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ISTEN

Integrated and Sustainable Transport in Efficient Network - ISTEN

PORTFOLIO

Action Plans for an integrated network of ports and hubs in Adrion Region

Photo by Stefano Zerauschek

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Document information

Abstract

The ISTEN Interreg ADRION project aims at qualifying the Adriatic and Ionian Ports as strategic nodes and hubs for the ADRION Region by setting up strategies, a transnational cooperation network and a joint action plan to improve hinterland intermodal connections, pushing in particular rail freight flows and last-mile connection to the TEN-T Corridors.

Starting from the analysis of the main bottlenecks towards achieving an integrated network of ports and hubs, each ISTEN project partner identified a set of relevant measures to be planned and implemented for the achievement of the desired level of integration among port hinterland actors, infrastructures, and operations.

This document reports an overview of the main characteristics of the Local Action Plans defined by the ISTEN project partners. It opens with a summary of the main findings of the local context analysis and Cooperation network activities. Then, the most relevant information on each Action Plan is outlined, following the same structure.

Keywords

Local Action Plan, Port-hinterland integration,
Freight intermodal transport, Port logistics

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Table of Contents

List of abbreviations and definitions

AP: Action Plans • **LAP**: Local Action Plan •
PCS: Port Community System • **TEN-T**: Trans-European Transport Network

List of Figures

1. Introduction

The ISTEN Interreg EU project aims at qualifying the Adriatic and Ionian Ports as strategic nodes and hubs for the ADRION Region by setting up strategies, a transnational cooperation network and a joint action plan to improve hinterland intermodal connections, pushing in particular rail freight flows and last mile connection to the TEN-T Corridors.

ISTEN Project Consortium is led by Mediterranean University of Reggio Calabria and involves ports from Italy, Croatia, Slovenia, Greece, and Montenegro as main Mediterranean gateways to the TEN-T and Motorway of the Sea, plus other research institutions and stakeholders from Albania, Italy, Serbia and Greece.

The project objectives

The core objectives of the project consist of:

1. steering priorities of involved territories by identifying major bottlenecks and developing integrated infrastructure planning at transnational level and consistent investment strategies;
2. providing guidelines and criteria for defining legal, technical and operational conditions useful to establish an efficient ADRION transnational network;
3. building capacity in planning infrastructures and identifying measures and actions to be adopted for setting-up integrated hubs and
4. enhancing the efficiency and environmental sustainability of freight logistics flows across the ADRION area.

The project activities

ISTEN activities are organised through two different pillars:

- WP T1 – Transnational Cooperation Network. It aims to carry out an in-depth analysis of the local characteristics, context and bottlenecks of ISTEN sites and develop a Transnational Cooperation Network, with related meetings and reports.
- WP T2 – Action Plans for ADRION Hubs. It aims to
  1. set up and develop Local Stakeholders Working Groups,
  2. drafting of site-specific Local Action Plan, one per each of the ISTEN site, and
  3. building of a Strategic Action Plan for ADRION Region.

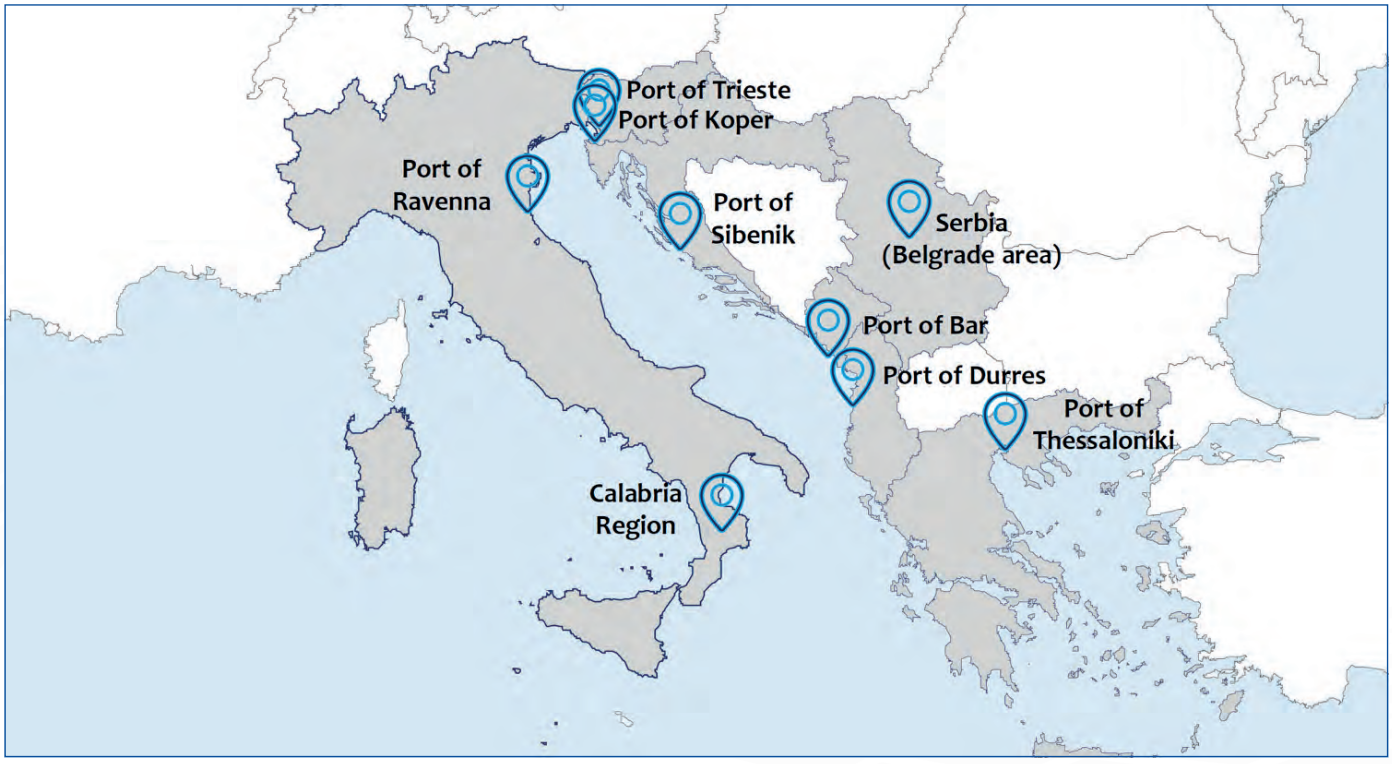

Figure 1 - Ports and regions addressed by the ISTEN project

2. The ISTEN approach

Bottlenecks analysis

Improved knowledge on the current port-hinterland bottlenekcs in the ADRION Region

In 2018 and 2019, the ISTEN Project had developed a comprehensive analysis at both local and transnational/EU level of the existing and potential commercial flows across the ADRION area, identifying the main bottlenekcs towards achieving an 'integrated network of ports and hubs'. The analysis was based on five different cluster: marker, infrastructure, operation, institution, and innovation. Each partner identified some critical bottlenecks in each of these categories.
In parallel, the Consortium made a comprehensive overview of best practices on port-hinterland integration, identifying more than 30 different initiatives.

Cooperation network

Strengthened cooperation among port and hinterland stakeholders at local/hub and transnational/ network level

A set of different local Working groups (WGs) was developed since the project kicked-off. Each WG grouped key institutional and private stakeholders involved in the logistics and intermodal chain, such as port authorities, municipalities, freight/terminal operators, shipping agents, etc.).
The WGs periodically held meetings, coordinated by the ISTEN project partners, to discuss about the needs, problems, requirements and most important actions to be developed locally in order to overcome the main identified port-hinterland bottlenecks. In parallel, a transnational cooperation network was set up to facilitate the exchange of information and knowledge among key transport and logistics actors.

Planning

Enhanced capacity in planning and organising efficient and environmentally sustainable logistic services

Based on the findings and outcomes of the local Working Groups, each ISTEN project partner identified a set of relevant measures to be planned and implemented for the achievement of the desired level of integration among port-hinterland actors, infrastructures and operations.
As final activity, the Project has the ambition of gaining findings from the overall of ISTEN Project activities for drafting a transnational strategy/ plan for the development of an integrated hubs network at ADRION level. While ISTEN Local Action Plans have been developed for answering specific needs of the target port and its hinterland, this strategy will be a key element for defining future investments and opportunities for improve the competitiveness of the ADRION region and the operativity and integrations of the different nodes of the logistic chain.

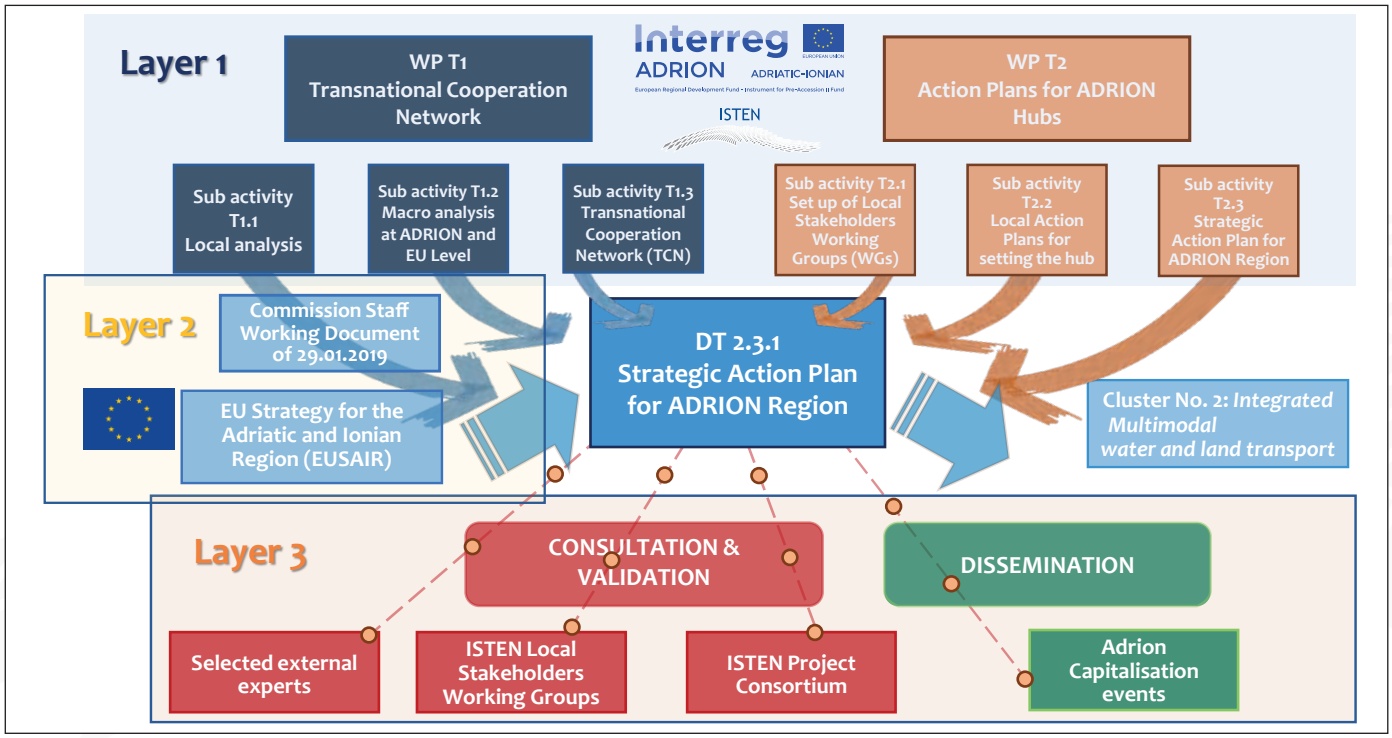

Figure 2 - ISTEN methodological approach

Key findings from the bottlenecks analysis

BOTTLENECKS

Market

- Limited hinterland market of the port
- Limited demand for intermodal port-hinterland services

Infrastructural

- Inadequate port infrastructure
- Lack of port expansion area
- Inadequate capacity of port handling equipment
- Inadequate port infrastructure
- Inadequate (capacity of) equipment of the rail operator
- Inadequate capacity of hinterland transport networks
- Infrastructure/ equipment incompatibilities between port and hinterland transport operators
- Inadequate soft infrastructure

Operational

- Not aligned operational processes of port-hinterland actors
- Not aligned operational processes between operational & public actors
- Limited breadth (or inadequate quality) of services provided by the port and/or the hinterland actors
- Inadequate cross-border coordination of port-hinterland corridor

Institutional

- Fragmented planning at local/regional/ national level
- Problematic national legal/institutional framework
- Low coordination/ cooperation between the port and the city in terms of port-hinterland development
- Low coordination/ cooperation with other ports or port-hinterland corridors

Innovation

- Low innovation content in the services provided
- Not harmonised (or missing) digital information exchange between port-hinterland actors and between operational & public actors
- Inability to provide seamless port-hinterland cargo visibility to operational actors and shippers

The Methodology for drafting the LAP

The results of each WG discussion have been analysed and elaborated for identifying the local measures most relevant at site level to foster the integration of port with its hinterland. The steps and specific actions for the implementation of these measures have been developed in the Local Actions Plans (LAP). The LAP are planning instruments detailing the main interventions and measures needed to address and overcome some of the identified bottlenecks and foster the integration of the port with its hinterland.

ITL Foundation was the leader of this activity coordinated the ISTEN partners in the elaboration of the specific local action plans (one per each ISTEN site). A common methodology was defined based on the Canvas approach, which has been useful in supporting and summarising the discussions held at local level with the relevant stakeholders.

More detailed information have been reported on D.T.2.2.1 - ISTEN Common Methodology for Local Action Plans, available at https://isten.adrioninterreg.eu/news/isten-technical-deliverables-wpt2-1

1 STAKEHOLDERS INVOLVED

- With are the main stakeholders identified and engaged you consider important to reach your objective.

2 KEY ACTIONS

- Main steps to solve the problem and to reach your objectives.

3 AIMS

- The value proposition of your action. In this section you may list the main objectives and why you are considering this action so important

4 PROBLEMS FACED

- List here the main problems you encountered during the definition of this action plan

5 TIMESCALE IMPLEMENTATION

- Steps and actions linked to a timeframe. Important to estimate when the action will be implemented

6 RISK ANALYSIS

- Understanding why actions fail to deliver?
- Doesn't achieve required outcome
- Resource & delivery issues
- Changing partner/ stakeholder perspectives
- Technology shift
- Identifying suitable mitigation measures to address this
- Risk management processes built into action plan

7 FUNDING SOURCES

Source affording:

- EU grants/subsidies
- National and regional government subsidies
- Revenue funding from public sector activities
- Private sector operators, developers, industry
- Other sources such bankleans & private investment

3. Overview of the ISTEN LAP

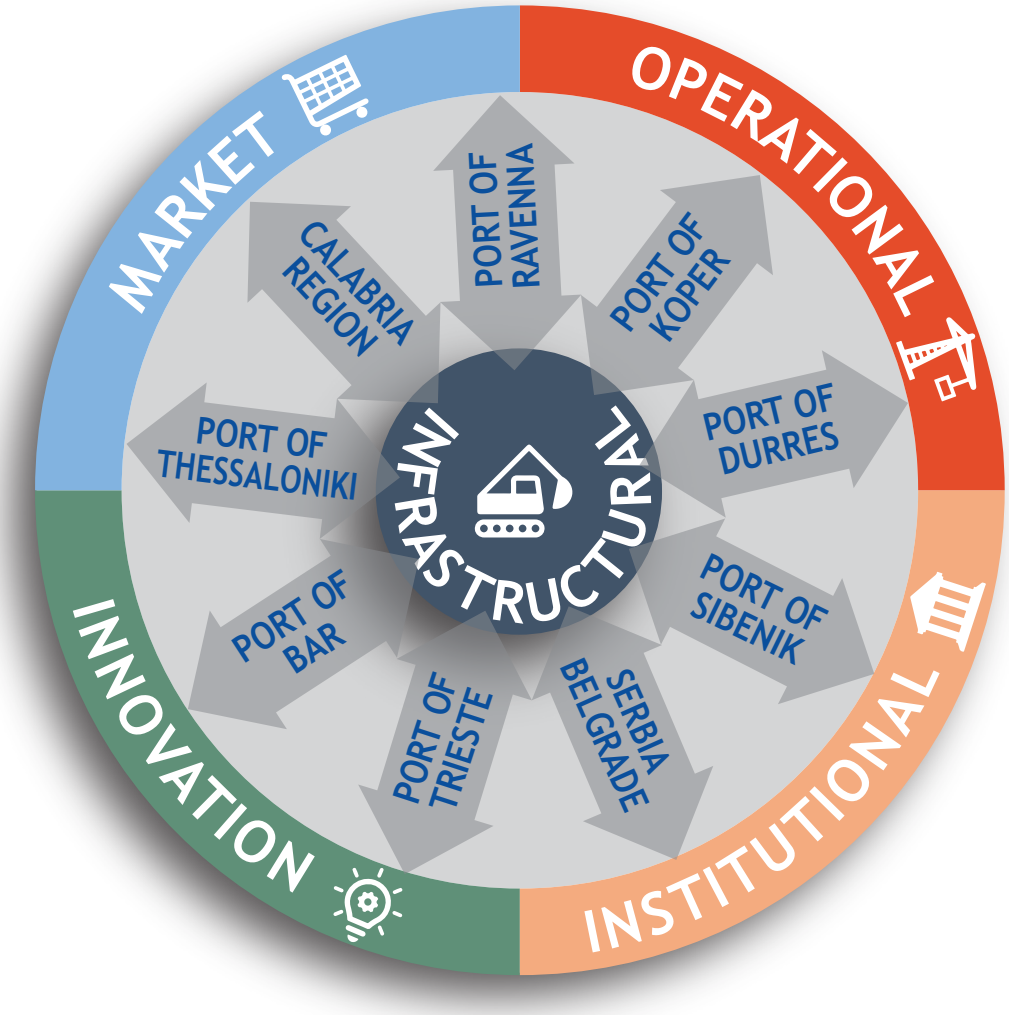

Figure 3 - Overview of the ISTEN Local Action Plans

Each ISTEN project partner developed a specific Local Action Plan addressing those areas that were commonly recognized as key priorities in the discussion with the stakeholders involved in the elaboration of the strategy.

The enhancement of reliable and efficient information flows of data among different stakeholders involved in the port-hinterland operations was identified as a key priority in the port of Trieste and Koper, which respectively focused their plan on the upgrade of the local Port Community System with new functionalities and the introduction of specific IT solutions for streamlining the logistics procedures at terminal and gates. Actions at the PCS level were also planned in the Bar plan. Other partners aimed at developing a consistent framework within the port organisation that would put the basis for the introduction of new and innovative solutions. It was the case of the port of Thessaloniki, where the setup of an Innovation hub has been planned, including a StartUp Incubator, a Digital Skill Academy, and other structures. Also, Serbia moved in this direction and planned similar measures. The Action Plans of Ravenna and Calabria Region were focused on expanding the hinterland market of the port, the first by strengthening the connection between the port and the Ceramic industry District, the second by planning commercial strategies for better positioning the Calabrian ports in the Deep sea and Short sea main shipping routes. The Sibenik Knin and Durres AP developed strategies for improving the international cooperation between regional, national and intranational stakeholders (the former) and upgrading the regulation in line with the IMO and EU standards (the latter).

At the same time, all partners identified some specific actions to be developed at the level of the railway infrastructure and port hinterland connections that could enhance the intermodal freight flows towards a progressive modal shift to rail transportation.

4. Port of Ravenna

The Port of Ravenna is positioned in the central-north western side of the Adriatic Sea, in the Mediterranean basin. It is the main port of the Emilia Romagna region, located in Northern Italy.

The port is a core node of the TEN-T network as defined by Regulation EU 1315/2013. It belongs to the Baltic-Adriatic Corridor as well as to the Baltic-Adriatic Rail Freight Corridor – RFC5 and it also belongs to the Mediterranean Corridor.

Within the scope of the Baltic-Adriatic Corridor development, the port is identified as primary logistic platform by the Connecting Europe Facility Regulation 1316/2013.

The Port of Ravenna is the only port canal in Italy. The Candiano Canal is 14 km long and offers 14.5 km of operational quays, currently used by 27 terminal operators.

The maximum depth of the port is currently 11.5 m. The port is interconnected to the main road and rail network. At present ten 10 terminals are connected to railways.

The total area of the port is 21 km^2 and its storage capacity consists of more than 600 thousands m^2, 1,350 thousands m^2 yards and 1.3 million m^3 of storage tanks.

Country: **Italy** | Region: **Emilia Romagna**

Main cargo specialisation:
Dry bulk, Ro-Ro cargo, containers

Characteristics of the Ravenna container terminal

Total length of quays [m]	Terminal quay depth [m]	Maximum vessel draft allowed* [m]	Total terminal area [m^2]	Container stacking capacity [TEUs]
670[1]	10.50[1]	9.60[2]	250,000[1]	13,500[1]

*in all or part of the quay length

[1] Contship Italia S.P.A. official website (2019). Available at: https://www.contshipitalia.com/en (Accessed: 26 September 2019).
[2] Port System Authority of the Central-Northern Adriatic Sea official website (2019). Available at: http://www.port.ravenna.it/ (Accessed: 26 September 2019).

Figure 4 - Port of Ravenna

Key bottlenecks identified in the local context analysis

Market

- Port activities sectorialization on import of good (raw materials) for the Italian industry sector
- Scarce significance of the Port of Ravenna in other segments of the maritime transport market i.e. container traffic and Ro-Ro
- Low level of export volumes in terms of finished goods produced by the same industries that are using the Port of Ravenna in other segments of the maritime transport market i.e. container traffic and Ro-Ro port for input purposes.

Infrastructural

- Limited depth of the access canal and of the Railway network: train length, axle load, Lauding gauge (RFI improvements ongoing)
- Inadequate capacity of hinterland transport networks

Operational

- Operational barriers affecting cross border operations of long distance traffic flows between European Member States:
- Communication between Infrastructure Managers (IMs') Traffic Control Centres (TCCs) or among Railway Undertakings (RUs) or between RUs and IMs at the borders;
- Operational rules between RUs and IMs at the borders"

Institutional

Innovation

- Inability to provide seamless port-hinterland cargo visibility to operational actors and shippers

Improved relation between the port and the Ceramic District located in the regional hinterland

Overview

The Port of Ravenna serves the excellence industry located in the Emilia Romagna Region and Northern Italy, representing a gateway for the dry bulk materials necessary for these industries. Considering the relatively high specialisation of the port and its strong integration with the manufacturing and industrial sectors of the local and national economy, the plan was focused on a specific manufacturing sector identified in the ceramic industry. The regional ceramic industry is mainly concentrated within the "Ceramic District", a strategic area between the provinces of Modena and Reggio Emilia (Emilia Romagna Region) located about 140 km from the Port of Ravenna, which concentrates about 82% of the national production of tiles and slabs for flooring and ceramic coatings.

The Port of Ravenna has an important role both in the importation of raw materials coming from Ukraine and Turkey, and for the exportation of ceramic tiles, especially with Middle East/East-Med countries destinations. Also, transport and logistics activities related to the production and distribution of tiles constitutes an important service operated by the port of Ravenna in favor of the Ceramic District, e.g. the frequent rail connections with the terminal of Dinazzano, at the heart of the Ceramic District.

The issue

In consideration of the rail transport, raw materials for the ceramic industry resulted as one of the products determining unbalanced train services in terms of incoming and outcoming volumes. The "clay train" logistic service operates about 900 connections per year from the port of Ravenna to the Ceramic District – Dinazzano terminal (corresponding to about 1 million tons/year), returning empty to Ravenna port. Containerized rail services running between Dinazzano and Ravenna are infrequent and, moreover, are unscheduled, allowing road transport to be more reliable and attractive for freight forwarders. As a result, the district exported about 5500 TEUs2 (corresponding to 120.000 tons) overseas via the Ravenna Port, reaching the Port of Ravenna mainly by road transport (about 90%) and only in small part by train (about 10%) usually by means of 20ft. containers. In addition, the destination countries for this traffic are, limited to some specific areas (East Mediterranean and Black Sea countries, few residual volumes to Middle and Far East).

Stakeholders involved

- Ravenna Port Authority
- Freight Forwarders - GENERAL NOLI, JAS, DEL CORONA E SCARDIGLI, LEONARDI GROUP, SPINELLI, DB SCHENKER, DSV, TRANSMEC
- Port Terminal operator – SAPIR, TCR
- Multimodal Transport Operators (***MTO***s)
- Sectorial Association (Confindustria Ceramica)

Key actions

Key Action n. 1: *Implementation of a new scheduled service by using the "clay train" who currently returns empty to Ravenna Port*

The action consists in the development of a scheduled train service for tiles containers in export by using the existing service devote to the transport of clay (i.e. "clay train)" which currently connects the Port of Ravenna to Dinazzano terminal about 20 times a week (4 connections/day), returning empty (only occasionally some wagon containers are added).

After a preliminary assessment with the rail cargo operator based at the Dinazzano terminal, operational conditions (in terms of equipment and operational feasibility and availability) have been evaluated in detail. According to this consultation, it is supposed that up to 10 additional wagons for containers could be added to the returning clay train allowing to transport to Ravenna additional 20ft. containers per train. In total, a new service would guarantee the transport of 4.000 TEUs/year, partially covering the existing demand (it estimated that about 5000 TEUs of ceramic tiles reach Ravenna by truck each year).

The service allows a strong impulse to modal shift enabling the rail service to be always more convenient and attractive if compared to road alternative, because of a reliable scheduling and an increased frequency that would generate an additional demand ("critical mass").

It is important to underline that the action is subject to the stipulation of commercial agreements and strategies between commercial stakeholders (i.e. freight forwarders and transport operators)

involved in the maritime and hinterland logistics chain, aimed at consolidating a proper critical mass.

***Key Action n. 2**: Commercial actions for the development of new connections and the strengthening of existing feeder services*

The action consists in a new commercial strategy of the Port with the objective to involve shipping lines in order to verify the possibility to implement new direct connections and services as well as strengthen the existing ones.

Considering the sector of Ceramic tiles industry, the primary role covered by the Port of Ravenna in accommodating needs in terms of demand mainly occurs towards East Med destinations, as only indirect connections to Middle East and Far East are possible and one or more transshipments are required, with the consequent issues related to increased costs, transit times and risks (damage to goods and missed correspondences at the port of transhipment in case of delays). This situation, clearly, brings to the consequence that Transport companies may chose different departing Ports as more competitive to Middle East and Far East destinations.

The creation of new dialogues with shipping companies is enabled by the involvement of stakeholders (in particular Port Authority, Port Terminal companies and Freight Forwarders) and takes into account the possibility to include economic facilities. The latter point is justified according to the fact that is given the assumption that new shipping lines services can generate additional demand and improve port cargo volumes. Aiming, then, for an increase in the port attractivity both for the hinterland and for countries markets (especially Middle East markets but also new markets such as Far East), it is searched for more competitive services and optimal balancing between transit times and costs

Aims

- Consolidating the existing relations between the Port and its hinterland nodes by means of an improved port attractiveness and competitiveness within the Mediterranean Sea basin, as well as within the Northern and Central Italian intermodal system.
- A further increasing the traffic volumes at the port as part of its hinterland logistics chain with reference to total traffic and internodal traffic, including an increase in the modal share of rail traffic accessing the ports' terminals.

Timescale implementation

	Short term (by 2020)	Mid-term (by 2027)	Long term (by 2034)
Key Action 1	Beginning and completion of Key Action 1		
Key Action 2	Beginning of Key Action 2	Completion of Key Action 2	

Funding sources

Key Action 1

The funding sources for Key Action 1 are partially private (MTOs/ Railway operators which make investments and fully absorb the "train risk" + the ceramic industry, who can financially contribute to promote sustainability and modal shift initiatives) and partially public (Regional/State incentives for modal shift (e.g. L.R. 30/2019, Ferrobonus).

The funding sources for Key Action 2 are private (Maritime/port terminals, Inland rail terminals/ MTOs).

Impact on Bottlenecks

- Increase in the Incoming and outcoming volumes (tons) of raw materials/ceramic tiles, over a timescale of 1 year after implementation of the new service, and their variation compared to the previous year.
- Number of trains (inbound and outbound) connecting the port of Ravenna with the ceramic district for raw materials/ceramic tiles over a timescale of 1 year, their variation compared to the previous year.
- Improved integration of the Northern-Central Italian regions with the Adriatic Ionian basin and the TEN- T network (Baltic Adriatic).
- New connections/new shipping lines/new markets (N.) supplied by the Port of Ravenna.
- Travel time and distance (hours; km) of train services connecting the Port of Ravenna and Dinazzano, in relation to their difference in case of none, one or two shunting maneuvers.

Strengthening the last-mile connections and developing maritime infrastructural improvements for canal depth, new terminals and quays

Overview

Maintaining an efficient and effective infrastructure capable of serving the needs of the market and accompany the evolution of the port and maritime industry is a key element to keep a port competitive, especially in the mid and long-time horizons. Among the actions aimed at promoting the integration between the Port and its hinterland surroundings, and with international networks (TEN-T and Adriatic-Ionian basin), find place the infrastructure bottlenecks affecting the freight transport and logistics operations at the Port of Ravenna.

In particular, bottlenecks are related to the need of deepening the draft of the port canal, expanding the existing terminals and areas dedicated to logistics operations, and improving the last mile connections.

The issue

The port is currently constrained by a low draft of the harbour which limits the efficiency of the terminal operations to all types of cargo, and particularly dry bulks. The relatively limited depth of the access canal, whose maximum draught is 10.5 m, and of the quays, in some of which (some of the mains) the draft is limited to just above 9 m, is suitable to those ships whose dead-weight tonnage (DWT) is lower than 20-25 thousand tons (approximatively the segment of the Handysize ships), corresponding to around 30% units (10% if measured in DWT) of the world fleet.

The use of larger ships is subject to a reduction of the maximum permissible load, which can be achieved through a prior unload to a different port. Such constraint reduces the transport efficiency and increases the related costs, with a negative impact on the competitiveness of the Ravenna Port.

In parallel, some issues in the rail infrastructures are impacting on the last-mile connectivity between the Ravenna port and its hinterland.

In particular, interventions relating to the adjustment of the gauge, the length and the axle load of the railway lines interconnecting the port with the main logistics nodes located in the Emilia Romagna Region and more generally in the catchment area of the port are needed, to be in line with the standards required by the Regulation EU 1315/2013.

Stakeholders involved

- Emilia-Romagna Region
- RFI S.p.A. - National Rail infrastructure manager
- Ravenna Municipality
- Ravenna Port Authority
- Inland Rail terminal operator Dinazzano Po
- Port terminal operator SAPIR
- Port terminal operator TCR

Key actions

Key Action n. 1: *Renovation of rail/road infrastructure and services for the accessibility of the Ravenna Port*

The action consists in the resolution of the scarce accessibility to the port and last mile connections to the ports' terminals which affect the transport time, costs and thus the overall attractivity of the Port in favor of other contenders Ports. Moreover, this is also a priority for the new TEN-T policy, the Work Plan of the Baltic-Adriatic corridor, the Deployment Plan for the Motorways of the Sea as well as the Connecting Italy (Connettere l'Italia) strategy, and the Strategic National Plan for Ports and Logistic (Piano Strategico Nazionale dei Porti e della Logistica).

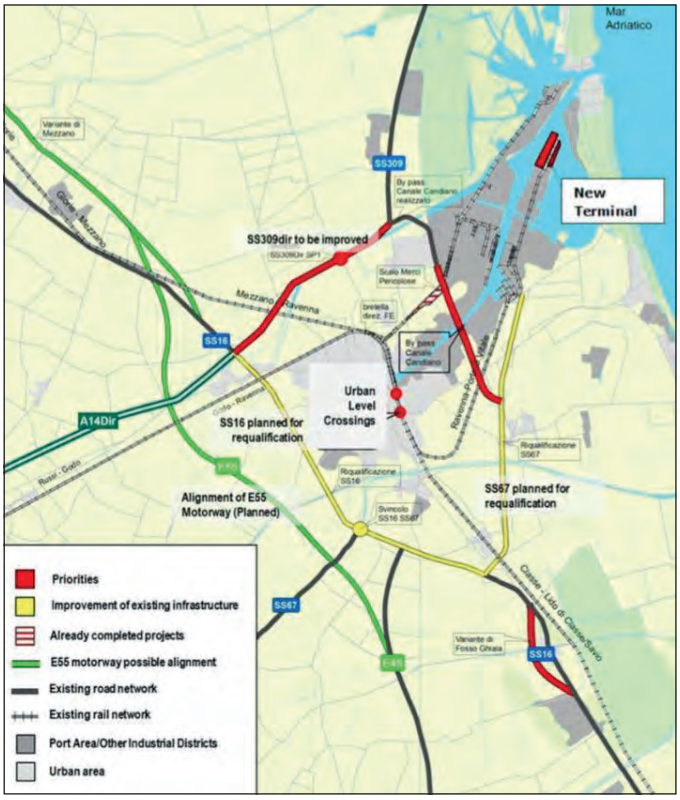

Figure 5 - Port last mile connections

About rail last mile connections, the objective is again to ensure the ports and their terminals respect as far as possible the technical standards in terms of:

- Electrification;
- Gauge;
- Axle load;
- Train length.

Furthermore, there is the need to upgrade and further develop the existing rail infrastructure within and in the immediate surroundings of the port areas. Improvements are required also in view of future traffic increase. The following issues have been recognized:

- Freight terminal close to its capacity limit;
- Interference with passenger train station;
- Low speed and long travel time to port terminals;
- Road – rail interference: level crossings (no barriers);
- Unavailability of hazardous cargo yards.

In this framework, five planned works are included in this action:

No.	Description
1	Elimination of a level crossing (Via Canale Molinetto)
2	Teodorico Bridge: Upgrading to P/C80
3	Extension of the shunting track to the new container terminal
4	Strengthening of the North shunting track: • upgrade of the rail yard to freight terminal; • direct link to North bound main line into operation
5	Strengthening of the South shunting track: • electrification and equipment of the track; • upgrade of the rail yard ti freight terminal

Regarding road last mile connections, as the road infrastructure requires modernization, the national planning envisages interventions for the upgrade of the Ravenna's ring road, which shows criticalities in relation to the peak traffic volumes in summer months, particularly on those sections that distribute the traffic coming from the A14 dir between the North and the South area of Ravenna. Moreover, solutions to mitigate the impact of road transport on the respective urban areas are also needed.

More in details, the following actions are foreseen:

- Works for the improvement of road accessibility to the port are also planned for the upgrade of the SS 309 dir and its interconnection to the SS 16
- Upgrade of SS 16;
- the improvement of the SS 67 (included in the current Framework Agreement between the Italian Government and the National Highway Agency).
- Improvement of the Cesena-Ravenna-Mestre highway interconnecting Venezia to Ravenna, to Rome. This project is currently under consideration, assumed to be possibly developed under a PPP scheme

Key Action n. 2: *Maritime-side infrastructural improvements for canal depth, new terminals and quays (Ravenna Port Hub project)*

This action is based on the implementation of the Ravenna Hub Project, aimed at resolving the bottleneck consisting in limited maritime infrastructure, as well as guaranteeing port competitiveness. The first stage of the Ravenna Port Hub project (Figure 4), already under implementation, includes dredging the canals (marine, Candiano and Baiona) and the front port area, reaching a maximum draft of 11.8 m (+1m). This improvement will allow the access of full loaded vessels with 30-35 thousand tons, which corresponds to load capacity that is 50% higher than the current limit. This stage also envisages the upgrade of the existing quays and the construction of the New container/multipurpose terminal quay, as well as the re-use of dredged materials to raise

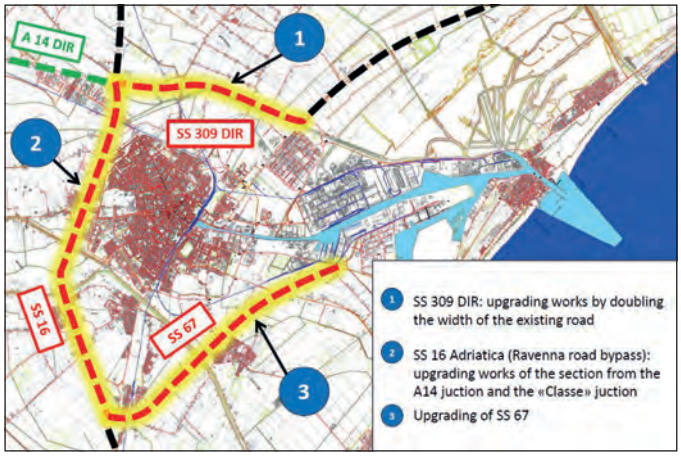

Figure 6 - Road sections interested by the planning upgrades

Figure 7 - Stage I of the Ravenna Port Hub project

the level of areas located in the proximity of the port, in order to develop them as logistics platforms.

The second stage of the project (Figure 5), instead, foresees a draft of -12,50/-14,50 meters in the superior parts of the Port, and up to -15,00 m in the approaching canal.

Aims

- Consolidating the existing relations between the Port and its hinterland nodes by means of an improved port attractiveness and competitiveness within the Northern and Central Italian intermodal system.
- A further increasing the traffic volumes at the port as part of its hinterland logistics chain with reference to total traffic and internodal traffic, including an increase in the modal share of rail traffic accessing the ports' terminals.
- Improved port attractiveness and competitiveness within the Mediterranean Sea basin, overcoming the possible progressive marginalization of the seaport due to the increasing vessel size of the word fleet and the existence of higher drafts available in other European ports that register dry bulks traffic volumes higher than 10 million tons..

Timescale implementation

	Short term (by 2020)	Mid-term (by 2027)	Long term (by 2034)
Key Action 1	Completion of the works for rail last mile connections to the ports' terminals	Completion of the works for the improvement of road last mile connections	
Key Action 2	Beginning of the works related to Stage 1	Completion of the works related to Stage 1 – Beginning of the works related to Stage 2	Completion of the works related to Stage 2

Funding sources

Key Action 1

The funding sources are public (State/EU funds). More in detail:

- the works for the improvement of rail accessibility (considering the interventions listed in the section "Key Actions" are quantified in about 70 € million (RFI SpA);
- the works for the improvement of road accessibility to the port are quantified in about 175 € million for the upgrade of the SS 309 dir and its interconnection to the SS 16, about 72 € million for the upgrade of the SS 16; €20 million for the improvement of the SS 67 (included in the current Framework Agreement between the Italian Government and the National Highway Agency).

Key Action2

The funding sources are public (State/EU funds) and correspond to about 235 € million. In particular, a part of the amount was awarded with CEF funds (2017-IT-TM-0044-W) for an amount of about 37 € million.

Impact on Bottlenecks

The realization of the Ravenna Port Hub project will allow to keep the port competitive and to overcome the possible progressive marginalization of the seaport due to the increasing vessel size of the world fleet and the existence of higher drafts available in other European ports that register dry bulks traffic volumes higher than 10 million tons.

The main impacts related to a disruptive improvement of port accessibility and the development of an "integrated network" between maritime infrastructure and land-based infrastructure, consist of an increase in the total traffic throughput of the port and the hinterland logistics chain with reference to total traffic and intermodal traffic, including an increase in the modal share of rail traffic accessing the ports' terminals.

The impacts related to accessibility have also an indirect impact on the overall competitiveness of the port-hinterland system. At last, the enhancement of this infrastructure is expected to provide an improved environmental performance of the local logistics chain in terms of decrease of road traffic in favor to the rail mode of transport, as well as a reduction in the travelled distances for the road freight transport addressed to the Port. In this way, the negative externalities related to road transport, such as GHG and noise emissions, will be reduced, while at the same time accommodating growing demand.

Indicators are being evaluated since the beginning of the activities (time 0), during the implementation of the actions and at the total completion of the actions.

Deliverable D.T2.2.1 – ISTEN Local action plan for the Port of Ravenna describes in detail the planned measures, their design and the stakeholders involved. It also provides more detailed description of the characteristics of each action.

5. Calabria Region

Country: **Italy**	Region: **Calabria**

Main cargo specialisation:
Containers and Ro-Ro (Gioia Tauro)
Liquid bulk (Vibo Valentia)
Liquid & dry bulk (Crotone)
Dry bulk (Corigliano)

Characteristics of the Gioia Tauro container terminal

Total length of quays [m]	Terminal quay depth [m]	Maximum vessel draft allowed* [m]	Total terminal area [m²]	Container stacking capacity [TEUs]
3,395	**14,00-18,00**	**n.a.**	**1,700,000**	**67,000**

The Calabrian port system consists of 39 ports of different sizes and functions, distributed along the 780 km coastline, partly along the Tyrrhenian side and partly along the Ionian one. The main commercial ports are Gioia Tauro, Vibo Valentia, Crotone and Corigliano Calabro.

The port of Gioia Tauro is located about 56 km north from Reggio Calabria town. The "logistic system" of Gioia Tauro is spread over a flat area of about 7 million m² of which the port areas cover an area of 3,200,000 m². The port has a channel configuration with an internal water surface of 1,800,000 m² located parallel to the coast, on which three main quays are developed (North, Eastern and West quays).

The port of Gioia Tauro, with a throughput about 3 millions of TEU/year, is one of the main transhipment port in the Mediterranean sea and the first port in Italy considering only TEU traffics (30% of the 10 million TEUs in Italy). It is a core network port belonging to Trans European Network and in particular to: i) the Scandinavian-Mediterranean TEN-T infrastructural corridor, that is implementing and is planned to complete in the 2030 (TEN T, corridor 5); and ii) the Central North-South Rail Freight commercial Corridor, that will be implemented by the end of 2015 (RFC, corridor 3).

The ports of Vibo Valentia, Crotone, and Corigliano serve mainly a local market, moving goods by specific production and consumption of the surrounding territories.

Figure 8 - Port of Gioia Tauro
Source: Port Authority of Gioia Tauro

Key bottlenecks identified in the local context analysis

Market
- Port activities specialization on a single sector
- Lack of commercial connections with the Balkan and Eastern Mediterranean countries

Infrastructural
- Inadequacy of the regional rail network
- Inadequacy of last mile connections (rail, road)
- Inadequacy of port and logistics infrastructure"

Operational
- Operational difficulties related to the inadequacy of the port infrastructure and road and rail links with the hinterland
- Lack of services (rail and road operators) for connection to the hinterland
- Poor competitive capacity (high time and high costs) in intermodal transfers (sea-road and sea-rail)

Institutional
- Scarcely effective decision-making system characterized by conflicts of skills, slowness and bureaucratic delays
- Presence of different bodies and institutions (Ministries, Port Authority, Consortium for industrial areas, Region, Railways, etc.)

Innnovation
- Lack of stable relationships among different stakeholders
- Age of handling equipment and information and communication systems

Calabria Region as competitive European terminal port for the Silk Maritime Road

Overview

Logistics chains are being modified and commit many States to sustain substantial investments. Some large infrastructural works have been completed, others are nearing completion, and others are still at the planning stage. In recent years, the Chinese government committed to the construction of two commercial corridors, one maritime and the other by rail (Silk Roads; BRI - Belt and Road Initiative) in order to reach the main European market at lower costs. To achieve this project, significant investments have been planned, including the construction and management of a new commercial port in North Adriatic Region capable of hosting large container ships (18-24.000 TEUs), with a commitment of the order of 2 billion euros. On the rail infrastructure side, the planned railway route starts from Xian through rural China, touches Teheran in Iran, arrives in Turkey, passing through Bosphorus Straits (Istanbul), and has the city of Duisburg in Germany the terminal in Europe. Logistics chains are being modified and commit many States to sustain substantial investments.

The issue

The design of Maritime Silk Road is expected to pass through Adriatic Sea, ending in Venice or Trieste, where the freights should be moved on trains towards Central Europe. However, this solution may underestimate a series of issues. The hypothesis of an offshore platform in the Adriatic Sea has been considered, but it seems to have little chance of success due to the investment costs and environmental risks. Furthermore, navigation along the Adriatic corridor for mother-ships would be very expensive for shipping companies and emissions could have negative effects on the marine ecosystem. Transport times would also increase due to longer routes and longer interchange times.

An alternative solution, more profitable and feasible, is proposed and described: the European continental terminal could be the Calabria Region (with its port system, based on a large container terminal - Gioia Tauro), with a possible integrated expansion of the port system towards Puglia along the Ionian corridor (ports of Crotone, Corigliano, Taranto) and towards Sicily (ports of Messina, Augusta and Catania). The advantages should be seen from a comparative perspective: greater Euro-Mediterranean geographical centrality, less maritime distances, ports of considerable capacity already operational. This solution could allow for lower and reasonable investments, slightly improve rail transport, avoid heavy impacts on the environment and on the tourism industry and would allow the entire Italian region to be linked from the south.

Stakeholders involved

- national, regional government authorities;
- authorities of Reggio Calabria Metropolitan City;
- Gioia Tauro Port Authority;
- private stakeholders as category representatives of the business and production field.

Key actions

The key actions that should be implemented in order to make Calabria the European terminal for the new silk road can be summarized in the following points

- institutional commitment to promote the terminal of the silk road in Calabria and useful actions to give continuity to the intermodal route through Calabria, also with specific funding;
- adjustment of integrated logistics services supply to make Calabria the real gravity center of freight flows between Asia and Europe, realizing the competitive advantage deriving from the position;
- territorial marketing activities aimed to include the Calabrian ports into national and international circuits and to attract transport and logistic demand;
- measures related to infrastructures, nodes and services to adapt regional transport systems to the needs of an intermodal intercontinental corridor (see next sections);
- definition of an industrial and macro-regional development plan with a medium-term horizon that includes economic and financial actions with international agreements relating to commercial exchanges and collaborative projects in the scientific and industrial fields

Aims

- Making the Calabrian port system the European continental terminal on the route of the Maritime Silk; with a possible integrated

expansion of the port system along the Ionian corridor (Crotone, Corigliano) towards Puglia (Taranto).

Timescale implementation

The duration of the activities planned for the design and implementation of this action is estimated at 3 years. Such a period is deemed necessary in order to elaborate and complete the institutional path as well as to activate appropriate agreements among the interested parties. Of course, the implementation of the action, which pertains to the market cluster, depends heavily on the construction of infrastructures necessary to get strong the intermodal transport system both local and national level.

Furthermore, the action is strictly connected to the improvement of the operation of the regional port system which should take place through the activation of highly advanced logistics services.

Funding sources

For the implementation of the action, the need of 25 Million € is approximately estimated (excluding measures related to infrastructures, considered in other specific Action). Possible sources of funding could be:

- EU grants/subsidies;
- national and regional government subsidies;
- private investments.

Impact on Bottlenecks

The main limit of the port of Gioia Tauro is represented by the fact that it is a port exclusively linked to transhipment and therefore vulnerable to the decision-making system of the major international ocean carriers and the competition of other Mediterranean ports. The mono-functionality of the port did not allow to extend to the surrounding territory the benefits of an economic nature, which remained limited to the narrow port area. Large container ships arrive in the port, unload their containers, which are loaded on feeder ships that leave for local distribution.

A complex of activities that takes place within the port area without any connection with the economic and social activities of the Hinterland. The inclusion of the Gioia Tauro node within the New Silk Road as well as allowing significant savings in terms of money and time for the distribution of goods to the north and central Europe, would guarantee the port greater prospects for development and expansion of its catchment area and therefore of its hinterland.

Hub and Spoke System in Euro-Mediterranean Area for Ro-Ro traffic with hub in Calabria Region

Overview

The concept of Short Sea Shipping (SSS) is specified in the communication n. 317 of 1999, in which the European Commission defines SSS as “the movement of goods and passengers by sea between ports located in geographical Europe or between these ports and ports located in countries outside Europe with a sea coast closed to the borders Europe”.

The motorways of the sea represent a specific type of SSS. They are freight transport services by sea, scheduled, high frequency, reliable, integrated in door to door logistic chain through intermodal transports. These services are realized using Ro-Ro (Roll on – Roll off) ships, that are loaded and unloaded with horizontal operations and haul specific load unit: trailers (unaccompanied transport) and trucks (accompanied transport).

The Mediterranean ports equipped for Ro-Ro services are about 60, and a dense network of routes (88 lines), which are being integrated with the territory, spreads throughout the basin. Currently, the services of SSS in the Western Mediterranean are all attested on couples of ports, and mostly on direct connections, without intermediate stopovers.

On the Eastern side, the Ro-Ro maritime transport network is less dense, developed mainly within the Adriatic Sea with connections between the Balkan area and the Italian peninsula; however, there are also connections among Turkey, Eastern Europe and Italy

The issue

At the geo-economic level, the Mediterranean interfaces the Atlantic and North European markets on the one hand and the Asian and African markets on the other. For this reason, the centrality of the basin in an international context is a strong factor of attractiveness for public and private investments in the transport and logistics fields,

which continue to grow despite some critical social and political situations. The Mediterranean is a privileged transit route for containerized traffic, but it is also a very significant area for short-distance Ro-Ro traffic, particularly in the North-South direction. This situation determines new market needs that require, not only transport services, but also integrated logistics services that presuppose the existence and functionality of an intermodal network system capable of projecting the Mediterranean basin regions at the center of Europe. In particular, the market requires integrated services that also include processes of freight handling and transformation, to generate added value and minimizing monetary costs and logistic times.

Hence the hypothesis of a hub and spoke network structure to realize an integration between the TEN-T networks and the Ro-Ro sea routes coming from the southern and eastern shores of the Mediterranean in order to produce significant economies both for transport operators and users.

Stakeholders involved

- national, regional government authorities;
- authorities of Reggio Calabria Metropolitan City;
- local municipalities;
- port authority;
- private stakeholders as category representatives of the business and production field.

Key actions

The key actions for the realization of a Hub & Spoke system for Ro-Ro traffic within the Mediterranean basin with Hub identified in the Calabria Region, can be summarized in the following points:

- institutional commitment to promote the realization of Ro-Ro maritime transport hub in the Calabria Region;
- joint venture among maritime transport operators in the Mediterranean basin aimed at changing the configuration of the network (transition from a point to point network to a hub & spoke network) through the synergic use of resources;
- planning, design and activation of integrated logistics services for groupage/degroupage activities of Ro-Ro loads;
- regulatory policies, guidelines and support for Ro-Ro maritime transport;
- activation of new Ro-Ro lines for the connection between the Balkan peninsula and Calabria and the latter and the west coast of the Mediterranean (Spain).

Regarding the last point, below is an example of a Ro-Ro navigation line that could be activated during the project (Figure 9). The line provides a Mediterranean East-West cross connection crossing Calabria region. In particular, it is possible to plan and activate an annual regular shipping line with Ro-Pax ship to connect the Greek town of Igoumenitsa and the Calabrian port of Corigliano Calabro for a continuation by road to Gioia Tauro and boarding for Valencia. This new route may be required as a “short bridge”. The name comes from the existing “Long Bridge” line operated by Grimaldi Lines and connecting Patras-Igoumenitsa-Brindisi-Civitavecchia-Barcelona. The line connects

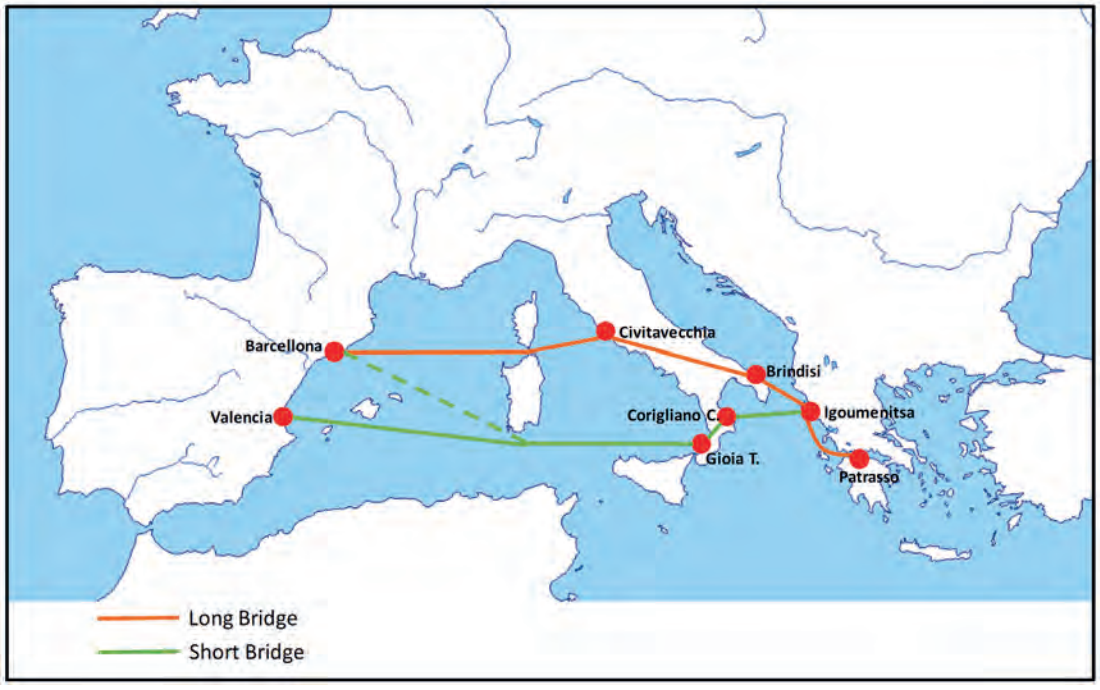

Figure 9 - Comparison between the Long Bridge and Short Bridge

Source: UNIMED elaboration

the Balkan area to Spain by sea with a road link between Brindisi and Civitavecchia. The two Long Bridge and Short Bridge paths are compared in the below.

The new line would have a significant economic impact at local level creating jobs and increasing the local nautical technical services. An increase in services involves a series of social activities to be increased in the Ionian area. The strengthening of the port of Corigliano Calabro with the described line would involve the regional ports with a new Ro-Ro traffic to both from Greece and even more to the Balkans.

Aims

- The proposed model is oriented to obtain economies related to the configuration of an intermodal sea-rail network with a hub in Calabria on which the connections, coming from the southern shore of the Mediterranean and/or from Eastern Europe, stand and spokes services (rail or sea) allow the connection with Central and Western Europe.
- The ongoing upgrade of the Italian rail transport network along the Ionian-Adriatic route, with the Southern terminal in the port of Gioia Tauro (railway C line with transit capacity for 750 m trains), with services structured to link in sequence the four ports, prefigures a reliable, efficient, and effective option of spokes towards Central Europe that could be very advantageous compared to direct transport by sea in terms of costs and travel times
- The configuration of the H&S network improves the cost/service ratio and allows the reduction of efficiency losses related to P2P transport due to poor reliability, high costs and times, low frequency, restricted space penetration, unbalanced traffic by direction, and low utilization of the maritime Ro-Ro lines. A system with hub nodes (logistic/intermodal terminals) and feeder connections (by road, by rail, and by sea) offered in terms of unique contractual/ transport tariffs can determine a higher average utilization coefficient of the network, a higher frequency of services, a greater spatial extension through the increase in the number of achievable destinations, and a more efficient use of transport units and loading units.

Timescale implementation

The action would be implemented over a three-year period as follows:

Action/Year	I Year	II Year	III Year
Institutional path	■	■	
Agreements among domestic and foreign stakeholders	■	■	
Port infrastructures adaptation		■	■
Definition and activation of logistic services		■	■

Funding sources

For the implementation of the action, the need of 25 Million € is approximately estimated (excluding measures related to infrastructures, considered in other specific Action). Possible sources of funding could be: EU grants/subsidies; national and regional government subsidies (Sea Bonus); private investments.

Impact on Bottlenecks

The main problem related to the markets in the minor ports of Calabria Region (Crotone e Corigliano Calabro) is the lack of commercial connections with the prospective Balkan countries, with the Eastern Mediterranean countries and with the southern Mediterranean shore. Currently the freight traffic in the port of Crotone concerns only the import of raw materials for the companies located in the port hinterland. Added to this is an insufficient marketing activity to attract maritime traffic flows of goods, in particular from the eastern and southern Mediterranean.

The reorganization of Ro-Ro traffic in the Mediterranean basin, with the transition from a P2P network configuration to a Hub & Spoke and with the activation of new Ro-Ro navigation lines, would allow the revitalization of the Calabrian ports, making them assume a central role in the short distance sea freight.

Integration and connection to the ADRION networks. Regional Level

Overview

Railway connections should be a distinctive feature of the port infrastructure system as they allow sustainable connections with the hinterland giving effective integration with the territorial and economic fabric.

The key variables for the railway network, in addition to the availability of the connection itself, are the maximum length of trains that can be operated, the layout of the tracks (which affects their performance), the methods of carrying out the manoeuvres (often a factor of low competitiveness of the rail transport compared to road transport). The connected rail tracks have sometimes an insufficient length, with the need for a greater number of manoeuvres for train formation and routing on the national network. Furthermore, the management of traffic peaks in correspondence with ship arrivals requires a high availability of tracks and a very efficient management capacity of the train, also in order to create frequent connections with the hinterland. Coordination with the railway standards adopted on the TEN-T corridors is another factor influencing the development of the supply: competition with other ports is played above all on the efficiency of the land connections and the railway costs are strongly decreasing with the size of the trains.

The issue

Today the Calabrian network does not allow the transit of trains with a length exceeding 500 m. In addition, the restrictions on the admissible structure gauge along the Calabrian Ionian corridor limit the transit of trains with High Cube containers (whose use today is equal to 15% of container traffic and it is growing rapidly) and semi-trailers. In recent years (starting from 2017), RFI (Italian railway company) has promoted infrastructure investment programs in the medium term, to enhance the railways, for the transit of trains with 650 - 750 m modules in the Center-South area; works are programmed on the structure gauge, for a wide coverage of the national railway network with shapes PC45 (constraint for the High Cube transit) and PC80 (constraint for the transit of semi-trailers and heavy trucks).

For the railway network of the Calabria Region, a strengthening of the Ionian corridor is proposed together with the connection line between Lamezia Terme and Catanzaro Lido in order to link the Gioia Tauro port to the Ionian-Adriatic corridor (Figure 10). The choice of linking the Gioia Tauro port to the Ionian corridor through the Lamezia Terme-Catanzaro Lido derives from two fundamental needs. The first is linked to transport safety since the Paola-Sibari line is subject to a very weak element of circulation represented by a tunnel section of about 16 km (from Paola to Castiglione Cosentino), single-track, with a strong presence of passenger trains and with restrictive limits concerning safety standards. The second is related to the opportunity to enhance two significant commercial ports of the Region located on the Ionian coast (Crotone and Corigliano).

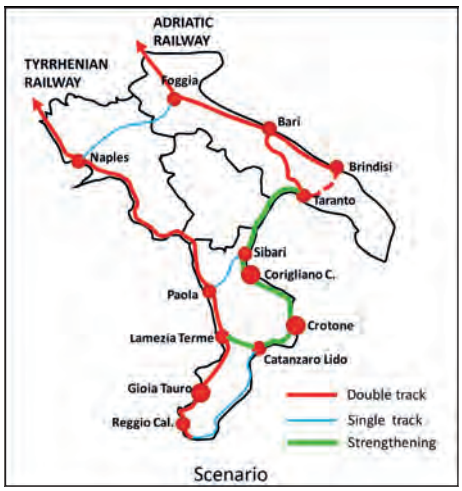

Figure 10 - Actions on the regional railway network
Source: UNIMED elaboration

In agreement with the RTP (Regional Transport Plan of Calabria Region, 2017), Local ActionPlan proposes the inclusion of the Ionian railway in the TEN-T COMPREHENSIVE NETWORK (European Corridor No. 5) as Figure 11 shows. The proposed enhancement of the Ionian railway network would allow the "high speed" also for freight traffic along the Ionian-Adriatic corridor.

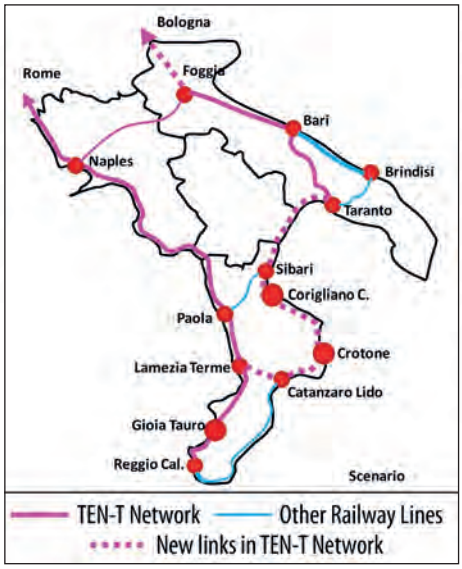

Figure 11 - Inclusion of the Ionian railway in the TEN-T COMPREHENSIVE NETWORK
Source: UNIMED elaboration

Stakeholders involved

- Infrastructure and Transport Ministry;
- National Railway Company (RFI);
- Calabria Region;
- business associations as industrial and commercial bodies.

Key actions

Key Action n. 1: Rehabilitation and Upgrade of Ionian railway

Adjustment of axial mass

Adjustment of axial mass to D4 category (22,5 tons per axis and 8,0 tons per metre) for Lamezia Terme -CZ Lido-Crotone-Sibari railway (Figure 12); the interventions envisaged by RFI in the period 2017-2026 include only the adjustment to category D4 of the San Lucido-Sibari-Metaponto line

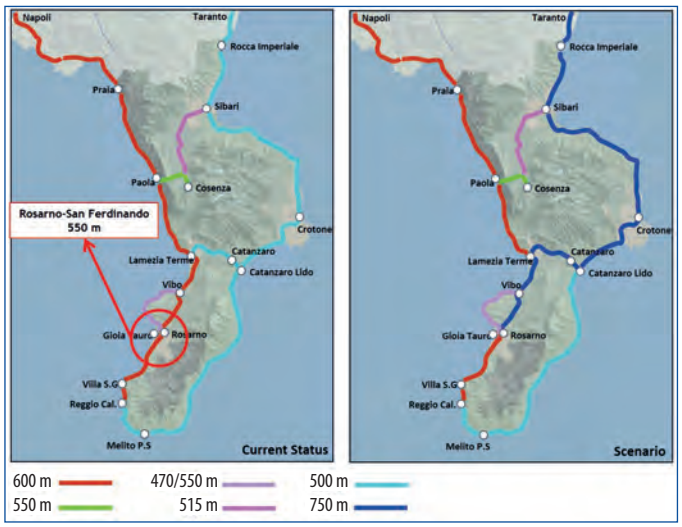

Figure 12 - Adjustment of axial mass
Source: UNIMED elaboration

Adjustment of structure gauge

Adjustment of gauge to PC45 class for Catanzaro Lido-Crotone-Sibari railway (Figure 13); the PC45 gauge allows to route along railway line the High Cube containers; currently only swap bodies and trailers can be routed along this line (PC32 gauge); the RFI intervention plan (2017-2026) proposes the adaptation to the PC45 gauge only for the San Lucido-Sibari-Metaponto line

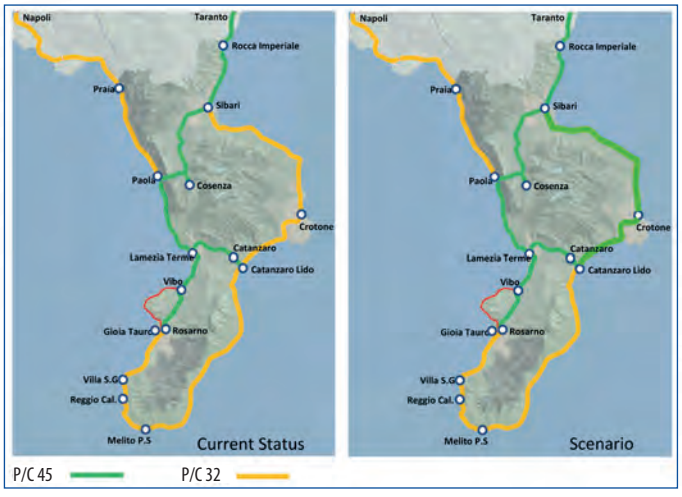

Figure 13 - Adjustment of structure gauge
Source: UNIMED elaboration

Adjustment of railway module

Adjustment of railway module to 750 m for the itinerary from Gioia Tauro to Catanzaro Lido and Ionian railway (Figure 14); the RFI intervention plan (2017-2026) proposes the adaptation of the module to 750 m only for the San Lucido-Sibari-Metaponto line.

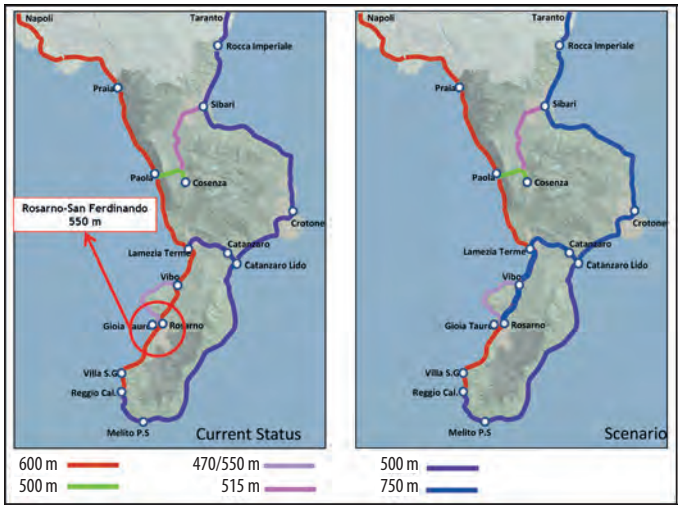

Figure 14 - Adjustment of railway module
Source: UNIMED elaboration

Aims

Calabria is currently crossed by the European freight corridor number 3 (RFC3 – Rail Freight Corridor 3). The Scandinavian Mediterranean Corridor stretches more than 7.000 km through the following countries: Norway, Sweden, Denmark, Germany, Austria and Italy connecting the cities of Stockholm, Malmo, Copenhagen, Hamburg, Innsbruck, Verona and Palermo.

This corridor, in Calabria, includes the Tyrrhenian railway line to which only the port of Gioia Tauro is connected (still inadequately). The commercial ports of Crotone and Corigliano Calabro on the Ionian coast of the Region are bypassed by the corridor RFC3. Furthermore, High Cube containers cannot be transported along the Calabrian Tyrrhenian railway due to limits related to the shape (old tunnels in specific way) and the length of the trains can reach at most 600 meters.

For this reason, the main objective of the proposed action is to adapt the Ionian railway to European high standards so as to include it within RFC3. Specifically, it is proposed to insert the Lamezia

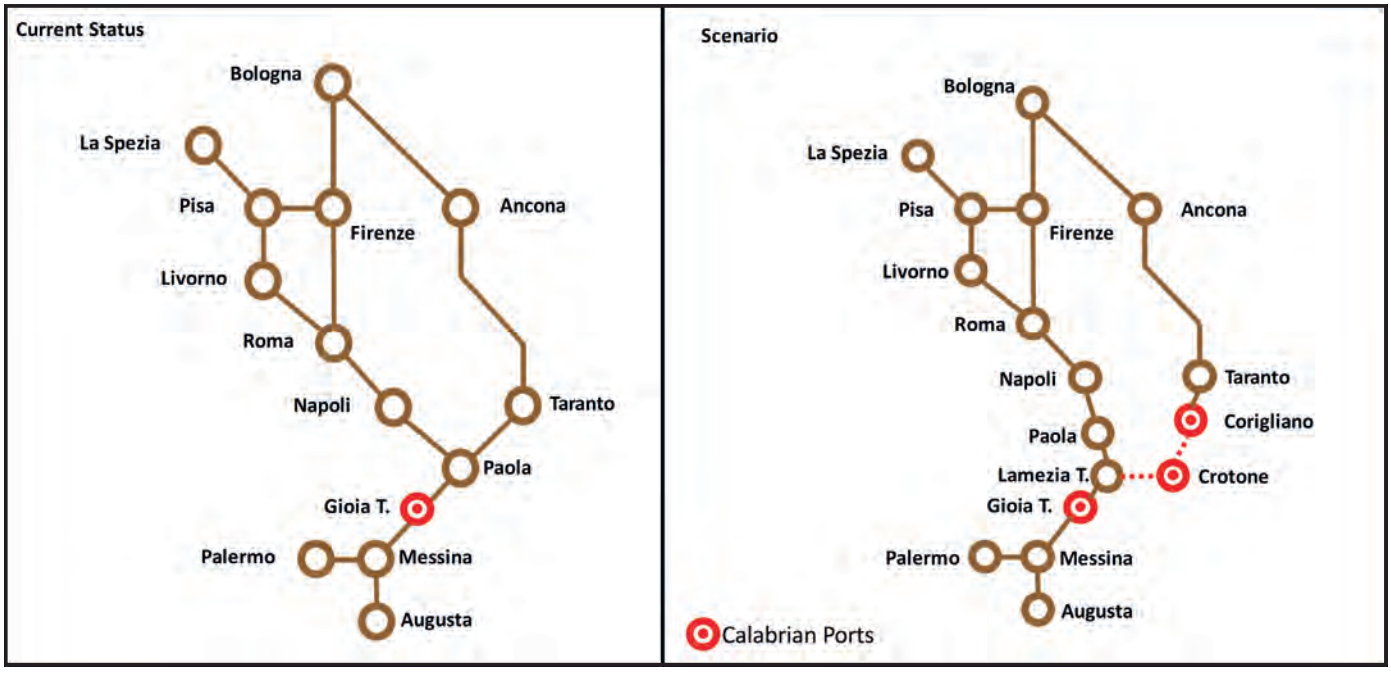

Figure 15 - New proposal for the RFC3 corridor
Source: UNIMED elaboration

Terme-Catanzaro Lido-Crotone-Corigliano Calabro-Sibari railway inside the RFC3 corridor, to connect the main commercial ports of the Calabria region with the Italian Adriatic railway (Figure 15).

Timescale implementation

The estimated time period for the implementation of this action is 7 years. In this period, it will be necessary to proceed with the start-up and finalization of the institutional path (1-4 years), with the planning (3-4 years), with the financing of the infrastructural works (3-4 years) and finally with the realization of the proposed key actions (5-7 years). An approximate Gantt chart is proposed below.

Action/Year	I Year	II Year	III Year	IV Year	V Year	VI Year	VII Year
Institutional path	■	■	■	■			
Design				■	■		
Financing				■	■		
Realisation					■	■	■

Funding sources

For the implementation of the action, the need of 500 Million € is approximately estimated. It is useful to consider that a specific program has already been adopted and financed by National and Calabrian governments in order to enhance the Ionian railway; the works are not still ended and just a part of funds have been expended. Possible sources to cover the difference of funding could be:

- EU grants / subsidies;
- national and regional government subsidies.

Impact on Bottlenecks

One of the main infrastructural bottlenecks is represented by the limits of the regional railway network which is not suitable for the movement of high cube containers, to accommodate freight trains of standard length (750 m), and presents significant criticalities in terms of route (tunnels, viaducts, etc.). Currently, the transfer times of the goods and the management costs of the service are high and not competitive. The critical issues related to connections with other transport networks severely penalize intermodality and sea-land integration.

The proposed actions aim at an adaptation of the regional railway network in order to guarantee the feasibility of intermodal transport and the connection by rail between the Calabrian ports and among them and its hinterland in order to create a regional port system integrated with the hinterland and capable to offer competitive and sustainable transport services.

Integration and connection to the ADRION networks
Local Level - Last mile links

Overview

The port is a pivot of a wide and diffused logistics system which, through the land infrastructures and the organization and governance of processes, can interact efficiently and effectively with its local production system. The complete integration of a port with all the infrastructures of the territory allows to extend both the hinterland and competitiveness of the port itself.
So, the inefficiency of the goods management and handling systems is an element that constitutes a constraint to future growth, but it is also a factor of competitive setback.

The issue

Today the "last mile" costs (monetary and temporal) represent a serious problem for port systems and heavily affect logistical functions. Therefore, for the connection of ports to backport areas and consequently to the hinterland, it is necessary to improve the road and rail infrastructures of the last mile (local area) which allow direct connections to national and/or transnational networks.
For the Calabrian port system, a series of key actions have been identified which are considered of fundamental importance for the integration of ports into road and rail networks. In particular, attention is paid to the ports of Gioia Tauro, Crotone and Corigliano, but some significant connections to the industrial areas of Vibo Valentia and Lamezia Terme, linked to the Ionian-Adriatic project itinerary, are also identified.

Stakeholders involved

- Infrastructure and Transport Ministry;
- National Railway Company (RFI);
- Calabria Region;
- business associations;
- Municipalities of Gioia Tauro, Lamezia Terme, Vibo Valentia, Crotone and Corigliano-Rossano;
- ANAS - National Autonomous Roads Corporation;
- CORAP - Regional consortium for the development of production activities.

Key actions

Key Action n. 1: *Road connection of Gioia Tauro port with south junction Motorway A2.*

For a complete connection of the port to the regional road network, the construction of a new by-pass road, already foreseen in the Port Master Plan and in the Structural Urban Plan of the Gioia Tauro Municipality, is necessary. This by-pass road is fundamental as it would allow the direct connection of the port to the Gioia Tauro junction of the A2 motorway, ensuring easy access to the port on the South side by overcoming bottlenecks of ordinary urban roads and the separation of freight traffic that currently it crosses the city of Gioia Tauro.

The East by-pass road starting from the port (facing the evolution basin, Gioia Tauro-San Ferdinando provincial road) should cross the Tyrrhenian railway (overpassing it), the SS 18 and, crossing the Torrente Budello, the provincial road for Rizziconi, reaching the Gioia Tauro junction of the A2 motorway (Figure 16).

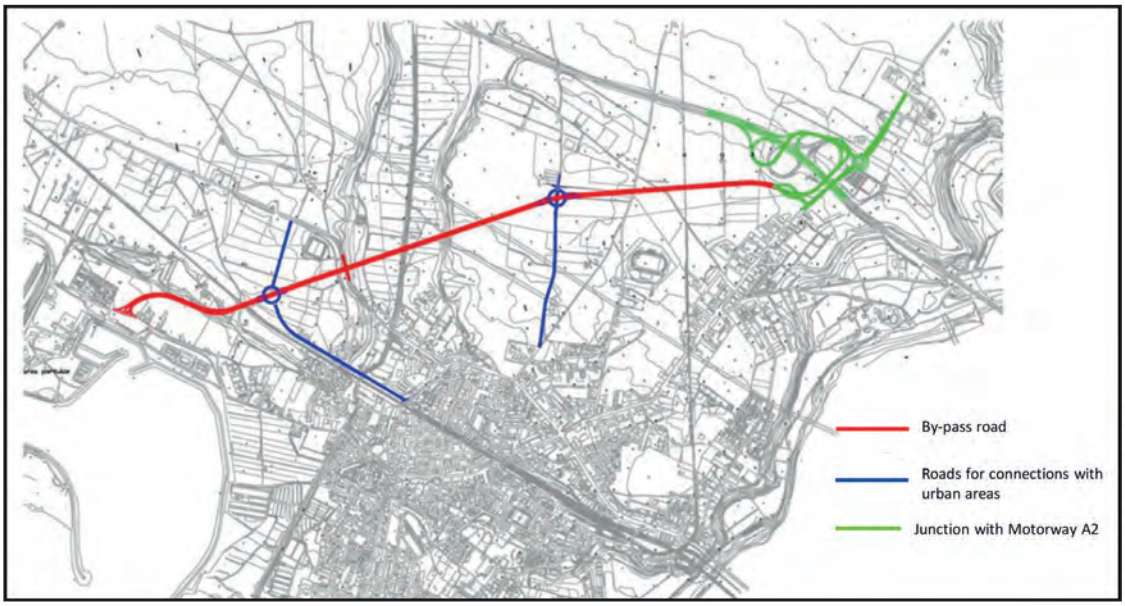

Figure 16
East by-pass road for Gioia Tauro port
Source: UNIMED elaboration

Key Action n. 2: *Enhancement of the Gioia Tauro Port - Rosarno Station railway link*

The Gioia Tauro port is connected to the national railway network through the San Ferdinando station, which is linked to the Rosarno station by a simple track line, electrified of about 5 km. There is a second track currently out of operation (Figure 17). The S. Ferdinando station is equipped with 7 electrified tracks. The modulus varies between 549 m (tracks I to IV) and 565 m (tracks V to VII). There are the secondary tracks of the «Support bundle» and «Sectioning bundle» served by the track "EAST Ridge" for parking rolling stock. These tracks, not electrified and not centralized, have a variable module between 250 m to 350 m. The interventions to be carried out include:

- the enhancement of the north multimodal connection to the TEN-T networks, with the electrification of the second track and adjustment of the module to the target 750 m; these works contributes to increase the railway capacity and to enhance the standard level of connection to the TEN-T networks of the nodes linked to logistics in the port area;
- the adaptation of the San Ferdinando rail tracks to the standard of 750 meters;
- the adaptation of railway links in the port area, and in particular of the railway connection between the Control Centre of San Ferdinando and the container terminal bundle of tracks (gateway), and of the railway junction which allows to reach the rail bundle of the car terminal. These actions have already been proposed in the POT 2016-2018, ALI Calabria Gioia Tauro (Draft 2017) and PON 2014-2020 / MIT and included in the Calabrian Regional Transport Plan. These documents also envisage the construction of railway auctions linked to the San Ferdinando Control Centre serving the ex-ASIREG first industrial area and the redevelopment of the railway track serving the cold stores in the ex-ASIREG second area, for the connection by cold storage railway.

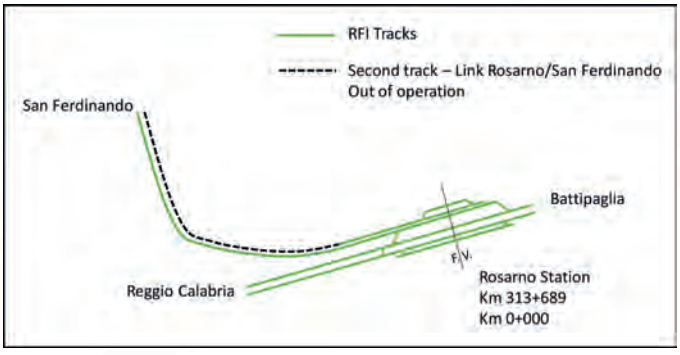

Figure 17 - Railway line San Ferdinando-Rosarno
Source: Gioia Tauro Port Authority - POT 2016-2018

Key Action n. 3: *Road connection Lamezia Terme industrial area*

The Lamezia Terme area is increasingly taking a leading role in the system of regional traffics, for its geographical centrality, but also in relation to a great economic dynamism. Significant elements appear:

- the airport which, in recent years, has increasingly assumed the role of an international airport, with an increasing traffic trend (over 2.9 million passengers in 2019);
- the railway station, primary link between the Ionian and the Tyrrhenian, between the regional and inter-regional networks;
- the industrial area, which is now configured as an emerging logistics and production area.

These three strategic poles, arranged in line, along the territorial belt between the Tyrrhenian coast and the A2 motorway axis, can certainly contribute to a further development of the regional transport and logistics system, provided that they are part of an organic design of strategies and planning. The industrial area, in particular, could take on the characteristics of a logistics district, with an orderly industrial area and a lorry terminal for the exchange of goods by road in close connection with the port of Gioia Tauro which is about 67 km away. Currently the industrial area is not directly connected to the A2 motorway, therefore it seems more appropriate than ever to make the proposal to create an intermediate junction between those of Lamezia and Vibo for a direct link between the industrial area and the highway itself.

The junction would have several positive effects; among others:

- facilitating access to the industrial area;
- the enhancement of a freight exchange structure that could gradually take on the characteristics of a "truck terminal " in connection with the port area of Gioia Tauro;
- the lightening, in terms of heavy vehicles, of the existing interchanges;
- the reduction of congestion, pollution and traffic unsafety phenomena associated with the presence of trucks both on the A2, but especially on the highway 18.

The position deemed appropriate for the new junction is the area close the San Pietro Lametino village, where the motorway and railway tracks diverge. This makes it possible to insert the connecting ramps to the motorway. The site appears convenient because it can be directly connected to the industrial area, with a road axis located on the East-West route.

Key Action n. 4: *Rearrangement of road system near the port of Crotone and Truck Terminal*

The road links serving the port of Crotone are inadequate and do not guarantee a quick, efficient and safe connection to the nearby industrial area or to the regional and national road network.
An overall reorganization of the local road network, also with the construction of new roads and new junctions, in order to:

- ensure the efficient connection among the different nodes (Truck Terminal, Port, railway station, industrial area);
- separate commercial traffic from ordinary vehicular traffic, essentially based on a new by-pass road (about 5 km of highway).

Figure 18 shows a possible reorganization of local roads.

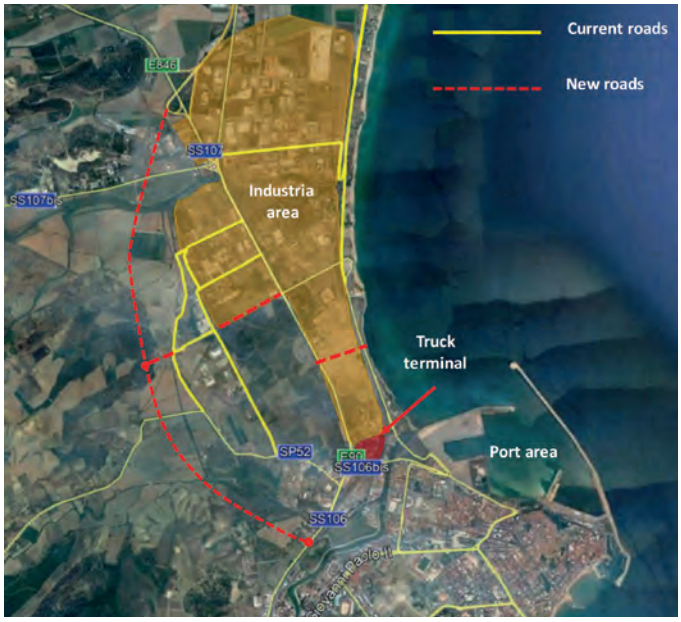

Figure 18 - Reorganization of local road viability
Source: UNIMED elaboration

A new Truck Terminal is also proposed. The identified area is located close to the railway station and to the industrial area and very close to the port area (Figure 18). The construction of a Truck Terminal in this area would guarantee a sea-rail-road modal interchange. The area, currently not intended for any use, has a surface of about 3.5 hectares and is already connected to the industrial zone via the E90 road, but is not directly connected to the port and to the railway station.

Key Action n. 5: *Road and railway connection at Corigliano port*

Corigliano port and the industrial area are connected by SS106 Bis. The freights arriving at the port and directed to the nearby industrial area must pass through an artery which has high traffic and which could therefore go into congestion with the takeover of new ones.

A study of the territory and infrastructure has made it possible to identify a dedicated route for the freights (Figure 19). The port is internally equipped with a double lane road that runs alongside the Port Authority buildings to end at the evolution basin. This road finds its natural continuation with the road located east of the industrial area. The connection would take place with the construction of 1 km of double lane road; the low-cost intervention would reduce the incidence of heavy traffic on the SS106.

Figure 19 - Road connection between Corigliano port and Industrial Area - Source: UNIMED elaboration

Concerning the railway connection, it should be emphasized that the port of Corigliano Calabro is currently not connected to the regional railway network; of course this limits the possibility of integration with the hinterland and with the other ports of the Calabrian port system. Therefore, in coherence with the indications of the POT, a project idea is proposed, for the connection of the port to the railway network (Figure 20).

Figure 20 - New railway link to connect Corigliano port
Source: UNIMED elaboration

The project plans to connect a new port station to the Thurio station in Ionian railway by a 3.2 km long rail section. The overall scenario envisages the construction of some tracks on the port quay to allow the loading and unloading freights. With this scenario, a connection with the port of Gioia Tauro would be operational, having an electrified line. A further aspect is that the port of Corigliano would be connected directly to the Adriatic railway, potentially attractive for traffic not treated by nearby ports, for example ro-ro traffic unaccompanied, which could be routed from here, via the railway network, to Northern Italy and Western Europe through the use of few wagons, and with a view to sustainable intermodality being accompanied by a tractor only in the final stretch (door).

Key Action n. 6: Recovery of railway connection to the Vibo industrial area (Vibo Valentia port)

Currently the port and the industrial area in Vibo Valentia are not connected to the railway network, despite the presence of the tracks inside it. Some works to adapt infrastructures, plants and services are necessary in order to connect the industrial area (and consequently the port) to the local and regional railway network (Figure 21).
The connection to the railway network must take place through a junction between the industrial area (including the important General Electric Company area) and the Trainiti station in order to guarantee at the local companies the opportunity of the rail transport mode (economic, safe and sustainable) for the procurement of raw materials and the distribution of products. Furthermore, the connection can be used to transport freights arriving/going to the port and which are brought to the industrial area by ordinary roads

Figure 21 - Railway connections to Vibo Valentia industrial area - Source: UNIMED elaboration

Aims

The direct connection of ports with rail and road networks is an element of fundamental importance for the development of market. The existence and quality of last mile connections should be distinctive traits of the quality of the port supply. It is therefore essential that ports are efficiently connected to rail and road networks.
The problems in terms of accessibility of the port from/to the hinterland derive mainly from the inadequacy or even the lack of last mile connections. The improvement of the road and railway accessibility of the ports is fundamental to facilitate their market penetration in the reference hinterlands.
The aim of the planned actions is to create adequate connections between the port nodes and the local transport networks in terms of economic sustainability (competitive travel times and costs), social (safety) and environmental sustainability.
The action involves a series of coordinated interventions to achieve competitive, effective and efficient conditions for the land forwarding of goods, primarily by rail. The goal is to allow a smooth passage of freights from sea to land and vice versa.

Timescale implementation

The estimated time period for the implementation of this action is 5 years:

Action/Year	I Year	II Year	III Year	IV Year	V Year
Institutional path	■	■			
Design		■	■		
Financing		■	■	■	
Realisation			■	■	■

Funding sources

For the implementation of the action, an investment of approximately 150 million € is estimated. Possible sources of funding could be:

- EU grants / subsidies;
- national and regional government subsidies;
- private investments and project financing.

Impact on Bottlenecks

Many of the infrastructural bottlenecks of the Calabrian port system concern the last mile connections often inadequate or even absent. The proposed actions are essential to ensure the connection of the regional port system to the hinterland and national networks.

Deliverable D.T2.2.3 – ISTEN Local action plan for the Calabria Region describes in detail the planned measures, their design and the stakeholders involved. It also provides more detailed description of the characteristics of each action.

6. Port of Koper

Country: **Slovenia** | Region: **Slovene Istria**

Main cargo specialisation:
Containers, Ro-Ro (new cars)

Its geographical location and history make Slovenia an intensive transport and transit area at the crossroads of the two major EU corridors (i.e. the Mediterranean and Baltic-Adriatic).

Located in the North Adriatic, the port of Koper is considered to be a modern multi-purpose port, serving the transhipment of different categories of freights. In the past decade, the traffic of the port increased from year to year which led to an increase of volumes for the whole logistics in the hinterland. Each year, the throughput and other economic indicators return again with different types of records.

The port is largely bound up with international trade in back-up markets, with only about 30% of transhipment intended for the domestic Slovenian economy. With the increase in throughput, though the absolute share for Slovenia is somewhat increasing, but in relative terms it falls considering that transhipment is increasing at the expense of foreign back markets, which evidences the important role of export in port's services.

Following internal port's statistics, the main customers for the only Slovenian port are Austria, Hungary, Czech Republic, Slovakia, Poland, Germany, Italy and the Balkans.

Characteristics of the Koper container terminal

Total length of quays [m]	Terminal quay depth [m]	Maximum vessel draft allowed* [m]	Total terminal area [m²]	Container stacking capacity [TEUs]
596[1]	10.10-15.10[2]	14.50[1]	270,000[1]	28,677[1]

*in all or part of the quay length

[1] Lula Koper d.d. official website (2019). Available at: https://www.luka-kp.si/eng/ (Accessed: 27 September 2019).

[2] Port of Koper (2019). Port Info Book [online] Available at: http://www.luka-kp.si/eng/port-terminal-information-books/ (Accessed: 27 September 2019).

Figure 22 - Port of Koper

Key bottlenecks identified in the local context analysis

Market

- Restriction rules for the competition in the railway system.
- Rail transport suffering a lack of marketing to attract the attention of industrial shippers, which perceive the railway as difficult to implement and unreliable and expensive with respect the road transport
- Difficulties in management of empty containers
- Port, road and rail operators do not use marketing instruments for the promotion of services.

Infrastructural

- Limited capacities of the railway system linking the coastal region with the hinterland.
- Limitation in railway transport from/to the port just through only one railway track.
- Presence of only one port's gate, which is not enough for the actual and future volumes of freight manipulated and planned in next few years.

Operational

- Practical problems of the operators working at terminals and Border Crossing Points, such as the one related to truck drivers performing international journeys, who have to speak in different languages.
- Complex system of fees for the use of railway infrastructure, the use of stations and other railways facilities.
- In the port, only one railway track leaving the port until Divača causes delays and internal organizational issues related to the interport's railway system.

Institutional

- Issues in alignment of national documents with those expected in other EU countries.
- Lack of programme and more capacitive software equipment needed to solve higher flows/quantities of data and documents.

Innnovation

- Lack of cooperation in digitally sharing information among relevant actors.

Update of container and car terminals and enhanced railway connection between Koper and Divača

Overview

Through the decades the Port of Koper strengthened its role of logistics basis in terms of import and export, for many of the countries gravitating in its vicinity. The port of Koper represents the main logistic solution for neighboring countries' markets like Austria and Hungary, but it serves also the markets in the Balkans and in Central Europe, where car industries and general cargo freights are constantly handled.

The statistics about transport modes and types of cargoes are showing that in general, the main growth in terms of volumes of cargo has been detected for cars and for containers, where the main transport mode is represented by the railway for around the 60 % of the freights. The plans for the future are dedicated mainly to these two types of cargo and terminals, which includes both, an infrastructure improvement but also an organizational effort, to handle the increasing volumes of freight, mainly depending from the routes to the Far East and back. Not only for the Slovenian market, but mainly for the whole ADRION and CENTRAL EUROPE region.

The issue

The growth of volumes of cargo in the port of Koper in the last decade is mainly because the relationships with Far East countries are seeing a quick development in terms of technologies but also in terms of logistic operations. Even bigger vessels in the Adriatic-Ionian region are linking the Far East with the ports of Piraeus, Koper and other ports of the Northern Adriatic, both in import and export operations. The routes are consolidating their schedules and always new solutions for services are proposed. The infrastructures serving the port of Koper are in many cases obsolete and inadequate. If in the initial steps the routes were just testing links, now when all the connections are consolidated and working on daily or weekly basis, the planned growth of volumes is putting under pressure the infrastructures, which are foreseen to be implemented by the end of 2025 in most of the crucial points in the ADRION region. For the Port of Koper, the fundamental solution in terms of new infrastructures is the construction of a second railway track from Koper to Divača, which is actually the most problematic line of the national railway system. The port by itself is also planning to enlarge its capacities in terms of operating area, which will go in parallel with the construction of new links at national level. In particular, for the next five years, it is planned:

- the increase of capacities at the container terminal, with the extension of Pier I for additional 100m towards the sea and the construction of the third port's gate in Bertoki. It will solve two of the main problems namely the increase of storage area and increase the berthing capacities allowing to berth at least two of the biggest container vessels at the same time in the port of Koper;
- the increase of storage areas at the car terminal, which in concrete means the construction of a new garage house in the port and the predisposition of new parking areas in the vicinity of the third Basin, where the new ro-ro berth has been completed in 2020.

Stakeholders involved

- Municipality of Koper
- Slovenian Government, through the Ministry of Infrastructure
- Association of local forwarders and the shipping agents

Key actions

The main actions conducted in the name of development of infrastructure for a better connection with hinterland and fostering of multimodality, were linked with the increase of cargo volumes and especially with the development of car terminal and container terminal. Both the sectors are constantly growing in the last decade and the infrastructure in the port has been, or is going to be, developed, modernized and enlarged to face the growth of both the sectors.

The most significant actions for the development of proper solutions were the institutional relationships maintained by Luka Koper and the Municipalities of Koper and Ankaran. Both the institutions are leaving in direct contact with the port. The support of the Ministry of Infrastructure was fundamental, when some disputes about specific lands emerged.

The National Spatial Plan defined by the Government, the Port's Development Plans for 2020-2025 and 2020-2030 are some of the documents including all the interventions planned in the port and in the region, in order to increase the infrastructures'

capacities and to allow the logistic chain to grow as foreseen in experts' forecasts – not only in Slovenia, but in the ADRION and CENTRAL EUROPE region too.

In concrete, it was agreed that the container terminal needs a land and operational organization, with the extension of the Pier I, the modernization of equipment and the upgrade of existing ICT tools for the digitization of data not only at local level (at the container terminal) but also for the better sharing of data and digitization of information, which would allow the stakeholders to obtain the information just-in-time and directly from the specific actor involved (forwarder, customs, shipping agent, railway operator etc.).

The below picture shows the infrastructural improvements to be operative by the end of 2021:

Figure 23 - Infrastructural improvements in the Port of Koper - Source: Luka Koper's own elaboration

The planned upgrade of existing infrastructure is a process which started in the last decade and will be completed in next five years. As specified in previous chapters, the above-mentioned upgrade refers to the development of the infrastructure for car terminal and for container terminal. The reason is that both the types of cargo are actually growing considerably. In addition to this, if we're considering in general the development of port's infrastructure, Luka Koper has plans until 2040 and more, when also the extension of the Pier II with its new petrol berths is planned and the construction of the Pier III is foreseen too. But really, these are plans that are too far from actual developments of logistics and many things can change in next decades. That's why the concrete interventions are foreseen at Pier I and in port's development of PCS and its sub-systems, which will go in parallel with the opening and construction of new gates out of the city centre, where the industrial areas are going to be developed for the better localization of logistics and development of local hub near the port.

Aims

The capacity of the container terminal is actually around 1 MLN of TEUs. The objective is to reach the capacity of 2 MLN of TEUs by the year 2025. All actual schedules are confirming this tendency also considering the fact that the works have now all the necessary documents and permissions in order to proceed with the activities at Pier I and at the third gate in Bertoki (the second gate in Sermin was opened in April 2019 and serves mainly the container terminal). The main internal infrastructural bottlenecks are going to be solved by the end of 2025 and it will allow both to increase the capacity of the terminal to 2 MLN of TEUs and to reduce the traffic bottlenecks in the city centre, by moving most of the trucks to the second and third gate, respectively Sermin and Bertoki, which are (going to be) built in the industrial area, out of the centre's road ring, which is mainly used by citizens.

The infrastructural issue is going to be faced also by the Government, which started last year to build the second railway track from Koper to Divača. This is representing from many years the critical bottleneck for the link between the port and the hinterland and now the works have started. The railway infrastructure is planned to be completed by the end of 2025, which is line with the construction of the new berths that Luka Koper is planning to build in the port.

Of the total cargo handled in the port of Koper, approximately 60% is transported by rail. That's why the extension of Pier I for the container terminal and the enlargement of parking areas with the new garage and the park areas in the vicinity of the third Basin are the biggest challenges in the port of Koper for the short period. From this point of view, the purposes of the second track of the Divača–Koper railway line can be seen in:

- A modern and efficient railway link between the port of Koper and the Slovenian/EU rail network;
- To reduce the limitations of throughput and transport capacity of the railway line from Koper to the junction in Divača;
- To increase reliability of the operation of the railway line from Koper to Divača;
- To increase the level of traffic safety;
- To shorten travel times;
- To reduce environmental impacts and risks to the environment;
- To additionally increase the proportion of cargo transported by rail;
- To enable and to increase the use of environmentally friendly modes of transport.

Some details of the second railway track from Koper to Divača, planned by the end of 2025, are provided in the figures below:

Figure 24 - Characteristics of the second railway track from Koper to Divača - Source: http://www.drugitir.si/resources/files/pdf/Second_track_DIVACA-KOPER_brochure.pdf

The aims for the container terminal as well as the car terminal are to face the upcoming higher volumes of cargo with the proper infrastructure and equipment, in order to streamline the operative procedures and digitize the information for internal database as well as for just-in-time sharing of information to the whole logistic chain.

In terms of "gains" for the port of Koper, also the car terminal will benefit from the planned infrastructural interventions, both from the financial and from the operative point of view.

Higher capacities and newer equipment will allow faster operations, bigger volumes of cargo to be handled and higher earnings in the future. At the same time, from the operative point of view it will mean in the specific, for example, that the port will have additional 2.8 kilometers of railway tracks for the Car & RO-RO terminal.

Timescale implementation

Car terminal

Action/Year	2020	2021	2022	2023
Construction of new ro-ro berth in Basin III	■			
Building of sixth group of railways in the port of Koper	■			
Building of new garage in the port of Koper	■			
Creation of parking area at the backyard of the basin III	■	■	■	
Traffic planning in the northern side of the port			■	■

Container terminal

Action/Year	2020	2021	2022	2023	2024	2025	2026	2027
Construction of the new berth 7D	■							
Construction of the Bertoki gate	■							
Construction of the backfilling of the berth 7D	■	■						
Construction of the cassette at the northern side of the Pier I		■	■	■				
Construction of berths 7F and 7G			■	■	■	■		
Extension of berth 7 towards east			■	■	■	■	■	■

All the milestones are foreseen in port's development plan and goes in parallel with the national spatial plan and development of the railway system in Slovenia – focus on the second railway track from Koper to Divača. The completion of the second railway track from Koper to Divača is expected to be completed by 2025

Funding sources

The resources considered for the completion of the investment plans in the short period (for the years 2020-2025) related to the two terminals described above are mainly attributable to:

- the company's own resources;
- co-funding from EU projects and
- loans for the financial construction necessary for the distribution of risks through the years and in line with the expected levels of revenues in the short-medium period.

The EU projects were mentioned also in the chapters above and in fact they're actively included in the financial structure of some of the investments in infrastructures planned in the port of Koper. For the works and milestones linked to the container terminal and car terminal, which were listed in previous chapters, an important role is played also by two CEF co-funding projects:

- NAPA4CORE in which are included the works for the extension of Pier I with the initial works foreseen for the construction of berth 7D, the (re)construction of berths 7A and 7B, the construction of the new Bertoki gate and the construction of some railway tracks in the port of Koper (21 a, b, c with the eRMG cranes' tracks and the DEPO track 18c), all dedicated to the container terminal;

- CarEsmatic as anticipated by project's acronym, the Action foresees infrastructural interventions to improve the capacities at the car terminal in the port of Koper. The works are concentrated on the construction of the new ro-ro berth where the cars are going to be transported more intensively in next years, the construction of parking stations for electric cars and the construction of the sixth group of railway tracks, which are mainly dedicated to the transport of cars to the area in front of the new ro-ro berth.

Impact on Bottlenecks

As described in many occasions, during the drafting of the current deliverable, the main impacts that the foreseen actions are going to have on the bottlenecks identified in ISTEN's Local Context Analysis could be divided in two main groups:

- The financial impact, which can be more evident during the long period. Being the works concentrated on the infrastructural lacks that are limiting the growth of the port and its hinterland, the expected consequence in case these works are completed in time is obviously an increase of revenues not only for the port but also for its stakeholders working on the logistic chain. It can evident through an increase of employed staff, an increase in orders, an increase of transported goods by train and an increase of profits, as well as an increase of revenues for the States, considering the level of taxes paid by the involved stakeholders;
- The operative improvement, which would be a direct consequence of the increased capacities of port's terminals. The real impact would be represented by the higher level of volumes of handled TEUs and cars, as well as by the new or upgraded systems planning the works and the shifts, which could be better described in the next CLUSTER where the development of ICT tools and upgrade of systems can streamline the operations and the data transfer not only in the port, but also between the whole partnership working on a specific logistic chain.

The infrastructural improvement can also serve as a sustainable way of living in symbiosis with the local community, considering that the new gates are moving the traffic of big and polluting vehicles from the city centre to the industrial area.

It doesn't matter if logistically the new gates will allow a quicker access of trucks to the container terminal because it will inevitably also have a positive impact on the traffic in the city centre, where the pollution is always expected to be reduced (noise reduction and small particles reduction).

Introduction of ICT tools to digitalize some aspects of the logistic chain and streamline the procedures at the terminals and gates

Overview

In 2019, Luka Koper, d.d. adopted the 2020-2025 Strategic Business Plan, which, in addition to the Company's objectives and orientations, outlines nine strategic projects with which the Company will implement the said strategic business plan. The projects include extensions to both strategic product groups and the digitization of key processes, notably in linking the entire logistics chain and increasing port throughput.

The Strategic Business Plan also envisages the development of the port by 2030, when Luka Koper will have a modern container terminal with a capacity of more than 2 million container units - TEU. With this document, Luka Koper has a clear development strategy, owing to which it can reasonably expect stable growth in the long term.

The infrastructural needs and developments planned in the near future, threated in the above chapter, cannot be useful if the processes and procedures aren't upgraded too. That's why the operational aspects are indicated as fundamental in the second cluster identified for the port of Koper.

The issue

In the sphere of containers and cars, in the last ten years the company has doubled the quantities measured in container units and number of vehicles. Total throughput increased by a third. The number of trucks has more than doubled, reflecting the extraordinary dynamics of economic development in the hinterland countries, particularly in the automotive and container sectors. The number of trains increased by almost a third, despite the

restrictions of the single-track line between Koper and Divača, which has been described sufficiently in detail in the previous chapter.

On the way to optimize operational processes in the port of Koper, the most efficient solutions seem to be the introduction of ICT tools or upgrades of the existing systems, in order to digitalize some aspects of the logistic chain and to streamline the procedures at the terminals and gates.

What has been taken in consideration for the current Deliverable are the implementations linked with both the types of cargo which have the highest growth in terms of volumes in the last decade, namely cars and containers. The upgrades of the systems or the ICT tools introduced to support these two terminals that were considered as Operational cluster in ISTEN are:

- ACAR hybrid system for the car terminal;
- VBS tool for port's gates and
- EDIFACT CENTER 2 upgrades of the system.

Stakeholders involved

- Logistic partners for the transport of the cargo handled from/to the port (railway operators, forwarders and shipping agents)
- Local stakeholders' community
- Government, through the Ministry of Infrastructure
- Association of local forwarders, the shipping agents, the customs, the terminal operators and the transport operators (railway and road transport

Key actions

Key Action n. 1: ACAR hybrid system

ACAR hybrid system, is a new information system for operation management introduced for the car terminal. This system allows on-line connection of manually controlled terminals with the system's main database and optimises work processes both on site and in the back office. Constant data access contributes to better work-quality and enables the following of modern trends in the logistics chain, where rapid reception of information is of key importance for maintaining a competitive advantage. Since the very beginning, Luka Koper d.d. has included its esteemed partners in the development of the new IT system, which has resulted in improved and standardised data exchange and also the introduction of some new functions that make their work easier and enable better control over goods flows;

Key Action n. 2: VBS

The Vehicle Booking System (VBS) is an online platform of Luka Koper for making truck appointments, checking cargo status and scheduling plans, recording truck entries in the port, reviewing the validity of annual permits for entry into the port, and editing data for organisations booking truck appointments in the Port of Koper.

Key Action n. 3: EDIFACT CENTER 2

EDIFACT CENTER 2 is an upgrade of the existing system. It is linked with the regulation of the area of the entrance of empty containers to the area of the Port of Koper. The latter was also crucial in that the company continued to focus on the comprehensive introduction of Edifact connections with shipowners and the connection of the Edifact center 2 system with the truck and railway announcement system. One of the immediate results for Luka Koper, d.d. was the elimination of the need to use dispositions for empty containers. The introduction of the entire Edifact center 2 system represents a major change in processes among stakeholders in the port community, so the participants were mainly

Figure 25 - First car registered with the new system - Source: Luka Koper archive

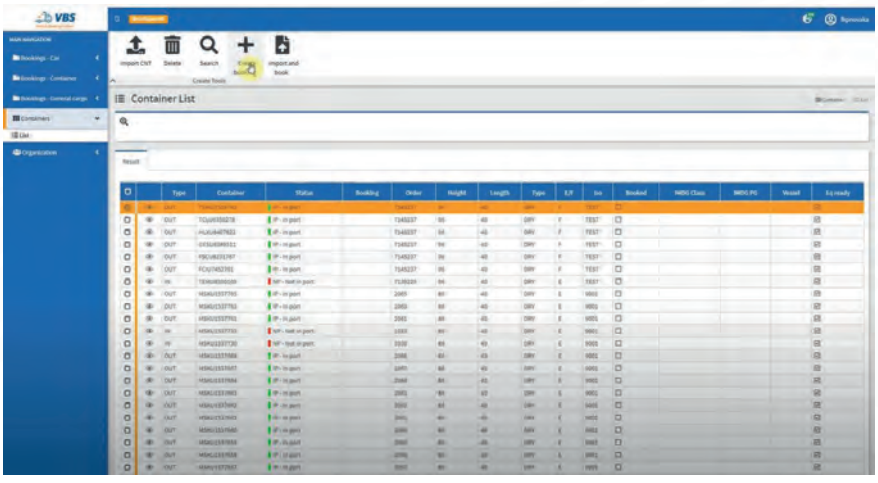

Figure 26 - VBS system screenshot Source: Luka Koper's archive

interested in the impact on their daily work. In many constructive discussions, they highlighted changes in relation to the current situation, which will lead to a faster and more accurate flow of information and a clearer delineation of responsibilities between stakeholders. They will also enable some other improvements in the field of paperless operations and the digitization of processes in accordance with the strategic orientations of the company and the expectations of the entire port community.

Aims

The growing volumes of cargo (especially cars and containers) are multiplying also the vehicles and machinery that handles the freights, which means that the objective of 2 MLN of TEUs at the container terminal as well as 1 MLN cars per year could be reached by the end of 2025 only with a proper intervention also on port's systems, through an upgrade of existing systems or by providing new solutions for the terminals.

The aims that are foreseen at this regard are directly linked with the:

- Digitization of information: the data usually provided by logistics operators are all gravitating around the information required by customs, phytosanitary inspections and terminal operators. They're necessary for the correct and prompt distribution as well as for the respect of delivery time, in line with EU directives and national laws. Of course, this is not just a matter of permissions, but the digitization of processes is in Luka Koper's case also a need related to the more fluent share of information for the registration of cargo entering/leaving the port. The information can be stored on a platform or server, which can be at disposal of the logistic operators, also to better plan their activities, orders, deliveries etc., which might lead to a higher level of efficiency and excellence of the port community itself;.
- Automatization of processes: the next step in the digitization procedures could be represented by the automation of processes which would lead to a standardized service efficiency and a reduction of involvement of staff on the field, having a positive impact also for what regards accidents and safety of the employees. The automation of processes can also reduce the steps needed for the completion of a specific task, which might lead to a reduction in terms of costs and time spent for the activity.

Timescale implementation

Car terminal

Action/Year	2019	2020	2021
Integration of the ACAR hybrid system with the other systems	■	■	
Full introduction of the EDIFACT CENTER platform, with integrations with the national system and support for all the suggestions proposed by the stakeholders		■	■
Adoption of the VBS system for the acceptance of transporting vehicles and registration of transported cargo in the port. The ICT tools helps also in planning the operational activities and time scheduling at the terminal (introduced in September 2019 and is going to be implemented by the end of 2021 after the construction of the new Bertoki gate).		■	■

Container terminal

Action/Year	2019	2020	2021
Implementation of the Tideworks system with the introduction of the application Terminal View	■	■	
Full introduction of the EDIFACT CENTER platform, with integrations with the national system and support for all the suggestions proposed by the stakeholders		■	■

Funding sources

The resources considered for the completion of the investment plans in the short period related to the ICT solutions described above are mainly attributable to:

- the company's own resources and
- co-funding from EU projects.

The EU projects in which Luka Koper is involved for the development of ICT solutions are part of the EU Interreg ADRION's programme and in the specific there are the ADRIPASS and the ISTEN projects which are both oriented on the digital solutions for the improvement of multimodal solutions in the area and the better link with port's hinterland - also considering that the port of Koper is part of the TEN-T Core Network and at the same time it represents the link between the Motorways of the Sea and the TEN-T corridors. As said, for the works and milestones linked to the container terminal

and car terminal, which were listed in previous chapters, an important role is played by the following co-funding projects:

- ADRIPASS in which are included the developments of the ACAR hybrid System, the introduction of the VBS platform and its digital solutions, as well as the upgrade of the EDIFACT CENTER, which will allow the logistics operators to digitize their processes and to have all the necessary data available;
- ISTEN as anticipated above, the project focuses its efforts on the improvement of the link between the port and its hinterland by introducing ICT solutions at port's container terminal, for the digitization of the information and the streamlining of operational processes at the terminal's yards. In fact, there's also an important introduction through the ISTEN project, which is represented by the upgrade of the existing Tideworks system with the integration called "Terminal View". It will significantly increase the planning and the handling of containers, by calculating the optimal solutions for the positioning and movement of containers on the yards, pairing the orders with the availability of vehicles and equipment on the field.

Impact on Bottlenecks

The introduction of new ICT solutions or upgrades of the existing systems will streamline the processes and the operational activities on the field. The administrative processes will be speeded up by the higher level of digitization, which will automatically have positive impacts on the waiting times and planning of activities. All the logistic operators involved in processes will have the possibility to have the necessary info just-in-time, thanks to the database that will automatically share the information with the involved stakeholders.

The direct impacts of the adopted ICT solutions on the port's operations can be substantial, due to the fact that the higher level of information provided to the logistic operators involved can allow them to obtain in time the information for the transport service and the handling of containers/cars at the terminals. The installation of proper tools at the terminals can allow the optimization of the operational activities at the yards (for container terminal), allowing to choose the optimal solution for the handling and positioning of the cargo.

For example, knowing where a container is located or has to be positioned, and knowing which are the available vehicles and equipment that can handle it, there're ad-hoc ICT solutions that can help to calculate the optimal solution, allowing to reduce the time necessary to complete the operation, with a consistent reduction also in terms of pollution. Of course, last but not the least also the financial aspect has its benefits.

Deliverable D.T2.2.4 – ISTEN Local action plan for the Port of Koper describes in detail the planned measures, their design and the stakeholders involved. It also provides more detailed description of the characteristics of each action.

7. Port of Trieste

Country: **Italia** | Region: **Friuli-Venezia-Giulia**

Main cargo specialisation:
Liquid bulk, Ro-Ro cargo, containers

Characteristics of the Trieste container terminal

Total length of quays [m]	Terminal quay depth [m]	Maximum vessel draft allowed* [m]	Total terminal area [m²]	Container stacking capacity [TEUs]
770[1]	18.00	17.40[1]	400,000[1]	n.a.

[1] Trieste Maritime Terminal S.p.a. official website (2019). Available at: https://www.trieste-marine-terminal.com/en/ (Accessed: 26 September 2019).

Located at the intersection between the Baltic-Adriatic and Mediterranean TEN-T core network corridors, the Port of Trieste is an international hub for overland and sea trade with the dynamic market of Central and Eastern Europe.
The intensification of trade and maritime traffic between the Far East and Europe along with the EU enlargement process, have revived the importance of the Upper Adriatic, paving the way for new development opportunities for Trieste maritime industry. In this context, Trieste plays a decisive role in two different supply chains: long-distance, intercontinental maritime transportation and short/medium-distance intra-Mediterranean trade. The convergence of the TEN-T strategic axes of the East Mediterranean Motorways of the Sea with the Baltic-Adriatic and Mediterranean Corridors is resulting in the growth of port multimodal services and the development of innovative solutions in the field of rail-based intermodal transport nodes and operations. In 2019 Eurostat statistics confirm Trieste as 1st Italian port, total throughput: 60,3 million tonnes. Railway connections represent a significant competitive asset for the port of Trieste, allowing it to significantly expand its catchment area, at the same time contributing to the decarbonization of freight transport and limiting its impact on externalities, such as air pollution and congestion.

Figure 27 - Port of Trieste

Key bottlenecks identified in the local context analysis

Market

- Limited market hinterland of the port

Infrastructural

- Adapting the physical and non-physical infrastructures to the growing intermodal transport
- Structural lack of port expansion area and the congestion of common spaces (such as access gates), the latter mainly caused by the high traffic of trucks
- Need of updating the railway infrastructures, especially those connecting the Campo Marzio Railway station
- Reactivation of other stations/segments serving the port and inland terminals: Villa Opicina / Transalpina (connecting with Trieste RRT) and Aquilinia / Servola (Industrial Port)

Operational

- Customs procedures lead to extended transit/ loss of times and long processes.
- The number of locomotives available for shunting procedures and planned service interruptions for maintenance purposes have to be better aligned to organizational needs expressed by the port operators.
- The relations between port terminal operators and RRTs are still quite limited and concern mostly Ro-Ro traffic to/from Trieste inland terminal

Institutional

- The Italian national legal and institutional framework is undoubtedly complex and somehow fragmented, implying the need to interact with different public authorities and bodies, especially regarding relations with the Customs agency

Innnovation

- The integration of all the actors involved in port-hinterland operations within the Sinfomar PCS appears to be crucial.
- The digitization level of internal management tools and staff digital skills are very diversified across organizations; from this point of view, further efforts should target railway operators

Upgrade of the Campo Marzio - port shunting area and improved connection between Aquilinia station and the Industrial Zone of Trieste

Overview

Over the last five years, the Port of Trieste has enjoyed growing trends in the maritime and railway services. The total throughput increased from about 57 to 62 million tons (~ +8.46%), and the number of containers passed from 471,641 TEU to 789,594 TEU (~ +22.95%). The port of Trieste has an excellent intermodal links network, with more than 200 weekly trains connecting to the Italian Northeast industrial sites, Luxembourg, Germany, Austria, Hungary, Slovakia and Czech Republic, totalling 9,771 trains in 2019. The increased volumes of cargo require consequent adaptation or strengthening of the infrastructures, especially the railway network, to be able to effectively manage and operate the new freight traffics.

The issue

Despite the steady growth rate in rail transport, railway infrastructures within and outside the Port of Trieste have not been upgraded accordingly, leading to the risk of a potential congestion in the coming years.

Piers no. 5, 6 (RoRo) and 7 (containers) generate most of the port's railway traffic and are connected to the national railway line through the port marshalling yard, to Campo Marzio station, managed by RFI S.p.A. This is the most strategic and sensitive part of the port railway network, affecting the overall port efficiency.

The current railway layout of both Campo Marzio station (in black in figure below) and the railway sidings managed by the Port Network Authority (magenta) hinders the further development of intermodal transport to/from the port. In particular:

- the train length is currently limited to 550 metres, while EU Regulation no. 1315/2013 requires the Core network corridor accommodate freight trains at least 740 m long;
- it does not allow trains to operate simultaneously from the three port terminals, forcing the other two to stand still when one of them uses the railway sidings managed by the Port Network Authority;
- the manoeuvres of the marshalling yard are not automated, causing delays and posing higher risks to the safety of the operations due to human errors.

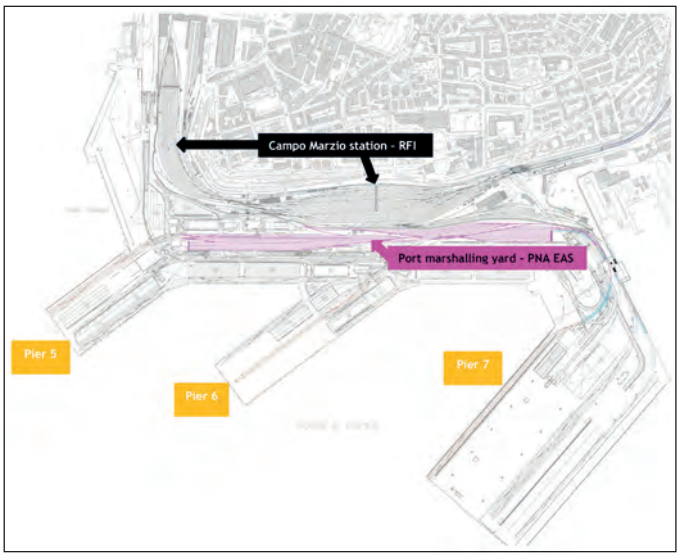

Figure 28 - Campo Marzio station: current layout
Source: Port of Trieste

The eastern part of the port of Trieste (Zaule canal) is connected to the national railway line through the Aquilinia station, also serving the Industrial Zone of Trieste.

In particular, the Aquilinia station connects two different areas:

- FreeEste (ex Wärtsilä);
- ex Aquila.

The FreeEste area is connected to the Aquilinia station through a 3,156-metre long railway siding, which has not been used for several years, and now needs radical renovation.

On the easternmost side of the port, lies the so-called "ex Aquila" area, where the Aquila refinery was located.

Inactive since many years, the area recently attracted the attention of the Hungarian government, which decided in July 2019 to invest 100 million euros for the construction of a multi-purpose terminal for Hungarian goods in import and export, as this area benefits from the Free Zone status as the other port areas.

The area is connected to the Aquilinia station through a railway track, which is in a state of abandonment since many years.

Stakeholders involved

- National infrastructure manager (RFI S.p.A.);
- Trieste inland terminal (Interporto di Trieste S.p.A.);

- terminal operators;
- railway shunting company (Adriafer S.r.l.);
- railway undertakings.

Key actions

Key Action n. 1: Upgrade of the layout of the Campo Marzio station - port shunting area

Works for the new layout of the port's marshalling yard will be divided into two subsequent stages. In the first phase, works will be launched on the northern part, while the southern part will remain fully operative in order to minimise the impact on the port and hinterland-related operations.

Phase 1 entails works in the northernmost part, closer to the area belonging to RFI S.p.A.:

- decommissioning and demolition of:
  - tracks 1-4 of the central and arrival yards;
  - tracks 1-6 of the departures yard;
  - modification to the interconnection with Pier no. 5, including new switches;
- building of the new access tracks from the Campo Marzio station with the new layout, without interfering with the daily operations to/from the port terminals.

Phase 2 comprehends works in the southern part, closer to the port terminals:

- decommission and demolition of:
  - the main rail pivot;
  - the railway access to Pier no. 7;
  - tracks 5-11 of the central and arrivals yard;
  - gate no. 3;
- building of the new layout of the rail pivot, including new switches;
- building of new interconnection with Pier no. 7;
- building of the new gate no. 5;
- completion of the tracks 5-11 of the central and arrivals yard connecting with Pier no. 5;
- opening of gate no. 2 (in the current layout this gate is closed, since it is at a dead end of a railway track) and no. 4, already existing, which will be reopened upon the completion of Phase no. 2.

Key Action n. 2: New signalling system

This activity covers the procurement, licensing and installation of a new, automated and coordinated signalling system for the assembly and handling of trains in the port area, fully interoperable with the systems used by RFI S.p.A. in order to ensure a streamlined operation flow with the Campo Marzio station.

The signalling system will follow the Computer-Based Interlockings (ACC) architecture commonly adopted by PNA EAS and RFI S.p.A.. This consists of:

- one main control centre, aiming to safely manage the logical processes that govern the circulation functions of the shunting area with the consequent implementation and control of the equipment used for the connections with the various subsystems that make up the ACC;
- secondary control centres, connected to the main one through a fibre optic network, containing the operators for the command and control of the shunting.

The circulation of trains will be managed through a unique interface

Key Action n. 3: New soft infrastructures

This activity covers the installation of new hardware and software for full IT interoperability with all port stakeholders, namely:

- RFI S.p.A.;
- Terminal Operating Systems (TOSs) of the port terminals;
- Customs Agency;
- railway shunting company;
- MTOs;
- inland terminals/RRTs;
- railway undertakings.

This activity entails the development and deployment of a set of functionalities:

- the evolution of the electronic bill of lading, leading to the complete digitalisation of operations related to the rail movements and an effective tracking of goods/logistic units;
- the integration of terminal operators in the PCS environment, data exchange with related TOSs, enabling the complete exchange of logistical, security and customs data with operators;
- the activation of data exchange with existing train gates, equipped with automatic recognition systems (cameras) to allow, through the collection of logistical information on the entry/exit of trains in the port area, operations to be faster, verified and safe;
- IT interface with the "Trovatore" platform (Customs Agency), enabling automatic data exchange with the Customs Agency on inbound/outbound trains and each ITU transported, therefore compressing time for customs procedures and streamlining trains entrance/exit;

- IT interface with the IT systems of RFI for train circulation on the national railway lines and manoeuvres, achieving an integrated management of processes and documentation related to train manoeuvring and circulation;
- IT interface with the control and signalling systems, allowing to manage the booking and the assignment of the port railway tracks and therefore guarantee the correct routing of trains through the signalling and traffic management systems, as well as information on the internal location of trains useful for operational and customs purposes;
- IT interface with the "AIDA" system (Customs Agency) enabling, through an automated exchange of information on inbound/outbound trains and the ITUs transported, the planning of administrative controls demanded to the various competent authorities using a one-stop-shop approach (Single Customs Desk and Controls – SUDOCO);
- Customs dialogue evolution and Finance Police gate automation – this foresees the extension of the IT interface with the Trovatore system to automate customs controls and make the information detected by the cameras installed on the railway gates available also to the Finance Police (Guardia di Finanza) the application of the Railway Gate Automation model currently being studied at national level by the Customs Agency in the Port of Trieste.

The branch lines that connect the FreeEste and ex-Aquila areas to the Aquilinia station running at grade level with the roadways, for their reactivation in operational and safety conditions require a series of works to be carried out, such as:

- vegetation removal and railway grounds cleaning;
- replacement of wooden railway ties;
- renovation of a flyover;
- building of railroad crossings and related signage.

Once completed, these works will also pave the way to the realisation of a new set of exchange sidings in the FreeEste area to be used for container loading/unloading.

Aims

- improve the hinterland accessibility and multimodal connections of the Port of Trieste
- increase the train capacity of the marshalling yard by 80%, up to 18,000 trains;
- allow 750m-long trains, thus increasing the train length by 35%;
- increase the speed of shunting operations on average by 35%, and by 70% for Pier no. 7 to 3 and 2 hours respectively;
- ensure full IT interoperability with port railway stakeholders;
- The action concerning links to the Aquilinia station aims at shifting traffic flows generated by the wider port and inland terminals from road to rail, therefore improving the overall railway capacity and hinterland accessibility.

Timescale implementation

	2020	2021	2022	2023	2024	2025
Works in the Campo Marzio station	■	■	■	■	■	■
Connections towards FreeEste and ex-Aquila areas	■	■	■			

Funding sources

- Government allocations (RFI actions): EUR 112,000,000
- EU funding (PNA EAS actions): EUR 45,500,000 (6.5 Meuros CEF, 39 Meuros EIB)

Impact on Bottlenecks

The actions illustrated above focus on the upgrade of the railway hard and soft infrastructure serving the Port of Trieste, specifically its marshalling yard and two railway links connecting to the industrial port and inland logistics area, with the objective of enabling the use of combined/intermodal maritime-rail transport for the transfer of growing freight flows

The enhancement of this infrastructure is expected to result in the decrease of road traffic, preventing the respective negative externalities, such as GHG and noise emissions, while at the same time accommodating growing demand.

For these reasons, the described actions will positively impact on the competitiveness of the port-hinterland system and the environmental performance of the local logistics chain.

Development of EDI with the RUs serving the Port of Trieste

Overview

In the last five years the Port Network Authority of the Eastern Adriatic Sea has been steadily investing in IT solutions able to smooth communications and data exchange along the entire supply chain and to increase its railway capacity. The overall goal is to streamline and digitalise administrative procedures related to rail traffic through the development of new modules and functionalities based on interoperability standards of the IT platform currently in use in the Port of Trieste, the Sinfomar PCS.

The issue

The management of port-related supply chains is challenging due to the complex and heterogeneous operations of ports, with several actors and processes. This is particularly true with respect to the multimodal transport setting, which implies the management and control of port-related sea and inland traffic sectors throughout the interaction/coordination between different types of business actors. In fact, the cooperation of every actor in multimodal transport chain is of vital importance for efficient cargo movement while, at the same time, each actor has its own procedures and priorities.

The cornerstone of this approach is the Sinfomar PCS.

Figure 29 - Sinfomar multi-stakeholder cooperation approach - Source: Port of Trieste

The Train Module of the PCS, devoted to the management of information flows regarding trains originating from or entering the Port of Trieste, is fully integrated with the other modules. In particular, it communicates with the Ship Module as the port railway gates are equipped with cameras using an optical reading system enabling the registration of ILU codes for rolling stock, BIC for containers, UIC for wagons.

As of 2018, handling of freight arriving/departing by sea and by train has been standardized as far as the aspects concerning customs, logistics and security operations are concerned through the automatic generation of arrival and departure notice documents.

To allow the complete tracking of a container/ITU/goods arriving and departing by train from/to the port areas, the rail carrier must issue customs documentation using a specific document called "CH30".

In the past, the Port of Trieste used 13 different models of CH30, with non-standardized data that were not comparable among them. Today, the PCS generates a single CH30 adopting a standardized template, agreed with the operators and the Customs authority according to objective criteria, and prepared using a shared terminology and structure.

This allowed to dramatically reduce the probability of errors, and paved the way to a more comprehensive electronic data interchange among public and private actors.

Barcodes related to customs procedures, such as the MRNs of the Train Freight Manifest, allow customs agents to close the consignment of goods on the Customs Agency IT platform (AIDA) by using a manual scanner, thus reducing the time needed to capture information from 10-15 minutes to less than one minute and eliminating errors linked to manual data entry.

Stakeholders involved

- National infrastructure manager (RFI S.p.A.);
- Railway shunting company (Adriafer S.r.l.);
- Railway undertakings;
- Inland terminal/RRTs;
- MTOs;
- Customs Agency and Finance Police.

Key actions

Key Action n. 1: *EDI on the relation Trieste - Bettembourg*

This action is focused on the implementation of the interoperability with TX Logistik AG/Mercitalia Rail S.r.l. to reach a complete automatization of all procedures related to the intermodal rail service connecting Trieste to Bettembourg (Luxembourg). The action consists in enabling a two-way communication between the Sinfomar PCS and IT systems used by the railway companies. The exchange of logistical/customs data concerning inbound trains (e.g. position of the wagon in the train, wagon/container plate number, type of ITU, type and weight of goods etc.) is made possible by the creation of a Web Service using the Simple Object Access Protocol (SOAP). Real-time data is automatically collected through SOAP-based interoperability, allowing to know the exact position of the train for each timeframe. After such data is linked with information gathered by other modules in the Sinfomar PCS, it is easily accessible through a dashboard presenting the actual data concerning rail operations status and thus allowing better planning of future actions.

This action has been developed taking as a starting point an existing cooperation with Rail Cargo Austria (RCA) and that has allowed to reduce the time needed to handle train-related processes from 6-7 hours to 30-40 minutes.

Key Action n. 2: *EDI Port of Trieste - Fürnitz inland terminal*

This action consists in the development and implementation of IT solutions for the creation of a cross-border logistic corridor between the Port of Trieste and the Railroad Terminal (RRT) of Fürnitz (Austria) which includes also control operations on the documentation concerning goods and ITUs by the respective Customs authorities. Also in this case, the followed approach has been to enable the communication between the Sinfomar PCS and the IT platform used by the rail carrier (RCA).

At the same time, this action is laying the groundwork for an upgrade in the interoperability between the Sinfomar PCS and the IT systems used by the Customs Agency (il Trovatore/AIDA) as well as for the standardisation of the rail waybill.

Key Action n. 3: *EDI Port of Trieste - Mahart Container Center*

This action aims at capitalising the results of those described above, in that its objective is to upgrade the PCS module and functionalities whose data feed in the train-related documentation. In particular, the action will bring to the generation of the electronic waybill and achieve the interoperability between the Sinfomar PCS and the IT system used by Budapest Mahart Container Center (Hungary).

Aims

All actions result in a considerable reduction of the time needed to handle train-related documentation and ultimately the whole transport process, ensuring seamless freight flows and therefore contributing to make rail transport more efficient.

Timescale implementation

Action/Year	2019	2020	2021
EDI on the relation Trieste - Bettembourg	■	■	
EDI Port of Trieste - Fürnitz inland terminal	■	■	
EDI Port of Trieste - Mahart Container Center		■	■

Funding sources

EU funding:

1) Interreg Alpine Space Programme, AlpInnoCT project: EUR 58,000;
2) Interreg Italy-Austria Programme, SmartLogi project: EUR 90,000;
3) Interreg Central Europe Programme, CoModalCE project: EUR 80,000.

Impact on Bottlenecks

The analysed actions enhance the coordination among several key stakeholders in the logistics chain and improve the efficiency of combined/intermodal transport services, both in the cross-border and transnational dimension. The most challenging bottlenecks concerning operations and namely, misalignments in the processes involving port-hinterland private and public actors will not be completely overcome by these measures, which can nevertheless be seen as a step forward in the right direction.

Upgrade of the Sinfomar PCS for streamlining inland freight flows

Overview

The use of ICT is crucial when considering the latest changes in the governance of regional ports and Railroad Terminals (RRTs).

Legislative Decree no. 169/2016 reforming the Italian port sector envisages that the President of port authorities can seek integration and a common governance with inland platforms. As from January 1st 2020, the Port Network Authority of the Eastern Adriatic Sea has gained competence over the Port of Monfalcone, which is located 30 km from Trieste and is dedicated to RoRo and general cargo, totalling more than 4 million tons of yearly total throughput.

Moreover, it is the second shareholder of the inland terminal of Trieste-Fernetti, which controls also the inland terminal of Cervignano.

These recent developments show the willingness of the Port Network Authority to play a pivotal role in the regional logistic systems, and this action plan move towards this direction. Also, the Three-year Operational Plan envisages the creation of a new integrated railway service system with the other regional logistic nodes, optimizing existing infrastructures and offering competitive services as an integrated "continental gateway.

The issue

This new situation implies a change in the mindset of policy makers and operators alike.

A shift from individual platforms often competing to one another, to integrated platforms in "Proximity Terminal Networks" has to be realized, in order to optimise the use of existing infrastructures and gain the critical mass that the Friuli Venezia Giulia Region has been lacking.

Also, the main feature of the Port of Trieste is represented by its legal status of International Free Port established by the Peace Treaty of Paris, namely its Annex 8. This entails that the Free Zone (FZ) areas enjoy a customs clearance exemption and are to be considered as external to the EU customs territory.

This peculiar legal status has been taken into account since the early stages of the design process of the Sinfomar PCS, when FZ areas were basically concentrated within port areas. However, recent legislative developments granted the Port Network Authority a greater role in the administration of such FZ, which has led to this status being extended to inland facilities such as the railroad terminal of Trieste-Fernetti and the new FreeEste area.

In line with its strategic priorities, the Port Network Authority has commissioned to an external contractor the development of new PCS functionalities whose aim is to allow the integrated management of, and seamless freight flows between inland Free Zone areas, in order to streamline infrastructure and minimise the risk of road congestion.

Stakeholders involved

- Customs Agency;
- RRTs;
- Logistics services providers;
- Terminal operators.

Key actions

Key Action n. 1: *Creation of new PCS module "External Free Zone areas"*

The pilot action implemented within ISTEN consists in ensuring that goods arriving and departing from inland FZ areas are handled efficiently and in a standardised way within the Sinfomar PCS. Such facilities, located in a 10 to 30 km range from the Port of Trieste, are currently used as external buffer areas, where vehicles directed to the terminals can park while waiting for the authorization to enter the port gates, in order to avoid cramming port areas and to enable planning traffic flows.

To this end, a new PCS module has been created to allow the integrated management of the pre-arrival notification, containing all the customs data concerning cargo arriving in the Free Zone area and of train-related documentation (CH30) for FZ areas including railway branch lines.

The customs regulations in force require all freight movements (inbound/outbound) to be collected in a registry in chronological order, with the indication of the respective customs documents. This registry contains the following data: number of customs operation, date of the operation, type and number of customs document, goods description, weight (net), reference number in the registry, goods quantity, goods position in the warehouses, reference to the transport document accompanying

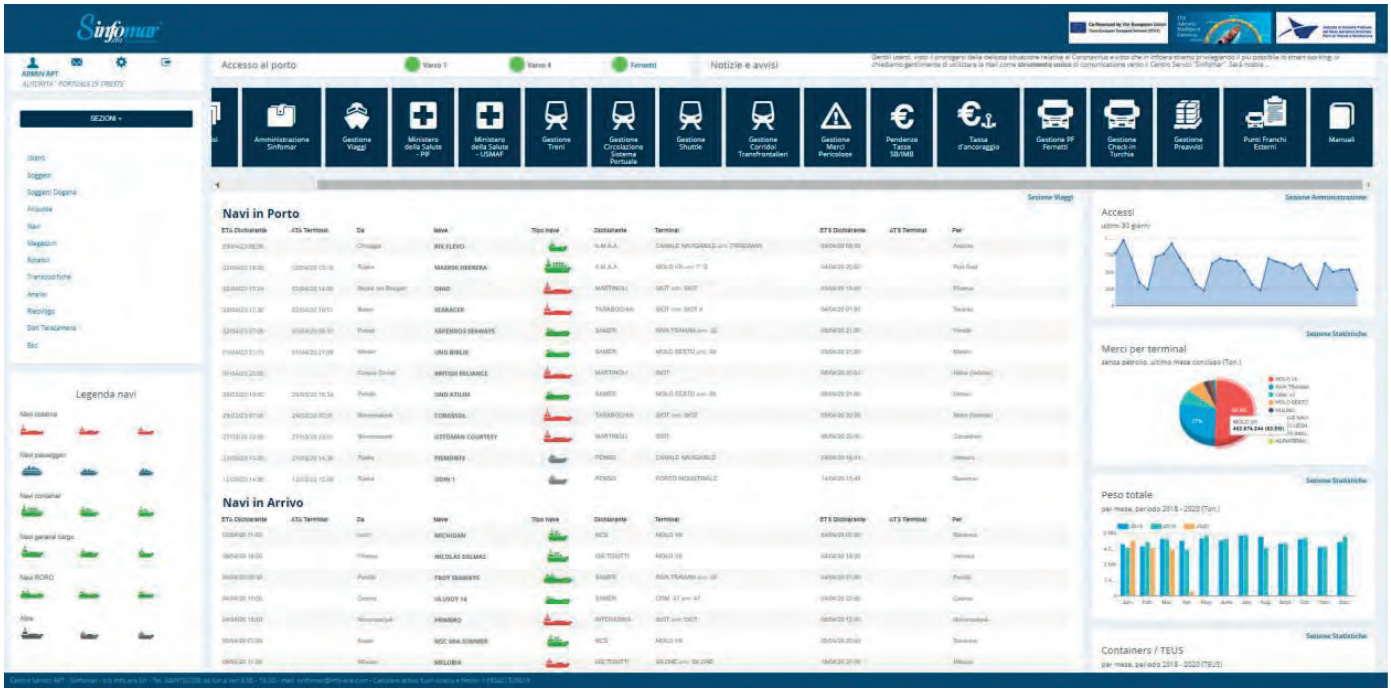

Figure 30 - New module in Sinfomar PCS - Source: Port of Trieste

the goods in the FZ area, MRN (Movement Reference Number), type of handling operation.

The PCS module "External Free Zone areas" features the following functionalities working in real-time:

- management of pre-arrival notifications/ incoming vehicles in the FZ area;
- management of vehicles in the FZ area;
- management of vehicles directed to the port of Trieste without using a customs corridor;
- management of vehicles directed to the port of Trieste using a customs corridor.

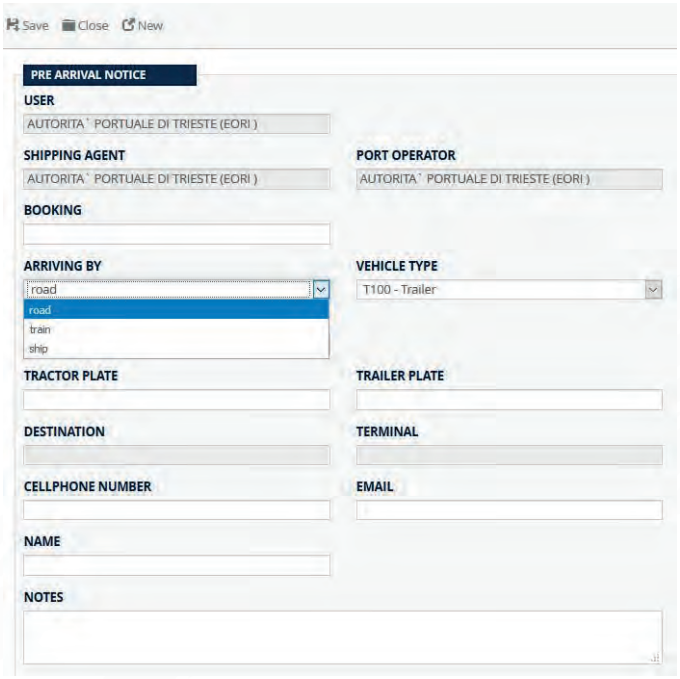

Figure 31 - Pre-arrival notification
Source: Port of Trieste

For the FZ areas connected to the railway network, the module integrates the management of the Train Freight Manifest (CH30) and additional train-related documentation to access data concerning trains, wagons, tracks and shuttle services.

Once selected the Free Zone area where the logistic activities are going to be performed, the preparation of the pre-arrival notification requires the fields displayed in the Figure 31 to be filled.

Since the pre-arrival notification involves several stakeholders, this notification is automatically created for and accessible by the logistic operators working in the selected FZ area, as shown in the detailed forms depicted in figures 14-15-16 included in the Annex following Section 5.

In order to test the results of the action, an operator based in the so-called Old Free Zone area and specialised in metal logistics (Genoa Metal Terminal S.r.l., GMT) has been selected. The following figures show all the data that can be extracted from the pre-arrival notifications of vehicles within the company's area, including the status of the transfer authorization to a different logistics area (green/ red light).

The results obtained in the ISTEN project, are capitalised in another project, "PROMARES - Promoting maritime and multimodal freight transport in the Adriatic Sea", co-financed by the Interreg Italy-Croatia 2014-2020 Programme. In particular, within the PROMARES project a new PCS module is currently being developed, to address the management of cargo movements between external FZ areas, using data captured from already

installed cameras and ensuring freight traceability both for rail and road transport.

Complementary to the ongoing and future upgrading of the ICT tools in use in the Port Network Authority is the need to ensure that its staff are adequately prepared to use each and every of their functionalities, according to the respective roles and tasks required. To this end, a specific action aims at providing training on the new PCS modules, namely those devoted to rail traffic, and in general make the employees more digitally knowledgeable and aware of the potential of such tools.

Aims

This strand of actions aims at enabling the real-time management of inland warehousing and logistics areas, at the same time ensuring the visibility of freight movements between Free Zones.

Timescale implementation

After the design phase, which took place during the first half of 2019, the tender for the pilot action was awarded in October 2019. As foreseen, all the activities concerning the ISTEN project were finalised in February 2020, while the other (PROMARES) is expected to be completed by October 2020.

Funding sources

EU funding:

- Interreg ADRION Programme, ISTEN project: 48,000 euros;
- Interreg Italy-Croatia Programme, PROMARES project: 85,000 euros.

Impact on Bottlenecks

These actions further extend the scope of the Sinfomar PCS to provide the technological tools required to play the role of an integrated port-hinterland system, taking into consideration the limited space available for port expansion and responding to the need to avoid congestions in the road network by optimising the use of existing infrastructure and facilities. Similarly to actions described in section 3.1, these improvements represent pieces of a bigger picture towards the objective of an efficient and sustainable integration of infrastructure, processes and actors in the port-inland hub.

Deliverable D.T2.2.5 – ISTEN Local action plan for the Port of Trieste describes in detail the planned measures, their design and the stakeholders involved. It also provides more detailed description of the characteristics of each action.

8. Port of Thessaloniki

Country: **Greece** | Region: **Central Macedonia**

Main cargo specialisation:
Containers, liquid & dry bulk

Characteristics of the Thessaloniki container terminal

Total length of quays [m]	Terminal quay depth [m]	Maximum vessel draft allowed* [m]	Total terminal area [m²]	Container stacking capacity [TEUs]
570	12.00	10.80	317,000 [1]	5000 [1]

[1] ThPA SA (2019) 'ONE HUB - New horizons: Development Concept for the Port of Thessaloniki after Privatization - Potential for Railfreight' [PowerPoint presentation]. International Rail Freight Business Association Congress, Athens, April 4, 2019.

Thanks to its advantageous geographical location and road links and train connections, the port of Thessaloniki is a major Gateway port to the Balkans and South Eastern Europe. It is located within the Mediterranean, through which the majority of ships linking Asia with Europe pass, as well as a significant part of the "Round the World" lines, and is included in the Core European Transport Network (Trans-European Corridor Orient/ East Med, Pan European Corridors IV & X). The exports and imports by land are dependent on transit through non- EU countries; more specifically through the Balkans (Serbia, Former Yugoslavian Republic of Macedonia) for merchandise directed to European countries, and through Turkey for trade with Central Asia.

Moreover, Greece is a transit country itself, primarily for Turkish trade. Six to seven million tons of cargo are transported on an annual basis from the port facilities, mainly by trucks via Egnatia and PATHE (i.e. the main road corridors that are part of the TEN-T). The inbound traffic of the port on a daily basis exceeds 1.000 trucks. In 2017, transit goods represented the 28% of total conventional port traffic (45% vessel discharged goods, 6,5% vessel loaded goods). Only 12,5% of them were served by rail network.

Figure 32 - Port of Thessaloniki
Source: https://container-news.com/

Key bottlenecks identified in the local context analysis

Market

- Limited port-hinterland market
- Low quality of the level of combined transport service provided
- Cross-border differences in legislation and network capabilities, which affect the smooth operations within the port hinterland system

Infrastructural

- Low level of maintenance of road infrastructures
- Missing links with most of the multimodal connections between Hungary, Bulgaria, Romania and Greece, that are yet to be constructed or substantially upgraded
- Regarding the railway network, problems are detected in line lengths, axle loads and the poor state of railway infrastructure
- Railway network along the Orient / East-Med Corridor still not fully compliant with some of the characteristics thresholds set out by Regulation No. 1315/2013, particularly regarding train length and cross-border traffic management systems (ERTMS).

Operational

- Low quality and reliability of rail freight services, mainly due to the lack of coordination in cross-border capacity offer, traffic management and planning of infrastructure works
- Transit traffic slowed down by border procedures and complexity in the customs clearance process.
- Non-24-hour operation of port gates causing delays in the port-hinterland chain
- Lack of staff in customs office to accommodate inbound and outbound traffic

Institutional

- Proliferation of ad hoc regulations applied to logistics activities with much duplication, overlap of administrative responsibilities, and unnecessary constraints.
- Multiplicity of actors involved and related fragmentation of responsibilities and jurisdictions
- Complexity of administrative, operational and legal framework of maritime transport and logistics sectors
- Lack of direct e-exchange of information and documentation

Innnovation

- Lack of innovative services, which discourages involved actors and consequently, reduces the efficiency and limits the competitiveness of the port-hinterland chain.
- Low level of of connectivity and exchange of information among port-hinterland actors

Setting up of an Innovation Hub for increasing the port competitiveness and efficiency

Overview

The Key Action that is proposed is the creation of an Innovation Hub. As relevant stakeholders mentioned during the ISTEN Local Working Group, the creation of an Innovation Hub will help Port of Thessaloniki achieve additional growth, increase its competitiveness and efficiency.

Initially, the Innovation Hub would focus in 4 axes that according to stakeholders are capable to solve the majority of the innovation bottleneck and be a solution for bottlenecks from other clusters.

These 4 axes will include a startup incubator, a digital skill academy, an initiative that will solve the lack of connectivity and exchange of information inside port operations (Information Exchange System) and a research center.

The issue

The main bottlenecks dealing with the innovation and operation cluster, namely i) the lack of innovation content in the services provided by local port-hinterland chain actors, ii) the lack of connectivity and exchange of information regarding port operations with port-hinterland actors and iii) the level of internal management tools and staff's computer literacy diversified across organizations, represent a liability for port competitiveness as they reduce efficiency and are an obstacle for other innovative services and initiatives to develop.

Many problems arise due to different data formats and documentation in hinterland's supply chain which affects every participant in the ecosystem.

This problem can be alleviated by adopting common approaches and formats and by developing an information exchange solution, as the Hellenic Logistic Association underlines.

Stakeholders involved

- Region/Prefecture of Central Macedonia
- Thessaloniki Chamber of Commerce and Industry (TCCI)
- Greek Exporters' Association
- Hellenic Logistic Association
- Municipality of Thessaloniki
- Thessaloniki Port Authority administration,
- Scientific/academic institutions

Key actions

Key Action n.1: *Set up of the administrative team(s)*

A starting point in order the key action of Innovation Hub is to secure sufficient funding, building facilities and material infrastructure by the administrative team. As the creation of an Innovation Hub is a complicated and difficult task, different administrative teams should be created in order to coordinate each initiatives tasks. More specifically, there will be 4 administrative teams responsible for the startup incubator, the research center, the digital skill academy and the software development initiative; all of them will be managed by the Innovation Hub Administrative Team. Each administrative team will set its own goals, objectives and timeline in accordance with the Innovation Hubs' general goals, objectives and timeline.

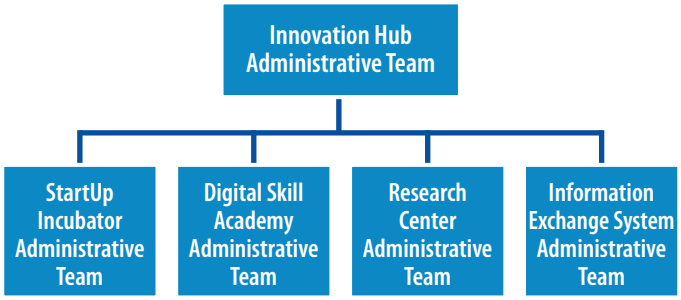

Figure 33 - The Innovation Hub Administrative team

The Innovation Hub Administrative Team should coordinate the individual administrative teams, evaluate their progress and intervene in case they deviate from their targets. Another important task of the Innovation Hub Administrative Team would be the connection of Thessaloniki port with city's scientific and academic community. The main tasks/steps for the development of action no.1 are reported below.

Innovation Hub Administrative Team	
Id	**Key actions**
1.1	Secure Sufficient Funding
1.2	Building Facilities
1.3	Material Infrastructure
1.4	Partnerships with city's academic community

Table 8.1 - Key actions of the Innovation Hub Administrative Team

Key Action n. 2: StartUp Incubator

Part of the Innovation Hub should be an entity that could foster entrepreneurship, and especially startups (as underlined by the representative of Greek Exporters' Association and the Hellenic Logistic Association). More specifically, Greek Exporters' Association suggested the creation of an incubator to support port-related start-ups. Although this action had been previously discussed, it has not been materialized yet. This incubator can accelerate innovative ideas related to port hinterland and solve different bottlenecks like infrastructure, operational, and could potential create products and/or services of added-value, after receiving though proper business directions and targeted recommendations. The main tasks/ steps for the development of action no.2 are reported below.

Start-up Incubator Administrative Team	
Id	**Key actions**
2.1	Search for Start-ups
2.2	Mentoring Program
2.3	1st Acceleration Bootcamp
2.4	Attracting research teams
2.5	Evaluation of research teams
2.6	Announcement of the selected research teams & funding

Table 8.2 Key actions of the start-up incubator Administrative team

Key Action n. 3: Digital skill Academy

Another initiative to be developed concerns the creation of a Digital Skill Academy, which will develop employees' digital skills - an action that both associations underlined as important given the low digital literacy of port employees. Greek Exporters' Association recommends targeted training programs that will be focused on occupations related to port policy and port management as well as on supply chain services. In organizations inside and outside port hinterland, there are employees with different levels of digital skills or even employees with the absence of adequate digital skills. The transition of Thessaloniki port from a public entity to a private one forces the personnel to adapt to new working conditions and the different culture that the private investors established within the organization. The main tasks/steps for the development of action no.3 are reported below.

Digital Skill Academy Administrative Team	
Id	**Key actions**
3.1	Establishment of Digital Skill Academy
3.2	Search/Recruit for Associates
3.3	Evaluation of the existing skills of administrative employees
3.4	"Digital Skill Program" development
3.5	Define common culture and objectives
3.6	1st Digital Skill Program
3.7	Evaluation Process of the Program
3.8	Redesign the program
3.9	2nd Digital Skill Program

Table 8.3 Key actions of the Digital skill Academy Administrative Team

Key Action n. 4: Research center

The third axis of the Innovation Hub is a research center. As the interviewee for the Hellenic Logistic Association mentioned, the research center will support technological advancements covering solutions related to Internet of Things (IoT), Artificial Intelligence (AI) (e.g. software robotics), etc that can be directly implemented to port related solutions such as supply chain integration, transportation, tracking, storage and more. The objective of the research center would be to develop solutions that could solve not only innovation bottlenecks but also infrastructure or operational bottlenecks.

Key Action n. 5: information exchange system

he most important axis of the Innovation Hub will be the information exchange software solution; a Port Community System (PCS). However, as the representative of Hellenic Logistics Association underlines, the PCS is a sensitive issue especially at ports where the majority shareholders are private competitive investors. The same problem appeared in the case of the port of Piraeus where the investor is a shipping company (i.e. a competitor by default to the other port users), which also offers now logistics services through a relevant subsidiary that has been established. To overcome this problem, it is suggested a governmental institution to govern the software solution as insurance that all relevant actors share their data. Thus, it should be governed by a body that will be under the umbrella of a governmental institution,

and it should be ensured that all relevant actors share their data. In this specific sector, there is a lack of available data today, so, the creation of a common software system will be used also as a data warehouse; helpful for strategic decision and policy-making as well as digitally enabled solutions and transformation. For providing added-value, the aforementioned information exchange solution must be in line with different governmental institutions such as the Independent Authority of Public Revenue, the Ministry of Shipping & Insular Policy, the Ministry of Development & Investments, and the Ministry of Transport & Infrastructure. Such a quadruple approach will ensure that the data collected will never be used for creating unfair competition, but on the contrary be utilized, as is the case in other countries, for supporting business development decisions. The main tasks/steps for the development of action no.5 are reported below.

Information Exchange System Administrative Team	
Id	**Key actions**
5.1	Identify key stakeholders
5.2	Secure stakeholders' participation
5.3	Secure governmental institutions participation
5.4	Search and Partnership with organization for platform development
5.5	Identify key actions-operations
5.6	Platform Development
5.7	Platform Adoption
5.8	Platform seminars
5.9	Stakeholders Feedback
5.10	Platform improvements based on Feedback
5.11	New Platform version
5.12	Stakeholders feedback
5.13	Final Platform launch & maintenance
5.14	Maintenance

Table 8.4 Key actions of the Information Exchange System Administrative team

Aims

- Digitally transform the port system processes, customer experience and business model to remain competitive and increase revenues
- Implementing digital features to existing operations or using digital technologies to advance the infrastructure to provide additional value to port's customers and enhance its services, thus improving the competitiveness of Thessaloniki Port
- Create an ecosystem that will help organizations achieve a greater level of integration among businesses, which in turn can allow developing economies of scale

Timescale implementation

First and second year

	Initiative	1st Year				2nd Year			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Innovation Hub	Secure Sufficient Funding	■	■						
	Building Facilities		■	■	■				
	Material Infrastructure				■				
	Recruit employees			■	■				
	Partnerships with city's academic community				■				
StartUp Incubator	Search for Start-ups					■			
	Mentoring Program						■		
	1st Acceleration Bootcamp							■	
Digital Skill Academy	Establishment of Digital Skill Academy					■			
	Search/Recruit for Associates					■	■		
	Evaluation of the existing skills of administrative employees							■	
	"Digital Skill Program" development							■	
	Define common culture and objectives							■	
	1st Digital Skill Program								■
	Identify key stakeholders					■	■		
	Secure stakeholders' participation							■	■
	Secure governmental institutions participation					■	■	■	
	Secure sufficient funding						■	■	
	Search and Partnership with organization for platform development								■
Information Exchange System	Identify key stakeholders					■	■		
	Secure stakeholders' participation							■	■
	Secure governmental institutions participation					■	■	■	
	Search and Partnership with organization for platform development								■

Third and fourth year

	Initiative	3rd Year				4th Year			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Research Center	Attracting research teams	■							
	Evaluation of research teams	■							
	Announcement of the selected research teams & funding		■						
Digital Skill Academy	1st Digital Skill Program	■							
	Evaluation Process of the Program		■						
	Redesign the program		■						
	2nd Digital Skill Program			■	■				
Information Exchange System	Search and Partnership with organization for platform development	■							
	Identify key actions-operations	■	■						
	Platform Development		■	■	■				
	Platform Adoption					■			
	Platform seminars					■			
	Stakeholders Feedback						■		
	Platform improvements based on Feedback						■		
	New Platform version							■	
	Stakeholders feedback							■	
	Final Platform launch & maintenance								■

Funding sources

- To overcome the above-mentioned bottlenecks organizations, have to secure sufficient funding resources through local and regional public authorities, academic/scientific community. Due to the multiple aspects that are included in the Innovation Hub, the organization is capable to secure funding related to entrepreneurship or digital entrepreneurship, digital skill development, digital transformation etc. The participation of public authorities can secure sufficient funding from programs that are only for public authorities like ESPA or EU research projects similar to “Smart Cities”. On the other hand, the academic community has access to funding programs both from the EU (like Horizon2020) and other institutions.
- The H2020 supports SMEs by funding research and innovation fields, enhances EU international research, and Third Country participation. Furthermore, the H2020 attaches high importance to integrate social sciences and humanities encourages to develop a gender dimension in projects. Based on this description, the H2020 fund could be used to fund the software development action as it could be a partnership between SMEs, research institutions, and other participants. Furthermore, to promote ICT activities an interesting source of funding is the European Structural and Investment Funds (ESIF). The ESI funds are used to boost jobs, growth, and investment across Europe while focusing on the least developed areas and sectors with growth potential. Some of the promoted initiatives include Research & Innovation and Digital Technologies.
- Private funding and Venture Capital that will allow the development of the start-up ecosystem supported by either large existing companies in the region or VCs that are interested in development of innovative solution related to port operations can also be a significant part of the funding equation.

Impact on Bottlenecks

The Local Context Analysis for Thessaloniki port identified as the main innovation bottlenecks the lack of innovation content in the services provided by local port-hinterland chain actors, the lack of connectivity and exchange of information regarding port operations with port-hinterland actors, and the low level of internal management tools and staff’s computer literacy diversified across organizations.

The key actions that participants in the Local Working Group identified offer a solution to all above-mentioned bottlenecks. The establishment of an Innovation Hub could be a solution for port’s need to inject innovation to its offer services and to digitally transform port’s supply chain. On the other hand, the digital skills training program will improve the low level of employee’s digital literacy. Finally the Information Exchange system could be a solution for the second bottleneck (lack of connectivity) and the first part of the third bottleneck the low level of management tool. However, it is essential decisions about these issues should involve policymakers and different ecosystem stakeholders as they are problems confronted not only from port authorities and associates but also from collaborative businesses.

For these reasons, the described actions will positively impact on the competitiveness of the port-hinterland system and the environmental performance of the local logistics chain.

Combined transport solution for the enhancement of port's rail and road connection at domestic and regional level

Overview

From the discussion with the stakeholders involved in the Local Working Group activities, the importance of infrastructure as a condition for ports' future growth and competitiveness was commonly acknowledge. Also, it was underlined that a modern port should be connected with industrial areas. In the case of Thessaloniki, the port connection with the surrounding industrial areas is considered problematic due to lack of infrastructure. Until today, the only way to transport cargo from port to other locations is via road transport/trucks which is considered an environmental unsustainable solution due to increased gas emissions.

Solving infrastructure bottlenecks will help the port of Thessaloniki to play a leading role in the Balkan region and South-East Europe in general and should be on top of priority. Thus, the key action that come up after the interviews with the Local working Group is a combined transport solution including improvements to road and rail infrastructure in hinterland and surrounding area in domestic and Balkan level. Finding a solution to this bottleneck will cause externalities and solve other bottlenecks related to the limited availability of the port land. Based on the information gathered during the interview we could say that the infrastructure bottleneck is the cause of problems related to ports connectivity. In order for the key action to be accomplished, 3 additional sub-measures should be brought forward. These measures could enhance port's rail connection, and modernize the infrastructure which will be useful to set-up industrial areas in the vicinity of the port and the creation of a dry port network.

The issue

The Local Context Analysis indicated 4 categories of bottlenecks related to infrastructure cluster. The categories are related to port corridors (network level), road and rail infrastructure (network level), road and rail infrastructure (port level), port infrastructure, and policy. All interviewed stakeholders unanimously recognized the importance of infrastructure bottlenecks in general, and they underlined the poor conditions of the existing road and rail infrastructure, including those of railway connection between the Thessaloniki Port and Balkan region.

Currently, almost all freight volumes are being accommodated by trucks; a costly and environmental unsustainable solution. Furthermore, this solution does not fall within a sustainable development strategy nor high-quality service. Efficient connections of the port with the rail but also road network are of high importance for the port's growth and development strategy.

Stakeholders involved

- Region/Prefecture of Central Macedonia
- Egnatia Odos S.A. (Authority - Road infrastructure provider)
- Railway operators of the Balkan region
- Balkan governments

Key actions

Key Action n. 0: *Set up of a dedicated Administrative team*

This action concerns the set up of an administrative team that will coordinate each measure and connect the different parties. As a coordinator, the administrative team would have to secure sufficient funding, identify and connect the key domestic and Balkan stakeholders. The connection of the key stakeholders would have as a result the creation of partnerships between public and private parties. However, the most important task of the administrative team will be to run a study examining the condition, the improvements and the required standards of the existing rail and road infrastructure. This study would be an input for the other measures and will accelerate each process. Another great importance initiative, which will be held by the administrative team, will be the government level agreement in board control and "green lane". These initiatives are connected with the road and rail connection as they eliminate the waiting time during cargo transport. Key actions are summarised in the table below.

Administrative Team	
Id	**Key actions**
0.1	Secure sufficient funding
0.2	Identify domestic key stakeholders
0.3	Identify key stakeholders in Balkan region
0.4	Study to identify the condition, the improvements and the required standards
0.5	Partnerships with private-public entities
0.6	Set the rail and road standards
0.7	Agreement in government level about board control and "green lane"

Table 8.5 - Key actions of the Administrative Team

Key Action n. 1: Enhancement of port's rail connection in domestic level

The first measure pertains to the enhancement of port's rail connection in domestic level, and is a major priority and an important prerequisite for supporting the port's growth, considering also planned investments at the port area (e.g. expansion of Pier 6, new terminal equipment, etc.). As the Hellenic Logistic Association suggested, the railway line connecting the port with the network should be modernized so that the shipment and receipt of goods can be facilitated. To be able to efficiently handle the freight volumes, the line should be a double one, thus it is of utmost importance to complete the bridge, so that the port is provided with a dedicated rail access (i.e. not interfering with city traffic) which will further strengthen its competitiveness thus will contribute towards achieving lower transportation costs. Except of the bridge construction, relevant works should be undertaken also in the port area so that loading / unloading processes on rail wagons are facilitated and enhanced. The representative of the Thessaloniki Chamber of Commerce and Industry mentioned that this would be a sustainable environmental solution. Key actions for this task are summarised in the table below.

Rail connection (domestic level)	
Id	**Key actions**
1.1	Conclude the bridge project
1.2	Study specifically for rail connection in domestic, Balkan, and European level.
1.3	Adopt the suggested standards

Table 8.6 - Key actions for the rail connection

Key Action n. 2: Improvements of road connection in domestic level

The second measure concerns the improvements of road connection in domestic level. The poor condition and the poor connection of port with industrial areas represent a thorny issue and an obstacle to port's further development. Several port service providers are now concentrated in the area of Kalochori which however presents structural and infrastructural problems given the absence of relevant urban plans. Recent studies examining the development of an industrial park there should be soon materialized and an analytical assessment should be conducted on infrastructure improvements that need to be undertaken. Once these are documented and prioritized, available funding mechanisms should be investigated and exploited (e.g., from national programmes, funds from the Region of Central Macedonia) so that the implementation process can be rapidly initiated. The benefits to be derived from these works should be successfully communicated to the stakeholders located there so that any inconveniencies caused are easily overcome and delays in the implementation process are minimized. Furthermore, targeted incentives should be provided so that invest interest is enlarged and companies providing complementary services to existing ones are attracting addressing the current fragmentation that the port-hinterland market presents.

Key Action n. 3: Enhancement of Road and rail Connectivity at the regional level

This action concerns the road and rail connection with the international market and especially with the Balkan region, as it is considered an important parameter which could solve other infrastructure bottlenecks of Thessaloniki Port. There are major structural gaps on the railway network in the Balkan countries. Repair works need to be undertaken at several parts of the network so that greater speeds can be achieved. The greater capacity that rail transport offers should be better exploited, and there is indeed a great interest from actors located in countries surrounding the Balkan region (e.g., Poland, Ukraine, Austria) to support such developments. Once the rail and road connection of the port to the hinterland is improved, the bottleneck related to the limited port land would be eliminated with the creation of a network of dry ports located in carefully selected positions within the Balkans that meet all required preconditions (i.e., efficient connections with the road and rail transport network, availability of large storage facilities). Those dry ports can serve as extended gates transferring some key functions of the port there so that the negative impact on the surrounding the port roadway network is reduced. In that way, the port of Thessaloniki will be able to further extend its reach into more distant hinterland markets and attract additional freight flows better supporting its advancement into a hub for South-East Europe.

Rail and road connection (regional level)	
Id	**Key actions**
3.1	Study examining all necessary preconditions will allow to identify the most appropriate locations of these dry ports and then examine the right governance model to be followed.
3.2	Private-public partnerships
3.3	Construction

Table 8.7 - Key actions for the enhancement of road and rail connection at regional level

Aims

Advancing the rail and road connection of Thessaloniki Port will set the port as a transport hub for South-East Europe. As mentioned above, due to externalities the new road and rail connection will solve other infrastructure bottlenecks such as the limited availability of the port land area considering the port's function as storage depot as well as the existing lack of rail capacity. In addition, the port should benefit from the introduction of new operators in the Greek market and should investigate what services can be offered allowing the development of efficient multi-modal solutions. This will decrease the transportation costs and improve ports competitiveness.

Timescale implementation

The administrative team which will coordinate the parallel initiatives/projects should set the foundation for the future projects in the first two years.

	Initiative	1st Year				2nd Year			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Administrative Team	Secure Sufficient Funding	■	■	■	■	■	■		
	Identify domestic key stakeholders			■	■				
	Identify key stakeholders in Balkan region			■	■				
	Study to identify the condition, the improvements and the required standards				■	■	■	■	
	Set the rail and road standards								■
	Partnerships with private-public entities							■	■
	Agreement in government level about board control and "green lane"							■	■

Funding sources

As the representative of the Region of Central Macedonia mentioned, the European Union constitutes the key source of funding this type of activities as there is a variety of funding programs that target the improvement or modernization of existing infrastructure, the development of infrastructure projects that promote the financial growth of cities.The Region of Central Macedonia has already funded with nearly € 7 million a relevant project looking at how the port can be better connected with the railway network, but of course continuing the construction of the relevant infrastructure is necessary. Except of the funding programs that target the development and update of infrastructure, there are funding programs aiming to promote environmental sustainability.

The interviewee from Thessaloniki Chamber of Commerce and Industry (TCCI) underlined that focusing on the improvement of railway connection of port hinterland with the surrounding areas will have an environmental impact and reduce gas emissions, due to the currently dominant role of road/truck transport.

This calls for a new approach pursuing new funding avenue or instruments as both in European and domestic level there is a variety of funding programs that promote environmental-friendly solutions and investments.

In the case of Thessaloniki, as the port represents an integral part of the city, the environmental factor is considered extremely important and necessary for future growth. Another important funding source is the national funds which try to increase country's competitiveness by improving infrastructure. Furthermore, the Ministry of Maritime Affairs and Insular Policy promotes programs that improve ports' infrastructure.

Impact on Bottlenecks

The combined transport solution will decrease transportation costs which will affect the import and export costs since new players will participate in the port-hinterland market. Solving infrastructure bottleneck should improve ports competitiveness and be the starting point to solve other significant bottlenecks like operational, innovation, market etc.

Another effect that the combined transport solution would have is to further extend its reach into more distant hinterland markets and attract additional freight flows better supporting its advancement into a hub for South-East Europe.

Deliverable D.T2.2.6 – ISTEN Local action plan for Thessaloniki area describes in detail the planned measures, their design and the stakeholders involved. It also provides more detailed description of the characteristics of each action.

9. Port of Durres

The Port of Durres is located in the middle of the Adriatic Sea, to the South of the Durres City, about 35 km away from the capital Tirana. It is the center of the Albanian railway network and also the starting point of the Pan-European Corridor 8, and an important intersection of roads Durres-Kukes-Morine, which connects Albania with Kosovo.

The port covers an area of about 650,000 square meters, and water area of 67 000 square meters. Entrance to the port is realized through an access channel with a depth of 8.5 m, 1.8 km in length and width of 104 m.

Being the largest port of Albania, it processes a volume of about 5.5 Million tonnes per year, handling roughly 78% of the country's seaborne trade in tonnage terms and 75% of all the export and import trade of the country. Maritime trade exchange through Durres Port volume is increased especially with Italy, Russia, and Turkey. In 2017, more than 2.1 million tonness of goods were traded from Durres port to more than 63 different seaports in the Mediterranean region, in the United States, China, and Brazil. Italy and Russia account respectively for 21 % of the volume of goods traded via Durres Port. The list also includes Turkey, Malta, Greece, China, Egypt, Spain, Germany, the US, and Turkmenistan.The port has an annual container volume of 66,000 TEU (twenty foot equivalent unit).

Country: **Albania** | Region: **County of Durrës**

Main cargo specialisation:
General cargo, containers

Characteristics of the Durres container terminal

Total length of quays [m]	Terminal quay depth [m]	Maximum vessel draft allowed* [m]	Total terminal area [m²]	Container stacking capacity [TEUs]
265	8.60-10.00	8.00[1]	60,062	3,000

[1] Durres Container terminal SH.A. official website (2019). Available at https://www.dct.al/ (accessed: 27 September 2019)

Figure 34 - Port of Durres
Source: https://container-mag.com/

Key bottlenecks identified in the local context analysis

Market

- Quality of the services offered by the railway transport is such that cannot meet the requirements of the present transport market
- Limited intermodal services within port system.

Infrastructural

- Road infrastructures mainly used by operators for the transport of goods.
- Inadequate port infrastructure such as the length of quay, depth, lack of appropriate surface to operate, lack of railway connections and road networks around the port.
- Inadequate soft infrastructure especially toward Rail Operational System, Customs clearance system, and interfaces between systems.

Operational

- No coordination between operational actors within port, and among public and private actors.
- Inability to quantify the financial & economic benefits of port hinterland actors' coordination / cooperation.

Institutional

- Lack of coordination and collaboration among stakeholders;
- Fragmented planning at local/regional/ national level

Innnovation

- Low innovation content in the services provided
- Not harmonised (or missing) digital information exchange between port-hinterland actors and between operational & public (e.g. customs) actors.

Infrastuctural intervention/improvements on canal depth and port/rail industry

Overview

The strategic position of Durres in connection with the European Transport Network (Corridor VIII) facilitates the transit of goods and passengers from the Adriati Sea to Europe. Durres port is also of interest as an alternative to neighboring countries ones, such as: Kosovo and Macedonia, and as, a principal gateway to the Balkans and southeastern Europe. However, there are several infrastructural bottlenecks that limit smooth, reliable and efficient operation between the port and its hinterland.

The issue

Durres Port operators, especially the ones operating in shipping, emphasized the inadequate port infrastructure such as the length of quay, depth, lack of appropriate surface to operate, and lack of railway connections and road networks around the port.

An inadequate soft infrastructure was also highlighted especially concerning Rail Operational System, in particular: lack of rail links with all port terminals, overall poor conditions of Albanian railway network, weak connections with network beyond Albanian borders. All these negatively affects the performance and productivity of the terminal and therefore the question of the land use v/s land area availed becomes very important.

Stakeholders involved

- Public National Authorities (Ministry of Energy and Infrastructure; Durres Port Authority, Albanian Institute of Transport, Durres Port Harbor, Albanian Railway S.A, Environmental Directory APD Durres, Albanian Hydrographic Service, General Maritime Directory)
- Regional Authorities (Durres Regional Council, Prefecture of Durres, Municipality of Durres, Regional Directory of Environment, Railway Inspection Directorial)
- Concessionaries in Durres Port Authority (CMA/GCM, EMS Albanian Port Operator, Albanian Ferry Terminal)
- Private Agencies operating in APD (REIMAR, PELIKANI, DIAMANT, REDAN, VITALI, etc.)
- University (Aleksander Moisiu University of Durres)

Key actions

Key Action n. 1: Infrastuctural intervention/improvements on canal depth

This action consists in the implementation of the Durres Hub Project, aimed at resolving the bottleneck consisting in limited maritime infrastructure, and guaranteeing port competitiveness.

The 1st stage of the Durres Port Hub project, already under implementation, includes dredging the entrance canal and basin in the front port area, reaching a maximum draft of 10.5 m. This improvement will allow the access of full loaded vessels with 30 thousand tons - DWT (Deadweight tonnage) per cargo or 1,700 TEU (Twenty-foot Equivalent Unit) per container.

Targets of the project are:

- new location of Quays 1&2 to bring the waterfront line at the same line with that of the redesigned Quay 4 (eliminating the turn at Quay 3);
- provision of a bearing capacity 4 tons/m^2 for the new berths;
- achievement of optimum conditions for the 3 phases power supply to the operating ships,
- protection of the waterfront side of the berths using fenders with energy absorption and reaction force for the ships approach up to 30,000dwt;
- safeguarding the cranes on the quay during different storms, safeguarding the ships and other operational equipment against fire.

During the design process of this project, the storehouse no. 13 has been demolished, the bridge crane has been dismantled and the backyard of Quay 1 has been adjusted by third contractor of DPA.

Future cranes will handle multipurpose operations and will have maximum capacity of 45 t and boom length of approx. 40 m. According to Master Plan of 2008, mobiles cranes are foreseen to be used on new Quays 1&2, the new quays will be provided with normal working conditions for handling general cargo such as, among others, operation of 45 tons electric-cranes on rails.

The new quay will be aprox. 500 ml of length and with an extension 30 ml of width and in total of 42 ml of width.

Figure 35 - An overview of the cargo port of Durres
Source: https://commons.wikimedia.org/

***Key Action n. 2:** Improved infrastructure in the port/rail industry*

This action refers to the modernization of the existing Durres-Tirana railway line and to the construction of the new railway line to Rinas Airport (TIA). The modernization of the railway line aims to the upgrade of geometric and operational characteristics of the line according to EU standards set by relevant EU Directives, to increase the effectiveness and safety of railway transport of goods and passengers between Tirana, Durres and Rinas airport and at the same time to contribute significantly to the economic development of the Tirana – Durres regions and of the whole country.

The railway line was examined initially through a feasibility study in December 2009 funded through WBIF and was proposed to be rehabilitated in the context of a 10 year investment program and under a medium development scenario. The proposals included the complete renewal of the track system, repairs to many structures / station buildings / platforms and accesses, as well as the installation of a new EU compatible signaling system.

Subsequently, the railway line was studied through a detailed technical and feasibility study, which included the economic/financial evaluation of the whole Albanian railway network, rendering this section as a first priority from the socio-economic point of view. The study also covered the detailed technical study of the section and its connection to Rinas airport, where updated specifications for the rehabilitation / construction of the lines, as well as modern signalling and telecommunication systems were used.

The main objectives in terms of outputs are to rehabilitate the existing railway line from the future location of the Tirana Public Transport Terminal (PTT) to Durres port for a length of 34.7km and also to construct a new railway line connecting the main line at the area of Domje with Rinas airport for a total length of 7.4km (4,25 km direct and 3.15 km at the junction area).

In terms of outcomes the project is expected to:

- Serve almost 1.4 million passengers per year
- Over 220,000 tons of commodities by the first year of its operation
- In 2030, these figures are expected to develop to over 1.9 million passengers and 320,000 tons respectively.

Aims

- The integration between ports partners in the ISTEN project, Italian ports and other Mediterranean Port in order to promote intermodal hinterland of Durres Port.
- A further increase of the traffic volumes at the port as part of its hinterland logistics chain with reference to total traffic and intermodal traffic, including an increase in the modal share of rail traffic accessing the ports' terminals.

Timescale implementation

	Short term (by 2020)	Mid-term (by 2022)	Long term (by 2025)
Key Action 1	(Phase 1)	(Phase 2)	(Phase 3)
Key Action 2	(Phase 1)	(Phase 2)	(Phase 3)

Funding sources

- Key action 1

  The funding sources for Key Action 1 are public (State/World Bank).

  The funding sources for this Action are foreseen in the SECTORIAL STRATEGY OF TRANSPORT & ACTION PLAN 2016 – 2020

- Key action 2

  The funding sources for Key Action 2 are public (State/World Bank).

  The founding sources for this Action are foreseen in the SECTORIAL STRATEGY OF TRANSPORT & ACTION PLAN 2016 – 2020 and in the other financing programs of Albanian Railway.

Impact on Bottlenecks

Improvement of the navigational capacities of the port such as deepening the access channel, basin and the quaysides will make it possible for the port to accommodate bigger ships and this will result in bigger incomes for the port.

Enhanced maritime regulatory system in line with IMO and EU standards and regulations

Overview

Concerning Priority Action Maritime 1 and 2, the Ministry of Energy and Infrastructure (MIE) is working on the adoption of IMO and EU rules and regulation. Examples of regulated activities in the maritime sector include, but are not limited to, flag and port state control, maritime safety and security, environmental protection, maritime training and labor, and port health and safety.

Several regulatory standards have been developed to ensure the safety, security, and environmental sustainability of maritime and port operations.

Many of these regulations are set by international organizations such as the IMO, the ILO and the EU.

The issue

There is a lack of specific regulations referring to intermodal transport addressing development of terminals and services in Albania. Moreover, intermodal transport is a consequence of the needs regarding market demand, fastening traffic flows and goods manipulating process, etc

Stakeholders involved

- Public National Authority
- Regional National Authority
- Concessionaries in Durres Port Authority
- Private Agencies operating in APD
- University

Key actions

Key Action n. 1: *Enhanced maritime regulatory system in line with IMO and EU standards and regulations*

The following list includes some of the laws on the basis of which intermodal transport is organised:

Maritime Code of Republic of Albania nr.9251 date 08.07.2004;

- Law on the Port Authority of Port of Durres nr. 9130 date 08.09.2003;
- Law on Security Forces on ships and ports nr. 9281 date 23.09.2004;
- Decision of the Government on creation of the security forces in port of Vlore, Shengjini and Saranda nr. 171 date 28.03.2007;
- Decision on Announcement of the Raguza nr.1 and 2 as a port refuge nr. 45 date 24.01.2007;
- Law on some changes on the Port Taxes of the Republic of Albania 9769 date 09.07-2007;
- Law “On Turistic Ports” nr. 9710 date 10.04.2007;
- Order of the Ministry of Public Works, Transport and Telecommunication on the licensing of maritime Subjects, nr.10, date 23.06.2008;
- Law on “Establish the maritime Administration” nr. 10.109, date 02.04.2009;
- Order of the Prime Minister nr. 131, date 14.06.2010 “For Approval of the Structure and the Organics of General Maritime Directorate”.

In most of the cases intermodal transport is considered a local issue, which implies that local authorities are responsible for the majority of the regulations in this area. To minimize the negative impacts of freight transport, there has been some positive steps to enhance maritime regulatory system in line with EU standards and regulations, ratifying and endorsing IMO regulations and EC rules on maritime safety, security, environmental protection, and coastal management.

In 2017 there were some initial discussions on necessary steps to ratify recent amendments to MARPOL and SOLAS, including GHG amendments (MARPOL) and Container Weight Verification Requirement (SOLAS).

The ratification procedure of Annex. VI of MARPOL Convention has started and it has been ratified in February 2020.

Nowadays, there are ratified SOLAS 74’&78, but there are not yet ratified SOLAS ’88 and Agreement 96’under discussion to be done by MIE and TA.

The problem of personnel is expressed in the absence of qualified personnel for intermodal transport based on the EU standards and regulation.

It is necessary to establish a curriculum for acquiring vocation and professions in the field of multimodal and intermodal transport in line with new laws and ratified regulations of EU.

It is necessary to define vocations and professions in the sector of intermodal transport and prescribe mutual recognition of vocations, professions, diplomas etc.

Aims

- Creating and reorganising the Maritime Administrate Institutions in line with IMO and EU standards and regulations
- Increasing the capacities of the personnel who works in the Maritime Institutions in compliance with the European standards

Timescale implementation

	Short term (by 2020)	Mid-term (by 2022)	Long term (by 2025)
Key Action 1		(Phase 1)	(Phase 2)

Funding sources

- The funding sources for this action are public (State/EU funds).
- Also can be used funds from Grants, Projects and Programs that support the raise of capacities, and other specific alternatives linked with maritime sector and transport

Impact on Bottlenecks

The reorganisation of the Maritime Administrate Institutions, in line with IMO and EU standards and regulations and the increased capacities of the personnel that works in the Maritime Institutions in compliance with the European standards will enhance the integration of the port of Durres in the EU network and traffic.

Deliverable D.T2.2.7 – ISTEN Local action plan for Durres area describes in detail the planned measures, their design and the stakeholders involved. It also provides more detailed description of the characteristics of each action.

10. Port of Bar

Country: **Montenegro** | Region: **Bar Municipality**

Main cargo specialisation:
Dry bulk, containers and general cargo

Characteristics of the Bar container terminal

Total length of quays [m]	Terminal quay depth [m]	Maximum vessel draft allowed* [m]	Total terminal area [m²]	Container stacking capacity [TEUs]
330	n.a.	12.00[1]	80,062	2,500

[1] Port of Adria JSC official website (2019). Available at https://www.portofadria.me/ (accessed: 27 September 2019)

The Port of Bar is the main cargo port of Montenegro. It covers an area of 200 ha (including port aquatorium with cca. 90 ha and its depth up to 14m). The Bar port system is managed according to landlord port model introduced by law on ports which was put into force in the year 2011. Currently, at the area of the port of Bar two principal operators are functioning, "Port of Bar" H.Co. and "Port of Adria" JSC.

The Port of Bar is one of the essential elements of the transport and economic system of Montenegro, through which almost complete trade of goods is carried out overseas. Integrated with the Belgrade - Bar railway and road traffic network, the Port represents a very important link in the chain of intermodal transport. The Port is a junction of the trunk road M-24 Herceg-Novi – Bar - Ulcinj and the road Bar – Podgorica – Belgrade.

The port is specialised in the transport of dry bulk, with a total throughput in 2018 of 1.382.563,42 tonnes. The Dry bulk terminal is located on the Volujica quay and equipped with three gantry cranes, a mobile Harbour Crane and a grain loading tower.

Figure 36 - Port of Bar
Source: https://www.balkaninsider.com/

Key bottlenecks identified in the local context analysis

Market

- Low level of the economic activities in port hinterland
- Problems caused by political issues.

Infrastructural

- Speed restrictions on the Bar-Belgrade railway (for the Montenegro part (i.e. Bar - Vrbnica).
- Bar-Belgrade railway that doesn't meet modern rail transport requirements with regard to railway transport, speed, service level and reliability.
- Aggressive environment and low level of the maintenance conditions of the Volujica quay, which led to a progressive state of vulnerability, implying insufficient stability of piers and safety of berths on them.

Operational

- Available workforce (number of qualified port workers, qualification structure of port workers, ...);
- available port machinery (operational readiness, reliability, capacity, ...);
- operative planning.

Institutional

- Difficulties in involving the relevant institutions in the process of resolving recognized problems.

Innnovation

- Low level of innovative solutions in the port system.

Comprehensive plan for improving the port system conditions and rail and road network

Overview

The Dry bulk terminal of the Port of Bar is located in the southern part of the Port. It is equipped with:

- three gantry cranes with 12 t capacity;
- mobile Harbour Crane Liebherr LHM 550 with 144t capacity;
- grain loading tower (hourly capacity 300 t/h).

Operational quay of the terminal is 550 m with water depth of 14 m. It is specialized for acceptance and dispatch of all types of ores, concentrates, as well as other types of bulk cargo. The area of the open storage space on concrete base extends to 27 000 m2. This terminal also contains grain silo with capacity of 30 000 t which is designed for reception and dispatch of grain to and from silo.

The issue

Current infrastructures in the Port of Bar are for most part inadequate and outdated and in need of rehabilitation and reconstruction.

Stakeholders involved

- Ministry of Transport and Maritime Affairs
- Maritime Safety Department of Montenegro
- European Integration Office
- Municipality of Bar
- Interlog d.o.o
- Logicar d.o.o

Key actions

Key Action n. 1: *Reconstruction of the quay Volujica (554m in length) and construction of the extension of the quay Volujica (166m in length)*

The internal necessity of Port of Bar is to ensure capacity and quality infrastructure to support the transport infrastructure projects. The Volujica quay is the largest quay in the Port of Bar. Due to aggressive environment and low level of the maintenance, corrosion of the construction appeared.

Prior to infrastructure investment in quay reconstruction, the main design was prepared through NEWBRAIN (ADRION) project. Technical solutions for reconstruction (rehabilitation) are divided depending on the degree of damage, and in the design several types of rehabilitation measures are recognized depending on the level of damages. After the repair and reconstruction of the damages the extension of the quay is planned in order to improve overall performance and enforce higher level of productivity. The action includes also: carrying out work on extension of the operational quay Volujica for 166m (width 30m); design and installation of the system for cathode protection for this part of the construction of operational quay; deepening the aquatorium for the extended area; design and construction of an open warehouse in the hinterland of the operational quay dimensions 166m x 50m; design and construction of necessary infrastructure (electric power, water and sewerage, railway tracks) for a new part of the operational quay;

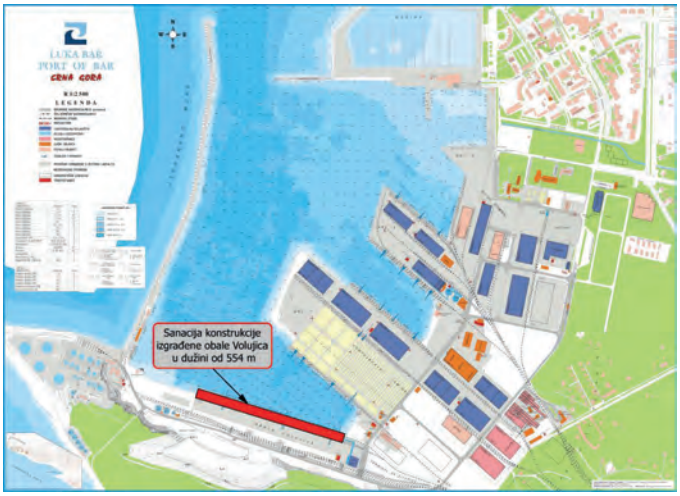

Figure 37 - Position of the Volujica quay in the Port of Bar

Key Action n. 2: *Extension of the quay at Passenger terminal in Port of Bar*

This project includes extension of Passenger terminal, i.e. of the operative quay 432 m in length and 30 m in width, as an extension of the existing berth 54, on the inner side of the secondary breakwater. This action is to improve accessibility of the port with focus on medium/large Ro-Pax ships (with deeper draft) and cruise ships in Bar. The Main Design for this action was made through EA-SEA WAY project (IPA ADRIATIC Programme).

The extension of the coast of the passenger terminal is designed for a current sea depth of 7 to 12,4 m, which could accommodate ships up to 300 m in length and 8,3 m freeboard.

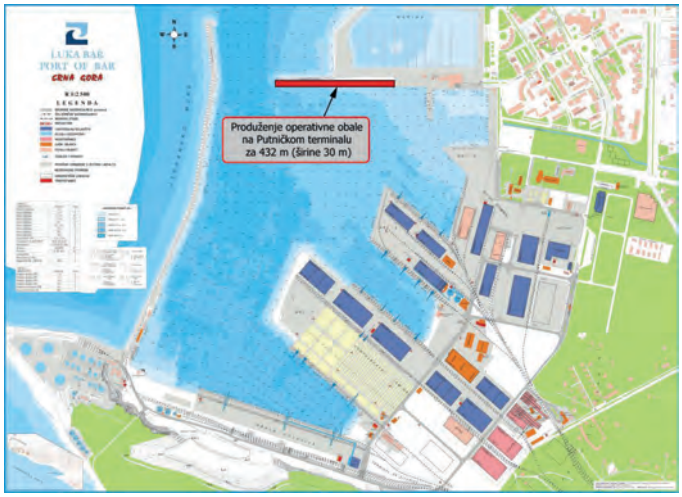

Figure 38 - Extension of the quay at Passenger terminal in Port of Bar

Key Action n. 3: *Rehabilitation of road infrastructure*

The road infrastructure in port area is used for intensive traffic flows and the maintenance level is not at a high level. The road infrastructure covers the entire port area and is used for all port operations.

The damages on the road infrastructure vary from low to high and there is a need for rehabilitation of the entire construction especially in the busiest part of the port (shown in the image below).

Figure 39 - Road infrastructures serving the port

Key Action n. 4: *Reconstruction of energy network (10 / 0.4 kV substations in the Port of Bar)*

Expected effects of realization of the investment are increase of degree of reliability of substations, minimization of interruption of process of transhipment of means of coastal port equipment, minimization of interruption of processes.

Figure 40 - Position of the substations

Key Action n. 5: *Construction of an open storage 166 x 50 m, in the hinterland of planned extension*

Extending the operational quay for 166m will create space for the storage area. Investments in substructures and storage areas are planned due to expected increase of demand and desire of the company to attract more business and new cargo flows, while increasing the technological possibilities.

Key Action n. 6: *Dredging the depth to 14m at the extended part of the terminal*

The action will fulfill the precondition that ships with the same characteristics (size) as on the already existing part of the coast (554 m long) can be moored on the newly built part of the operational coast.

Key Action n. 7: *Construction of closed warehouse*

The need for increase in general cargo storage capacity and reduction of existing restrictions associated with currently insufficient general cargo storage capacity are the reason for this investment.

Figure 41 - Position of the new closed warehouse

Key Action n. 8: *Construction of acetic acid tank, 5,000 t capacity*

Increase of the capacity for transshipment of acetic acid in Port of Bar while increasing the average quantities of cargo currently per ship amounting from 2,500 tons, to 5,000 tons, in the variant of transshipment between the tank and ship.

Key Action n. 9: *Construction of system for handling and storage of LNG*

Construction of the entire system (reservoirs, pipelines, devices for the transfer LNG between ship - tank and vice versa, as well as tank - truck / tank wagon) in accordance with the provisions of the spatial planning documentation for the Port area.

Aims

- Optimal use of infrastructure
- Financial sustainability of infrastructural investment
- Elimination of risks to people and tangible assets that exist due to damages
- Enabling adequate utilization of existing infrastructure and achieving higher productivity

Timescale implementation

Action	Year										
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Action 1	■	■	■	■							
Action 2	■	■	■	■	■	■	■	■	■	■	■
Action 3	■	■									
Action 4	■	■									
Action 5	■	■	■	■	■	■	■	■	■	■	■
Action 6	■	■	■	■	■	■	■	■	■	■	■
Action 7	■	■									
Action 8	■	■	■								
Action 9	■	■	■	■							

Funding sources

The estimated costs of each action are reported in the table below

Action no.	Estimated cost
1	10.000.000 €
2	12.500.000 €
3	150.000 €
4	216.000 €
5	700.000 €
6	1.000.000 €
7	2.500.000 €
8	2.500.000 €
9	15.000.000 €

The main source of funding would be:

- EU grants/subsidies
- Own funds/Loans
- Private fundings
- National subsidies

Impact on Bottlenecks

See the corresponding section of the action “Enhanced information flow through Bar PCS system” below.

Enhanced information flow through Bar PCS system

Overview

The PCS in the Port of Bar was developed and later upgraded through EU-funded projects. Development of the system was enabled by ADB Multiplatform project (IPA SEE Programme) in 2014, and it was later upgraded through EA-SEA WAY, CAPTAIN (IPA Adriatic Programme) and, the most recent, ADRIPASS project (ADRION Programme). PCS platform has undoubtedly improved port operations and increased competitiveness of the Port of Bar. Motivations to implement and develop a PCS was to improve the accessibility, to meet requirements of the logistic community, to improve port operations and increase competitiveness, interchange data between all subjects in the logistics chain, to avoid paper, to formalize processes, preparation for implementation of the EU legislation (EU Directive 65/2010, etc.). During this process, electronic exchange of all relevant information related to ship's arrival and departure were deployed, IMO FAL forms were introduced (EA SEA WAY), efficient up-to-date exchange of information delivered by machine generated emails about different actions in the PCS, where main stakeholders were actively engaged (CAPTAIN), and with the most recent pilot action control centre was upgraded as well as customs and truck module, possibilities to view, create and certificate were of some documents in PCS were established by mobile phone or tablet and user interface was improved (ADRIPASS).

The issue

Remaining actions that need to be implemented include:

- Upgrade of functionalities related to the dangerous goods;
- Functionalities related to railway;
- Uploading customs documents to the system
- Automatic check-up of customs data in work orders;
- Blocking containers by the Customs in PCS,
- Informing external agents about cargo status and electronic signature / approval of port's documents.

Stakeholders involved

- Ministry of Transport and Maritime Affairs
- Maritime Safety Department of Montenegro
- European Integration Office
- Montenegrin Customs Administration
- Municipality of Bar
- Interlog d.o.o
- Logicar d.o.o

Key actions

Key Action n. 1: *Development of PCS module related to the dangerous goods handling*

The process of handling dangerous goods is performed in line with defined technology of work, which was created based on Material Safety Data Sheet (referring to specific dangerous goods) and other relevant written recommendation. It is defined by strict rules and procedures. Work orders on which dangerous cargo is mentioned do not differ from the rest, and although they pass through a process of strict rules, such processes cannot be seen through information system (application).

The key action consists in development of a step, i.e. examine whether criteria for handling dangerous cargo are met. When documentation is prepared, a person in charge shall give a green light for such handling, and only then a work order could be verified. Supporting documentation must be scanned and attached to the work order.

Inquiry for providing new service could be created electronically and connected to workflow, so that until a document Technology of handling dangerous goods is created, work order shall wait for approval. The competent person checks the documentation, scans them and attaches to work order.

A forwarding agent should state that the cargo is dangerous, and such information should be included in the contract between the port and forwarding agent. Work order must contain a special box or flag which clearly shows it, and the forwarding agent is obliged to tick it. In that way, such work orders in workflow differ from the rest work orders, and they are transferred to alternative flow.

It is also possible to automatize the overall processes by introduction of special reader for dangerous goods.

A list of possible PCS functionalities related to handling dangerous goods would include, among the others, advanced pre - notification

for all dangerous goods arriving by sea or land, administrative procedures regarding IMPORT, EXPORT and TRANSHIPMENT of Dangerous goods, safety requirements digital guidelines and library, Dangerous goods LODGEMENTS management, etc.

Key Action n. 2: Uploading customs documents to the system

With regard to the action of uploading customs documents to the system, currently, a forwarding agent must ensure that all customs documents are valid before a driver arrives to a port, and when he arrives to a gate, he must possess a work order and necessary customs documents which would allow him to enter. Therefore, waiting for customs documents to be prepared is considered as a bottleneck in the whole process. The situation becomes even more complicated when data are entered into the port's system not by the Customs, but by a forwarding agent after he gets necessary data from the Customs.

In this action what is proposed to be done is, in cases where customs documentation is received subsequently, to allow uploading and verifying work orders without complete customs documentation, and then allowing forwarding agents or Customs to enter data to the system afterwards, to a separate part of work order or as an attachment to work order.

In order to reduce the above-mentioned bottleneck, or even eliminate it, it is advised to connect port's and customs' systems, directly or through PCS. In addition, there are cases where bottlenecks could be reduced by customs' consent that work could be performed even before the Customs finishes its work.

The following example could be the solution:

Pre-clearing refers to cargo which arrives to the port by sea. A forwarding agent is allowed to send work orders along with ship's manifest to the Customs, thus allowing the performance of work, although a ship is still at sea and customs documents are not prepared. Customs service shall send a status for each ship through web service to a port's system.

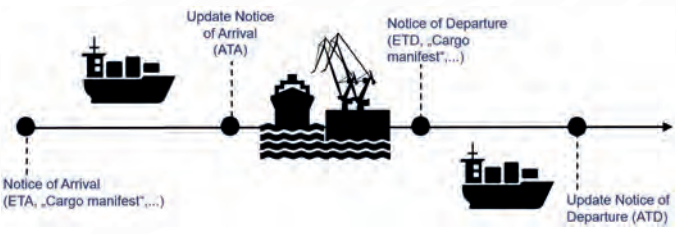

Figure 42 - Main steps in the arrival/departure of cargo

Automatic check-up of customs data in work orders

For the time being, customs data in work orders are not equal to the real data in customs system. Customs documents are attached to work order and the existing system does not control the type of document. Data entered by the Customs agent may be wrong (due to a mistake made by entering data) or not updated (in case of change). In case that forwarding agent enters such data, the chance of mistake is increased.

By using PCS system, customs system may be integrated so as to check the availability, type, validity and status of necessary customs documents. Some data must be available during validation of work order, other in later phases, but all must be included before finalization of work order. A key action proposes that for each work order, direction of cargo, type of transport and customs status it should be defined which customs documents a forwarding agent should mention in work order.

Blocking containers by the Customs in PCS

This functionality is currently not available in the current port system. As a part of action, it would be possible to implement alternative flow for containers' work orders, and the Customs could block a specific container due to customs check-up by making a request to PCS. Such container could not leave the port prior to unblocking made by the Customs. For blocked container, PCS would not allow issuing work order, and Lubaris would block all actions related to issuing documents for blocked container.

Key Action n. 3: Informing external agents about cargo status

In this key action, external agents could have access to an adapted version of a report, with possibility to search their data, and have access to strictly defined areas. In addition, certain external agents could receive PCS messages, e-mails or EDIFACT messages containing previously defined data. In such way, errors in these reports could be reduced, and services could become automated.

The following portal functionalities could be implemented:

- Community Portal with all relevant public information (general information, tariff, etc.)
- Reporting center
- Location and customs status of the cargo (container)
- Support for electronic invoices

- Ports tariff
- Contract management
- Concession management
- Vessels in port
- Premises rentals
- Document system for port community members
- Environmental reports & green port capabilities (emission monitoring, etc.)
- Permits issuing (guests, vehicles, etc.)
- Port view portal (graphical representation of port

Key Action n. 4: *Electronic signature / approval of port's documents*

Instead of printing and co-signing the documents, this action proposes implementation of electronic signature, while implementing valid standards in the state (PKI certificates, etc.). During status implementation of specific documents (workflow), it is possible to introduce a step which includes approval by a third party (forwarding agent, the Customs, agents, railway operator, ...) for documents which require co-signing, and the third party would obtain a specific document through oveflow, and after co-signing, they would return the document to a submitter.

Key Action n. 5: *Railway module*

This functionality is currently not available in the current port system. The Railway module functionalities would include, among the others, Train in arrival and departure, Schedule of rail lines, Rail operations traceability, Railway composition announcement in arrival, etc.

Aims

- Further upgrade of PCS
- Wider network of users
- Improvement of railway and dangerous goods modules
- Paperless communication among users
- Provision of functionalities of processes and documentation
- Integration and compliance with EU directives

Timescale implementation

All the actions foresee a flexible timescale, spanning from one up to five years. All the actions would expected to be completed by 2025.

Funding sources

Action no.	Estimated cost
1	65.000 €
2	80.000 €
3	30.000 €
4	25.000 €
5	50.000 €

The main source of funding would be:

- EU grants/subsidies
- National subsidies
- Own funds

Impact on Bottlenecks

Key actions described above aim to satisfy the economic, spatial-planning, and transport interests of the locals, tourists, local government, and the wider interested public, as well as to stimulate the intermodality of transport.

Better infrastructure would create the preconditions for better transport connectivity, which is crucial for development. Investments in the infrastructure must also be followed by investments in different means of informing, application support, and supporting technologies, such as PCS.

It has been decided that the Port of Bar, the Bar Municipality, and the Ministry of Transport and Maritime Affairs will make significant efforts to create conditions that support overall development, in line with development plans at national, regional, and local levels.

These key actions are also directly related to the improvement of intermodality and linking to the TEN-T corridors (indicative extension of the Main TENT-T network to region of Western Balkans). Extension of the two Trans-European corridors, Mediterranean corridor and corridor Middle East - Eastern Mediterranean directly include the Port of Bar as a part of Main network on the territory of Montenegro (indicative extension of the Main (CORE) TEN-T network to the region of Western Balkans).

Deliverable D.T2.2.8 – ISTEN Local action plan for Bar area describes in detail the planned measures, their design and the stakeholders involved. It also provides more detailed description of the characteristics of each action.

11. Serbia - Belgrade Area

Country: **Serbia** | Region: **Belgrade District**

Main cargo specialisation:
n.d.

As a landlocked country, Serbia doesn't have any port or direct access to the sea.

Serbia is landlocked country located at the crossroads between Central and Southern Europe. Serbia is found in the Balkan Peninsula and the Pannonian Plain and it borders with Hungary, Romania, Bulgaria, FYR Macedonia, Kosovo, Montenegro, Bosnia and Herzegovina and Croatia.

Serbia is in the middle of three main geo-political entities: Danube macro-region, Adriatic-Ionian macro-region and Western Balkan 6 initiative. Two main transport corridors, i.e. European Corridors X and VII (River of Danube) (now replaced as Orient/East-Med Corridor and Mediterranean corridor) directly cross the city.

Thanks to its strategic position, on one of the oldest historical paths connecting the West and East, Serbia has a big portion of transit movements of goods coming from Greece, Turkey, Macedonia, Montenegro and Bulgaria to western part of Europe, as well as in opposite way from Germany, Italy, Poland, Austria, Hungary and others going to Greece, near and even far East.

The Railway network suffer poor condition with over 300 spots of slow driving and need for reconstruction. A huge number of rehabilitation, re-construction and construction works are on-going.

Figure 43 - An overview of the Belgrade area
Source: https://airlines-airports.com/

Key bottlenecks identified in the local context analysis

Market

- Lack of knowledge of the hinterland market players and benefits of port-hinterland system.
- Inability or limited access to certain markets, which limits possibilities for new contracts and increasing the business.

Infrastructural

- Bad condition of railway tracks and huge number of "slow ride" points creating a significant number of micro-bottlenecks.
- Road network missing links in the Core network, including: i) Incomplete Belgrade by-pass, including rail (works ongoing), ii) Incomplete connections on Route 4 (connection Romania - Belgrade - Montenegro) and on Niš - Dimitrovgrad link; iii) Insufficient capacity to Bosnia and Herzegovina and Romania;
- Need of dredging certain parts of the River of Danube.

Operational

- Not aligned operational processes of port-hinterland actors.
- Not aligned operational processes between operational & public (e.g. customs) actors.
- Limited breadth (or inadequate quality) of services provided by the port and/or the hinterland actors.
- Inadequate cross-border coordination of port-hinterland corridor.

Institutional

- Fragmented planning at national and regional level.

Innnovation

- Low innovation content in the services provided.
- Not harmonized and missing digital information exchange between port-hinterland actors and between operational and public actors.
- Inability to provide seamless port-hinterland cargo visibility to operational actors and shippers.
- Need of investment in educated staff and education of personnel.

Improved connectivity of regional multimodal corridors and enabled intermodality

Overview

Transport infrastructure of Serbia is characterized as well structured and developed, with network density above EU average. On the other side, the capacity of the network, the quality and application of standards in terms of interoperability are on the mid to poor level, especially of railway network which is mostly old and not well maintained, with huge number of slow ride points and old and inefficient objects and equipment. After consultations at project level, ISTEN group of private and public Serbian stakeholders agreed to set the focus of local context analysis and local action plan to the area of the City of Belgrade, which is the zone with highest economic, industrial and trade activities, including transport and logistics. Moreover, the city of Belgrade represents the main transport node at regional level, where all of three main regional corridors intersect.

The context analysis detected numerous infrastructure bottlenecks at the different levels. Most obvious infrastructural bottlenecks are missing links and inadequate transport network, together with infrastructural objects, such are intermodal nodes and terminals, railway shunting yards and stations, for enabling the intermodality in Serbia.

Actual intermodality issues are not represented only by low volume of intermodal units, where annual throughput in Serbia is estimated to 60-80.000 TEU, which is about few high-capacity sea vessels, but also by huge number of empty containers leaving Serbia (over 70%), which showing the poor level of intermodal activities in total logistics chains.

Main goals of actions proposed is to ensure the connectivity of regional multimodal corridors, including the River of Danube, and enable intermodality through better interconnection of existing and future terminals, together with construction of new high-capacity intermodal terminal in Batajnica.

The issue

Infrastructural bottlenecks in Serbia are numerous, especially concerning railways, where high number of points of slow ride is introduced due to poor condition of tracks. For the Belgrade area, there are two main detected infrastructural bottlenecks. One in the area of missing links in road and railway transport, and second in the area of intermodal transport enabling and development.

In the group of network missing links, the first detected bottleneck is road/railway by-pass around the City of Belgrade. The road by-pass is partly completed at the level of full highway profile, partly at the level of ordinary two lane road and the last part is in preparation phase. The railway part of by-pass is the part of complex Belgrade railway node. It is completed for the pan-European Corridor X, but there is a missing link on the same route as road. The key action is focused on the completion of road/railway by-pass around the City of Belgrade. The second detected infrastructural bottleneck, is missing intermodal terminal. At the moment, there is one private, low capacity (half train length) terminal, owned by company Nelt, located in western zone of the Belgrade, one integrated railway terminal - state owned terminal "ZIT" in the south zone of the City. In the time of drafting this document, there are construction works in the port of Danube in Pancevo, at the left bank of Danube River, where private port operator is working on construction of three-modal terminal in the port. All terminals are insufficient capacity and not well connected. The key Action is development and construction of state-owned intermodal terminal in settlement of Batajnica, at the North-West side of Belgrade. The locations of the terminals relative to the bypass are shown in the figure below.

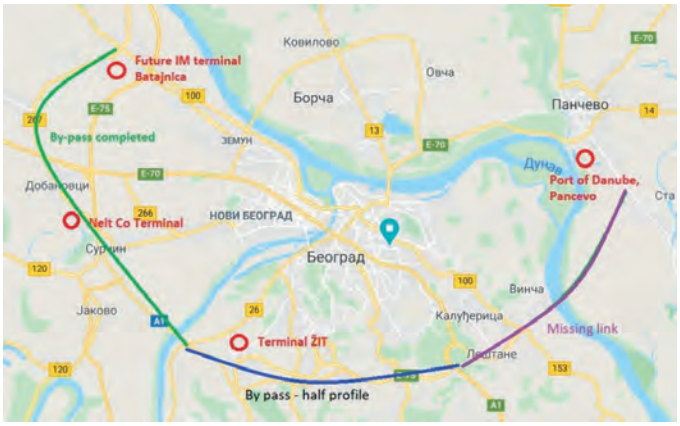

Figure 44 - Overview of the locations of the planned actions

Stakeholders involved

- Ministry of construction, transport and infrastructure of Republic of Serbia, Department for Railway and intermodal transport
- Private Company Nelt Co. Ltd, Belgrade – Logistics provider

- Free Zone Pirot, Pirot
- Associated Partner – Faculty of Transport and Traffic Engineering, University of Belgrade

Other relevant stakeholders include the following:

- Transport Secretariat of City of Belgrade – local authority
- Serbia Cargo, AD, Belgrade – national railway operator
- Railway Integrated transport (ŽIT) doo, Belgrade – state owned intermodal terminal
- Milšped doo, Belgrade – private logistics provider
- European Contract Logistics Serbia doo, Belgrade – private freight forwarder
- RALU doo, Belgrade – private operator in road transport
- Office Ivanovic, Belgrade – consulting, experts

Key actions

Even numerous actions were identified in different phase of development, two infrastructural actions are recognized as key intermodality and connectivity enablers from the perspective of Belgrade area, and which most efficiently can improve Belgrade area transport system.

Key Action n. 1: *Railway/Road by-pass around the City of Belgrade (Belgrade by-pass)*

Belgrade railway/road by-pass is the part of bimodal Orient/East-Med TEN-T Corridor (pan-European Corridor X) and it's the only part of the entire corridor which contains the road section as ordinary two-lane road. The rest of couple hundreds kilometres of corridor has highway profile. The railway part of the by-pass is electrified single track and belongs to the Belgrade railway node with good connections to the existing and future terminals. From the aspect of Belgrade area, the railway infrastructure main issue is the missing link of by-pass on south side of the City (same as road) and poor condition of tracks on certain points due to the lack of proper maintenance in previous period.

Missing link is Sector B of road by-pass around the Belgrade as well as railway link. This missing part of road and railway network should connect main Corridor X (Orient/East-Med) with Port of Danube and Route 4 to Romanian border. The biggest investment on this missing link is the new bridge over the Danube River which needs to be constructed. Regarding that missing link routes are almost the same for road and railway, the new bridge over the Danube is planned for both, road and railway traffic.

Regarding the road network, entire by-pass is divided into several sectors, where sector A is fully completed, Sector B is projected and partly completed and the rest of by-pass, including the new bridge over the Danube River is in preparation phase. After completion of Sector A, the efforts for completion of entire Belgrade by-pass were slowed down, because the connectivity issue is partly solved. Still, the quality, capacity and safety of existing Sector B is at very low level, causing the time lost and generating additional costs, directly to private sector and indirectly for the state and society.

Regarding the railway network, the issues are very similar to the road ones, where main problem is missing link at the south side of the city. Currently, freight flows from/to Pancevo industrial zone and further to Romanian border, going through the city centre through underground tunnels and urban area. The railway network of Belgrade node and locations of terminals and missing link is shown at following picture.

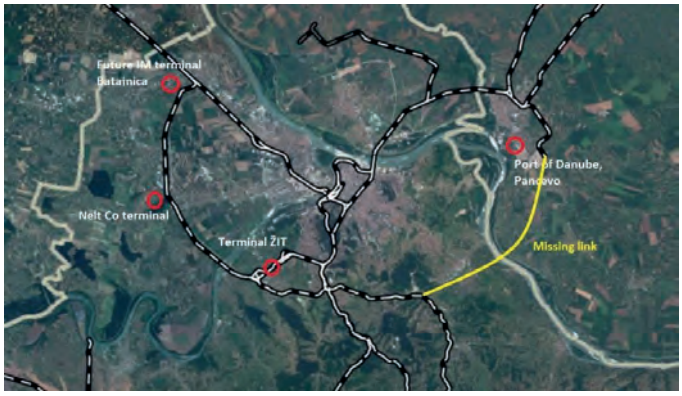

Figure 45 - Missing link and locations of terminal in the Belgrade area railway network

By completion of the by-pass, connectivity issues of Route 4, connecting the road corridor through Romania and Hungary, road and railway corridor through Croatia-Serbia-North Macedonia-Greece, with Adriatic corridor and port of Bar, would be solved together with problems of freight flows through the urban area. Moreover, the completion of entire by-pass around the Belgrade will allow a direct connection between the industry zone of the City of Pancevo at the left bank of Danube River, where Oil refinery, chemical industry and port of Danube are located, with the pan-EU corridor X, removing the heavy transport from the city centre of Belgrade.

The following map showing the main Corridors passing the Belgrade zone. The south-north connection, Route 4 is going through the urban area and construction of mentioned missing link is the key enabler for intermodality and solving freight transport in Belgrade area.

Figure 46 - Rail/Road corridors and railway network of Serbia

Key Action n. 2: *Construction of new Intermodal terminal "Batajnica"*

Construction of new intermodal terminal at north-west side of the city of Belgrade, located near railway station "Batajnica" and near highway system connecting main brunches of Orient-East/ Med corridor to Croatia and Hungary and Belgrade by-pass, is the project of national interest and importance not only for the city of Belgrade. This project was under preparation for several years and it came into construction phase during the drafting of this document.

The project and technical documentation was completed in period from 2014-2016, funded by direct help of European Commission of 2M Euro and Ministry of CTI. From 2016, the lack of funds, administrative issues and lack of political will slowed down the beginning of construction.

The project is conducting under the Government of Republic of Serbia – Ministry for Construction, Transport and Infrastructure and investor is Government of the City of Belgrade –Directorate for Construction Land and City development.

Intermodal terminal will have direct connection to road and railway Corridor 10, where railway connection will be reached by railway station "Batajnica" located nearby.

Total surface of the terminal is projected at 13 hectares.

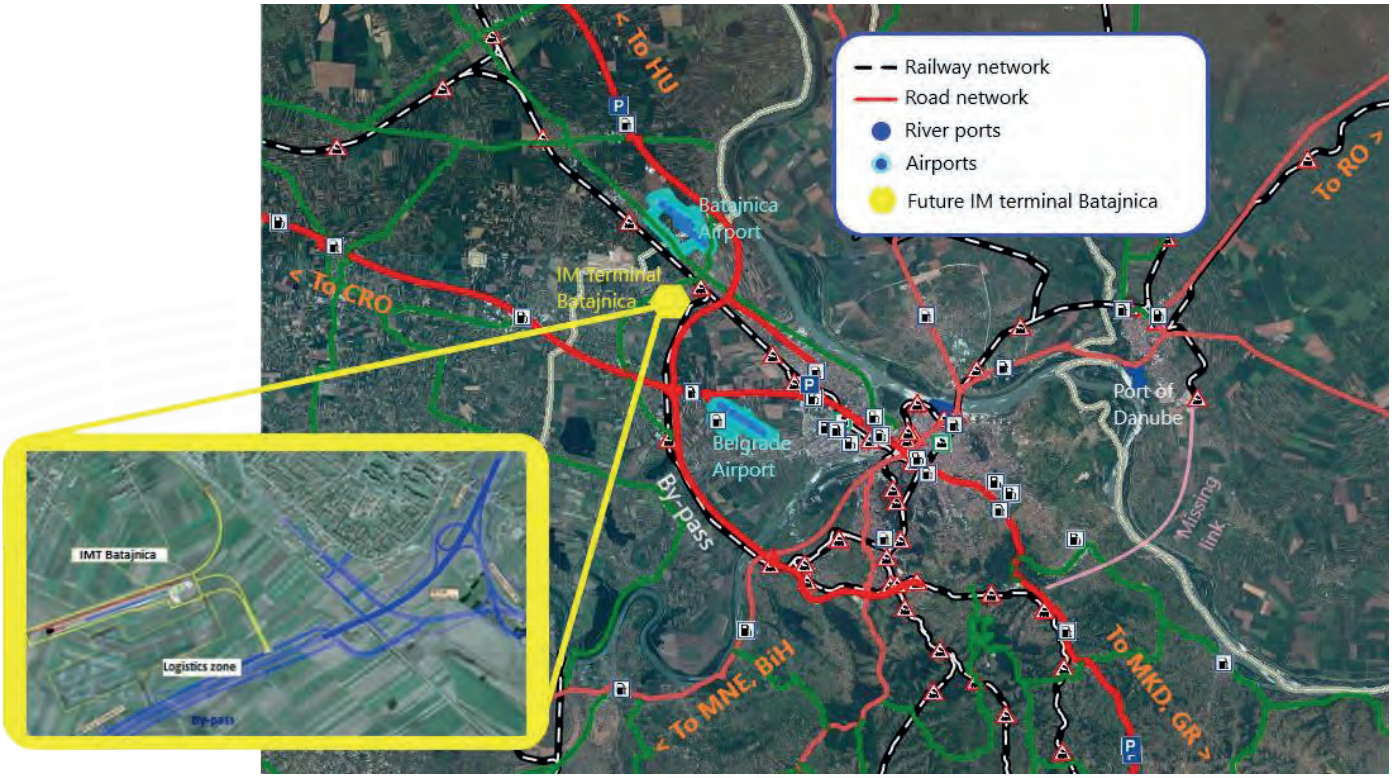

Figure 47 - Position of the new Intermodal terminal "Batajnica"

The tender for Construction is completed in January 2020 and Contractor is STRABAG AG Austria.

Further development of the location is planned through the planned logistics centre at total surface of 85.5 hectares.

Aims

- Complete the main infrastructural missing links to enable direct transit flows
- Enable and introduce intermodality in full capacity for the City of Belgrade and wider area.
- Allow a direct connection between the industry zone at the left bank of Danube River with the pan-EU corridor X, removing the flows of road and railway freight transit through the urban zone of the Belgrade city.
- Enable faster transnational freight flows, increase attraction of Belgrade as important transport node and improve connections to east and central Europe, creating the more competitive far hinterland for ADRION sea

Timescale implementation

Action/Year	2020	2021	2022	2023	2024	2025	2026
Construction of Sector B of Belgrade by-pass: 1 to 3 years	■	■	■	■	■		
Project and construction of Sector C of Belgrade by-pass 4 to 6 years	■	■	■	■	■	■	■
Construction of Intermodal Terminal "Batajnica" – contracted 30+12 months from January 2020 (2023)	■	■	■	■			

Funding sources.

Funding resources for construction of Sectors B and C of Belgrade by-pass are not defined. Several negotiation processes are conducting in parallel (from European funding mechanisms to possible different bilateral arrangements). Investment for three sections needed for completion of Sector B is estimated to around 200 million euro, while Sector C is in preparation. Knowing that Sector C will include the new road-railway bridge over the Danube River, the investment will be much higher.

Funding of Intermodal Terminal "Batajnica" is foreseen through IPA2015 and national Serbian budget. Total amount of investment is 18.4 million euro.

Impact on Bottlenecks

As mentioned above, Belgrade is located at road and railway Corridor X and river Corridor VII (TEN-T Orient-East/Med and Danube) and has problems with transit traffic, especially road and rail freight and transport of dangerous goods. Currently, the highway ring (the by-pass) is under construction around the Belgrade, which aims to connect existing highways to Hungary, Croatia, North Macedonia, Bulgaria, and future highways to South-Adriatic and Romania (existing routes). Special issue for the City of Belgrade is road and railway freight traffic through the City Centre and over the Danube Bridge to City of Pancevo (north part of the country and industrial and agricultural zones).

By constructing the Belgrade by-pass to full extent, connections of existing and future highway and railway corridors through the country will be enabled as fast, safe and more environment friendly way of transport, as well as faster way for transit flows.

Construction of Intermodal Terminal "Batajnica" will represent the first fully operational and well connected Intermodal Terminal in Serbia. Even some intermodal facilities already exists, this facility will actually enable the use of containerized export activities, while current facilities are mostly focused to import of goods or bulk containers. The estimated current annual throughput of containers is 60-80.000, where over 80% are going out of Serbia empty. There are several issues to improve the intermodal transport in Serbia, but main precondition is Intermodal Terminal with logistics facilities where goods and transport related services can be organized, creating the market for new services and transport solutions.

Creation and enhancement of dedicated environment for implementation of innovative solutions

Overview

Through the ISTEN Local context analysis, the low innovation content in the services provided was identified as main general bottleneck in the area of innovations and implementation of new technologies.

To overcome the identified bottleneck, it is not enough only to push the efforts or investments into the new technologies, but some preconditions have to be achieved.

Two main preconditions for higher level of innovation content in transport and logistics services were identified through local context analysis and consultations with stakeholders, namely:

- Legal framework and standardization of digital communication
- Gap of employees' skills in technological innovation

Main objectives of proposed actions are to set the general preconditions for further development and implementation of innovative solutions, but also for certain existing systems which are already implemented and in use within European Union framework or wider.

The issue

The fast-changing information environment and need for implementation of new technologies requires a tailored legal framework for secure information exchange and use of internationally recognized standards and rules related to new technologies and IT solutions. For example, even the use of digital signature is legally well defined according to international standards, the proper use of electronic consignment note – eCMR is not possible before the ratification of the protocol to the CMR Convention. This ratification would create the legal framework for Customs and other stakeholders to start developing the system for use of eCMR.

On the other side, this framework needs educated and skilled workforce in terms of new technologies and IT solutions at both, development and user levels and within private and public sector as well. Education system of Serbia recognized the need to include "digital skills" into the formal education, but there is a high number of employees who needs to be trained through recognizable vocational education and trainings, Companies trying to invest in their employees, but those actions are individual and different from case to case.

In that terms, creating the legal framework and improving standardization of digital communication, and overcoming the gap in employee's skills in technological innovation, are two main proposed actions, focused on creation and enhancement of environment for implementation of innovative solutions.

Stakeholders involved

- Ministry of construction, transport and infrastructure of Republic of Serbia, Department for Railway and intermodal transport
- Private Company Nelt Co. Ltd, Belgrade – Logistics provider
- Free Zone Pirot, Pirot
- Associated Partner – Faculty of Transport and Traffic Engineering, University of Belgrade

Other relevant stakeholders include the following:

- Transport Secretariat of City of Belgrade – local authority
- Serbia Cargo, AD, Belgrade – national railway operator
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- Milšped doo, Belgrade – private logistics provider
- European Contract Logistics Serbia doo, Belgrade – private freight forwarder
- RALU doo, Belgrade – private operator in road transport
- Office Ivanovic, Belgrade – consulting, experts

Key actions

Key Action n. 1: *Creating the legal framework and standardization for digital communication related to transport and logistics*

Even the title of the action is more general, the action is proposed more as demand to competent authorities to adopt certain specific transport-related legal framework as the precondition for implementation of certain solutions.

What was identified during consultations with stakeholders, directly related to trade and transport facilitation, which have to be adopted by government decisions:

- eCMR - Ratification of second additional protocol to UNECE CMR convention have to be initiated. In February 2008 an additional e-protocol was added to the CMR convention, which entered into force in June 2011. The e-protocol provides a legal framework and standards for the use of electronic means to record the CMR consignment note. At the moment of drafting this LAP, 27 countries ratified this protocol, but not the Serbia. Out of ADRION participants, only Slovenia ratified it.
- Single window - Establishing the necessary legal environment is a pre-requisite for Single Window implementation. Related laws and legal restrictions must be identified and carefully analysed. For example, changes in legislation are required in order to facilitate electronic data submission/exchange and/ or an electronic signature system. Restrictions concerning the sharing of information among authorities and agencies, as well as organisational arrangements for the operation of a Single Window, need to be overcome. Finally, setting the lead agency and the legal issues related to delegating power and authority to a lead agency need to be adopted through legal framework.

Key Action n. 2: *Improving the educational standards in the area of digital communication and new technologies skills*

For private sector, large companies and corporations mostly found the way to train their employees, by internal trainings or by outsourced trainings. However, those trainings are mostly focused on specific implemented solutions or general trainings for standard tools (e.g. Office, Internet, Operating Systems etc.).

Proposed action is to introduce the education module in formal and unformal education system which would be dedicated to specific educational programmes in transport and Logistics area. Educational module should be focused on Information flows in transport and logistics and specific electronic transport documents and systems supporting the digital data exchange and digital communication along transport and logistics chains.

To achieve mentioned, the following tasks should be completed:

- Adoption of formal educational system, according to European Qualification Framework (EQF):
  - Review of Key Competences related to new technologies
  - Improve the standards for digital skills
  - Revision of the Serbian Qualification Framework
- Including the digital skills development into the certain formal educational programmes at high school and university level, related to transport and logistics needs, focusing on
  - Electronic transport documents – practical use
  - Telematics systems – practical use
  - Data collection, processing and reporting – practical use
- At Vocational Education and Training (VET) level
  - Introducing the training modules related to specific needs of transport and logistics sector and VET certification system which will be recognized by private and public sector equally
  - Setting the standards and requirements for e-Learning in order to be accepted and recognized equally as conventional method of learning, at least for programmes and modules related to digital skills in transport and logistics sector (e.g. FIATA training programme for freight forwarders)

Aims

Benefits for government

A Single Window can lead to a better combination of existing governmental systems and processes, while at the same time promoting a more open and facilitative approach to the way in which governments operate and communicate with business in terms of:

- More effective and efficient deployment of resources
- Correct (and often increased) revenue yield
- Improved trader compliance
- Enhanced security
- Increased integrity and transparency

Benefits for trade

The main benefit for the trading community is that a Single Window can provide the trader with a single point for the one-time submission of all required information and documentation to all governmental agencies involved in export, import or transit procedures, in terms of:

- Cutting costs through reducing delays
- Faster clearance and release
- Predictable application and explanation of rules
- More effective and efficient deployment of resources
- More transparency

On the other hand, overcoming the gap in employee's skills in innovation technology use is the long lasting process which is already defined within formal education system. However, existing employees needs to be additionally trained. There are two main groups of employees, those who work in private sector and officials and staff in public sector.

What was identified, there is no systematic trainings for the transport and logistics solutions which would give the background to employees to understand the benefits for them self, for the company and the authorities and agencies and particularly to establish the foundation in terms of information security, corporate security and application of standards and recommendations.

In that terms, standardized and systematic Vocational Education and Trainings should be established through recognized VET certification.

Timescale implementation

Determining the timescale or time horizon for actions related to new technologies and fast changing environment is not the essential. The only right approach in this terms is continuous improvement, where initial basis should be updated at least on annual basis.

The period for creation legal framework as basic foundation is one year. Everything beyond that can be treated as late, because demands and requirements will be aged due to new solutions which will come meanwhile.

Funding sources

To implement proposed actions, the funding resources are required only to staff costs of competent authorities and amounts shouldn't be significant.

Sources of funding should be national budget and EU funds.

Impact on Bottlenecks

As it was mentioned in introduction, the main bottleneck detected through Local context analysis is low innovation content in transport and logistics services. To start introducing innovative solutions in proper and standardized way, two preconditions are identified - setting the legal framework and overcoming the gap in employee's skills in innovative technologies.

The proposed actions should contribute to enabling the faster and more effective implementation of innovative technologies and new solutions based on digitalization and communication, and integration with existing transport and logistics services as well as creation of new business models and services.

Deliverable D.T2.2.9 – ISTEN Local action plan for Serbia (Belgrade area) describes in detail the planned measures, their design and the stakeholders involved. It also provides more detailed description of the characteristics of each action.

12. Šibenik - Knin Region

Country: **Croatia** | Region: **Šibenik - Knin County**

Main cargo specialisation:
Dry bulk

The Port ok Šibenik doesn't have a dedicated terminal for handling containers.

Šibenik-Knin County (ŠKŽ) is located in southern Croatia, in the north-central part of Dalmatia bordering Bosnia and Herzegovina on the north. It has a sea border with Italy on south, while on east and west Split-Dalmatia County and Zadar County complete the limits of ŠKŽ. The biggest city in the county is Šibenik, which also serves as county seat.

Port of Šibenik is linked to the hinterland by the railway but does not have direct access to the highway. In particular, it is linked to the mainland by the 22-kilometer Šibenik-Perkovid railway through City of Knin as the most significant railway intersection, and onwards to Zagreb via "Lika" and "Una" railway directions.

Croatian seaports have a huge economic potential based on its favourable geographic position. The main comparative advantage of Croatian seaports in relation to the other ports of the European Union reflects in the deep penetration of the Adriatic Sea into the continent, which allows the shortest and most affordable traffic connections between the Croatian hinterland and the eastern Mediterranean, and through the Suez Canal, between the countries of Asia and the East Med. The port specializes in bulk cargo, timber, and mineral traffic notably phosphates transhipment.

Figure 48 - Port of Šibenik
Source: https://www.eldmarc.com/

Key bottlenecks identified in the local context analysis

Market

- Šibenik region in itself as relatively small market
- Strong dependency on just one specific industry and related over-reliance on just one stakeholder

Infrastructural

- Railway network in poor conditions due to low level of maintenance
- "Una railway" still not completed
- Non-electrification of "Lika railway"
- Storage capacities of the port, as well as boarding/unloading infrastructure, not operating with full capacity

Operational

- Administrative and bureaucratic needs of are expansive and slow down the process of submitting and gathering data, as well as collecting and using them
- Unresolved property-legal relations with Bosnia and Herzegovina
- More expensive and less efficiency of the rail transport system compared to road

Institutional

- Presence of fragmented different strategies for State, County and City ports
- Noticeable differences between priorities of Croatian Railways and ports in ŠKC area
- Human capacities being underdeveloped or uninterested in work opportunities

Innnovation

- Investment in technological and innovation development are not planned/developed

Modernisation of Šibenik Port equipment and improvement of the Una and Lika railway

Overview

The Šibenik port has a long tradition and has been a significant factor in the development of the Šibenik region for over 100 years. It started operating in the late 19th century with the export of coal from the hinterland (which required the construction of a railway), and continued with the export of timber from western Bosnia and Herzegovina, and the export of aluminum and other products. In the second half of the 20th century, automated bulk cargo handling facilities (phosphates, fertilizers) were built, making Šibenik the only port on the east side of the Adriatic with this capacity. Una railway and Lika railway are two most important connections respectively towards Bosnia and Herzegovina and central Croatia.

The Šibenik Action plan envisages action related to the port system operation and organisation, the two railway corridors (Una and Lika) and the cooperation among differenent stakeholders and institutions.

The issue

At the network level, key issues concerning the main railway corridors, i.e. the Una and Lika railway, have been defined through the Local Context analysis.

The Una railway is a section of the railway line Novi Grad (Bosanski Novi) - Knin with a total length of 177.9 km, of which 119.44 km passes through Bosnia and Herzegovina and 59 km through Croatia. The Una railway has linked central Croatia and northwestern Bosnia with the Adriatic for decades and as such still holds a huge potential worth considering when thinking about port-hinterland connections. Since 1990, the railway has been neglected to be completely abandoned since 2010, while, before the war, more than one million passengers and four million tons of goods were transported annually.

The Oštarije - Knin section is a non-electrified one-lane railway with a total length of 224 km known as the "Lika railway". It is an integral part of the international railway M604 Oštarije - Knin - Split. In Oštarije, it connects to the RH2 corridor, which is located on the Mediterranean corridor of the Trans-European Transport Network. Within Croatia, this railway is very important because it connect two large geographical entities - central and southern Croatia. The problems of the Lika railway concern the large slopes and the high transportation costs.

At the port level, there is no terminals or location for liquid bulk in port of Šibenik, although there is a tank capacity of 2.250 cbm which is unused since the traffic capacity is not flexible to demand for such a cargo type and its construction and development require substantial financial resources. The total amount of existing tanks for the current load is approximately 20,000 to 25,000 cbm. There is no container traffic in the Šibenik port area. However, some containers are filled with trimmed plaster and then transported by road (with heavy-duty trucks and other vehicles) to other Croatian sea ports (port of Rijeka) to finally finish overseas in other EU countries (Hungary, Austria etc.). To transport its goods chemical industry "Petrokemija" (which is majority owner of the Port of Šibenik Ltd) uses both modes of transport (railway and highway) on the route between Šibenik and Kutina. Commodity exchange between these two modes of transport is carried out at the ports of Šibenik.

The issues of progress in the modernization of port services and construction of the rail and road network are crucial for linking the port terminals to the main rail and road routes towards ADRION Network.

Stakeholders involved

- Port of Šibenik Authority
- Ministry of the Sea, Transport and Infrastructure
- Port of Šibenik d.o.o.
- Croatian Railways Infrastructure
- Ministry of Communications and Transport of Bosnia and Herzegovina (Action no. 3)

Key actions

Key Action n. 1: *Modernization of the Šibenik cargo port*

The first action consists of the reconstruction of some major infrastructures: the Rogač terminal, the Wood terminal (TB), the Dobrika terminal, including also the reconstruction of port roads and railways, the Dobrika-Rogač junction coast and other. The expected result of the implementation of this part of the project is the arrangement of the basic port infrastructure in the cargo part of the Port

of Šibenik, which includes the arrangement of the road and rail network, stormwater drainage system, construction and alteration of tracks, construction of a new pavement structure, arrangement and renovation of part of the operational coast with buffers. By installing bumpers and spacers on the Wood Terminal, a draft of at least 7.0 m would be achieved, furthermore, manipulative surfaces would be arranged and the concrete construction of the shore berth restored. In addition, the road junction Wood terminal (TB) - Terminal Rogač would be renovated. The project envisages a solution of the junction of the Dobrika coast with the Rogač coast in the cargo part of the Port of Šibenik - a part of the port area that is not regulated. The designed solution envisages the construction of a concrete ramp for the reception of classic Ro-Ro cargo ships and for cargo manipulation, as well as the arrangement of the coastal areas. The new coast is designed in the length of 128 m, the height of the coast is + 3.0 m, depth -8.0m.

Figure 49 - Šibenik Port organisation

The planned interventions are divided into 10 specific activities:

- Renovation of the coast and railway Rogač I and Rogač II
- Arrangement of the existing port road and existing manipulative areas Rogač II and Wood Terminal West
- Renovation of the concrete structure of the Wood Terminal coast and installation of bumpers
- Renovation of manipulative area Wood Terminal - East and of slope toward Vrnaža bay
- Replacement of the port area fence
- Demolition and removal of objects that are not functioning
- Construction of a new control house
- Construction of additional roads
- Renovation of railway infrastructure and construction of the coastal wall between the Wood terminal and the coast of Rogač III
- Construction of connecting coast: Dobrika - Rogač

Some of the planned interventions already have technical documentation, while some others will require the preparation of project studies. The dynamics of the works are planned accordingly.

Key Action n. 2: *Upgrade and renovation of Šibenik cargo port equipment*

The Šibenik port is the only port in the eastern part of the Adriatic that has equipment specialized for bulk cargo handling (crude phosphate and fertilizers). The port also handles general cargo (mainly aluminium blocks and ingots) as well as wooden goods. In view of the latest inquiries, especially by IMPOL TLM for loading containers with aluminium products, during the reconstruction of the port area of Rogač, one crane will be moved closer to the sea so that the containers can be loaded and unloaded effectively. It should be noted here that the Šibenik port has no space for developing larger capacities for loading and unloading of containers; but for the needs of the local economy, infrastructure will be adjusted in the port area of Rogač with the aim of ensuring the sufficient capacities for container handling. Port of Šibenik has 5 tanks for liquid cargo:

- -3 tanks of volume 6.000 m3
- 2 tanks of volume 2.000 m3

The tanks are located in the central part of the port. One of the tanks has been refurbished and the remaining 4 will require around EUR 4.5 million. The refurbishment of the remaining tanks will depend on the demand for transshipment of liquid goods on the market. Certainly, if interested companies emerge, tanks can be rebuilt in a relatively short time (1 year).

Figure 50 - Terminal for bulk cargo

The planned interventions are the following:

- Moving the container crane closer to the sea
- Construction of 4 tanks for liquid goods
- A banana and citrus warehouse is planned to be built in the port area. The intended

construction is on a level ground - in the area of the port maneuvering plateau.

Trough adjustment of existing equipment and building new premises, this action will improve and diversify business activities within the port.

Key Action n. 3: Reconstruction of Una railway

As said above, the Una railway is a railway line passing 119.44Km through BiH, 59 km through Croatia. The railway crosses the interstate in seven places, and it has three railway infrastructure managers: Republika Srpska Railways, Federation BiH Railways and HŽ Infrastructure. According to information from BiH, part of the Una railway in BiH has been restored and is in good condition.

The 2001 agreement between Croatia and BiH defines the crossings of the railway across the state border Novi Grad - Knin and the ownership relations that do not change with respect to the sections of the railway and facilities located in their national territory. A dividing point has also been established, that distinguish what would be the responsibility of the railway companies in BiH, and what would be the Croatian side responsibility.

The initiative to revitalize the Una railway in May 2017 was initiated by the line ministers of Croatia and BiH.

The Croatian part of the Una railway is currently not in good working condition and in order to establish traffic according to EU regulations it needs to be reconstructed, which implies an overhaul on the complete section.

According to the information from the responsible ministry and HŽ Infrastructures, in the next EU financial period (2021-2027), a complete reconstruction of the Croatian section of the Una Railway is planned, which includes the preparation of all necessary documentation, the execution of works and the equipping of the railway.

Key Action n. 4: Modernization of the Lika railway

The grant contract for the preparation of the study documentation for the modernization of the section Oštarije - Knin of the railway line was signed on the 17th December 2018., by the Ministry of the Sea, Transport and Infrastructure, the Central Agency for Financing and Contracting of EU Programs and Projects (CFCA) and HZ Infrastructure. The expected total duration of the project is 35 months from the signing of the contract. The total costs of the project is 2,55 mil EUR and it is co-financed by the European Union from the Operational Program Competitiveness and Cohesion from the Cohesion Fund with 1,75 mil EUR, while the rest of 0,8 mil EUR is covered by the Government of the Republic of Croatia.

In order to connect the wider area of Oštarije and Knin within the framework of this project, it is necessary to develop variant preliminary solutions of the route, a feasibility study, a financial and economic analysis and an environmental impact study. All variant solutions developed must also include technical connectivity solutions to the existing rail network and the future planned rail network.

The prepared study documentation will be the basis for the development of the preliminary design and other documentation required for obtaining location permits and further for resolving property-legal relations, designing the main design and obtaining construction permits for the execution of works and supervision services.

It can be expected that all project documentation, construction permit and execution of the works will be finished in next EU financial period (2021.-2027.)

Figure 51 - Railway network in the Republic of Croatia and Bosnia and Herzegovina

Aims

Action 1 and 2

- To improve the quality of cargo handling and docking in the port of Šibenik
- To prevent air and sea pollution (dust, oil)
- To prevent additional costs and possible lack of income, because of dilapidated existing infrastructure

- To improve and diversify business activities within the port, trough adjustment of existing equipment and building new premises

Action 3 and 4

- To connect the area of BiH and Serbia with the Dalmatian ports by rail
- To improve rail link with Central and Northern Croatia
- To improve connection of central and northern Croatia with Dalmatian ports

Timescale implementation

Action/Year	2020	2021	2022	2023	2024	2025	2026	2027
Modernization of the Šibenik cargo port	■	■	■					
Upgrade and renovation of Šibenik cargo port equipment		■	■	■	■	■	■	
Reconstruction of Una railway		■	■	■	■	■	■	■
Modernization of the Lika railway		■	■	■	■	■	■	■

Funding sources

Action no.	Estimated cost and funding source
1	The total value of the project is EUR 16 million. Financing: Modernization of cargo port in Šibenik will be financed by credit (HBOR) and state budget
2	Estimated value of the project is 6,5 mil. EUR. Renewal of the equipment in cargo port Šibenik will be financed by Port of Šibenik (concessionaire Luka Šibenik d.o.o.)
3	Value of the project will be estimated after the necessary project documentation has been prepared. Financing: Reconstruction of 59 km of Una railway will be financed by EU funds and State budget.
4	Value of the project will be estimated after the necessary project documentation has been prepared. Financing: Modernization of Lika railway will be financed by EU funds and State budget.

Impact on Bottlenecks

Each of the action described above will contribute, with different efforts, to the improvement of the Šibenik port-hinterland operation.

Reconstruction of infrastructure in the port of Šibenik will mainly impact the infrastructural bottlenecks Port of Šibenik is facing, but by doing so it will also affect market, operational and innovation bottlenecks of the region. The reconstruction of roads and railway within the port will improve handling of all types of cargo, including general and wooden cargo that will reduce the dependence on bulk cargo, especially since there is increasing interest in the transhipment of aluminium for the territory of Bosnia and Herzegovina. About 20.000 tons of aluminum is planned for BiH in 2020., and more in the coming years. These investments will enhance the operational capability of the port and enable the handling of containers. This in effect means less time and cost on operating the port transport, more market opportunities to attract potential shipment to Port and finally more incentive towards connecting the Port of Šibenik with the Šibenik region hinterland.

The Upgrade and renovation of Šibenik cargo port equipment will enable the loading and unloading of containers, increase the capacity for transhipment of liquid goods, and enable the transhipment and storage of tropical fruits, thus expanding the range of services provided and as such is impacting the infrastructural bottleneck needed for improving the port-hinterland connections. By making the port more accessible and easier to use, more market opportunities for both import and export will be achieved.

The reconstruction of the Una railway would again connect Dalmatian ports to the area of BiH, which is the fastest access to the sea. This would significantly expand the market and significantly affect the operations of Dalmatian ports, railways, as well as other related institutions and companies (customs, agencies, ship supply, etc.).

The modernization of the Lika railway would improve connection of Dalmatian ports to the central and northern Croatia. This would improve the market and affect the operations of Dalmatian ports, railways, as well as other related institutions and companies (agencies, ship supply, etc.).

Improving the cooperation between regional, national and transnational stakeholders

Overview

One of the institutional issues that reflects on the operational bottlenecks is the lack of clear communication lines between different level institutions. This encompasses regional, national and transnational institutions and other relevant stakeholders, so at times some activities are being prepared or already are set in motion while other stakeholders are not adequately informed on it. This in turn leaves some institutions to act individually or without support on solving the issues that would be mutually beneficial for everyone to solve.

The issue

There is no increased cooperation among port-hinterland actors and between ports which will put the pressure on the use of scarce hinterland infrastructure. Having good coordination between all actors involved in port-related transport, including infrastructural access to the hinterland, is required to be successful in port competition. In hinterland chains, different coordination problems exist for different reasons in which Institutional economics, public administration and markets plays a central role. Coordination among port-hinterland actors shows that different coordination problems exist in transport by road, rail, and waterway. These coordination problems occur due to the lack of willingness to invest and the strategic considerations of the actors involved. Based on interviews, due to a lack of prioritisation and clear criteria EU and national funding for ports has lacked focus and insufficient attention has been given to the coordination with hinterland access infrastructure. The importance of hinterland connections has been recognised as one of the critical issues in port competitiveness and development in Šibenik-Knin County.

Stakeholders involved

- Ministry of the Sea, Transport and Infrastructure of Croatia
- Port of Šibenik Authority
- Croatian Railways Infrastructure
- Šibenik-Knin County
- Ministry of Communications and Transport of BiH
- Ministry of Transport and Communication of Serbia
- Railways of Federation BiH
- Railways of the Serbia

Key actions

Key Action n. 1: *Setting up of transnational working group*

Port Authority of the Šibenik-Knin County will initiate process in cooperation with Croatian Ministry of the Sea, Transport and Infrastructure. During that communication, Ministry will set up working group in cooperation with BiH institutions, and starting to develop of Integrated plan of Una's railway reconstruction. This activity will be supported by finalization of the passenger port terminal in Šibenik that will provide necessary space for different type of state and county institutions and business related to port activities, and they be situated in one place which will improve cooperation.

Aims

- Develop an integrated plan involving State, County, and City level in Croatia and BiH.
- Set up an international working group involving Croatian and BiH decision makers, as well as rail infrastructure managers
- Set up domestic working group for modernization of Lika railway

Timescale implementation

Action/Year	2020	2021	2022	2023	2024	2025	2026	2027
Improving the cooperation between regional, national and transnational stakeholders		■	■	■	■	■	■	■

Funding sources

Action no.	Estimated cost and funding source
1	Value of the project will be estimated after the necessary project documentation has been prepared. - Financing: EU funds and State budget.

Impact on Bottlenecks

By improving the cooperation among regional institutions dealing with transport a common vision on external factors can be taken, improving the port-hinterland connections mutually. This will specifically refer to mutual support of the railway improvements.

Deliverable D.T2.2.10 – ISTEN Local action plan for Šibenik region describes in detail the planned measures, their design and the stakeholders involved. It also provides more detailed description of the characteristics of each action.

Local Actions Plan details

Reference document	Project Partner
D.T2.2.2 – ISTEN Local action plan for the Port of Ravenna	**Institute for Transport and Logistics Foundation** *Contact person:* Mr. Giuseppe Luppino giuseppe.luppino@regione.emilia-romagna.it
D.T2.2.3 – ISTEN Local action plan for the Calabria Region	**Mediterranea University of Reggio Calabria Engineering Department of Information, Infrastructures and Sustainable Energy (DIIES)** *Contact person:* Mr. Domenico Gattuso domenico.gattuso@unirc.it
D.T2.2.4 – ISTEN Local action plan for the Port of Koper	**Port of Koper, port and logistic system, public limited company. Department for strategic development** *Contact person:* Mr. Roberto Richter roberto.richter@luka-kp.si
D.T2.2.5 – ISTEN Local action plan for Trieste hub	**Port Network Authority of the Eastern Adriatic Sea** *Contact person:* Mr. Alberto Cozzi alberto.cozzi@porto.trieste.it
D.T2.2.6 – ISTEN Local action plan for Thessaloniki area	**Thessaloniki Port Authority S.A.** *Contact person:* Ms. Stella Fassa sfassa@thpa.gr
D.T2.2.7 – ISTEN Local action plan for Durres area	**Regional Council of Durres Department of Regional Development Policies** *Contact person:* Mr. Jovan Likja jovan.likja@qarkudurres.gov.al
D.T2.2.8 – ISTEN Local action plan for Bar area	**Port of Bar Holding Company Development and Cargo handling Department / Development Division** *Contact person:* Mr. Rade Stanisic rade.stanisic@lukabar.me
D.T2.2.9 – ISTEN Local action plan for Serbia (Belgrade area)	**Chamber of Commerce and Industry of Serbia Center for Project Management** *Contact person:* Mr. Nebojša Jevtić nebojsa.jevtic@pks.rs
D.T2.2.10 – ISTEN Local action plan for Šibenik region	**Port Authority of Šibenik-Knin County** *Contact person:* Ms. Nikolina Aras nikolina.aras@luskz.hr

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