



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



Danube Transnational Programme

DIONYSUS

Report on activities to initiate and support Container Liner Services

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Contributing Authors

Name	Organisation	Email
Daniel Jarnea	MPAC	djarnea@constantza-port.ro
Andra Opreanu	MPAC	aopreanu@constantza-port.ro
Georgiana Minea	MPAC	gminea@constantza-port.ro
Cristian-Mihai Iliescu	MPAC	cmiliescu@constantza-port.ro
Cristiana Dima	MPAC	cdima@constantza-port.ro
Nicoleta Constantinescu	MPAC	nconstantinescu@constantza-port.ro
George Mihaescu	MPAC	gmihaescu@constantza-port.ro

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Abbreviations

Abbreviation	Explanation

1 Introduction – description of project activities

Output O.T1.1 is based to a large extent on the findings of the previously elaborated project deliverables of A.T1.1. Especially the Status Quo Report of the transport infrastructure of the transport corridors in the DR, analysis of on-going and planned projects for selected Sections & Nodes, part of Core and Comprehensive Networks, as well as the Traffic Flows Analysis at Danube Region Transport Corridor level for all transport modes considered will be considered. This comprehensive analysis performed at the DR level will identify the gaps related to the current cargo flows but will also identify possible solutions and issuing Recommendations meant to overcome key bottlenecks in the transport system and in particular in relation to the better use and integration of the Danube waterway system. The output it's elaborated predominately by FTTE with inputs predominately by FTTE with inputs from all partners implementing the activity.

The market for cargo transportation on the Danube waterway not only depends on the trade flows and by the economic framework conditions at the local/regional level. The cargo transport potential is highly dependent on the waterway and in particular on the fairway conditions. Shallow water conditions limit the efficiency of waterborne transport by increasing the operational costs and by extending the transit times. Poorly maintained waterway sections aggravate the economic negative impact by limiting vessels draught beyond the hydrological conditions.

The impact of insufficient waterway maintenance was described and quantified in D.T1.2.4. Fairway maintenance impact report. Based on the findings of this report, a calculation tool shall be developed which illustrates the economic losses on the side of barge operators as well as the socio-economic losses deriving from reduced cargo transportation on the Danube. The calculations made with the help of the tool will put the impact of the fairway maintenance with guaranteed fairway depths on market size and profitability into figures. The tool shall address the IWT industry representatives (vessel operators, port service providers, logistics service providers) as well as to national decision-makers on political and public administrations levels. The tool, therefore, shall contribute to a fact and figure-based infrastructure policy of the Danube states. The tool it's developed under the responsibility of MPAC with inputs of all PP implementing A.T3.2.

Trade flows and economic development scenarios for the Danube Region are analysed. Based on this generated information, combined with the identification of cargo flows with the potential to be transported by IWT, a dedicated monitoring tool, namely the IWT Market Observatory will prepare. This output it's provided 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.

The implementing PPs under the coordination of MPAC executed two of the online Container liner services to which attended stakeholders, involved public authorities, shippers which are interested to use container liner services, maritime vessel operators, port and terminal operators to initiate and to support the establishment of container liner services as well as activities to facilitate collaboration of actor in a container transport chain. These activities are included and summarized in this report drafted by MPAC at the end of RP 5.

WP T1 aims to provide a substantial knowledge basis regarding on-going and future transport corridor developments in the Danube region as well as regarding their potential connections to transport corridors and networks in the Black Sea region.

The analyses and assessments carried out in this work package shall identify gaps in corridor planning and transport infrastructure of the DR. They also will deliver recommendations on how the Danube ports could gain importance through increased cargo flows thus creating economic prosperity in the DR as well as on the commercial and socio-economic impact on insufficient waterway maintenance.

Special attention will be put on the identification and quantification of new markets for the Danube IWT. Dedicated investigations will be carried out regarding the opportunities and potential threats for Container liner services which are considered as a pre-condition to develop container transport on the Danube of significance. Last but not least, the use of the Danube waterway and the interconnectivity with the corresponding transport corridor in the Black Sea region will be promoted with the help of a dedicated Strategy and an Action Plan.

WPT1 is coordinated by MPAC, A.T1.1 – Transport Corridors (Status of planning & Gap Analysis) is led by FTTE, A.T1.2 – IWT Market Analysis by AAOPFR, A.T1.3 – Case Study Container Liner Service by MPAC and A.T1.4 again by MPAC.

The responsibilities follow the core competencies of the partners such as transport & traffic engineering (FTTE), market analysis and liaison to industries (AAOPFR), logistics & business development (MPAC) as well as international cooperation & coordination and interaction with EC services for corridor development (MPAC).

Brief overview of outputs

- Output: T1.1: Gap analysis & Recommendations for corridor enhancement.

Output O.T1.1 will be based to a large extent on the findings of the previously elaborated project deliverables of A.T1.1.

Especially the Status Quo Report of the transport infrastructure of the transport corridors in the DR, analysis of on-going and planned projects for selected Sections & Nodes, part of Core and Comprehensive Networks, as well as the Traffic Flows Analysis at Danube Region Transport Corridor level for all transport modes considered will be considered.

This comprehensive analysis performed at the DR level will identify the gaps related to the current cargo flows but will also identify possible solutions and issuing Recommendations meant to overcome key bottlenecks in the transport system and in particular in relation to the better use and integration of the Danube waterway system.

The output will be elaborated predominately by FTTE with inputs from all partners implementing the activity.

- Output: T1.2: Fairway maintenance impact calculation tool.

The market for cargo transportation on the Danube waterway not only depends on the trade flows and by the economic framework conditions at the local/regional level. The cargo transport potential is highly dependent on the waterway and in particular on the fairway conditions.

Shallow water conditions limit the efficiency of waterborne transport by increasing the operational costs and by extending the transit times.

Poorly maintained waterway sections aggravate the economic negative impact by limiting vessels draught beyond the hydrological conditions.

The impact of insufficient waterway maintenance was described and quantified in D.T1.2.4. Fairway maintenance impact report. Based on the findings of this report, a calculation tool shall be developed which illustrates the economic losses on the side of barge operators as well as the socio-economic

losses deriving from reduced cargo transportation on the Danube. The calculations made with the help of the tool will put the impact of the fairway maintenance with guaranteed fairway depths on market size and profitability into figures. The tool shall address the IWT industry representatives (vessel operators, port service providers, logistics service providers) as well as to national decision-makers on political and public administrations levels. The tool, therefore, shall contribute to a fact and figure-based infrastructure policy of the Danube states.

The tool will be developed under the responsibility of MPAC with inputs of all PP implementing A.T3.2.

- **Output: T1.3: IWT Market Observatory**

Trade flows and economic development scenarios for the Danube Region are analysed. Based on this generated information, combined with the identification of cargo flows with the potential to be transported by IWT, a dedicated monitoring tool, namely the IWT Market Observatory will prepare.

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.

- **Output: T1.4: Workshops on Container Liner Services.**

In total three Workshops on Container Liner Services will be designed and executed, one workshop each by MPAC in Constanta (Online), one by FTTE in Belgrade (Online), and one by MPAC in Constanta. These workshops will constitute O.T1.4.

The workshops will reunite PPs, ASPs, and external stakeholders and will be organized with the purpose to identify interested companies to revive and develop the Container Liner Services on the Danube River. With this occasion the reports of the previous stakeholder meetings and the draft of Output T1.5. – Policy recommendations for Container Liner Services on the Danube River (report) will be presented and further discussed. The target audience will be stakeholders interested in further elaborate Business Cases which will bring together specialized concepts and policy recommendations, highlighting the necessary activities in order to initiate and support the development of container liner services.

Besides the specialized project partners who will bring in their expertise in IWT activities (port authorities, ship owners, port operators, consultancy companies), researchers (maritime and transport universities), representatives of business support organizations (chambers of commerce & industry) and policy decision-makers (transport ministries) will also contribute. On these occasions, the Stakeholders Reference Group will be initiated and expanded.

The Danube corridor offers the Danube waterway cost-efficient and sustainable transport solutions. These solutions are still not exploited by all possible industries. Expanding the use of the Danube waterway to new markets and new clients requires commercial and political efforts as well as a comprehensive promotion.

The Danube corridor connects to transport corridors in the adjoining Black Sea region. Especially the Middle Corridor comprising Georgia, Azerbaijan, Kazakhstan and reaching out to western provinces in China could offer interesting new cargo flows making also use of the Danube waterway.

Connections via the Black Sea linking the Danube seaports with destinations in the Russian Federation as well as in Turkey give access to other high cargo potentials. Interconnecting the Danube corridor and thus the Danube waterway with these corridors and tapping the cargo potentials will provide DR

industries with new and commercially attractive business opportunities thus generating socio-economic benefit.

A.T1.4 will analyze these socio-economic benefits and costs of increased cargo flows on the Danube waterway (T.T1.4.1).

Secondly, a strategic concept for the promotion of Danube waterway transport in the European transport policy framework and towards the transport & logistics markets will be elaborated (T.T1.4.2). Measures to connect the Danube corridor with EU Eastern Partnership (EaP) corridors, the Russian Federation and Turkey will be consolidated in an Action Plan (T.T1.4.4).

The activity will be led by MPAC which also will be responsible for D.T1.4.1 and D.T1.4.2.

PDM will be responsible for O.T1.6 which shall deliver a Strategy for promotion and awareness-raising for the economic and socio-economic value of Danube transportation.

MPAC, ONMU, and HFIP will organize each workshop aiming at the facilitation of cross-border/cross-Black Sea cooperation.

HFIP will be responsible for drafting the summary report on all activities carried out.

2 Activities dedicated to the analysis of the container liner services development on the Danube

In total three Workshops on Container Liner Services were organized: one workshop by MPAC in Constanta (Online), one by FTTE in Belgrade (Online), and one by MPAC in Constanta (Online). These workshops constitute O.T1.4. The workshops reunited PPs, ASPs, and external stakeholders and were organized with the purpose to identify interested companies to revive and develop the Container Liner Services on the Danube River.

The summaries of the activities carried out in the 3 workshops, dedicated to the analyses of the CLS development on the Danube, are presented below:

2.1 1st Workshop on Container Liner Services

The first workshop was organised online by MPAC on 10th October 2020. The 74 participants represent important organisations (public institutions, authorities, private companies, associations, universities, research organisations, etc.), providing useful information based on their various areas of expertise.

Regarding the importance and objectives of Dionysus, the following participants provided information, as follows:

Mrs. Cristiana Dima, representing MPAC, welcomed participants and described this first event as an important step towards the revival of Danube container transport. Mrs. Dima continued by stating that the purpose of Dionysus is to reunite relevant decision-makers who influence inland waterway transportation and to build the foundation of a stakeholder reference group, where people from EU organizations, private companies or all those involved in the academic fields can discuss the problems they identify in practice but most importantly, to provide solutions. According to Mrs. Dima, maintaining a realistic approach is compulsory for obtaining an improvement of the container transport situation on the Danube. While designing plans for the future, previous experiences and mistakes should be used as lessons. Moreover, the fast evolution of digitalization, the increasing trend of using clean transport ways and availability of EU funding schemes must be used as engines for keeping Danube a desirable transport alternative.

Mr. Silviu Meterna, representing Pro Danube Romania underlined that Dionysus aims to turn Danube ports into high performing, better connected and integrated hubs. According to Mr. Meterna, probably the most important output of the project will consist in the elaboration of a large number of port development plans, which will consequently be used by project partners for preparing quality investment projects in order to obtain EU funding. These investment projects will have a significant impact on the regional economic development of the port hinterland, making Dionysus a key instrument for reaching the EU's strategy regarding the Danube River.

Mrs. Desiree Oen, senior expert in DG MOVE and adviser to Karla Peijs, European coordinator of the Rhine-Danube TEN-T Corridor, expressed her congratulations to the entire Consortium for initiating such an ambitious project for the Rhine – Danube Corridor, emphasizing the importance of well-developed ports as modal points of intermodal logistic chains, playing a key role in facilitating a sustainable transport growth in the Danube Region. Mrs. Oen underlined the importance of port development as a catalyst to stimulate economic development and to create employment for both maritime and inland ports, making it essential to ensure available adequate infrastructure is the Rhine – Danube ports. Port developments plans are highly awaited and they will stand as an important corner stone in the development of sustainable logistic chains in the Danube Region and further in Europe.

"We need to create a real dialogue and not a competition" is the message from Desiree Oen, who highlighted the European Commission's constant efforts to support transport on the Danube, a priority

being the fairway maintenance works on the inland waterway, customs formalities and digitalization. She also highlighted the importance of developing the Danube ports in terms of infrastructure, but also the need of an adequate fleet, which can be achieved by using dedicated financing instruments in the next period for the development of this waterway, all these measures being a support for the transport of containers. The need to invest in the entire navigation system of the Danube is vital, mentioned Ms. Oen expressing her conviction that the Dionysus project will be a real support for the sustainable development of transport on the Danube by creating an open dialogue environment, but also through the analysis and studies resulting under this project.

Mr. Manfred Seitz, General Director of Danube Commission began his speech by saying that when dealing with development issues related to transport on the Danube several exciting questions arise. One is why are there so few containers being transported on the Danube although the worldwide container volume has grown extremely in the last decades. The second question is how can container transport on the Danube be developed and moreover, transformed into an economic success. The answers to these questions will be investigated within Dionysus, through concepts and analysis and by facilitating cooperation between stakeholders having economic interest but also economic power and market capability to make container transport at a larger scale, going beyond niche markets.

Manfred Seitz mentioned that, although a number of projects/studies have already been carried out on how to improve container transport on the Danube, it is now more necessary than ever for this topic to be brought to everyone's attention again, given the need for economic integration of the Danube region, the continuation of the process of expanding global logistics chains to all modes of transport, the continuous growth of the container market, transport connections dedicated to containers that can be made through the Port of Constanta in the Black Sea region and towards Asia, the growing interest of logistics companies in developing river ports, the European Commission's Green Deal policy that makes it necessary to include the Danube as a way of transport which contributes to reduced environmental pressure.

In the opinion of Ms. Monica Patrichi, representative of Romanian Ministry of Transport, Infrastructure and Communication, Dionysus will stand as a real support for the future development of the Danube ports. The Danube Strategy has successfully generated cooperation between partners and the Action Plan, revised in April 2020, stands as an integrated response to a common set of challenges and opportunities identified together with all partners in the Danube Region. Ms. Patrichi pointed out that Dionysus' objective of achieving an efficient infrastructure planning for ports and their connections with the hinterland is in line with the first two thematic areas included in the Action Plan.

The presentation made by Mrs. Carmen Costache, President of the Union of Romanian Inland Ports focused on the importance of port integration within multimodal transport chains, underlining that this can be achieved only by ensuring that inland ports become bundling platforms. In order for ports to become bundling platforms there are some mandatory conditions that must be fulfilled, such as updated transshipment facilities, proper and all year-round available infrastructure for vessels, port community system implementation and connection to river information system, logistic area to be available in proximity of the port, available area for extension around the port, close cooperation with local authorities and last, but not least, good hinterland connection. Mrs. Costache stressed on the idea that ports must not be approached individually but as a network.

Regarding Dionysus Project - WPT1 - General view, the following participants provided information, as follows:

Mrs Mihaela Mihai from MPAC, as work package coordinator for WPT1 made a general description of the WPT1 – Transport Corridors and IWT Markets objectives. The two main objectives are the ongoing and future transport corridor developments in the Danube region and the potential connections to transport corridors in the Black Sea Region. Mrs Mihai also mentioned in her presentation that WP T1 will focus on the following: gap analysis of corridor planning and transport infrastructure;

recommendations for Danube ports to contribute to corridor enhancement (by increased cargo flows); identify and quantify new markets for Danube Region; opportunities and threats developing a Container liner service on Danube (practical); Strategy and Action Plan – improve DR transport system and its interconnectivity with Black Sea region.

Mr Vladislav Maras representing the University of Belgrade made a presentation of the framework condition analysis on container liner services having the following tasks: a comprehensive analysis of the market framework conditions for container transport on the Danube; investigation of the previously failed container transport services; focus on maritime containers being shipped from and to the Danube seaports. According to Mr Maras, the aims of the analysis are: drawing conclusions about the development phase of container transport on the Danube; understanding the characteristics of that phase defining requirements and constraints to be included in the modelling; figuring out what should be done to move to the next phase of development of container transport on the Danube. The representative of the University of Belgrade also mentioned that the aim of containerization potential on Danube is to elaborate IWT market potential in the Danube region and the determination of cargo flows with a potential to contribute to the development of intermodal services in this region.

In his second presentation Mr Vladislav Maras presented the concept for Container Liner Services. The main tasks are assessing potential routes/ services and models the container liner services according to vessel concepts and market requirements and in the end the outcome is that the concepts shall provide a sound knowledge basis for companies that are interested in container transport or in the operation of container liner services. A case study was presented, with the following main objectives: to determine the subset of ports to be called at; to determine the amount of containers to be shipped between each pair of ports; to maximize the profit of the shipping company; to develop an integrated approach to design shipping routes while simultaneously taking into account: optimal turnaround time, optimal choice of the final port in the outbound direction and empty container balancing and repositioning, if needed.

Mr Daniel Jarnea from MPAC presented the report on activities to initiate and support Container Liner Services. He reported the status of the current situation: a very small number of containers are transported on the Danube and most of these containers belong to empty container return market operations. In the past, several companies tried to implement such services, similar to an initiative back in the early 2000 between Deggendorf – Enns - Budapest with dedicated 45 feet open-sided containers. MPAC representative informed that under the coordination of MPAC a series of activities of activities will be organized, such as stakeholder meetings, coordination meetings with involved public authorities, shippers which are interested to use container liner services, maritime vessel, operators, port and terminal operators to initiate and to support the establishment of container liner services as well as activities to facilitate collaboration between parties in a container transport chain. Based on market analysis and stakeholder feedback, recommendations for the conditions to set-up a successful service will be elaborated by MPAC in the D.T. 1.3.4 Report, by October 2022.

Mrs Karin Voglsam, representative of Ennshafen Port presented policy recommendations for Container Liner Services, noting that these recommendations shall create a favourable framework for a successful implementation of a container liner service on the Danube, including measures for the improved regulations and handling of border and customs control, preferential tariffs for ports and canals, priority rules at locks, financing and funding opportunities, other supportive measure and stakeholders' meetings. The conclusions of the WPT1 workshop on container services will be reflected in the Policy Recommendations on Container Line Services. Project partners will share and filter information, develop harmonized solutions together, analyze previous failed transport experiences of containerized cargo. Moreover, the architecture of the new container transport services will be established and the evaluation of new routes and services will be executed.

Regarding scientific perspectives on Danube container transport, the following participants provided information, as follows:

Mrs Cristina Dragomir, professor at the Maritime University of Constanta presented scientific perspectives on Danube container transport providing a few Danube navigation technical info. Also, the professor presented some conclusions derived from a comparison between Danube and Rhine River: Danube provides a viable alternative to roads and rail systems, crucial for regional development; Danube offers excellent opportunities for freight, passenger and tourist inland water transportation; the navigability potential of the Danube still remains largely under realized; not visible results for minimum depths necessary for river navigation; a fleet specialized in dredging and breaking ice bridges is necessary.

Presentations by private companies interested in the development of container transportation on Danube River:

The first presentation of a private company interested in the development of container transportation on Danube River was made by Mr Otto Hawlicek, CEO of Container Terminal Enns. The presentation focused on the most important numbers that describe the terminal's activity: TEU, trains, container repairs, containers in permanent storage, daily handling capacity for trucks, annual sales turnover, etc. The key performance indicators of the Terminal were also mentioned: movement capacity per crane/hour, dwelling time per truck, max slot duration / train, height storage container stocks.

Mr Antonio Stoean as Commercial Director at TTS made a presentation regarding today's main barriers and challenges for the container liner services on Danube. Mr Stoean explained that the main barriers in today's Danube traffic are Danube's infrastructure (water levels and navigability) and Danube ports (quays, equipment, connections to hinterland).

Mr Stoean also pointed out what are the necessary investments for the majority of ports in the lower Danube, such as: quays platforms and supra-structural works; dredging works in the ports; specialized equipment for container operations; road and rail connection. Regarding a long-term strategy a 5 points plan was presented, including investment programs in new river vessels with low drafts, investments in port infrastructure, supra-structure and equipment and market analysis – proximity to market and efficiency.

Mr Ovidiu Papiniu, Managing Director at IST Logistic made a presentation regarding the main problems that led to the disappearance of Full Loaded Containers traffic on the Danube, mentioning at the same time the essential obstacle to be dismantled. He explained that unfortunately, certain objective and subjective aspects make very difficult the development of traffic management. One of the biggest difficulties is the unpredictability of Danube water level and the big number of points with very low water level. At the end of his presentation Mr Papiniu assured participants that the company he represents will continue its efforts in promoting Danube as a viable option in the multimodal transport practice and hopes to succeed in becoming part of a real container Liner Service.

Mr. Paul Ivanov, CEO of Trading Line Group & Inland Shipping BV stressed on the idea that the company he represents will never give up developing container transport on Danube, discovering in practice that one of the ways to achieve that is by using big capacity and low draft vessels. Within the development programme, the company has already made some investments, thus, next year such vessels will be brought in Romanian ports. Also, big capacity free floating cranes will also be made available next year, standing as an alternative for operators who refuse using barges.

2.2 The 2nd Workshop on Container Liner Services:

This Workshop was organized online by FTTE on 7th December 2021 and it aimed to revive and develop the Container Liner Services on the Danube River. The workshop ambition is to provide a chance to stakeholders from the Danube region to familiarize themselves with the experiences of other regions in the COB development. It may enable workshop participants to acknowledge key success factors for container barging and hopefully get some ideas on how to initiate these services on the Danube.

The 82 participants representing important organisations (public institutions, authorities, private companies, associations, universities, research organisations, etc.) took part to the Workshop and provided useful information based on their various areas of expertise.

Prof. Dr. Vladislav Maraš welcomed participants to the Workshop on behalf of the DIONYSUS project and University of Belgrade, Faculty of Transport and Traffic Engineering. Prof. Maraš pointed out that obstacles that, to a greater or lesser extent, limit the development of container barge transport on the Danube are today widely recognized by all stakeholders. Thus, representatives of shipping companies, ports, agencies, state authorities, and the academic community need to take them into account and to find ways to overcome them, if the container traffic on the Danube is to be further increased. Prof. Maraš continued by explaining that the workshop ambition was to provide a chance to stakeholders from the Danube region to familiarize themselves with the experiences of other regions in the COB development. In that context, he particularly welcomed the participants from the Rhine Commission, Empyria STM, Argentina and Department of Inland Waterway Transport, General Department of Waterway-Maritime Transport and Port, Ministry of Public Works and Transport, Cambodia who were invited and accepted to give presentations about COB developments on the Rhine River, Parana – Paraguay Waterway and Mekong River. Prof. Maraš also highlighted that innovative barge technologies should contribute largely to launching and improving container liner services on the Danube River. Therefore, workshop participants were in position to listen about most recent advances in the inland waterway transport from invited speakers from TU Delft, University of Belgrade – Faculty of Mechanical Engineering, Expertise- and Innovation Centre Barging (EICB) and Mercurius Shipping Group. It was particularly underlined that the workshop approach was defined so as to enable workshop participants to acknowledge key success factors for container barging and get new ideas on how to initiate these services on the Danube River.

Mr. Silviu Meterna, representing Pro Danube Romania underlined that Dionysus aims to turn Danube ports into high performing, better connected and integrated hubs. According to Mr. Meterna, probably the most important output of the project will consist in the elaboration of a large number of port development plans, which will consequently be used by project partners for preparing quality investment projects in order to obtain EU funding. These investment projects will have a significant impact on the regional economic development of the port hinterland, making Dionysus a key instrument for reaching the EU's strategy regarding the Danube river.

Mr Alexandru Craciun, head of Governmental Affairs, DP World, pointed out that the purpose of the DP World is to enable smarter trade and create a better future for everyone. He explained that DP World has two mainline and six feeder services calling at their container terminal in the Port of Constanta. Even though there were some attempts, so far we have not experienced consistent development of the COB on the Danube River. So, the liner services which exist in the maritime legs and calling at their terminal in the Constanta Port have not been replicated, in any measure, at the river legs. Mr. Craciun pointed out the DP World possess perfect conditions for handling river barges at the terminal. Therefore, the problem related to the lack of container services on the Danube does not stem from the maritime transport aspects. Mr. Craciun raised the issue of customer expectations from the Danube transportation. According to him, customers would like to see reliability, transparency, visibility and efficiency. Today, contrary to other transport modes, Danube container transport can offer to the

customer's uncertainty, lack of transparency and long transit times. First condition for liner service to work is predictability – the foundation the concept of liner services has been built. So far, predictability issues have been related to the improper infrastructure maintenance on the Danube. Mr. Craciun highlighted that we have not measured so far to what extent the design of ships and latest available technologies in propulsion and navigation could ease the restrictions imposed by infrastructure. Historically speaking, the most issues related to the inefficiency lays within capability of Danube ports to provide first and last mile services. He pointed out that the consistency of service enables reliability and capacity to provide lower costs. These attributes would make inland waterway transport competitive for most cargos even with long transit times.

Presentations of container transportation development on various rivers in the World as best practices for Danube

Mr. Ariel Savarese began his speech by presenting natural inland waterways in South America. He explained the benefits of the Parana – Paraguay waterway compared to other rivers and introduced important container ports. Container transportation experienced very significant growth during recent years i.e. 50% growth from 2011 to 2018.

Mr. Savarese presented several inland shipping companies like CMP, Nevemar, Panchita. Although the container movement is very small in comparison to other countries in the region, the experienced growth has shown that this waterway has great potential. Predictions for the future are a normalization of operations after COVID-19 and the historical low water level 2020/2021, the introduction of Bolivia as a new stakeholder and user of the waterway and Montevideo is going to have a port with 50 feet draft.

Ms. Lisotihny Chin from the Ministry of Public Works and Transport in Cambodia presented International Port Development in Cambodia on the Mekong River which is the 12th longest river in the world and the 7th longest in Asia. The Mekong flows through six countries: China, Myanmar, Thailand, Laos, Cambodia, and Vietnam. Ms. Chin explained that ships can't operate along the entire length of the river. He presented the Phnom Penh Autonomous Port – PPAP as the largest river port operator and the second-largest international container terminal port in Cambodia with accessibility to vessels from the South China Sea through Vietnam. According to Ms. Chin, PPAP operates four terminals with significant growth of container traffic. The PPAP has several challenges like the quality of the port's infrastructure and port services, lack of Laws and Regulations, and the Port has faced with many issues arising out of the technical problems with the equipment, deficiency in information systems, etc.

Mr. Chin presented two activities for improving port operations. The first one is related to the port to the ship direction and includes dredging and maintenance program, aids to navigation, AIS, pilotage service, better arrangement of tug assistance, barge formation and berth allocation improvement. The second set of activities refer to port to the customers relations and includes expansion of port infrastructure, improvement of TOS, the establishment of SEZ and Cold/Dry warehouses, improvement of container liner service, etc. In conclusion, Mr. Chin explained PPAP cooperation needs and joint actions.

Administrator for Statistics and Market Observation Dr. Robert Kriedel from Central Commission for the Navigation of the Rhine began his speech by explaining why container transport has struggled with growth path last several years. Dr. Kriedel pointed to the highest intensity of TEU containers on this river and showed container transport volume depending on the observed sector. He showed the difference between the movement of containers upstream and downstream, as well as the countries of TEUs loading and unloading.

Observing the upstream and downstream movements on the Lower, Middle, and Upper Rhine of full and empty containers Dr. Kriedel represented the status of container transportation on this river.

Dr. Kriedel's drawn several conclusions in addition to the fact that container transport is in competition with the railway and explained that a longer-term outlook points out to a structural slowdown in the world trade growth, which would affect long-distance container transport on the Rhine.

Dionysus Project – WPT1: General view

Work package coordinator Ms Cristiana Dima from MPAC – National Company Maritime Ports Administration SA Constanta introduced DIONYSUS WP1 whose main task is to provide substantial knowledge regarding on-going and future transport corridor developments in the Danube region and potential connections to transport corridors in the Black Sea Region.

According to Ms Dima, one of the major tasks of the project is to build a stockholders reference group which is a data base organized by type of entities starting from the international organization, infrastructure and service provider, SME, business support organization, National Public Authority. A lot of work has been done in 2021, like a study on socio-economic costs & benefits of IWT in the Danube Region, framework condition analysis and concept for container liner services, report on trade flows and economic framework conditions for cargo and passenger transport development, and report on cargo transport flows, transport infrastructure, active participation in policy and logistics events, report on IWT cargo potential, report on on-going and planned projects on the transport corridors in the DR and awareness and promotion strategy for Danube transportation. Ms Dima presented a few more activities that need to be done by the end of the year and activities which need to be completed during Reporting Periods 4 and 5.

Dionysus Project – Activity T1.3 – Case Study Container Liner Service

Prof. Dr. Vladislav Maraš from the University of Belgrade presented the work on definition of concepts for Container Liner Services. This work was based on two perspectives. The first one was consultations with important stakeholders from the Danube Region, and the second one was related to consultation from the available literature related to these aspects. He explained mathematical programming methods that can be used to define those concepts. The main tasks were to assess potential routes and services and present a model of the container liner services according to vessel concepts and market requirements. Prof. Maraš explained that concepts shall provide a knowledge basis for companies that are interested in container transport. Shipping routes design process has been based on the optimal turnaround time, the optimal choice of the final port of call in the outbound direction, and empty container balancing and repositioning.

Prof. Maraš presented the developed online tool for the definitions of concepts for container liner services on the Danube River. He explained the registration process as a prerequisite for using the tool. He also showed all the possibilities of this tool in terms of determination of ports to be called in the upstream and downstream direction, the number of full containers to be shipped between called ports, the number of empty containers to be shipped between called ports, the number of empty containers to be stored at each port, the number of empty containers to be leased at each port, turnaround time and calculation of container transport costs between called ports as well.

As for the report on containerization demands in the Danube Region, Prof. Dr. Vladislav Maraš introduced the concepts of containerization factors, as well as a methodology, composed of eight steps, to be used for the assessment of the IWT containerization potential in all the countries of the DR. He showed a case study related to Serbia.

Mr. Daniel Jarnea from MPAC presented the report on activities to initiate and support Container Liner Services. According to Mr. Jarnea, the report will comprise the activities developed by the implementing project partners during the whole DIONYSIUS project, with the purpose to contribute to the initiation and support of the development of Container Liner Services on the Danube. These activities include:

- organization of the 1st Workshop on Container Liner Services organized on 10th of December 2020, by MPAC – The purpose of this Workshop was to bring together stakeholders interested to develop container transport on the Danube;
- the Stakeholders Reference Group (SRG) – stakeholders will be periodically updated with key information related to the overall project activity;
- Three port community representatives meetings – the main purpose is the clarification of the details for the realization of D.T1.2.4 Fairway maintenance impact report,
- 2nd Workshop on Container Liner Services,
- 3rd Workshop on Container Liner Services,
- other meetings organized by DIONYSUS partners.

Policy recommendations for Container Liner Services on the Danube River were presented by Ms. Werner Auer from EHO. Mr. Auer mentioned several studies in the past like COLD study 2006, KoLEG study 2012, and Feasibility study of Empty Container Business 2018, developed within the DAPhNE project. Conclusions of DAPhNE Container report were that related to the bundling of transports and less empty runs, reduced costs, agreements with shipping companies to establish continuous, closed combined offer on the Danube, and creation of Transport policy framework. According to Mr. Auer, policy recommendations need to create a favorable framework to have a successful implementation of a container liner service on the Danube.

Innovative barge technologies

Prof. Dr. Bart Wiegman gave a presentation about performance of intermodal inland waterway transport, i.e. modeling conditions influencing its competitiveness. As the introduction prof. Wiegman explained the differences between costs of road-only and intermodal transport using a transport cost model and scenarios. He explained the base case for sailing IWW.

Prof. Dr. Bart Wiegman showed cost competitiveness of intermodal barge transport in single trips for sailing, handling, and haulage; cost competitiveness of intermodal barge transport in roundtrips, and impact of terminal size on the cost competitiveness of intermodal barge transport where the one of several important conclusions is motivation to promote intermodal transport. Prof. Wiegman explained that important influence in this research had the cost of pre-and end-haulage, roundtrips, use of FEUs (instead of TEUs), examination of impact of larger vessels, handling costs, and drop & pick operations.

The topic of the second presentation of Prof. Wiegman was Evaluation of Potentially Successful Barge Innovations where the focus of work was to examine to what extent increased barge transport offers an alternative for road transport. According to the professor's opinion, it is very important to find new markets and new products that can be introduced. He presented barge innovations such as double-hull barges, ICT, Fuel cell, electric barge motor, catalyst, and filter systems, Z-drive, Advising, Air lubricated barges fast barges, etc.

Prof. Wiegman told that the most promising innovations for a successful broad-based market introduction are the catalyst and filter systems, Z-drive, Tempomaat, air-lubricated barges, model shift scans, dedicated barges, and sea-river transport, and that is very important for barge transport to create new markets and new products to stay competitive with road transport.

Prof. Dr. Igor Bačkalov from the Faculty of Mechanical Engineering, University of Belgrade begins his speech by explaining inland container vessels that have very specific design features. According to prof. Bačkalov such vessel should operate in low water periods. Prof. Bačkalov showed a convoy of partially unmanned or periodically unmanned following vessels remotely controlled from the fully manned leading vessel and explained the design of the VT ships (objectives, challenges, approach, and results).

As the design results, he presented five container RoRo vessels: NOVIMAR Class Va inland container Ro-Ro vessel – regular draught, NOVIMAR Class Va inland container RoRo vessel – shallow draught (sterb access version, double-end access version), NOVIMAR Class III inland container RoRo vessel, NOVIMAR sea-river container RoRo vessel.

At the end of the presentation prof. Bačkalov showed animation which compares two designs and shows that the double access exactly twice the speed of the loading of the vessels.

Mr. Erwin van den Linden presented the project NOVIMOVE related to novel inland waterway transport concepts for moving freight effectively. He explained that IWT is a major key-holder for unlocking congestion in seaports, terminals, road networks, and access to urban areas besides being a main factor in reducing CO₂ emissions in transport and that potential is not yet fully exploited. Overview of key NOVIMOVE results includes enhanced IWT freight throughput performance with respect to 2010 for the Rhine-Alpine route and innovative vessel concepts and operations. According to Mr. Linden's presentation, a dynamic scheduling system for bridges and locks will be in use by 2026.

At the end of his presentation, Mr. Linden explained that stakeholder groups are becoming more and more important, and how crucial their role is in this processes.

Dr. Cornelis van Dorsser, independent consultant at Trends & Transport, shows the effect of ship dimensions on the capacity of inland ships. He explained the importance of volume, deadweight, and stability of the vessel.

Dr. Cornelis van Drosser explained the principles of static vessel stability and the effect of stability on container loading capacity as well. According to this presentation, containers can be stacked approximately as high as they can be stacked in width – but not always full on the top layer. Conclusions on vessel capacity for heavy bulk cargoes tend to be constrained by the deadweight of the barge that scales with the product of the length, beam, and draft on the vessel, and lighter more voluminous cargoes tend to scale with the length and the square of the beam – explained Dr. Cornelis.

2.3 The 3rd Workshop on Container Liner Services

This workshop, organized by MPAC on 14th April 2022 aimed to continue the process of identifying interested companies to revive and further develop the Container Liner Services on the Danube River.

The 50 participants who attended the 3rd Workshop on Container Liner Services represented important organisations (public institutions, authorities, private companies, associations, universities, research organisations, etc.), providing useful information based on their various areas of expertise.

General view:

Mr Daniel Jarnea, representing MPAC – NC Maritime Ports, welcomed participants to the workshop dedicated to container liner services, with the aim of concluding the series of events focusing on containers, hoping that by bringing the major involved actors to the same table would succeed to emphasise the main problems that each part of the container transport on Danube mechanism is dealing with.

Mr Jarnea stressed the idea that the present climate of great uncertainty has huge implications, the economic consequences will be felt mainly as a rise in commodity prices, which will fuel the already existing inflationary pressures; net importers of energy & food products will be particularly affected, with the spectre of major supply disruptions in the event of an even greater escalation of the conflict. The drop in demand from Europe will also hamper global trade, and consequently the transport on Danube.

Regarding the Danube transport development, according to Mr Jarnea, this situation may be an opportunity, unfortunately without having an estimation yet to what extent; Constanta Port is already

attracting a consistent share of goods to be transported to the rest of Europe, being preferred within the Black Sea area. The tremendous increase of traffic in Constanta, due to the geopolitical circumstances, could give a push also to the other modes of transport, even if we are talking about rail, roads and inland transportation. Inland and rail are already first priorities for the investments, in the context of the European Green policy.

Mr Daniel Jarnea continued this idea by mentioning that all the stakeholders should pledge to transform the Danube River in a successful Green Corridor. The shipping industry emits an estimated 1 billion metric tons of carbon dioxide each year. On its current trajectory, maritime trade is projected to grow by as much as 130% by 2050 over today's trade volume. The world cannot stop the climate crisis without urgent action to decarbonize international shipping this decade. By building out zero-emission maritime "corridors," major trade partners can catalyse land-side investments needed in clean energy and zero-emission electro-fuel infrastructure at ports. The current lack of fairway maintenance on the Danube resulting in unreliable and unpredictable navigation is a pressing issue for the inland waterway sector and the industry using it. The failure of some countries to honour their commitment to maintain the Danube threatens the safe and cost-efficient navigability of the river with disastrous consequences for the sector and affected industry. The containerized transport on Danube is affected by this reality, but these times of change could be the urge that Danube transportation needs.

Mr Silviu Meterna, representing Pro Danube Romania, the lead partner of Dionysus Project, welcomed the participants to the 3rd Workshop on Container Services, organized by MPAC. Mr Meterna mentioned that all 3 Dionysus workshops dedicated to the development of the new container liner on the Danube were meant to identify and bring together stakeholders interested to revive and develop container transport on the Danube.

Special attention was given to the process of identifying and quantifying new markets dedicated to waterway transport. Containers represent a major market on Rhine Corridor, but in the Danube region it is almost inexistent. Within the Dionysus Project the scope to overcome the difficulties of bringing the container business in the Danube area has been analysed through studies, interviews, outcomes and outputs.

Mr Meterna talked about the first workshop on container liner services organized on 10th of December 2020 – „1st Workshop on Container Liner Services” – that was an online event organized by MPAC as a partner in the DIONYSUS project. The meeting gathered 60 participants belonging to different categories of actors involved in promoting and developing transport on the Danube, from decision makers at the Rhine-Danube TEN-T Corridor level, Danube Commission, UPIR, Romanian Ministry of Transport, Infrastructure and Communications, to the members of the project consortium and the academic environment, but also representatives of the Romanian and also foreign private companies.

The second workshop was organized online by the University of Belgrade on 7 December 2021. The 82 participants representing important organizations (public institutions, authorities, private companies, associations, universities, research organizations, etc.) took part to the Workshop and provided useful information based on their various areas of expertise. The event aimed to identify interested companies to revive and develop the Container Liner Services on the Danube River. The workshop purpose was to provide a chance to stakeholders from the Danube region to familiarize themselves with the experiences of other regions and allow the participants to acknowledge key success factors for container barging and hopefully get some ideas on how to initiate these services on the Danube.

Mr Meterna underlined that the 3rd Workshop continues the path initiated in order to have a debate and some conclusions drawn on the perspectives regarding the development of Container liners services on Danube.

Mr Turi Fiorito, representing European Federation of Inland Ports, began his presentation by mentioning the need to stimulate the transport of containers on the Danube. Mr Turi Fiorito gave as an example CCNR Annual Report 2021, in which it is presented statistically: “In this case that 99.99% of all container transport performance (TKM) on European inland waterways occurs in the six Rhine countries (the Netherlands, Belgium, Germany, France, Switzerland, Luxembourg). On the Danube, container transport is still almost non-existent”.

The development of container transport on the Danube would produce positive, long-term effects.

In his presentation, Mr Turi Fiorito took into account some actions needed, which could be implemented to increase the level of container transport on the Danube, such as: investments in fairway improvement, the existence of adequate port infrastructure so as to handle the demand, improving rail connections, providing a proper business model development.

Ms Bettina Matzner, representing Via Donau – Austrian Waterway Management and Development Company, made a presentation about opportunities and advantages of development Danube container transport, considering the fact that Danube is the larger river in Europe, passes through 10 countries, connecting 19 countries and 83 million people.

Regarding logistics, Ms Bettina Matzner considered necessary to increase the competitiveness of inland navigation in logistic network. Referring to transport volumes by commodity groups on the Danube, the percentage is low. Mrs Bettina Matzner mentioned some initiatives which should be taken into account, such as: evaluating the potential for promising cargo types, enhancing cooperation between the relevant market actors, organizing expert working groups focusing on dedicated product groups on national level.

Ms Matzner offered valuable information regarding the advantages of containerised transport on the Danube; for ex. Rhine-Main-Danube connection provides a transport axis from major European seaports (ARA, Black Sea) to the hinterland; the capacity of inland vessels and their multifunctionality are perfectly suited to smooth peaks; container optimized vessels offers high efficiency; good environmental performance and low transport costs, empty containers included; heavy containers can be easily transported; numerous container terminals are located along the Danube.

Mr Horst Shindler, representing DTP MA/JS, had a presentation about programming period 2021-2027, starting with the characteristics of DTP. Mr Shindler identified the priority objectives such as:

- A smarter Danube Region, by enhancing innovation and technologies transfer in Danube region; development of skills for advancing smart specialisation strategies, industrial transformation and transition towards industry 4.0 including cross sectorial collaborations.
- A greener, low carbon Danube Region, by enhancing the integration of renewable energy sources; promoting climate change adaptation capacities in the Danube Region and disaster management on transnational level in relation to environmental risks; sustainable, integrated, transnational water and sediment management in the Danube River Basin ensuring good quality and quantity of waters and sediment balance;
- A more social Danube Region, promoting accessible, inclusive and effective labour markets, quality services in education, training and lifelong learning; socio-economic development through heritage, culture and tourism;
- Better cooperation governance in the Danube Region, by increasing institutional capacities for territorial and macro-regional governance.

In conclusion, Mr Shindler presented few information about budget and second step procedure.

Regarding deliverable A.T1.3, case study on container liner service, Mr Maraš provided specific data on low number of containers transported on Danube, mentioning that several companies tried to implement container services on the relation Giurgiu-Constanta, Belgrade-Constanta, as well as Budapest-Belgrade-Constanta, but these services did not prove to be economically successful and were ceased. Mr Maraš identified both favourable and unfavourable conditions for established container transport on Danube (annual container traffic in the port of Constanta, low water level).

Ms Karin Voglsam, representing of Ennschafen OO GmbH, considered that the output shall create a favourable framework for a successful implementation of a container liner service on the Danube.

Regarding O.T.1.5 - Policy recommendations on CLS on the Danube River, Ms Voglsam presented main objectives such as: measures for the improved regulations and handling of border and customs control; preferential tariffs for ports and canals; priority rules at locks; financing and funding opportunities; other supportive measure which might be identified in stakeholder meetings; findings of WP T1 Workshops on container liner services will be reflected; analyses of previous failed transport experiences of containerized cargo; harmonized solutions in the form of Recommendations for positive regulatory framework & service implementation; assessment of new routes & services; architecture of new container liner services.

Ms Voglsam presented drafts of structure and content regarding the above mentioned deliverable.

Mr Daniel Jarnea, representing MPAC – NC Maritime Ports, presented information about fairway maintenance impact calculation tool, which purpose is to conduct an impact analyses on fairway maintenance, based on the situations encountered and reported, illustrating economic losses impacting the barge operators (limitations of transport capacity, days of delay). In creating the tool, were identified and analysed the critical areas and depths, based on the existent history, negatively impacting the costs (ships berthing, not loading at full capacity).

Mr Jarnea mentioned the variables that should be taken into account when performing the calculation: the ships/barges/composition of the convoy, the penalties for delays specified in the contract documents, the daily expenses associated with the ship/barge (euro/hour).

Scientific perspectives on Danube Container transport

Mr Costel Stanca, professor at Maritime University of Constanta, began his presentation with a general framework. Regarding strategic planning, Mr Stanca underlined few aspects that should be implemented in order to develop container transport on the Danube: becoming a part of the national transport strategy and waterborne transport strategy; necessary clear measures from port authorities, canal administration, service providers; to be included into development strategies of key players.

Mr Stanca considered that Danube role within transport logistic chain should be increased, despite the fact that the container services have a lot of challenges to overcome. Mr Stanca identified several solutions: defining of cargo flows (main actors, cargo type, ports) and route connections (role of Constanta Port); coordination of existing lines (JIT); regularity and predictability; flows of full / empty containers; model for ships to be used.

Mr Stanca concluded his presentation by stressing the necessity of synergies, new projects on inland water container transport, boost of dedicated political decisions, relevant answer from logistic chain actors.

Mr Willem Slendebroek, senior expert from Maritime & Transport Business Solutions, started his presentation with the role and benefits of Danube for Constanta Port. The capacity of the river is used to a limited extend, but with more coordination, it can be improved.

Mr Slendebroek considered that green corridors can benefit the implementation of new initiatives, as predefined routes are determined where initiatives can be launched and case studies to actualize the

action plan are needed. At the same time, cooperation across stakeholders is the key (national governments, port authorities, shippers, vessel owners) and, in the same time, pivotal to the successful greening of the Danube IWT operations. Constanta aims to be a facilitator in this process.

Presentations by private companies interested in the development of container transportation on Danube River

Mr Fabian Zoltan, representing MAHART Container Centre Ltd., began his presentation by providing participants with real-time footage of container handling.

Mr Zoltan presented statistic data about modal split in Hungary and inland waterway transportation and also identified the solution for bottlenecks within river services: infrastructure problems – sufficient water level; missing proper port equipment for loading/unloading containers by reliable way; lack of proper vessel – self on-going standard Rhine-type vessels is not a reliable option; old/outdated regulations for container transport on Danube; container line services should focus not only containers, but other intermodal units also.

Ms Sanja Djurisc, on behalf of Luka Dunav AD, presented Dunav Pancevo, a fully utilized intermodal terminal for containers. Pancevo facilitates easier access for goods from EU, China and other markets; current ports for receiving containers from are Constanta, Rijeka and Koper. The existing direct connection of port's berths with rail and road provides full intermodal services. In 2020, over 1 million tons of various goods were transhipped/handled in the Port of "Danube" Pancevo.

3 Updated market analysis regarding the perspectives of development for container liner services development on the Danube

3.1 Danube Container Transport SWOT

Strengths	Weaknesses
<ul style="list-style-type: none"> • Dense network of ports and transport infrastructure – ports, roads, railways in the region; • Connections with the maritime transport • Shipping costs and low level of emissions related to the volume of cargo transported • Experienced and flexible Port Operators and logistic competence • Good competition level; • Multimodality. The majority of ports are trimodal • Proactive management for promoting the development projects and applying the principle of partnership at the Port Community level • Experience in demand driven development • Good planning of inland ports development • The availability of a wide range of ship and freight services • Experience for development of projects and ongoing measures for ports development • Qualified personnel • Consolidated port management models (includes: Port management model; The use of corporatized port management model, which allows for development in accordance with market requirements) • Member in international and European organizations • Waterway administration established and in charge for ensuring good navigation conditions. 	<ul style="list-style-type: none"> • Low capacity utilization of available facilities in ports • Public economic situation • Old infrastructure and superstructure in many ports; old handling equipment and many ports do not have equipment for container handling • Needs for investments in the rail and road connections Lack of inventory of realistic development needs and plans • Lack of long term port policies and port development strategies • Unsatisfactory coordination between different modes of transport and lack of integrated transport systems; • Lack of Port Community Systems (PCS) • Slow business development • Intermodal transport not developed enough • Insufficient lobbying for ports and IWT • Long transport times • Too strong competition from road and rail links to/from nearby ports for container transports, in terms of distances, prices and regular services. • Lack of resources for maintenance and repair. • Insufficient investment in port infrastructure and new handling technologies.
Opportunities	Threats
<ul style="list-style-type: none"> • Introduction of businesses/industries into ports • Existence of European funds available for the development of transport infrastructure • Taking advantage of free capacity • Modal split shift • New industrial clusters / Development of clusters to boost competitiveness • Support of the European Union for the development of water transport • Alternative fuels / Eco-footprint philosophy /Decarbonizing strategy • Regional European policies regarding the Danube and Black Sea • “One belt one road” – new transport routes to/from Far East • New markets (biomass, LNG, high & heavy, Ro-Ro, containers, etc.) • Improving shipping conditions (Danube waterway, CEF projects) • Training of port professionals, training of labor force suitable for any port • Research and design of modern equipment for handling in ports and for container traffic • Modern standards and technology for transshipment in Austria and Hungary as an opportunity for know-how transfer to other countries. • Cooperation between ports 	<ul style="list-style-type: none"> • Problems with Danube navigability / hydrological conditions • Occurrence of bottlenecks on the fairway (insufficient depths) or in the road / railway connections • The direct competition of rail transport, as well as of the road transport • Competition between ports • Unstable market and demand for port services • Low predictability for traffic demand and economic framework • Bureaucracy • Dislocation of heavy industry • Emigration of industry / Decline in industrial production on the region • Economic situation in the Eastern Europe and global economy • Economic situation of the port operators and service providers • Stricter environmental regulations for ports / Potential new cost of implementation environmental legislation • Insufficient investment in port infrastructure and new handling technologies • Lack of labor supply • Risk of delay in the implementation of large infrastructure projects • Small market sector

3.2 Market analysis on the existing Danube service development for container liners

Ports in the Danube area are conveniently located along an important European multimodal transport corridor, officially titled as the “Rhine-Danube Core Network Corridor”. This represents a strength which Danube ports should use as a basis of their future development. This creates a significant number of opportunities for growth and for important financial injections needed for infrastructure development through the European Commission funding (Connecting Europe Facility - CEF funding).

All Danube ports are directly connected with the seaport of Constanta, acting as a gate, or the “Rotterdam of the East” for virtually all Danube countries. This gives them a comparative advantage over other transport routes in terms of cost efficiency, generalized transport costs and even cost of externalities. Many Danube ports are already connected with rail and road connections to the rest of the national and European transport networks. This gives them the strength of intermodality which, indeed, needs to be bolstered with adequate modern equipment. Corporatization of port authorities is also seen as one of the strengths on which future development directions should be built, as this port management model provides sufficient flexibility to port authorities to react on market dynamics and changes in demand for different port operating services, including the value added services.

Thanks to the growing reintroduction of industrial production in the ports or in their immediate vicinity, Danube ports have the opportunity to exploit this phenomenon and use it to their own advantage, by offering the industry a quick, competitive and reliable service and the benefits of the economies of scale offered by inland waterway transportation. This implies that the ports efforts are combined with the efforts to improve the navigability, especially in the critical sectors on the Danube and Sava, and thus increase the overall reliability of inland waterway transportation in the Danube area.

Regional European policies regarding the Danube and Black Sea represent a very convenient opportunity which Danube ports should make use of in order to create awareness of various stakeholders towards the business opportunities and importance of transport options offered by ports. Additional opportunities at disposal of the Danube port industry are new markets, cargo flows that will emerge along the transport route from the Far East (“One belt one road”), as well as the growing interest of young professionals towards the port industry.

Unfortunately, apart from the above mentioned strengths and opportunities, Danube ports have a number of weaknesses which will need to be neutralized, minimized or completely eliminated when and if possible. Most notable weaknesses focus around the excess capacity or low utilization of the available capacities, as well as lack of resources for provision and improvement of high quality road and rail connections of ports with the rest of the network.

Insufficient lobbying for interests of ports is also seen as one of the common weaknesses of the entire Danube port industry. Many ports are in need of heavy upgrade of their old infrastructure and supra-structure, while the funds for maintenance of infrastructure are very limited and are not provided from European funds.

Moreover, Last, but not least, port industry in the Danube area is faced with a number of threats which are external to ports themselves, but which call for measures to mitigate or remedy such threats. Most important threats for the Danube area port industry are still persisting 191 navigation hindrances along the Danube, overall economic situation in Southeast Europe, fierce competition of road and rail sectors feeding the industrial and commercial sectors along the Danube directly from nearby seaports of Koper, Rijeka, Trieste and even from the farther ports in the Northwest Europe, like Rotterdam, Amsterdam, Antwerp, Hamburg and others. Volatility of the market also represents a serious threat which will be very difficult to mitigate. Even though an increasing number of young professionals take

interest in port business, a constant supply of skilled labour, both on operational and managerial level, is still a threat, especially on the long-term run.

It is unlikely that a waterway offer on the Danube created on regular services will be marketable as long as there is no equivalence of the waterway system with the railway system in the area of aid.

Under the precondition of marketability, a container liner service offer would provide a location advantage for the participating ports. In addition to the "new Silk Road", such a liner services offer in combination with railway could significantly increase the attractiveness of the location.

Currently, however, almost all providers and terminals in their infrastructure and in their organization are geared to the railway system and would have to adapt their internal structures only to the new system. As long as there are no bottlenecks on the railways, it is unlikely that such system adjustments will be made, not least because of the rail's extensive network effect, as it limits the flexibility of relational choice. However, it should also be noted here that for such possible strategy changes, an isolated consideration of the container sector alone is not constructive.

There is currently an opportunity in the Danube region to develop and establish full container liner services in those areas where there is a need for container transport (industry / seaports) and where there is currently insufficient rail capacity. In particular, there is potential in the Danube region downstream from Budapest to Constanta. Here the window of opportunity should be used and with relevant companies, these container line services should be built up before sufficient railway capacities are built up. As soon as rail capacity is built up, it is very difficult to be competitive with block train solutions in terms of market price and handling time.

Compared to the Rhine, the shipping companies for the Danube have not yet developed a sufficient commitment to establish a continuous, closed combined offer on the Danube (combined price from sea transshipment and IWW route transport). Only through such a combination product you can get in the direction of a competitive market price, otherwise the costs for the broken transport routes result in high costs (individual processes and individual prices result in non-competitive sums compared to offer from a single source). This topic should be addressed by individual shipping companies and initial pilot projects should be developed.

Presently we do not hold much information regarding the new business models concerning the transport of containers on the Danube. The shipping industry has the potential to become genuinely competitive in the future thanks to the new type of vessels powered by electricity or liquid natural gas, and tailored to the demands of today's goods transport, but European countries must abide by the existing agreements and ensure that their waterways meet the agreed standards. Even if the best vessel and the best logistics system exist, they are of no use if the general conditions on the Danube are not met (for example in relation to water depth, bridge height or the technical specifications of locks) and they have not been implemented everywhere. We are currently witnessing the tendency of containerization of cereals in maritime traffic, which can also be translated on river transport on the Danube, as future trend on this sector.

The war in the Ukraine is stifling trade and logistics of Ukraine and the Black Sea region. The search for alternate trade routes for Ukrainian goods has rapidly increased the demands on land and maritime transport infrastructure and services. For Ukraine's trading partners, many commodities now have to be sourced from further away. This has increased global vessel demand and the cost of shipping around the world.

Higher energy costs have led to higher marine bunker prices, increasing shipping costs for all sectors. By the end of May 2022, the global average price for very low sulphur fuel oil (VLSFO) had increased by 64 per cent with respect to the start of the year. Taken altogether, these increased costs imply higher prices for consumers and threaten to widen the poverty gap.

Disrupted regional logistics, the halting of port operations in Ukraine, the destruction of important infrastructure, trade restrictions, increased insurance costs, and higher fuel prices, have all contributed to the logistical hurdles arising in the Black Sea region. They have also contributed to a more costly and unpredictable global trading and shipping environment. Many countries have had to look further afield for suppliers of oil, gas and grain.

Consequently, shipping distances increased, along with transit times and costs. It is not possible to associate all developments in global shipping with a specific cause. The war in Ukraine is one of several major issues currently affecting international maritime transport, compounding other challenges such as the COVID-19 pandemic, port congestion, the need to switch to low carbon fuels, to name but a few.

Nevertheless, it is clear that the disruptions and the higher ton-mile demand caused by the war in Ukraine contribute strongly to higher shipping costs.

Although the Russian Federation and Ukraine are not deeply integrated into global container shipping and value chain networks, the conflict and trade restrictions have also affected this shipping segment. Container carriers cut ship carrying capacity assigned to the Russian Federation, and suspended operations at Ukrainian seaports. Several neighbouring countries saw ship capacity deployed in their ports increase slightly.

As ports closed and carriers discontinued shipping services to the Russian Federation and Ukraine, ships and containers had to re-route. Cargo designated for the Russian Federation and Ukraine is now piling up at ports, including Hamburg, Germany; Rotterdam, Netherlands; Constanta, Romania; and Istanbul, Türkiye. Shippers are facing delays and can be expected to see an increase in detention and demurrage charges at ports.

Russian Federation cargo is also being stranded at ports e.g. in Europe. This adds pressure on warehousing and storage capacity and drives costs upward. Freight rates had surged since the pandemic and the need to reposition ships and containers during the war adds to upward pressures on freight rates.

The COVID-19 pandemic led to a sudden dip in international seaborne trade. But by late 2020 there had been a swift rebound mainly in container and dry bulk shipping. The asymmetric maritime trade recovery, mainly on East–West containerized trade lanes, increased pressure on supply chains, ports, shipping and trade. The surge in e-commerce, capacity constraints, equipment shortages and renewed virus infections in some parts of the world put supply chains under pressure in 2021. Pressure continued in 2022 so far still exhibiting high port congestion and constrained logistics and transport networks. Median waiting time in ports for container ships increased by almost 20 per cent between pandemic times and the end of 2021.

Freight rates surged, surcharges proliferated and service reliability declined while delays and dwell times went up. By the end of 2020, container rates were over five times higher than their 2019 levels; although declining, they remain elevated. New disruptions such as the closing of manufacturing activities and ports in China in the first half of 2022 due to new cases of COVID-19 infections have further disrupted the system. Increased costs are a challenge for all traders and supply chains, particularly smaller shippers who are less able to absorb the additional expense and disadvantaged when they are negotiating rates and booking space on ships.

4 Conclusions and recommendations

The recommendations and conclusions for the conditions of setup a succesful Container Liner Services development on the Danube, drawn by the participants of the 3 workshops, are presented as follows:

- maintaining a realistic approach is compulsory for obtaining an improvement of the container transport situation on the Danube;
- the fast evolution of digitalization, the increasing trend of using clean transport ways and availability of EU funding schemes must be used as engines for keeping Danube a desirable transport alternative;
- the elaboration of a large number of port development plans, which will consequently be used by project partners for preparing quality investment projects in order to obtain EU funding;
- ports must not be approached individually but as a network;
- an efficient infrastructure planning for ports and their connections with the hinterland is in line with the first two thematic areas included in the Action Plan;
- understanding the characteristics of that phase defining requirements and constraints to be included in the modeling; figuring out what should be done to move to the next phase of development of container transport on the Danube;
- containerization potential on Danube is to elaborate IWT market potential in the Danube region and the determination of cargo flows with a potential to contribute to the development of intermodal services in this region;
- to determine the subset of ports to be called at; to determine the amount of containers to be shipped between each pair of ports; to maximize the profit of the shipping company; to develop an integrated approach to design shipping routes while simultaneously taking into account: optimal turnaround time, optimal choice of the final port in the outbound direction and empty container balancing and repositioning, if needed;
- necessary investments for the majority of ports in the lower Danube, such as: quays platforms and supra-structural works; dredging works in the ports; specialized equipment for container operations; road and rail connection; including investment programs in new river vessels with low drafts, investments in port infrastructure, supra-structure and equipment and market analysis – proximity to market and efficiency;
- to provide a chance to stakeholders from the Danube region to familiarize themselves with the experiences of other regions in the COB development;
- the innovative barge technologies should contribute largely to launching and improving container liner services on the Danube River;
- cost competitiveness of intermodal barge transport in single trips for sailing, handling, and haulage; cost competitiveness of intermodal barge transport in roundtrips, and impact of terminal size on the cost competitiveness of intermodal barge transport where the one of several important conclusions is motivation to promote intermodal transport;
- the development of container transport on the Danube would produce positive, long-term effects; to take into account some actions needed, which could be implemented to increase the level of container transport on the Danube, such as: investments in fairway improvement, the existence of adequate port infrastructure so as to handle the demand, improving rail connections, providing a proper business model development;
- the priority objectives identified :

- a smarter Danube Region, by enhancing innovation and technologies transfer in Danube region; development of skills for advancing smart specialisation strategies, industrial transformation and transition towards industry 4.0 including cross sectorial collaborations;
- a greener, low carbon Danube Region, by enhancing the integration of renewable energy sources; promoting climate change adaptation capacities in the Danube Region and disaster management on transnational level in relation to environmental risks; sustainable, integrated, transnational water and sediment management in the Danube River Basin ensuring good quality and quantity of waters and sediment balance;
- a more social Danube Region, promoting accessible, inclusive and effective labour markets, quality services in education, training and lifelong learning; socio-economic development through heritage, culture and tourism;
- a better cooperation governance in the Danube Region, by increasing institutional capacities for territorial and macro-regional governance;
- measures for the improved regulations and handling of border and customs control;