

ANALYSIS OF FOREIGN VESSEL TRAFFIC AND ITS ECONOMIC IMPACT ON THE PORT OF KLAIPEDA *ĀRVALSTU KUGU SAIKSMES UN TĀS EKONOMISKĀS IETEKMES UZ KLAIPĒDES OSTU ANALĪZE*

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Abstract. *The port of Klaipeda, situated on Lithuanian's Baltic Sea coast, serves as a pivotal hub for maritime trade. Foreign ships play a crucial role in transporting diverse cargo to this port, facilitating international trade and economic growth. These vessels, representing various countries, navigate the Baltic Sea to deliver goods ranging from raw materials to finished products. The influx of foreign ships into Klaipeda underscores the port's significance in global commerce and highlights Lithuania's integration into the broader maritime network. Understanding the dynamics of foreign ship traffic to Klaipeda is vital for comprehending the port's role in regional and international trade.*

Keywords: *cargo vessels, economic implications, logistics, port of Klaipeda, water transport.*

Introduction

Water transport in logistics have been and still is one of the cheapest ways of transport in the industry, although the shipments consumes the most time compared to the others ways of transport like rail transport or road transport. In Lithuania there are only two main ports: port of Klaipeda and port of Butinge, but the main one is port of Klaipeda, among the biggest ports in Baltic sea. It makes life easier for Lithuania since they can easily access foreign countries in further distance through the seas or oceans. Tons of shipments have been through water and it continues perfectly working to this day.

The aim of research is to find out what kind of and how many ships of foreign countries transport cargo to the port of Klaipeda.

Objectives of the research are:

- To present types of cargo vessels.
- To analyze logistical considerations.
- To analyze economic implications.
- To compare Klaipeda and Riga ports.

The object of the research is to present the difference of the cargo ships that arrives to Lithuania, port of Klaipeda.

Research methods: statistical and comparative analysis.

The results are displayed at the end of the article in conclusions section.

Characteristics of cargo vessels

The Klaipeda State Seaport, situated in the Klaipeda Strait, serves as a non-freezing, all-encompassing deep-water harbour. Annually, approximately 6,000 vessels from nearly 50 countries dock at this port. It accommodates a diverse array of ship types that consistently navigate to and from the port of Klaipeda. These vessel categories encompass:

1. Bulk carriers: are ships designed to transport bulk commodities such as grain, coal, and ore. Their massive cargo holds play a crucial role in facilitating global trade.
2. Container Ships: Klaipeda port handles container vessels, which carry standardized shipping containers. These containers hold a variety of goods, from electronics to textiles, facilitating efficient transportation across continents.
3. Tankers: Oil tankers and chemical tankers dock at Klaipeda to load or unload liquid cargo. They ensure a steady supply of petroleum products and chemicals.
4. Ro-Ro (Roll-on/Roll-off) Vessels: These specialized ships transport wheeled cargo, including cars, trucks, and trailers. Ro-Ro ramps allow vehicles to roll on and off the vessel easily.
5. Ferries: Klaipeda serves as a gateway for passenger and cargo ferries connecting Lithuania with Sweden and Germany. These vessels provide essential transportation links for both people and goods.
6. General Cargo Ships: Versatile general cargo vessels carry a mix of goods, including machinery, steel, and project cargo. They adapt to various cargo requirements.
7. Cruise ships: Cruise liners visit the port of Klaipeda, allowing tourists to disembark and explore the city and its surroundings. These ships offer amenities and entertainment (Klaipėdos uostas, 2024b).

Klaipeda Port's strategic location and efficient facilities attract a diverse fleet of ships, contributing to regional and international commerce.

Having analyzed the table data provided by the official statistics portal, it is evident that ships from various countries reached the port of Klaipeda (see Table1).

Table 1

Number of arrivals of vessels at seaports 2018 - 2022 (Oficialiosios statistikos portalas, 2023)

| Contry. | Number of ships calling at seaports pcs. | | | | |
|---|--|-------|-------|-------|-------|
| | 2018 | 2019 | 2020 | 2021 | 2022 |
| Total by country. | 7 163 | 6 860 | 6 520 | 6 619 | 5 679 |
| <u>Antigua and Barbuda</u> | 512 | 538 | 475 | 437 | 364 |
| <u>Bahamas</u> | 139 | 142 | 114 | 83 | 86 |
| <u>Belize</u> | 15 | 12 | 17 | 26 | 5 |
| <u>Denmark</u> | 174 | 223 | 185 | 273 | 463 |
| <u>Estonia</u> | 20 | 6 | 17 | 61 | 46 |
| <u>Gibraltar</u> | 108 | 105 | 91 | 58 | 42 |
| <u>Greece</u> | 34 | 29 | 17 | 14 | 22 |
| <u>Italy</u> | 39 | 50 | 33 | 28 | 11 |
| <u>United Kingdom</u> | 44 | 43 | 37 | 70 | 22 |
| <u>China</u> | 26 | 13 | 22 | 20 | 12 |
| <u>Cyprus</u> | 366 | 436 | 618 | 639 | 723 |
| <u>Latvia</u> | 65 | 86 | 66 | 48 | 75 |
| <u>Poland</u> | 34 | 22 | 6 | 18 | 15 |
| <u>Liberia</u> | 201 | 191 | 214 | 215 | 231 |
| <u>Lithuania</u> | 2 905 | 2 444 | 2 267 | 2170 | 1 501 |
| <u>Malta</u> | 282 | 283 | 274 | 251 | 230 |
| <u>Marshall Islands</u> | 236 | 171 | 153 | 159 | 123 |
| <u>The Netherlands</u> | 535 | 585 | 511 | 555 | 417 |
| <u>Norway</u> | 135 | 129 | 160 | 181 | 180 |
| <u>Panama</u> | 186 | 154 | 166 | 162 | 160 |
| <u>Portugal</u> | 129 | 120 | 114 | 192 | 256 |
| <u>Russia</u> | 163 | 153 | 102 | 121 | 30 |
| <u>Saint Vincent and the Grenadines</u> | 116 | 104 | 114 | 131 | 59 |
| <u>Finland</u> | 129 | 124 | 104 | 92 | 91 |
| <u>Sweden</u> | 16 | 27 | 38 | 37 | 31 |
| <u>Germany</u> | 215 | 276 | 214 | 205 | 189 |

Of all the ships, 26 % were from Lithuania, 13 % from Cyprus, 8 % from Denmark, and 7% from the Netherlands. These four countries accounted for more than half of all the arriving

ships. In addition, a trend was observed that the number of ships arriving decreases over the years. Potential factors that could influence the decrease in the number of ships arriving at the port of Klaipeda include the war in Ukraine and related sanctions, economic trends, industry changes, and changes in the types of cargo. Despite these challenges, the port of Klaipeda continues to invest in infrastructure and environmental protection, aiming to ensure sustainable development.

Logistics considerations

Logistical challenges and infrastructure

The port of Klaipeda is the most important and largest transport center of Lithuania - where the sea, land and railway routes from the east and west connect. During the year, the port can transship more than 70 million tons of various cargoes and has trade relations with 70 different countries. Cargo in the port moves 24/7, so specialists are constantly needed here, whose duty is to ensure that the cargo moves smoothly. Seaport logisticians are a very important part of seaports. They analyze and plan cargo movement routes, take care of cargo storage, their reception and movement from the port, coordinate the arrival of ships and cargo preparation. There are 109 different companies who are engaged in many kinds of expeditioning that are associated with Port of Klaipeda (*Klaipėdos uostas, 2024d*). There are 19 large cargo companies operating in the port (the largest is AB "Klaipeda sea cargo company"), shipyard AB "Baltijos laivų statykla", ship repair companies (the largest is AB "Laivitė" ship repair workshop), all of which are provided with maritime business and cargo service-related services (*Geografija, 2014*).

In Lithuania the main challenge sea transport faces is the lack of depth and ships with bigger draft depth can't transport cargo through inland waters. As the port of Klaipeda is linked to the Baltic Sea it has more capabilities of transport and because of that the port can accommodate ships with a length of 400 m, a width of 59 m and a draft depth of 14.3 m. Geographical area of Klaipėda is effective for exchange among eastern and western Europe, however it additionally faces demanding situations because of it functioning within the Baltic Sea territory, which may face harsh climate, particularly at colder winters. But unlike other ports located further north, the port of Klaipėda does not freeze even in the coldest winters, guaranteeing uninterrupted shipping and loading operations (*Klaipėdos uostas, 2024a*).

Port Capacity, Storage Facilities, and Transportation Networks

The port of Klaipėda is the leader in container transshipment among the ports of the Baltic countries. Shipping lines to the main port of Europe and other continents pass through the port of Klaipėda that has a capability of annual cargo capacity of 70 million tons of cargo. The average load dynamics of the port is about 40 million tons per year. Lithuanian cargo is mainly transported through Klaipėda sea port; transit accounts for about 40% of port cargo. (*Klaipėdos uostas, 2024e*).

As it is stated in the graph (see Figure 1), the load dynamics of 2023 were 32.7 million tons of cargo. And we can see that in 2020 when the pandemic started, the loads were as high as 47.8 million tons, but has been decreasing since that time. The decrease is caused by loss of nearly all transit cargo due to the war in Ukraine and related sanctions. The decrease in transit cargo, which mainly consisted of Belarussian bulk fertilizer, was partially compensated by a record number of containers twenty-foot equivalent unit' (TEU) and increase in liquefied natural gas (LNG) and other petroleum product cargo volumes (*Port of Klaipėda, 2023*). A TEU is a measure of volume in units of twenty-foot-long containers (*Maersk, 2024*) and LNG is natural gas that has been converted liquefied for ease of storage or transport (*Student energy, 2024*).

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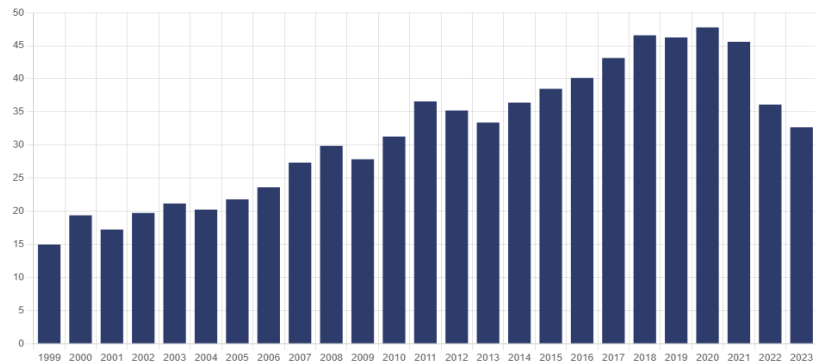


Figure 1. Annual dynamics of cargo handling in the Port of Klaipėda 1999 - 2023
(Klaipėdos uostas, 2024c)

The area of covered warehouses in the port is 99,380 m², open storage areas - 1,045,879 m², the volume of liquid cargo tanks is 749,000 m³, refrigerators - 66,000 tons, bulk cargo warehouses - 933,700 tons. These storage facilities are adapted for the main types of cargo that circulates in the Port of Klaipėda. Main types of cargos are:

- Fertilizers – 32.2 %;
- Containers – 15.4 %;
- Ro-ro – 12.4 %;
- Oil – 12 %;
- Grains – 9.7 %;
- LNG – 3 %;
- Others – 15.3 % (Port of Klaipėda, 2024).

Transportation network is multimodal transport that combines multiple modes of transportation for cargo delivery which is beneficial when the cargo's unique characteristics and other relevant conditions are needed to meet. For example, grains and LNG cargo is more beneficial to transport by railway than by road transport. Road transport can be more useful if the delivery time is important and another factor for road transport is to deliver the goods with “door-to-door” services.

Economic implications

Today, Lithuania boasts a modern and efficient shipping industry, with well-developed ports and a strong logistics network. The country's main port - Klaipėda Seaport handles a significant volume of cargo and passenger traffic, contributing substantially to the national economy. Ships arriving in Lithuania facilitate international trade and commerce, allowing businesses to import and export goods to and from different parts of the world. The number one export of Lithuania is refined petroleum which makes up 11.7 % of total exports led by furniture which makes up 4.77 % of exports. To accommodate the need for growth of petroleum industry Lithuania is making further investments in its oil and liquid energy terminal development. In 2026 the first hydrogen filling station will be built in Klaipėda port; this project will substantially increase ports competitiveness in Baltic region. The other substantial project being built is the cruise ship terminal, which will fill the increasing demand in the region. This project is estimated to generate 3.6 million euros per year to the port and surrounding businesses. These projects will increase the attractiveness of the port and increase the arrival of new ships. Klaipėda multimodal port is home to 14 large ship repair and cargo handling companies which create more than 58 thousand workplaces. This ports activity's make up 6.13 % of entire Lithuanian gross domestic product. Lithuania's maritime sector is changing because of technological innovations like automation, digitization, and environmentally friendly shipping

options. Lithuanian ports can boost productivity, lessen their environmental effect, and remain ahead of the curve in a world market that is changing quickly by embracing innovation and implementing sustainable practices. In the long run, Lithuania's maritime sector seems to have a bright future full of growth and expansion prospects. Lithuania may profit economically from ships calling at its ports and maintain its position as a major participant in the Baltic maritime industry by making investments in infrastructure, technology, and human resources.

Comparison of Klaipėda and Riga ports

Both ports in Klaipėda and Riga are major ports, located in the Baltic Sea region, serving as crucial hubs for trade, transportation, and maritime activities. Here's a comparison of the two ports across various aspects (see table 2).

Table 2

Comparison of Klaipėda and Riga ports

(compiled by authors from Port of Klaipėda, 2024; Freeport of Riga, 2024)

| Criteria | Klaipėda port | Riga port |
|--------------------------------------|---|--|
| Location and accessibility | Placed in Lithuania, with a strategic location on the Eastern coast of the Baltic Sea. It offers convenient access to both, the Baltic States and landlocked Eastern European countries. | Located in Latvia, Riga Port is positioned on the Gulf of Riga, which provides direct access to the Baltic Sea. It serves as a gateway to Latvia and it's neighboring countries. |
| Size and capacity | It is the largest port in Lithuania and one of the biggest in the Baltic region. It has extensive infrastructure for handling various types of cargo, including containers, bulk, and general cargo. | While not as large as Klaipėda Port, Riga Port is still a significant maritime facility in the Baltic region. It has modern terminals capable of handling diverse types of cargo, including containerized, bulk, and Roll-on/Roll-off cargo. |
| Cargo handling | Known for its specialization in handling liquid bulk cargo, particularly oil and LNG. It also handles other types of cargo such as containers, dry bulk, and general cargo. | Riga Port handles a diverse range of cargo types, including containers, bulk cargo (such as coal, grain, and ore), Ro-Ro cargo, and general cargo. It has terminals specialized in various types of cargo handling. |
| Infrastructure and facilities | It has modern infrastructure and facilities, including deep-water berths, specialized terminals, storage facilities, and rail connections. The port is continually investing in upgrading its facilities to accommodate growing cargo volumes and larger vessels. | Similarly, Riga Port boasts modern facilities and terminals equipped with advanced cargo-handling equipment. It has invested in improving its infrastructure to enhance efficiency and attract more shipping lines. |
| Trade and connectivity | Due to its strategic location and connectivity to major transportation networks, Klaipėda Port serves as a vital gateway for trade between Europe, the Baltic States, and countries further east. | Riga Port plays a crucial role in facilitating trade between Latvia, the Baltic region, and countries in Eastern Europe and beyond. It serves as a key transit hub for cargo moving between Europe and Russia/CIS countries. |
| Environmental initiatives | Both ports have been increasingly focusing on environmental sustainability and implementing measures to reduce emissions, minimize environmental impact, and promote eco-friendly practices. This includes investments in cleaner technologies, waste management systems, and renewable energy sources. | |

While Klaipėda and Riga ports may compete for some cargo traffic, they also engage in cooperation initiatives, such as joint marketing efforts to attract shipping lines and investment in infrastructure projects that benefit the Baltic region as a whole.

Conclusions

1. Statistical analysis revealed that the number of arrived ships has fallen. In 2018 7163 (counting Lithuania's ships) arrived in port of Klaipėda and in 2022 only 5679 (counting Lithuania's ships), although there are variety of foreign ships that arrived to the port.
2. Overall, the port of Klaipėda, robust infrastructure, and dynamic adaptation to changing market conditions it as a cornerstone of Lithuania's transportation and trade ecosystem, ensuring continued connectivity and economic vitality for the region and beyond.
3. Lithuania's main port has developed a lot in the past decade to a modern and efficient shipping industry, with strong logistics network. In the future it sees to surprise everyone even more beginning with hydrogen filling station that is expected to be built in 2026.
4. Klaipėda and Riga ports are vital hubs for maritime trade in the Baltic Sea region, each offering its unique advantages and serving as key drivers of economic growth and connectivity for their respective countries and the broader Baltic states.

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