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The Last 5 Years of Maritime Shipping: Special Focus on Trade Relations between Hungary and China

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Abstract

Today, it has become unthinkable for a company to produce its products using only local raw materials and semi-finished products. Thus, economic systems depend highly on cheaper raw materials from other continents or semi-finished and finished products. One obvious solution for transporting these raw materials is to use maritime transport. In this research, the trends in sea container transport over the last 5 years have been examined in terms of sea container transport and Hungary's main trading partners, with a special focus on China. As a starting question, the impact of the pandemic period on the value of sea freight trade was formulated. In addition, the volumes of containers handled worldwide were examined, and how the European and Asian regions reacted to the impact of the virus. The research concluded that although the COVID-19 virus has affected and transformed the entire world, in many respects, the maritime transport industry has remained a stable and prominent industry during the period under study. In addition, in terms of trade, although Germany and the European Union are certainly Hungary's main trading partners, the trade relationship with China has been growing in recent years, especially in terms of import values, and it is important to highlight the Republic of Korea in terms of the same trend.

Keywords

maritime transport, container shipping, Covid 19 impact, trade relations, China

1 Introduction

The economics of maritime shipping are intertwined with global trade dynamics to form a complex system. Its expansion is due to factors such as the geographical location of the extraction of raw materials or the outsourcing of the assembly of goods and products, primarily to countries in the Far East, to serve Western culture's industrial needs (Rodrigue, 2024). Maritime freight transport is one of the main drivers of global trade, as about 80 % of the world trade volumes are transported by ship (Gere and Simigh, 2016). This mode of transport is economical and efficient, especially over long distances and for large volumes of goods. Container ships, oil tankers, bulk carriers, and other specialized vessels transport various goods, including electronics, vehicles, raw materials, foodstuffs, and energy carriers (Notteboom et al., 2022).

Global transport routes are vital to international trade and economic growth (Bernek et al., 2023). The location and importance of routes depend on several factors, including geography, location of economic centers, and geopolitical context (Guerrero et al., 2022). The importance and layout of maritime routes have changed over time as a result of economic development and technological advances (Erdősi, 2022). In addition, it is important to note the importance of ports as the main hubs of these trade routes and the technological developments that have occurred there (Mańkowski and Charłampowicz, 2024). Among these, containerization has significantly impacted the configuration of transport routes through innovative services. Before containerization, loading or unloading a ship was costly and time-consuming, and a cargo ship typically spent more time in port than at sea (Erdélyi, 2024). Routes have typically developed between assembly and production plants in Southeast Asia and the primary user base in North America and Europe. The Asian region, especially China, has become one of the major centers for container transport thanks to the country's massive export capacity and its key role in the global supply chain (Miklós, 2024). Europe and North America are major players in this market, with

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several high-traffic ports. The steady increase in global container traffic shows that container transport is essential for modern trade (Wang et al., 2025). Container transport is a key element of logistics that has a significant impact on global trade networks.

According to the latest United Nations Conference on Trade and Development (or UNCTAD for short) global trade analysis, global trade will reach a record $ 33 trillion in 2024, an increase of 3.7 % ($1.2 trillion) over the previous period. However, while trade looks to remain strong, several factors could offset this growth in 2025, such as rising geo-economic and geopolitical tensions and trade disputes. Fig. 1 shows the annual change in the value of trade in goods and services over the past period.

This affects not only global trade chains and relationships but also the current economic situation in our country. Maritime transport is a key element of global trade, and the following is a literature review of its development, with a special focus on the challenges of the recent past.

2 Literature review

Maritime freight transport has undergone significant changes over the past five years. At the start of the COVID-19 pandemic, transport costs rose dramatically as closures and ports disrupted global supply chains became congested (Grzelakowski, 2023; USITC, 2020). Container prices peaked in September 2021 and then gradually declined but did not return to pre-plague lows, which in some cases led to a reversal of global trends, favoring local production (Bálint and Illés, 2022; Ferrari et al., 2023). Nevertheless, the costs of land transport have not decreased to the same extent, especially in Europe due to the energy crisis (Jenei et al., 2025). For the Hungarian economy, the changes in maritime transport have posed significant challenges, especially in the manufacturing and logistics sectors. Increasing costs of imported raw materials and components have increased production costs, while the competitiveness of exported products has decreased due to higher transport costs (Huszárik et al., 2024).

Fig. 1 Annual growth in the value of trade in goods and services, 2019 Q1 – 2025 Q1 (UNCTAD, 2025)

Maritime transport accounted for 13.5 % of the EU's total transport-related GHG emissions, much lower than road transport (71 %) and slightly lower than air transport (14.4 %) (Al-lami and Török, 2025; Vierth et al., 2024). The sector has taken significant steps to reduce its environmental hazard, not necessarily just emissions (Rodriguez, 2023). The use of alternative fuels such as liquefied natural gas (LNG) has also come to the fore as it reduces emissions while maintaining the efficiency of long-distance shipping (Park et al., 2024). However, sustainability and protecting the environment are still significant challenges for the sector (Łuczyszyn, 2024). For example, underwater noise from ships' engines and propellers can cause hearing loss and behavioral changes in marine animals, and underwater noise energy emitted in EU waters more than doubled between 2014 and 2019 (EMSA and EEA, 2021). In addition, maritime transport is also the primary contributor to the introduction of alien species, which can invade new habitats by clinging to the hull of ships or traveling in the ship's ballast water, disrupting and even destroying local ecosystems (EMSA and EEA, 2021). Further action is needed to improve the sector's sustainability, particularly to reduce emissions and protect marine ecosystems.

Trade relations between Hungary and China have developed significantly in recent years. Trade between the two countries has more than tripled in the last decade. China is Hungary's ninth most important trading partner and the largest investor outside Europe (Goreczky, 2019). Hungarian exports to China consist mainly of wine, medical devices, and pharmaceuticals, while Chinese imports are mainly electronics and machinery. The development of trade relations between the two countries has also been supported by the 'Eastern Opening' policy, which aims to strengthen economic ties between Hungary and Asia. One of the most important elements of the Hungarian- Chinese economic relations is the Belt and Road Initiative (BRI), which creates synergies not only with the development strategies of Hungary but also with those of European countries (Buzna et al., 2024). The Belt and Road Initiative (BRI) is one of China's most ambitious economic and geopolitical projects, launched in 2013 under the leadership of President Xi Jinping. The initiative aims to revitalize the ancient

Silk Road and create new trade routes and links between Asia, Europe, and Africa, promoting economic cooperation and regional integration (Druhalóczki, 2024). Under the BRI, China is making significant infrastructure investments, including railways, ports, highways, and energy projects, which will significantly impact the countries affected by the project. Although Hungary has no coastline, many Chinese goods arrive in Europe by sea and then reach Hungary by land (Bernek, 2023). For example, upgrading the Budapest- Belgrade railway line as part of the project is a vital link in the rail link, offering the fastest alternative for freight transport between Western Europe and the Greek port of Piraeus (Kovács, 2018). These collaborations will help strengthen economic, logistical, and financial links. At the same time, however, the project has also been criticized, as some countries could be trapped in debt due to Chinese loans, and local economies could become more vulnerable (Gelpern et al., 2023). In addition, the BRI is also important from a geopolitical perspective as China increases its influence in the participating countries (Bartók et al., 2020).

3 Research framework

The COVID-19 pandemic at the end of 2019 has posed unprecedented challenges to the global economy, supply chains, and international trade, with significant impact. With the virus's rapid spread across continents, nations have introduced various measures such as closures, travel restrictions, and social distancing. This affected not only public health but also world economic activity. It is widely recognized that the pandemic disrupted established trade patterns and consumer behavior. In light of this disruption, the question of how exactly the pandemic has affected trade may be raised, and this research aims to examine the specific impact of the pandemic on global maritime trade. Fig. 2 shows the research framework.

In addition, as the literature review has shown, China's opening towards Europe, and within it, the strengthening of its trade partnership with Hungary, has recently become a strategic priority for the actors. That is true. Hungary is in a special situation for the analysis, as it does not have a seaport. However, at the same time, it has an absolute presence in the market for goods from maritime transport, which is a key factor in trade relations with Asia. The aim of this research is, among other things, to map the direct and indirect effects of these trade relations.

4 Analysis

Several key indicators can be used to characterize trade relations and global maritime transport, map the industry's current state, and draw conclusions for the future. In the following, the indicators that can best characterize the main trade relations and the current state of maritime transport are presented.

4.1 Evolution of container charges over the last 5 years

Container prices have fluctuated significantly in the past. During the COVID-19 pandemic, transport costs rose sharply, reaching a peak in September 2021, when renting a standard container cost around USD 10,000. In the following years, prices gradually fell, and by the beginning of 2023, they were already 20 % below the average of the last ten years. Over the last ten years, the average container price was $ 2,695, but in the pre-pandemic period, 2019, the average price to rent a container was still $ 1,420 (Drewry, 2025). The price change has significantly impacted global trade and various industries, especially agriculture and manufacturing, which benefit from lower transport costs. Fig. 3 shows the evolution of container rates between 2015 and 2025 based on the World Container Index (WCI).

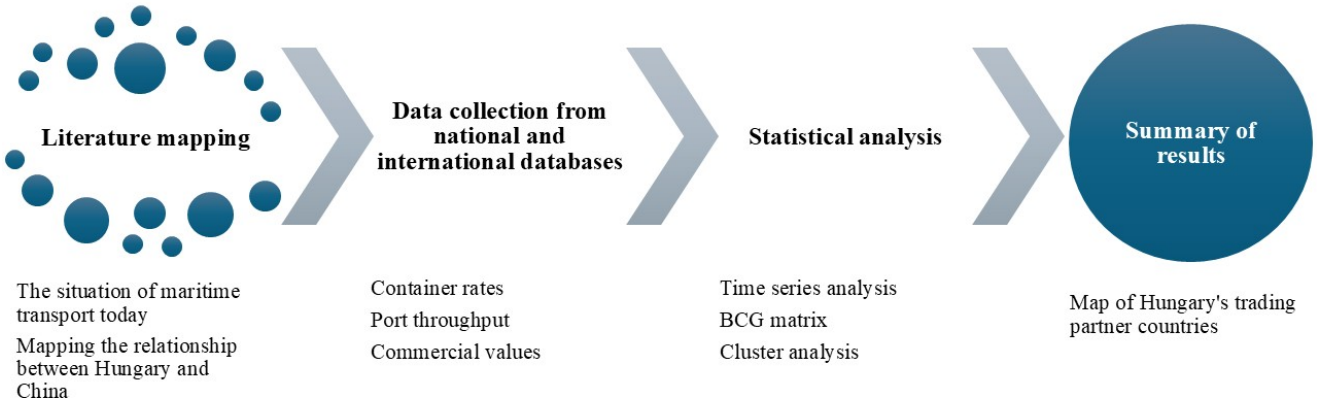


Fig. 2 Research framework

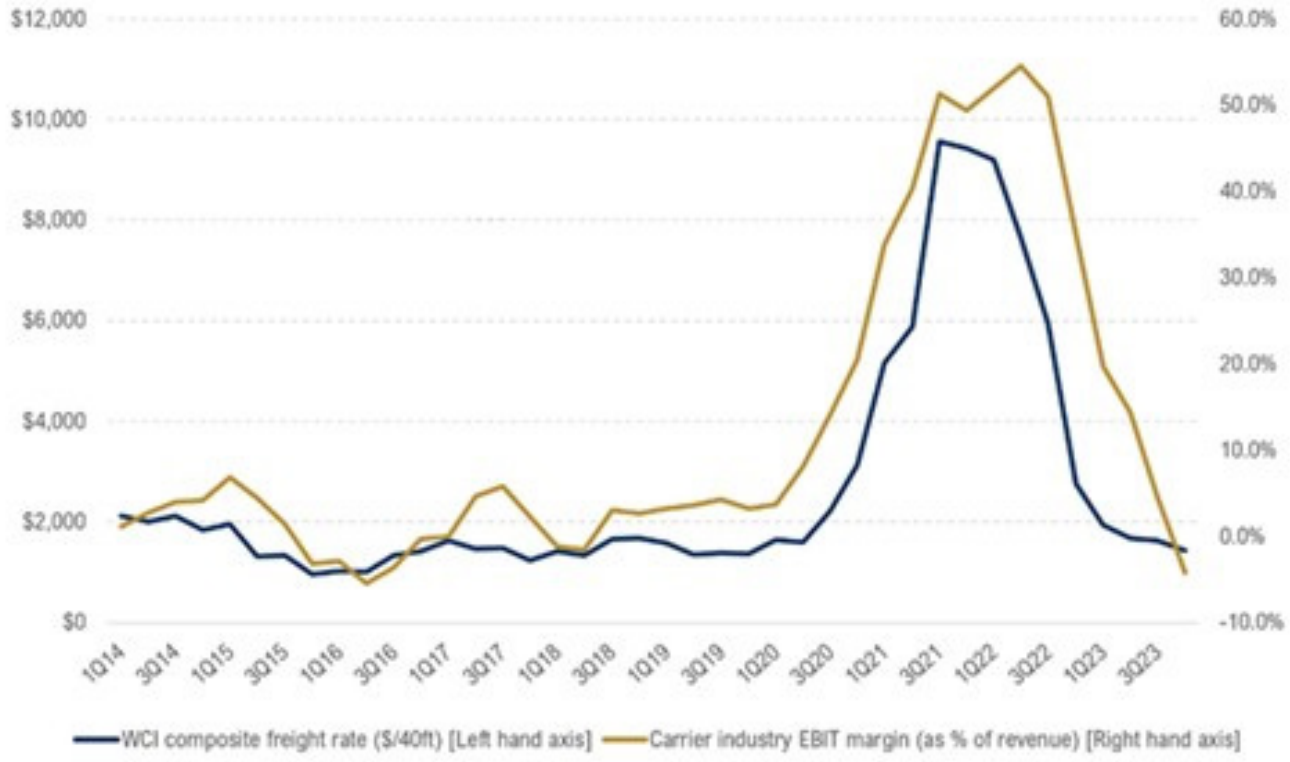


Fig. 3 World Container Index: spot freight rate vs carrier profits (Drewry, 2025)

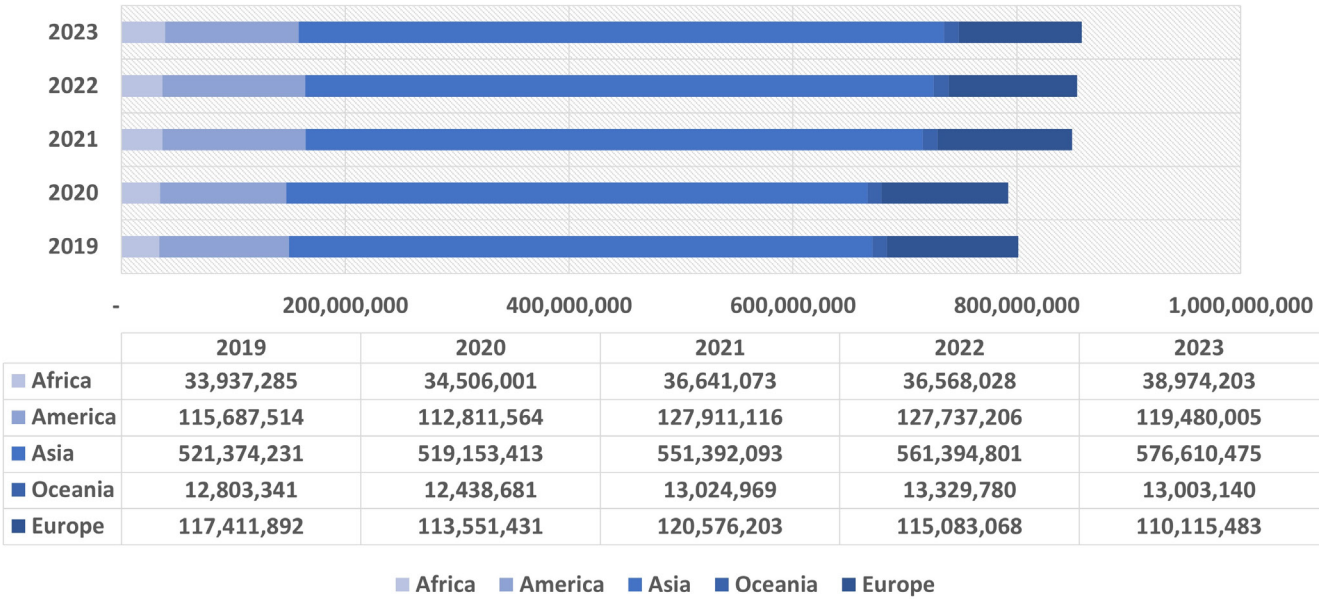
The Fig. 3 shows that the fluctuation, mainly the increase in container prices, was particularly high during the COVID-19 pandemic, leading to a very high increase in transport costs. Prices peaked in 2021 and then gradually declined, returning to near pre-pandemic levels by 2023. Several factors, including container shortages, port congestion, and the reorganization of shipping routes, drove the price rise. Prices only began stabilizing towards the end of 2022 and the beginning of 2023, but they were still higher than pre-pandemic levels in many respects.

4.2 Evolution of container permeability over the last 5 years

In addition to container prices, another important indicator is the container throughput of ports, which provides a more comprehensive picture of the changes that have occurred over the period under review. The container throughput of seaports is important for several reasons. First, it determines how much cargo a port can handle over a given period, directly affecting global trade chains' efficiency and reliability. Ports with high throughput can handle incoming and outgoing containers faster and more efficiently, reducing waiting times and logistics costs. Container throughput, on the other hand, is an important indicator of the port's infrastructure and technological development. Ports have become more competitive in the global market and are more attractive to international trading partners. Global container throughput by continent is shown in Fig. 4.

The Fig. 4 clearly shows the dominance of Asia, more specifically in terms of total container throughput over the years, which is more than 60 %. Furthermore, Europe and the Americas are about equally weighted, besides Asia. The data show an increasing trend; the only year this trend was broken was 2020. In the period under review, the number of containers handled worldwide increased by almost 57 million twenty-foot equivalent units (TEUs), with a significant part of the Fig. 4 coming from the Asian region, 55 million to be precise, representing 97 % of the total increase. In Europe, 110 million containers were handled in 2023, fewer than in 2019, representing a drop of around 7 %.

The Covid-19 virus had a similar impact on container throughput in Asia and Europe in 2019-20. A closer look at the specific data reveals that while Asia saw a reduction of 2.2 million TEUs per year, Europe handled nearly 3.9 million fewer containers during the period. The decline in the European data accounted for 44 % of the global decline, while for the Asian continent, it was only 25 %. In terms of throughput, the pandemic had a more negative impact



	2019	2020	2021	2022	2023
Africa	33,937,285	34,506,001	36,641,073	36,568,028	38,974,203
America	115,687,514	112,811,564	127,911,116	127,737,206	119,480,005
Asia	521,374,231	519,153,413	551,392,093	561,394,801	576,610,475
Oceania	12,803,341	12,438,681	13,024,969	13,329,780	13,003,140
Europe	117,411,892	113,551,431	120,576,203	115,083,068	110,115,483

Fig. 4 Evolution of container permeability between 2019 and 2023, by continent

on European maritime transport between 2019 and 2020 than on Asian transport.

The analysis and literature review shows that the COVID-19 pandemic significantly impacted the maritime transport industry, especially in container throughput and container rates during the epidemic. After the first wave, however, demand and values bounced back quickly, dramatically increasing container rates. However, without a further decrease in the volume of goods moved, the number of containers handled in 2021 exceeded pre-pandemic levels.

4.3 Analysis of Hungary's trade relations with China

A country's trade relations play an important role in its economic development, which is no different for Hungary. The balance between exports and imports, strategic partners, and economic policies all determine the country's external trade situation. The tables of the Hungarian Central Statistical Office (KSH, 2025) were used to analyze Hungary's main trading partners. Fig. 5 shows Hungary's export and import values over the last 5 years.

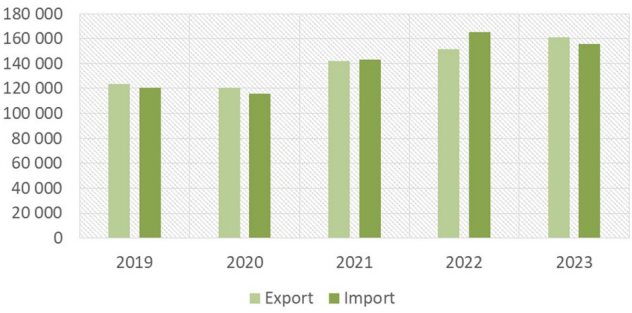


Fig. 5 Hungary's export-import performance over the last 5 years (USD million)

Recent events (COVID-19, Russian-Ukrainian conflict, economic recession, etc.) have also affected Hungary's trade relations, and there is a perceptible shift in the balance of major trading partners, especially with Asian countries, which may help to overcome the difficulties. Hungary's main European trading partners include Germany, Poland, Slovakia, Austria, and the United States. Germany is the number one trading partner, accounting for a significant share of exports and imports. Fig. 6 shows the distribution of imports between continents in % value between 2019 and 2024.

The graph shows the main links regarding the % by value of goods imported into Hungary from the EU. Moreover, if we add the % of non-EU countries, we can see that about 60 % of imports by value are from within Europe. However, there has been an apparent decline over the last period, from 58 % for the EU in 2019 to less than 51 % in 2024. At the same time, there has been a parallel increase in Asia, from 23 % in 2019 to 26 % in 2024. These values are negligibly small for African countries as well as for Australia and Oceania. Fig. 7 shows the % value of imports from countries with high value.

Looking at the country-by-country data, we see that China is Hungary's leading trading partner after Germany. China is a particularly important trading partner for Hungary, and trade between the two countries is growing steadily. Perhaps it is interesting to note from the data that the Republic of Korea has moved to third place by 2024, whereas in 2019, it was only eighth. Fig. 8 shows the values in terms of imports for the main partner countries.

Fig. 8 also shows that there is indeed a strengthening in Asia in terms of numbers. However, let us look not at

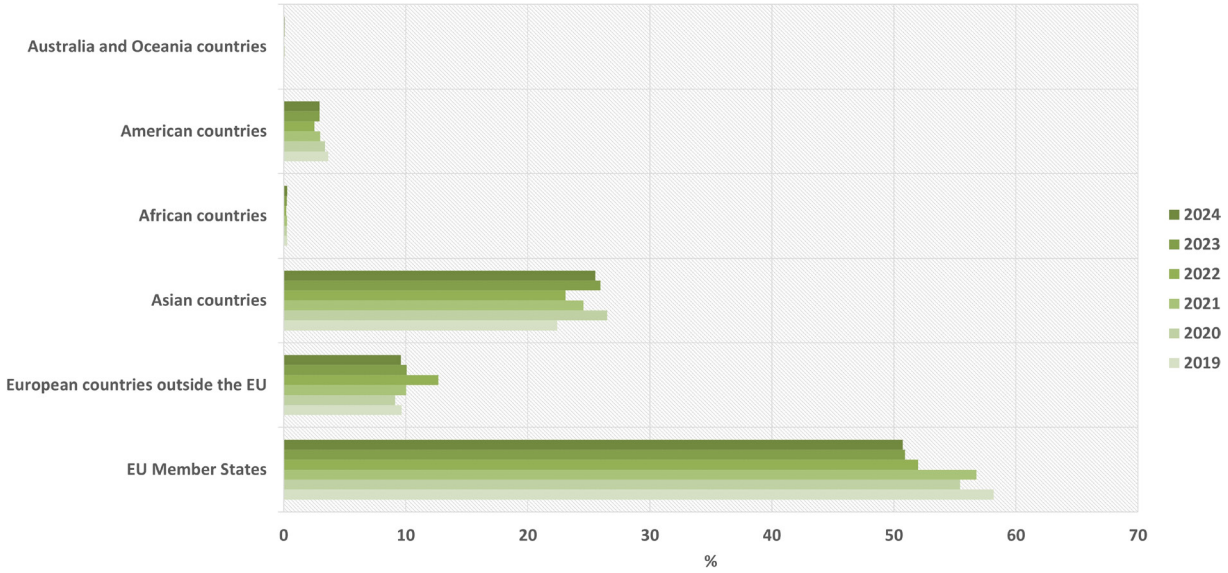


Fig. 6 Imports in HUF by continent, % distribution

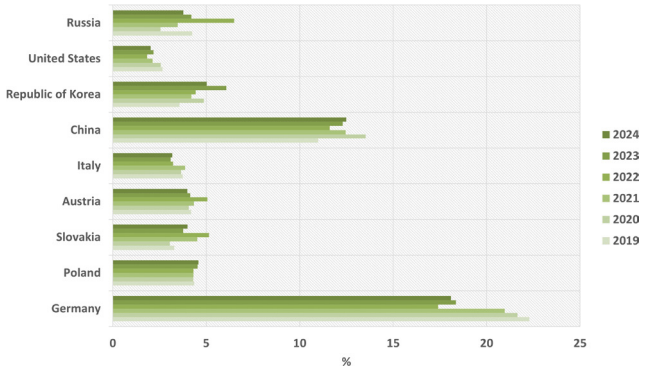


Fig. 7 Imports in HUF by main countries of origin, % distribution

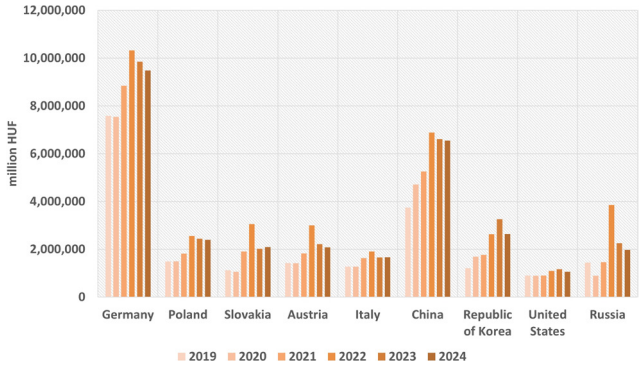


Fig. 8 Imports in HUF by main countries of origin

the development of the % distribution but the development of the specific values. There is also a decline, whether in Germany or China, which could indicate the economic difficulties that are increasingly present in our country.

4.4 Categorisation of partner countries

Following the analysis of the trade indicators, the BCG matrix of countries - Intensity BCG matrix (Boston Consulting Group) was developed. The BCG matrix is a marketing tool that assesses the strategic position of companies in two dimensions: relative market share and market growth rate (Harsáczki and Nagy, 2013). Based on this, the data were analyzed in two dimensions for Hungary by considering export and import values per leading trading partner country and illustrating the changes by visualizing the difference between the values in 2019 and 2024, taking them as vectors in Eqs. (1) and (2).

$$\left|\boldsymbol{E}_{\Delta}\right| = \boldsymbol{E}_{2019} - \boldsymbol{E}_{2024} \tag{1}$$

$$\left|\boldsymbol{I}_{\Delta}\right| = \boldsymbol{I}_{2019} - \boldsymbol{I}_{2024} \tag{2}$$

This is shown as the BCG matrix in Fig. 9.

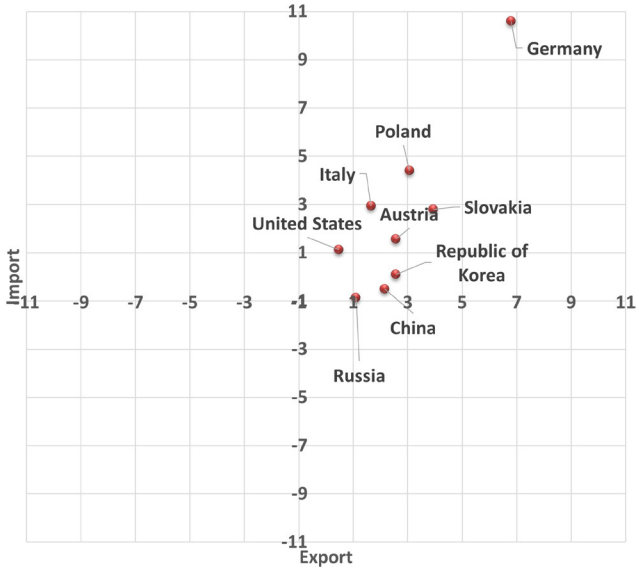


Fig. 9 Export-import matrix of Hungary's trading partners

For the analysis, the data for 2019 and 2024 were used, and the difference between the two years was plotted in the matrix. Looking at our country's main trading partners, exports and imports have been growing steadily over the last 5 years, with Germany and most other European countries following the same trend. Regarding exports, China and Russia have moved into negative territory, so recent events have certainly impacted exports from our country to these countries, and they are currently at a lower level than before COVID-19. Building on this data, a cluster analysis of the countries has been carried out using the PSPP program, which has classified the countries into three groups:

- Cluster 1: Italy, Austria, United States, Slovakia, Poland
- Cluster 2: Republic of Korea, China, Russia
- Cluster 3: Germany.

The representation of clusters on a dendrogram is shown in Fig. 10.

The cluster analysis shows that countries fall into three main clusters based on import and export values. Germany stands out with its high import and export values as Hungary's largest trading partner, significantly impacting our economy. Nearby countries such as Poland, Slovakia, and Austria are important trading partners, while Italy and the United States also fall into this category. China, the Republic of Korea, and Russia are also included in a separate category, suggesting that our relations with each of these countries have similar characteristics in the East.

5 Summary

With globalization's increasing role and impact, world systems are becoming increasingly complex, affecting their sensitivity to external influences. This research examines the relationship between Hungary and China in addition to global maritime transport. The impact of COVID-19 on maritime transport was analyzed, and data provided by the UNCTAD, were used for statistical analyses. As a result, overall, the virus had a similar impact on the continents examined, with Asia and Europe, in particular, being highlighted. However, it is also important to note that the number of containers moved in Europe fell to a greater extent in the period in question between 2019 and 2021. In addition, the results of the analyses show that the virus did not significantly reduce the volume of global goods traffic. When examining the trade relations of our country, it is

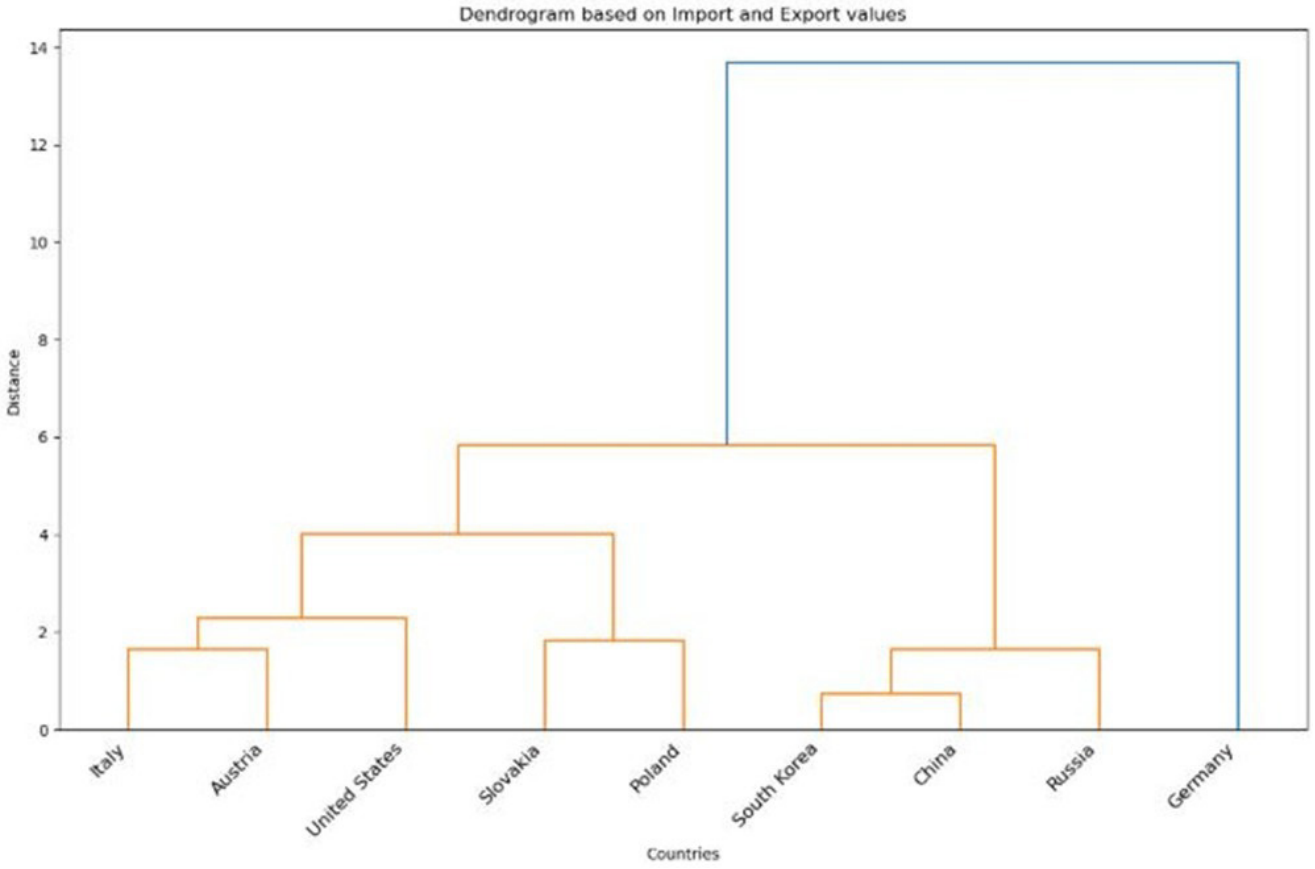


Fig. 10 Dendrogram of Hungary's main trading partners

important to highlight that, despite the policy of opening to the East, its leading trading partner is still Germany and the countries of Europe. In addition, although there is a strengthening in terms of imports from both China and the Republic of Korea, this trend can no longer be said about exports from Hungary to these countries, so it may be questionable what balance the countries' trade relations will show in the future and to what extent this trend will continue. Trade with countries such as China and Russia allows Hungary to access global markets. However, at the same time, it can be stated in terms of numbers that our country's main trading partners are still in Europe. It is important to mention as a limitation of the research that since Hungary does not have a seaport; it is not possible to determine from basic statistical data on freight transport what proportion of goods arriving in Hungary arrived by sea transport routes. Further research potential could be to examine how the volumes of goods transported along the Silk Road developed in the countries concerned, as well as the development of the economies, and what these relationships mean on land.

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