



## Integrated and Sustainable Transport in Efficient Network - ISTEN

<b>DT1.1.4 - Local context analysis for Trieste</b>
---

WP no. and title	WPT1 - Activity T1.1 - Local Analysis
WP leader	CERTH
Responsible Author(s)	Alberto Cozzi, Anna Carobolante
Contributor(s)	Elisabetta Scala, Stefania Silvestri
Planned delivery date	M6 - May 2018
Actual delivery date	M7 - June 2018
Reporting period	RP2

Dissemination Level		
PU	Public	x
PP	Restricted to other program participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

*This document has been produced with the financial assistance of the European Union. The content of the document is the sole responsibility of the authors and can under no circumstances be regarded as reflecting the position of the European Union and/or ADRION programme authorities.*

## Document information

### Abstract

The report aims at providing a comprehensive analysis of the port-hinterland chain of Trieste, the challenges posed by technological and governance innovations, its development vision and planned investments. Existing bottlenecks pertaining to market, infrastructure, operations, institutional framework and innovative services characterizing the local context are identified through the contribution of relevant stakeholders. On these bases, the analysis finally outlines plausible mid-term scenarios and their possible impacts on the evolution of the local context.

### Keywords

Local context analysis, port-hinterland, bottlenecks, scenarios

### Authors

<b>Editor(s)</b>	Anna Carobolante
<b>Contributors</b>	Alberto Cozzi, Elisabetta Scala, Stefania Silvestri
<b>Peer Reviewers</b>	Alberto Cozzi

### Document history

Version	Date	Reviewed paragraphs	Short description
01	May 14, 2018	1; 3.1; 3.2; 3.3; 3.4; 3.5	First draft
02	June 6, 2018	4.1; 4.2; 4.3	Final version

## Table of contents

1	INTRODUCTION .....	5
2	CHARACTERISTICS OF THE LOCAL ENVIRONMENT .....	7
2.1	Port-hinterland chain overview .....	7
	Ro-Ro Terminal - Pier 5.....	13
	Europe Multipurpose Terminal (EMT) - Pier 6 .....	14
	Container Terminal (Trieste Marine Terminal, TMT) - Pier 7 .....	15
2.2	Port-hinterland chain operations .....	16
2.3	Port-hinterland chain governance .....	18
3	BOTTLENECKS TOWARDS BECOMING AN INTEGRATED HUB .....	19
3.1	Market bottlenecks .....	19
3.1.1	Market bottlenecks identified .....	19
3.1.2	Impacts of market bottlenecks .....	19
3.2	Infrastructural bottlenecks .....	19
3.2.1	Infrastructural bottlenecks identified .....	19
3.2.2	Impacts of infrastructural bottlenecks .....	20
3.3	Operational bottlenecks.....	20
3.3.1	Operational bottlenecks identified.....	20
3.3.2	Impacts of operational bottlenecks .....	21
3.4	Institutional bottlenecks .....	21
3.4.1	Institutional bottlenecks identified .....	21
3.4.2	Impacts of institutional bottlenecks .....	21
3.5	Innovation bottlenecks .....	21
3.5.1	Innovation bottlenecks identified .....	21
3.5.2	Impacts of innovation bottlenecks .....	22
4	MEDIUM-TERM SCENARIOS .....	23
4.1	Main factors to influence future development.....	25
4.2	Scenarios' formulation .....	27
4.3	Expected impacts of alternative scenarios .....	28

## List of figures

<i>Figure 1 - The Port of Trieste and TEN-T Corridors .....</i>	<i>7</i>
<i>Figure 2 - Intermodal connections of the Port of Trieste .....</i>	<i>8</i>
<i>Figure 3 - Ports and RRTs in Friuli Venezia Giulia .....</i>	<i>9</i>
<i>Figure 4 - Railway infrastructure of the Port of Trieste .....</i>	<i>11</i>
<i>Figure 5 - Port of Trieste - node of Campo Marzio .....</i>	<i>12</i>
<i>Figure 6 - Sinfomar PCS - current architecture .....</i>	<i>17</i>
<i>Figure 7 - Masterplan of the Port of Trieste .....</i>	<i>23</i>
<i>Figure 8 - Plausible scenarios for Trieste port-hinterland chain .....</i>	<i>27</i>

## List of tables

<i>Table 1 - Stakeholders' contributions - overview .....</i>	<i>6</i>
<i>Table 2 - Port of Trieste - total throughput 2015-2017.....</i>	<i>8</i>
<i>Table 3 - Ports of Friuli Venezia Giulia - total throughput 2017 .....</i>	<i>9</i>
<i>Table 4 - RRTs of Friuli Venezia Giulia - data on infrastructure and services.....</i>	<i>10</i>
<i>Table 5 - Port of Trieste - number of trains 2015-2017.....</i>	<i>11</i>
<i>Table 6 - Rail destinations 2015-2017 - Pier 5.....</i>	<i>14</i>
<i>Table 7 - Rail destinations 2015-2017 - Pier 6.....</i>	<i>14</i>
<i>Table 8 - Rail destinations 2015-2017 - Pier 7.....</i>	<i>15</i>
<i>Table 9 - Morphological table of the port-hinterland chain of Trieste.....</i>	<i>26</i>

# 1 INTRODUCTION

The aim of this deliverable is to provide an in-depth analysis of the Port of Trieste, including an overview of its local port community and relations among its players, as well as their roles in the local intermodal chain. The scope of the analysis will not be limited to the port hard and soft infrastructure but will also include the main hinterland logistics infrastructure and services.

The report will give first an overview of the port-hinterland chain, to then look into the relevant operations carried out and governance in place (chapter 2). In chapter 3, the existing bottlenecks will be taken into account, their assessment being broken down into whether hindrances pertain to the market, the infrastructure, the operations, the institutional framework or innovative services. Finally, possible medium-term scenarios will be identified and explored in view of increasing the port-hinterland chain efficiency and sustainability and consolidating the role of the port as intermodal hub.

To this end, a crucial contribution will be represented by the needs and views expressed by the local stakeholders the Port Network Authority of the Eastern Adriatic Sea identified as particularly relevant in this context:

- *Associazione dei terminalisti*, the organisation gathering the terminal managers that operate in the Port;
- *Associazione degli spedizionieri*, which represents the freight forwarders active in the Port;
- *Interporto di Trieste-Ferneti S.p.A.* and *Interporto di Cervignano del Friuli S.p.A.*, the two inland terminals whose current activities and vision are more relevant for developing intermodal freight flows in the regional hinterland;
- *Alpe Adria S.p.A.*, a logistics company that coordinates and manages intermodal and combined transport services from and to the Port of Trieste as well as the two other ports operating in the Friuli Venezia Giulia Region (Monfalcone and Porto Nogaro).

One-to-one meetings with representatives from each of the above organizations were arranged; they were first given a general presentation of the objectives and activities of ISTEN project, stressing their role and contribution to technical work packages.

A structured questionnaire prepared by CERTH as WPT1 coordinator, was used as a basis to start reasoning with representatives from the five organizations, and their input has been assessed and discussed within the ISTEN project team. Their collective contribution has then been integrated in the relevant sections of this report.

Details concerning such meetings are summarized in the table below.

Organization	Interviewee(s)	Date of interview	Follow-up
Trieste RTT / Interporto di Trieste S.p.A.	Prof. Giacomo Borruso (President)	4 May 2018	Summary sent back on May 7 - further background information provided by Trieste RTT on May 9
	Mr. Oliviero Petz (Managing Director)		
	Mr. Fabio Predonzani (Sales and Operations Manager)		
	Ms. Shirin Mahdavi (Sales and Operations Dept. - EU Projects)		
Associazione dei terminalisti / Port terminal operators	Mr. Fabrizio Zerbini (President)	9 May 2018	N/A
Cervignano RTT / Interporto di Cervignano del Friuli S.p.A.	Mr. Aldo Scagnol (Director)	10 May 2018	21 May 2018
Associazione degli Spedizionieri / Freight forwarders	Mr. Stefano Visintin (President)	10 May 2018	N/A
	Mr. Walter Gregori (Secretary General)		
Alpe Adria S.p.A. / MTO	Ms. Paola Geremia (Financial Director)	16 May 2018	Questionnaire completed in writing - 22 May 2018

Table 1 - Stakeholders' contributions - overview

## 2 CHARACTERISTICS OF THE LOCAL ENVIRONMENT

### 2.1 Port-hinterland chain overview

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.

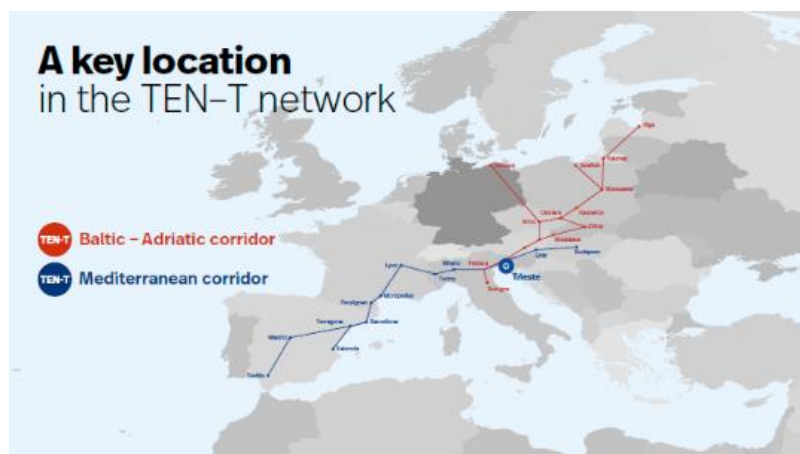


Figure 1 - The Port of Trieste and TEN-T Corridors

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.

#### The Port of Trieste in numbers

Port areas: about 2.3 million m<sup>2</sup> of which about 1.8 million of free zones

Storage areas: about 925,000 m<sup>2</sup> of which about 500,000 under cover

Length of docks: 12 km

Number of berths: 58 (for break bulks, multi-purpose vessels, container ships, Ro-Ro ferries, oil tankers, chemical tankers, passenger ships)

Maximum depth: 18 meters

Length of rail track: 70 km

In 2017, the Port of Trieste ranked first among Italian ports for total throughput, with approximately 62 million tons.

	2015	2016	2017	Δ % 2015/2017	Δ % 2016/2017
<b>TOTAL THROUGHPUT</b>	57,124,772	59,244,255	61,955,405	+8.46%	+4.58%
<b>Liquid Bulk</b>	41,286,761	42,756,341	43,750,555	+5.97%	+2.33%
<b>Dry Bulk</b>	1,607,232	1,971,001	1,639,595	+2.01%	-16,81%
<b>General Cargo</b>	14,230,779	14,516,913	16,565,225	+16.40%	+14.11%
<b>Number of vehicles</b>	301,353	302,619	315,705	+4.43%	+3.99%
<b>Number of containers (TEUs)</b>	501,144	486,462	616,156	+22.95%	+26.66%
<b>Total TEUs (CTNRs, vehicles)</b>	1,165,033	1,158,1329	1,314,953	+12.87%	+13.52%

Table 2 - Port of Trieste - total throughput 2015-2017

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.

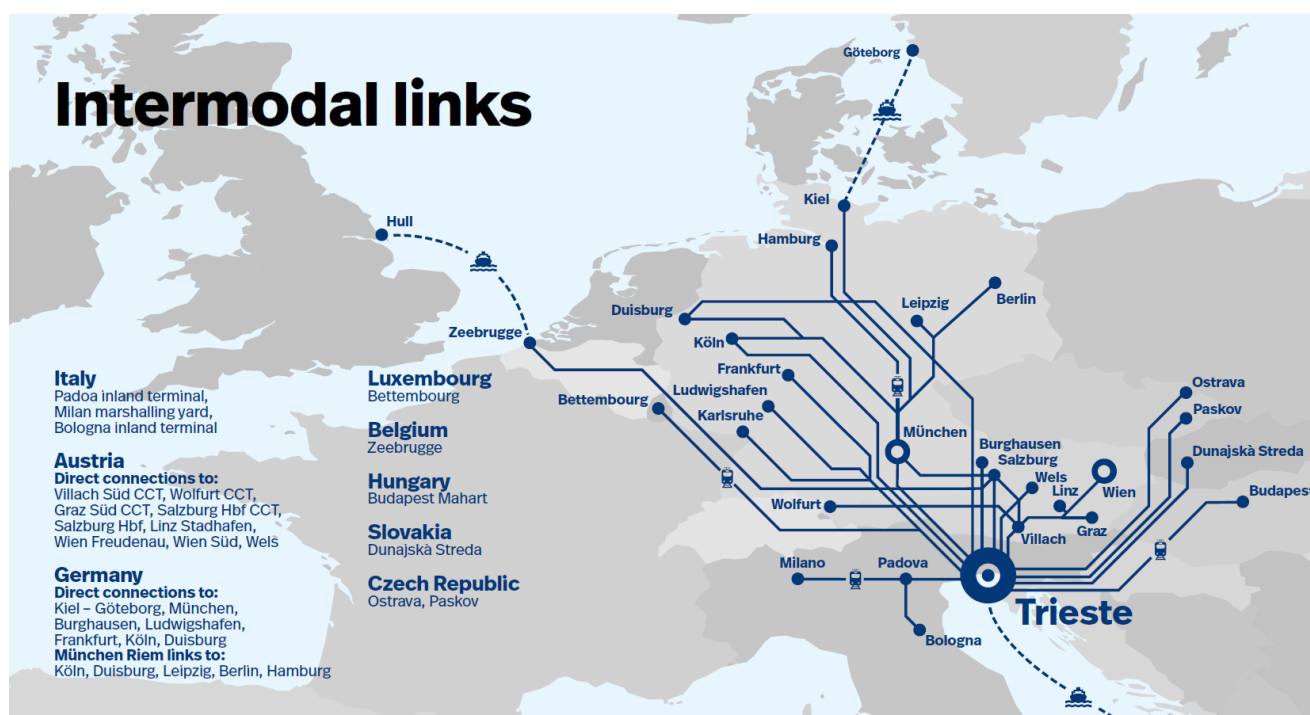


Figure 2 - Intermodal connections of the Port of Trieste



Friuli Venezia Giulia Region boasts the presence of several multimodal logistic platforms - as defined in Article 3 (r) of the TEN-T Guidelines - i.e. four railroad terminals (RRTs) and three ports, a significant infrastructural endowment for a region of only 1.2 million people.



Figure 3 - Ports and RRTs in Friuli Venezia Giulia

In particular, the Port of Trieste represents 92% of the total maritime traffic generated within the Region.

PORT	TOTAL THROUGHPUT IN TONS (2017)	%
Trieste	61,955,405	92
Monfalcone	4,633,411	7
Porto Nogaro	1,001,666	1
<b>TOTAL</b>	<b>67,590,482</b>	<b>100</b>

Table 3 - Ports of Friuli Venezia Giulia - total throughput 2017

Customs procedures and freight consolidation services, as well as facilities and security services for carriers (mainly road haulers) are available in all four regional RRTs. The table below summarizes their respective infrastructure and intermodal services.

<b>TRIESTE</b>	<ul style="list-style-type: none"> <li>• Managed by Interporto di Trieste S.p.A. - public-owned company</li> <li>• Located in Ferneti - near the border with Slovenia, 18 km from the Port of Trieste</li> <li>• Total area: 232,000 m<sup>2</sup>, out of which: 35,000 m<sup>2</sup> roofed warehouses; 80,000 m<sup>2</sup> parking area</li> <li>• 6 railway tracks, 450-meter long (North side) and 350-meter long (South side) respectively</li> <li>• RoLa shuttle service connection w/ New Port terminals</li> </ul> <p>Development projects: 320,000 m<sup>2</sup> area (out of which, 70,000 m<sup>2</sup> storage) located in the industrial zone - 10 km from the Port area, directly linked to the road and railway networks; it will have free zone status</p>
<b>CERVIGNANO</b>	<ul style="list-style-type: none"> <li>• Managed by Interporto Cervignano del Friuli S.p.A. - public-owned company</li> <li>• Located in Cervignano del Friuli, 48 km from the Port of Trieste</li> <li>• Total area: 460,000 m<sup>2</sup>, 24,000 m<sup>2</sup> warehouses, plus 600 m<sup>2</sup> for cold storage; 50,000 m<sup>2</sup> parking area</li> <li>• 8 railway tracks (six 750-meter long, two 450-meter long)</li> </ul> <p>Planned extension of operational yard in the adjacent area for 40,000 m<sup>2</sup></p>
<b>GORIZIA</b>	<ul style="list-style-type: none"> <li>• Managed by SDAG S.p.A. - only shareholder: Municipality of Gorizia</li> <li>• Located in Gorizia, on the Italian-Slovenian border</li> <li>• Total area: 600,000 m<sup>2</sup>, the intermodal terminal areas cover 20,000 m<sup>2</sup>; storage area: 28,000 m<sup>2</sup>, out of which 2,800 m<sup>2</sup> cooled warehouses</li> <li>• The terminal connects with the Gorizia-Nova Gorica international line that links Gorizia (I) railway station to Vrtojba (SI) railway station</li> <li>• 5 railway tracks whose length range between 340 and 500m</li> <li>• Trains from and to Trieste need additional shunting and a change of locomotive upon arrival in Gorizia RRT</li> </ul> <p>A further 4,400 m<sup>2</sup> cooled storage area is under construction</p>
<b>PORDENONE</b>	<ul style="list-style-type: none"> <li>• Managed by Interporto Centro Ingrosso di Pordenone S.p.A. - public-owned company</li> <li>• Total area: 836,000 m<sup>2</sup>, out of which 67,000 m<sup>2</sup> warehouses and 1,000 m<sup>2</sup> for cold storage; 28,000 m<sup>2</sup> parking area</li> <li>• 7 railway tracks (4 for operations, length ranging from 560 to 830 m)</li> </ul> <p>No rail traffic so far, despite the substantial infrastructure</p>

Table 4 - RRTs of Friuli Venezia Giulia - data on infrastructure and services

The port of Trieste is also the first Italian port for intermodal connections, with more than 200 trains a week connecting Trieste port to the Italian North-East industrial sites, Belgium, Luxembourg, Germany, Austria, Hungary, Slovakia and Czech Republic, totaling 8,681 trains in 2017.

	2015	2016	2017	Δ % 2015/2017	Δ % 2016/2017
<b>TOTAL TRAINS</b>	<b>5,980</b>	<b>7,631</b>	<b>8,681</b>	<b>+ 45.71%</b>	<b>+ 13.76%</b>

Table 5 - Port of Trieste - number of trains 2015-2017

To reach the target markets in Central and Eastern Europe, highly specialized intermodal services have been developed using direct trains organized by the company Alpe Adria S.p.A., a multi-client operator, which offers all-inclusive packages with guaranteed delivery and frequency.

The Port of Trieste has an internal rail network (70 km of track) connected to the national and international network; this allows all the docks to be served by rail, with the possibility of shunting and/or assembling freight trains directly in the various terminals.

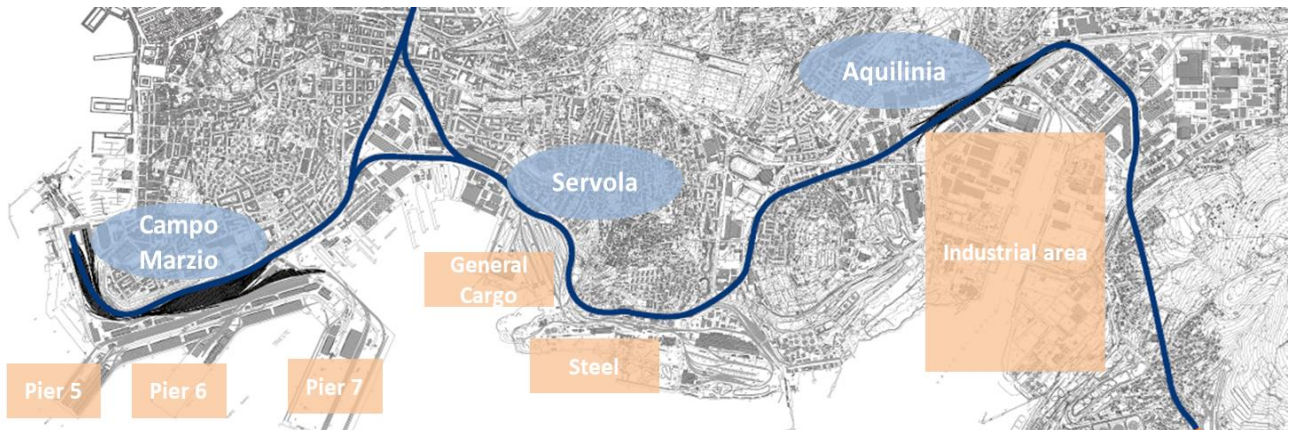


Figure 4 - Railway infrastructure of the Port of Trieste

The Port of Trieste is connected to the national railway line, thus to the TEN-T networks, through the following nodes:

- 1) Campo Marzio, serving Piers 5, 6 (Ro-Ro) and 7 (containers), where most of the traffic is currently concentrated;
- 2) Servola, serving the industrial port, i.e. general cargo terminal and one of the most important steel production sites in Northern Italy;
- 3) Aquilinia, serving the industrial area of Trieste.

A direct junction and a flyover (within the Port) connect to the outside road system, which leads directly to the motorway network, ensuring ease of access to the national road network.

Private operators manage the terminals of the Port of Trieste under Italian Law no. 84/1994 and are located in the docks area of the Port.

The main terminals of the Port of Trieste in terms of multimodal connections, located in the New Free Zone area, are connected through the port marshalling yard to the Campo Marzio railway station, managed by Rete Ferroviaria Italiana - RFI S.p.A., the national infrastructure manager:

- Ro-Ro Terminal, Pier 5, Samer Seaports & Terminals S.r.l.;
- Ro-Ro Terminal, Pier 6, Europe Multipurpose Terminal (EMT S.p.A.);
- Container Terminal, Pier 7, Trieste Marine Terminal (TMT S.p.A.).

These three private operators are all equipped with modern technology for handling, transportation and storage at the service of all types of traffic: Ro-Ro, Ro-La, containerized cargo, fruit and vegetables (potatoes, onions, oranges, and nuts), coffee, grains, metals, engines, steel and chemical products, timber, dry and liquid bulk, crude oil and derivative products.

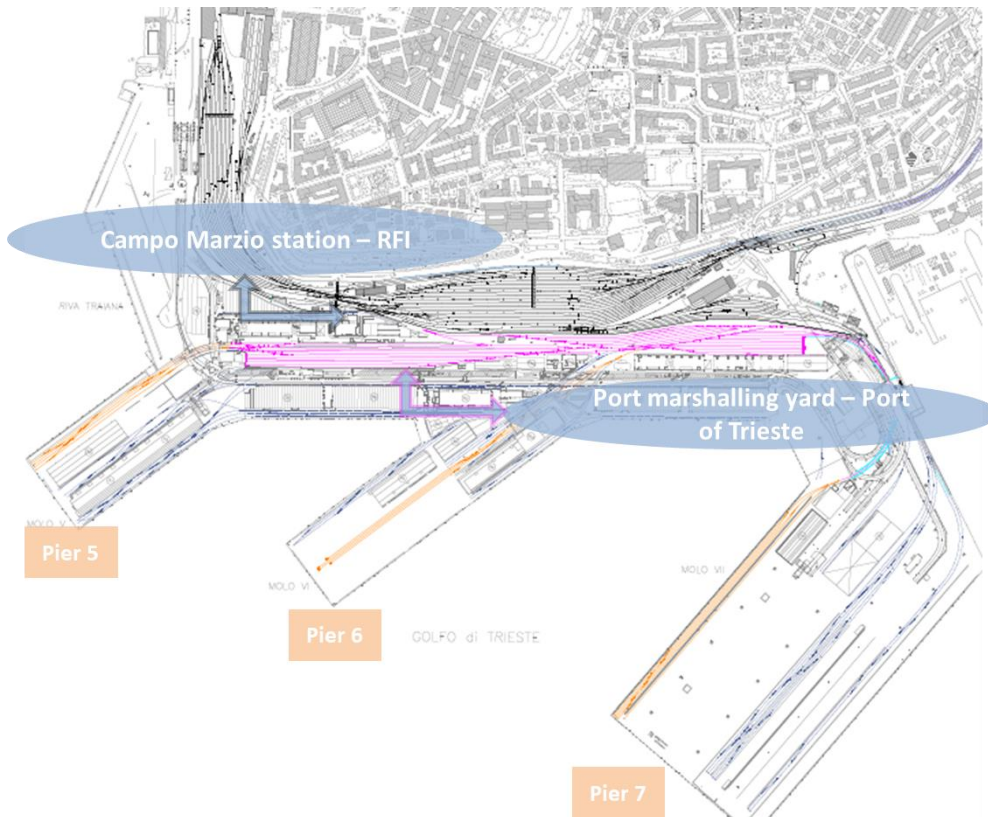


Figure 5 - Port of Trieste - node of Campo Marzio

However, the current layout of both the Campo Marzio station (in black) and the railway sidings managed by the Port of Trieste (fuchsia) hinder the further development of intermodal transport to/from the port:

- 1) the train length is currently limited to 550 meters, while EU Regulation no. 1315/2013 requires the Core network corridor accommodate freight trains at least 740-meter long;

- 2) 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;
- 3) the maneuvers of the marshalling yard are not automated, causing delays and posing higher risks to the safety of the operations due to human errors.

The so-called Global project (2018-2025) envisages the upgrade of the railway infrastructures of the Port of Trieste, in order to accommodate the abovementioned double-digit trends of railway traffic flows.

The Global project comprises four main sections:

- 1) Upgrade of the railway last mile connection;
- 2) Infrastructural upgrade for the reactivation of the railway line connecting Aquilinia station to Campo Marzio;
- 3) Upgrade of the existing infrastructure and new railway station at Scalo Legnami;
- 4) Infrastructural and technological upgrade of the port marshalling yard connecting Piers 5, 6 and 7 to Campo Marzio Station and then to the national railway lines.

The Italian government has already funded most of this Global project, but only on the sections belonging to the national infrastructure manager (RFI S.p.A.). The Port Network Authority of the Eastern Adriatic Sea recently applied to the 2017 CEF blending call for proposals in order to raise additional resources to fund the complementary actions in the port areas. In fact, should the Port of Trieste not upgrade its own marshalling yard - which is located between the terminals and the Campo Marzio station - the interventions on the national infrastructure manager side would be unserviceable. On the contrary, the development project designed for the upgrading of the port railway network presumes that the facility will double its traffic volumes, going from an actual capacity of 10,000 trains per year up to 17,820 from 2023 onwards.

### Ro-Ro Terminal - Pier 5

The terminal can host three vessels simultaneously with a 12 meters natural draft and a storage area of 150,000 m<sup>2</sup>. Operations are carried out 365 days a year with no interruption, including customs formalities enabling a movement of over 200,000 heavy units per year to be managed seamlessly.

The Terminal in numbers:

- 3 Ro-Ro ramps
- 870 meters pier length
- 12 meters draft
- 150,000 m<sup>2</sup> storage area

This terminal includes a recently renovated section devoted to rail operations featuring a rail-mounted stacking crane able to operate on four 310 meter-long tracks.

### Railway traffic origin/destination 2015 - 2017

#### Pier 5

2015	2016	2017
Wels	Wels	Wels
Krefeld	Krefeld	Bettembourg
Fernetti	Salzburg	Krefeld
Duisburg	Bettembourg	Ludwigshafen
	Novara	München
		Krefeld-Uerdingen

Table 6 - Rail destinations 2015-2017 - Pier 5

### Europe Multipurpose Terminal (EMT) - Pier 6

Pier 6 is located in the center of the Port of Trieste with a total area of 70,000 m<sup>2</sup>, 1500 meters berths, one Ro-Ro berth, draft between 9 and 10 meters, four rail tracks and one 5,000 m<sup>2</sup> warehouse.

It is equipped with four reach stackers with piggy-back, 10 tug-master Ro-Ro tractors and over 20 forklifts.

The main connection involved in the service line of Ro-Ro services leave from Pier 6 of Trieste heading to Istanbul.

### Railway traffic origin/destination 2015 - 2017

#### Pier 6

2015	2016	2017
Ludwigshafen	Köln	Wels
Ostrava	Ludwigshafen	Bettembourg
Köln	Ostrava	Krefeld
	München	Ludwigshafen
	Novara	München
	Bettembourg	Krefeld-Uerdingen
		Zeebrugge
		Ostrava
		Köln
		Karlsruhe
		Kiel

Table 7 - Rail destinations 2015-2017 - Pier 6



### Container Terminal (Trieste Marine Terminal, TMT) - Pier 7

Pier 7 is equipped with an internal rail park that guarantees trains loading and discharging during the vessels operations offering all the services of a modern container terminal. The rail park consists of five rail tracks of 600 meters each served with three rail-mounted stacking cranes able to operate up to five trains at the same time, ensuring the efficiency of the terminal rail connections.

The Terminal in numbers:

- 400,000 m<sup>2</sup> of stacking surface
- 900,000 of current capacity in TEUs
- 18 meters of natural draft
- 3,000 meters of rail tracks inside the terminal (5 tracks of 600 meters each)

Trieste Marine Terminal has a capacity of 11,500 trains per year granting a further opportunity to achieve a strong growth of the rail traffic volumes in the coming years.

#### Railway traffic origin/destination 2015 - 2017

##### Pier 7

2015	2016	2017
Bologna	Villach	Budapest
Padova	Padova	München
Milano	Milano	Villach
Budapest	Budapest	Melzo
München	Salzburg	Salzburg
	Melzo	Padova
	Dunajská Streda	Ostrava
	München	Dunajská Streda
	Burghausen	Burghausen
	Bologna	Bratislava
	Ulm	Štúrovo
		Paskov

Table 8 - Rail destinations 2015-2017 - Pier 7

## 2.2 Port-hinterland chain operations

The number of public and private actors involved in the wide-ranging and complex cargo operations and processes taking place in a port represent a challenge for the efficient management of the related supply chain. This is particularly true in the case of multimodal/intermodal transport settings, which imply the management and control of traffic flows both by sea and by rail/road taking into account that different sectors and actors involved have each their own procedures and priorities in terms of regulatory framework and economic/operational aspects.

As far as the Port of Trieste is concerned, these operations entail the interaction of different public authorities, each for its area of competence, such as:

- Port Network Authority;
- Customs Agency;
- Harbor Masters Office;
- Maritime Health Office;
- Financial Police.

In addition, two public-owned companies provide fundamental services for freight to be handled smoothly from one mode of transport to another, namely:

- Adriafer S.p.A. - a company whose only shareholder is the Port authority, carries out rail shunting activities within the port areas;
- Alpe Adria S.p.A. as a multimodal transport operator coordinates road, rail and sea carriers in order to organize and handle intermodal and combined transport services; the Port authority is one of three public shareholders.

On the other hand, a number of private companies operate in the port and inland terminals, from freight forwarders to railway undertakings.

The Port Network Authority recognizes the development of ICT and digitization as a crucial mean to face the challenges associated to enabling optimization of the port management system and integration of multimodal nodes and services. Launched in 2014, the Port Community System (PCS) of the Port of Trieste, called Sinfomar was elaborated within the ITS Multi-port Adriatic Gateway, co-financed by the TEN-T Programme and it is now viewed as a best practice in this field, being selected as a finalist in the 2017 national contest for innovation and quality in the public administration “Open-Gov Champion”. In the Port Network Authority’s vision, Sinfomar is key to improving the efficiency of port-hinterland logistics operations through effective communication flows and dematerialized paperwork. All main public and private port community actors were involved in the process leading to outlining the features of the PCS and particular attention was given to the specific administrative and legal requirements linked to the free zone areas of the Port of Trieste.



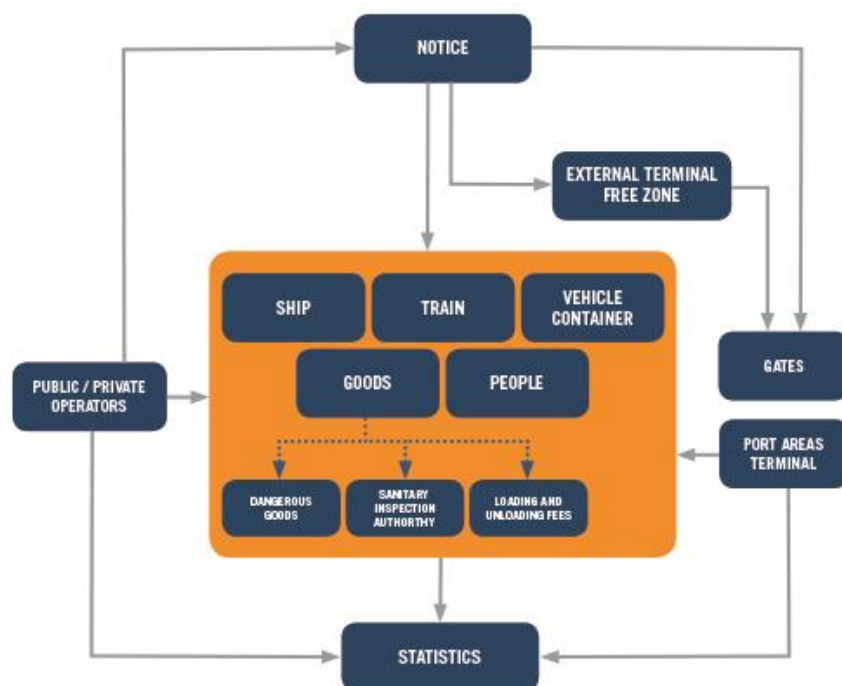


Figure 6 - Sinfomar PCS - current architecture

Since its launch in 2014, Sinfomar has been constantly adapted and developed from the four original modules to arrive to the current 11-module configuration. One of its most successful applications is the ship information module, which allows to digitally paying customs duties and port dues for both cargo loading and unloading procedures. Furthermore, the technological upgrading of the port rail infrastructure and tracking/planning road traffic volumes through monitoring functionalities are currently being investigated and will eventually lead to additional modules.

Private operators (e.g. maritime agents, freight forwarders etc.) enter the data related to their operations in real time, which are then validated and subsequently approved by competent public authorities (i.e. Customs Agency and Financial Police). The same data are collected and made available through Sinfomar for statistical and analytical purposes.

From a technological standpoint, Sinfomar acts as trusted interface being an open platform that enables the intelligent and secure exchange of information between public and private stakeholders. Its interoperability with platforms operated by other organizations within the port community allows the electronic exchange of information, facilitating administrative and procedural requirements through easy access and sharing of data. Last but not least, it also acts as a “National Single Maritime Window” in accordance with the EU legal and policy framework.

Furthermore, recent changes in the national legislation concerning the port sector and the specific regulations on free zone status that apply to the areas of the port of Trieste have boosted further developments in the PCS functionalities, namely with the introduction of a module for the integrated management of freight traffic from and to inland infrastructures such as Trieste RRT.

## 2.3 Port-hinterland chain governance

The Legislative Decree no. 169/2016 reformed the governance structure of the Italian port system, by aggregating existing port authorities into 15 new “Port Network Authorities”. This reform entails a new role for port authorities, passing from port administrations at local level, to the central focus of new aggregation, also with other regional ports or inland terminals. In fact, the art. 6 of the above-mentioned decree foresees that the new Port Network Authorities “promote coordination with nearby hinterland and railroad terminals”.

The Port of Trieste endorsed this approach within its Three-year Operational Plan, adopted in August 2017. The 2017-2019 Operational Plan calls for increased cooperation with the aforementioned regional nodes, especially the port of Monfalcone and the railroad terminal of Trieste. Indeed the Legislative Decree no. 169/2016 envisages that regional ports can be included under the competence of port system authorities if the regional administration formally requires such a change. The Italian Government recently approved the request made by the FVG Region in December 2016.

An ongoing study commissioned by the FVG Region is assessing new governance structures able to provide an institutional framework to the new pivotal role the Port of Trieste aims at playing within the regional logistic system.

New governance structures alone will not yield the expected results without the interaction with private logistics operators (terminal operators and freight forwarders alike) and other public administrations, such as the maritime authority and the customs agency. This is why the Three-year Operational Plan foresees the enlargement of Sinfomar PCS to new stakeholders.

Currently, the PCS connects with:

- Maritime agents;
- Freight forwarders;
- Customs agency.

In the next three years, it will also connect with:

- Financial Police;
- State Police;
- State Prefecture;
- Maritime Health Office;
- Phytosanitary Office;
- Terminal operators.

## 3 BOTTLENECKS TOWARDS BECOMING AN INTEGRATED HUB

### 3.1 Market bottlenecks

#### 3.1.1 Market bottlenecks identified

In this context, rather than identifying actual market bottlenecks the local port-hinterland system faces in becoming an integrated hub, the stakeholders addressed by the Port Network Authority have shared different views and perspectives depending on their specific business environment and the level of integration within the port-hinterland system.

In particular, the two RRTs (Trieste and Cervignano) characterized by a higher level of integration in the local port-hinterland system are eager to further develop rail connectivity and promotional initiatives capable of enhancing their intermodal services, for example strengthening marketing actions towards carriers. The Association of Port Terminal Operators is confident that the consolidated trade relations with the markets of Central and Eastern Europe and the increasing traffic volumes of the port system will continue boosting further demand for intermodal port-hinterland services, *a fortiori* once the Port of Monfalcone will be finally included in the Port Network Authority. On the other hand, the Association of Freight Forwarders expressed doubts as to whether the demand for intermodal services to and from the Port of Trieste will continue to show a positive trend in the light of a limited (200 km) catchment area of its hinterland and the proximity of other, more competitive logistics systems in the neighboring regions.

#### 3.1.2 Impacts of market bottlenecks

The limited market hinterland of the port affects the local port-hinterland system in commercial terms. In this perspective, the upgrading of the railway infrastructure is crucial for extending its catchment area.

### 3.2 Infrastructural bottlenecks

#### 3.2.1 Infrastructural bottlenecks identified

Although port infrastructures are considered adequate to meet the current traffic volumes, the steady growth rate of the last few years pose a challenge. Issues can be summed up in the structural lack of port expansion area and the chronic congestion of common spaces (such as access gates), the latter mainly caused by the high number of trucks arriving in and leaving from the port. In this regard, the need to demolish unused multi-story warehouses was pointed out by several stakeholders.

The obsolete conditions of the motorway network serving the port-hinterland system form bottlenecks in both directions. In particular, the current layout of the 120-km motorway segment connecting Venice to Trieste has two lanes only, although works for the construction of the third one are ongoing and should be completed by 2020.

As far as the railway infrastructure is concerned, regardless of bottlenecks identified at regional network level (e.g. in the proximity of Udine and Tarvisio, near the border with Austria), some issues affect both the inner port railway network and how this connects with the outer network. In this context, priority actions concern:

- Campo Marzio Station: full automation of the marshalling yard, new layout enabling a direct connection with all the New Port terminals and the composition of 750-meter long trains;
- reactivation of other stations/segments serving the port and inland terminals: Villa Opicina/Transalpina (connecting with Trieste RRT) and Aquilinia/Servola (Industrial Port).

The current state of railway connections with other inland terminals - namely, Cervignano and Gorizia - requires the national infrastructure provider (RFI S.p.A.) to upgrade the network so that their full potential capacity is reached.

### 3.2.2 Impacts of infrastructural bottlenecks

The existing bottlenecks have clear impacts on the competitiveness of the port-hinterland system. Highlighted weaknesses in the railway system serving the Port of Trieste indirectly affect the environmental performance of the local intermodal chain.

## 3.3 Operational bottlenecks

### 3.3.1 Operational bottlenecks identified

With regard to port-hinterland operations, the main criticalities observed concern the relations between private operators and Customs agency. It should be pointed out that at national level, different controls on imported/exported cargo are carried out by several public authorities/bodies. In order to optimize timing, procedures, and costs related to such controls, since 2011 the Customs agency has been implementing the so-called “Customs Single Window” (Sportello Unico Doganale). However, interviewed stakeholders stressed that the system is far from being implemented at its full extent: indeed, the platform should integrate up to 68 type of controls but at present only 3 out of 18 public authorities/bodies responsible of the corresponding processes are operating within the system. In the everyday practice, stakeholders remark also that the Customs agency tends to follow a quite restrictive interpretation of the applicable regulations and this affects the timeframe to take into account in order to perform all relevant procedures.

Concerning the port railway network, aspects such as 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. In this regard, the

Association of Port Terminal Operators highlights the need to implement shared procedures and IT tools in parallel.

One of the multimodal transport companies operating in the port of Trieste also pointed out issues related to inadequate coordination of the port-hinterland corridor at cross-border level.

### **3.3.2 Impacts of operational bottlenecks**

The bottleneck entails uncertainty as to whether goods need to undergo controls and how long the whole process will take, possibly resulting in extended transit times and consequently, higher shipping costs, negatively affecting the performance of the regional port-hinterland system, especially *vis-à-vis* cross-border competitors.

## **3.4 Institutional bottlenecks**

### **3.4.1 Institutional bottlenecks identified**

The Italian national legal and institutional framework is undoubtedly complex and somehow fragmented, implying the need to interact with different public authorities and bodies. The remarks gathered from local stakeholders mostly pertain to their relations with the Customs agency for the aspects highlighted in the previous paragraph.

From this point of view, it is worth introducing a point that will be further developed in chapter 4 hereafter. The 2016 reform of port authorities has been long awaited by Italian port community actors and all local stakeholders share the view that its implementation and the renewed mission of port network authorities will bring positive outcomes in terms of their relations with other institutional actors. For example, the Legislative Decree no. 169/2016 foresees that each port network authority implement a “one-stop-shop” system aimed at harmonizing procedures and deadlines for administrative proceedings related to port operations (except for those pertaining to customs controls) - the adoption of implementing guidelines is currently pending.

### **3.4.2 Impacts of institutional bottlenecks**

Similarly to operational bottlenecks, issues leading to the uncertain application of regulations and the fragmentation of authoritative powers are detrimental in commercial terms.

## **3.5 Innovation bottlenecks**

### **3.5.1 Innovation bottlenecks identified**

The stakeholders’ assessment on services provided is not entirely satisfactory in terms of innovation contents. In this context, the integration of all the actors involved in port-hinterland operations within the Sinfomar PCS appears to be crucial. Needless to say, 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.

Gate automation and greater effectiveness in granting access to port areas are also considered of utmost importance for business continuity.

### **3.5.2 Impacts of innovation bottlenecks**

Innovation gaps impact the efficiency and the competitiveness of the whole logistics chain.

## 4 MEDIUM-TERM SCENARIOS

The strategic vision of the Port of Trieste is included into two main documents: the Port Master Plan (*Piano Regolatore Portuale - PRP*) and the Three-year Operational Plan (*Piano Operativo Triennale - POT*). The PRP refers to the long-term planning of the Port of Trieste, while the POT gives a view of the effective operational development covering a period of three years.

The current version of the Port Master Plan was approved in April 2016; the update reflected the need to adapt the Port of Trieste to the changing conditions in the maritime transport system in order to guarantee its role of international hub in the North-Adriatic Sea.

The main works planned in the Port Master Plan can be summarized as follows:

- Extension of Pier 7
- New Ro-Ro Terminal (Noghere)
- Logistics Platform - Lot 1
- New Pier 8

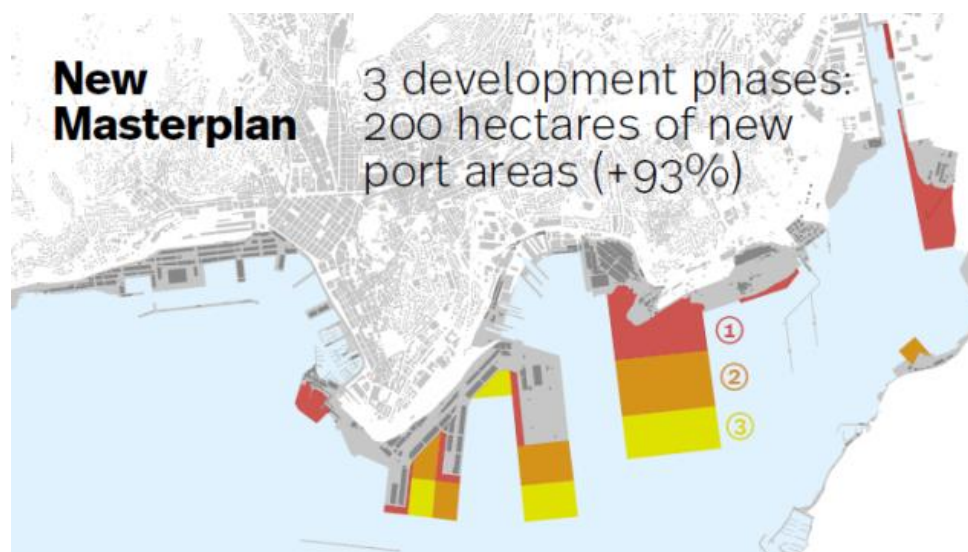


Figure 7 - Masterplan of the Port of Trieste

Taking into account the recent legislative changes and the strategic objectives identified by the Master Plan, the new Operational Plan was adopted in August 2017 referring to the mid-term programming period 2017-2019.

The main investments included in the 2017-2019 Operational Plan aim at putting into effect strategic actions such as the enhancement of existing maritime links between EU Member States and international key actors, with particular focus on strengthening trade relations with Central and Eastern Europe and with China and the Far East.

Furthermore, the Three-year Operational Plan envisages the realization of a new integrated railway service system with the other regional logistic nodes with the aim



of creating an integrated logistic system at regional level, optimizing existing infrastructures, able to offer competitive services as an integrated “continental gateway”.

In this context, the most important infrastructural works to be implemented are:

- Logistics Platform - Lot 1: construction of a new terminal connected to the Trieste motorway link road and the rail network outside the port with a dock of 600 meters in length and 14 meters in depths (total funds earmarked: 132 Meuros);
- Logistics Platform - Lot 2: continuation of the abovementioned work with the creation of equipped yards and new docks, from which the future Pier 8 will extend (total funds: 184.5 Meuros)
- Campo Marzio Rail Terminal, a new terminal next to the port boundary, consisting of an outer 4-track rail ramp served by a rail-mounted gantry crane for more efficient management of the port rail connections.

From a strategic point of view, the progressive implementation of the PCS represents another opportunity for developing an advanced and specific knowledge base on the port. Its port community system is one of the essential tools through which the Port of Trieste, together with its partners, intends to position itself prospectively in the technological scope of port services, in both a national and international dimension, therefore achieving higher standards of efficiency and security in information exchange to the benefit of freight flows. In this regard, extremely important actions are being implemented also in the framework of EU-funded projects, such as:

- Fer-Net (co-funded by the ERDF Regional Operational Program 2014-2020), aimed at implementing an IT management tool for the international free zone of the railroad terminal of Trieste and realizing a customs corridor connecting the hinterland to the Port of Trieste;
- SmartLogi (co-funded by the Italy-Austria 2014-2020 CBC Program), whose objective is to create a rail customs corridor between the Port of Trieste and the dry port of Villach Süd-Fürnitz.

Another important piece in the puzzle of the regional logistic system followed less than a year ago the 2016 reform of the governance of port network authorities. In fact, the Decree of 13 July 2017 of the Ministry of Infrastructures and Transport (MIT) outlines an integrated logistic system between the Port of Trieste and the free zones external to the port area (e.g. Trieste RTT), with the potential for industrial development and economic growth for the whole hinterland.

Historically, the International Free Zone status entails that the Port of Trieste can be home to any kind of industry, trade or ancillary activities. The MIT Decree is the long-awaited implementing regulation granting the Port Network Authority a central role in the administration of the free port status, which includes both free zones areas located within the port boundaries and free zones areas of the hinterland. As an example, the Decree confers the Port Network Authority the power to identify free zones and adapt their boundaries (within the province of Trieste), as well as to



devote specific areas for industrial activities (e.g. processing) and logistics services, develop railway facilities and services and regulate the use of the infrastructure.

In this regard, it is worth mentioning two further recent events. In November 2017, the Port Network Authority became the main shareholder of the newly established Consorzio di sviluppo economico locale dell'area giuliana - COSELAG (Trieste Industrial Development Consortium). This public economic body has the mission to attract new industrial and manufacturing activities in the areas near the port boundary (Industrial Port) and once fully operational, will be in charge of the management of the industrial free zone. Also, the Port of Trieste underwrote a capital increase of the inland terminal of Trieste together with a regional financial institution, thus controlling 36% of the company's shares. These recent developments show the willingness of the Port of Trieste to play a pivotal role in the regional logistic system.

#### **4.1 Main factors to influence future development**

In light of the strategic objectives and existing bottlenecks illustrated above, a number of high-level factors have been identified as capable of influencing future developments of the local port-hinterland chain. Taking as a starting point the views expressed by local stakeholders only some of those, where the majority indicated them as most likely to produce effects on the outlook of the Port of Trieste and its hinterland, have been taken into account, although their potential interactions with others have been considered in the formulation of possible scenarios.

Market evolutions will mostly depend on factors characterized by a global scope - such as changes in global trade routes and China's Belt and Road Initiative - and public/private investments in the port and railway infrastructures.

The implementation of the International Free Zone status in new areas, not included in the port boundary, combined to strengthened intermodal connectivity with the wider hinterland is also likely to draw new business in the territory or encourage local industry towards reshoring actions. Also, the share of cross-border hinterland traffic will definitely play a role in defining the outlook of the port of Trieste.

Innovative soft infrastructure, including but not limited to that enabling automated port-hinterland processes, is also considered key to enhancing the attractiveness of the corridor, specifically in that clients will put increasing weight on operational efficiency in choosing the port as their gateway towards broad and dynamic markets. From this point of view, it can be expected that a higher standard in intermodal services will also depend on one hand, on the degree of maturity of emerging technological solutions applicable in this field and on the global pace of digitalizing logistics information streams on the other.

The Association of Port Terminals Operators stressed the need to define a long-term investment strategy concerning LNG infrastructure. Considering that Ro-Ro traffic has been consistently growing in the last few years and the evolving regulatory environment will probably stimulate the development of new technology in this field, a boost in the demand for alternative fuels can be envisaged.

As far as the institutional framework is concerned, the role of the port authority will influence and at the same adapt to the challenges related to implementing integrated infrastructure, processes and services to the benefit of the port-hinterland as a whole. In this regard, the recent reform of the governance framework has set the bases for a proactive role of the Port Network Authority towards both other institutional actors - acting as a sort of *super partes* dialogue facilitator on behalf of the port operators - and potential investors. This will also contribute to promoting the shift towards a gateway, region-based competition model in attracting freight flows.

The influencing factors with their corresponding states are depicted in the “morphological box” of table 9 below, in which:

- the first row includes the main factors to influence the future development of the port-hinterland chain of Trieste;
- under each main factor, its respective development variations (states) are indicated. These are codified using a letter of the Latin alphabet (corresponding to the respective uncertainty) and a number (corresponding to its respective state).

I. CHANGING GLOBAL TRADE ROUTES / LOCALIZATION / RESHORING (U1)	II. AUTOMATION IN PORT & HINTERLAND PROCESSES (U2)	III. IMPORTANCE PLACED BY CLIENTS ON EFFICIENCY AS A PORT/CORRIDOR SELECTION CRITERION (U3)	IV. ROLE OF PORT AUTHORITY (U4)	V. MATURITY OF EMERGING TECH SOLUTIONS (U5)
I.1 Trade routes to Trieste show a decrease	II.1 Automation in port & hinterland processes experiences a slight decrease	III.1 Clients to put lower importance on efficiency to select the port/corridor	IV.1 The Port Authority plays a weak role as hinterland corridor’s promoter	V.1 Emerging tech solutions require high costs and long time to be developed
I.2 Trade routes to Trieste remain unchanged	II.2 Automation in port & hinterland processes experiences a slight increase	III.2 Clients to put unchanged importance on efficiency to select the port/corridor	IV.2 The Port Authority plays a strong role as hinterland corridor’s promoter	V.2 Emerging tech solutions still imply high development costs but become more readily available
I.3 Trade routes to Trieste show an increase	II.3 Automation in port & hinterland processes experiences a firm decrease	III.3 Clients to put higher importance on efficiency to select the port/corridor	IV.3 The Port Authority plays a weak role as hinterland corridor’s landlord	V.3 Emerging tech solutions still imply long time to be developed but costs decrease
	II.4 Automation in port & hinterland processes experiences a firm increase		IV.4 The Port Authority plays a strong role as hinterland corridor’s landlord	V.4 Emerging tech solutions’ development costs and time are acceptable

Table 9 - Morphological table of the port-hinterland chain of Trieste

## 4.2 Scenarios' formulation

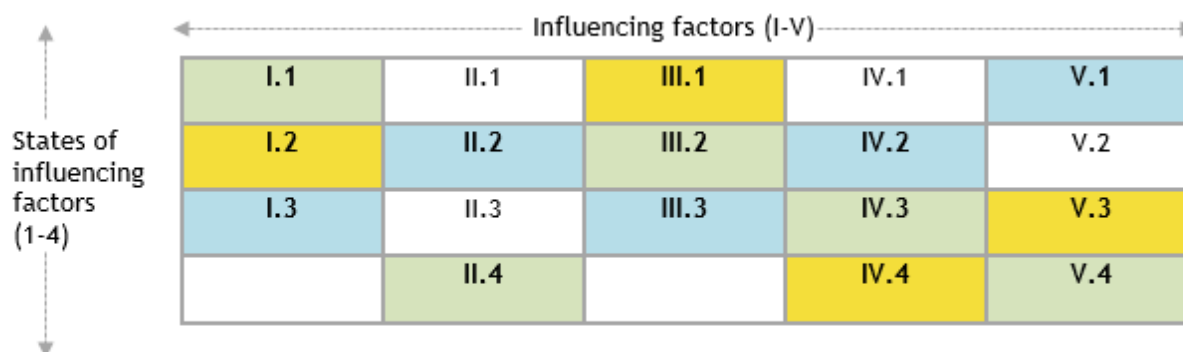


Figure 8 - Plausible scenarios for Trieste port-hinterland chain

### SCENARIO A

Changing global trade routes convey increased traffic flows towards the Mediterranean and the Port of Trieste, thanks to its strong intermodal links, reinforces its role as gateway to Central and Eastern European markets. Through an effective management of its International Free Zones, the Port Authority is capable of enhancing the territory attractiveness for new business, triggering a rise in the demand of efficient intermodal services for the implementation of their distribution channels.

However, emerging technological solutions are still not able to meet market demands in terms of cost- and time-effectiveness and this hinders heavy automation of port/hinterland processes.

### SCENARIO B

Trieste's stance in global trade routes remains unchanged. Traffic volumes are steady and clients seem to be satisfied with the current level of the services offered by the port-hinterland chain.

The reform of the governance of port authorities starts to bear its fruits in that it has fostered the integration of regional logistics platforms at both infrastructural and governance levels. Emerging technological solutions still imply high investment costs but on the other hand, they afford secure and smart exchange of information that are easily adaptable to diversified purposes (e.g. commercial/statistical, planning and management of operations). The Port Authority launches a strong development policy focused on ICT services to ensure secure and timely exchange of information between different platforms.

## SCENARIO C

Trieste experiences decreased traffic flows and the Port Authority struggles to adapt to its new governance structure, procedures are time-consuming and difficult to implement at the same time in varied organizational set-ups. Clients still demand certain standards of efficiency in port-hinterland operations.

In the effort of keep up with competitors, private operators and especially port terminal managers and railway undertakings aim for enhanced automation of port-hinterland processes, taking advantage of available technologies.

### 4.3 Expected impacts of alternative scenarios

The expected impact of scenario A is two-fold: on one hand, the Port of Trieste's competitiveness is likely to be enhanced by an extended catchment area and strengthened intermodal connections to consolidated and new markets. On the other, the local port-hinterland chain risks facing difficulties in handling rapidly growing traffic volumes considering that the infrastructural investments necessary to improve its capacity require time and considerable financial resources.

The conservative assumptions of scenario B would allow governance and technological innovations to evolve in parallel to optimize existing services and improve relations among the different actors of the logistics chain.

While the first two present both challenges and opportunities, scenario C poses a number of critical issues and would entail remarkable economic and human resources to be absorbed in the effort to maintain the current pace of traffics and standards of intermodal services on one side, and adapt to a new institutional framework on the other.