problems experienced by Turkish logistics companies, which are turning to alternative routes due to the closed border gates in Central Asia and therefore losing time and money.

• **An action plan should be developed for the Caspian Corridor** in order to increase the attractiveness of the Middle Corridor and to eliminate the bottlenecks on the Caspian corridor.

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Annexes

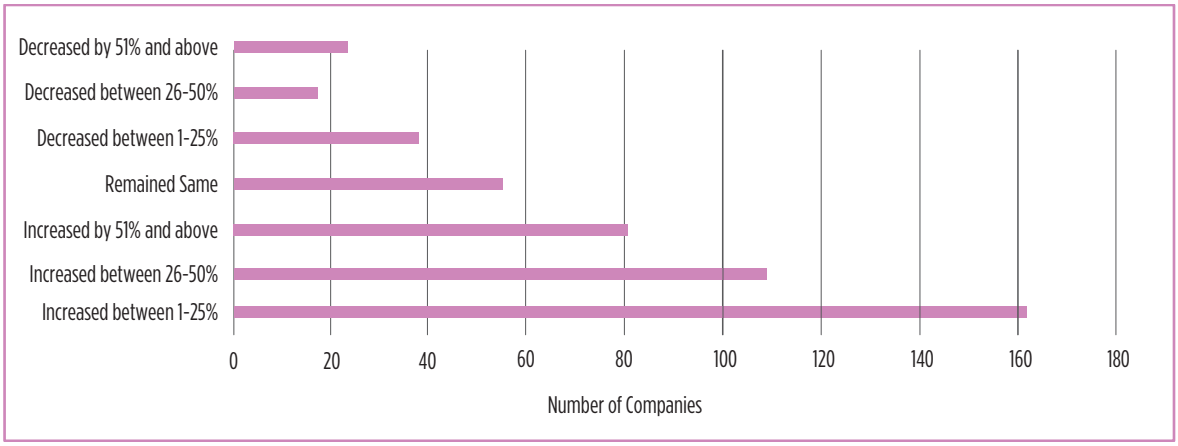
Annex-1: Focus Group Meeting Participant List

Name - Surname	Organization	Title
Adem Beyribey	Kars Provincial Directorate of Trade	Provincial director
Ahmet Yearsmaz	Türkgözü Customs Directorate	Manager
Aslı Aygün	United Nations Development Program (UNDP) Turkey	Expert
Aşkın Kızılkaya	Ardahan Chamber of Commerce and Industry	Secretary General
Azizcan Sarısu	Akar Logistics	
Barış Ayhan	Serhat Development Agency	Coordinator
Cihat Gök	UNDP Turkey	Fragile Sector Analysis Sector Analyst
Erkan Ocak	Erde Construction	Operator
Evren Bingöl	UND	Chief Executive Officer
Fatih Arslan	Presidency Strategy and Budget Office	Expert
Ferdi Baycan Ögel	Iğdır Chamber of Commerce and Industry	Secretary General
Ferdi Gürel	Ağrı Provincial Directorate of Industry and Technology	Provincial director
Gizem Aydın	UTIKAD	Sectoral Relations Specialist
Gizem Coşkun	Serhat Development Agency	Coordinator
Gökçen Turan	Iğdır Chamber of Commerce and Industry	Secretary General
Gökhan Özince	Serhat Development Agency	Coordinator
Hakan Aras	Iğdır Organized Industrial Zone Directorate	Manager
Dr. İsmail Çağrı Özcan	UNDP Turkey	Fragile Sector Analysis Logistics Sector Expert
Mehmet Eraslan	Truck Park Operation	Operator
Dr Mehmet Emin Özsan	Ministry of Industry and Technology	Expert
Mehmet Şakir Pelit	Ağrı Provincial Directorate of Trade	Deputy Provincial Director
Mehmet Şensoy	Gürbulak Customs Directorate	Manager
Murat Gümüşlüol	Logitrans Intermodal Taşımacılık A.Ş.	Business Development Manager
Mustafa İrfan Kaya	Iğdır Internal Customs Directorate	Assistant manager
Nejla Albayrak	UND	UND Ankara Coordinator
Nurullah Karaca	Serhat Development Agency	Coordinator
Nusret Kasapoğlu	Dilucu Customs Operations Directorate	Manager
Sinan Miraç Demirel	Aktaş Customs Directorate	Manager
Tamer Öztin	UNDP Turkey	Fragile Sector Analysis Team Leader
Tülay Atak	Ardahan Provincial Directorate of Commerce	Provincial director
Veysel Sarıcı	Presidency Strategy and Budget Directorate	Expert

Annex-2: Logistics Survey Results of Companies Operating in Manufacturing Sectors

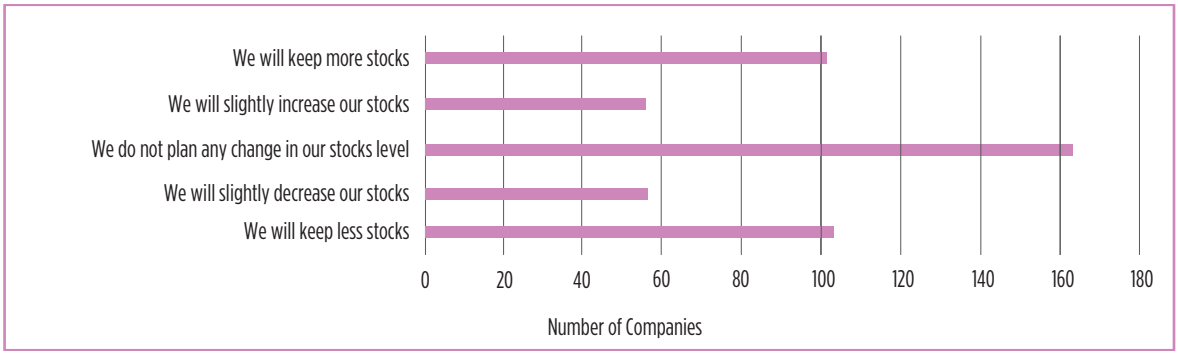
In addition to the survey applied to logistics companies within the scope of the project, a survey study has been applied to companies operating in food, machinery and automotive sectors and benefiting from the services of logistics companies, and the answers are summarized below.

Firstly, the distribution of the answers given to the question "How has the logistics costs of your company changed as a result of the COVID-19 pandemic" is shown in Annex Figure 1. Similar to the results shown in Figure 30, it is seen that there is a significant increase in the logistics costs of companies.



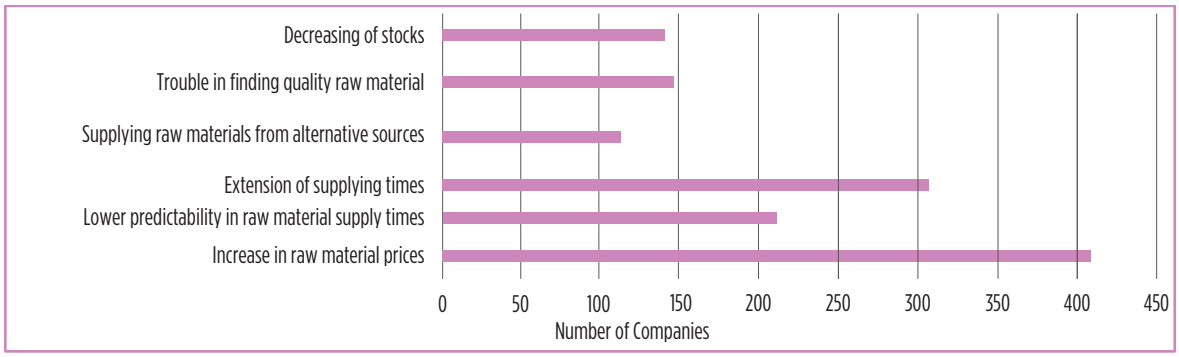
Additional Figure 1: *Change in Logistics Costs of Companies Receiving Logistics Service After Pandemic*

Secondly, it is examined whether companies will change their stock policies in the medium term (3-5 years) as a result of the COVID-19 pandemic. As can be seen in Additional Figure 2, it is predicted that there will not be a meaningful change in the stock policies of companies.



Additional Figure 2: *Change in Stock Policies of Companies Receiving Logistics Service After Pandemic*

In the next stage, companies were asked about the negativities experienced in the supplying processes after the COVID-19 pandemic. The two most important problems are the increase in raw material prices and the extension of raw material supplying times.



Additional Figure 3: *Problems Encountered by Companies Receiving Logistics Services in their Supply Processes After the Pandemic*

Companies were asked to list the problems they experienced during the COVID-19 pandemic. While ranking, companies have brought the biggest problem to the first place and the smallest problem to the last. Accordingly, while declines in sales and production emerged as the two most important problem areas, problems related to logistics were considered as the fifth biggest problem.

Additional Table 2: *Ranking of Problems Experienced by Companies Receiving Logistics Service During Pandemic*

	Problem	1	2	3	4	5	Average Score	Rank
Turkey	Decline in Sales	187	241	48	44	29	2,07	1
	Decline in Production	243	110	97	66	45	2,22	2
	Decline in Profitability	42	106	283	78	43	2,95	3
	Increase in Stock Costs	43	45	65	58	66	3,21	4
	Problems With Logistics	19	27	43	271	117	3,92	5
	Problems in Labour Supply	40	45	38	57	274	4,06	6

When asked to list the problems in the supply chain due to the COVID-19 pandemic, interruptions in port services and health inspections at the borders came to the fore (Additional Table 3).

Additional Table 3: *Ranking of the Problems Experienced by the Companies Receiving Logistics Services in the Supply Chain During the Pandemic*

	Problems with the Supply Chain	1	2	3	4	5	Average Score	Rank
Türkiye	Interruption in Port Services	266	86	60	53	43	2,06	1
	Health Inspections at the Borders	33	277	108	65	41	2,63	2
	Interruption of Air Cargo Operations	20	21	29	19	16	2,91	3
	Increasing Logistics Costs	152	54	44	252	36	2,94	4
	Road Traffic Restrictions	55	69	276	94	47	3,02	5
	Changing Routes due to Countries' Closing Their Borders	11	38	29	28	52	3,46	6
	Changes in the Type of Transport (such as road, rail) Due to Countries' Closing Their Borders	37	29	28	63	339	4,29	7

Finally, they were asked to list the logistics services with the most problems during the COVID-19 pandemic. In this ranking, customs and packaging services were the most problematic logistics service areas.

EAdditional Table 4: Ranking of Logistics Services Companies Have Most Problems During Pandemic

	Problem	1	2	3	4	5	Average Score	Rank
Turkey	Customs Services	344	103	51	41	17	1,71	1
	Packaging Services	36	305	87	66	50	2,61	2
	Transport Services	142	69	37	295	24	2,98	3
	Insurance Services	11	14	304	98	88	3,46	4
	Warehouse Services	4	17	24	38	49	3,84	5
	Distribution Services	37	66	71	36	346	4,06	6

COVID-19 Crisis Response and Resilience Project

LOGISTICS SECTOR ANALYSIS REPORT AND GUIDELINES

TRA2 REGION