Interreg

EUROPEAN UNION

Danube Transnational Programme

DIONYSUS

Integrating Danube Region into Smart & Sustainable Multi-modal & Intermodal Transport Chains

IWT Market observatory

DR report

[Version 1.0]

[28.02.2022.]

[final]

Project co-funded by European Union Funds (ERDF, IPA, ENI)

Document History

Version	**Date**	**Authorised**
1.0	28.02.2022	HFIP

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1 Table of Contents

2 Table of Figures

3 Table of Tables

4 Abbreviations

Abbreviation	Explanation
IWT	Inland water transport
TEU	twenty-feet equivalent unit
DR	Danube region
IWW	inland waterway
EUSDR	European Union Strategy for Danube Region
HFIP	Hungarian Federation of Inland Ports
CNNR	Central Commission for the Navigation of the Rhine

5 Scope of the document

The aim of this output is to analyse the trade flows and economic development scenarios for the Danube region. Based on the generated information of cargo flows which have the potential to be transported by IWT, a dedicated monitoring tool, namely the IWT Market Observatory, will be elaborated. This output will provide - by means of market analyses and status-quo reports - a collection of information for the most important market segments with high potential to be developed in the near future such as: demands and availability of containerized transport opportunities considering both the mid-term perspectives and the necessity to be part of the regional and international multi-/intermodal transport chains.

6 Executive summary

In this report, based on previously elaborated DIONYSUS deliverables, interviews with IWT experts and port professionals, we examine status, trends and future development plans of IWT in the Danube Region with an outlook on Hungary. This document is divided into three sections:

- current status of trade and cargo flows in the Danube Region and in Hungary,
- future trends of cargo and trade flows, potentials in the DR and in Hungary,
- strategic steps to be taken in the DR and recommendations made by Hungarian stakeholders to raise the modal share of IWT in order to achieve its potential.

Internationally, the share of road transport is 31%, while in Hungary it is the dominant mode (85% in 2020) and IWW is only 8.5%. Due to the nature of waterborne transport, the transport of goods by ship is only an intermediate element in a transport chain involving several modes of transport.

Regarding the current status, we can state that despite of reductions in case of iron ore, metals and coal transport, IWT performance on the Danube decreased less than expected due to the increase of agricultural products. Traffic is more intense near the Black Sea. In the Middle Danube the most common products are related to the metallurgical vertical (45-55% of total traffic).

Considering future trends and cargo flows, potentials of IWT, this output identifies the types of goods that are currently not transported by water. To determine the transportability of the types of goods identified in this way, a conformity assessment system shall be envisaged to filter types of goods not suitable for waterborne transport.

In 2018, the global volume of container traffic increased by 4%, it was down from the 5.6% growth recorded the previous year.

New technologies, such as container liner bags, can divert new types of goods to be carried in a standard shipping container. Liner bags are a clean, safe, and effective packaging solution that transforms containers into reliable and cost-effective alternatives to tank containers, ensuring the lowest logistical costs while the reducing environmental impact.

Regarding development scenarios in the DR, the document is based on the main statements defined in the European Union Strategy for Danube Region. The Action

Plan 2020 identifies 12 Priority Areas (PA) including 85 actions. PA 1a Waterway mobility contains 6 actions which are presented in detail in this output. These actions are:

- Action 1: Contribute to improve waterway and port infrastructure & management
- Action 2: Foster business development
- Action 3: Facilitate fleet modernisation
- Action 4: Support the further roll-out and enhancement of River Information Services
- Action 5: Contribute to the enhanced quality of education and jobs
- Action 6: Contribute to the simplification, harmonisation and digitalisation of administrative processes

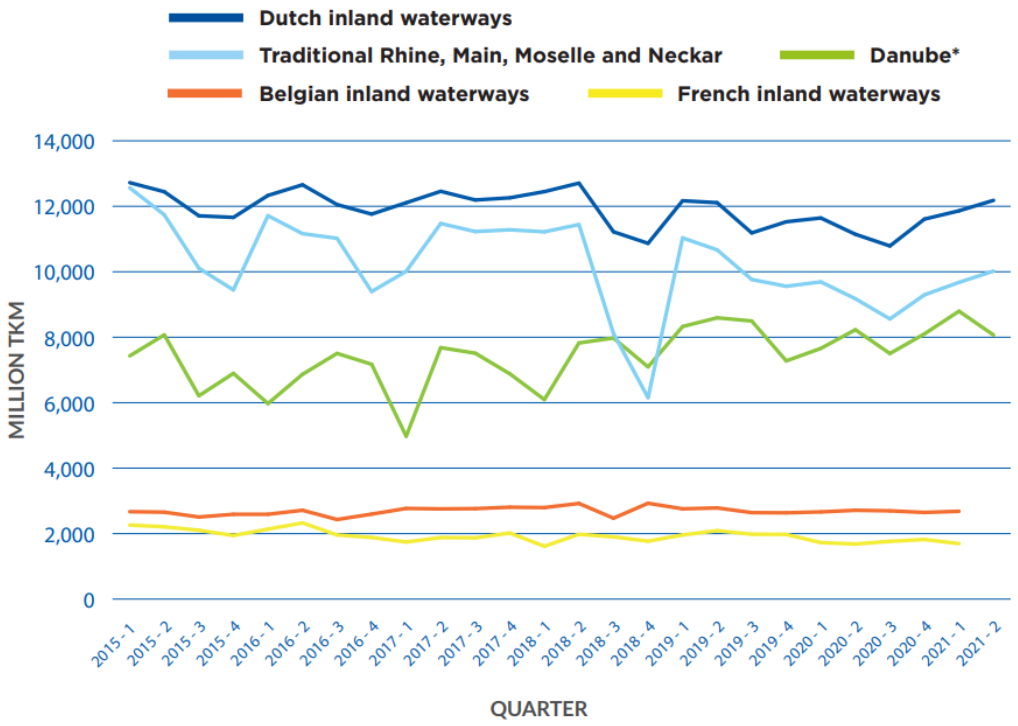
Finally, the development plans for the IWT sector in Hungary are presented based on the National Port Development Master Plan Strategy and focusing on financing and allocating support and establishing a legal framework for facilitating modal split. The recommendations shall be adapted by other Danube countries as well.

7 Current status of trade and cargo flows on the Danube

7.1 Current IWT market volumes

After a period of decreasing transport performance (low waters in 2018, macroeconomic weakness in 2019, Covid crisis in 2020), cargo transport on the Rhine and on Dutch waterways started to recover between Q3 2020 and Q1 2021. More recent data (for the lock of Iffezheim on the Upper Rhine) point to an increase of 4.7% in transport volume during the first eight months of 2021, compared to the same period in 2020. However, the difference compared to the level in the first eight months of 2019 was still 6.9%.

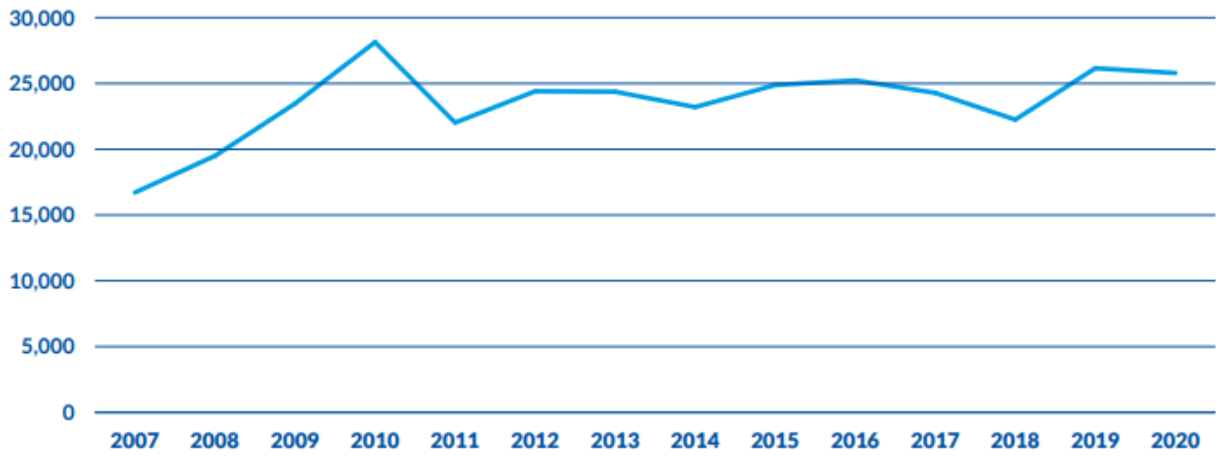
1. Figure Shipped volumes on inland waterways in the EU (2015-2021)



Sources: Eurostat [iww_go_qnave], OECD (Ukraine), Destatits (Rhine and affluents), *Danube = TKM in all Danube countries including Ukraine

While transport performance in Belgium and France was rather constant, with some fluctuations, Danube navigation continued its upward trend.[i]

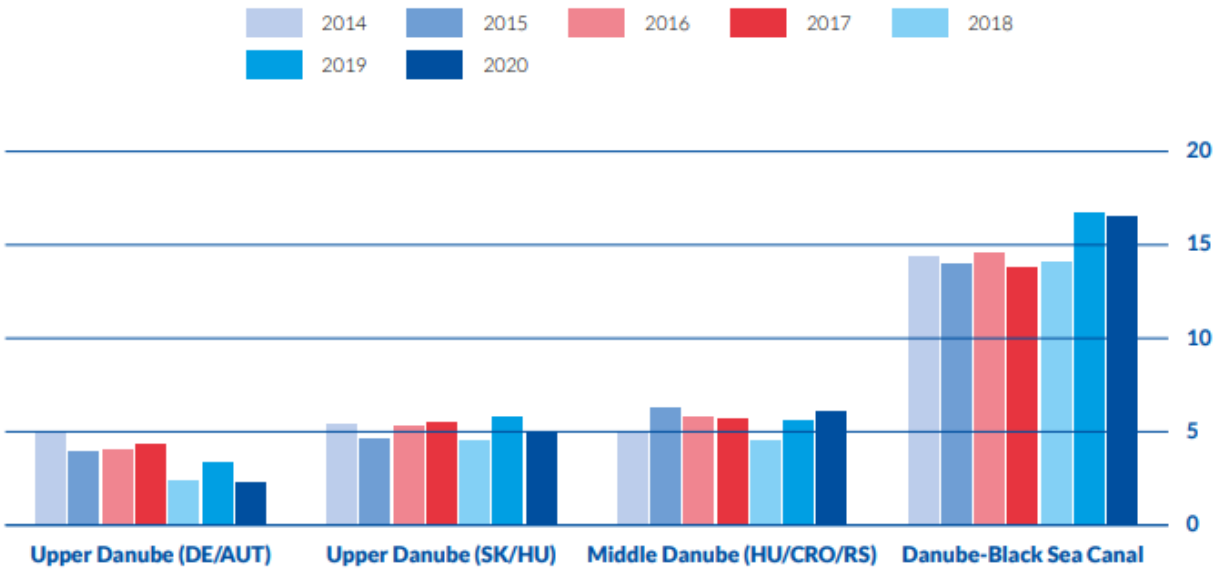
2. Figure: Transport performance in freight transport on Danube (in million tkm)



Source: CCNR Market Observation – Annual report 2021

Despite of reductions in iron ore, metals and coal transport, transport performance on the Danube decreased by only 1,4% in 2020, thanks to a vital upsurge in transport of agricultural products, a significantly better rate than the 10% decline along the Rhine.

3. Figure: Yearly freight transport at different measurement points along the Danube and on the Danube-Black Sea Canal (in million tonnes)

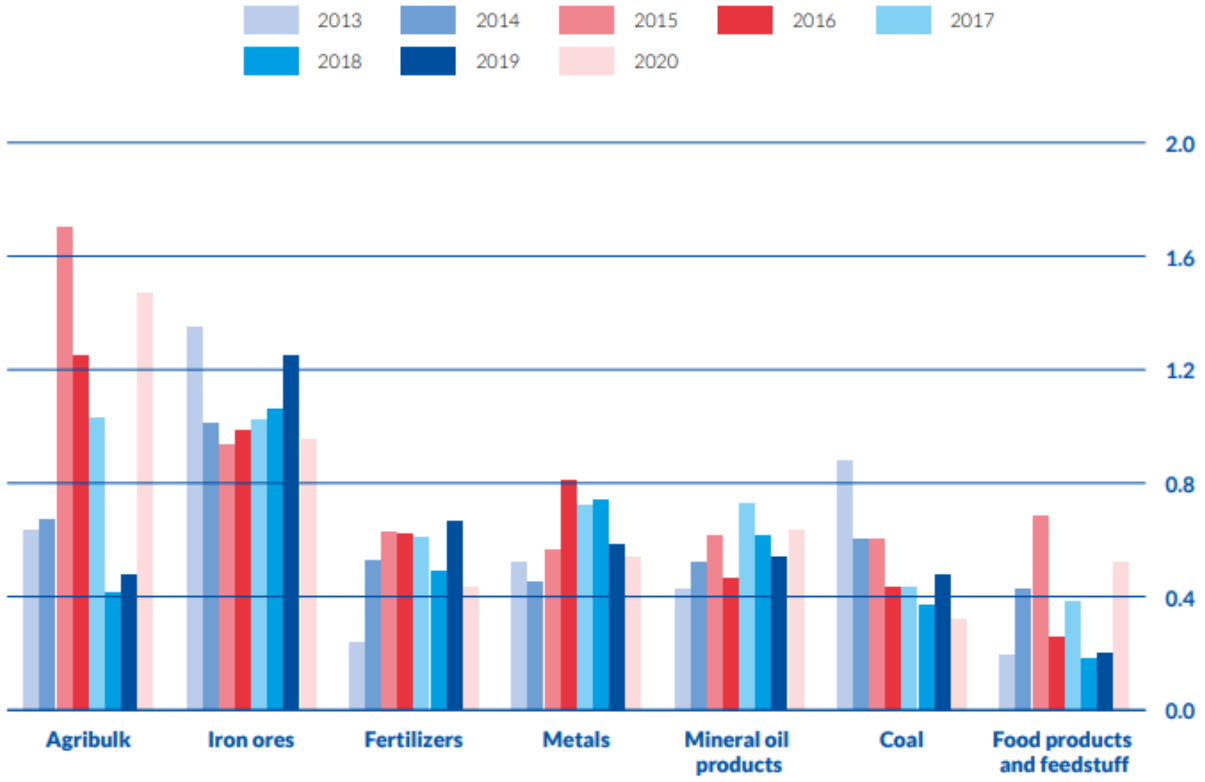


Source: CCNR Market Observation – Annual report 2021

It should also be noted that navigation on both the Danube and the Rhine is sensitive to periods of low water levels, which strongly affects the overall transport performance of both river basins - in 2018, the Danube River's transport performance was reduced by about half.

Danube traffic is more intense near the Black Sea. This is certainly due to better navigation conditions in the Lower Danube region, compared to the Central and Upper Danube.

4. Figure: Goods transport on the Middle Danube (in million tonnes)



Source: CCNR Market Observation – Annual report 2021

The most important freight transport in the Middle Danube is the transport of products related to the metallurgical vertical (iron ore, metals, metal products, steel, coking coal), which account for about 45-55% of the total traffic. This is due to an increase in the demand for metallurgical products as a result of the general increase in economic performance.

Another area of particular importance is the trade in agricultural products, of which grain is the second most important in terms of product volume.

As economic and environmental considerations become more important, combined transport is becoming increasingly important. Combined transport is an intermodal transport where the majority of the transport distance is covered by rail or waterway and the road transport distance is minimised. Only the transport unit containing the goods is transferred between the vehicles of the different modes of transport; the goods remain in the same container or means of transport from the consignor to the consignee. A distinction is made between accompanied and unaccompanied combined transport according to the mode of transport. In the former case, the entire road train and its driver (crew) also "travel" on the train or ship, in the latter case, usually only the trailer (semi-trailer) or uncoupled container is transported by other means.

In the EU, the share of intermodal rail freight in total rail freight is 21.6% (in 2016, based on data from 24 countries), and has been steadily increasing since 2005 (16.5%). In Hungary, the share was 13% in 2016.

7.2 Current cargo flows and trends in Hungary

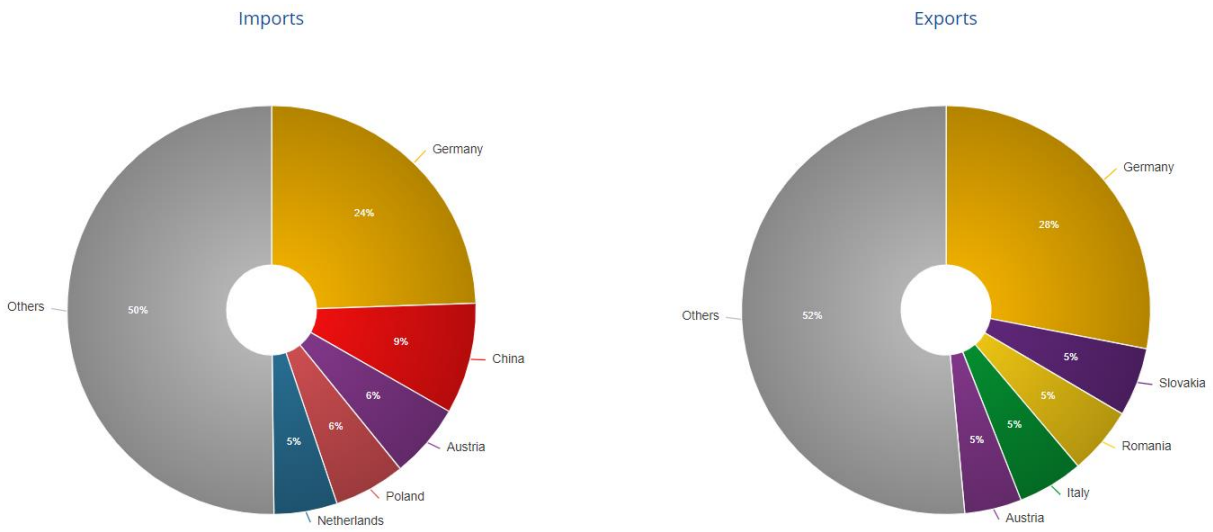
Total imports between 2015-2019, raised from EUR 81.865 million to EUR 104,761 million. Among commodity groups, machinery and equipment has the largest share with EUR 50,779 million. It is followed by processed products (EUR 37,791 million), energy carriers (EUR 8,421 million), food and beverages and tobacco (EUR 5,557 million) and raw materials (EUR 2,212 million)

1. Table: Trade flow in Hungary

Commodity groups	Export (million EUR)	Import (million EUR)
Machinery & equipment	62,659	50,779
Processed products	33,536	37,791
Energy carriers	2,859	8,421
Food, beverages & tobacco	7,538	5,557
Raw materials	2,502	2,212
Total	**109,095**	**104,761**

Source: DT.1.2.1. Summary Report

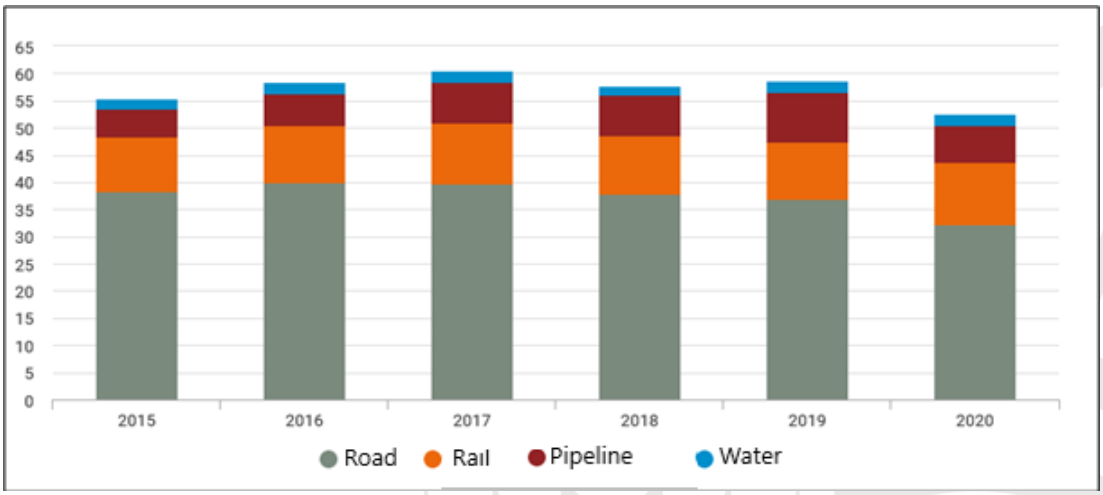
5. Figure: Hungary's most important foreign trade partners and their share of the contry's foreign trade turnover



Source: [Trade in goods by top 5 partners, European Union, 2020 (europa.eu)]

The graph above shows Hungary's main trading partners in terms of both imports and exports. It shows that Germany is Hungary's most important trading partner for both imports (24%) and exports (28%). In terms of imports, China (9%) is still of major importance for Hungary, a share that could even increase in the future due to the projects under the Belt and Road Initiative. In terms of exports, neighbouring countries considered to be the most important export partners.

6. Figure: Distribution of freight transport performance by billion tonne-kilometres



Source: Hungarian Central Statistical Office – Transport sector snapshot, 2020

In Hungary, inland waterway freight transport performance showed a slight upward trend between 2014 and 2017, but declined in 2018, with 6.9 million tonnes of goods transported by inland waterway (2.3% of total goods transported) and 1 608 million tonne-kilometres of goods transported (2.8% of total goods transported). The vast majority of inland waterways transport is international, with a negligible share of domestic transport.

Domestically, road transport is the dominant mode, accounting for 79 tonne-kilometres of freight and 85% of volume in 2020. Internationally, the share of road is much smaller, accounting for 31% of the volume of goods transported in 2020, 9.1 percentage points more than rail, while pipeline transport accounted for 21% and inland waterways for 8.5%.

2. Table IWT by group of goods, 2017

Product	Weight of goods delivered		Performance	
	thousand tonnes	distribution (%)	million tonne-kilometres	distribution (%)
Products of agriculture, hunting and forestry; fish and other fishing products	2587	30,8	533	26,7
Coal and lignite; crude petroleum and natural gas	518	6,2	94	4,7
Metal ores and other mining and quarrying products; peat; uranium and thorium ores	1562	18,6	463	23,3
Food, drink and tobacco products	320	3,8	74	3,7
Wood, articles of wood and cork (except furniture); straw and other plaiting materials; pulp; paper pulp, paper and paper products, printed matter and other reproduced media	38	0,5	11	0,6
Coke and refined petroleum products	1440	17,1	262	13,2
Chemicals, chemical products and chemical fibres; rubber and plastic products; nuclear fuel	909	10,8	220	11
Semi-manufactures; fabricated metal products, except machinery and equipment	890	10,6	292	14,6
Machinery and equipment n.e.c.; office machinery and computers; electrical machinery and apparatus n.e.c.; radio, television and communication equipment and apparatus; medical, precision	23	0,3	9	0,4

and optical instruments, watches and clocks				
Means of transport	37	0,4	11	0,6
Secondary raw material; municipal and other waste	63	0,7	16	0,8
Equipment and material used in the transport of goods	16	0,2	3	0,1
Total	**8414**	**100**	**1992**	**100**

Source: Central Statistical Office - Situation in the transport sector, 2017

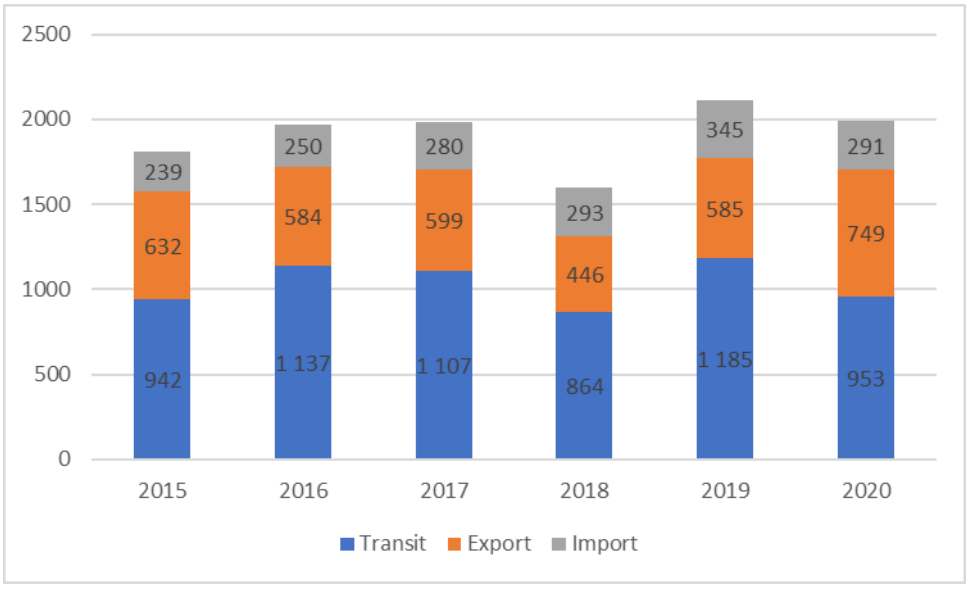
In 2017, 31% of the goods transported by inland waterways were agricultural products (2.6 million tonnes), but a significant share (19% and 17% respectively) was also accounted for by metallic ores and other mining and quarrying products, and coke and refined petroleum products.

Looking at the port's cargo throughput in recent years (total volume loaded and volume of agricultural products loaded) and the performance of agriculture, it can be seen that the weight of goods loaded varies in line with the previous year's crop.

The volume of goods loaded in inland ports is influenced not only by the performance of agriculture, but also by the number of days available for navigation. In Hungary, the average of the last 20 years is 67%, i.e. roughly eight and a half months, when the Danube is open to navigation without restrictions.

For freight transport to be predictable, this period should be longer (300 days per year, i.e. 85-90%). With a water depth of 2.5 metres, which the European Union also expects on the Hungarian stretch, navigation in Hungary would be much smoother.

7. Figure: Evolution of inland waterways freight transport performance by direction (million tkm)



Source: Central Statistical Office - Situation in the transport sector, 2020

In 2020, the total inland waterway transport performance in tonne-kilometres of goods decreased by 5.8% to 1998 million, while the volume increased by 2.5% to 8.8 million tonnes. The performance of import traffic decreased by 16%, inland by 19%, transit by 20% and export by 28%. In 2020, only 8.5% of goods on the Hungarian section of the Danube were carried by Hungarian flag vessels. The nationality of the vessel owned by the carrier is not necessarily the same as the nationality of the transport company. According to EU rules, the performance of vessels must be recorded according to the country in which the vessel is registered. The most important foreign carriers were German, Romanian and Austrian vessels, with 26, 14 and 12% respectively.

According to inland port statistics, in 2018 two thirds of all cargo traffic was with EU member states (in previous years - 2014-2017 - this share was around 80%), with Romania and Germany accounting for the largest share of the total loaded weight. Serbia, a non-EU country, was also an important partner, with a share of 14.5%. In 2018, 31% of goods imported and unloaded in Hungary by inland waterways came from Austrian ports, 30% from Romanian ports and 17% from Serbian ports. The most important destinations for Hungarian exports were Austrian (30%) and Romanian (29%) ports, with 59% of the total 2.4 million tonnes exported (1.4 million tonnes loaded), while Germany's share was 18% and Serbia's 17%.

3. Table Weight loaded in inland ports, 2017-2018 (tonnes)

	Loaded mass	Unloaded mass	Total loaded mass	Loaded mass	Unloaded mass	Total loaded mass
	2017			2018		
Direction of loading operation						
Vessel - vessel	4 443	4 443	8 886	11 462	8 207	19 668
Vessel - road vehicle	1 036 674	451 414	1 488 088	583 079	390 026	973 105
Vessel - shore	2 459 239	1 237 358	3 696 597	2 038 070	1 460 972	3 499 042
Vessel - railway wagon	191 152	414 121	605 273	152 281	555 281	707 770
Total	**3 691 508**	**2 107 337**	**5 798 845**	**2 784 981**	**2 414 695**	**5 199 586**
Packaging						
Bulk	3 462 747	1 995 783	5 458 530	2 587 411	2 304 718	4 892 129
General cargo	215 857	108 674	324 531	190 132	108 016	298 148
20 feet - Container	3 771	18	3 789	585	820	1 405
40 feet - Container	9 073	2 862	11 936	6 763	1 141	7 904
Other containers	59	-	59	-	-	-
Total	**3 691 508**	**2 107 337**	**5 798 845**	**2 784 891**	**2 414 695**	**5 199 586**
By port of loading						
Baja Országos Közforgalmi Kikötő	498 328	145 976	644 304	234 631	112 117	346 749
Csepeli Országos Közforgalmi Kikötő	417 070	705 341	1 122 411	246 080	672 129	918 209
Győr-Gönyű Országos Közforgalmi Kikötő	104 430	63 001	167 431	34 428	71 219	105 647
Other inland ports	2 671 680	1 193 019	3 864 699	2 269 752	1 559 229	3 828 981
Total	**3 691 508**	**2 107 337**	**5 798 845**	**2 784 891**	**2 414 695**	**5 199 586**

Source: Central Statistical Office - Situation in the transport sector, 2018

94% of the total weight loaded was in bulk, 5.7% in other general cargo, and the share of containerised transport was less than 2 thousandths. The total number of containers loaded in inland port traffic in 2018 was 2,732 (three quarters of which were 40-foot containers), of which 2,030 were loaded and 702 unloaded. The reason for the decrease in 2018 was the low number of days of navigation due to the low water level of the Danube.

Due to the nature of waterborne transport, the transport of goods by ship is only an intermediate element in a transport chain involving several modes of transport. In 2018, 16.2% of goods continued their journey to the customer by road, 23.0% by rail, 0.3% by ship, immediately after unloading from the ship, and 60.5% had not yet left the ports at the time of the survey. Of the goods loaded, 20.9% arrived by road, 5.5% by rail, 0.4% by ship and 73.2% had been stored in the port for some time before loading.

The supply disruptions caused by the pandemic COVID-19 affected the inland navigation sector in Hungary partly rather indirectly, with one of the major challenges being the lack of manpower in the sector. This labour shortage is partly directly in the operation of ports and vessels, and partly indirectly in the road transport sector, where driver shortages cause disruptions in the delivery of transported goods.

8 Potential to be transported by IWT

The objective of this chapter is to present the potential of inland waterway transport, both from regulatory and technological point of views.

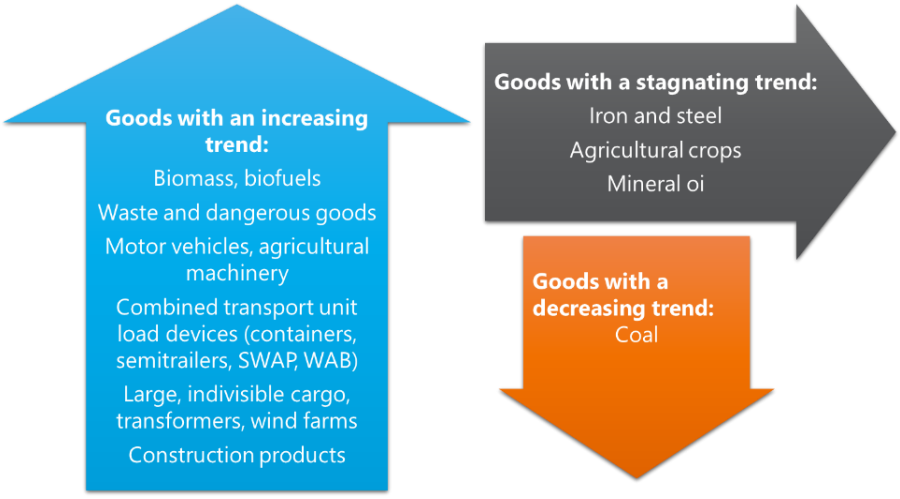
8.1 IWT potentials based on Hungarian National Port Development Plan

The situation analysis of the National Port Development Plan Strategy divides the transported goods into 3 groups. The groups include both the sets of goods already transported on water and goods that can potentially be transported on water. In the identification, it can be distinguished on the basis of transport volume:

In order to provide opportunities for expanding the potential commodity base and extending the existing commodity base, the strategy calls for a separate growth action plan for each of the three identified groups, depending on the transport trend of the particular commodity.

1. In view of the relatively low cost of inland waterway transport and the predictability of the commodity base, the strategy aims to reduce the specific freight rate in order to increase the transport of goods with decreasing tendencies on inland waterways.
2. With regard to goods with stagnant tendencies, the strategy is based on the distinction from other modes of transport, emphasizing the low level of environmental burden of waterborne transport compared to other transport modes, taking into account the proportion of energy required to move the mass of goods in the group.
3. During the establishment of an entry/development action plan related to the volume of commodities with growing tendencies, it is necessary to focus on the development of a so-called 'goods-friendly' transport, the relatively low transport costs and the sustainable transport system due to the low environmental impact.

8. Figure: Inland waterway transport trends of commodities



Source: National Port Development Plan Strategy

Transport solutions for potential and compatible goods

The examination identifies the types of goods that are not currently transported by water. In order to determine the transportability of the types of goods identified in this way, the strategy envisages the development of a conformity assessment system as a research and development activity, with the help of which the type of goods not suitable for water transport can be filtered.

The fit testing system analyzes the types of goods that can be transported from 3 perspectives:

- Characteristics of the goods-producing industry:
  - Current situation of the industry in the region (in terms of timeliness of entry)
  - The position and bargaining power of other modes of transport in the given industry
  - Calculate a fixed cost and compare the costs of other modes of transport that work with the industry
  - The degree of commitment of the identified competitors to the industry
- Costs of establishing a relationship with the industry:
  - Government policy related to industry
  - Entry capital requirement
  - The expected reaction of the industry

  - The ratio of the cost of acquiring the required technology to the expected profit
- Characteristics of the transport technology related to the given goods:
  - Existence of transportation technology
  - Manufacturer and concentration of transport technology
  - Existence of substitute technology

The matching test system developed by these criteria can be used to develop credible proposals for access to the transport system of the potential commodity industry, which ports can use at their own discretion.

8.1.1 Conclusions from DIONYSUS DT 1.2.3 Summary report DR Countries[ii]

Infrastructure needs for the IWT market development

FAIRWAY - Cargo is transported along the Danube over an average distance of about 2400 km. In order for these shipments to be transported in an economic way, a stable and reliable fairway is needed. Close international cooperation and coordination in this respect is required. Waterway administrations all over the Danube region seek to make the Danube fairway accessible during the whole year. Within the framework of the EU Strategy for the Danube Region, a Fairway Rehabilitation and Maintenance Master Plan for the Danube was developed in cooperation with the waterway administrations and representatives of private shipping companies. This document identified the most critical locations in the waterway network and, more importantly, draws up proposals for their elimination.

PORTS -Digitalization holds great potential for making maritime transport chains more efficient, flexible and agile. It thus opens up the possibility for ports to meet the challenges of globalization, demographic change and urbanization.

With the help of digital solutions, the efficiency of the operation of a single port and its specific transport chains can already be increased, complex processes simplified or energy consumption reduced. In the international environment of the maritime, digital networking of ports offers additional opportunities to improve efficiency and safety along the entire transport chain. Through the targeted exchange of information and data, ports can develop and use new business models.

ADMINISTRATIVE BOTTLENECKS[iii] – The European Strategy for the Danube Region addresses both the authorities involved in border controls and the shipping companies and vessel operators along the rivers. It is a declared objective of the European Union to increase the modal share of sustainable transport means and especially inland

waterway transport. However, shipping companies operate with low profit margins and administrative obligations have a negative effect on transport costs and travel time. A time-efficient and transparent border control system is an effective means to increase the competitiveness of Danube navigation and to actively support modal shift.

Findings by countries

Bulgaria

Inland waterway transport (IWT) is an environmentally friendly alternative to other transport modes and the increase in its use is seen as favourable. The significant contribution that this efficient, safe and sustainable mode of transport can make towards mitigating the negative effects of the transport sector as a whole is indisputable.

Reliability is a crucial factor in logistics chain. As operators rely on just in time delivery for their operations and with the gradual improvement of the transport hubs they require, amongst others, accurate and up-to-date information on fairways, blockages and maintenance.

Further actions and support are needed to unlock the full potential of inland waterway transport as an efficient, safe and sustainable transport system. As stated in the Council conclusions “Inland waterway transport – exploiting its full potential” adopted on 3 December 2018: “With the EU goal to shift freight by 30% from road to rail and water by 2030 and by 50% by 2050 to ensure sustainable mobility, the long-term goal is to turn inland waterway transport into a synchromodal partner in the hinterland of seaports and in continental transports.”

Hungary

There are several identifiable opportunities for IWT in Hungary, which, with the right regulatory framework and optimalisation of the support environment, could benefit the country's society in the long term, both economically and environmentally.

It is important to focus on those products that have been and are expected to continue to be increasingly important for river freight transport in recent years, namely:

Biomass, biofuels, waste and dangerous goods, motor vehicles, agricultural machinery, combined transport unit load equipment (containers, semi-trailers, SWAP, WAB) large, indivisible loads, transformers, wind turbines, construction products.

Preparing for the increase of volume of transport of these products is essential, both in terms of infrastructure and regulatory environment, while at the same time digitalization of the river systems, ensuring environmentally friendly transport and improving working conditions, are also key aspects.

Republic of Moldova

GIFP is the only RM port through which goods are exported and imported.

The port is strategically important for providing the country with vital goods and developing the economy. The port does not carry out transshipment of goods delivered from other inland RM ports.

The increase in the volume of cargo transshipment in the port is directly related to the successful foreign trade of RM with other countries, and above all with the maritime powers and the countries of the Danube region.

Another important factor for the growth of the IWT potential is the consolidation of cargoes to the volumes of the corresponding vessel carrying capacity.

The analysis shows that the growth of IWT potential can be realized by increasing the volume of transportation of agricultural products. To achieve this goal, it is required to create a modern infrastructure for the storage of products for agricultural producers, to develop a transport infrastructure, as well as to create logistics firms providing high-level services.

Analysis of logistics supply chains (export / import) of goods in RM through GIFP allows us to conclude that at the moment, the main water transport corridors are:

- Danube, providing communication with the countries of the Danube region with which RM carries out foreign trade, primarily with Romania, Bulgaria, Serbia;
- Danube and Sea (Black, Mediterranean and others) through which foreign trade is carried out primarily with countries such as Turkey, Italy, Greece, Spain, Syria, Russia and China.

To increase the transshipment of goods at the GIFP port, technological innovations should first of all be introduced for container transport. Container shipments in the direction of China, USA, Turkey, Georgia, which are carried out from Giurgiulești through the port of Constanta, are promising for the growth of volumes.

Analysis of the structure of cargo transported through GIFP allows us to conclude that the main and traditional for IWT are liquid and bulk cargo: oil products; vegetable oil; grain & seeds and others.

Analysis of RM's foreign trade made it possible to identify a number of promising directions and types of cargo that would increase the potential of IWT. For its implementation, it is necessary to develop new transportation technologies, as well as transport and logistics infrastructure.

The growth of the potential of the IWT due to the optimization of the costs of transportation and port services, as well as due to the correct tariff policy, has prospects. However, in our case, this prospect can be realized only through the redistribution of transportation volumes carried out primarily by road transport or through other ports (Odessa, Constanta).

At the moment, there are no problems with the legislation, regulations and administrative procedures that would significantly affect the potential of IWT in RM. The status of a free economic zone allows GIFP to carry out its economic activities quite efficiently.

Romania

Potential for IWT for Romania is identified first in relation with imports and exports of 4 Romanian regions, that have a good accessibility to the Danube ports, from/to DR countries. Based on the current trade flows, the IWT potential to be attracted above the existing traffic is estimated to 1.57 million tonnes per year.

Regarding the trade flows of the DR countries with the Black Sea countries, the IWT potential to be attracted above the current traffic is estimated to 821 thousand tonnes per year.

Thus, it can be concluded that the total potential to be attracted above the current flows is estimated to 2.4 million tonnes per year.

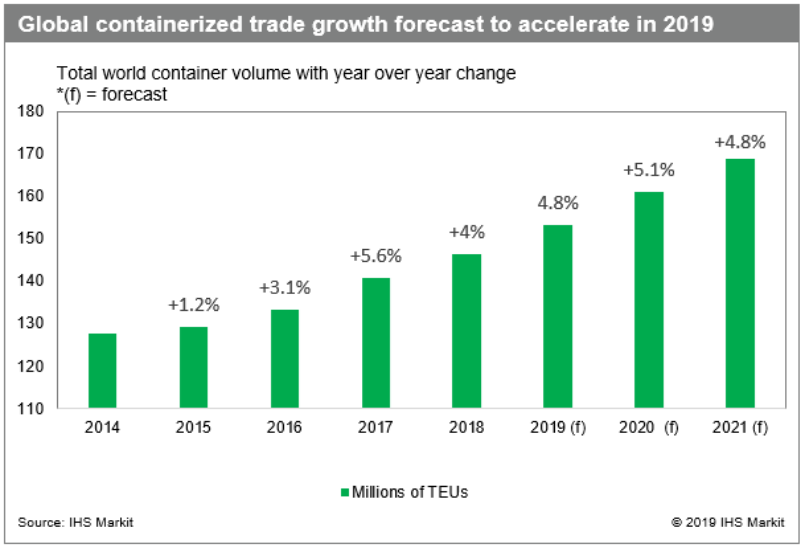
8.2 Containerized IWT potentials

The potential of containerized inland waterway transport is far from being exploited, so in this study we will focus more on mapping this area. To this end, we review global and DR trends and introduce technology that can contribute to the future expansion of the container market.

8.2.1 Container shipping global forecast

Data from IHS Markitiv show that while 2018 global volume increased by 4 percent to 146.4 million TEU, it was down from the 5.6 percent growth recorded the previous year.

9. Figure: Global container trade growth (base year 2014, 2014-2021)



Source: IHS Markit

But the declining growth is expected to turn around in 2019, with demand from the five largest container exporting nations — China, the US, South Korea, Japan, and Thailand — growing at a rate of about 4.8 percent a year through 2025 before slowing to 4.3 percent by 2030, according to the latest IHS Markit Trends in the World Economy and Trade report.

8.2.2 Potentials for new cargo types in shipping containers with liner bags

New technologies, such as container liner bags can divert new type of goods to be carried in a standard shipping container.

Liner bags are a clean, safe and effective packaging solution that transforms containers into reliable and cost-effective alternatives to tank containers, ensuring the lowest logistical costs and reducing environmental impact:

- Protect goods from external agents and contaminations
- Reduce total handling costs: easy and fast to install – load – discharge – dispose
- Maximize container payload
- 100% waterproof
- 100% recyclable

Fields of application[v]

Food and Feed: Barley, cocoa, corn, fishmeal, flour, ground nuts, lentils, milk powder, nuts, peas, rice, salt, seeds, soya beans, starch, sugar, tea leaf, wheat, grain, flour, cattle feed, mixed grain feed, etc.

Chemicals: ABS resin, aluminium, certain fertilizers, glass beads, nylon polymer chip, polyester granules, PE granules, PP granules, PVC powder, PTA powder, soda, catalysts, pigments, zinc powder, detergents, carbon black.

Minerals: Anhydrite binder, bentonite clay, gypsum, silica, talcum powder, tri-poly phosphate, vanadium slag, aluminum fluoride, bleaching earth, titanium dioxide, zeolite, cement, lime, chalk.

Wastes: organic waste, residue sludge and ashes from industrial and organic processes.

9 Economic development scenarios for the Danube Region

In the first part of this chapter, we present the recommended steps, actions and key elements to develop the Danube Region. In the second half, we summarize the desires defined by Hungarian stakeholders (HFIP and external experts) to decision makers in the respective ministry for transport, currently called Ministry for Innovation and Technology. We recommend the Hungarian development plans to be adapted by other Danube countries.

9.1 IWT development according to the EUSDR

The economic development vision for the Danube Region is outlined in the European Union Strategy for Danube Region (EUSDR) and its Action Plan 2020.

The Strategy provides an integrated framework for strengthening cooperation between the countries the Danube flows through.[vi] The strategy has integrative and cohesive functions by bringing together 115 million people from nine EU member states, three EU candidate countries and two EU neighbour countries.

During the last decade since its launch in 2010, the strategy has successfully generated structures, projects and networks, however there are still common challenges to tackle: climate change, migration become more and more urgent and shall be managed in cross-border cooperation. The EUSDR Action Plan defines 85 actions within 12 priority areas which are:

1.a Waterways mobility

1.b Rail-road-air mobility

2. Sustainable energy

3. Culture and tourism

4. Water quality

5. Environmental risks

6. Biodiversity and landscapes, quality of air and soils

7. Knowledge society

8. Competitiveness of enterprises

9. People and skills

10. Institutional capacity and cooperation

11. Security

The 12 priority areas are brought together into 4 pillars:

1. Connect the region (1a, 1b, 2, 3)
2. Protecting the Environment (4, 5, 6)
3. Building Prosperity (7, 8, 9)
4. Strengthen the Region (10, 11)

As mentioned above, the 12 Priority Areas (PA) include 85 actions. PA 1a Waterway mobility contains 6 actions present output, O.T.1.3. can build on:

Action 1: Contribute to improve waterway and port infrastructure & management

Action 2: Foster business development

Action 3: Facilitate fleet modernisation

Action 4: Support the further roll-out and enhancement of River Information Services

Action 5: Contribute to the enhanced quality of education and jobs

Action 6: Contribute to the simplification, harmonisation and digitalisation of administrative processes

Below the strategic frame, the actions and targets, and exact projects and activities (completed, ongoing and planned) within PA 1a, Waterways mobility are presented as long as these elements are in line with the future scenarios of the DR.

The mission in the frame of PA 1a defined in the 2010 Action Plan was 'to improve mobility and multimodality – inland waterways.' As of 2019, objectives had been added to the Priority area:

- to optimally manage and improve navigability conditions as well as shore side infrastructure in a harmonized and environmentally sustainable way;
- support transnational initiatives to promote IWT and business development to raise the modal share of IWT in the DR;

- develop the fleet to reduce emissions of GHG and air and water pollutants and to become more fuel-efficient;
- implement harmonized RIS on the Danube and its navigable tributaries in line with European legal provisions and ensure international data exchange;
- solve the shortage of qualified personnel and harmonize standards of competence for professionals in Danube navigation;
- establish time-efficient, service-oriented and transparent administrative procedures, especially border controls, in the framework of navigation on the Danube and its navigable tributaries.

Integration with EU Policy Provisions

In line with the EU Cohesion Policy Provisions' specific objective, the Danube Region aims to develop a sustainable, climate-resilient, intelligent, secure and intermodal TEN-T corridor.

Actions and targets were identified based on experiences gathered since 2010 in the fields of inland navigation, policy developments, feedback from stakeholders.

Action 1: Contribute to improve waterway and port infrastructure & management

The management and improvement of navigability conditions, shore side infrastructure in a harmonised and environmentally sustainable way is aimed within this action. To reach this goal, PA 1a supports the management of maintenance activities of IWWs to keep their navigability conditions on the Danube and its navigable tributaries to ensure operations are completed in line with environmental goals and legal frame. Further goal of this action is to facilitate the application of integrated approach when establishing navigability projects to contribute to good navigability conditions and favourable conservation status according to the Water Framework Directive and Habitats Directive. Besides, the action is intended to contribute to the service-oriented optimization of lock operations and shore side infrastructure by increasing the quantity and quality of berths and underpasses as required. It also contributes to better multimodal access to inland ports and other transhipment points and their hinterlands.

TARGET: Significant development of the condition of waterways and shore side infrastructure along the Danube and its navigable tributaries, which will be evaluated based on an annual survey of waterway users.

Action 2: Foster business development

The goal of the action is to facilitate transnational initiatives in the fields of encouraging IWT and business development to raise the modal share of IWW in the Danube Region. To achieve this, regular consultations are organized with the participation of key stakeholders with the aim of continuously identifying the needs of waterway users and

identifying promising market segments for shipping on the Danube through market analyses. Finally, the main goal of the action is to contribute to discussions between international corporations aiming the increase of the modal share of IWT.

TARGET: Contribution to B2B discussions between companies every year.

Action 3: Facilitate fleet modernisation

The goal of this action is to create a modern Danube fleet by reducing the emission of greenhouse gas, air and water pollution aiming climate neutrality and bringing innovation into the sector. To achieve this, PA 1a monitors on-going technology innovations aiming greener and more modern fleet, and it contributes to implement a strategy facilitating the declaration and practical introduction of measures for innovation and modernization in the Danube fleet. PA 1a evaluates project experiences e.g., Clean Inland Shipping funded by LIFE.

TARGET: Promote the use of EU funds for fleet modernization and support the development of national funding schemes.

Action 4: Support the further roll-out and enhancement of River Information Services (RIS)

The goal of this action is to introduce harmonized river information services (RIS) on the Danube and its navigable tributaries on European level according to the laws, and to ensure data exchange. To achieve this, PA 1a facilitates collection of information on the current and expectable future status of navigable rivers and use of this information in place and in an online available, service-oriented and user-friendly way. Efficiency of managing traffic can be improved with better traffic information. Moreover, the action facilitates establishing RIS-based solutions aiming logistics and traffic management, and it encourages the integration of different transport modes.

TARGET: Establish up-to-date online waterway information service, make it available and ensure its interoperability in the Danube Region.

Action 5: Contribute to the enhanced quality of education and jobs

The goal of this action is to solve the lack of professionals, and to introduce harmonized aptitude requirements for crews working in the Danube Region. PA 1a supports the extension of EU Directive 2017/2397 on the recognition of professional qualifications in inland navigation on the entire Danube, not only in EU Member States, but also in non-EU coastal states. Furthermore, this action identifies measures to increase the availability of shipping crew, the attractiveness of jobs in the sector and the knowledge transfer about Danube navigation to future decision-makers and logistics supply chain managers.

TARGET: Support the implementation of the EU Directive 2017/2397 in all Danube countries, especially in non-member states.

Action 6: Contribute to the simplification, harmonisation and digitalisation of administrative processes

The goal of this action is to introduce time-efficient, service-oriented, and transparent administrative processes, especially in case of border control. To achieve this, PA 1a and PA 11 commonly harmonize and simplify border control processes through guidelines, and standardized printed matter. Furthermore, PA 1a facilitates establishing such new digital tools that make border control more efficient.

TARGET: The goal of this action is the significant development of administrative processes, especially in cases of border control and inland navigation on the Danube and its navigable tributaries till 2023.

9.2 Development plans, desired state in the Hungarian Danube section

Hereby the development plans for the IWT sector in Hungary are presented based on the National Port Development Master Plan Strategy and focusing on financing and allocating support and establishing a legal framework for facilitating modal split. The recommendations shall be adapted by other Danube countries as well.

National Port Development Master Plan Strategy completed in 2019 aims facilitating modal shift and declares the followings on a strategic – policy level:

Hungary's goal is to transfer 30% of road transport to other modes by 2030, and 50% by 2050 e.g.: rail or waterway due to effective, eco-friendly cargo transportation corridors, and IWT to reach 10% of total national freight transport volume by 2030 in line with the guidelines defined in the White Book 'Roadmap to a Single European Transport Area' published by the European Commission. To achieve this, appropriate infrastructure development is necessary, and incentive of modal shift is also essential. Increasing the role of waterborne freight transport can only be achieved in coordination with other modes of transport and integrated into the combined and intermodal transport system.

Strategic objectives shall be achieved by implementing a complex approach with financial incentives and the shaping of the regulatory environment.

- financial support system,
- regulatory framework for the transport of oversized goods.

9.2.1 Encouraging IWT – financial support

The aim is to contribute to the presented strategic objective by introducing a system of financial support that facilitates the shift of freight transport by road to IWT.

9.2.1.1 Defining the sum of grant

When determining the amount of aid per transport performance, several factors are worth of examination, including environmental and economic impacts.

As the first step, we estimated the economic benefits of IWT to determine the potentially justifiable maximum amount of aid, i.e., the external cost savings of IWT instead of road freight kilometres.

The methodological basis was provided by the Handbook on the external costs of transport 2019 issued by the European Commission, in which the external costs of each mode of transport were determined. Based on this, external costs per tonne-kilometre of the means of transport used for the transport of bulk goods typically transported on IWW in Hungary were compared.

Mode of transport	Accident	Air pollution	Climate impact	Noise pollution	Traffic conflict	Refuleling	Habitat	Sum
Road transport	0,07 €-cent	0,44 €-cent	0,41 €-cent	0,01 €-cent	4,30 €-cent	0,10 €-cent	- €-cent	**5,33 €-cent/km**
IWT	0,10 €-cent	1,84 €-cent	0,20 €-cent	- €-cent	- €-cent	0,09 €-cent	- €-cent	**2,23 €-cent/km**

In relation to the two modes of transport examined, the difference of EUR cent 3.10 / freight-tonne-kilometre i.e., the amount of aid potentially equal to the amount per tonne of freight per km can be justified in terms of economic benefits. To determine the potential budget, we calculated an average mileage equal to half the length of the Danube section in Hungary, and the average traffic volume of the last 3 years were taken into account. Based on this, the inland cargo transport generates an annual economic benefit of EUR 38,794,375 compared to road transport, which means HUF 13,578,031,298 at the exchange rate of 350 HUF/EUR.

In determining the actual amount of aid, the concept of aid planned for competing rail transport was taken as its basis – there is no such aid scheme in force in Hungary – so the two aid schemes can be assessed together.

In the case of IWT, the average subsidy of more than 25 tonnes of freight per tonne-kilometres, between 30-100, between 101-250 km were taken into account, which are EUR 24.95 per 1,000 km.

The basis of the proposal would be 80% of this value, i.e., EUR 19.96, which is EUR 0.01996 per km.

Based on the 3-year improvement of port traffic, the base value of the support system at the time of introduction was set at 6,002,069 tonnes, compared to which is expected that is 20% increase in volume as a result of the proposal.

The target value is thus 7,202,483 loaded tons, for which the estimated total amount is EUR 29,974,286 at an exchange rate of HUF 340 per year, covering half of the Danube section in Hungary (208.5 km).

9.2.1.2 Method of allocating aid

The method of allocating aid for goods transported by IWW also follow the Western-European practice. The beneficiary of the subsidy amount is the owner of the goods, whose goods are loaded at a Hungarian inland freight port and the goods cross the national border for export and import.

The freight tonne-kilometre is determined based on the border section of the port of loading and the IWW. It is important that the system provides support only for the Hungarian section.

Transit traffic, i.e., when transporting goods without touching a domestic port for loading purposes, is not eligible for aid. In each case, the weight of the goods is indicated in the river bill of loading and/or loading list certified by the port, which is based on a certified measurement report.

Since all the information needed for applying for grant are created in the port, namely the quantity of goods, distance to / from sender or receiver port, customer, thus ports will be able to handle and administrate grants.

In order to compensate increasing administrative burden, ports charge a 5% handling fee, with the remaining amount being passed on to the beneficiary.

The Hungarian Danube ports are obliged to use the subsidy to reduce the service fee for those who order loading directly. By doing so, discount is given directly to the shipping and goods-owning company in proportion to the performance actually carried on IWW. The requirement for the transparent display of subsidies and fees in the billing system helps to implement this principle.

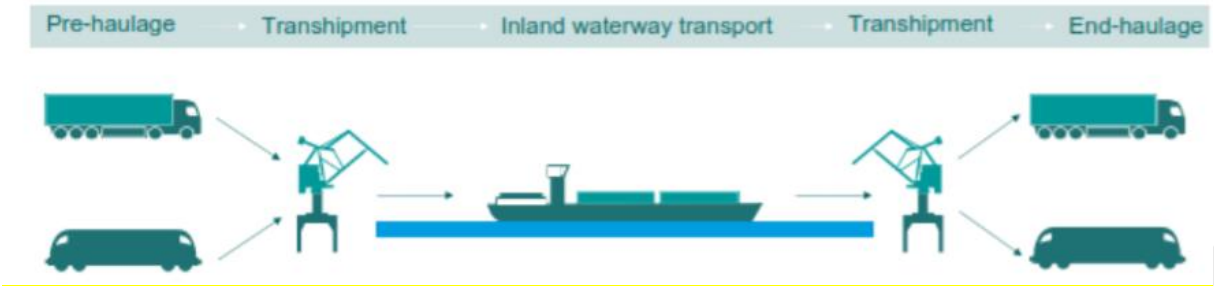
9.2.2 Encouraging the combined transport of oversized goods by IWW

Integrated transport is a movement of goods (in one and the same loading unit or a vehicle) by successive modes of transport without handling of the goods themselves when changing modes. It is hence a type of multimodal transport. Multimodal freight transport refers to the carriage of goods by at least two different modes of transport.

The aim of the proposal is to encourage modal shift of oversized goods from the current road transport towards combined road and IWW, whereas circumstances and weather allow and economic benefits support to do so.

Under the proposal, when authorizing oversized goods, it would be mandatory to examine the availability of inland ports for the combined transport of goods by IWW between the point and place of destination that can be used for the transport of goods. As a thumb rule, if such combined transport solution is available and the total length of the road element of the combined transport does not exceed 50% of the available pure road transport mode, the carrier would be obliged to use IWW combined transport. An exception to this obligation is if navigation conditions (water level of the Danube) at that time does not allow the transport of the given goods.

10. Figure Combined transport including IWT and road/rail



Source: Inland Waterway Transport Reader, 2016

With this measure, a significant volume of cargo traffic could be diverted from road to IWW without any public support, without budgetary expenditure, by means of a mere regulatory instrument, and in the case of goods which are the greatest burden on road infrastructure and other road users.

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- Trade in goods by top 5 partners, European Union, 2020 (europa.eu), available at: Trade in goods by top 5 partners, European Union, 2020 (europa.eu)

Other resources:

- DIONYSUS DT.1.2.1. Summary Report
- DIONYSUS DT 1.2.3. Summary Report

Footnotes:

[i] Source: https://inland-navigation-market.org/wp-content/uploads/2021/11/Market-Insight_Q3_EN_Web.pdf
[ii] Source: DIONYSUS DT 1.2.3 Summary report, page :132
[iii] Source: DIONYSUS DT 1.2.3 Summary report, page :132
[iv] Source: https://www.joc.com/maritime-news/global-container-growth-forecast-rebound_20190425.html
[v] Source: http://www.eceplast.com/category/liner-for-container/
[vi] EUSDR ACTION PLAN SWD(2020)59 final.pdf (kormany.hu)