REPUBLIC OF TÜRKİYE
MINISTRY OF INDUSTRY
AND TECHNOLOGY

İZMİR
DEVELOPMENT
AGENCY

BIG DATA ANALYSIS ON CONTAINER MOVEMENTS AND ROUTE SEARCH RECORDS IN MARITIME TRANSPORT

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ShipsGo

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ABBREVIATIONS

ABPRS	Address-Based Population Registration System
CART	Classification and Regression Tree
CORINE	Coordination of Information on the Environment
EC	European Commission
et al.	et alia (and others)
EU	European Union
EUROSTAT	Statistical Office of the European Commission
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GIS	Geographic Information System
IMF	International Monetary Fund
MoEU	Ministry of Environment and Urbanization
MoIT	Ministry of Industry and Technology
NAD	National Address Database
OECD	Organisation for Economic Co-Operation and Development
OIZ	Organized Industrial Zone
SARS	Spatial Address Registration System
SDG	Sustainable Development Goals
SEDI	Social Economic Development Index
SPO	State Planning Organization
TÜBİTAK	The Scientific and Technological Research Council of Türkiye
TUIK	Turkish Statistical Institute
TURKSTAT	Turkish Statistical Institute (Formerly State Statistical Institute)
UN	United Nations
UN Habitat	United Nations Human Settlement Programme
UNSC	United Nations Statistical Commission
UNSD	United Nations Statistics Division


SOCAR TERMINAL
MAERSK


MAERSK
HAMBURG SÜD
MAERSK SEALAND
ADMIRAL
APL
CMA CGM
CCNI

FOREWORD

ShipsGo platform is a cloud-based application that provides global container transport tracking and route search services. This application enables instant port-to-port tracking of the containers of shippers or the logistics intermediaries carrying out the operation on their behalf with the data received from shipowners and satellites. In the application, container movement is tracked and anonymous information such as loading port, transfer port, transit time, waiting time at the transfer port, timely arrival and delay are recorded in the database. In the last three years, more than 800,000 route searches from over 160 countries have been searched on the platform, which anonymously records the most-searched routes by city and country.

CNTR Informatics Inc., which operates as an R&D company with an academic partnership in the Dokuz Eylül Technology Development Zone, generates "blue data" with this database as a "blue startup." Initiated by the İzmir Development Agency, the "Big Data Analysis on Container Tracking and Route Search Records in Maritime Transport" project facilitates the processing of said data as big data for the first time and is used for regional analysis.

First, all the big data collected in the database in the last three years to meet the goals specified as part of the project was collected and unified. The study then continued with the analysis and reporting of said big data according to the relevant questions, and the results were discussed and interpreted with the project teams. In the study, 202,038 transports, 443,996 containers and 286,281 route searches, which were observed in the last three years, were collected, sorted, classified and compiled in a file to determine more convenient analysis processes.

The report, which focuses on the Port of İzmir and the Ports of Aliağa, is mainly based on the 2019/2020 period and export shipments, which are richer in data. Based on the available data, the goal of the report was to provide new and unique data to the decision-makers in the maritime ecosystem, such as the market shares of shipowners, digital performance of ports by routes, the shipowner-specific transit times of ports by routes, transit time reliability, timely arrival performance and the number of direct routes. Although interpretations vary based on certain sub-variables, the said big data offers statistically significant interpretations. Data limitations were mentioned in the relevant parts of the study.

We hope that the report, which contains analyses that aim to determine the basic situations and trends in a wide area with big data, reveals findings that will be useful to maritime industry stakeholders.

Secretary General of
İzmir Development Agency

EXECUTIVE SUMMARY

Container tracking and route searching services between two ports, offered by ShipsGo platform mostly to foreign trade businesses and logistics service providers, are used in more than 160 countries. Information about ports and carrier enterprises (transit time, the waiting time at transit ports, the number of transfers, the waiting time at ports, the most-searched ports, routes) arising from the consumption of these services by users are recorded in the database anonymously.

In the last three years, 202,038 transports, 443,996 containers and 286,281 route searches have been collected on the ShipsGo platform, and unique outputs have been revealed through the analysis carried out as part of this study. Consisting of big data, the ShipsGo database is statistically considered to be highly representative of the population data. In data reliability analyses, the margin of error as of 2020 was calculated as ±1 percent for export shipments, and ±4 percent for import shipments. The entire sample group has a 99-percent confidence interval, enabling interpretation regarding container transports.

Analyses carried out to compare the current state and projections of the Port of İzmir and the Ports of Aliağa with the competitors as part of the blue growth approach and development of the maritime economy, which were prioritized by the İzmir Development Agency for the region's development, have revealed outputs regarding indicators of maritime transport and ports, such as shipowners' market shares, the number of ports with direct connections, the characteristics of docking ships, regions/countries of the shipments, digital performance, transit time deviation, the timely arrival rate and transfer times.

Shipowners' market shares were calculated by analyzing the weighted container tracking data on the ShipsGo platform. MSC, Hapag-Lloyd and CMA CGM shipowners carried out 45.4 percent of the export shipments at the Ports of Aliağa in 2020, while MSC, COSCO and Evergreen shipowners carried out 76.8 percent of the export shipments at the Port of İzmir. In import shipments, Maersk is well ahead with 55.9 percent at the Ports of Aliağa, followed by Hapag-Lloyd and ZIM. In imports to the Port of İzmir, COSCO is well ahead with 46.5 percent, followed by MSC and the Turkon Line.

The number of direct port connections is considered a major criterion when determining the competitive advantage of a container port. Based on data from the ShipsGo database, this value was measured as 125 for the Ports of Aliağa in 2020. When compared with the ports of Türkiye and the Mediterranean, the Ports of Aliağa emerge as the second-most active port in Türkiye, right after the Mersin International Port. Likewise, the Ports of Aliağa outperform ports such as Piraeus and Gioia Tauro in terms of the number of direct port connections. The Port of İzmir has direct connections with 95 ports, which reduces its competitive advantage.

The characteristics of the docking ships are also major indicators of port performance. The characteristics of the ships docking at the Port of İzmir and the Ports of Aliağa were obtained with the analysis of all the ships tracked on the ShipsGo platform. It was determined that Capesize ships can dock at the Port of İzmir and the Ports of Aliağa. However, analysis of average DWT shows that most of the ships docking at the Ports of Aliağa are Handymax ships, while most of those docking at the Port of İzmir are Supramax ships. Although there are no significant differences between the capacities of the ships docking at the two ports, the Port of İzmir seems to boast higher values than the Port of Aliağa in terms of both average and maximum ship sizes.

Regions and countries of the shipments show how actively the ports are used for export, and to what extent they are preferred. Regions and countries in shipments from the Port of İzmir and the Ports of Aliağa were calculated by analyzing the weighted container tracking data on the ShipsGo platform. Based on the aforementioned measurements, while the volume of export shipments from the Ports of Aliağa to Northern European countries was rather high in 2020, the countries with the highest volume of shipments were the United States, Germany and China. While the volume of export shipments from the Port of İzmir to Mediterranean countries was rather high, the countries with the highest volume of shipments were Israel, China and the United Kingdom. It can be said that the Port of İzmir and the Ports of Aliağa are significantly similar to the Mersin International Port in terms of their shipment regions.

Digital performance is an indicator of how strongly ports are involved in the digital environment. The digital performances of the Port of İzmir and the Ports of Aliağa were measured based on the route searches between the two ports made by the users on the ShipsGo platform. These measurements emerge as innovative and unique values that demonstrate the demand for both the route and the relevant port. In 2020, routes from the Ports of Aliağa were searched 42,763 times, and the most searched route was Aliağa-Jebel Ali (735). Out of all route searches, 91.2 percent were made in Türkiye, and mostly in İzmir and Istanbul. In 2020, routes from the Port of İzmir were searched 22,785 times, and the most-searched route was Aliağa–Kuwait City (416). Out of all route searches, 89 percent were made in Türkiye, and mostly in İzmir and Istanbul.

Transit time reliability and timely arrival reliability values are mostly indicators of shipowner performance. Performances of the ports are also effective on these reliability values. Based on the container tracking observations made on the ShipsGo platform database, “transit time reliability” and “timely arrival reliability” values were also analyzed on the routes connected to the Port of İzmir and the Ports of Aliağa. It is observed that the global “timely arrival reliability” values of container transport, which has a significant impact on the development of global supply chains, are lagging behind both 2019 and 2018 in 2020. Measurements in December 2020 show that the global timely arrival reliability of shipowners is approximately 45 percent. It is observed that the quarterly performances of the Port of İzmir and the Ports of Aliağa in 2020 are quite similar, not exceeding 45 percent. The same trend was observed in all competitors. These low levels of reliability may cause problems such as inventory costs and late delivery for users of the Port of İzmir and the Ports of Aliağa, both for supply logistics (inbound) and physical distribution (outbound).

Lucrative transit transport is among the most prominent elements in today’s maritime transport and port competition. In 2020, the transit movements at the Ports of Aliağa corresponded to 5,680 TEUs. The ShipsGo platform database observed some of these movements, determining the average waiting time as 5.3 days. ShipsGo database did not observe any container transfer movements at the Port of İzmir. Ministry data also confirms that there were no transit movements at this port in 2020. Study shows that the Port of İzmir and the Ports of Aliağa do not follow the “transfer port positioning” approach for their operations.

CHAPTER 1.

Methodology

The methodology of the study is presented under two main headings. The purpose and scope of the study in question are set forth in detail under purpose, scope and limitations. Data collection, reliability and sampling plan are based on the scientific and statistical interpretation capabilities offered by the anonymous data from the ShipsGo database.

1.1. Purpose, Scope and Limitations

This report was been prepared to determine the container transport performance of the TCDD Port of İzmir and the Ports of Aliağa and contribute to the "Current Situation and Analysis on the Development of the Ports of İzmir" study. The study was carried out to:

1) Determine the position of the Port of İzmir and the Ports of Aliağa in terms of shipowners' market shares, the number of ports with direct connections, regions/countries of the shipments, digital performance, transit time deviation, timely arrival rate and transit times, and
2) Support the suggestions regarding the positioning required for the Aegean Region for more competitive power and increased share in global and Mediterranean maritime trade.

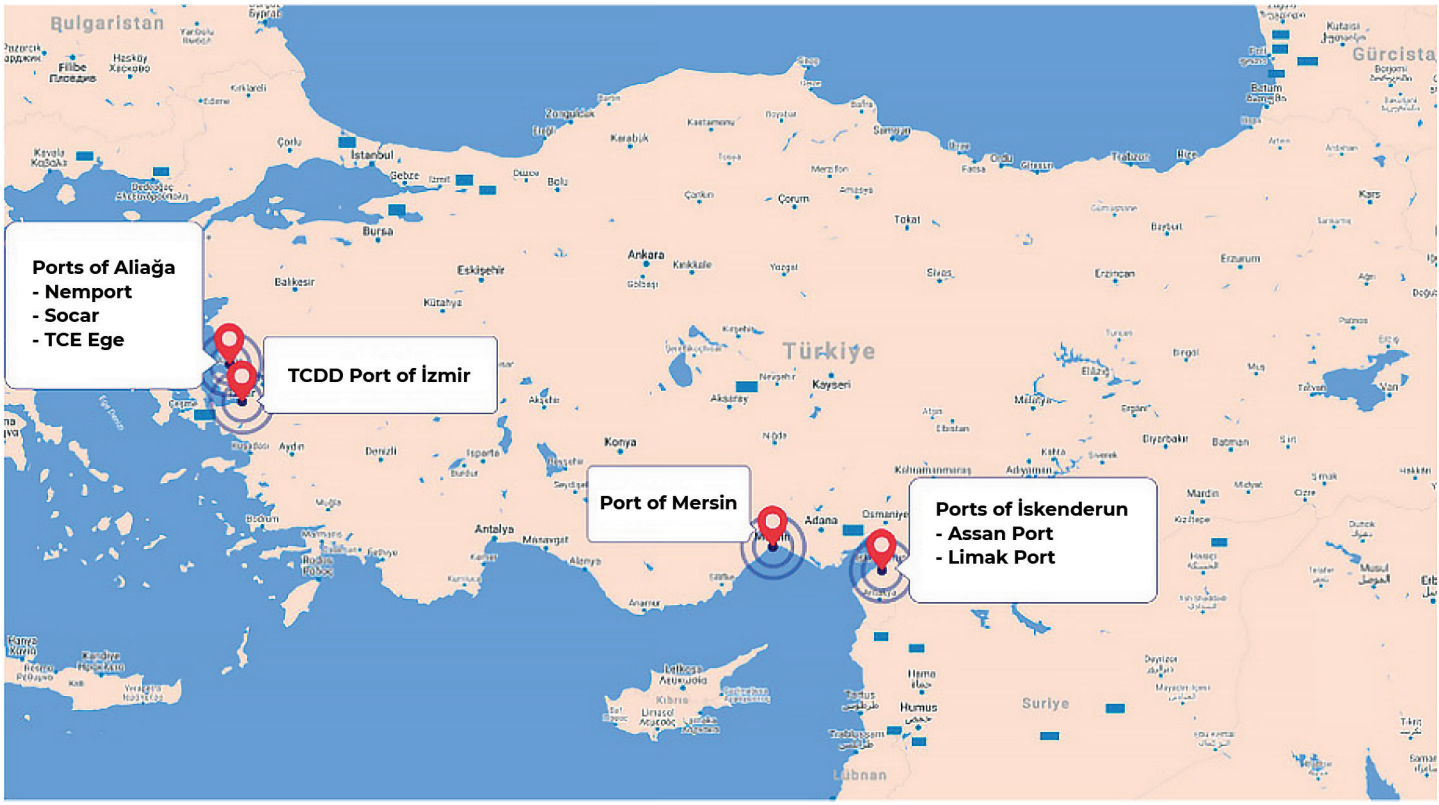
The report was prepared with the anonymous data collected in the last three years by the ShipsGo platform, which provides global container tracking and route search services.

In the study, the Port of İzmir and the Ports of Aliağa were compared with other ports of Türkiye (Mersin and İskenderun) and the Mediterranean (Algeciras, Gioia Tauro, Haifa, Malta, Piraeus and Valencia) to the extent allowed by the data set.

Nemport, SOCAR and TCEEGE container ports operating in Aliağa were evaluated as a whole under the Ports of Aliağa. The ports in question are three special ports that provide container services in Aliağa, forming the basis of container data. Nemport, the first private container port in the Aegean, was commissioned in 2010. SOCAR terminal is operated by Petlim Port Business Trade Inc., which was established by Petkim Petrochemicals Facilities Inc. TCEEGE Container Terminal Facilities is a wholly owned subsidiary of Ege Fertilizer Industry Inc. These three special reports will hereinafter be referred to as "Ports of Aliağa."

While the Port of İzmir and the Ports of Aliağa are the focal points of this report, other comparisons will be made, primarily with the container ports of Mersin and İskenderun. Mersin International Port (MIP) is a private port managed by the PSA group, which provides port administration services around the world. There are two ports under the Port of İskenderun: Assan Port and Limak Port. These ports are shown on the map in Figure 1.

FIGURE 1. Ports Covered by the Study



The fact that the number of observations in the data set was greater in 2019 and 2020 compared to 2018, as well as the fact that the export data was more abundant than import data, caused the analyses to focus more on exports and the 2019–2020 period.

In addition, the low number of transfer movements at the Port of İzmir and the Ports of Aliağa, as in Türkiye's other ports, prevents more comprehensive analysis.

1.2. Data Collection, Reliability and Sampling Plan

ShipsGo is a cloud-based service interface developed as a "container transport" platform. This interface provides its users with two different services: (1) a container tracking service and (2) a route search service (Figure 2). The container tracking service is preferred by professional users for container tracking. Information about ports and carrier enterprises (transit time, waiting time at transit ports, number of transfers, waiting time at ports) arising from the consumption of these services by users are recorded in the ShipsGo database anonymously. Since its inception, ShipsGo has tracked more than 1 million containers in total and recorded them anonymously in its database, while prioritizing privacy as part of big data principles. The route search service, which is also used as an indicator and analyzed in this study, is a free service that is used by more than 160 countries, and mostly by Türkiye. In route searches, information regarding the frequency and user groups of port and route search records is recorded in the database anonymously.

FIGURE 2. ShipsGo Platform Interface

Source:https://shipsgo.com/

According to the data published by the Ministry of Transport and Infrastructure for Port Authorities, container cargo handled at the Ports of Aliağa was 1,250,134 TEUs in 2020.

As of 2020, 7.22 percent of the total transaction volume at the Ports of Aliağa was digitally tracked by the ShipsGo database. This data is particularly prominent in export shipments. For instance, while the export shipments tracked by the ShipsGo database at the Ports of Aliağa in 2020 added up to 86,467 TEUs, the port's import shipments were at 3,906 TEUs. As of 2020, the margin of error, which was ±1 percent in export shipments, was calculated as ±4 percent in import shipments. The entire sample group has a 99-percent confidence interval, enabling the interpretation of TEU for containers tracked by ShipsGo.

Confidence intervals and margins of error of the values in 2019 and 2020 are detailed in the table (Table 1). The sample group in question is within the statistical limits in terms of confidence intervals and margins of error, enabling interpretation on the subject.

According to the data published by the Ministry of Transport and Infrastructure for Port Authorities, container cargo handled at the Port of İzmir was 407,802 TEUs in 2020. As of 2020, 8.18 percent of the total transaction volume at the Port of İzmir was digitally tracked by the ShipsGo database. Observations of export shipments were more abundant than import shipments for the Port of İzmir. Confidence intervals and the margins of error for these observations are statistically significant and facilitate interpretation (Table 1).

In this study, which compares the Port of İzmir and the Ports of Aliağa with other ports of Türkiye and the Mediterranean, the import-export population and sampling plan of the other ports are provided in Annex 1.

TABLE 1. Export and Import Population and Sampling Plan of the Port of İzmir and Ports of Aliağa (2019–2020)

Shipment Type	Data Type	2020			2019			TOTAL
		Aliağa	İzmir	Total	Aliağa	İzmir	Total	
Export	Realized (TEU)	651,719	278,945	930,664	592,472	253,586	846,058	1,776,722
	Sample (TEU)	86,467	28,442	114,909	23,494	13,854	37,348	152,257
	Sampling Rate (%)	13.27	10.20	12.35	3.97	5.46	4.41	8.57
	Confidence Interval (%)	99	99	99	99	99	99	99
	Margin of Error (%)	±1	±1	±1	±1	±2	±1	±1
Import	Realized (TEU)	553,919	287,328	841,247	503,563	261,207	764,770	1,606,017
	Sample (TEU)	3,906	4,941	8,847	1,765	978	2,743	11,590
	Sampling Rate (%)	0.71	1.72	1.05	0.35	0.37	0.36	0.72
	Confidence Interval	99%	99%	99%	99%	95%	99%	99%
	Margin of Error	±3%	±2%	±2%	±4%	±5%	±4%	±2%

As previously mentioned, ShipsGo is the only global-scale platform that provides container transport route searches as well as tracking of container shipments. For instance, users may compare all shipowners operating on this route and their transit time performances by selecting the loading port and the destination port on the interface. Users' ability to search for routes on this interfaced interface is considered a potential factor for transport demand, and an indicator of both port and route popularity in the digital environment. Searched ports and search frequency, countries and regions may offer major findings on port performance. Although route searches from over 160 different countries are made on the ShipsGo platform, searches from Türkiye amount to 64 percent of all searches. Accordingly, carrying out the route search analysis of the Port of İzmir and the Ports of Aliağa solely in regard to ports of Türkiye will yield better results.

In 2020, 519,654 route searches were performed on the ShipsGo platform from over 160 different countries. Routes from the Ports of Aliağa were searched 42,763 times in the same year. This value represents 8.22 percent of the total route searches.

Routes from the Port of İzmir were searched 22,785 times on the ShipsGo platform in 2020. This value represents 5.34 percent of the total route searches. Total searches on the ShipsGo platform and their representation rates in this study are provided in Annex 2.

TABLE 2. ShipsGo Platform Search Frequency for Routes from the Port of İzmir and Ports of Aliağa (2020)

Search Type	Amount	Percentage
Searches of Routes from the Ports of Aliağa	42,763	8.22
Searches of Routes from the TCDD Port of İzmir	22,785	5.34
Total	**519,654**	**100**

CHAPTER 2.

Global Container Transport: General Framework

This chapter will examine certain basic statistics regarding global container transport to shed light on the analysis and interpretation of the data collected anonymously by the ShipsGo platform for the Port of İzmir and the Ports of Aliağa. These statistics will be useful in the evaluations and discussions regarding the locations and future strategies of the Port of İzmir and the Ports of Aliağa.

According to Statista data, it is observed that, as of the end of 2020, container transports are carried out mostly in Europe and Asia with a capacity of 23 million TEUs. The Port of İzmir and the Ports of Aliağa covered by this study also operate in these regions.

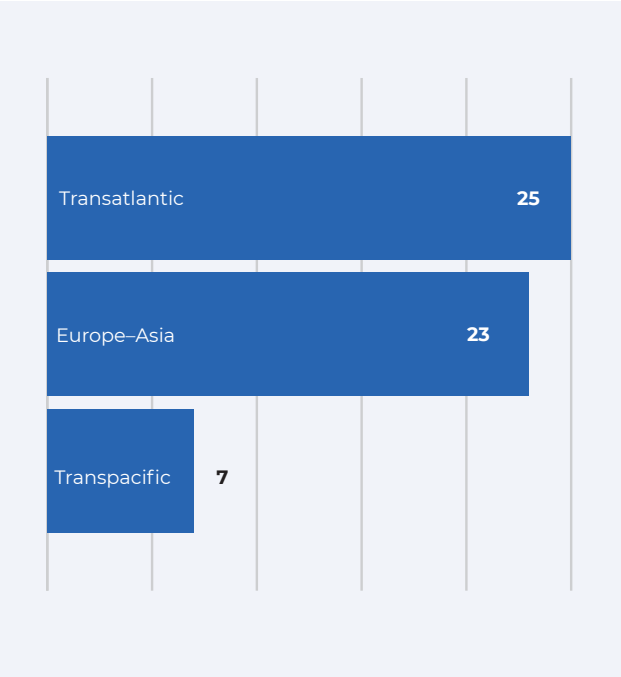
According to UNCTAD data, the total output of global container transport in 2020 was 775 million TEUs (UNCTAD, 2021). This value represents a 3-percent decrease from the previous year. In the last 20 years, global container transports have contributed significantly to the growth of the global economy and the development of supply chains. In this process, significant gains have been achieved with the container port investments made by countries and the development of the shipowners that carry out regular line transport services.

The biggest factor in the decline of container transport in 2020 was the COVID-19 pandemic. Significant losses were observed in supply chains in 2020 due to the pandemic, which dealt a significant blow to the global economy and global container transport. For instance, on February 13, 2020, 153,000 containers were recalled from the Europe–Asia route, while 310 container ships were recalled on March 2, 2020 (Statista, 2020). These instances occurred rather frequently in 2020, which affected the supply chains with container transports.

Container ports and shipowners are the two most critical factors in container transport. Countries are investing in ports to improve trade and increase efficiency in global supply chains. The costly nature of container transport has enabled the survival of shipowners (carriers), who can only create economies of scale in global transport, and the domination of the global market by major shipowners.

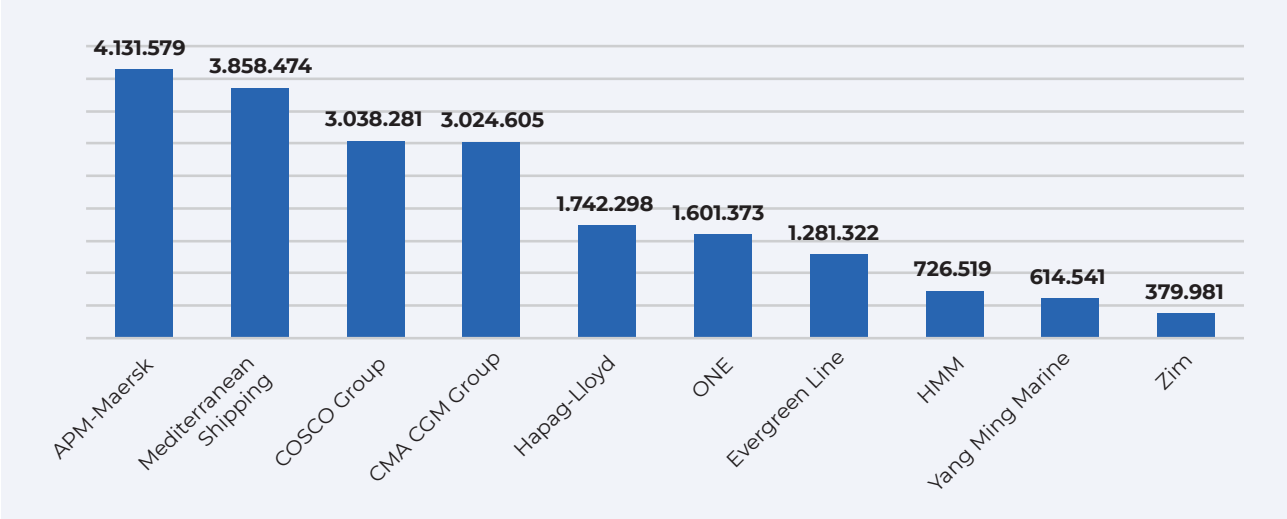
According to Alphaliner data, as of January 2021, there are 10 big players in global container transport (Graph 2). TEU-based capacity rankings include APM-Maersk, MSC, COSCO, CMA CGM and Hapag-Lloyd in the top five. While there may be differences in the market shares of these enterprises in various ports and regions of the world, the picture is expected to remain almost identical in other regions. It is estimated that the capacity of 5,000 container ships carrying out global container transport is approximately 21 million TEUs (Alphaliner, 2021).

GRAPH 1. Main Regions with Intensified Container Transport by Capacity (2020, TEU)



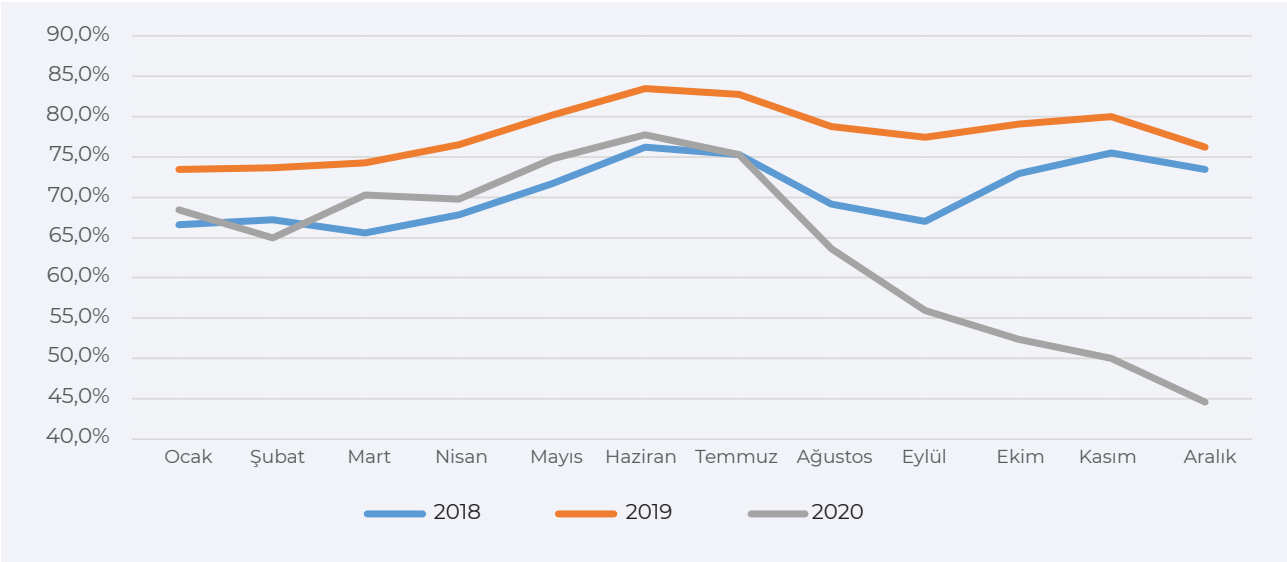
Source: Statista, 2020

GRAPH 2. Capacities of Container Transport Shipowners in 2020 (TEU)



Source:Alphaliner, 2020

GRAPH 3. Timely Arrival Reliability of Shipowners (2018–2020)



Source: Sea Intelligence, 2020

Even though the contributions of container transport to the development of global supply chains are well-documented, the performance of the industry seems to have decreased in recent years, especially in terms of timely arrival rates. Timely arrival rate is a key performance indicator demonstrating the shipowners' compliance with the specified transit time. While the said indicator is primarily related to shipowner performance, it is known that port performances (port congestion, equipment efficiency) also affect these indicators.

Timely arrival rates of shipowners dropped significantly in 2020, especially after July, lagging behind both 2019 and 2018 (Graph 3). As previously demonstrated, the COVID-19 pandemic is thought to be the main factor behind the significant decline in 2020.

CHAPTER 3.

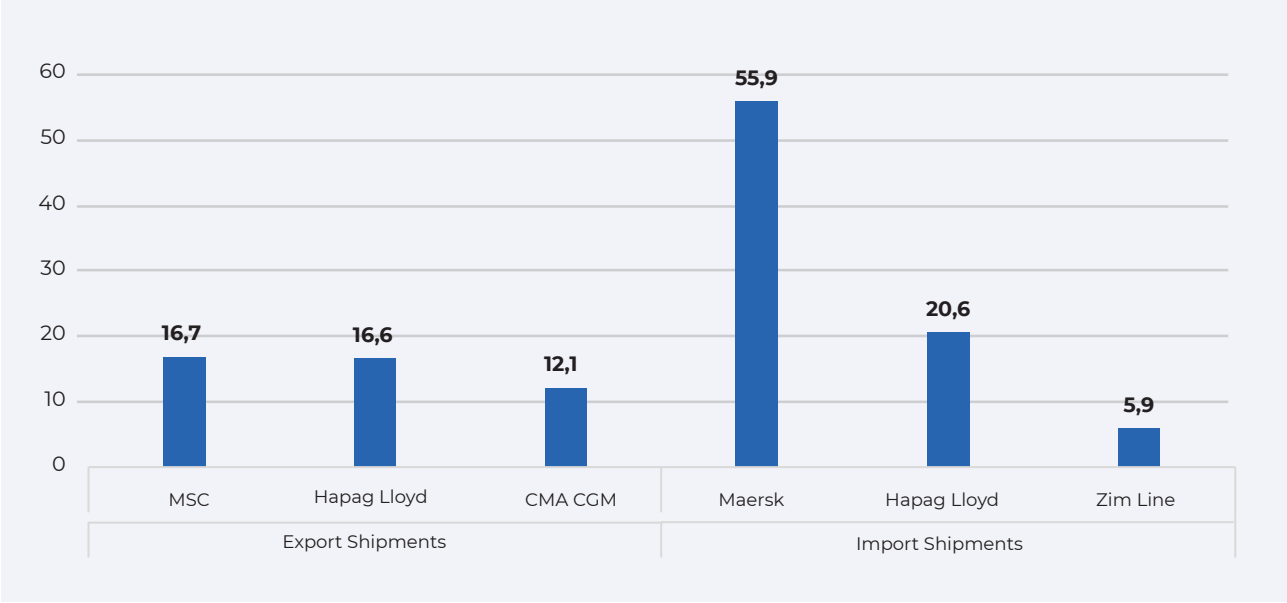
Shipowners Using the Ports and Comparison with Other Ports

This chapter aims to offer a shipowner-specific distribution of the shipments from the Port of İzmir and the Ports of Aliağa, which are tracked by the ShipsGo platform, and to shed light on their market shares. The analysis in question includes determining the shipowners that are active at the ports of the region and comparing them with the competition. The analysis also contributes to the stakeholder analysis for regional policies, and enables the follow-up of the investments of the relevant shipowners and their innovative and environmentalist practices. Identifying the effective shipowners in İzmir will therefore provide multiple benefits.

Export shipments as of 2020 show that the Ports of Aliağa are used extensively by three shipowners: MSC, Hapag-Lloyd and CMA CGM. These three shipowners carried out 45.4 percent of the shipments at the ports of Aliağa (Graph 4).

As for imports, Maersk takes the first place, followed by Hapag-Lloyd and ZIM. Maersk is well ahead with 55.9 percent, followed by Hapag-Lloyd and ZIM. The margin of error in the relevant import data is ±3 percent.

GRAPH 4. Three Shipowners with the Biggest Share in the Export and Import Shipments at the Ports of Aliağa (2020) (%)



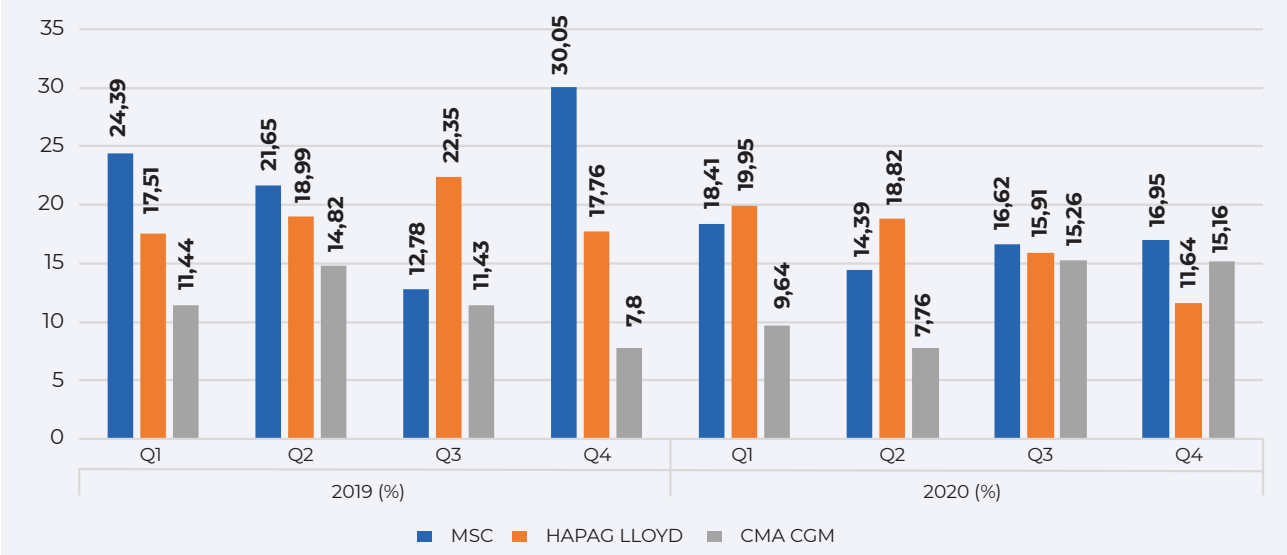
Source: ShipsGo Database

Quarterly analysis was also carried out for a more comprehensive analysis of the shipments carried out in 2019 and 2020 by the top three shipowners using the Ports of Aliağa for their export shipments (Graph 5). Except for the massive increase for MSC in the fourth quarter of 2019, market shares do not show any significant changes.

The 2020 analyses focusing on the Port of İzmir also show that three shipowners, MSC, COSCO and Evergreen, use the Port of İzmir extensively for export shipments. These three shipowners are responsible for 76.8 percent of the shipments in İzmir. COSCO, MSC and Turkon Line stand out in import operations. COSCO is well ahead with 46.5 percent, followed by MSC and Turkon Line (Graph 6).

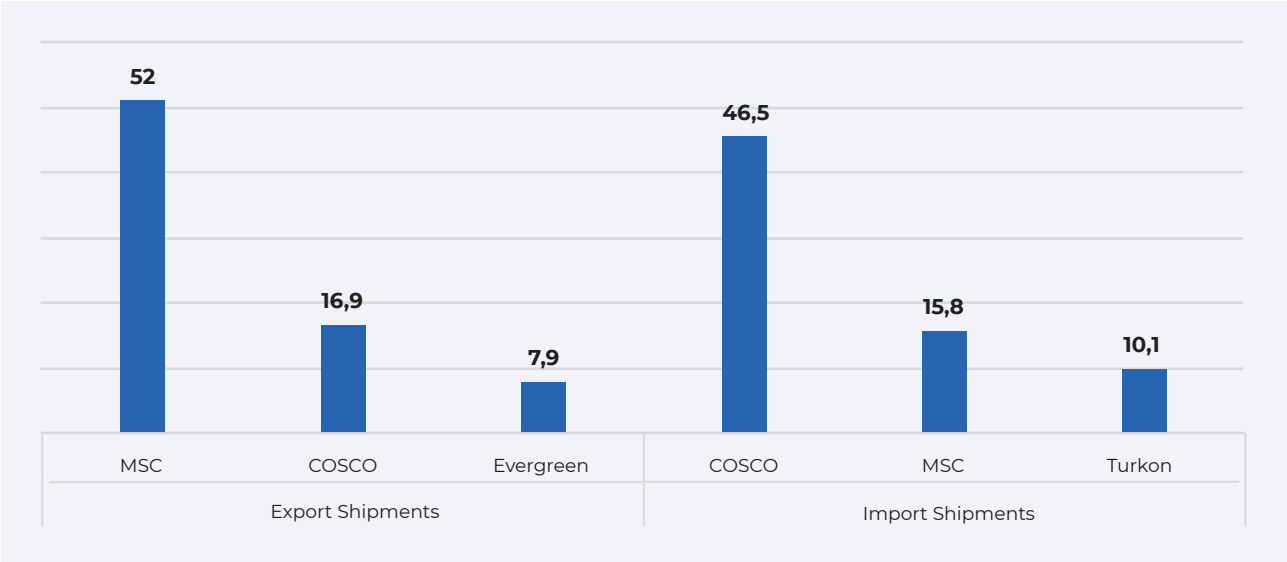
Shipments in 2019 and 2020 carried out by the top-three shipowners using the Port of İzmir for their export shipments were also analyzed. Looking at the market shares of these shipowners based on quarterly export shipments in the last two years, market shares do not show any significant changes 1. except for the massive increase for MSC in the fourth quarter of 2019 (Graph 7).

GRAPH 5. Three Shipowners with the Biggest Share in the Export Shipments at the Ports of Aliağa (2019, 2020, Quarterly Periods) (%)



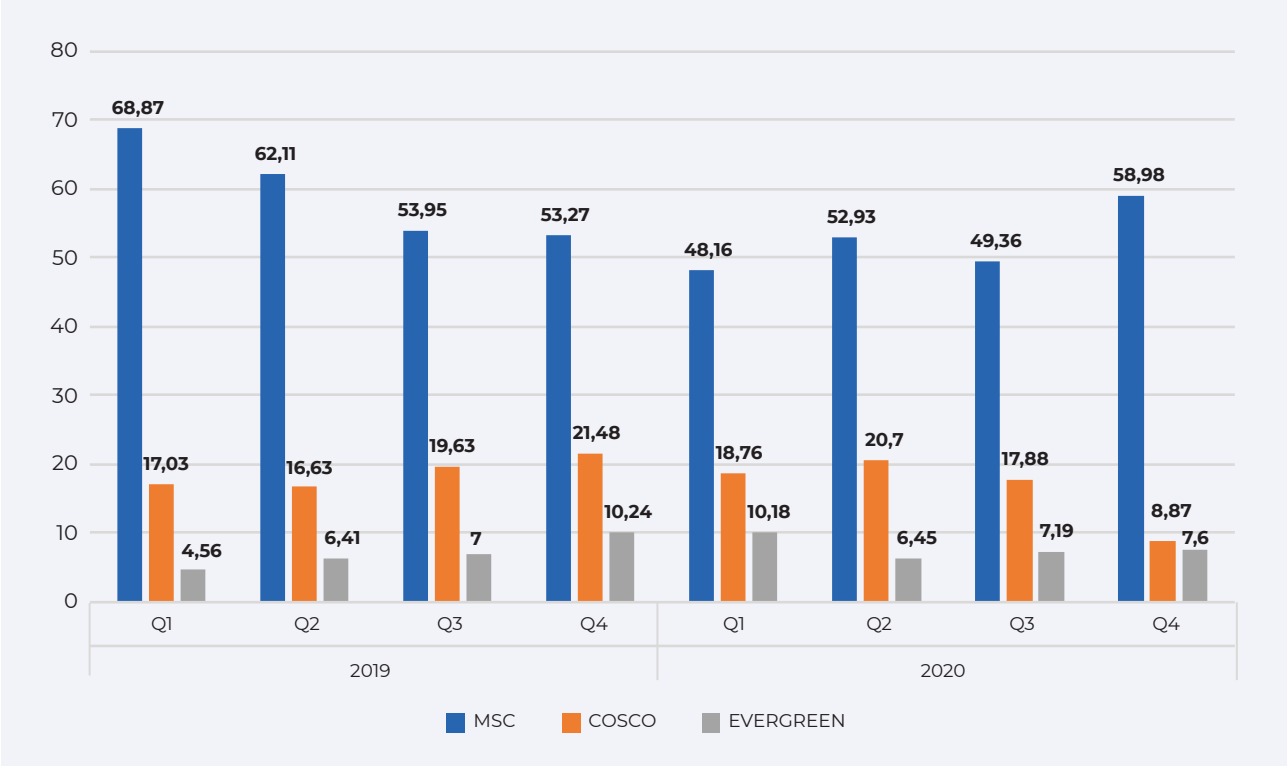
Source: ShipsGo Database

GRAPH 6. Three Shipowners with the Most Intensive Operations in Export and Import Shipments at the Port of İzmir (2020) (%)



Source: ShipsGo Database

GRAPH 7. Quarterly Analysis of the Three Shipowners with the Most Intensive Operations in Export Shipments of the Port of İzmir – 2019–2020 (%)



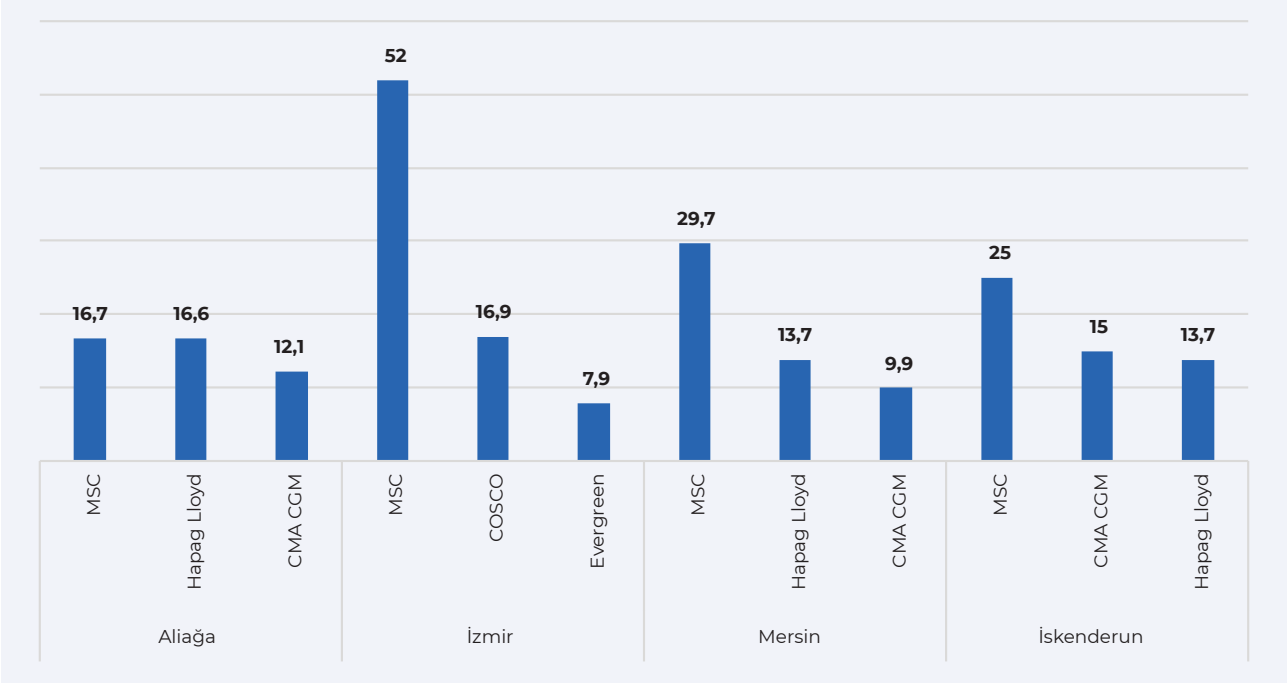
Source: ShipsGo Database

Comparison of the Port of İzmir and the Ports of Aliağa with Türkiye's other ports in export shipments shows that MSC has a significant market share in all ports (Graph 8). MSC, the most frequent user of the Port of İzmir, has a significant share at the Mersin International Port as well. This is mostly due to MSC being a major agency and marketing network both in the Aegean and all around Türkiye. Another significant reason is the abundance of Türkiye's direct lines to export markets.

Import shipment analysis shows that COSCO takes the lead at two ports of Türkiye (Graph 9). It should be noted that MSC's share at the Port of İskenderun is as significant as that of COSCO. Even though the number of observed import shipments is relatively low, the data show that different shipowners are preferred for export and import shipments across all of Türkiye's container ports. This situation is directly associated with the lines where shipowners have strong operations and direct connections. On the other hand, the differences in export and import cargoes and regions also affect the market shares of shipowners.

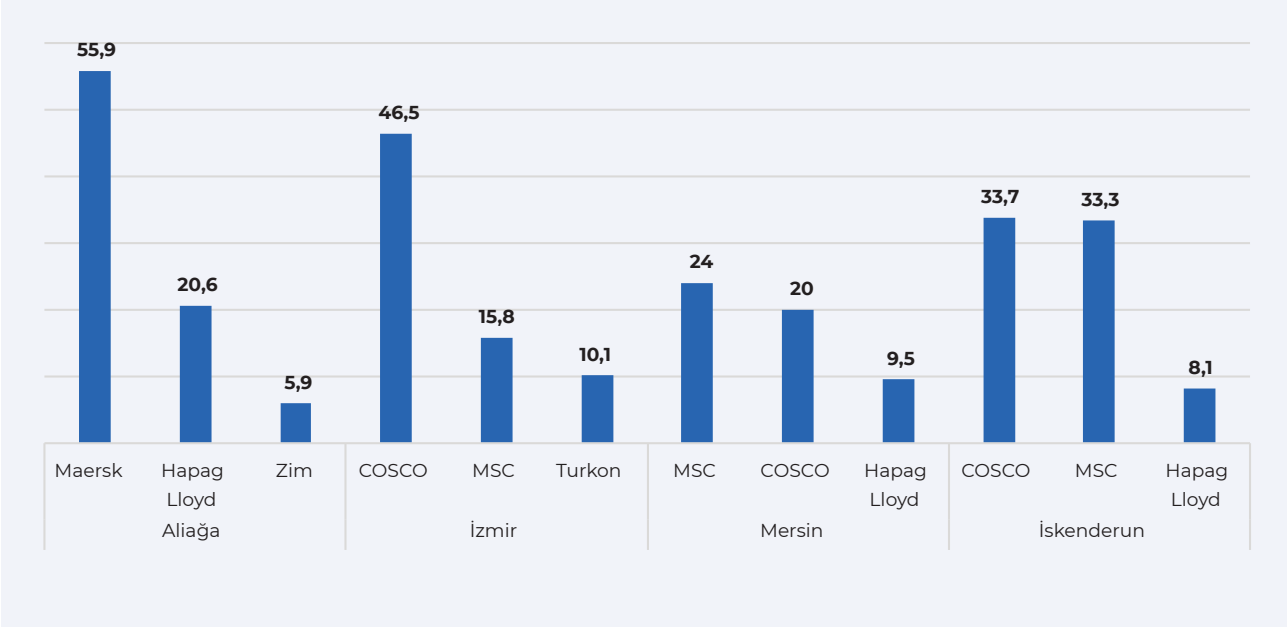
As previously mentioned, the shipowners' market shares at the Port of İzmir and the Ports of Aliağa may offer significant contributions in developing Blue Growth policies. The CO_2 emissions created by the global maritime industry are expected to reach 709 million metric tons by 2025 (Statista, 2020). Even though it is predicted that emission values will decrease by 2070, the process needs to be strictly monitored. Many shipowners declare their GHG and NOx emissions as well as their CO_2 emissions in response to this need. Shipowners share this information transparently in line with the sustainability principles and expectations intertwined with competition. The follow-up of this issue is critical in terms of the region's green and blue policies.

GRAPH 8. Shipowners with the Most Intensive Operations in Export Shipments at Türkiye's Select Ports (2020) (%)



Source: ShipsGo Database

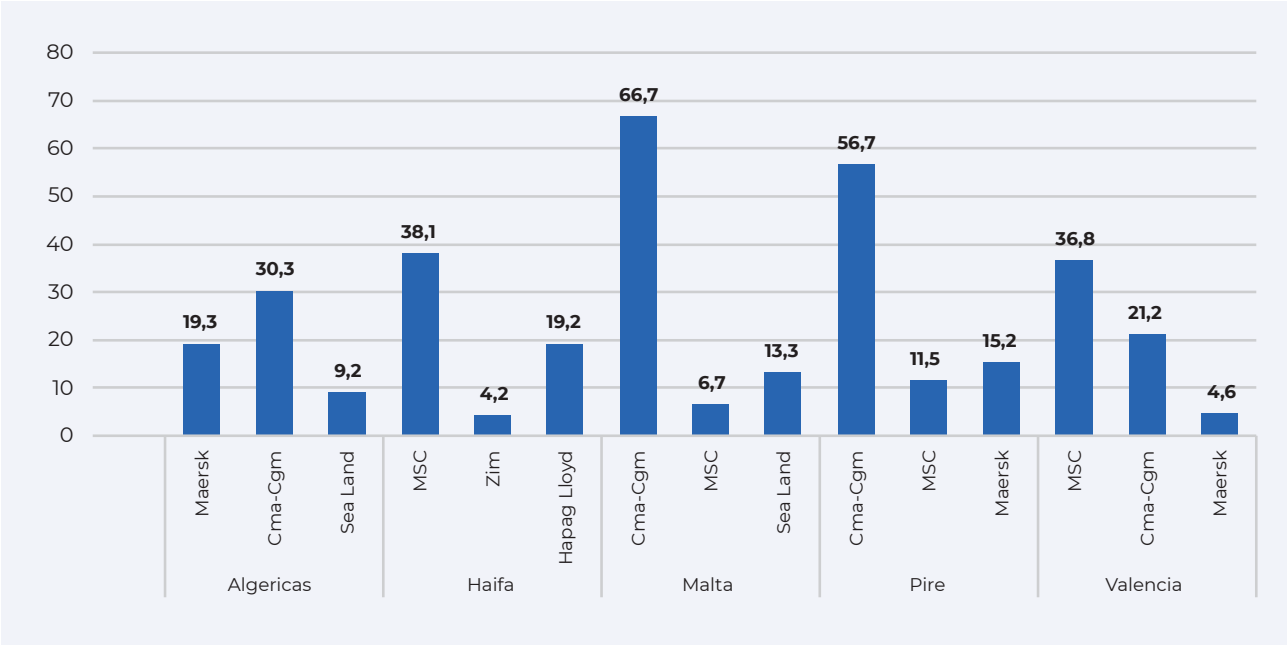
GRAPH 9. Comparison of Select Ports in Türkiye Based on Shipowners with the Most Intensive Operations in Import Shipments – 2020 (%)



Source: ShipsGo Database

The shipments carried out by the shipowners at select ports in the Mediterranean in 2020 are key pieces of information in terms of port competition. Accordingly, an analysis of the shipowners' market shares shows that MSC has intensive operations at the ports of Valencia and Haifa, while CMA CGM handles a great deal of volume at the ports of Malta and Piraeus (Graph 10).

GRAPH 10. Shipowners with the Most Intensive Operations in Export Shipments of the Ports of the Mediterranean – 2020 (%)



Source: ShipsGo Database

As mentioned in the previous chapter, the Port of İzmir and the Ports of Aliağa are located in the container transport regions of Europe and Asia. The dominance of global container shipowners in this region that boasts the highest transport volume is an expected outcome. MSC's strong network and agency infrastructure, originating from its history and continuing today, is considered to be the biggest reason for the company's continued market dominance.

Even though domestic carriers such as Arkas and Turkon use this port, their volumes are rather low. The efficiency of global shipowners is also significant at the Port of İzmir and the Ports of Aliağa. On the other hand, the Port of İzmir and the Ports of Aliağa are similar to the ports of Haifa and Valencia in terms of their shipowner usage.

CHAPTER 4.

Analysis of Direct Port Connections

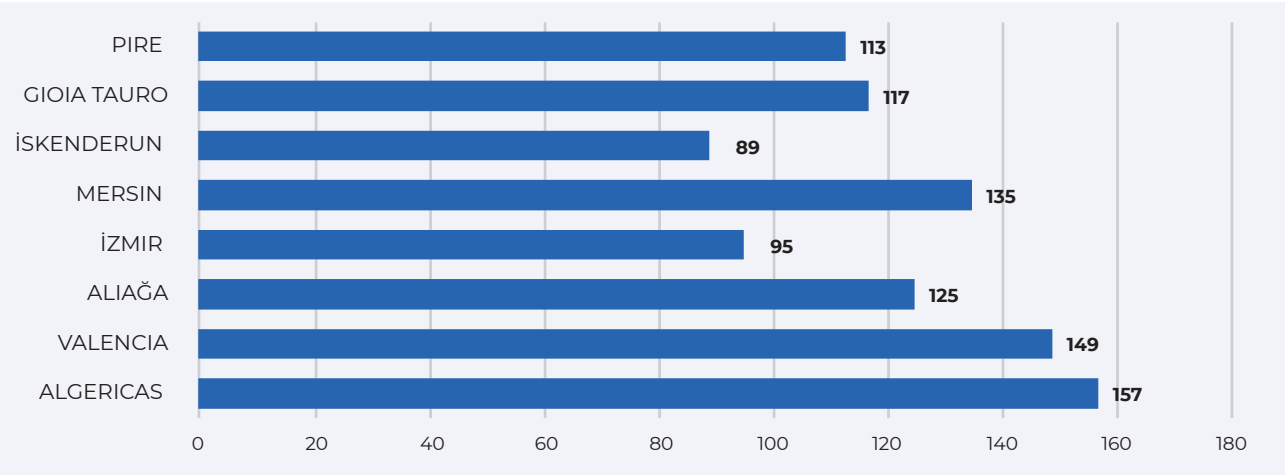
The number of direct connections of a port demonstrates its competitive advantage, and is considered a key value in accessibility indices. Also known as the Node Degree, this value is 288 at the port of Shanghai, the world's highest volume port. The increase in the number of direct connections of a container port significantly increases the supply chain efficiency of both the port and the relevant hinterland in export shipments and import shipments.

Based on data from the ShipsGo database, this value was measured as 125 for the Ports of Aliağa in 2020 (Graph 11). When compared with the ports of Türkiye and the Mediterranean in this regard, Aliağa emerges as a key region. Aliağa, which is the most active port region in Türkiye right after the Mersin International Port, also outperforms ports such as Piraeus (113) and Gioia Tauro (117) in terms of direct port connections. The three shipowners leading the market shares contribute significantly to the high number of direct port connections. In 2020, MSC (48), CMA CGM (39) and Hapag-Lloyd (40) provided direct port connections to the region. The high number of direct connections provides businesses in the hinterland of the Ports of Aliağa with the opportunity to reach markets for both import and export shipments and effective (short and competitive) transit times.

The said opportunities become a competitive advantage for exporters, and enable importers to better manage their stock levels thanks to shortened transit times. Accordingly, the increase in direct port connections offers significant benefits for the foreign trade enterprises operating in the hinterland. By providing shorter delivery times, especially to target markets, regions' businesses increase their global competitive power. The increase in the number of direct connections is a major factor that triggers the adoption of transfer port characteristics. Mersin is emerging as one of the most efficient and competitive transit ports in Türkiye with its 135 direct connections. Details regarding transfer times are further discussed in the following chapters of the report.

When compared with other ports in Türkiye and the Mediterranean, the Port of İzmir offers fewer direct connections. To increase the number of direct connections and improve the competitiveness of the Port of İzmir, which has 95 direct port connections, certain policies must be implemented.

GRAPH 11. Comparison of the Number of Ports with Direct Connection to the Port of İzmir and the Ports of Aliağa with the Competition (2020)



Source: ShipsGo Database and World Bank Data

CHAPTER 5.

Analysis of Docking Ships

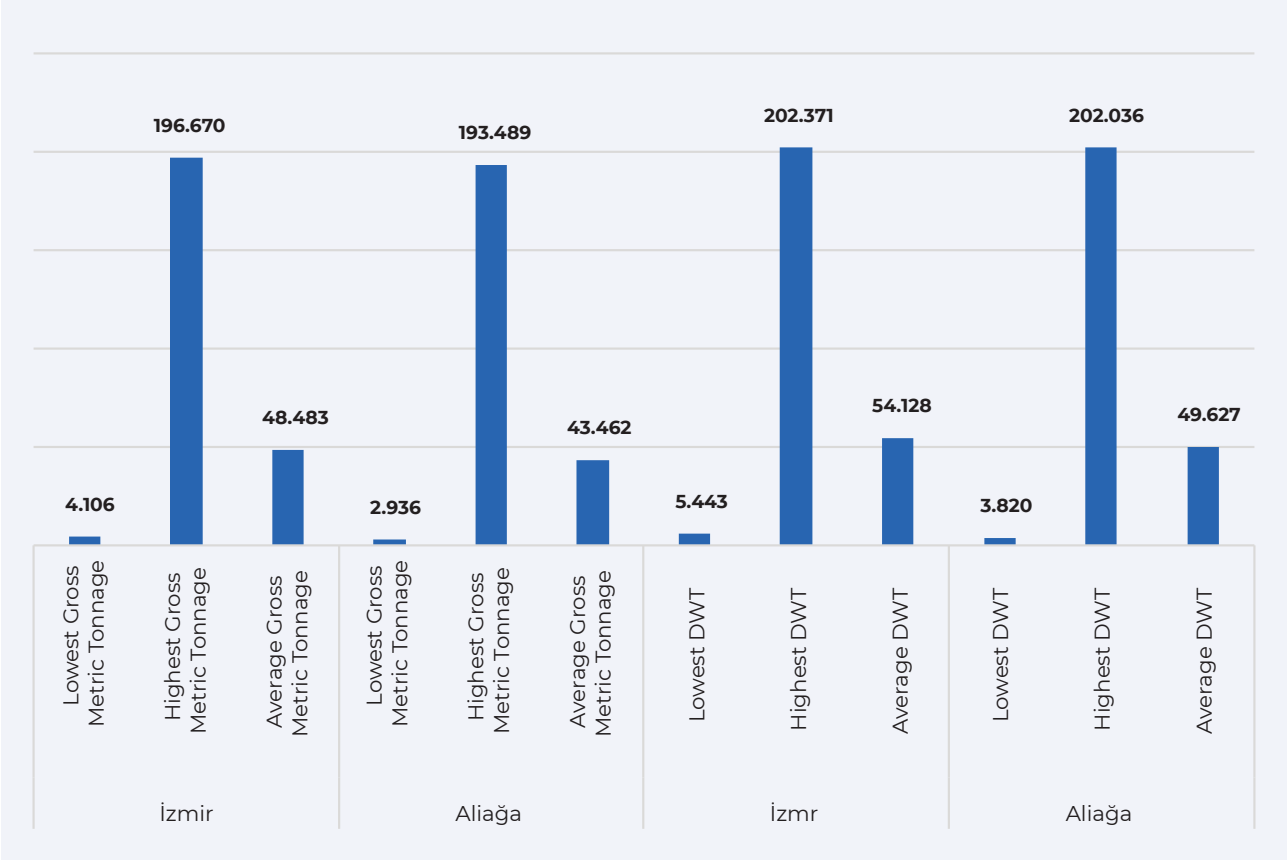
During the container tracking process, ShipsGo records the ships docking at the relevant ports in the database to enable analyses based on ship characteristics. This chapter of the study analyzes the sizes of the ships docking at the Port of İzmir and the Ports of Aliağa.

According to the ShipsGo database, 404 different ships docked at the Ports of Aliağa in 2020. Twenty-four different shipowners have used the Ports of Aliağa in the last three years (Table 3). Analyses of the docking ships show that the lowest gross metric tonnage was 2,936, while the largest was 193,488. Meanwhile, DWT analysis shows that the lowest DWT was 3,820, while the highest was 202,036. The average DWT of ships docking at the Ports of Aliağa was 49,627. While Capesize ships occasionally dock at the Ports of Aliağa, it was determined that most of the ships docking at these ports were Handymax ships.

In 2020, 206 ships of 23 different shipowners docked at the Port of İzmir. Analyses of these ships show that the lowest gross metric tonnage was 4,106, while the largest was 196,670. Meanwhile, DWT analysis shows that the lowest DWT was 5,443, while the highest was 202,371. The average DWT of ships docking at the Port of İzmir was 54,128. While Capesize ships occasionally dock at the Port of İzmir, it was determined that most of the ships docking at this port were Supramax ships.

Although there are no significant differences between the capacities of the ships docking at the two ports, the Port of İzmir seems to boast higher values than the Port of Aliağa in terms of both average and maximum ship sizes (Graph 12).

GRAPH 12. Comparative GRT and DWT Analysis of Ships Docking at the Port of İzmir and the Ports of Aliağa (2020)



Source: ShipsGo Database

TABLE 3. Shipowners Docking at the Port of İzmir and Ports of Aliağa (2020)

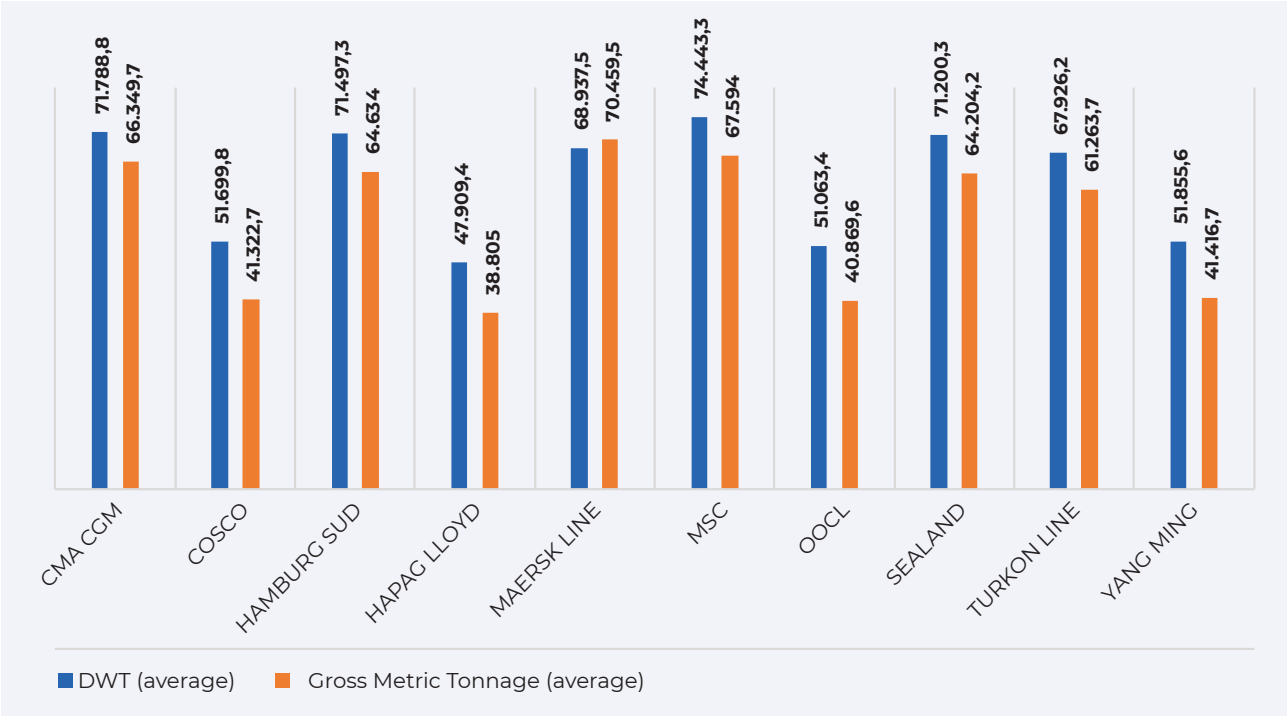
No	Shipowners at the Port of İzmir	Shipowners at the Ports of Aliağa
1	ADMIRAL LINE	ADMIRAL LINE
2	APL	AKKON LINES
3	ARKAS LINE	APL
4	CMA CGM	ARKAS LINE
5	CONTAINERSHIPS (CONTAZ)	CMA CGM
6	COSCO	CNC LINE
7	EVERGREEN	CONTAZ
8	GOLD STAR LINE	COSCO
9	GRIMALDI	EVERGREEN
10	HAPAG LLOYD	GOLD STAR LINE
11	MAERSK LINE	HAMBURG SUD
12	MILAHA	HAPAG LLOYD
13	MSC	HYUNDAI MM
14	NILE DUTCH	MAERSK LINE
15	ONE LINE	MEDKON
16	OOCL	MILAHA
17	SAFMARINE	MSC
18	SEALAND	NILE DUTCH
19	TARROS	ONE LINE
20	TS LINES	OOCL
21	TURKON LINE	SAFMARINE
22	YANG MING	SEALAND
23	ZIM LINE	TARROS
24		TURKON LINE

Source: ShipsGo Database

Analyses of ships docking at the Aliağa–Felixstowe and Bremerhaven–Aliağa lines by shipowners are provided in Graphs 13 and 14 for a more comprehensive analysis of the ships and shipowners docking at the Ports of Aliağa. DWT analysis of both routes shows that the largest ships belong to CMA CGM and Hamburg Süd.

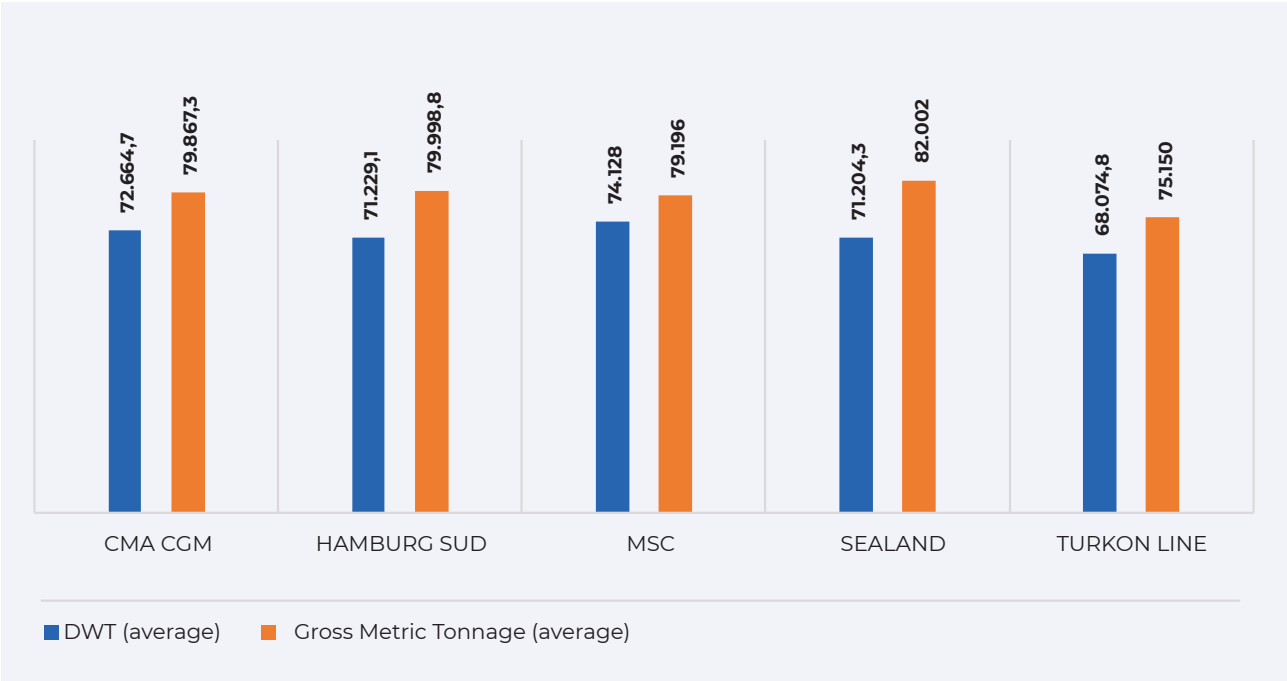
These findings reveal that larger ships can dock at both the Port of İzmir and the Ports of Aliağa. Despite the comments on how larger ships cannot dock at the Port of İzmir due to the draft issue, analyses show that this is not the case. However, it should be noted that the occupancy rate of the docking ships is also a major factor in the draft issue.

GRAPH 13. Comparative Analysis of the Ships Using Aliağa–Felixstowe Line by Shipowners



Source: ShipsGo Database

GRAPH 14. Comparative Analysis of the Ships Using Bremerhaven–Aliağa Line by Shipowners



Source: ShipsGo Database

CHAPTER 6.

Regions and Countries in Export Shipments

This chapter focuses on the ports where the containers tracked by ShipsGo are shipped. The analysis here offers a distribution by port countries and regions. This analysis shows the top destination ports for the containers shipped from the region's ports, and may be interpreted as the shipment region preferences of the region's shippers. The analysis should not be expected to be directly compatible with Türkiye's export countries/regions.

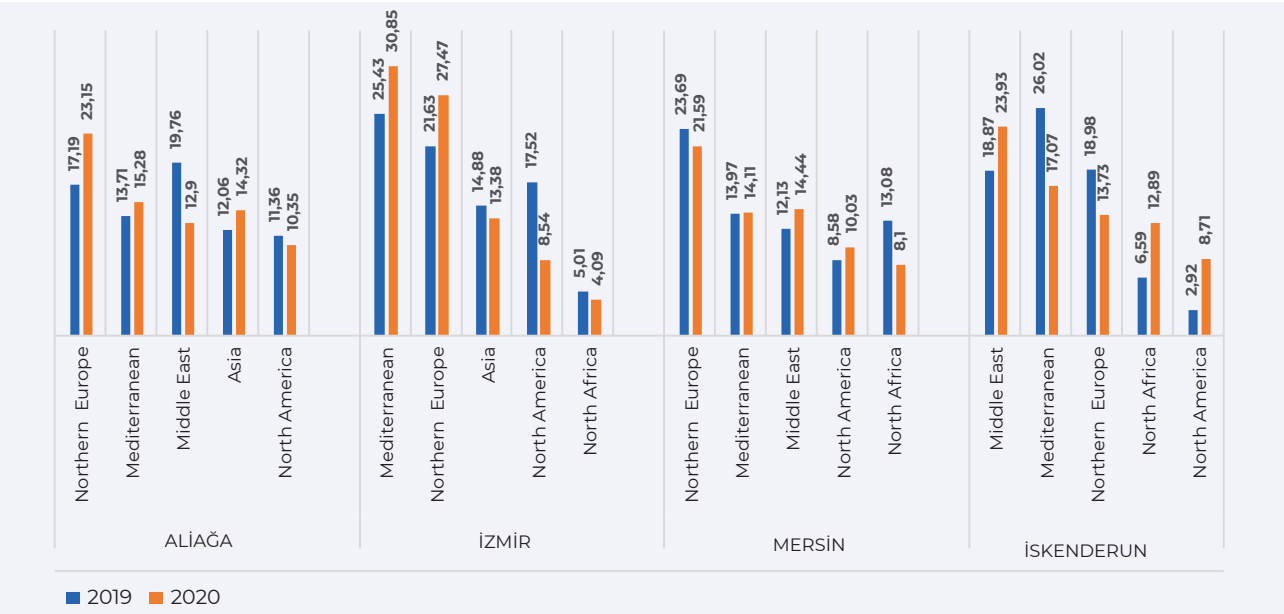
According to ShipsGo data, the regions with the highest number of shipments from the Ports of Aliağa in 2020 were Northern Europe (23.15 percent), the Mediterranean (15.28 percent), the Middle East (12.9 percent), Asia (14.32 percent) and North America (10.35 percent). Northern Europe includes other European countries that do not have a coast on the Mediterranean. Northern Europe shipments, which had a share of 17.19 percent in 2019, showed a significant increase in 2020 (Graph 15). Ranking by country in 2020 was the United States (9.61 percent), Germany (8.85 percent), China (9.28 percent), Spain (5.84 percent) and Britain (5.95 percent). There was no significant proportional change between 2019 and 2020 (Graph 16).

As of 2020, the regions with the highest number of shipments from the Port of İzmir are the Mediterranean (30.85 percent), Northern Europe (27.47 percent), North America (8.54 percent), Asia (13.38 percent), and North Africa (4.09 percent). Shipments from the Port of İzmir to Northern Europe and the Mediterranean increased in 2020, while shipments to North America decreased (Graph 15).

Ranking by country showed that the United States' large share of 17.15 percent in 2019 decreased significantly to 7.41 percent in 2020, while Israel's share of 5.73 percent in 2019 increased significantly to 12.98 percent in 2020 (Graph 16).

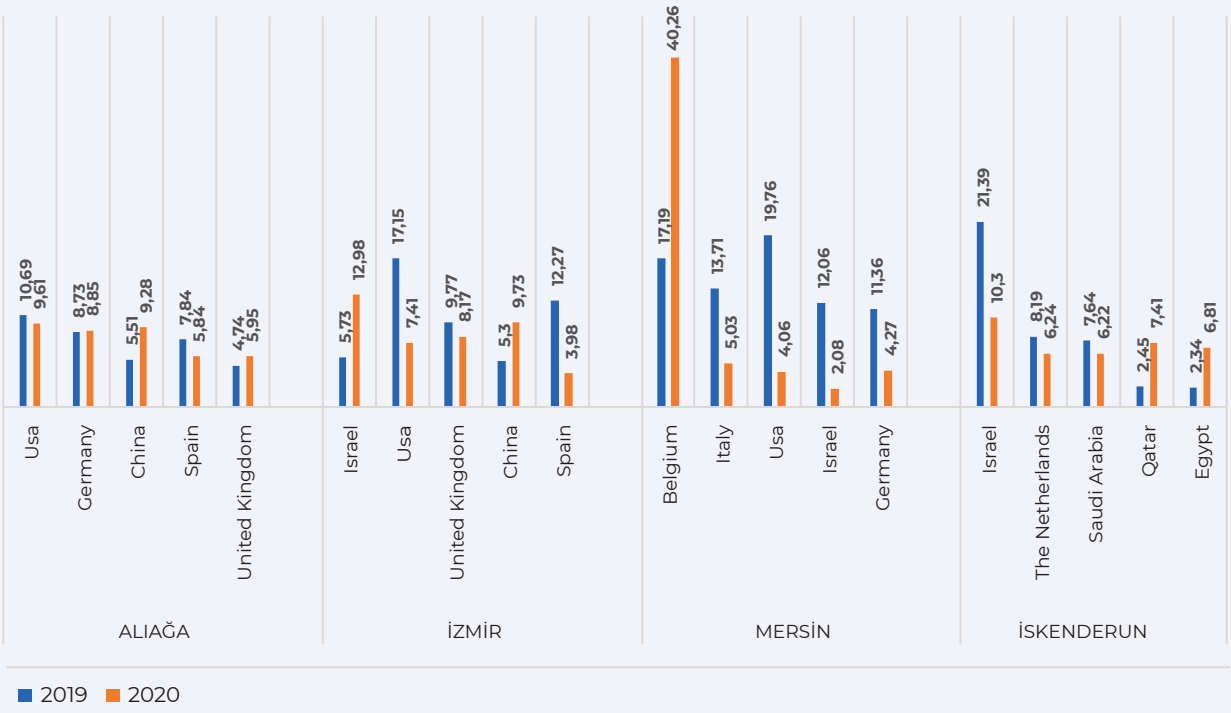
It can be said that the Port of İzmir and the Ports of Aliağa are significantly similar to the Mersin International Port in terms of their shipment regions. Even though the Port of İskenderun shows a similar profile to other ports, it carries out more shipment operations thanks to its location especially for the Middle East market (2020: 23.93 percent), with Saudi Arabia (6.22 percent) and Qatar (7.41 percent) emerging as the prominent countries.

GRAPH 15. Comparison of Regions with Export Shipments from the Port of İzmir and the Ports of Aliağa with Ports of Türkiye and Select Ports (2019, 2020) (%)



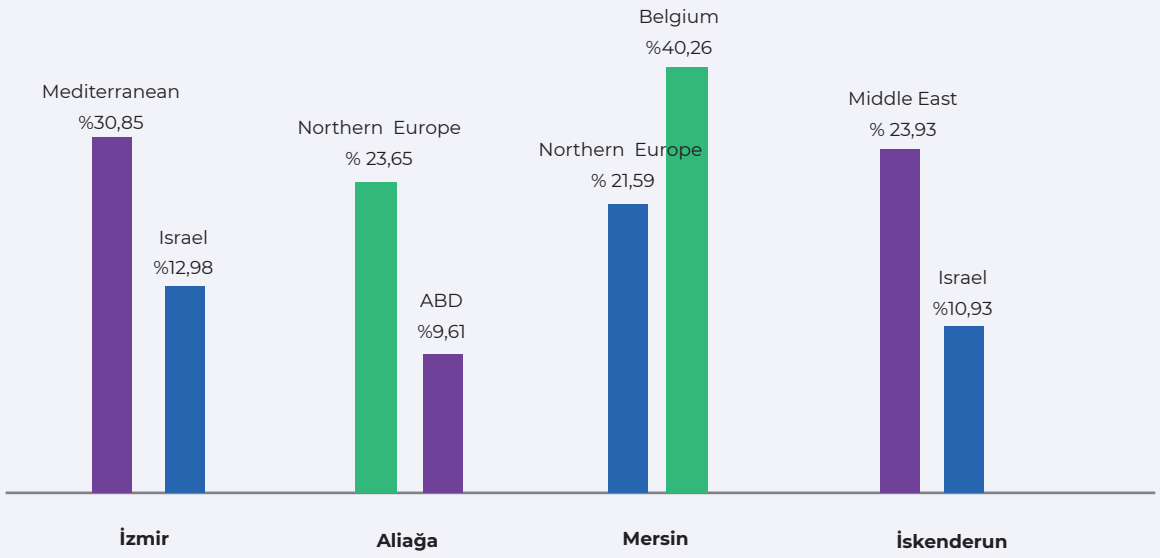
Source: ShipsGo Database

GRAPH 16. Comparison of Countries with Export Shipments from the Port of İzmir and the Ports of Aliağa with Ports of Türkiye and Select Ports (2019, 2020) (%)



Source: ShipsGo Database

GRAPH 17. Top Regions/Countries for Shipments of the Ports of Türkiye




MEDKON LINES

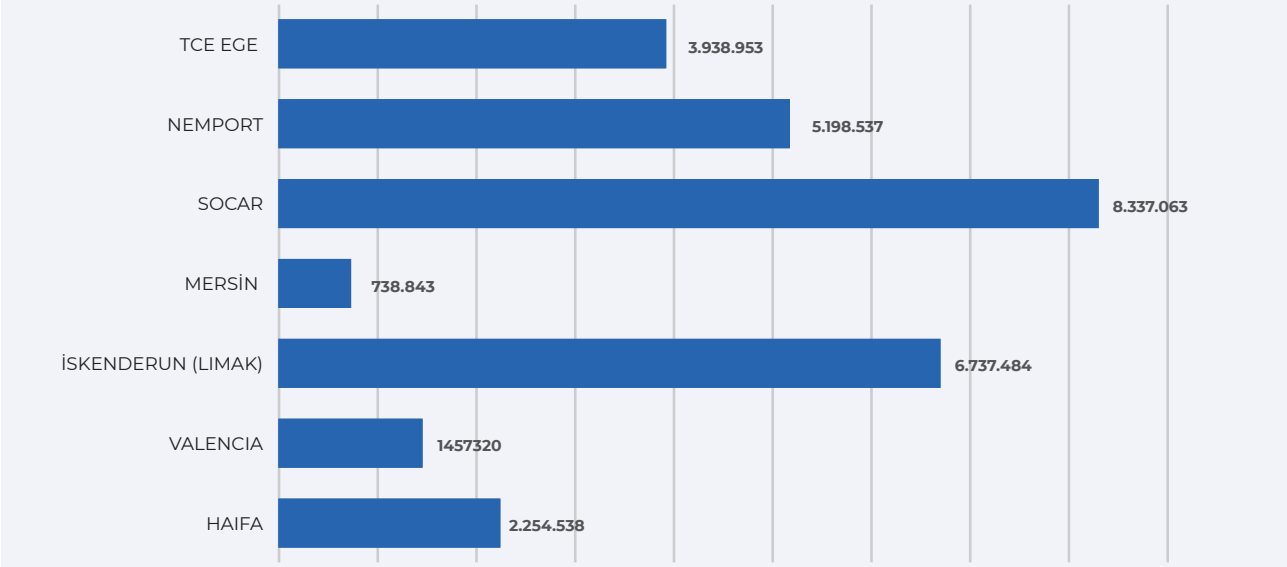
CHAPTER 7.

Digital Performance

Before the digital performance analyses measured by the ShipsGo platform, website popularity for the Port of İzmir and the Ports of Aliağa will be detailed based on overall data. Since the Port of İzmir does not have an official website of its own, it was not included in this evaluation. The official websites of Nemport, TCEEGE and SOCAR, the three ports in Aliağa evaluated as part of the study, were evaluated separately.

Alexa.com offers a website ranking by "clicks and uses." This allows for more information on the subject. A low value in this application, which ranks 1st worldwide thanks to Google's omnipresence, is considered to be a key indicator of the popularity of the relevant website.

GRAPH 18. Website Popularity Ranking of Ports Based on Alexa Data



Source:www.alexa.com

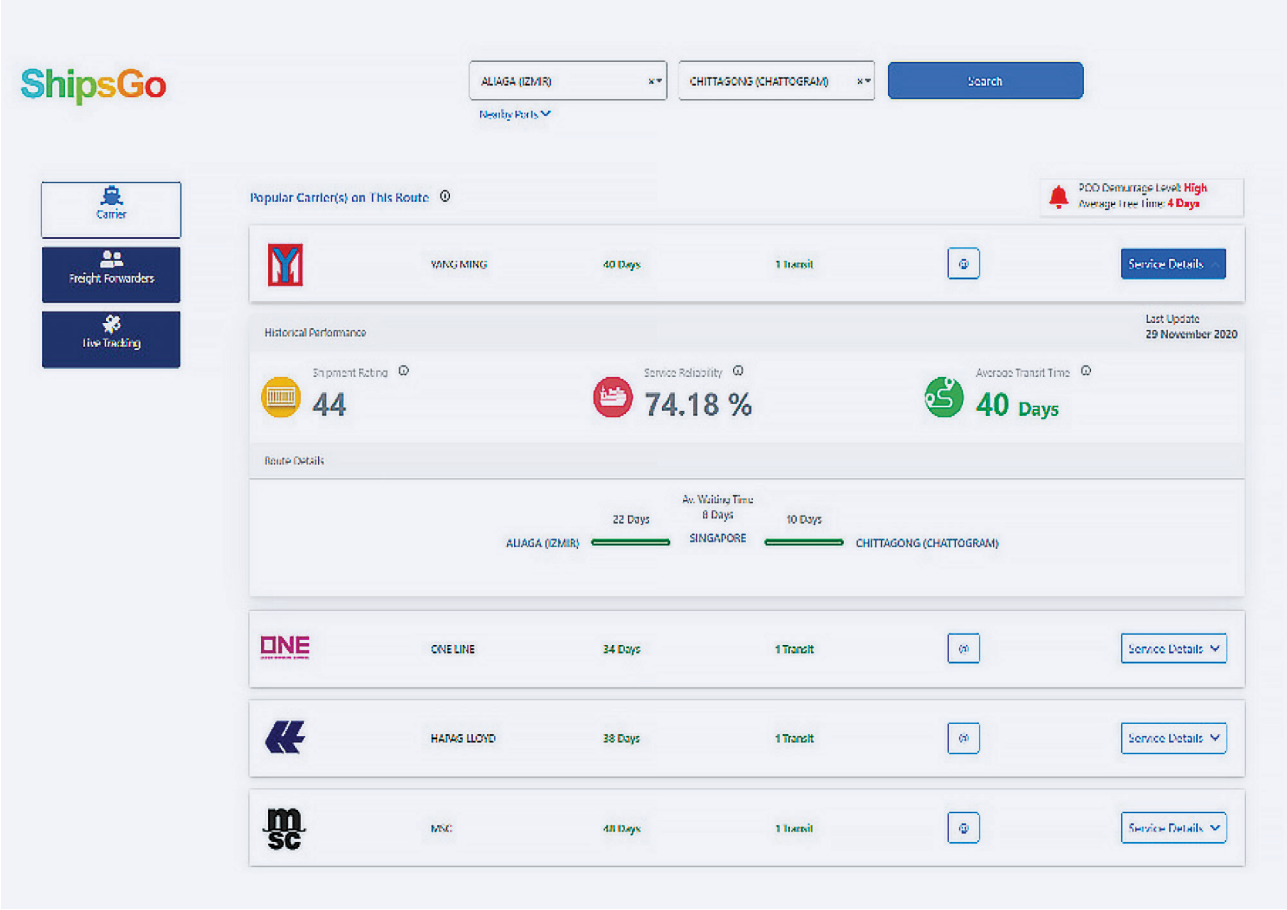
The data in Graph 18 show that Mersin International Port website is the most popular with a ranking value of 738,843. As mentioned earlier, low Alexa ranks indicate popularity. It was also observed that the visit performance was low for the websites of the three ports serving in Aliağa. While SOCAR

had the weakest performance with a ranking of 8,337,063, TCEEGE had the strongest performance among the three ports with a ranking of 3,938,953. The rankings in question were compiled from alexa.com in January 2021. Rankings may vary according to daily clicks and usage.

The ShipsGo platform allows its users to search routes (between two ports), which demonstrates which shipowners are working on the searched route and their transit time performance. Since the route search service (service finder) is a free service, it is used as an interface where 3,000+ different route searches are made daily by foreign trade enterprises and logistics enterprises. Examples of the search results between the Aliağa–Chittagong ports are shown in Figure 3.

Searches made by users of the route finder service are included in the study as innovative and unique measurement values that demonstrate the demand for both the route and the relevant port.

FIGURE 3. Aliağa–Chittagong Search Results on the ShipsGo Platform



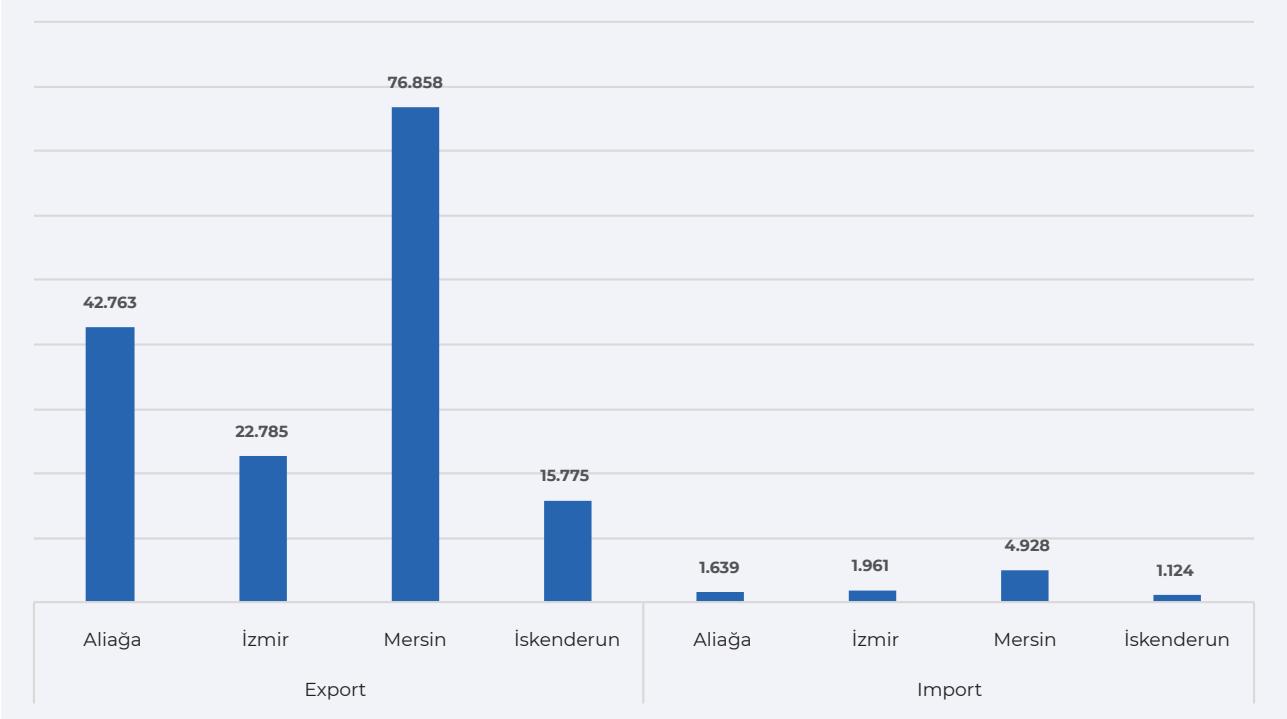
Number of searches made using the ShipsGo interface in 2020 for export routes from the Ports of Aliağa was 42,763 in total. Of these searches, 91.1 percent were made in Türkiye. Most prominent searches from abroad were from Germany (3.9 percent), the United States (0.6 percent) and Belgium (0.1 percent). The total number of searches made using the ShipsGo interface in 2020 for import routes from the Ports of Aliağa was 1,639. Of these searches, 89.2 percent were made in Türkiye.

The total number of searches made using the ShipsGo interface in 2020 for routes from the Port of İzmir was 22,785. Of these searches, 89 percent were made in Türkiye. Most prominent searches from abroad were from Germany (3.6 percent) and Belgium (0.6 percent). The total number of searches made using the ShipsGo interface in 2020 for import routes from the Port of İzmir was 1,961. Of these searches, 89 percent were made in Türkiye.

A comparison of the Port of İzmir and the Ports of Aliağa with Türkiye's other ports in route searches shows that the Mersin International Port is the most popular port, followed by the Ports of Aliağa. The biggest reason for this is that both ports are ahead of other ports in terms of their direct connections and container handling volume. On the other hand, the Mersin International Port's involvement in a major port network may also be cited as one of the biggest reasons. This is naturally reflected in their digital performances (Graph 19).

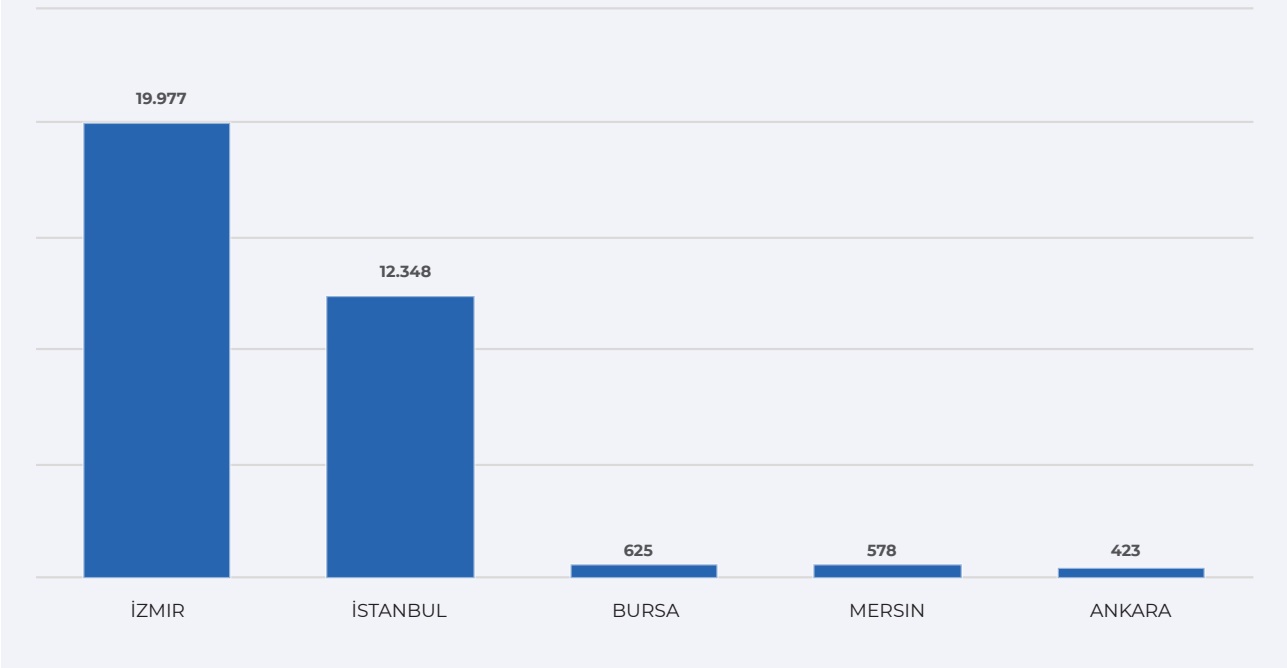
It is observed that most of the searches for export routes from the Port of İzmir and the Ports of Aliağa are made in İzmir and Istanbul (Graphs 20 and 21). The analysis in question also offers important information about the hinterland and the users of both ports.

GRAPH 19. Comparison of the Port of İzmir and the Ports of Aliağa with Türkiye's Other Ports in ShipsGo Route Searches – Frequency (2020)



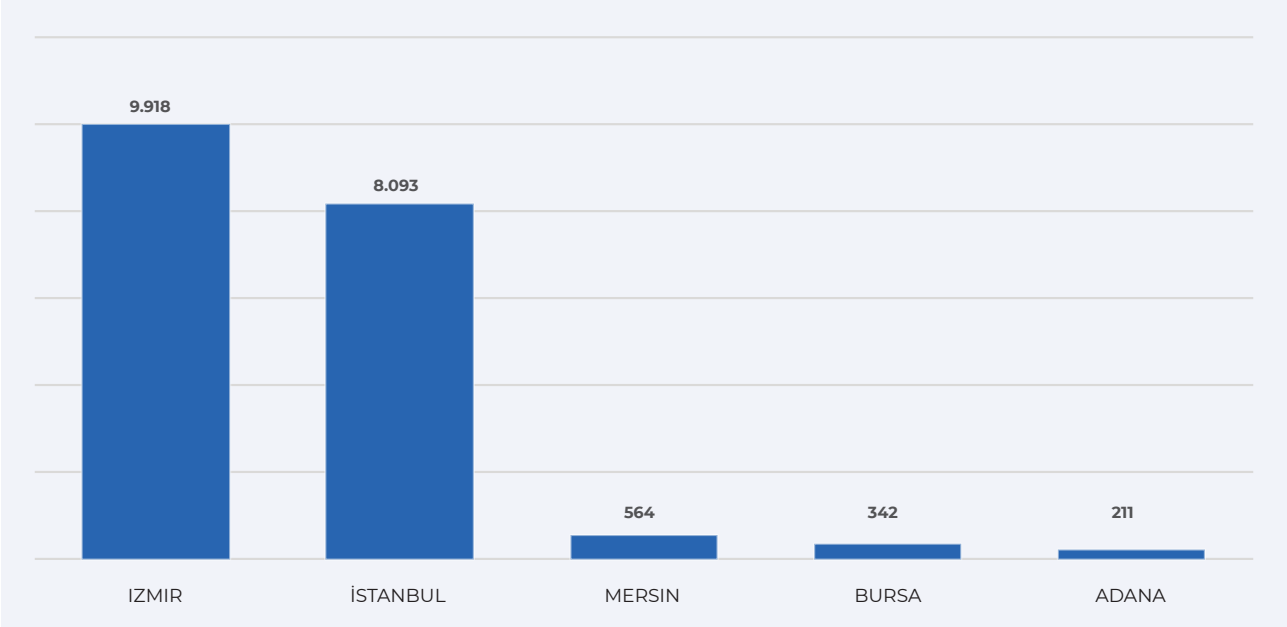
Source: ShipsGo Database

GRAPH 20. Distribution of Those Looking for Routes from Aliağa by Cities – Frequency (2020)



Source: ShipsGo Database

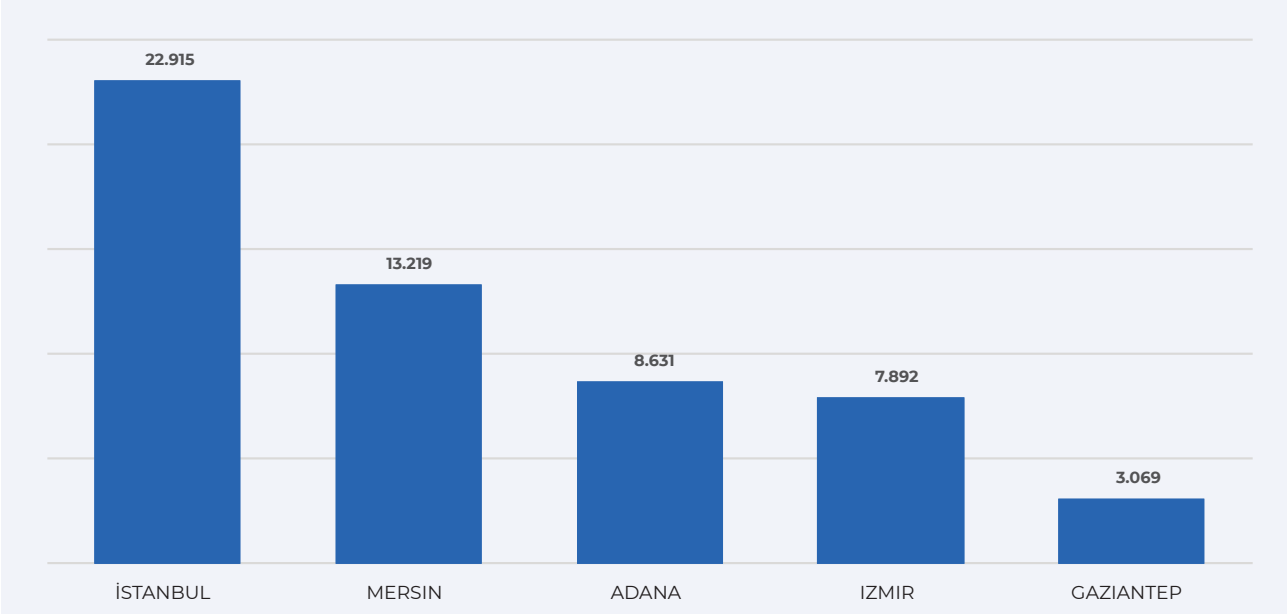
GRAPH 21. Distribution of Those Looking for Routes from İzmir by Cities – Frequency (2020)



Source: ShipsGo Database

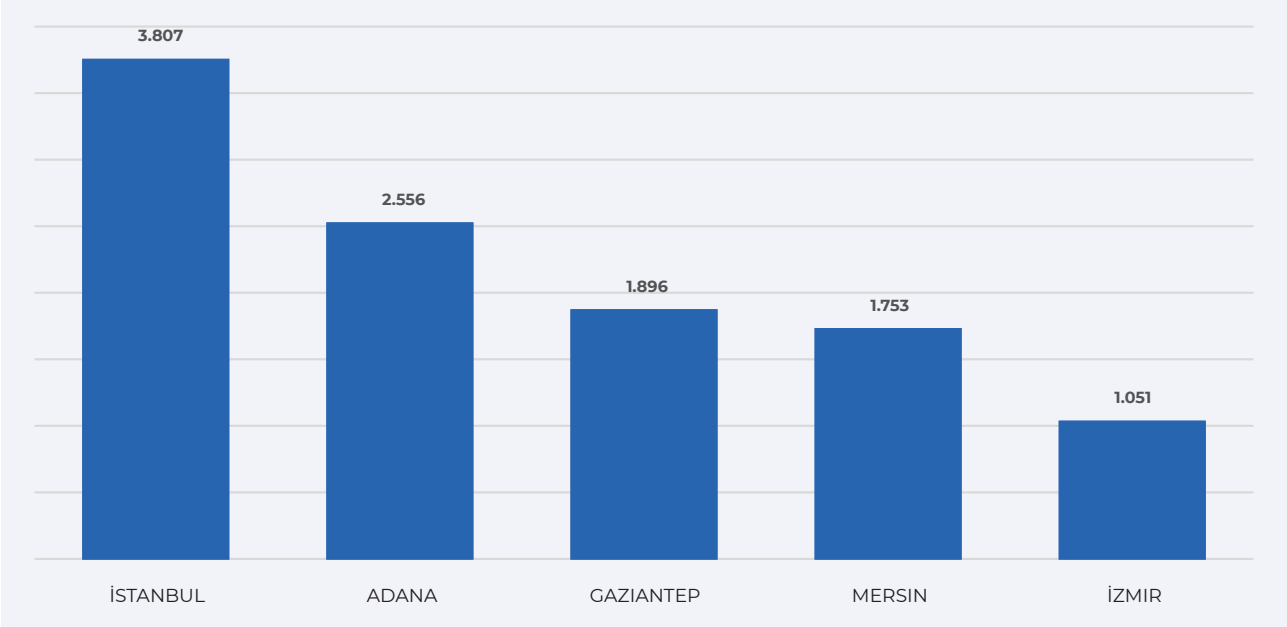
It is observed that the International Mersin Port and the Port of İskenderun were searched often, particularly in Istanbul, in addition to the expected searches from the other provinces in the hinterland (Mersin, Adana). (Graphs 22 and 23). The analysis in question also offers important information about the hinterland and the users of both ports.

GRAPH 22. Distribution of Those Looking for Routes from Mersin by Cities – Frequency (2020)



Source: ShipsGo Database

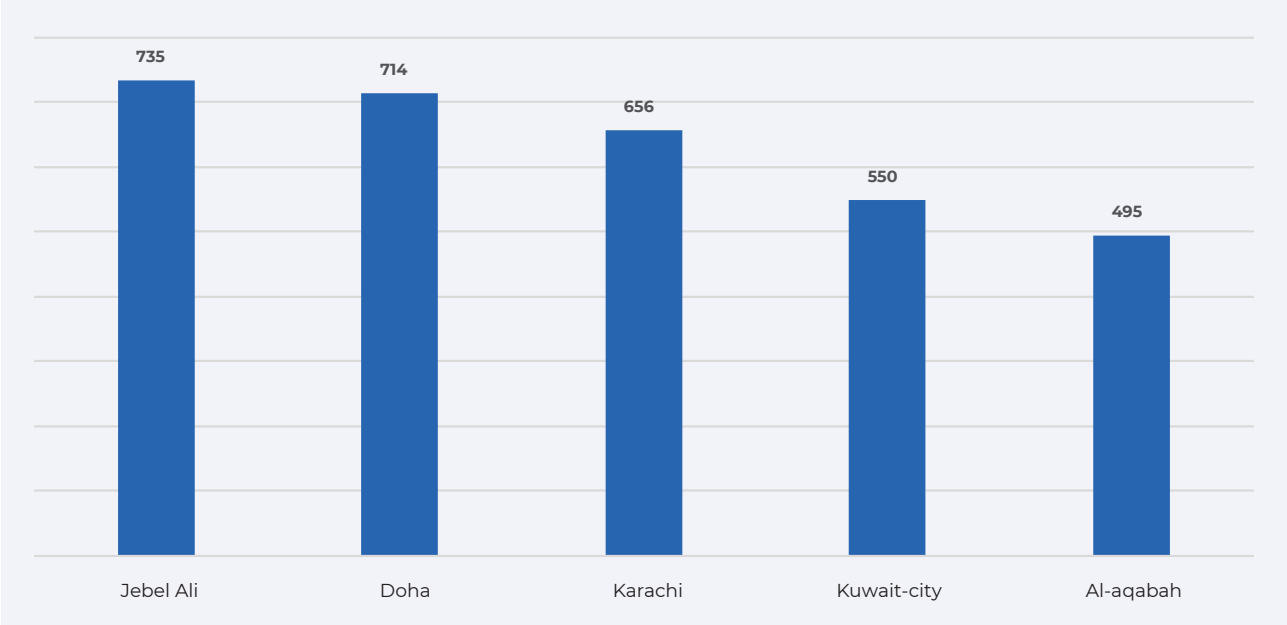
GRAPH 23. Distribution of Those Looking for Routes from İskenderun by Cities – Frequency (2020)



Source: ShipsGo Database

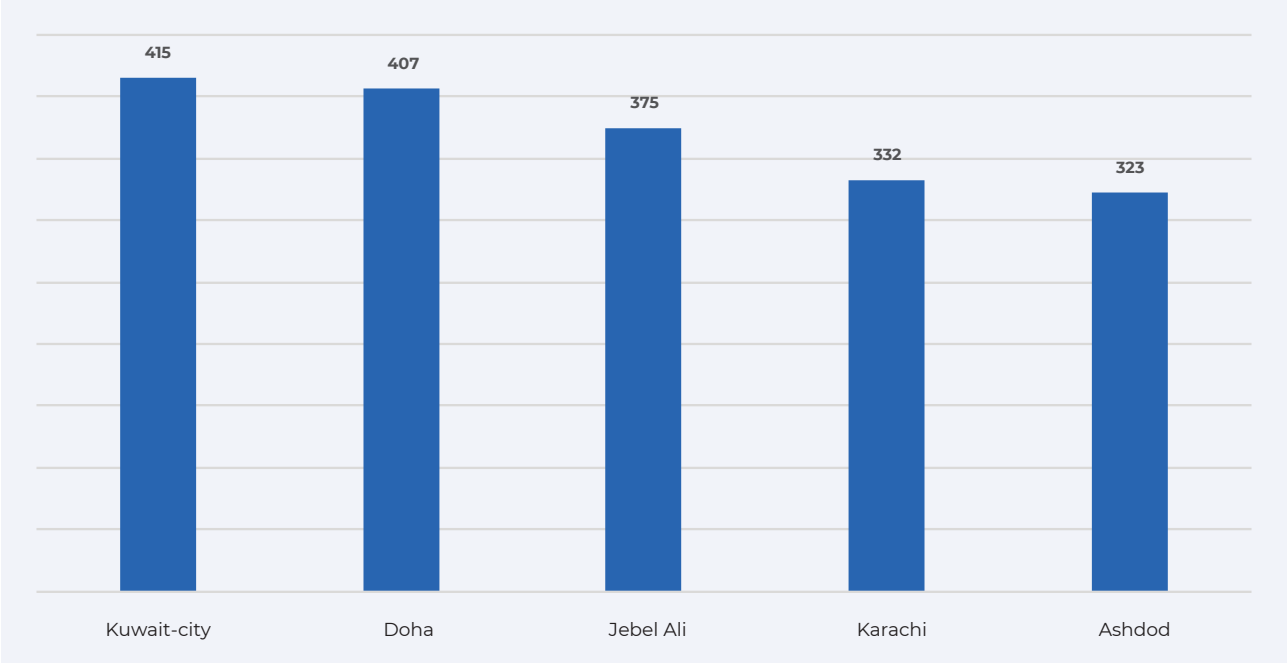
Graph 24 and beyond present the ranking of the most searched routes in 2020 for the Port of İzmir and the Ports of Aliağa as well as the Port of İskenderun and the Mersin International Port. The aforementioned graphs may also be considered digital indicators of which routes are in higher demand. The relevant data shows that Aliağa–Jebel Ali and Doha, İzmir–Kuwait City and Doha, Mersin–Al Aqabah and Jebel Ali, and İskenderun–Al Aqabah and Jebel Ali are the most prominent relations.

GRAPH 24. Most-Searched Ports on Routes from Aliağa (Frequency – 2020)



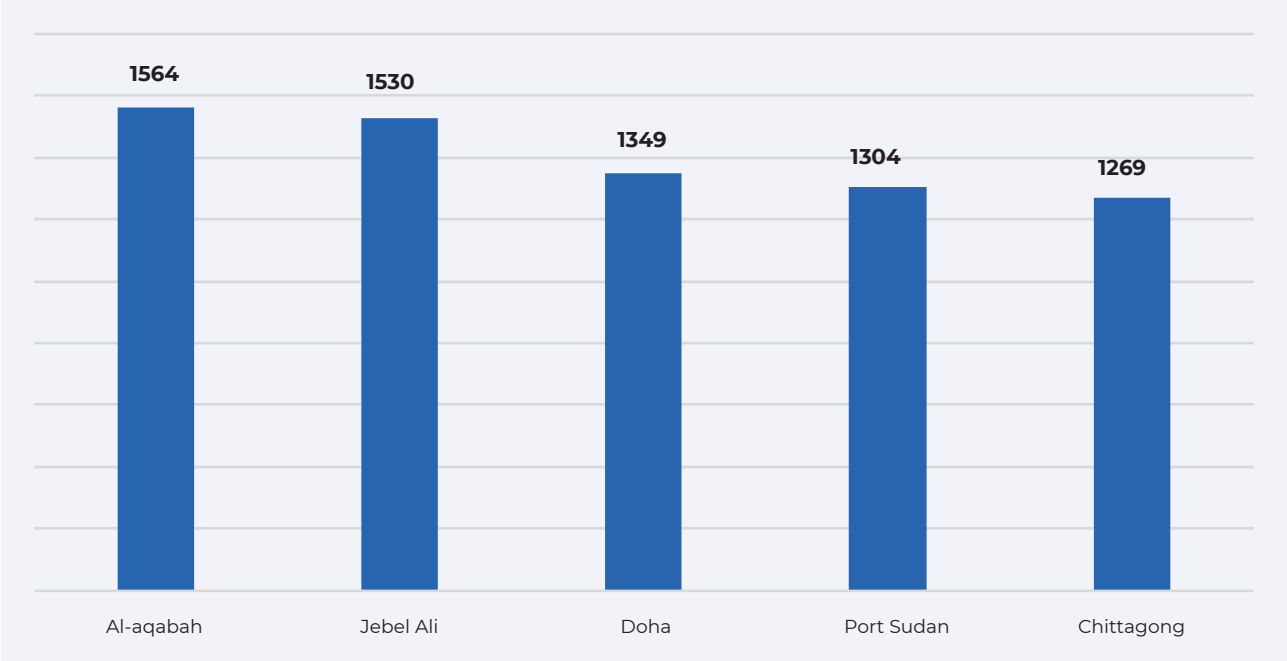
Source: ShipsGo Database

GRAPH 25. Most-Searched Ports on Routes from İzmir (Frequency – 2020)



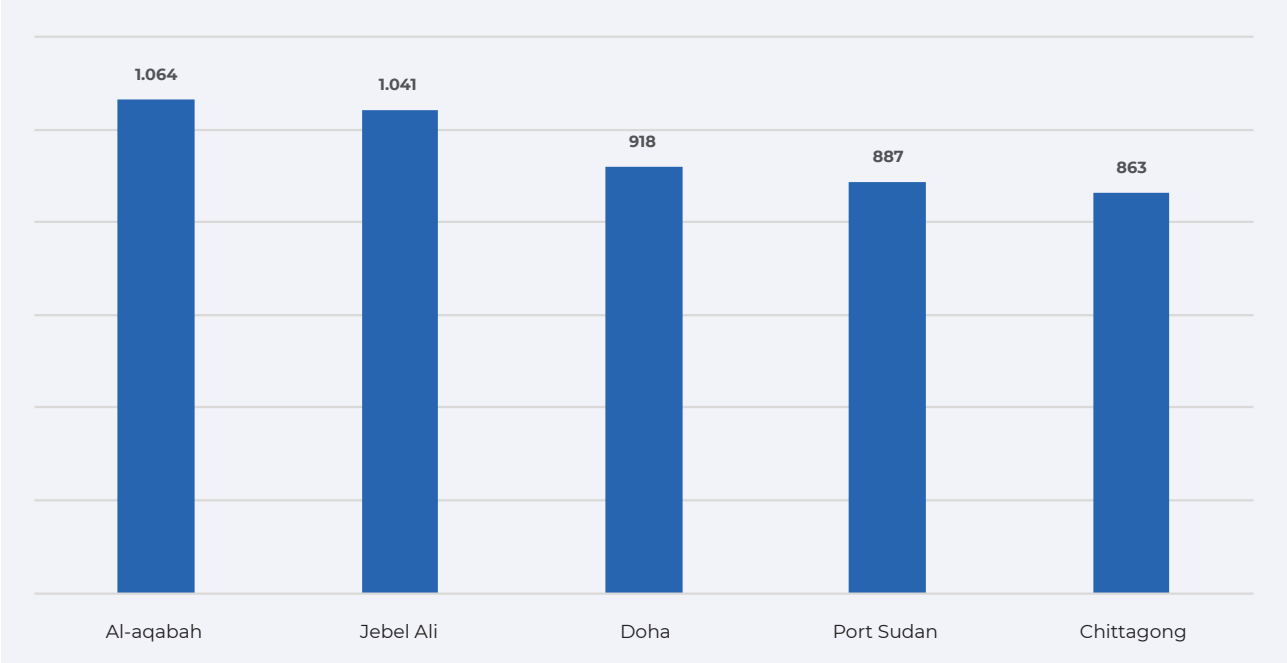
Source: ShipsGo Database

GRAPH 26. Most-Searched Ports on Routes from Mersin (Frequency – 2020)



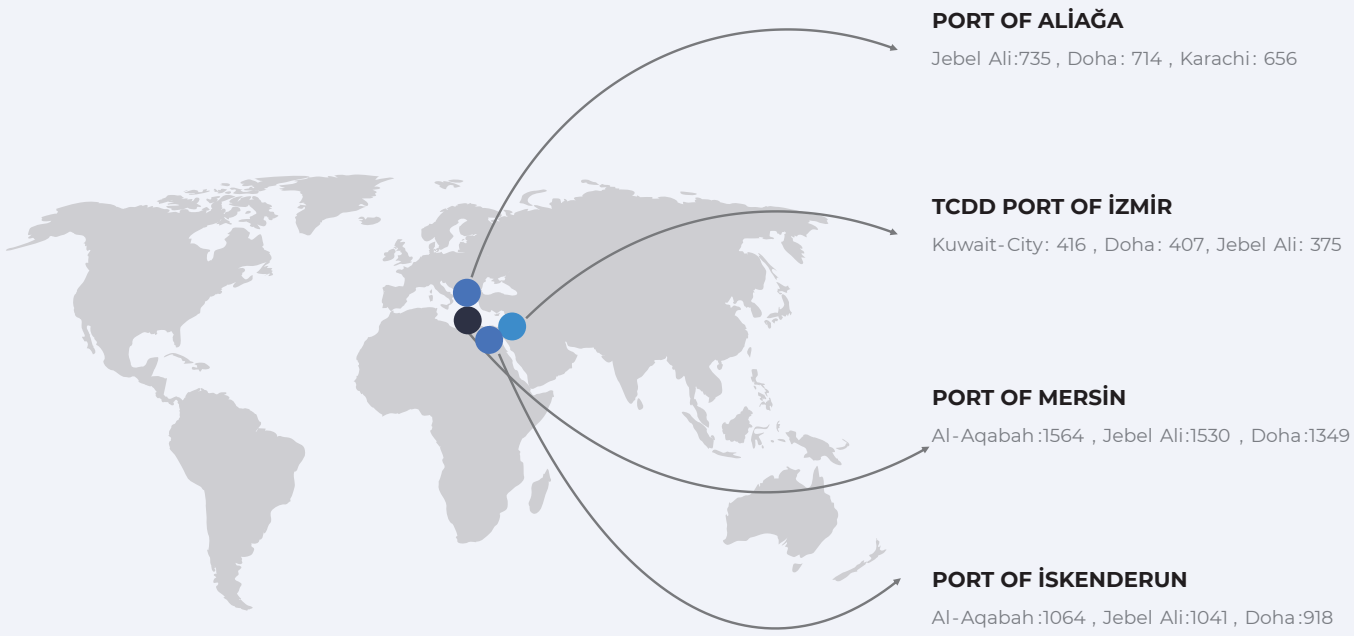
Source: ShipsGo Database

GRAPH 27. Most-Searched Ports on Routes from İskenderun (Frequency – 2020)



Source: ShipsGo Database

FIGURE 4. Routes Searched for the Ports of Türkiye



CHAPTER 8.

Transit Times and Reliability at Select Routes

This chapter will analyze the "average transit times," "transit time reliability" and "timely arrival reliability" values for select shipowners and lines with connections to the Port of İzmir and the Ports of Aliağa. Even though the said values are mainly related to the shipowners' performance, the densities of the ports are also effective. If a ship is made to wait at the port because of congestion, it extends the transit time and negatively affects the reliability of the relevant route.

The impact of container transport on global supply chains is rather significant. In macro terms, both the supply logistics (inbound imports) and physical distribution (outbound exports) performances of a country almost directly correlate to the container transport performance. Analysis of the transit time, transit time reliability and timely arrival reliability performances of the Port of İzmir and the Ports of Aliağa on select routes will reveal the region's supply chain efficiency in terms of both supply logistics and physical distribution. Before moving on to the analysis, it would be useful to define these concepts.

The average transit time is calculated by dividing the transit times of all the transports carried out by the shipowner from port to port on the determined route by the observed values. The averages of transit times in the last four quarters of 2020 are analyzed by days in terms of shipowners and select routes with graphs for comparison.

Transit time reliability is an indicator of how much the shipowner deviates from the time specified prior to transport. For instance, 80-percent transit time reliability means a 20-percent deviation from the time specified by the shipowner. If the shipowner has specified a transit time of 20 days on the relevant line and the ShipsGo database measures the rate at 80 percent, it is understood that a deviation of four days has occurred. As ShipsGo transit time reliability increases, deviations decrease. In other words, a high value indicates a positive development. Transit time reliability was analyzed comparatively in the four quarters of 2020 on select lines of shipowners.

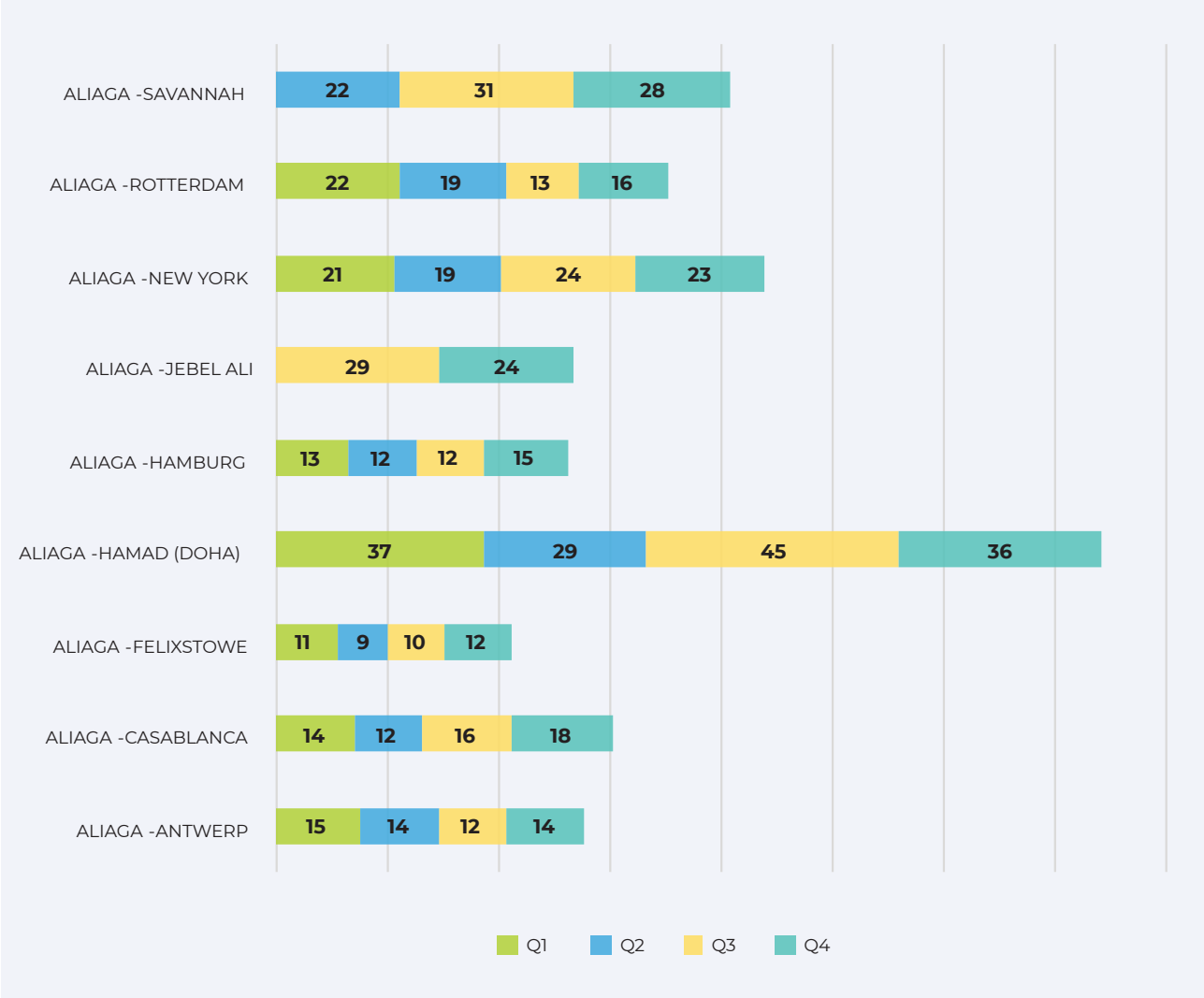
Timely arrival reliability defines the rate of arrival on the day specified by the shipowner. Timely arrival reliability rate is presented comparatively using both tables and graphs based on import shipments by shipowners and ports.

8.1. Analysis of Transit Times and Transit Time Reliability of the Export Shipments at the Ports of Aliağa

In export shipments, the transit time performances of MSC, Hapag-Lloyd and COSCO on select routes in the four quarters of 2020 were analyzed and presented with graphs for comparison.

It is observed that MSC experienced significant transit time differences on certain routes. For instance, the shortest transit time to the port of Doha was 29 days, while the longest was 45 days. A similar case was observed on the Aliağa–Rotterdam route (shortest 13 days–longest 22 days) (Graph 28)

GRAPH 28. Average Transit Time Performance of MSC on Select Lines in 2020 – Ports of Aliağa (Days)



Source: ShipsGo Database

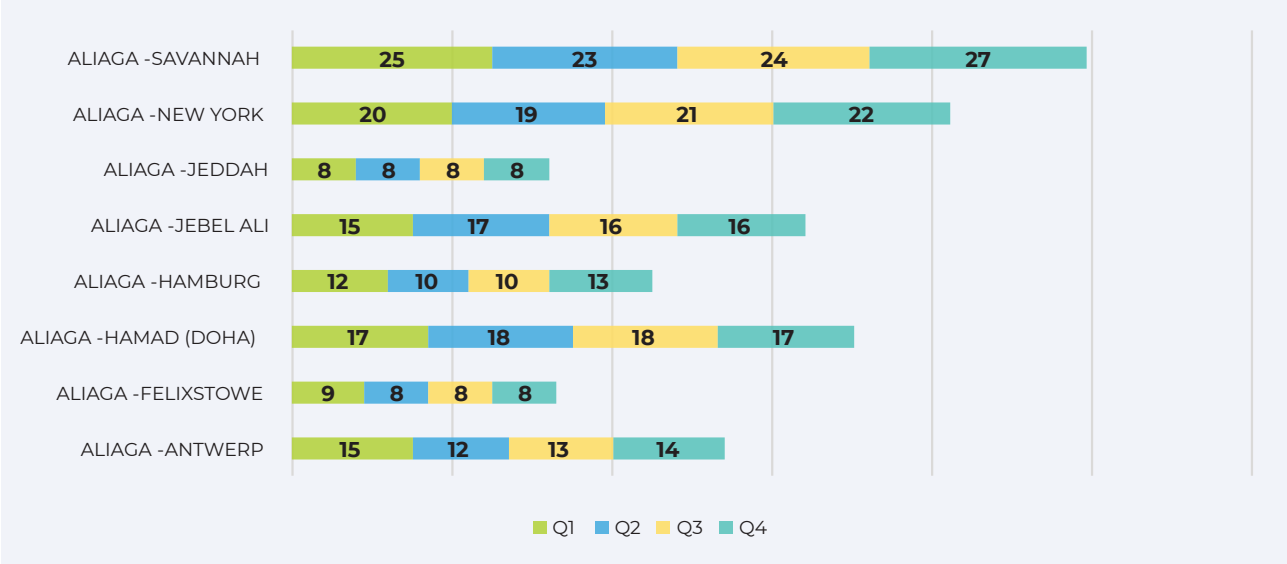
Transit time reliability shows significant deviations and low rates. For instance, in the third quarter of 2020, the reliability rate on the Jebel Ali route was rather low at 13 percent. Likewise, for the Doha route, a transit time reliability rate of 9 percent was recorded in the last quarter of 2020. It is worth noting that the Hamburg and Rotterdam routes boast higher and more stable reliability rates (Graph 29).

GRAPH 29. Transit Time Deviation Reliability of MSC on Select Lines in 2020 – Ports of Aliağa (%)

Source: ShipsGo Database

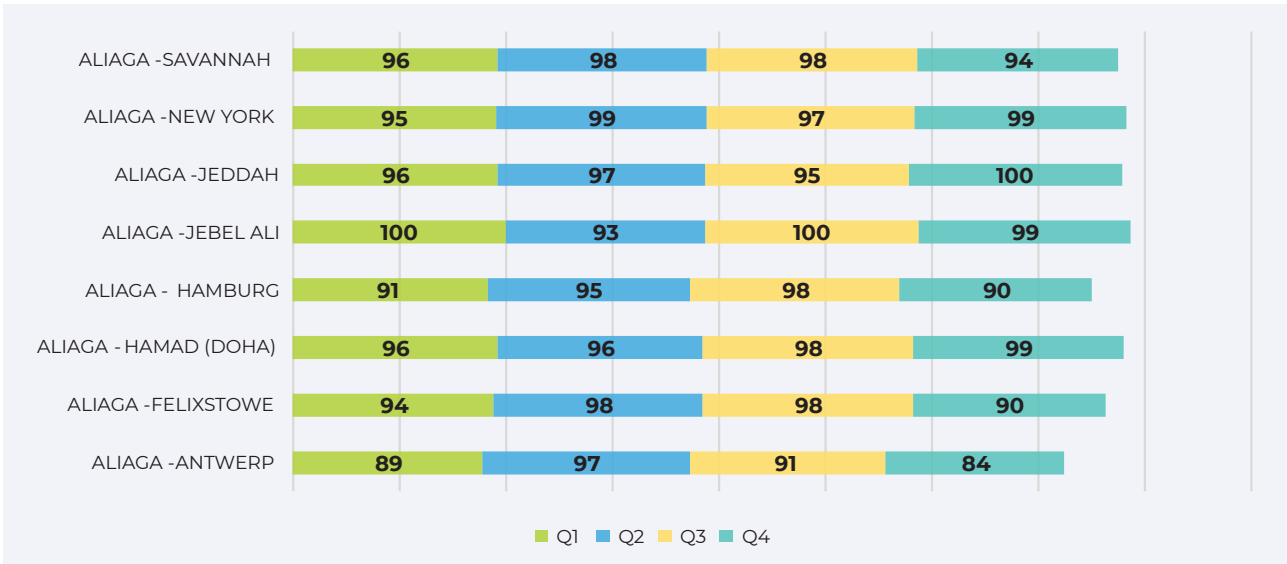
Hapag-Lloyd seems to have outperformed MSC in terms of transit time differences in export shipments of the Ports of Aliağa. Hapag-Lloyd did not experience any major variations in transit time performances on routes such as Jeddah, Jebel Ali, Doha and Felixstowe in the four quarters of 2020. This is reflected in the shipowner's transit time reliability rates. The lowest rate achieved by the shipowner on select routes from Aliağa was 84 percent (Graphs 30 and 31).

GRAPH 30. Average Transit Time Performance of Hapag-Lloyd on Select Lines in 2020 – Ports of Aliağa (Days)



Source: ShipsGo Database

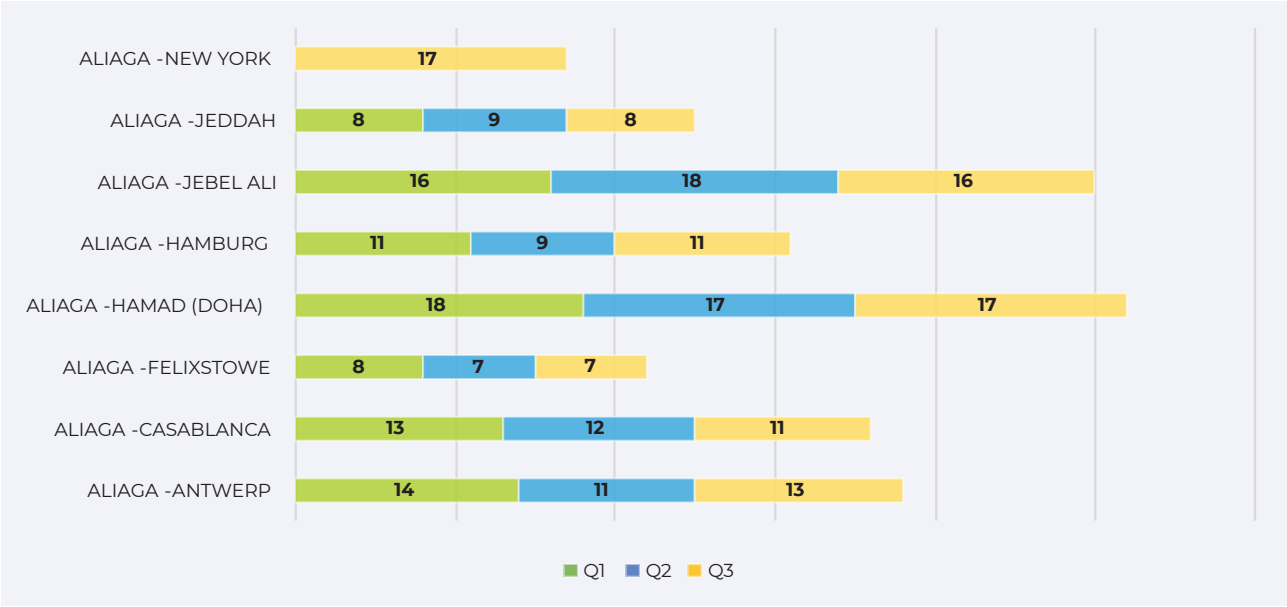
GRAPH 31. Transit Time Deviation Reliability of Hapag-Lloyd on Select Lines in 2020 – Ports of Aliağa (%)



Source: ShipsGo Database

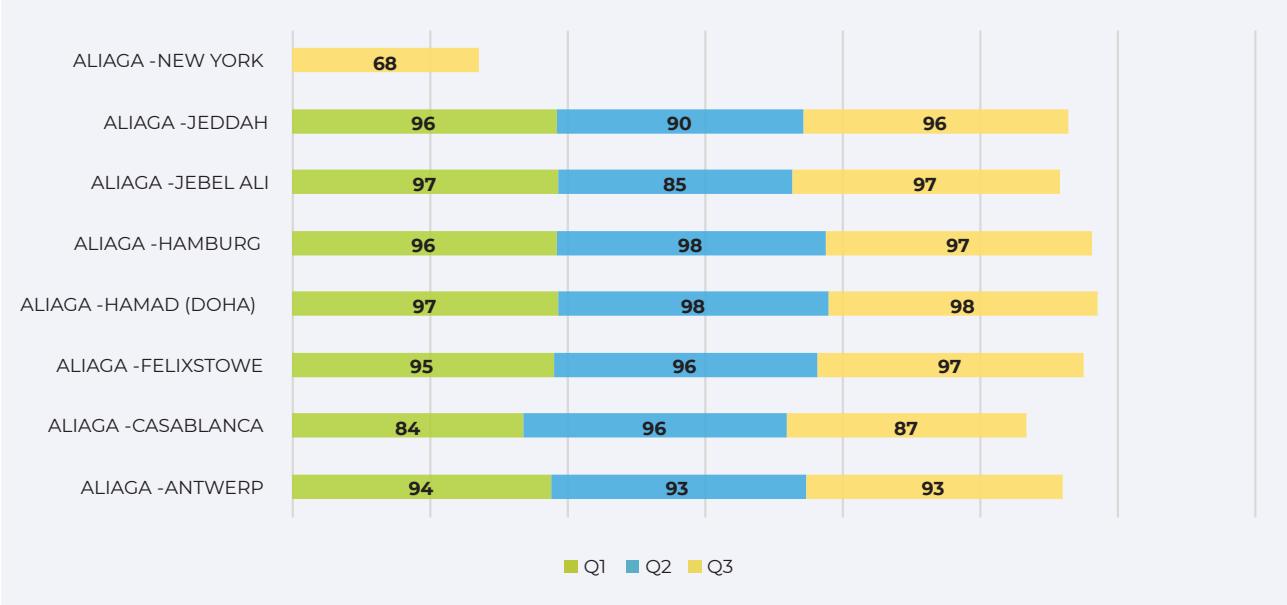
Observations made for only three quarters in 2020 showed that COSCO performed similarly to Hapag-Lloyd in terms of export shipments at the Port of Aliağa. There was minimal variation between the transit times in different quarters, and the lowest reliability rate is observed on the New York route with 64 percent (Graphs 32 and 33).

GRAPH 32. Average Transit Time Performance of COSCO on Select Lines in 2020 – Ports of Aliağa (Days)



Source: ShipsGo Database

GRAPH 33. Transit Time Reliability of COSCO on Select Lines in 2020 – Ports of Aliağa (%)



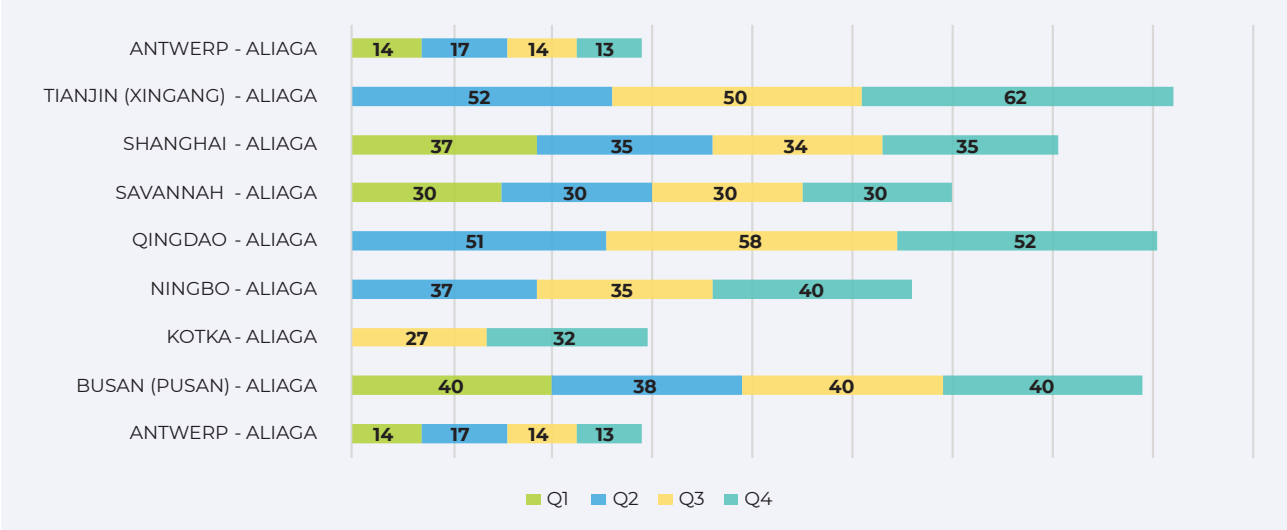
Source: ShipsGo Database

FIGURE 5. Ports of Aliağa Shipowner Performance on Select Routes

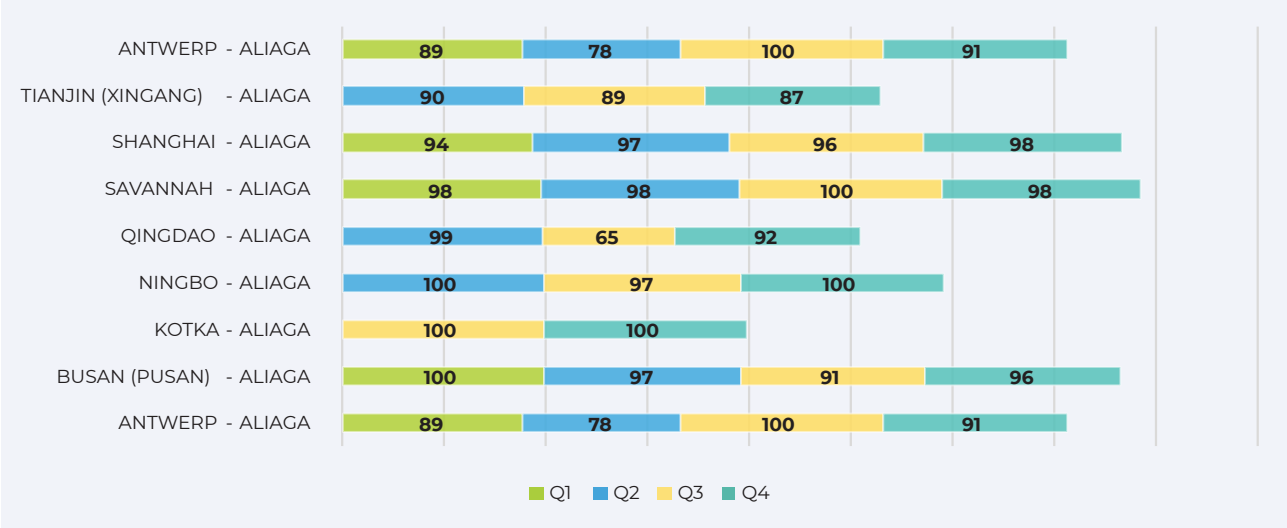
8.2. Analysis of Transit Times and Transit Time Reliability of the Import Shipments at the Ports of Aliağa

The transit time performances of Hapag-Lloyd and Maersk shipowners on select routes were analyzed based on the number of observations of the import shipments at the Ports of Aliağa. Hapag-Lloyd's transit time on the Xingang–Aliağa route was longer in the fourth quarter of 2020, while transit times varied on the Qingdao–Aliağa and Ningbo–Aliağa routes. Hapag-Lloyd had the lowest transit time reliability on the Qingdao–Aliağa route with 65 percent in the third quarter (Graphs 34 and 35).

GRAPH 34. Average Transit Time Performance of Hapag-Lloyd on Select Lines in 2020 – Ports of Aliağa (Days)

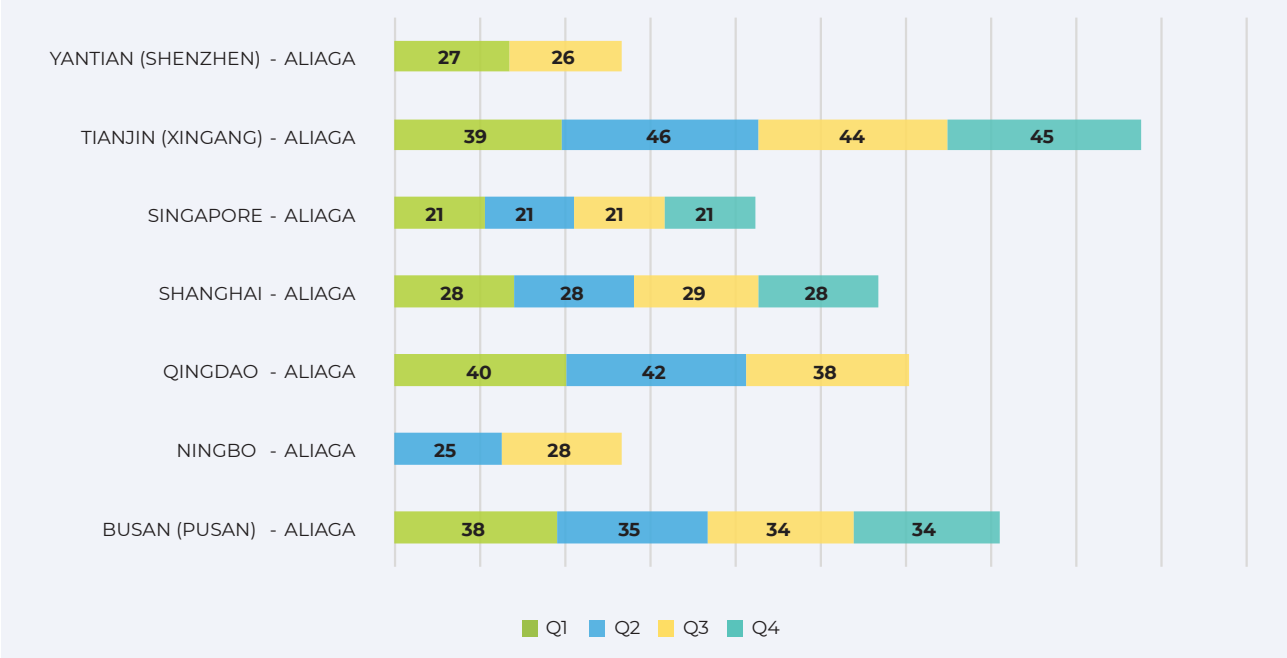


GRAPH 35. Transit Time Deviation Reliability of Hapag-Lloyd on Select Lines in 2020 – Ports of Aliağa (%)

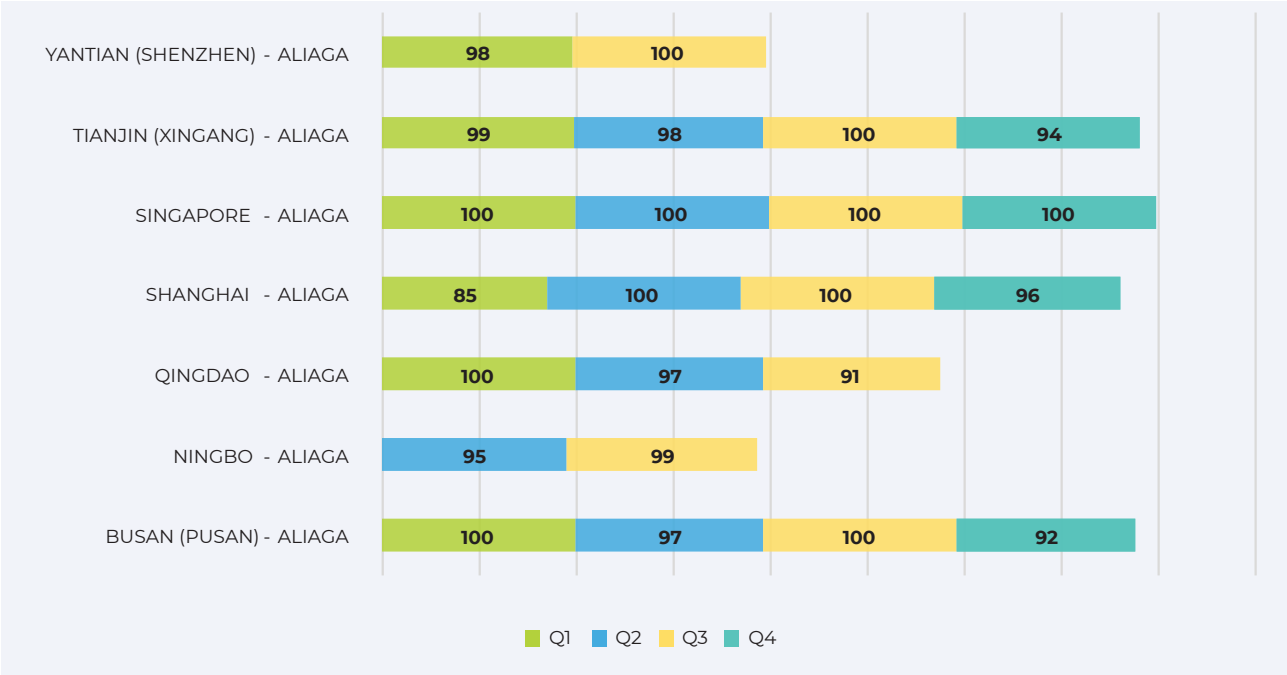


An analysis of import shipments of Maersk shows that there are significant transit time variations, especially on the Qingdao–Aliağa route, and their transit time reliability is quite high (Graphs 36 and 37).

GRAPH 36. Average Transit Time Performance of Maersk Line on Select Lines in 2020 – Ports of Aliağa (Days)



GRAPH 37. Transit Time Reliability of Maersk Line on Select Lines in 2020 (%)

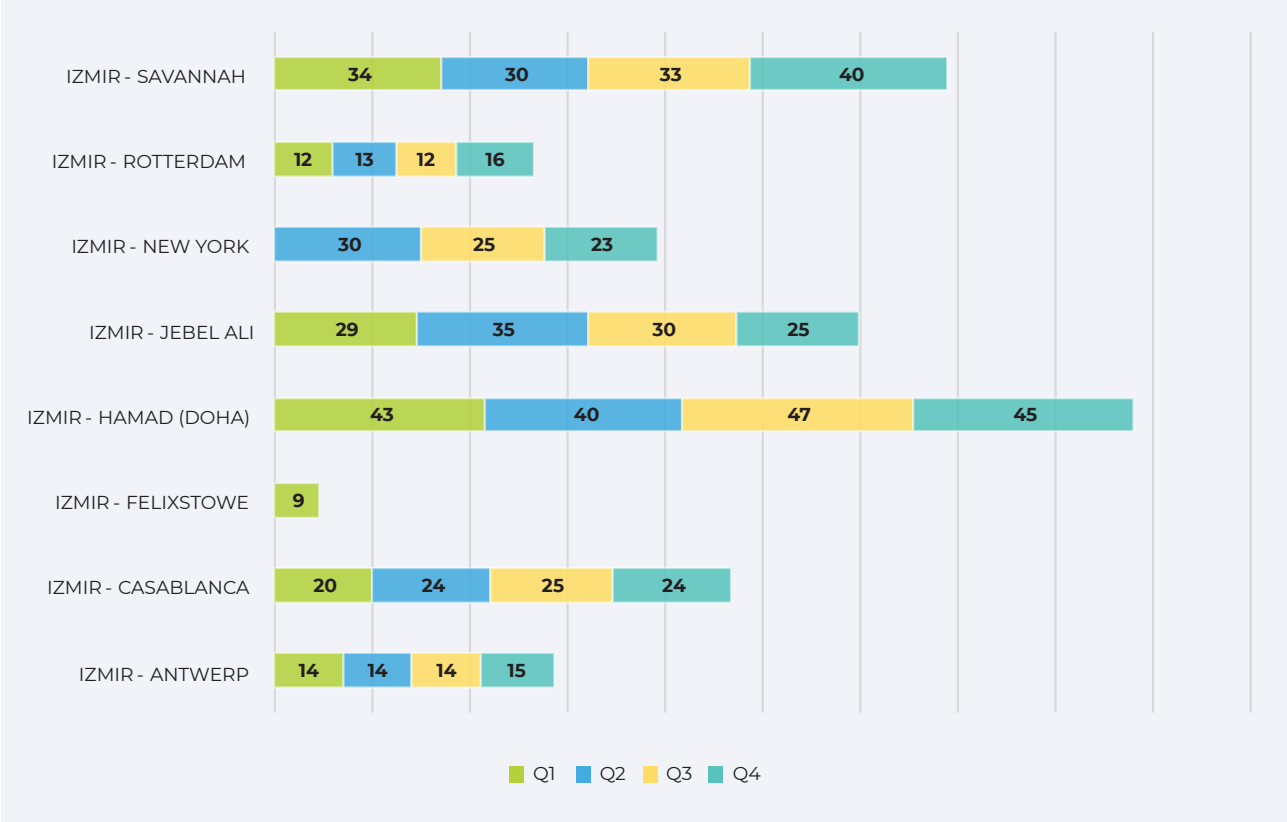


8.3. Analysis of Transit Times and Transit Time Reliability of the Export Shipments at the TCDD Port of İzmir

The change in transit times and transit time reliability of MSC, Hapag-Lloyd and COSCO shipowners experienced at the TCDD Port of İzmir in 2020 on select lines was analyzed on a quarterly basis.

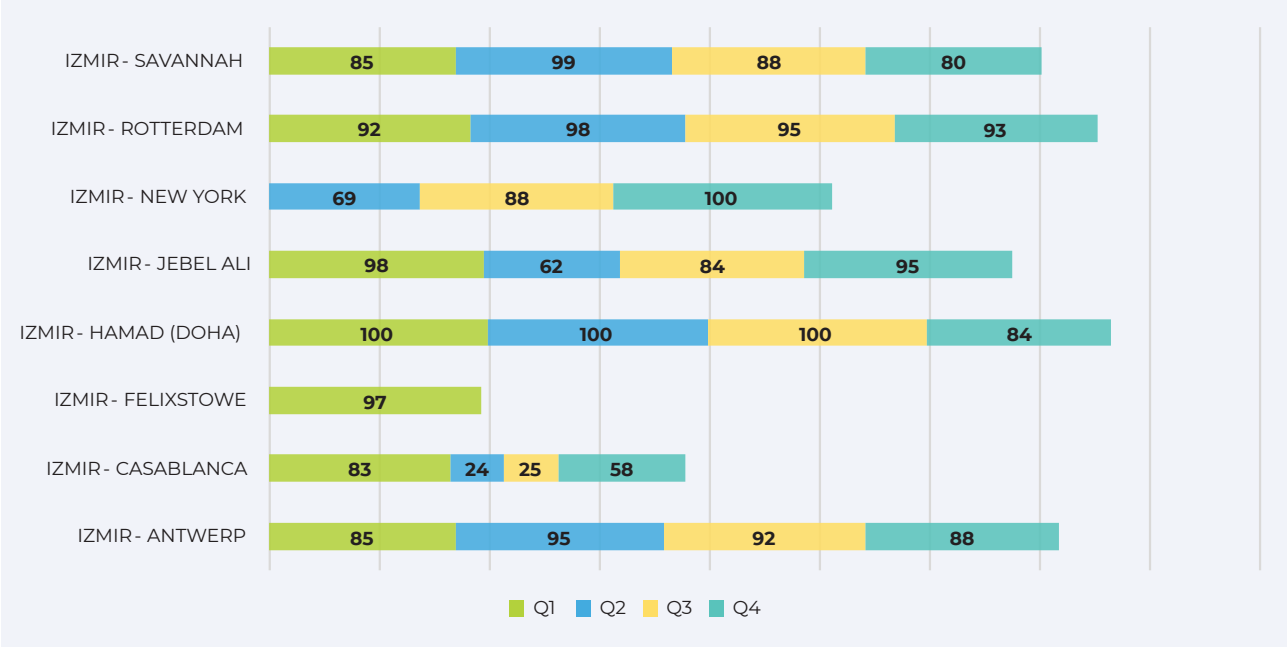
Except for the İzmir–Antwerp line, the transit time of MSC varies significantly in the relevant quarters and lines. This is reflected in the company's transit time reliability. The İzmir–Casablanca line is a good example, with a reliability rate as low as 24 percent. MSC's best transit time reliability performance was on the İzmir–Doha line, which then dropped to 84 percent in the last quarter (Graphs 38 and 39).

GRAPH 38. Average Transit Time Performance of MSC on Select Lines in 2020 – Port of İzmir (Days)



Source: ShipsGo Database

GRAPH 39. Transit Time Reliability of MSC on Select Lines in 2020 – Port of İzmir (%)

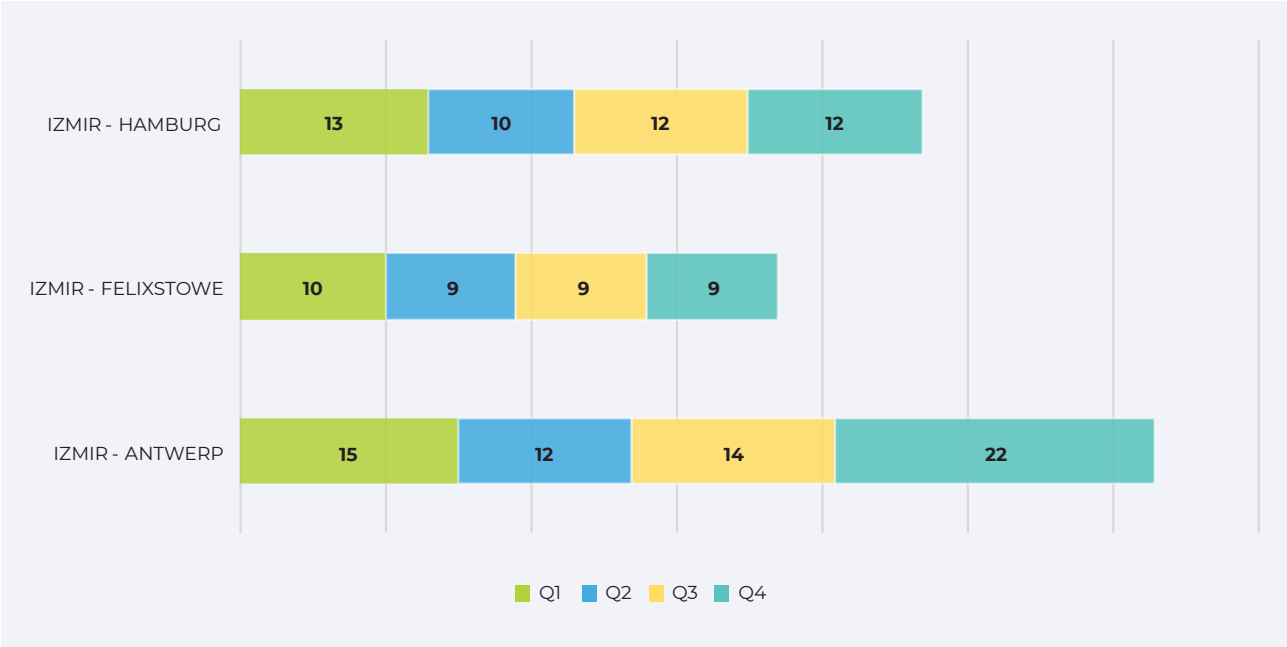


Source: ShipsGo Database

An analysis of only three lines of Hapag-Lloyd shows that their transit time varies significantly in the last quarter, especially on the Antwerp line (Graph 40).

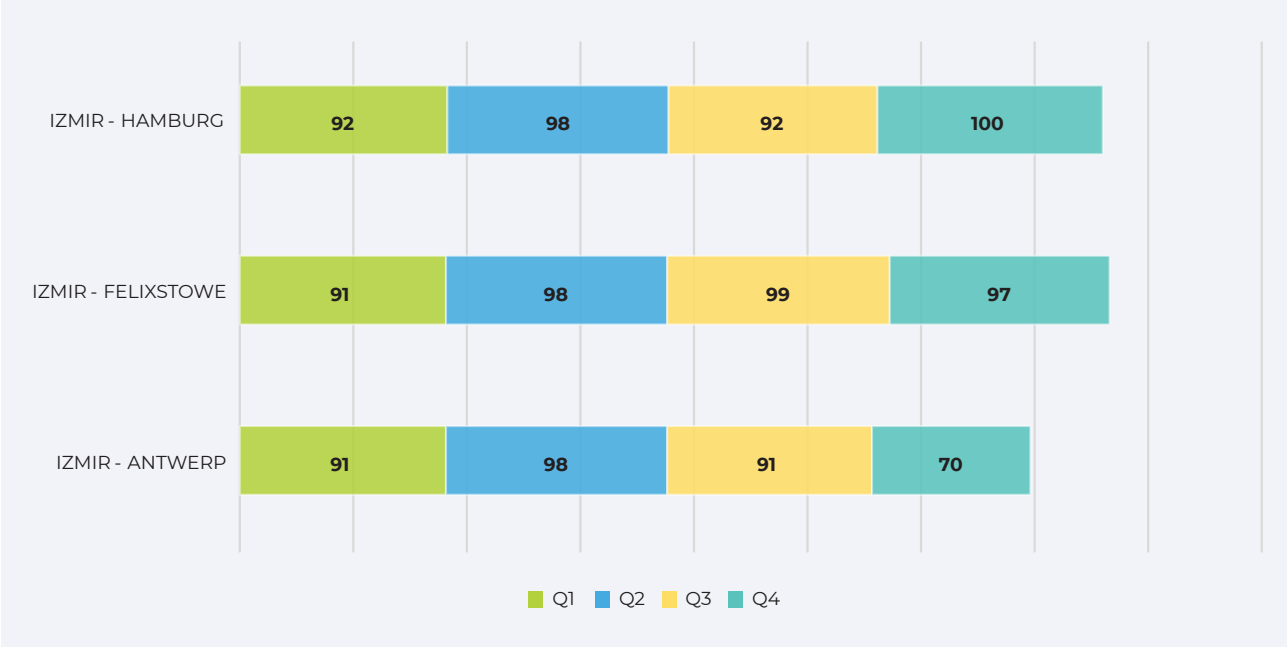
It is also observed that the transit time reliability on the said line is lower than on other lines on a quarterly basis (Graph 41).

GRAPH 40. Average Transit Time Performance of Hapag-Lloyd on Select Lines in 2020 – Port of İzmir (Days)



Source: ShipsGo Database

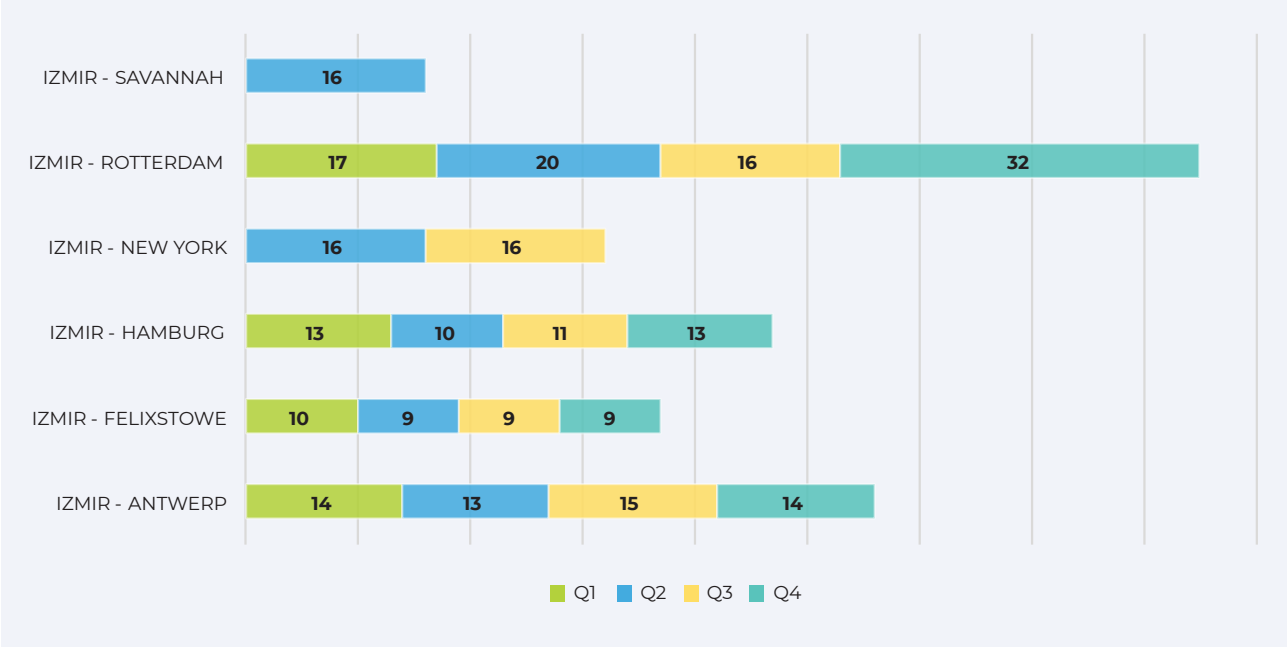
GRAPH 41. Transit Time Reliability of Hapag-Lloyd on Select Lines in 2020 – Port of İzmir (%)



Source: ShipsGo Database

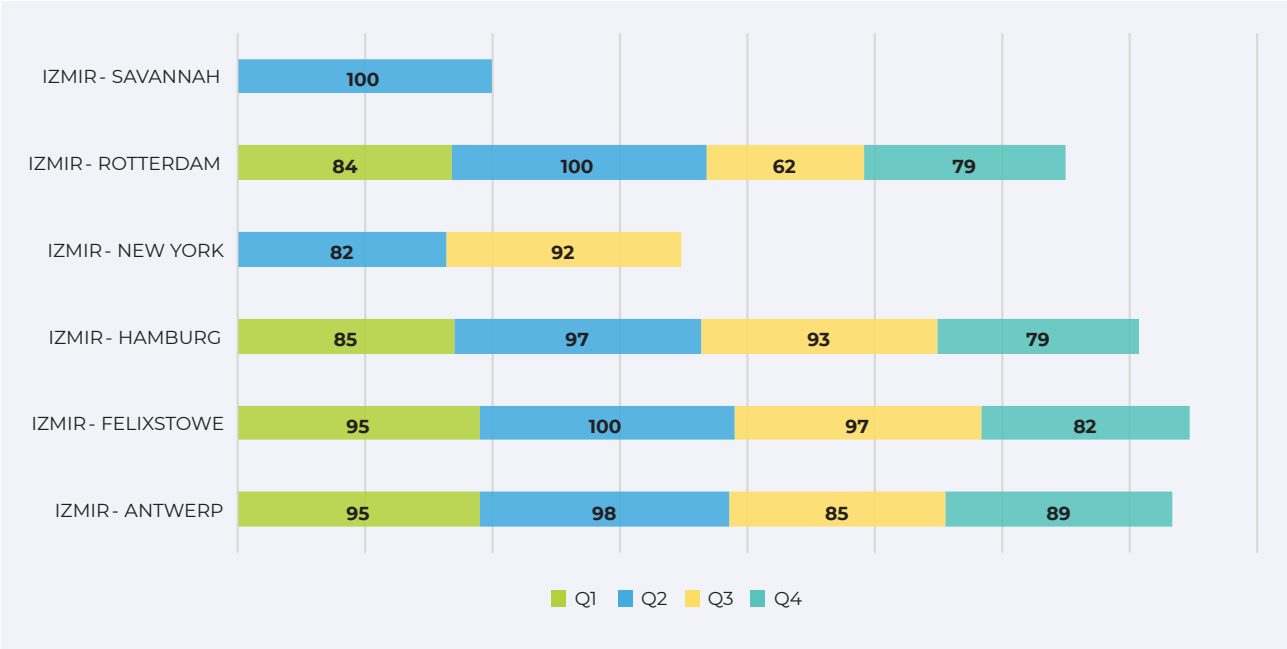
COSCO's transit time variations were not too large on a quarterly basis. However, transit time varied significantly on the İzmir–Rotterdam line in the last quarter of 2020 (Graph 42). This is observed in transit time reliability as well (Graph 43).

GRAPH 42. Average Transit Time Performance of COSCO on Select Lines in 2020 – Port of İzmir (Days)



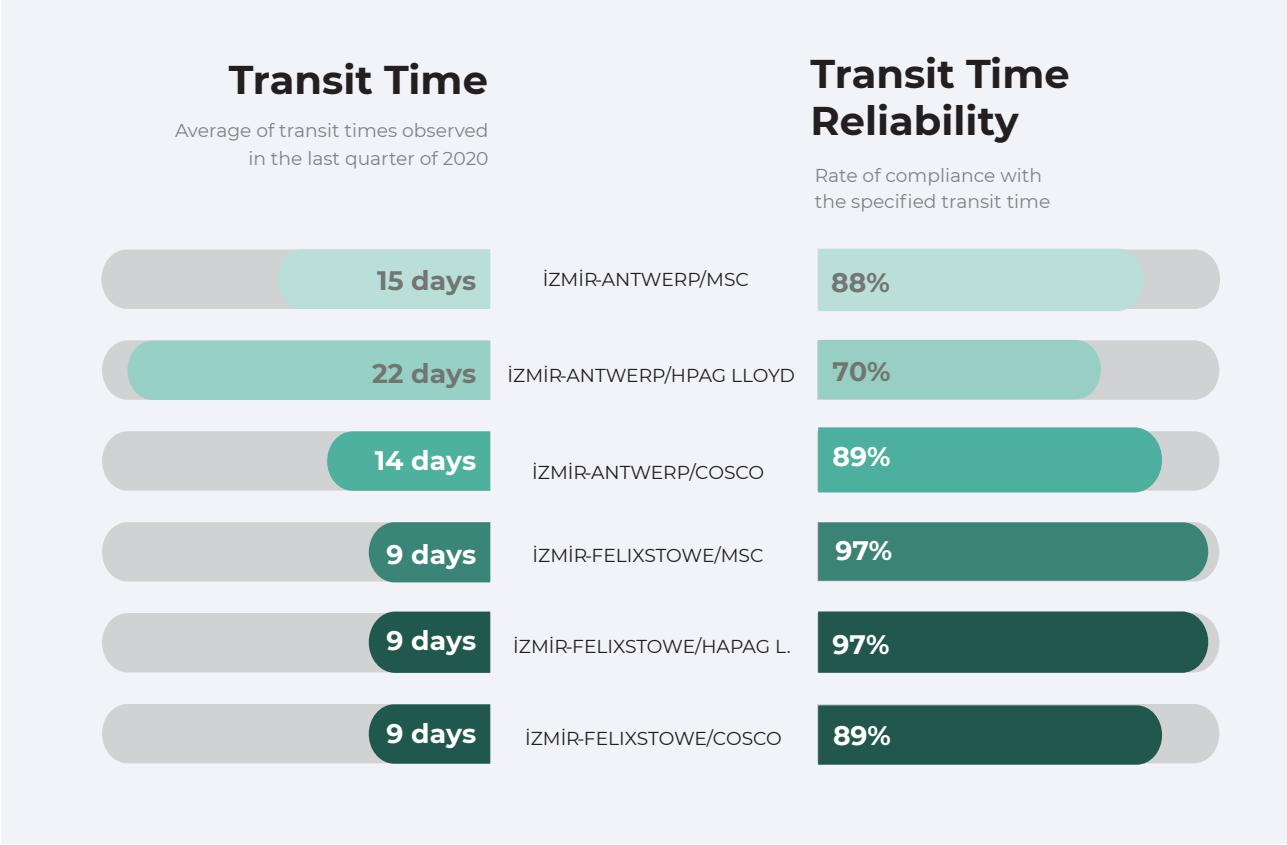
Source: ShipsGo Database

GRAPH 43. Transit Time Reliability of COSCO on Select Lines in 2020 – Port of İzmir (%)



Source: ShipsGo Database

FIGURE 6. Port of İzmir Shipowner Performance on Select Routes



8.4. Comparison of Shipowners' Timely Arrival Rates to the Port of İzmir and Ports of Aliağa with Select Ports

In the previous chapters, both transit times and transit time reliability of shipowners' export shipments at ports were analyzed based on select routes. This chapter will evaluate the timely arrival rates of import shipments at the Port of İzmir and the Ports of Aliağa together with the Ports of the Mediterranean. First, the performances of select shipowners in each quarter within the last three years will be evaluated, followed by graphs of the ports observed in each quarter of 2020. The numbers in parentheses next to the ports in the tables indicate the total number of observations.

It is observed that MSC achieved a rather high timely arrival rate at the Port of Haifa. The rate reached 53.8 percent in the fourth quarter of 2020. Even though the Mersin International Port did not perform as well as the Port of Haifa, it took second place with a rate of 22.8 percent in the fourth quarter of 2020.

The value obtained from the Ports of Aliağa for one quarter (Q3) in 2020 was rather low. Values were also very low in 2018. The four observations made over the last three years for the Ports of Aliağa give a limited indication of performance.

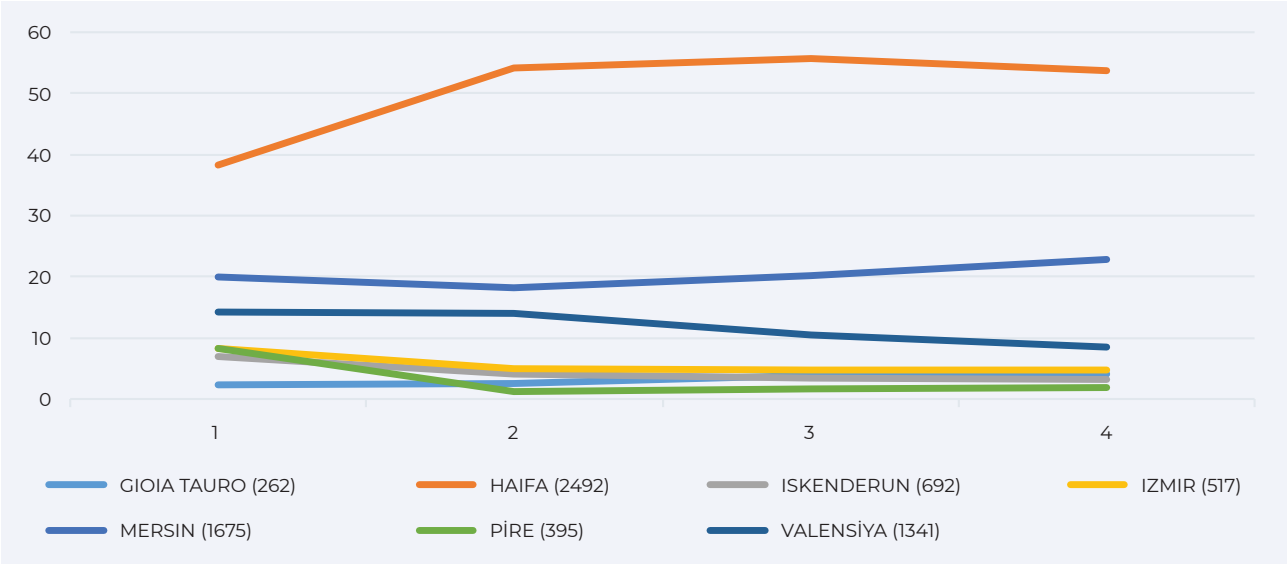
As for the Port of İzmir, 517 observations were made over three years, returning very low values once again (Table 4 and Graph 44). These values are similar to the low rates experienced by shipowners around the world, which will be further detailed in subsequent analyses. It is worth noting that such delays, especially in import shipments, may be problematic for production output.

TABLE 4. Comparison of MSC's Timely Arrival Performance at Select Ports (%)

		2018				2019				2020			
PORTS	**Observation**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
ALGECIRAS	47	–	–	–	0	–	0.4	1.2	0	0.4	0.5		0.6
ALIAGA	4	–	2.9	3.7	–	–	–	0.1	–	–	–	–	–
GIOIA TAURO	262	–	–	–	4.8	0.8	4	6.3	2.4	2.3	2.5	3.9	4.1
HAIFA	2,492	100	29.4	37	33.7	26.6	28.5	30.5	22.9	38.2	54.1	55.8	53.8
ISKENDERUN	692	–	–	7.4	4.8	11.7	15.6	9.5	6.2	7	4.2	3.4	3.3
IZMIR	517	–	–	7.4	8.4	10.9	7.4	7.2	5.9	8.2	4.9	4.7	4.7
MALTA	38	–	–	–	1.2	1.6	0.5	0.9	–	1.5	0.2	–	0.2
MERSIN	1,675	–	17.6	29.6	32.5	17.2	17.7	13.2	28.8	19.9	18.3	20.2	22.8
PIRE	395	–	–	–	2.4	11.7	9.4	9.6	6.5	8.2	1.2	1.6	2
VALENSİYA	1,342	–	50	14.8	12	19.5	16.3	21.6	27.4	14.2	14.1	10.6	8.6

Source: ShipsGo Database

GRAPH 44. Comparison of MSC's Timely Arrival Performance at Select Ports – 2020 (%)



Source: ShipsGo Database

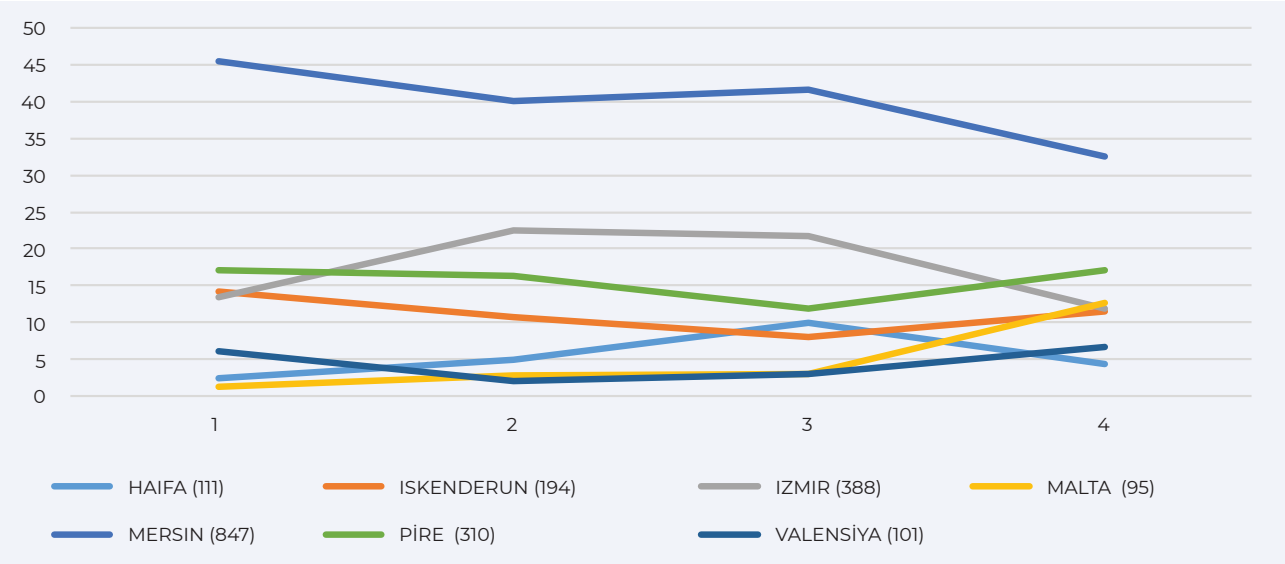
Analysis of COSCO's timely arrival rates to select ports shows that the company's highest performance is at the Mersin International Port. This value was 32.5 percent in the fourth quarter of 2020. Performance of the Port of İzmir, which increased in the second (22.5 percent) and third quarters of 2020 (21.8 percent), decreased (11.9 percent) in the fourth quarter. The Port of İzmir ranks second in timely arrival performance, right after the Mersin International Port. No observations were made for COSCO's import shipments at the Ports of Aliağa (Table 5 and Graph 45).

TABLE 5. Comparison of COSCO's Timely Arrival Performance at Select Ports (%)

		2018				2019				2020			
PORTS	**Observation**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
ALGECIRAS	22	–	0	6.7	0	0	5.0	3.3	0.9	0	0	0.3	3.2
ALIAGA	0	–	–	–	–	–	–	–	–	–	–	–	–
GIOIA TAURO	0	–	–	–	–	–	–	–	–	–	–	–	–
HAIFA	111	–	–	–	–	–	30	8.3	12.8	2.4	5	10	4.4
ISKENDERUN	194	–	–	–	4.1	9.5	5	5.0	11.1	14.2	10.7	8.1	11.5
IZMIR	388	–	–	–	4.1	9.5	10	8.3	6	13.4	22.5	21.8	11.9
MALTA	95	–	–	–	0	–	–	–	0.9	1.2	2.9	3.1	12.7
MERSIN	847	–	33.3	93.3	87.8	47.6	5	56.7	49.6	45.5	40	41.7	32.5
PIRE	310	–	66.7	0	4.1	33.3	40	15	16.2	17.1	16.4	11.8	17.1
VALENSİYA	101	–	0	–	–	–	5	3.3	2.6	6.1	2.1	3.1	6.7

Source: ShipsGo Database

GRAPH 45. Comparison of COSCO's Timely Arrival Performance at Select Ports – 2020 (%)



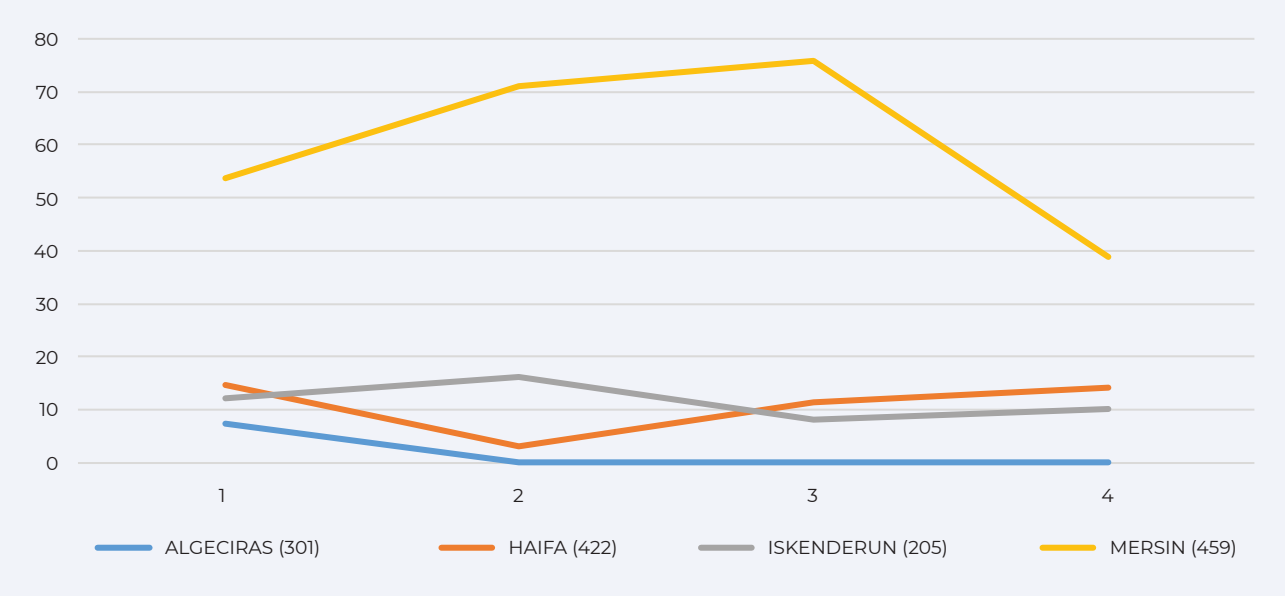
Source: ShipsGo Database

Analysis of Maersk's timely arrival performance shows that the company achieved the highest timely arrival rates at the Mersin International Port. Even though the high performance in the second (71 percent) and third quarters (75.8 percent) of 2020 decreased in the fourth quarter (38.8 percent), the value is still rather significant. Observations made for the Ports of Aliağa in the last quarter of 2020 reveal a timely arrival performance of 20.4 percent. There were no sufficient observations for Maersk at the Port of İzmir. With low performance all around, Maersk could not maintain timely arrival at other ports either (Table 6 and Graph 46).

TABLE 6. Comparison of Maersk Line's Timely Arrival Performance at Select Ports (%)

		2018				2019				2020			
PORTS	**Observation**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
ALGECIRAS	301	-	-	-	-	-	13,7	20,2	10,8	7,3	0	0	0
ALIAGA	198	-	-	99,4	-	-	0	0,4	4,2	-	-	-	20,4
GIOIA TAURO	9	-	-	-	-	-	3,4	3,2	1,7	-	-	-	-
HAIFA	22	-	-	-	-	50	16,2	12,9	31,7	14,6	3,2	11,3	14,3
ISKENDERUN	05	-	-	0	-	-	10,3	9,9	5	12,2	16,1	8,1	10,2
IZMIR			-	-	-	-	-	-	-	-	-	-	-
MALTA	45	-	-	-	-	-	3,4	1,8	1,7	-	-	1,6	2
MERSIN	459	-	-	0	100	0	29,1	18,1	21,7	53,7	71	75,8	38,8
PIRE	126	-	-	-	0	0	6	9,3	1,7	-	-	1,6	-
VALENSİYA	555	-	100	0	-	50	17,9	24,1	21,7	12,2	9,7	1,6	14,3

GRAPH 46. Comparison of Maersk Line's Timely Arrival Performance at Select Ports – 2020 (%)



Source: ShipsGo Database

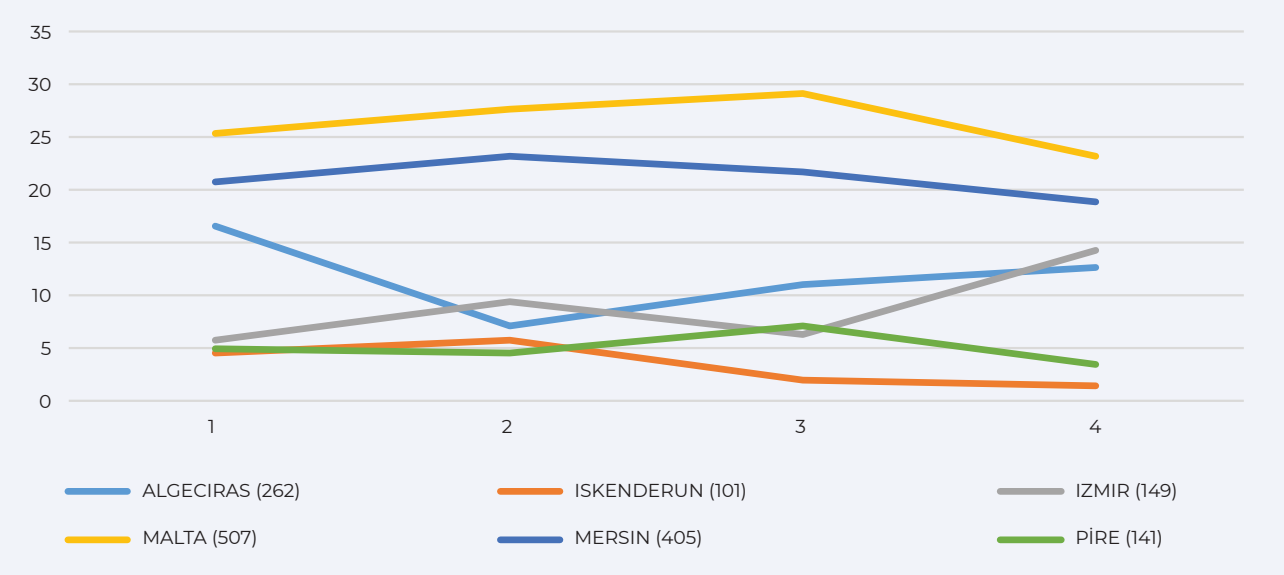
Analysis of CMA CGM's timely arrival performances shows that the Mersin International Port, which had a rate of 18.8 percent in the fourth quarter of 2020, performed similarly to the ports of Malta (23.2 percent and Valencia (26 percent). On the other hand, the Port of İzmir increased its timely arrival rate in the last quarter of 2020 (14.3 percent) (Table 7 and Graph 47).

TABLE 7. Comparison of CMA CGM's Timely Arrival Performance at Select Ports (%)

		2018				2019				2020			
PORTS	**Observation**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
ALGECIRAS	262	–	–	8.3		56.3	15.3	8.6	14.1	16.5	7.1	11	12.6
ALIAGA	6		–	–	8.3	–	–	0.6	–	–	0.4	–	–
GIOIA TAURO		–	–	–	–	–	–	–	–	–	–	–	–
HAIFA		–	–	–	–	–	–	–	–	–	–	–	–
ISKENDERUN	101	–	–	–	4.2	–	7.7	8.3	2.4	4.6	5.8	2	1.4
IZMIR	149	–	–	–	–	–	5.2	7	4.7	5.8	9.4	6.3	14.3
MALTA	507	–	–	41.7	75	23.9	25.8	18.4	38.8	25.4	27.7	29.1	23.2
MERSIN	405	–	–	41.7	4.2	4.2	20.6	20.8	18.8	20.8	23.2	21.7	18.8
PIRE	141	–	–	8.3	8.3	–	12.5	9.2	7.1	5	4.5	7.1	3.4
VALENSİYA	444	–	100	–	–	15.5	12.9	27	14.1	21.5	21.9	22.8	26

Source: ShipsGo Database

GRAPH 47. Comparison of CMA CGM's Timely Arrival Performance at Select Ports – 2020 (%)



Source: ShipsGo Database

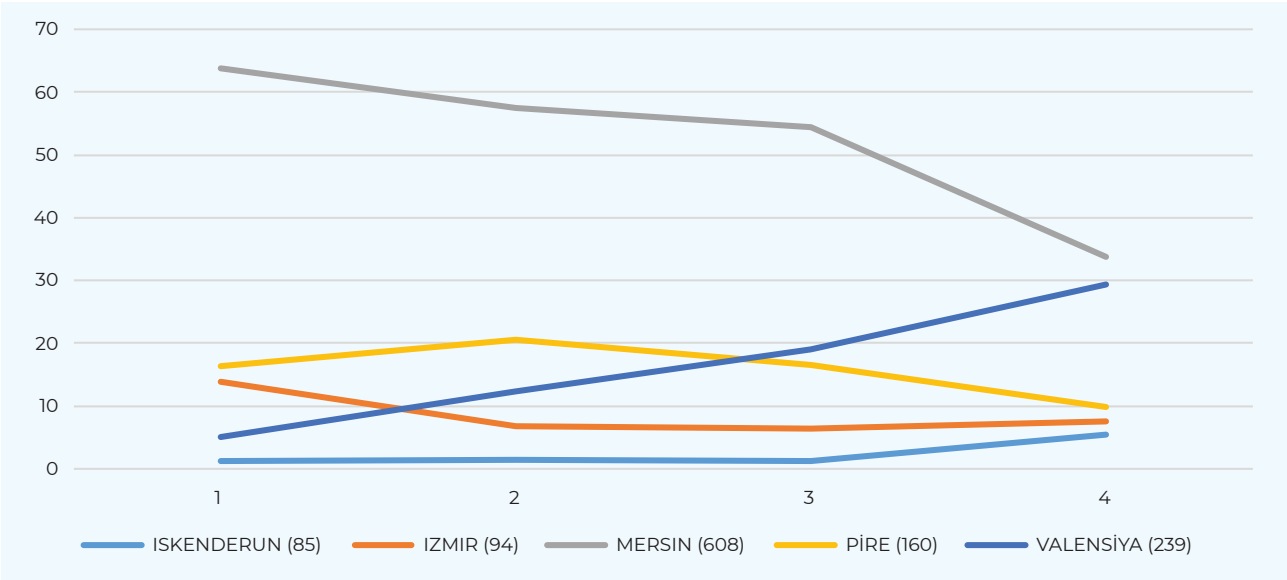
Hapag-Lloyd seems to provide a much higher arrival rate at the Mersin International Port compared to other ports. After achieving 13.8 percent in the first quarter of 2020, the Port of İzmir experienced significant decreases. The Ports of Aliağa had a value of 5.4 percent in the last quarter of 2020 (Table 8 and Graph 48).

TABLE 8. Comparison of Hapag-Lloyd's Timely Arrival Performance at Select Ports (%)

		2018				2019				2020			
PORTS	**Observation**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
ALGECIRAS	30	-	-	-	-	0	9	3,4	-	-	1,4	-	4,3
ALIAGA	9	-	-	-	-	-	-	0,4	-	-	-	-	5,4
GIOIA TAURO		-	-	-	-	-	-	-	-	-	-	-	-
HAIFA	23	-	33,3	-	-	8,3	6,4	3	-	-	-	2,5	1,1
ISKENDERUN	85	-	-	-	0	16,7	10,3	9,1	0,8	1,3	1,4	1,3	5,4
IZMIR	94	-	11,1	25	0	8,3	2,6	4,2	6,1	13,8	6,8	6,3	7,6
MALTA	20	-	11,1	-	-	-	0	3,8	0,8			0	3,3
MERSIN	608	33,3	22,2	75,0	71,4	58,3	32,1	28,8	59,1	63,8	57,5	54,4	33,7
PIRE	160	-	0	-	14,3	0	16,7	17	9,1	16,3	20,5	16,5	9,8
VALENSİYA	239	66,7	22,2	0,0	14,3	8,3	23,1	30,3	24,2	5	12,3	19,0	29,3

Source: ShipsGo Database

GRAPH 48. Comparison of Hapag-Lloyd's Timely Arrival Performance at Select Ports – 2020 (%)



Source: ShipsGo Database

FIGURE 7. Shipowners' Timely Arrival Performances at Select Ports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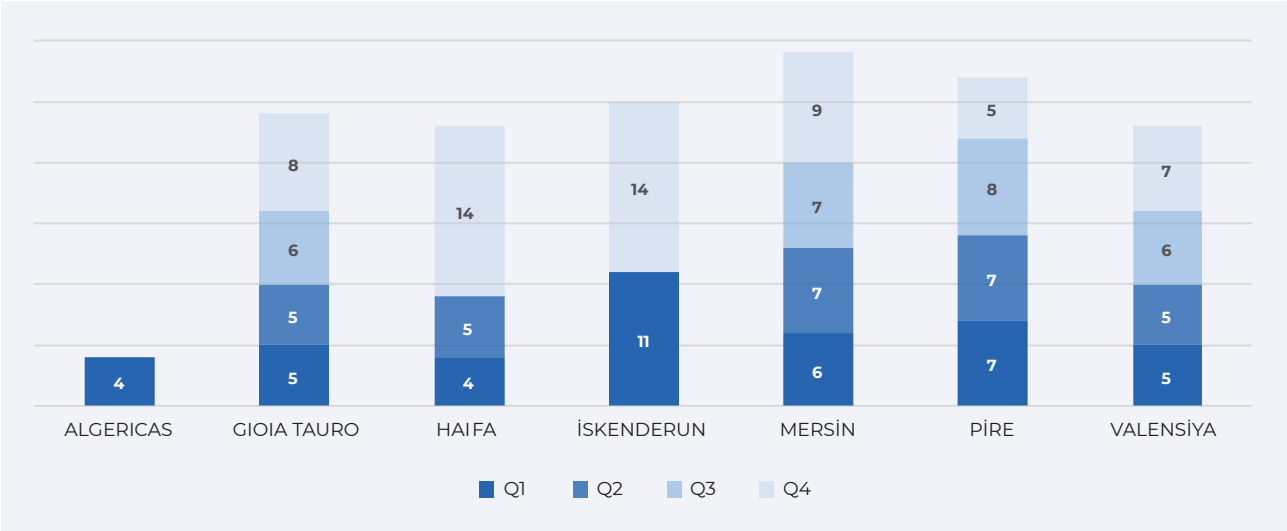
CHAPTER 9.

Analysis of Transfer Times

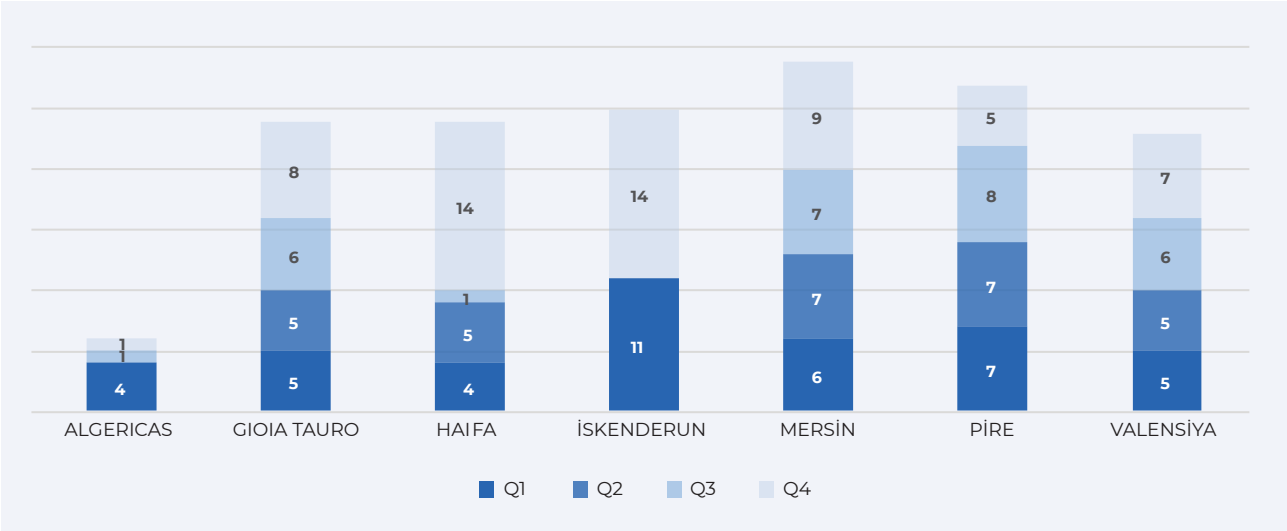
In 2020, only 21 transfer movements were observed in Aliağa Ports. According to the data received from the Ministry of Transport and Infrastructure, the transfer movements at the Ports of Aliağa in 2020 correspond to 5,680 TEUs. The average duration for these movements was 5.3 days. Transfers at the Port of İzmir were insufficient for analyzing purposes. Ministry data also confirms that there were no transit movements at this port in 2020. The transfer times observed at other ports for two shipowners are listed below. It is observed that the average transit time of the Mersin International Port is able to compete with other ports in the Mediterranean (Graphs 49 and 50). As for both Maersk and MSC shipowners, it is observed that the transit times at the Mersin International Port range from six to nine days on a quarterly basis.

GRAPH 49. Analysis of MSC's Transfer Times at Select Ports (2020)



Source: ShipsGo Database

GRAPH 50. Analysis of Maersk Line's Transfer Times at Select Ports (2020)



Source: ShipsGo Database

CHAPTER 10.

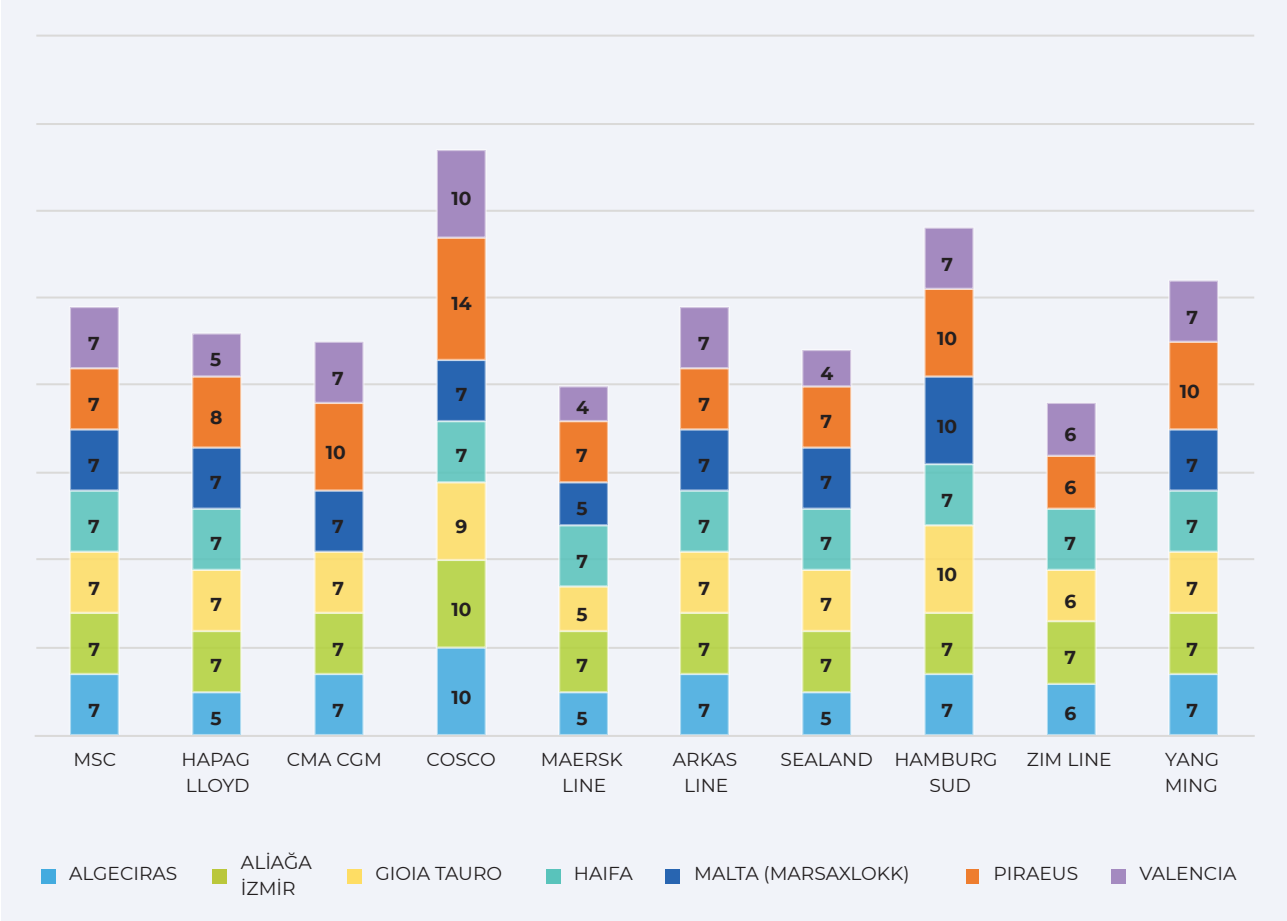
Free Time Analysis

Free time is defined as the period starting with the end of the container's journey at a port and the unloading of the container from the ship. Paid period starts when the specified free time periods are exceeded. These periods are referred to as "demurrage." In other words, free time is the time that the cargo can wait before demurrage charges apply. If a container has not been cleared from the port despite the expiry of the free period, a demurrage charge will apply for each day the container remains at the port. Demurrage may cause significant costs, especially for shippers (exporters/importers). The free time varies depending on the demand for the region and the availability of the port's holding area. Time decreases as demand rises. For instance, four days is the average time for the Port of Singapore, one of the busiest ports in the world.

When it comes to the availability of the port's holding areas, the time may be longer even if the demand is very high. This time is 10 days on average for the Port of Shanghai, the busiest port in the world. Comparisons of free time periods are available in Graph 51.

The average free time allowed by the shipowners at the Port of İzmir and the Ports of Aliağa is seven days. Meanwhile, this period is only 10 days for COSCO shipowners. Accordingly, views shipowners hold towards the Port of İzmir and the Ports of Aliağa are not much different than their views towards the ports in the Mediterranean. In this sense, the Port of İzmir and the Ports of Aliağa are quite similar to the ports in the Mediterranean.

GRAPH 51. Comparison of the Average Free Times of Shipowners at the Port of İzmir and the Ports of Aliağa with Those at the Ports of the Mediterranean



CONCLUSION AND ASSESSMENT

In accordance with the historical background and potential of İzmir, the İzmir Development Agency has prioritized the blue growth approach in the region's development with the goal of developing the region's maritime economy, and maritime transport and port services in particular. The studies aim to strengthen the position of the Ports of İzmir in the cargo and passenger traffic of the Mediterranean, and to increase the industry's contributions to urban economy.

Titled "Big Data Analysis on Container Tracking and Route Search Records in Maritime Transport: Comparative Analysis of the Port of İzmir and the Ports of Aliağa," this report, its analyses and the relevant interpretations were prepared to serve the Blue Growth policies implemented by İZKA. This report, which is based on the "blue data" analyses of a "blue startup," contains a set of unique outputs that can support the consolidation of the positions and strengths of the Port of İzmir and the Ports of Aliağa in container transport. In short, these outputs include shipowners' market shares, number of ports with direct connections, characteristics of docking ships, regions/countries of the shipments, digital performance, transit time deviation, timely arrival rate and transfer times.

ShipsGo platform is a cloud-based application that has been providing global container transport tracking and route search services for almost five years. In the last three years, 202,038 transports, 443,996 containers and 286,281 route searches have been collected on the ShipsGo platform, and all of the aforementioned unique outputs have been derived from this data. The report compares the Port of İzmir and the Ports of Aliağa with other ports of Türkiye (Mersin and İskenderun) and the Mediterranean (Algeciras, Gioia Tauro, Haifa, Malta, Piraeus and Valencia) to the extent allowed by the data set.

Shipowners' Market Shares

In the study, shipowners' market shares were analyzed based on the container tracking data from the ShipsGo platform. These values indicating port efficiency should be considered major findings for determining the market shares of the shipowners using the regional ports in consideration of the statistical significance of the data.

Export shipments as of 2020 show that the Ports of Aliağa are used extensively by three shipowners: MSC, Hapag-Lloyd and CMA CGM. These three shipowners carried out 45.4 percent of the shipments at the ports of Aliağa. As for imports, Maersk is well ahead with 55.9 percent, followed by Hapag-Lloyd and ZIM. From 2018 to 2020, 24 different shipowners docked at the Ports of Aliağa.

Export shipments as of 2020 show that the Port of İzmir is used extensively in export shipments by three shipowners: MSC, COSCO and Evergreen. These three shipowners carried out 76.8 percent of the shipments at the ports of İzmir. In imports, COSCO is well ahead with 46.5 percent, followed by MSC and the Turkon Line. From 2018 to 2020, 23 different shipowners docked at the Port of İzmir.

It is observed that strong shipowners, ranked among the top 10 worldwide, dominate the Port of İzmir and the Ports of Aliağa in market shares. This is also the case for other ports in Türkiye and the Mediterranean. The biggest reason behind this development was the strong fleets and networks of the shipowners as well as the region's cargo potential. These shipowners are very strong in direct port connections, and are very much able to retain foreign trade enterprises for direct shipments.

Shipowners' market shares at the Port of İzmir and the Ports of Aliağa are also significant for the stakeholders of the policy framework that will be developed. For instance, the CO_2 emissions created by the global maritime industry are expected to reach 709 million metric tons by 2025. Even though it is predicted that these values will decrease by 2070, the process must be strictly monitored. It is known that many shipowners declare their GHG and NOx emissions as well as their CO_2 emissions. Shipowners share this information transparently in line with the sustainability principles. Accordingly, the follow-up of the shipowners who serve the region intensively will contribute to the policy development process.

Number of Ports with Direct Connections

The report offers an integrated analysis of the Ports of Aliağa (Nemport, SOCAR Terminal and TCEEGE). As apparent in the report content, this integrated approach gives the Ports of Aliağa significant competitive advantages among ports of both Türkiye and the Mediterranean. For instance, in the number of ports with direct connections, the Ports of Aliağa come right after the ports of Valencia, Algeciras and Mersin with 125 direct connections. Even though the three ports in this region compete with each other, an integrated approach to port area positioning will most likely offer them significant competitive advantages, especially in international markets. Compared to other ports, the Port of İzmir has a very low number of direct connections. As the Ports of Aliağa are private ports, they are able to meet the shipowners' expectations of more flexible working conditions.

Even though the Port of İzmir is making an effort to serve foreign trade enterprises in its hinterland in both export and import shipments, its competitive advantages are not all that significant. The lower number of direct port connections of the Port of İzmir may be associated with the problems experienced in port infrastructure and operational processes. The improvements to be made in the infrastructure and operational processes are expected to accelerate the development of the Port of İzmir.

Along with the number of ports with direct connections, the number of shipowners serving the connected port is also a key indicator. However, this indicator is not very high at the Port of İzmir and the Ports of Aliağa. Considering that there are 154 direct services carried out by 62 shipowners between the Ningbo and Shanghai ports according to the data from UNCTAD, this value is achieved by 10 shipowners (two direct connections) between Aliağa and Shanghai, and by nine shipowners between İzmir and Shanghai. The number of shipowners in question is at most 12 for other routes from the Port of İzmir and the Ports of Aliağa.

Characteristics of Ships Docking at the Port of İzmir and the Ports of Aliağa

According to the data from UNCTAD, the average gross metric tonnage value of ships docking at ports around the world was 14,960 in 2019, while their maximum gross metric tonnage value was 234,006. These values show significant similarities with the Port of İzmir and the Ports of Aliağa. For instance, the largest ship docking at the Ports of Aliağa in 2020 was measured at 202,036 gross metric tons, and the largest ship docking at the Port of İzmir in 2020 was measured at 202,371 gross metric tons. These values show that the region's ports accept ships of the same sizes as ports around the world, providing them with competitive power. These findings reveal that larger ships can dock at both the Port of İzmir and the Ports of Aliağa. It can be said that the draft issue of the Port of İzmir is not a major obstacle since larger ships are still able to dock at the port. This is because the occupancy rates of the docking ships have a direct impact on the draft.

Shipment Regions/Countries

According to ShipsGo data, the regions with the highest number of shipments from the Ports of Aliağa in 2020 were Northern Europe (23.15 percent), the Mediterranean (15.28 percent), the Middle East (12.9 percent), Asia (14.32 percent) and North America (10.35 percent). Ranking by country in 2020 was the United States (9.61 percent), Germany (8.85 percent), China (9.28 percent), Spain (5.84 percent) and Britain (5.95 percent). There was no significant proportional change between 2019 and 2020.

As of 2020, the regions with the highest number of shipments from the Port of İzmir are the Mediterranean (30.85 percent), Northern Europe (27.47 percent), North America (8.54 percent), Asia (13.38 percent), and North Africa (4.09 percent).

Ranking by country showed that the United States' large share of 17.15 percent in 2019 decreased significantly to 7.41 percent in 2020, while Israel's share of 5.73 percent in 2019 increased significantly to 12.98 percent in 2020.

It can be said that the Port of İzmir and the Ports of Aliağa are significantly similar to the Mersin International Port in terms of shipment regions, with Saudi Arabia (6.22 percent) and Qatar (7.41 percent) emerging as the prominent countries.

Digital Performance

The report also discusses the digital performance of the ports. Carried out for the first time in Türkiye and in the world, this evaluation is a result of the analysis of route searches on the ShipsGo platform.

The ShipsGo platform allows its users to search routes (between two ports), which demonstrates which shipowners are working on the searched route and their transit time performance. These searches made by users (mostly foreign trade enterprises and logistics enterprises) on the ShipsGo platform are considered to be innovative and unique measurement values that demonstrate the demand for both the route and the relevant port. The search data in question provides inputs for ports to position themselves in terms of marketing, and enables them to compare themselves with the competition on the most searched routes. The study also discusses the popularity of the ports' websites. The lack of an official and comprehensive website for the Port of İzmir is considered to be a major shortcoming.

The analysis covers 286,281 route searches from 2020. The Mersin International Port being ahead in route searches, followed by the Ports of Aliağa, is a key parameter that shows the digital performance of these ports and the corresponding demand. The project also includes the most searched export routes from the said ports and reveals potential (highest demand) routes. These outputs are significant variables that can be used in the investment, production and marketing planning of the region's ports and users.

Transit time deviation and timely arrival rates

The transit time reliability and timely arrival rates of shipowners carrying out container transport operations are considered key issues. These issues are important because they reveal the efficiency of the supply chain both for ports and the entire region. The inability of shipowners to deliver very high performance in these parameters is a major global issue. For instance, in November 2020, the average timely arrival rate of shipowners was as low as 50.1 percent due to the global pandemic. Until now, no such measurements or comparisons with the competition have been made for the ports of Türkiye. This study determines and compares shipowners' "transit time reliability" in export shipments, and "timely arrival" in import shipments.

Timely arrival performances seem to be lacking for both the Port of İzmir and the Ports of Aliağa. However, this is also the case for other ports in Türkiye and the Mediterranean. It is possible to say that the Mersin International Port is in a better position compared to other ports in Türkiye. Even though the transit time reliability values calculated for export shipments are not very high, they are still in the "acceptable" range. Outputs are predominantly associated with shipowner performance. However, ports also have an impact (equipment efficiency, congestion, etc.) on this performance, albeit a modest one. The absence

of such internal data on ports in the ShipsGo database prevents carrying out this particular evaluation for the Port of İzmir and the Ports of Aliağa. Ports are able to perform customized analyses with their own internal data.

It is also worth noting that the expectations of deviations in transit times are not critical for every industry or business. While this aspect is critical for drop shipping businesses, it is not considered to be critical for other businesses. Considering the tendency of supply chains to operate with agility and therefore with the drop shipping model, minimizing these deviations is critical.

Transfer Times

In 2020, only 21 transfer movements were observed in Aliağa Ports. According to the data received from the Ministry of Transport and Infrastructure, the transfer movements at the Ports of Aliağa in 2020 correspond to 5,680 TEUs. The average duration for these movements was 5.3 days. Transfers at the Port of İzmir were insufficient for analyzing purposes. Ministry data also confirms that there were no transit movements at this port in 2020. It is observed that the average transit time of the Mersin International Port is able to compete with other ports in the Mediterranean.

Study shows that the Port of İzmir and the Ports of Aliağa do not follow the “transfer port positioning” approach for their operations. While the “Port of Çandarlı” is currently in the planning stage, it will take a long time before the construction of this transit port is finished. Considering the proximity of the Port of İzmir with the Ports of Aliağa, these ports taking joint action, particularly to become transit ports, may have a significant impact on both shipowners and other port users. The findings in this report should be considered in terms of the ports’ strengths and weaknesses, and an integrated transit center policy should be established for the region. It is predicted that this integrated approach will also contribute significantly to the common use of resources and to the Blue Growth policies prioritized for İzmir by the İzmir Development Agency (İZKA).

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ANNEXES

Annex 1. Population and Sampling Plan of Container Tracking Data

ANNEX TABLE 1. Population and Sampling Plan of the Port of İzmir

YEARS	Export Shipments (TEU)	Import Shipments (TEU)	Total (TEU)
2018/Realized	266,426	308,085	574,511
2018/ShipsGo Sample	4,518	229	4,747
Sample Confidence Interval; Margin of Error	99%; ±2%	95%; ±5%	99%; ±2%
2019/Realized	253,586	261,207	514,793
2019/ShipsGo Sample	13,854	978	14,832
Sample Confidence Interval; Margin of Error	99%; ±2%	95%; ±5%	99%; ±2%
2020/Realized	278,945	287,328	566,273
2020/ShipsGo Sample	28,442	4,941	33,383
Sample Confidence Interval; Margin of Error	99%; ±1%	99%; ±2%	99%; ±1%

ANNEX TABLE 2. Population and Sampling Plan of the Ports of Aliağa

YEARS	Export Shipments (TEU)	Import Shipments (TEU)	Total (TEU)
2018/Realized	498,122	417,053	915,175
2018/ShipsGo Sample	4,459	622	5,081
Sample Confidence Interval; Margin of Error	99%; ±2%	99%; ±5%	99%; ±2%
2019/Realized	592,472	503,563	1,096,035
2019/ShipsGo Sample	23,494	1,765	25,259
Sample Confidence Interval; Margin of Error	99%; ±1%	99%; ±4%	99%; ±1%
2020/Realized	651,719	553,919	1,205,639
2020/ShipsGo Sample	86,467	3,906	90,373
Sample Confidence Interval; Margin of Error	99%; ±1%	99%; ±3%	99%; ±1%

ANNEX TABLE 3. Population and Sampling Plan of the Mersin International Port

YEARS	Export Shipments (TEU)	Import Shipments (TEU)	Total (TEU)
2018/Realized (TEU)	820,550	793,997	1,614,547
2018/ShipsGo Sample (TEU)	2,434	1,476	3,910
Sample Confidence Interval; Margin of Error	99%; 3%	99%; 3%	99%; 3%
2019/Realized (TEU)	921,595	863,830	1,785,425
2019/ShipsGo Sample (TEU)	76,794	6,796	83,590
Sample Confidence Interval; Margin of Error	99%; 2%	99%; 2%	99%; 1%
2020/Realized (TEU)	1,013,755	950,213	1,963,968
2020/ShipsGo Sample (TEU)	134,013	13,576	147,589
Sample Confidence Interval; Margin of Error	99%; 1%	99%; 1%	99%; 1%

ANNEX TABLE 4. Population and Sampling Plan of the Port of İskenderun

YEARS	Export Shipments (TEU)	Import Shipments (TEU)	Total (TEU)
2018/Realized	253,965	251,389	505,354
2018/ShipsGo Sample	1,258	326	1,584
Sample Confidence Interval; Margin of Error	99%; ±4%	–	99%; ±4%
2019/Realized	331,047	341,575	672,622
2019/ShipsGo Sample	9,980	2,527	12,507
Sample Confidence Interval; Margin of Error	99%; ±4%	99%; ±3%	99%; ±2%
2020/Realized	375,733	739,884	1,115,617
2020/ShipsGo Sample	31,311	3,535	34,846
Sample Confidence Interval; Margin of Error	99%; ±1%	99%; ±3%	99%; ±1%

ANNEX TABLE 5. Population and Sampling Plan of Other Ports in the Mediterranean

	2018			2019			2020		
Ports	Actual Value TEU	ShipsGo Sample TEU	Confidence Interval; Margin of Error	Actual Value TEU	ShipsGo Sample TEU	Confidence Interval; Margin of Error	Actual Value TEU	ShipsGo Sample TEU	Confidence Interval; Margin of Error
Algeciras	4,773,158	1,399	99%; ±4%	5,125,385	23,585	99%; ±1%	5,105,800	26,335	99%; ±1%
Gioia T.	2,328,218	44	–	2,522,876	1,268	99%; ±5%	2,699,477	719	99%; ±5%
Haifa	1,469,000	1,435	99%; ±4%	1,615,900	8,523	99%; ±2%	1,777,490	21,421	99%; ±1%
Malta	3,312,559	533	–	3,484,812	9,076	99%; ±2%	3,833,293	11,716	99%; ±1%
Piraeus	4,900,000	3,284	99%; ±3%	5,650,000	23,968	99%; ±1%	5,480,000	36,505	99%; ±1%
Valencia	5,200,000	3,430	99%; ±3%	5,400,000	32,584	99%; ±1%	5,724,000	31,675	99%; ±1%

Annex 2. Population and Sampling Plan of Route Searches

ANNEX TABLE 6. Annual Route Searches in the ShipsGo Database and the Data Used in the Study

	2018	2019	2020
Total Searches	117,022	202,589	519,654
Data Used in the Study	36,09	65,753	184,438
Representing	30.84%	32.46%	35.49%

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