Territorial Needs Assessment of the Port of Ravenna

Deliverable no. D.3.2.5

Table of Contents

Index of Figures

Index of Tables

1 Introduction

The present report D.3.2.5 Territorial needs assessment for the port of Ravenna was written by ITL and the Port of Ravenna within WP3 of PROMARES project. It is a needs assessment on maritime and multimodal freight transport for the port of Ravenna containing SWOT analysis, future scenarios for the activation of new maritime/multimodal links and customs fast corridors, clusterisation opportunities, stakeholder mapping and feasibility studies.

It follows the methodology and the sections set out by VIU - D.3.2.1 Methodology for the implementation of the territorial needs assessments.

2 Section A - Territorial analysis

In this section the description of the port of Ravenna is reported. The logistics infrastructures inside the port and in its catchment area are analysed, in particular road and rail infrastructures and last mile accessibility (sub-section A1).

Then the analysis of the flows of goods loaded and unloaded in containers in the port of Ravenna in recent years is presented, and the port's potential market is quantified. The potential market of the port is constituted by the demand and the supply of goods that transit in the port and that are formed and originated in the national and foreign basins of the port (sub-section A2).

The third sub-section (A3) presents the existing "as is" scenario in terms of territorial plans and policies. It is a description of the current regulatory framework, including a description of the main strategic territorial plans and territorial policies for enhancement of maritime and intermodal freight transport in the territory of the port of Ravenna.

2.1 Subsection A.1 – Territorial description in the Programme Area focusing on most significant nodes and hubs

This sub-section describes the port of Ravenna, its main existing infrastructures for maritime and intermodal freight flows, the main infrastructures for intermodal transport currently operating in the catchment area of the port. Existing services for intermodal freight traffic in the catchment are described, and also the main freight transport links between the port and its hinterland (catchment area). Then, a current "as is" scenario of existing logistic infrastructures is presented. The main sources for this section are the Operational Plan of Ravenna Port and the Regional Integrated Transport Plan (PRIT 2025).

2.1.1 Introduction

The port of Ravenna is the main maritime harbour of the Emilia-Romagna region, in Northern Italy. Its location in the Central-North Western side of the Adriatic Sea and in one of the most dynamic economic regions of the Country has favoured its infrastructural and economic development. Unlike other Italian ports, Ravenna has the advantage of not being completely included in the urban context.

Over time, the port of Ravenna has been transformed from an industrial to a commercial port, distinguishing itself with the development of shipbuilding and the transport of solid bulk.

Nowadays, the port of Ravenna is one of the largest ports in Italy for the handling of solid bulk: it is a leader in the landing of raw materials for the ceramics, cereals, fertilizers and flours industry[1]. It is also an important point of arrival for various goods, such as timber and metallurgical products, in particular coils.

Within the port, along the two banks of the Candiano Canal, there are also various refineries and petrochemical industries, linked to the methane fields present some miles away from the coast. In fact, one third of the methane gas consumed in Italy is produced by the Ravenna offshore plants.

The main traffic basin of the port of Ravenna consists of the Eastern Mediterranean Sea and the Black Sea, where it is a leader in container traffic. It is also relevant for the RO-RO cabotage services, especially with Sicily.

The European Commission has appointed the Ravenna seaport "Core port" of the TEN-T Networks.

2.1.2 Existing infrastructures for maritime and intermodal freight flows of the port of Ravenna

The port of Ravenna extends along the entire state-owned area of a canal, the Candiano Canal, that connects the town centre of Ravenna (which is inland) to the sea. The Candiano Canal is 14 km long. Its maximum depth is currently 11.5 m. It offers 14.5 km of docks and operational quays, currently used by 27 terminal operators (Table 1).

The port of Ravenna hosts shipyards, multipurpose terminals, bulk cargo terminals and a containerized cargo terminal. Ten port terminals are connected to national railways by means of various bundles of tracks, that inside the port reach the length of 35 km. In economic terms, the result is that approximately 12% of the goods transiting in the port continues by train (Table 1).

Infrastructures	n. or size
n. of basins	**2**
Port canals length	**14 km**
Canals maximum depth	**11.50 m**

[1] For this reason, within this TNA, an analysis on the sector of ceramics and tiles was conducted, see chapter 7

Operational quays	**14.5 km**
Private terminals	**27**
Rail tracks length	**35 km**
Terminals connected to railways	**10**

Table 1 - Infrastructures of the port and their technical characteristics (Source: Port of Ravenna Authority)

The total area of the port is 21 square km, its storage capacity consists of more than 600 thousand square meters of warehouses and 1.3 million cubic meter of storage tanks. Yards occupy an area of 1,350 thousand square meters (Table 2).

Infrastructures	Size
Total area	**21 km2**
Warehouses	**602,258 m2**
Yards	**1,323,922 m2**
Storage tanks	**1,256,298 m3**

Table 2 - Surfaces and storage capacity (Source: Port of Ravenna Authority)

Various kinds of cranes operate on the docks of the port (Table 3). In addition, various types of bulk goods are handled in the port. For petroleum products, chemical products and food products, there are storage tanks in large numbers (Table 3).

Equipment	Number
Tower crane	**1**
Crane	**10**
Cranes for container	**4**

Oil storage tanks	**177**
Chemical products storage tanks	**122**
Agri-food products storage tanks	**56**

Table 3 - Technical equipment (Source: Port of Ravenna Authority)

In the port, cargo handling activities and numerous other activities related to transport and handling take place. The types of products affect the type of infrastructure needed.

One of the most relevant related activity is the shipbuilding one: at the port of Ravenna there are several companies operating in the construction, transformation and maintenance of ships, as well as in the repair and installation of all types of engines. So some infrastructures in the port have been designed also for these activities.

2.1.3 Existing infrastructures for maritime and intermodal freight flows of the catchment area of the port of Ravenna

The port of Ravenna is connected to the main Italian and European road by motorways and highways and to rail networks by the railway station of Ravenna city. The next sub-sections describe these networks and their main “last mile” infrastructures.

Road infrastructures

The port of Ravenna is connected to road networks by the Ravenna ring road (composed by parts of the national highways SS16 Classicana, SS309 Romea, SS67) that links it to the motorways A14dir and E45 (as shown in Figure 1).

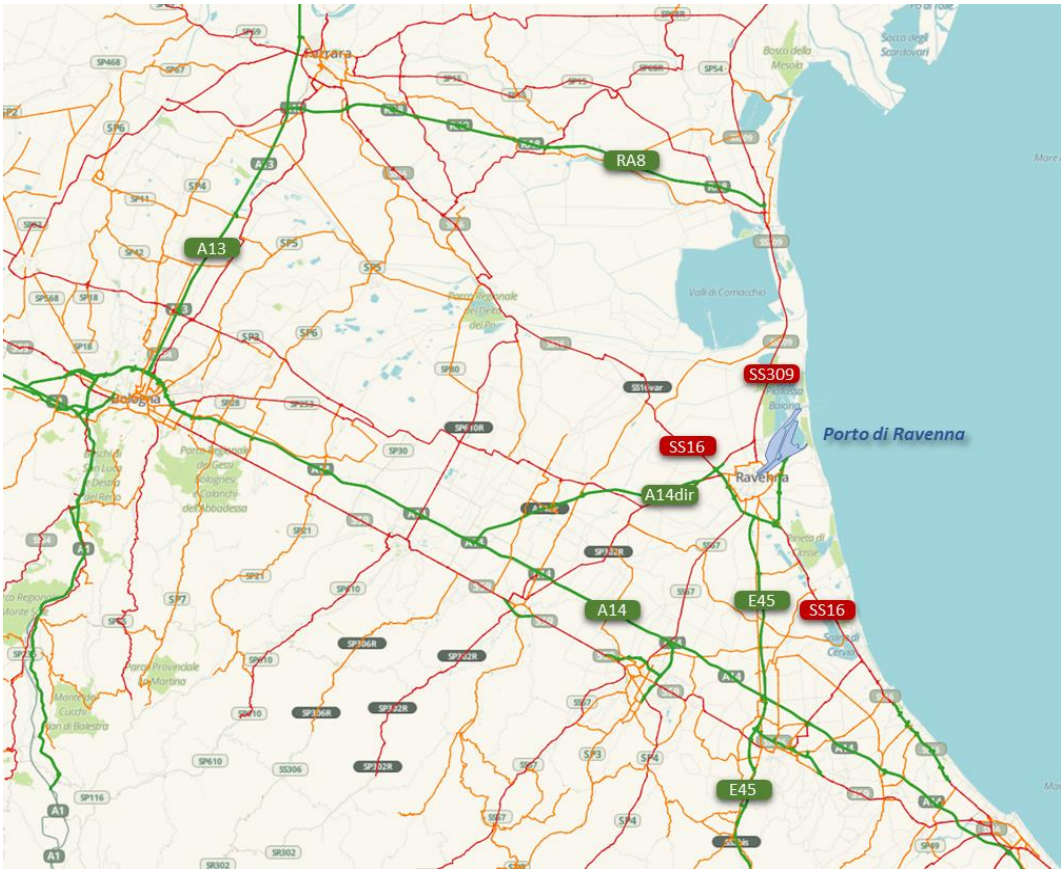

Figure 1 - The port of Ravenna and the national road network (Source: Port of Ravenna Authority)

The last mile road accessibility

The last mile connections of the port of Ravenna to the national road network are Baiona Street and the last section of the SS67 Romea road (Figure 2). They run along the two sides of the Candiano Canal. Baiona Street is on the north side of the canal, it is a two-lane carriageway. The SS67 Romea is on the south side of the canal, it has two carriageways and two lanes per direction.

Both road accesses are directly linked to the urban ring road, and through it to the regional and national intercity road network.

Figure 2 - The port of Ravenna and the local road network (Source: Port of Ravenna Authority)

Rail infrastructures

The Port of Ravenna is connected to the national and international railway network by four rail lines: the Castel Bolognese – Bologna line, some alternative routes that are connected to the Ravenna-Ferrara line, the Ravenna – Rimini line, the Ravenna-Russi-Granarolo-Faenza-Rimini line. The first two lines link up the port with the rest of northern Italy, the Brenner, northern and eastern Europe. The last two lines connect the port with southern Italy (Fig. 3).

They are four electrified single-track lines that allow the connection of the port to the national railway system. Two of these lines (i.e. Ravenna – Granarolo/Faenza and Ravenna – Castel Bolognese) are used for freight transport as a double-track line to connect Ravenna with the Adriatic railway line between Bologna and Rimini.

Despite the relevance of rail transport, the port of Ravenna cannot benefit from an optimal connection to the national network, which causes long train operating times. These are further penalized by the interferences occurring in the urban areas, especially on the line south of the Candiano Canal and due to the need of trains to transit through the city station.

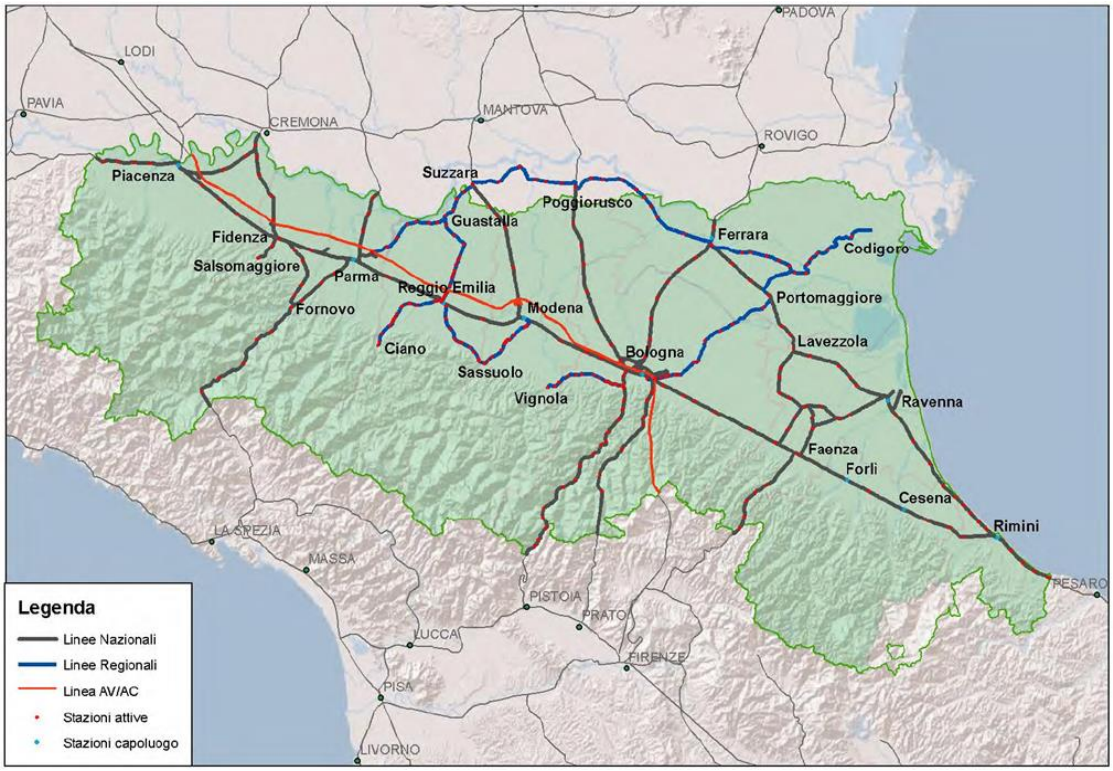

Figure 3 - National and regional railway network in Emilia-Romagna (Source: Emilia-Romagna Region, PRIT2025)

The main technical characteristics of the lines are shown in the table below (Table 4). The railway lines have the typical features to serve the regional passenger transport demand, and they already result to be suitable for freight transport, despite some restrictions concerning axle load and train length, the latter currently limited to 475 m.

Line	Length (km)	Nr. of tracks	Traction	Max speed (km/h)	Axle load	Gauge	Max train length (m)
Ravenna – Rimini	50	1	Electric	130	D4L	P/C 32	< 600 m

Ravenna – Ferrara	73	1	Electric	120	D4	P/C 32	< 600 m
Ravenna – Granarolo (Faenza)	8	1	Electric	135	D4L	P/C 80	< 600 m
Ravenna – Castel Bolognese	41	1	Electric	120	D4L	P/C 80	< 600 m

Table 4 - Characteristics of railway lines of the national network in the area of Ravenna (Source: RFI)

The last mile rail accessibility

The last mile connections of the port of Ravenna to the national rail network are two un-electrified rail tracks that run along the two sides of the Candiano Canal (Figure 4), joining the port to freight station located in the proximity of the Ravenna train station. From here then all the links to the regional and national network, previously described.

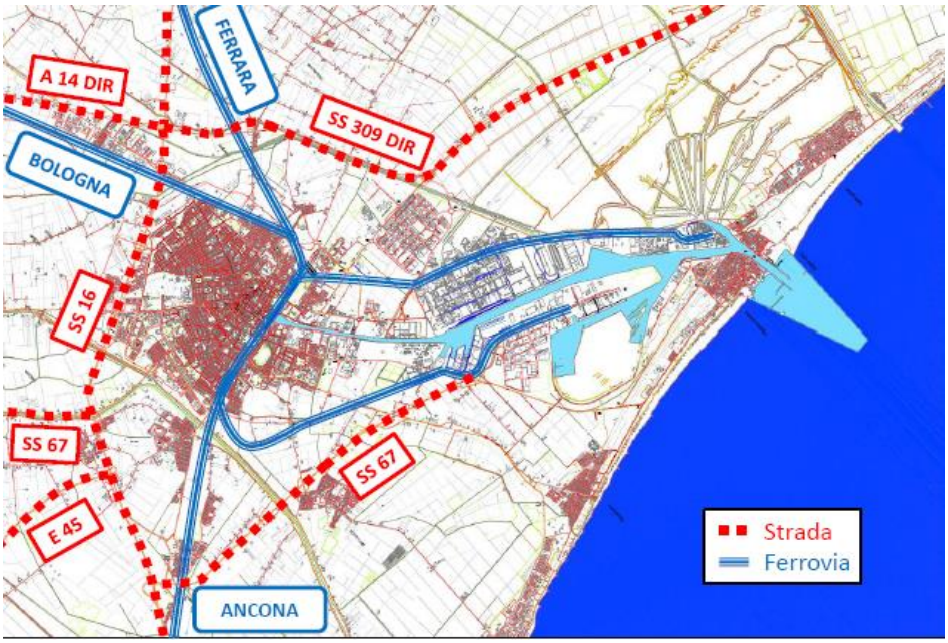

Figure 4 - Rail and road connection of the port of Ravenna to the local networks (Source: Port of Ravenna Authority)

At the port, the internal rail network, whose layout is represented in the figure above (Fig. 4), allows the direct connection of the plants listed below (Table 5).

Connected plants – North track:	Connected plants – South track:
Polynt (liquid chemicals)	Docks Cereali (cereals/flour)
Versalis (liquid chemicals)	Sapir (clay/vegetable oils/minerals)
PIR - La Petrolifera Italo-Rumena (liquid chemicals)	Setramar (steel coils/clay/cereals/flour)
Marcegaglia (steel coils)	TC Ravenna (containerized goods)
IFA (clay/flour)	
Terminal Nord (clay)	

Table 5 - Plants with rail connections at the port of Ravenna (Source: RFI)

At the port of Ravenna, the shunting service is provided by the following companies:

- Serfer SpA;
- Dinazzano Po SpA.

2.1.4 Freight transport links between the port and its catchment area

In the Emilia-Romagna region there are numerous areas used for logistics, cargo handling and modal interchange. These are generally large areas in which several operators in the logistics sector work for third parties. The strategies of regional territorial planning are oriented to support these areas.

One of the declared objectives of regional territorial planning is the integration of logistic nodes and transport networks[2]. So, in 2009 the Emilia-Romagna Region and the FS Group signed a Program Agreement with the aim of rationalizing the transport services of goods managed by RFI. Local authorities and operators agreed to concentrate activities in 9 plants on the RFI network, in addition to the main private connections already active. These nine plants are listed in the following table (Table 6).

	Main nodes			**Main nodes**
1	Piacenza		6	Ravenna
2	Parma freight village		7	Bologna S. Donato (wagons movement)
3	Marzaglia			**Other nodes**
4	Bologna freight village		8	Faenza
5	Villa Selva		9	Lugo

Table 6 - Logistics nodes and regional rail terminals for freight transport in Emilia-Romagna

[2] Prit 2025, Technical Report, page 12

The Parma and Bologna freight villages were recognized by Law n.240/1993, but they were already active years before. Among the most recent in order of time: the Villa Selva freight terminal (in Forlì-Cesena province) was activated on 1 January 2011; the terminal of Marzaglia (in Modena province) became operational in January 2019.

Beside the RFI freight systems, an important role is played also be terminals and regional railway infrastructure for freight transport managed by FER (Emilia-Romagna Railways). Among them, the main plant is at Dinazzano (in Reggio Emilia province). Dinazzano Po carries out services to support the Ceramic District of Sassuolo (in Reggio Emilia and Modena provinces) and the port of Ravenna.

The main rail connections are significantly influenced by the typologies of goods that are hauled by rail. The two most important relations involve Mantua for metallurgical products, through the Piadena terminal (located in Cremona province, outside of Emilia-Romagna region), and Reggio Emilia for ceramic raw materials, through the Dinazzano Po terminal. Other relevant terminals are Melzo (Milan), Cremona, and Parma. It is worth noting the existence of regular rail services on the rail lines directed towards Germany, Poland and France on the itineraries of the relevant EU core network and the Rail Freight Corridors[3].

The following map (Figure 5) presents the main intermodal logistic nodes operating in the catchment area of the port of Ravenna, listed in the first part of this paragraph (Table 6). The regional and national rail networks linking them are highlighted. The TEN-T networks that cross the region are also highlighted.

[3] http://www.rne.eu/rail-freight-corridors/.

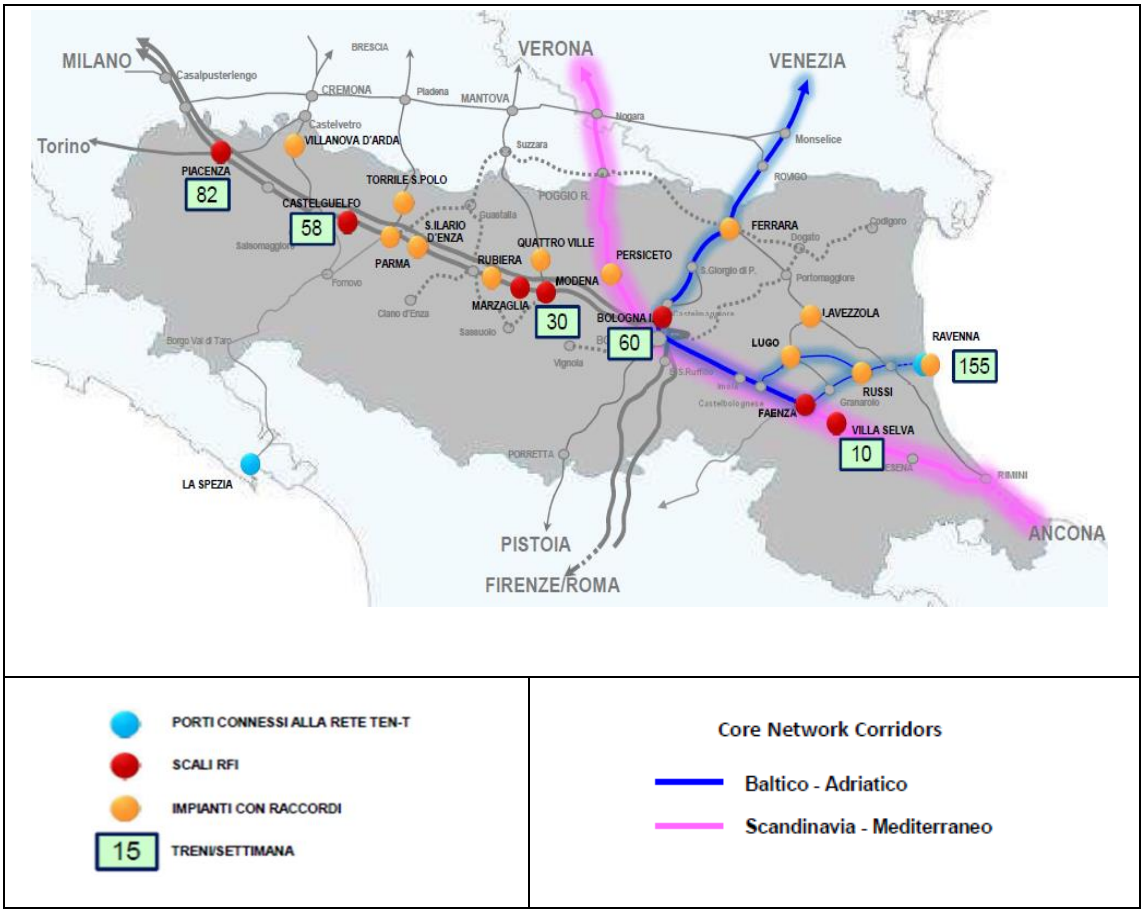

Figure 5 - Main rail terminals for freight transport in Emilia-Romagna region (2016) Source: RFI

From the analysis of the traffic flows of the port of Ravenna and of the main operators settled in it clearly emerges that the catchment area of the port of Ravenna extends beyond the borders of the Emilia-Romagna Region. It reaches numerous provinces that are located in other neighbouring regions, in particular: Lombardy (Bergamo, Brescia, Cremona, Lodi, Mantua, Milan, Monza and Brianza, Pavia), Veneto (Rovigo, Verona), Marche (Ancona, Pesaro-Urbino). Therefore, the port of Ravenna is in connection for the transport of goods with other intermodal logistic nodes, in addition to those described in the first part of this paragraph.

In particular, the port of Ravenna operates with the Piadena terminal (in the province of Cremona), the Milan Melzo terminal (located near Milan), the Cavatigozzi terminal (in the province of Cremona).

The following table shows the main technical characteristics of the intermodal logistic nodes and the rail-road terminals involved in the hinterland logistics chain of the port (Table 7). They are the Parma

and Bologna freight villages, Dinnazzano Po terminal, Piadena terminal, Cavatigozzi terminal, Milan Melzo terminal.

Logistic centre	Technical characteristics
CePIM (Interport of Parma)	Rail terminal: **35,000 m2**
	Warehouse: **2,500,000 m2**
	Intermodal terminal: **6,000,000 m2** (12,000 m2 refrigerated)
	7 rail tracks for loading/unloading
	Terminal services: handling, picking, container maintenance, goods transhipments
Dinnazzano Po	Rail terminal: **300,000 m2**
	8 rail tracks plus **13** rail tracks for loading/unloading
	Highway connections: **A22, A1**
	Specialized services: containers, pallets and bulk goods in particular for ceramics district
Interporto Bologna	Total surface: **4,100,000 m2**
	Warehouse: **580,000 m2**
	17 loading and unloading rail track
	Container terminal: **130,000 m2**
	Intermodal terminal: **140,000 m2**
	Bulk terminal: **50,000 m2**
	Terminal services: handling, heating and cooling, picking, wagons maintenance and repairing, container and swap bodies maintenance, treatment of dangerous goods
Piadena (Cremona)	Total surface: **180,000 m2**
	Warehouse: **10,000 m2** (with internal rail track)
	Equipped workshop: **3,000 m2**
	Additional warehouse: **500 m2** (which can be extended by 20,000 covered m2).
	Facility for recovery of equipment, maintenance, cleaning, supplies and permits, plus a governance office
	6 electrified tracks with direct connection to Piadena railway station (2 of 900 metres, of which 1 for storage and manoeuvres and 1 for internal movement of materials; 2 of 600 metres length for external movement of materials; 2 of 600 metres for intermodal use).
Milano Melzo	**5** electrified tracks (total length of 1300 m)
	Total surface: **160,000 m2**

Logistic centre	Technical characteristics
	Terminal services: handling, custom, handling of dangerous goods, trucking, container repair, container maintenance
Port of Cremona and Rail Freight Terminal Cavatigozzi	**10** electrified tracks (total length of 3,645 m)
Guastalla S.Giacomo	Freight terminal managed by Dinazzano Po

Table 7 - Main Terminals and logistics nodes in connection to the port of Ravenna (Source: several sources including Emilia Romagna Region, The logistic platform in the heart of Europe[4])

Many services for maritime and intermodal freight traffic between the port, its hinterland and its catchment area. The main ones are listed in the table below (Table 8).

Promoter	Route	Type of Traffic	Yearly tonnes transported
Dinazzano Po	Ravenna – Guastalla S.Giacomo	Traditional	203,237
Siderlogistics Consorzio /ASTL	Ravenna - Cava Tigozzi	Land intermodal	214,270
Terminal Nord	Ravenna - Dinazzano	Land intermodal	458,529
SAPIR - Porto Intermodale Ravenna	Ravenna - Dinazzano	Land intermodal	362,040
Spinelli	Milano Smistamento - Ravenna	Maritime Intermodal	59,584
Marcegaglia Carbon Steel	Ravenna - Piadena	Traditional	800,422
Cargo Clay Logistics	Ravenna - Dinazzano	Traditional	251,147
CePIM - Centro Padano Interscambio	Ravenna - Castelguelfo	Land intermodal / Tradional	76,434

Table 8 - Logistics Rail services between port of Ravenna and intermodal terminals (2014) (Source: Emilia-Romagna Region)[5]

2.1.5 Existing services for maritime and intermodal freight traffic in the port of Ravenna

The port of Ravenna operates cargo services with a primarily role and specialisation in dry bulk operations. In addition to oil and chemical products, traffic within the port involves raw materials and

[4] http://mobilita.regione.emilia-romagna.it/presentazioni-convegni-seminari/iniziative-2014-2018/transport-logistic-2017

[5] Monitoraggio 2017, Capitolo 9, La logistica e il trasporto merci e il porto di Ravenna https://mobilita.regione.emilia-romagna.it/allegati/pubblicazioni/monitoraggio/monitoraggio_2017/monitoraggio2017_cap9_logistica.pdf

finished goods from the ceramics district, metallurgical products, timber and agri-food production. Also, significant operations are those of containerised traffic handled within two terminals at the port as well as the Ro-Ro segment.

In addition, other services are available within the port of Ravenna, in particular: administrative services, freight commercial services, freight handling at port terminals, rail transport and shunting operations, freight handling at inland terminals, freight transport, terminal operations, road transport operations.

The following table summarizes the main services currently provided in the port of Ravenna and the subject that supplies them:

Agent	Type of service
Port Authority	Administrative services
Customs Agency	Administrative services
Harbor Masters Office	Administrative services
Maritime Health Office	Administrative services
Phytosanitary Office	Administrative services
Financial Police	Administrative services
State Police	Administrative services
State Prefecture	Administrative services
Freight forwarders	Freight commercial services
Shipping agents	Freight commercial services
Terminal operators	Freight handling at port terminals
Rail transport operators	Rail transport and shunting operations
Road transport operator	Road transport operations
Rail-Road/Freight Terminals	Freight handling at inland terminals
Multimodal Transport Operators (MTO)	Freight transport and terminal operations

Table 9 - Actors and services provided for freight transport and logistics Source: Ravenna Port Authority

2.2 Subsection A.2 – Multimodal transport: supply and demand analysis

2.2.1 Introduction

The aim of this sub-section is twofold. It starts with the analysis of the flows of goods loaded and unloaded in containers in the port of Ravenna in recent years. It is a part of the imports and exports of some Italian provinces (those that make up the “catchment area of the Port”) and which pass through the port of Ravenna.

The second objective of this sub-section is the quantification of the port's potential market. The potential market of the port is constituted by the demand and the supply of goods that transit in the port and that are formed and originate in the national and foreign basins of the port.

On the one hand, the potential demand is represented by all the goods purchased by Italian companies in foreign markets with which the port operates. When this commodity arrives in Italy, it composes the imports of the national productive system. On the other hand, the potential supply is represented by all the goods sold by Italian companies in foreign markets with which the port operates. When this commodity leaves Italy to reach the foreign destination, it composes the exports of the national production system.

Therefore, the analysed goods flows are imports and exports of some provinces of Central-Northern Italy, which represent the "national catchment area of the port of Ravenna". Within the national basin the demand for goods coming from foreign countries is generated and the goods that are sent abroad are produced.

The so-called "foreign catchment area of the port of Ravenna" is a group of foreign countries with which the port of Ravenna usually operates. These countries demand the goods exported from the Italian provinces and in these countries goods, that are requested by economic operators located in the Italian provinces, are produced.

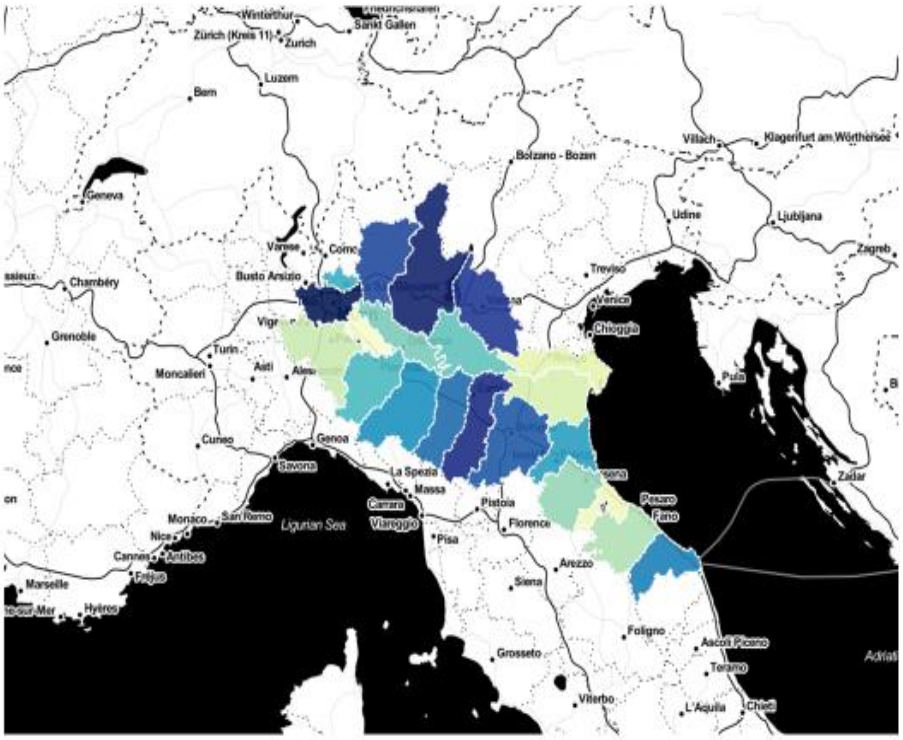

Figure 6 - National catchment area of the port of Ravenna (Source: elaboration by ITL Foundation on TCR information)

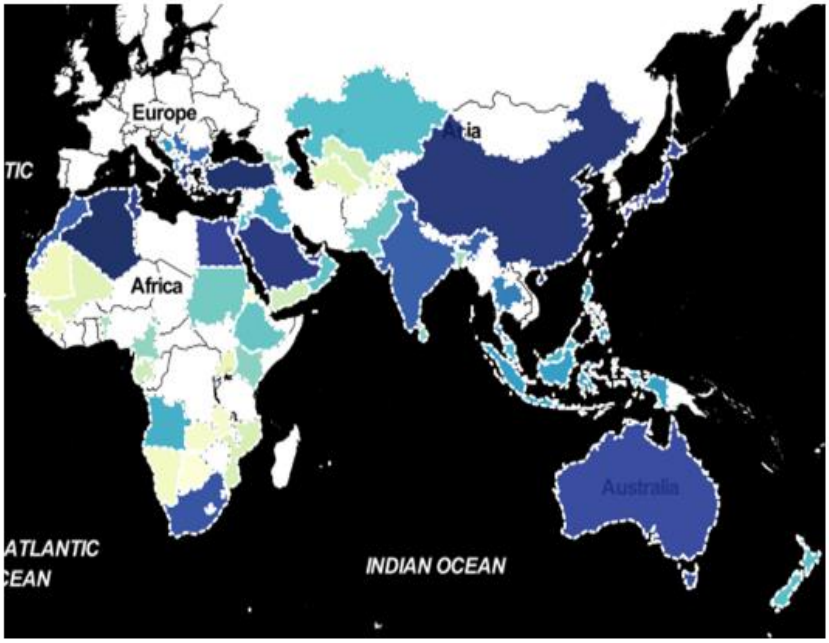

Figure 7 - Foreign catchment area of the port of Ravenna (Source: elaboration by ITL Foundation on TCR information)

2.2.2 Methodological notes

This sub-paragraph describes the flows of manufacturing goods of 21 provinces that constitutes the national catchment area of the port of Ravenna and which exchange with 80 foreign countries (which in turn represent the port's foreign catchment area). These flows of goods considered are both imports from abroad to the 21 selected provinces and exports to 80 selected foreign countries in connection with the port. The products taken into consideration are the manufacturing production described with the 2007 Ateco codes from CA to CM (see the Annex for details).

2.2.3 Containerized cargo flows in the port of Ravenna

In the port of Ravenna 216k Teus were handled in 2018 (Table 10). After the strong increase recorded in 2015, the data returned to those of previous years. For three years, since 2015, container flows have been falling. In 2018 the values have returned to those registered in 2012-13.The inflows and outflows are substantially balanced: during the same year we note that the containers inwards are generally of the same order of magnitude as those outwards, with differences not exceeding some thousands Teus, alternately now for the inwards now for the outwards (Table 10). However, since 2015 the inwards containers are always higher than the outwards ones, even if only slightly (Figure 8 and Table 10).

	2009	2010	2014	2015	2016	2017	2018
Inwards	91.184	90.804	110.852	124.579	118.436	113.924	110.545
Outwards	93.838	92.773	111.696	120.234	116.075	109.445	105.775
Total (In + Out)	185.022	183.577	222.548	244.813	234.511	223.369	216.320

Table 10 - Number of containers inwards and outwards in the port of Ravenna (TeUs) (Source: elaborations by ITL Foundation on data by Port of Ravenna Authority)

As it happens in other Italian ports, also the handling of containers in the port of Ravenna is considered from year to year, and it presents alternating trends between 2009 and 2015: the dynamics for Ravenna are in some years positive in others negative, but the signs are different compared to national average. In particular, between 2009 and 2012, when the national average grows, the Ravenna data decreases and vice versa. For example: between 2011 and 2012 the flows for the Port of Ravenna decreased by -3.3%, while the national average returned to growth by 1% and the first 20 European ports continue to grow (+3.5%). And then in the period between 2013 and 2014, the movement of containerized goods in the port of Ravenna experienced a setback, with inwards that decreased by -2.7% and outwards only by -0.9% (Table 11 and Figure 8), while in Italian ports there is an average growth by +1.4%.

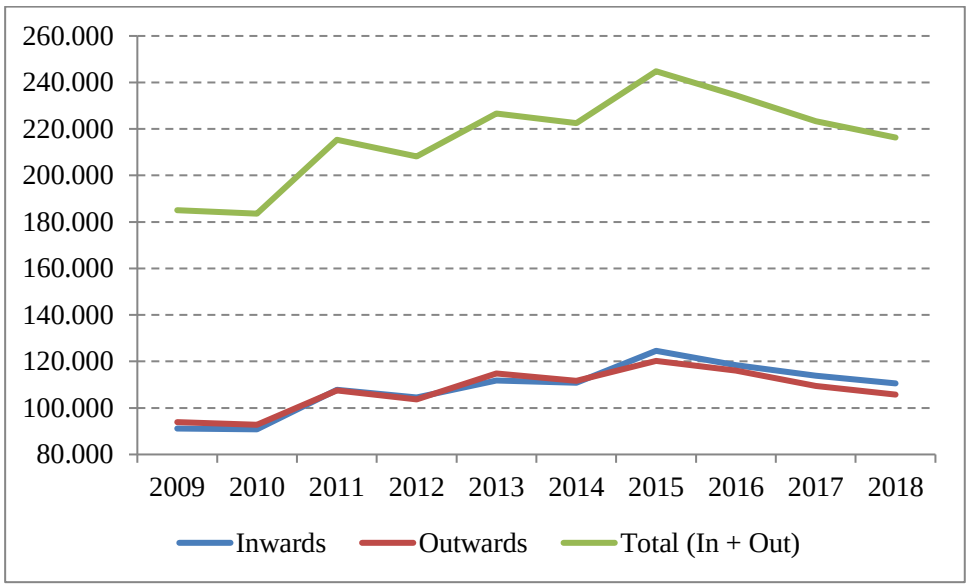

Figure 8 - Containers flows in the port of Ravenna (Source: elaborations by ITL Foundation on data by Port of Ravenna Authority)

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18

Inwards	-0,4	18,7	-3,0	7,0	-0,9	12,4	-4,9	-3,8	-3,0
Outwards	-1,1	15,9	-3,6	10,8	-2,7	7,6	-3,5	-5,7	-3,4
Total (In + Out)	-0,8	17,3	-3,3	8,9	-1,8	10,0	-4,2	-4,8	-3,2

Table 11 - Dynamics of inwards and outwards containers in the port of Ravenna (percentage changes) (Source: elaborations by ITL Foundation on data by Port of Ravenna Authority)

2.2.4 Catchment area of Ravenna port and containerizable freight flows

The national catchment area of the Port of Ravenna consists of 21 provinces of Central-Northern Italy, belonging to the regions of Emilia Romagna, Lombardy, Veneto (with the provinces of Verona and Rovigo only) and Marche (with the provinces of Ancona and Pesaro-Urbino only).

Imports and exports of the 21 provinces of the national catchment area, limited to the products of the manufacturing sector, are the potential flows of containerizable goods for the Port of Ravenna.

The following table (Table 12) shows the figures in Teus of import and export of the national catchment area of the port of Ravenna, that could be potential flows of the port.

From one million Teus reached in 2009 (not shown in Table 12), there are about 1.3 million Teus possible inwards and outwards between 2011 and 2014. In 2015, almost 1.5 million are reached (Tab. 12). And so between 2016 and 2018 flows registered increases (Table 12).

	2014	2015	2016	2017	2018
Import (1)	735.657	826.462	842.326	881.450	941.360
Export (2)	628.715	652.518	653.495	628.374	614.129
Total (1 + 2)	1.364.372	1.478.980	1.495.821	1.509.824	1.555.489

Table 12 - Import and export of the catchment area of the port of Ravenna (Teus) (Source: elaborations by ITL Foundation on Istat, Coeweb data)

The following table (Table 13) contains the values in millions of euros, in tonnes and in Teus of the flows recorded in 2018 in the catchment area of the port of Ravenna.

Analyzing the data of the container flows of the port (see Table 10 above), we note that the containers entering and leaving the port amount to 216.320 Teus, while the potential market amounts to 1.5 million Teus. The potential market is seven times the current flow of the port of Ravenna. **14% of potential flows transit through the port of Ravenna**.

	Export	Import
Flows in value (Mio euro)	45.473	39.706
Flows in quantity (ton.)	8.925.000	14.240.000

n. containers (Teus)	614.129	941.360

Table 13 - Trade of the catchment area of the port of Ravenna (2018) Source: elaborations by ITL Foundation on Istat, Coeweb data

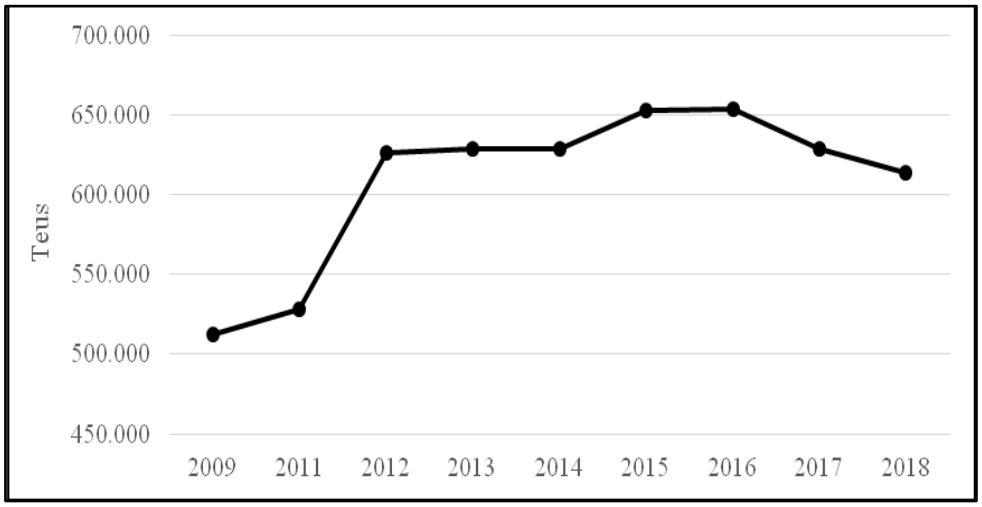

Figure 9 - Export of the national catchment area of the port of Ravenna (Teus; 2009; 2011-2018) Source: elaborations by ITL Foundation on Istat, Coeweb data

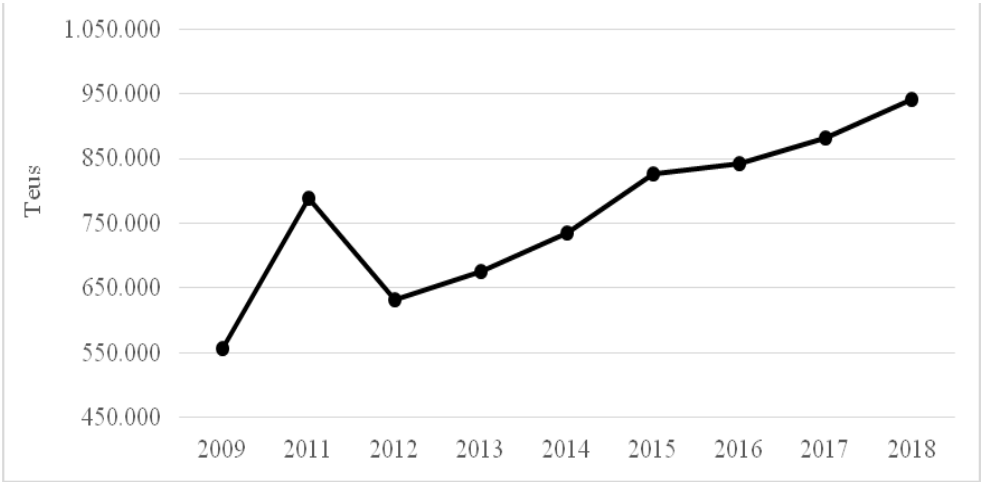

Figure 10 - Import of the national catchment area of the port of Ravenna (Teus; 2009; 2011-2018) Source: elaborations by ITL Foundation on Istat, Coeweb data

In the next six sub-paragraphs, exports and imports are presented by geographical area, by kind of product, by Italian province in the catchment area of the port of Ravenna.

2.2.5 Freight flows to foreign geographical areas in relation to the port of Ravenna

In 2018 exports from the 21 Italian provinces (the national catchment area of the port) to the foreign catchment area of the port of Ravenna suffered a further contraction, after that in 2017 (Tab. 14, as shown in Figure 9). Figures of 2018 are back to 2012 (not shown in Tab. 14).

The countries of North Africa contributed most to this decline, having fallen by almost 45% since 2015. Apart from the Middle East, which fell by more than 10%, the other geographical areas recorded growth dynamics in the period 2014-18 (Tab. 14).

Please note that between 2008 and 2009 in Italy there was the first phase of the financial crisis that involved all Western countries. The second phase of crisis was concentrated between 2011 and 2013. So the 2014 figures are lower, mainly for that cause.

Geographical areas of destination of freight	**2014**	**2015**	**2016**	**2017**	**2018**
North Africa	146.618	150.394	146.929	94.440	86.765
Other African Countries	37.561	34.645	33.596	36.486	33.678
Central Asia	24.058	26.985	28.524	30.129	34.380
East Asia	125.732	124.291	136.938	142.111	150.024
Middle East	128.741	133.663	124.741	129.317	117.905
Oceania	25.329	26.758	26.158	26.759	27.186
non-UE European Countries	79.936	95.104	92.377	98.031	90.585
European Union 28 (only 4 Countries)	60.740	60.678	64.232	71.101	73.606
Total	**628.715**	**652.518**	**653.495**	**628.374**	**614.129**

Note: the European Union considered consists of only four countries: Bulgaria, Cyprus, Greece, Malta.

Table 14 - Manufacturing exports of the national catchment area of the port of Ravenna by geographical area of destination (the 80 foreign countries in relation to the port) (Teus) Source: elaborations by ITL Foundation on Istat, Coeweb data

Between 2017 and 2018 manufacturing export decreases by -2.3% (Table 15). A smaller drop than in the previous period (-3.8%, 2016-17). Exports to Central Asia continue to increase (+14% in the last period, but positive dynamics also in previous years, Table 15) and also to East Asia (China) and to the four selected Countries of the EU28. Exports to Africa and Middle East decrease, -15% and -9% (Table 15).

Geographical areas	**2014/15**	**2015/16**	**2016/17**	**2017/18**

of destination of freight				
North Africa	2,6	-2,3	-35,7	-8,1
Other African Countries	-7,8	-3,0	8,6	-7,7
Central Asia	12,2	5,7	5,6	14,1
East Asia	-1,1	10,2	3,8	5,6
Middle East	3,8	-6,7	3,7	-8,8
Oceania	5,6	-2,2	2,3	1,6
non-UE European Countries	19,0	-2,9	6,1	-7,6
European Union 28 (only 4 Countries)	-0,1	5,9	10,7	3,5
Total	**3,8**	**0,1**	**-3,8**	**-2,3**

Note: the European Union considered consists of only four countries: Bulgaria, Cyprus, Greece, Malta.

Table 15 - Export dynamics of the national catchment area of the port of Ravenna (percentage changes) Source: elaborations by ITL Foundation on Istat, Coeweb data

2.2.6 Freight flows by kind of good to foreign geographical areas in relation to the port of Ravenna

In the period in question, manufacturing exports had significant medium-term dynamics in the agri-food products sector (growing in all years), in the textile and clothing sector (+10% in the last three years), in the computer sector, electronic and optical devices (+20% in the last two years).

Exports of other products recorded significant decreases in this period (Table 17).

Manufacturing products	2014	2015	2016	2017	2018
CA – food products	85.584	101.004	103.455	108.819	115.805
CB – textiles and clothing	13.521	12.744	13.115	14.073	14.204
CC – wood, paper, printing	22.703	25.502	25.739	26.225	25.492
CD – coke, refined petroleum products	12.311	15.267	17.557	16.291	18.487
CE – chemical products	90.177	87.147	87.608	86.104	88.981
CF – pharmaceutical products	2.972	2.676	2.827	3.131	2.688
CG – rubber, plastic and non-metallic minerals	129.691	135.445	137.391	144.658	136.915
CH – metals and metal products (excluding machines and plants)	135.790	134.829	128.662	91.853	81.723
CI – computers, electronic and optical devices	2.738	2.597	2.548	2.694	3.110
CJ – electrical appliances	33.827	33.877	33.130	32.516	30.941
CK – machinery and equipment.	67.548	68.478	69.622	72.348	68.536

CL – means of transport	17.898	18.370	18.288	17.289	14.813
CM – products of other manufacturing activities	13.955	14.582	13.552	12.371	12.435
Total	**628.715**	**652.518**	**653.495**	**628.374**	**614.129**

Table 16 - Manufacturing export of national catchment area of the port of Ravenna by kind of good (Teus) Source: elaborations by ITL Foundation on Istat, Coeweb data

Manufacturing products	2014/15	2015/16	2016/17	2017/18
CA – food products	18,0	2,4	5,2	6,4
CB – textiles and clothing	-5,7	2,9	7,3	0,9
CC – wood, paper, printing	12,3	0,9	1,9	-2,8
CD – coke, refined petroleum products	24,0	15,0	-7,2	13,5
CE – chemical products	-3,4	0,5	-1,7	3,3
CF – pharmaceutical products	-10,0	5,6	10,8	-14,1
CG – rubber, plastic and non-metallic minerals	4,4	1,4	5,3	-5,4
CH – metals and metal prod. (excluding machines/plants)	-0,7	-4,6	-28,6	-11,0
CI – computers, electronic and optical devices	-5,1	-1,9	5,7	15,4
CJ – electrical appliances	0,1	-2,2	-1,9	-4,8
CK – machinery and equipment.	1,4	1,7	3,9	-5,3
CL – means of transport	2,6	-0,4	-5,5	-14,3
CM – products of other manufacturing activities	4,5	-7,1	-8,7	0,5
Total	**3,8**	**0,1**	**-3,8**	**-2,3**

Table 17 - Export dynamics of national catchment area of the port of Ravenna by kind of good (percentage change) Source: elaborations by ITL Foundation on Istat, Coeweb data

2.2.7 Freight flows by Italian provinces of the national catchment area to foreign geographical areas in relation to the port of Ravenna

In the last year, between 2017 and 2018, exports of manufactured products fell significantly throughout the national catchment area. The greatest contractions are recorded in the two provinces of the Marche, in Mantua and Brescia for Lombardy, in Ferrara and Parma for Emilia (Table 19). Exceptions are Piacenza, Ravenna, Rimini and Bologna in Emilia-Romagna, Bergamo and Lodi in Lombardy (Table 19).

Italian provinces (the national catchment area)	2014	2015	2016	2017	2018
Piacenza	16.998	18.034	16.120	14.291	14.905

Parma	27.075	30.112	29.779	26.513	24.098
Reggio Emilia	30.936	33.467	32.924	33.991	33.412
Modena	69.621	72.753	75.527	76.330	74.992
Bologna	39.307	40.673	39.499	40.199	41.485
Ferrara	8.348	8.130	6.422	6.588	5.917
Ravenna	20.546	18.169	18.398	22.215	24.929
Forlì-Cesena	12.817	13.381	14.074	15.176	14.522
Rimini	5.275	6.051	6.100	5.873	6.185
Bergamo	40.650	40.512	45.836	40.948	43.546
Brescia	77.397	75.638	65.806	44.741	38.859
Cremona	14.261	15.798	14.434	15.087	14.774
Lodi	4.754	5.308	5.806	5.803	6.282
Mantua	14.927	16.271	17.671	18.817	16.166
Milan	130.090	132.530	140.353	137.359	138.520
Monza e Brianza	21.347	24.622	24.015	24.429	23.821
Pavia	9.362	9.235	8.471	9.196	8.871
Rovigo	6.498	7.322	6.178	5.528	5.505
Verona	42.693	44.860	45.903	45.300	43.931
Ancona	26.250	30.038	31.305	31.158	26.333
Pesaro e Urbino	9.563	9.614	8.874	8.832	7.076
Total	**628.715**	**652.518**	**653.495**	**628.374**	**614.129**

Table 18 - Manufacturing export of national catchment area of the port of Ravenna by Italian province (Teus) Source: elaborations by ITL Foundation on Istat, Coeweb data

Italian provinces (the national catchment area)	2014/15	2015/16	2016/17	2017/18
Piacenza	6,1	-10,6	-11,3	4,3
Parma	11,2	-1,1	-11,0	-9,1
Reggio Emilia	8,2	-1,6	3,2	-1,7
Modena	4,5	3,8	1,1	-1,8
Bologna	3,5	-2,9	1,8	3,2
Ferrara	-2,6	-21,0	2,6	-10,2
Ravenna	-11,6	1,3	20,7	12,2
Forlì-Cesena	4,4	5,2	7,8	-4,3
Rimini	14,7	0,8	-3,7	5,3
Bergamo	-0,3	13,1	-10,7	6,3
Brescia	-2,3	-13,0	-32,0	-13,1
Cremona	10,8	-8,6	4,5	-2,1

Lodi	11,7	9,4	-0,1	8,3
Mantua	9,0	8,6	6,5	-14,1
Milan	1,9	5,9	-2,1	0,8
Monza e della Brianza	15,3	-2,5	1,7	-2,5
Pavia	-1,4	-8,3	8,6	-3,5
Rovigo	12,7	-15,6	-10,5	-0,4
Verona	5,1	2,3	-1,3	-3,0
Ancona	14,4	4,2	-0,5	-15,5
Pesaro e Urbino	0,5	-7,7	-0,5	-19,9
Total	**3,8**	**0,1**	**-3,8**	**-2,3**

Table 19 - Export dynamics of national catchment area of the port of Ravenna by Italian province (Teus) Source: elaborations by ITL Foundation on Istat, Coeweb data

2.2.8 Freight flows from foreign geographical areas in relation to the port of Ravenna

Between 2014 and 2018 imports of manufactured products from the national catchment area of the port of Ravenna increased by just over 25%, from 735 thousand to 941 thousand Teus. The greatest contribution is provided by East Asia (China), Central Asia (India) and the countries of North Africa (Table 20 and Table 21).

In the preceding period between 2009 and 2014, manufacturing imports of the provinces that make up the national catchment area of the Port of Ravenna increased by 32%, going from 556 thousand Teus to almost 735 thousand Teus (data not shown in Table 19 nor in Table 20 below). The increase was concentrated between 2009 and 2011, with almost 42% of total values. During the economic-financial crisis, production suffered significant decreases (think of the GDP dynamics in the same period) and this contributed to significantly reduce imports over the years between 2011 and 2012. Even in that period the largest imports came from East Asia (in particular from China).

Geographical area of origin of freight	2014	2015	2016	2017	2018
North Africa	71.563	65.025	76.763	94.490	94.188
Other African Countries	32.620	32.185	33.242	27.138	25.049
Central Asia	87.494	70.810	73.888	111.703	107.517
East Asia	320.955	381.609	396.890	371.475	407.432
Middle East	87.018	121.506	102.214	80.672	90.683
Oceania	3.962	6.003	3.562	4.994	4.891
non-UE European Countries	96.328	112.590	116.089	133.506	165.021
European Union 28 (only 4 Countries)	35.717	36.734	39.678	57.472	46.580
Total	**735.657**	**826.462**	**842.326**	**881.450**	**941.361**

Note: the European Union considered consists of only four countries: Bulgaria, Cyprus, Greece, Malta.

Table 20 - Manufacturing imports of the national catchment area of the port of Ravenna by geographical area of origin (the 80 foreign countries in relation to the port) (Teus) Source: elaborations by ITL Foundation on Istat, Coeweb data

Geographical area of origin of freight	2014/15	2015/16	2016/17	2017/18
North Africa	-9,1	18,1	23,1	-0,3
Other African Countries	-1,3	3,3	-18,4	-7,7
Central Asia	-19,1	4,3	51,2	-3,7
East Asia	18,9	4,0	-6,4	9,7
Middle East	39,6	-15,9	-21,1	12,4
Oceania	51,5	-40,7	40,2	-2,1
non-UE European Countries	16,9	3,1	15,0	23,6
European Union 28 (only 4 Countries)	2,8	8,0	44,8	-19,0
Total	**12,3**	**1,9**	**4,6**	**6,8**

Note: the European Union considered consists of only four countries: Bulgaria, Cyprus, Greece, Malta.

Table 21 - Import dynamics of the national catchment area of the port of Ravenna (percentage changes) Source: elaborations by ITL Foundation on Istat, Coeweb data

2.2.9 Freight flows by kind of good from foreign geographical areas in relation to the port of Ravenna

In the period between 2014 and 2018, manufacturing imports had significant dynamics in the metals sector excluding machinery (+60%, from 205 thousand to 323 thousand Teus), in the chemical products sector (+22%, from 135 thousand to 167 thousand Teus), in the sector of machinery and equipment (almost +30%), and in the electrical equipment sector (although in volume it is of lesser importance than those mentioned before: 53 thousand Teus in 2018). In addition, also wooden and paper products increased in this period, but their volume was not so great as the previous ones: almost 18 thousand Teus in 2018.

Although on average the imports of the national catchment area of the port of Ravenna have increased, some kinds of product have registered a decrease. Among these, agri-food products decreased by 10%, going from 109 thousand Teus to almost 97 thousand. However, it is important to point out that despite some drops, no other product has registered a reduction in volumes from 2014 to 2018 such as food.

Manufacturing products	2014	2015	2016	2017	2018
CA – food products	109.123	108.906	103.206	98.950	96.755
CB – textiles and clothing	47.664	46.226	47.183	49.308	49.261

Manufacturing products	2014	2015	2016	2017	2018
CC – wood, paper, printing	14.411	14.856	14.764	15.831	17.817
CD – coke, refined petroleum products	53.043	51.064	44.566	63.394	64.260
CE – chemical products	135.232	133.677	147.575	161.890	167.371
CF – pharmaceutical products	4.144	4.015	4.576	3.985	3.912
CG – rubber, plastic and non-metallic minerals	46.644	49.734	52.937	57.068	59.638
CH – metals and metal products (excluding machines and plants)	205.287	293.593	292.049	280.708	323.164
CI – computers, electronic and optical devices	8.188	7.754	8.658	8.555	9.263
CJ – electrical appliances	38.670	41.764	45.266	52.330	53.634
CK – machinery and equipment.	33.075	33.431	36.754	40.166	43.580
CL – means of transport	23.502	24.913	27.886	31.339	33.314
CM – products of other manufacturing activities	16.674	16.529	16.906	17.926	19.392
Total	**735.657**	**826.462**	**842.326**	**881.450**	**941.361**

Table 22 - Manufacturing import of national catchment area of the port by kind of good (Teus) Source: elaborations by ITL Foundation on Istat, Coeweb data

Manufacturing products	2014/15	2015/16	2016/17	2017/18
CA – food products	-0,2	-5,2	-4,1	-2,2
CB – textiles and clothing	-3,0	2,1	4,5	-0,1
CC – wood, paper, printing	3,1	-0,6	7,2	12,5
CD – coke, refined petroleum products	-3,7	-12,7	42,2	1,4
CE – chemical products	-1,1	10,4	9,7	3,4
CF – pharmaceutical products	-3,1	14,0	-12,9	-1,8
CG – rubber, plastic and non-metallic minerals	6,6	6,4	7,8	4,5
CH – metals and metal prod. (excluding machines/plants)	43,0	-0,5	-3,9	15,1
CI – computers, electronic and optical devices	-5,3	11,7	-1,2	8,3
CJ – electrical appliances	8,0	8,4	15,6	2,5
CK – machinery and equipment.	1,1	9,9	9,3	8,5
CL – means of transport	6,0	11,9	12,4	6,3
CM – products of other manufacturing activities	-0,9	2,3	6,0	8,2
Total	**12,3**	**1,9**	**4,6**	**6,8**

Table 23 - Import dynamics of national catchment area of the port by kind of products (%) Source: elaborations by ITL Foundation on Istat, Coeweb data

2.2.10 Freight flows by Italian provinces of the national catchment area from foreign geographical areas in relation to the port of Ravenna

As said, between 2014 and 2018, in all the provinces, which constitute the national catchment area of the port of Ravenna, manufacturing imports recorded positive dynamics unlike exports. It is important to note that the imports of the provinces of Lombardy are more than double the imports of the provinces of Emilia-Romagna. Moreover, in the last few years, apart from Pavia, imports of all the Lombard provinces have also increased in significant percentages. Instead in the provinces of Emilia-Romagna there are numerous cases of contraction of imports. In Emilia-Romagna imports always increase only in Reggio Emilia and Rimini.

Italian provinces (the national catchment area)	2014	2015	2016	2017	2018
Piacenza	20.226	22.287	22.091	22.076	23.397
Parma	31.293	31.545	28.892	32.818	31.647
Reggio Emilia	23.972	31.385	31.401	37.635	38.064
Modena	21.601	23.948	22.435	22.435	23.098
Bologna	33.386	36.982	38.389	39.765	39.667
Ferrara	4.470	5.548	3.769	3.591	3.779
Ravenna	58.077	51.958	53.403	80.838	65.253
Forlì-Cesena	18.480	23.297	21.518	20.218	18.476
Rimini	9.265	9.695	11.310	11.350	11.981
Bergamo	41.129	47.133	49.402	51.245	56.410
Brescia	53.691	65.285	67.454	61.599	66.274
Cremona	11.971	22.934	27.274	31.834	41.698
Lodi	4.983	4.818	6.346	7.301	7.447
Mantua	60.551	99.139	102.871	73.451	124.037
Milan	231.738	237.178	238.765	247.202	264.026
Monza e Brianza	23.771	29.980	33.314	34.066	38.769
Pavia	27.533	24.954	21.105	28.250	17.369
Rovigo	5.169	5.698	5.713	8.067	8.728
Verona	30.047	31.438	36.066	46.385	41.503
Ancona	17.572	13.229	13.086	13.085	10.747
Pesaro e Urbino	6.732	8.031	7.722	8.239	8.991
Total	**735.657**	**826.462**	**842.326**	**881.450**	**941.361**

Table 24 - Manufacturing import of national catchment area of the port of Ravenna by Italian province (Teus) Source: elaborations by ITL Foundation on Istat, Coeweb data

Italian provinces (the national catchment area)	2014/15	2015/16	2016/17	2017/18
Piacenza	10,2	-0,9	-0,1	6,0
Parma	0,8	-8,4	13,6	-3,6
Reggio Emilia	30,9	0,1	19,9	1,1
Modena	10,9	-6,3	0,0	3,0
Bologna	10,8	3,8	3,6	-0,2
Ferrara	24,1	-32,1	-4,7	5,2
Ravenna	-10,5	2,8	51,4	-19,3
Forlì-Cesena	26,1	-7,6	-6,0	-8,6
Rimini	4,6	16,7	0,4	5,6
Bergamo	14,6	4,8	3,7	10,1
Brescia	21,6	3,3	-8,7	7,6
Cremona	91,6	18,9	16,7	31,0
Lodi	-3,3	31,7	15,0	2,0
Mantua	63,7	3,8	-28,6	68,9
Milan	2,3	0,7	3,5	6,8
Monza e della Brianza	26,1	11,1	2,3	13,8
Pavia	-9,4	-15,4	33,9	-38,5
Rovigo	10,2	0,3	41,2	8,2
Verona	4,6	14,7	28,6	-10,5
Ancona	-24,7	-1,1	-0,0	-17,9
Pesaro e Urbino	19,3	-3,8	6,7	9,1
Total	**12,3**	**1,9**	**4,6**	**6,8**

Table 25 - Import dynamics of national catchment area of the port of Ravenna by Italian province (Teus) Source: elaborations by ITL Foundation on Istat, Coeweb data

2.3 Subsection A.3 – Tools and measures supporting multimodal transport (policies, plans, etc.)

This sub-section is the existing “as is” scenario in terms of territorial plans and policies, it is a description of the current regulatory framework. A description of main strategic territorial plans and territorial policies for enhancement of maritime and intermodal freight transport in the territory of the port of Ravenna.

Main sources are the Operational Plan of Ravenna Port, the "Piano Territoriale di Coordinamento Provinciale" (PTCP) by the Province of Ravenna, the Regional Integrated Transport Plan (PRIT 2025).

2.3.1 Introduction

In regional transport planning documents the territory of the Emilia-Romagna is identified as a large area that joins national flows of people and goods, with a strategic role in the Italian economic and infrastructural system, not only road but also rail.

The Emilia-Romagna region is the core of the main corridors between the north and south of the Country, below briefly described (Prit 2025, Technical Report, p.12[6]):

1) the central dorsal corridor, consisting of the A1 motorway, the Bologna ring road junction and the new high-speed rail network;
2) the Adriatic corridor, consisting of the A14 motorway, the SS16 Adriatic national road with its southern branches towards Orte-Civitavecchia and its northern branches towards Mestre (near Venice), and integrated with the **port of Ravenna** for Mediterranean transport;
3) the *Tyrrhenian-Brenner route*, consisting of the Brenner railway axis, from the Parma-La Spezia railway line, from the A22 Brenner and A15 Cisa motorways.

In Emilia Romagna the main nodes of these corridors are: the airport of Bologna, the railway station of Bologna, the Medio Padana station of Reggio Emilia, the **port of Ravenna**; for logistics: the freight villages of Bologna and Parma, the railway freight stations of Marzaglia-Dinazzano and the rail terminal of Le Mose at Piacenza.

So it is evident that the port of Ravenna and its catchment area (as described in previous sub-sections) occupy a central role in the transport and logistics context of the region.

2.3.2 Improving the intermodal connections

In the main territorial planning documents mentioned in the introduction (§A3.1) the attention of the planner focuses on the need for improving the accessibility of the port of Ravenna and the need for improving the intermodal connections of the port with its catchment area and its hinterland.

The main objectives are:

[6] https://mobilita.regione.emilia-romagna.it/allegati/prit/adozione/relazionetecnicaprit2025.pdf/@@download/file/RelazioneTecnicaPrit2025.pdf.

a) to identify possible interventions to promote the modal shift from only road to intermodal transport on short distances;
b) to enhance rail connections between regional logistic intermodal nodes.

The mains interventions are not on the corridors but inside the node, in particular rail freight terminal.

At the Port of Ravenna (2.3.3) the most important planned interventions are aggregated into three groups: P142A (subdivided in three activities, see the table below and 2.3.4); P142B (a new rail station, see 2.3.5); other interventions (2.3.5).

Logistic node	Project ID	Interventions
Port of Ravenna	P142A	1. Rails extension on the right side of the Candiano Canal
		2. Suppression of the level crossing in via Canale Molinetto
		3. Adjustment of the silhouette of the overpass Teodorico
	P142B	A new station at the base rail track
	Other interventions	1. Activation of junction on the left side of the Candiano Canal
		2. Realization of other seven tracks and their electrification
		3. Transformation of the base rail track into tracks for arrivals and departures

Table 26 - Main projects Source: Program Contract 2017-21 Investment between Italian Ministry of Infrastructure and RFI

2.3.3 Interventions at the Port of Ravenna

At the Port of Ravenna the main interventions concern the "Activity P142A: Port of Ravenna" (§ A3.3.1), the "Activity P142B: Port of Ravenna – completion" (§ A3.3.2), "Other interventions" (§ A3.3.3). The first two are contained both in the "Contratto di Programma 2017-2021, investment part" between RFI and the Ministry of Infrastructure and Transport and in the Operational Plan 2017-2019 of the Port of Ravenna Authority.

The "Other interventions" are contained in the Memorandum of Understanding for the development of the Ravenna railway junction and the optimization of the freight traffic signed by RFI and Port of Ravenna in November 2017.

2.3.4 Activity P142A: Port of Ravenna

Both in the "Contratto di Programma 2017-2021" between RFI and the Ministry of Infrastructure and Transport and in the Operational Plan 2017-2019 of the Port of Ravenna Authority, the code P142A identifies the three infrastructure interventions described below (and the Annex).

The three interventions described in this paragraph are necessary to adapt the railway connections of the Port of Ravenna to the standards required by European legislation (see TEN-T guidelines) regarding railway infrastructure.

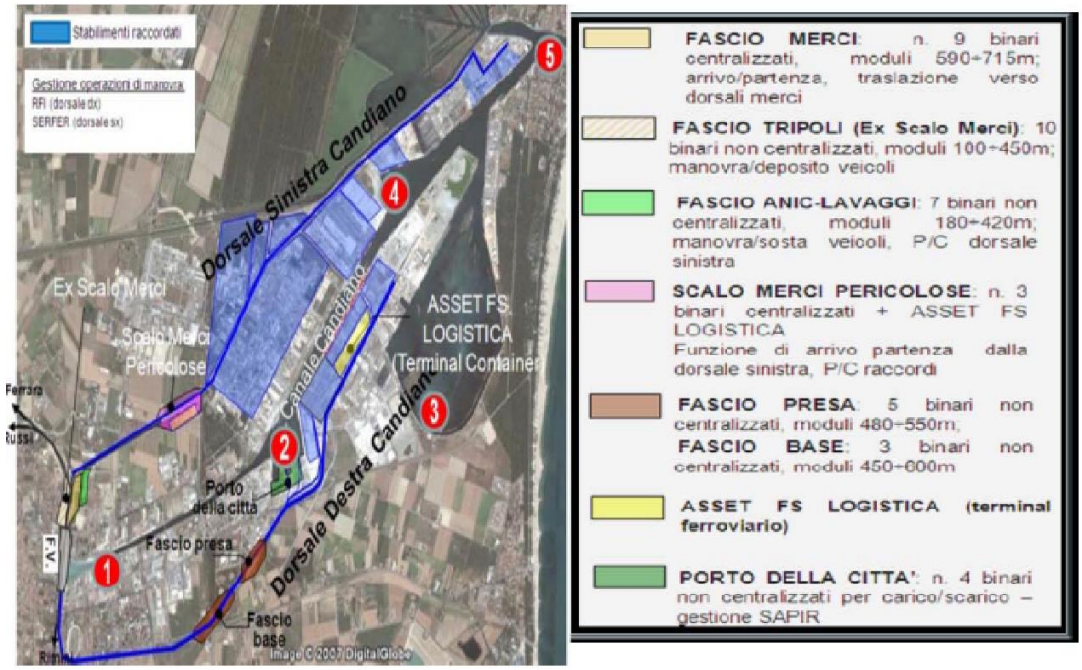

Figure 11 - Interventions in the Port of Ravenna

1. ***Rails extension on the right side of the Candiano Canal***

This extension of the tracks on the right side of the Candiano canal is from the current track term to the area of the new Container terminal, to be built on the Trattaroli peninsula. This work will also connect facilities not yet connected to the railway network. The intervention is in the planning phase. RFI is waiting for the Municipality of Ravenna to draw up the expropriation plan for the areas necessary for

the work (and for the provision of any state-owned areas). The definitive and executive planning of the intervention, the supply of the armament materials and the extension will be carried out by RFI with funding from the Italian Ministry of Economy and Finance.

2. ***Suppression of the level crossing in via Canale Molinetto***

This elimination will be carried out with the construction of a vehicular underpass. A feasibility study has been carried out with the Region and the Municipality. RFI is preparing the definitive and executive planning which, once completed, will then be delivered to the Municipality of Ravenna to be submitted to a Services Conference to obtain the necessary opinions and the necessary authorizations. The intervention is financed.

3. ***Adjustment of the silhouette of the overpass Teodorico***

It concerns the adaptation of the shape of the bridge to the European standard P/C 80. RFI has carried out the preliminary project which is awaiting the opinion of the Superintendence of Archaeology, Fine Arts and Landscape of Bologna. The intervention is funded.

2.3.5 Activity P142B: Port of Ravenna - completion

This "Activity P142B: Port of Ravenna – completion" is added to the three interventions described in the previous paragraph (Activity P142A: Port of Ravenna). It consists in the construction of a new rail station in correspondence of the basic tracks, necessary to transform the current rail connection into a «line».

In the "Contratto di Programma 2017-2021" between the Ministry of Infrastructure and RFI this infrastructure intervention is described by means of tables that contain information about the "strategic framework" of the intervention, its financial framework, its timesheet, the spending plan.

Reading these tables we can see that this intervention is part of the programmatic priorities of the Ten-T Corridors (Annex A3). An initial investment of 50 million euros has been estimated to carry out the work. The feasibility study is underway. At the end of these analyses it will be decided if the intervention will be carried out. Only after the completion of the feasibility study, if it is positive and favourable to the realization of the work, then the necessary financial resources will be sought. It is estimated that the resources will be available not before 2022. In the "Contratto di Programma 2017-2021" already mentioned it is assumed that the construction period (provided that the work passes the feasibility study) is between 2022 and 2026.

2.3.6 Other interventions

In addition to the projects described above, at the Port of Ravenna there are other interventions currently being defined with RFI, necessary to improve the last mile rail connections. They are envisaged

in the Memorandum of Understanding (MoU) between the Port of Ravenna and the RFI entitled “MoU for the development of the Ravenna railway junction and the optimization of freight traffic”, signed in November 2017.

The main interventions inserted in this MoU are described below.

1. ***Activation of junction on the left side of the Candiano Canal***

This intervention concerns the activation of an existing junction and its electrification up to the railway yard of Candiano. The initial investment amounts 3.5 million euros.

2. ***Realization of other seven tracks and their electrification***

A study of pre-feasibility has been realized. It has been sent to RFI (to the Central Structure of Functional Design of the Sales Management) for approval. This work needs an investment that has been estimated at 23 million euros. The construction work is estimated to last 36 months. It is not yet inserted in the “Contratto di Programma” between the Ministry of Infrastructure and RFI.

3. ***Transformation of the base rail track into tracks for arrivals and departures***

RFI has not yet completed a study of pre-feasibility. RFI will undertake to develop a functional analysis and to study an operational model of the plant in the hypothesis that all traffic relating to the right side of the Candiano Canal is managed at the current base track level. RFI will estimate times and costs for the electrification of the connection between the Ravenna rail station and the base rail track.

2.3.7 Investment costs

In the logistics hub of the Port of Ravenna an investment of about 96.4 million euros is planned for the implementation of P142A (subdivided in three interventions), P142B (a new rail station), other interventions (inserted in a memorandum of understanding).

For the three interventions in P142A the available financial resources amount to 20 million euros. These investment costs are entirely financed by the Italian Ministry of Economy and Finance. The investment called P142B costs 50 million euros, but no financial resources are yet available.

In the “other interventions” (Table 27) just for two of the three listed the financial amount has been quantified: the first one called “Activation of junction on the left side of the Candiano Canal” will cost 3.5 million euros, the second one “Realization of other seven tracks and their electrification” will cost 23

million euros. The third one "Transformation of the base rail track into tracks for arrivals and departures" has not quantified the needed investment. Management costs are not available.

Logistic node	Project ID	Interventions	Investments (million euros)
Port of Ravenna	P142A	1. Rails extension on the right side of the Candiano Canal	20.0
		2. Suppression of the level crossing in via Canale Molinetto	
		3. Adjustment of the silhouette of the overpass Teodorico	
	P142B	A new rail station at the base rail track	50.0
	Other interventions	1. Activation of junction on the left side of the Candiano Canal	3.5
		2. Realization of other seven tracks and their electrification	23.0
		3. Transformation of the base rail track into tracks for arrivals and departures	not yet quantified

Table 27 - Investments (Source: Program Contract 2017-21 Investment between Italian Ministry of Infrastructure and RFI)

2.3.8 Funding sources

The intervention at Port of Ravenna called P142A and subdivided in three activities will be financed by the Italian Ministry of Economy and Finance (MEF). For the other interventions, funding sources are not yet identified.

Logistic node	Project ID	Interventions	Funding sources
Port of Ravenna	P142A	1. Rails extension on the right side of the Candiano Canal	MEF
		2. Suppression of the level crossing in via Canale Molinetto	
		3. Adjustment of the silhouette of the overpass Teodorico	
	P142B	A new rail station at the base rail track	not yet identified
	Other interventions	1. Activation of junction on the left side of the Candiano Canal	not yet identified
		2. Realization of other seven tracks and their electrification	not yet identified

		3. Transformation of the base rail track into tracks for arrivals and departures	not yet identified

Table 28 - Funding sources (Source: Program Contract 2017-21 Investment between Italian Ministry of Infrastructure and RFI)

2.3.9 Constraints

At the Port of Ravenna, on the subject of rail connections, the main constraints are:

a) To identify the Single Operator of the railway shunting operator;
b) To guarantee an organization of the service of the railway shunting operator adapted to the needs of the port and to improve the shunting service for the benefit of the port system.

It should be remembered that a framework agreement was signed (between National Railway Safety Agency (ANSF), Ministry of Infrastructure with the involvement of Assoporti) intended to ensure that the connections between the national rail network and the ports have the same level of security as the national network.

3 Section B – Future Scenarios

3.1 The "Ravenna Port Hub: infrastructural works" and its Global Project

The Global Project, included in the 2007 Port Master Plan, and in the project lists of the Baltic-Adriatic and Mediterranean Corridors equals to about € 383 million. It consists of two phases which are independent under the technical scope of works and functional stand points. They are complementary in keeping and further developing the port of Ravenna as an efficient multimodal platform.

Stage I is aimed at solving a physical and operational bottleneck at the port of Ravenna. The port is currently constrained by a low draft of the harbour which limits the efficiency of terminal operations with reference to all types of cargo, but particularly regarding dry bulks. Considering that the port of Ravenna is the first in Italy and in the Adriatic basin for dry bulks and that it is one of the main ports in Europe for this type of cargo, the need to solve this critical issue is paramount. The increase in vessels sizes and the fact that most if not all other ports in Europe registering dry bulks traffic volumes higher than 10 million tons have drafts deeper than those currently available at Ravenna, makes it more urgent to implement the works.

Stage I of total value of € 235 million, includes dredging the canals (marine, Candiano and Baiona) up to -12,50 meters and the front port area up to -14,50 meters, upgrading the existing quays and constructing the New container/multipurpose terminal quay and the re-use of dredged materials to raise the level of areas located in the proximity of the port, so as to develop them as logistics platforms.

Stage II includes additional dredging works in several parts of the canal harbour up to -13,50 / - 14,50 meters (inner parts); and up to -15,00 m (approaching canal), as well as further development of multimodal platforms. These works are more dependent on the further expansion of global trade traffic.

The Action co-funded by the European Commission through the CEF Blending instrument consists mainly of Stage I and specifically:

- Dredging the marine, Candiano and Baiona canals to -12.50 meters;
- Upgrade of existing operational quays affected by the proposed interventions and construction a new container/multipurpose terminal quay;
- Setting the ground for new areas for logistic activities: the materials derived from the dredging works will be mainly used to raise the level of the areas located in the proximity of the port, so as to develop areas for logistic activities for temporarily storing inbound-outbound freight.

Together with this strategic project, other interventions are foreseen in Ravenna. These projects clearly show that the strategy of the Port of Ravenna is fully aligned with the targets and objectives of the new TEN-T policy, namely implement CEF pre-identified section projects which directly contribute to the development of the Baltic-Adriatic and Mediterranean corridors as interoperable and intermodal infrastructure for long distance sustainable traffic:

- A project by the Italian National railway infrastructure Manager, which includes actions that will improve the railway last mile connections to the existing terminals; thus further contributing to the on-going growth of rail modal share at the port;
- The other initiative is aimed at improving the Ro-Ro terminal, supporting the traffic growth trends in the Motorways of the Sea segment.

3.2 Other initiatives

Other initiatives are also worth mentioning which are either on-going or planned for implementation at the Port of Ravenna, which include the Stage II of the development of the port, part of the Global Project as well as additional actions for the development of port interconnections and improvement of e-Maritime services and development of alternative clean fuels.

TEN-T Project ID	Project name	Project category	Project promoter	Total costs (official)
1281	Ravenna Port Hub: infrastructural works	Maritime	Autorità di Sistema Portuale del Mare Adriatico Centro Settentrionale	235,00
1282	Ravenna Port Hub - 2nd phase	Maritime	Autorità di Sistema Portuale del Mare Adriatico Centro Settentrionale	148,00
1283	Ro-Ro terminal upgrading	Maritime	Autorità di Sistema Portuale del Mare Adriatico Centro Settentrionale	31,00
1285	ICT services for the port community: interoperability of PCS with the National Maritime Single Window; the National Logistics Platform and the Customs ICT platform	Maritime	Autorità di Sistema Portuale del Mare Adriatico Centro Settentrionale	3,00
1858	Dredged material treatment plant	Maritime	Autorità di Sistema Portuale del Mare Adriatico Centro Settentrionale	20,00
1859	Improvement of Data connection infrastructure for port services	Maritime	Autorità di Sistema Portuale del Mare Adriatico Centro Settentrionale	1,25
1286	LNG Storage Facility - Port of Ravenna	Maritime	PIR SpA/ Edison SpA	91,10

Source: Baltic Adriatic and Mediterranean Corridor's Project List 2019

Figure 12 - Project list involving the Port of Ravenna Source: Baltic Adriatic and Mediterranean Corridor's Project Lists

4 Section C – Mapping out stakeholders

The main stakeholders identified for the Port of Ravenna are the following.

- Association of Maritime Agents and Maritime brokers of the Ravenna Port
- Industrial association of the Ravenna Province – Port Group
- Customs broker association of the Emilia-Romagna Region
- Union of users and operators of the Port of Ravenna
- Association of the international Freight forwarder of Ravenna

Moreover, the following are the stakeholders involved for the focus on the ceramics district, as further detailed in the section 7 of the document.

- Port of Ravenna Authority
- Fondazione iTL
- Confindustria Ceramica
- Spinelli (freight forwarders-MTO)
- Dinazzano Po (Terminalist)
- TCR Ravenna (Terminalist)
- SAPIR (Terminalist)
- Jas (freight forwarders -MTO)
- Leonardi Group (freight forwarders -MTO)
- Del Corona e Scardigli (freight forwarders -MTO)
- General Noli (freight forwarders -MTO)

5 Section D – Analysis of IT systems

5.1 IT systems structure and implementation

In 2011 the port operators operating in the Port of Ravenna and in particular Shipping Agents and Freight Forwarders solicited the Port Authority to design and realize an IT system that could support the coordination of the different operators involved in the process for the customs formalities and in particular in the preparation and submission of the goods manifests. Thus, the design and fulfilment of the Port Community System for the Port of Ravenna began.

The system during this time has been implemented with many functionalities related to the logistic processes, the data exchange with the National Maritime Single Window and the formalities that the operators must respect in their relation with the Port Authority.

The main concept has been always the same: the share of data and documents in order to realize the "only one submission" objective, according to which the user must communicate the data only once and reuse them sharing and exchanging data and documents with all the other operators and administrations involved in the port processes.

5.2 Subsection D.1 architecture models

The PCS of the Port of Ravenna is designed according to the "central hub" architectural model. In this model the system operate as a data sorter that implements the specific process' logics for each port activity.

Specific attention was paid to grant the maximum flexibility concerning the technics to share data among the system users preferring, whenever it was possible, the machine-to-machine data exchange via web services that is considered the most efficient way to share data and documents.

Another central focus point is the function that the PCS could fulfil supporting the coordination of the processes and the collaboration among the different subjects, publics or privates, involved in a specific process. Unfortunately, in this context the Port of Ravenna faces since the begin the low disposition (that often became a total closure) of the ICT systems and of the organizational models. Moreover, from the side of the competent Authorities, there is often lack of active participation to share data and documents and to consider the PCS as a "partner" that represent the entire port community and an aid through which make the processes and all the supply chain more efficient and secure.

The system architecture must directly reflect itself into the governance model. The PCS of the Port of Ravenna is governed by a so called “Organismo di regia” (control body) composed by the delegates of the main operators categories in addition to the Port Authority and the delegates of the company that manage the system. That control body wants to represent the port community, that is the plural subject that must address the system’s management and development choices because is from the debate among the operators that can emerge the criticalities of the processes to which the PCS can give an answer in terms of innovation and efficiency.

5.3 Subsection D.2 implementation stages

5.3.1 Project initiation

The first phase of the design of the PCS was a study about the port processes, regarding the processes were managed and, about the documents exchanged, as well as the ways used for the exchange. This activity was carried out in the frame of an action co-financed by the UE Commission under the TEN-T program that has involved also the ports of Venice, Trieste, Koper and Rijeka.

The analysis and study of the processes turned out to be very useful not only to define in a correct way the data and documents to manage and share, but especially to carry out a review of the processes themselves in terms of innovation and common research of the better ways to improve the efficiency of the port.

During this first phase the basis are laid for the building of a new awareness that each operator must have to be part of a plural subject, the port community, that is called to search, all together, the keys for the improvement of the port attractiveness and to implement the solutions jointly identified. Is this change of mentality that will be crucial for the success of the following phases, move from the competitive to the cooperative and sharing paradigm.

5.3.2 System analysis and design stage

The phase of the system’s operational design and definition of the technical requirements and of the interfaces and data flows has been mainly based on the real needs and experiences of the port community and in particular of the operators that would become the users of the system. The port community has once again the opportunity to reflect on the processes and on the way to manage them in the specific context of the port of Ravenna.

5.3.3 Implementation and adoption

The system development was carried out one module at time in order of priority, on the basis of the real needs of the port community. At the beginning the “Customs Module” was developed and released, and it was devoted to the arrangement and management of the relevant Customs documents, mainly the

Manifests for the arrival and departing goods (summary declarations). In addition to be the most relevant module for the community, this first module, was the one that made it possible to join into the community the Maritime agents, the Freight forwarders, the Customs Agents and the container terminals, namely a very important part of the port operators. Simultaneously, the "Institutional Module" was implemented, by which some of the formalities that the operators must observe towards the Port Authority are managed.

Once the system was released and in use, another step was the implementation of the "Logistic Module", devoted to the management of all the logistic aspects related to the entry and the exit of goods to/from the port. For this step, the involvement of the terminals was crucial, especially in a peculiar port as the Port of Ravenna, where there is not a port gate, but each terminal has his own gate. This aspect represents also a critical item for the entire project, because not all the terminals are always ready and equipped to share data and documents, even if the goal is to coordinate the logistics' processes and make them more efficient.

5.3.4 Maintenance and growth

The management of the PCS cannot overlook the need of a continuous adaptation of the system to the new laws, to the process updates, to new technologies and to the opportunities that could arise for the test of innovative solutions form the technical or the process point of view
In this framework, the more significant implemented functions were:

- the functionalities for the "clearance at the sea" experimental procedure;
- the function for the registration of the certified gross mass for container to be loaded on the vessels;
- the data acquisition from the National Maritime Single Windows (PMIS);
- the test of the Customs controlled corridors.

The adaptation and implementation process proceed by a continuous listening of the port community with the objective to agree up new functionalities and solutions to mitigate the inefficiency of the port's processes in general.

5.4 Assessing impact of IT systems adoption: usage by and impact on freight agents

The Port of Ravenna has witnessed important impacts from the adoption of new IT systems, which at the moment can only be assessed qualitately.

In fact, most port communities still experience problems that are not in line with the current digital transformation in the port industry:

- low IT penetration, especially for inland parts of the supply chain;
- fragmented industries with multiple screens from different systems;
- unnecessary numbers of communication channels;
- difficulty in uncovering information origin errors when they occur;
- heavy use of manual transactions;
- excessive rekeying of information;
- unnecessary and wasted (truck) movements.

Port community systems can address these and similar challenges enabling the simplification, standardization, and acceleration of information exchange among supply chain participants (SCPs). They are also responsible for increasing the efficiency of interactions between the various private SCPs and government bodies such as Customs and Maritime and Port Authorities in authorizing, monitoring, controlling, and verifying port processes.

The benefits of using PCS solutions depend on each type of user, but there are some overall benefits to the community, which are also present in the Port of Ravenna:

- Time to market is reduced through services that handle booking, scheduling, tracking, and documentation.
- The entire door-to-door shipment process can be tracked and traced.
- Trade permit declarations can be simplified using PCS services to assist the cargo clearance process.
- Gate clearance at the port is automated.
- Information allows haulers and truckers to better plan movements which can improve overall turnaround times.
- The number of processes and documents exchanged decreases.
- Vast amounts of information can be handled faster.
- Redundant data entries are eliminated by interfaces between systems, making data acquisition more reliable.

Overall, PCSs save money in port operations and add value to these and to logistics and transportation chains. As an example, it has been estimated that the Valencia port PCS in Spain saves around € 23 million each year across the whole port community. Similarly, Portnet, the PCS currently operating in Singapore, has reportedly generated savings of over $80 million over a three-year period (Port Strategy, 2012).

The goal of a PCS is not simply to support port operations—it is more about supply chain trade facilitation through shared information flows. PCSs are designed to increase the visibility of core operations among the interdependent members of a supply chain, enabling better network optimization for individual operations/operators and the sector. Modern logistics chains demand efficiency at each step of the supply chain. Unlike traditional chains, they envision an uninterrupted flow of products and information, which eventually helps minimize inventories. Logistics operations should be able to cover all steps in the logistics chain, in which ports are positioned as intermodal transportation nodes and logistics centers enabling the integration of the information across the entire supply chain.

Leading ports have reacted to this challenge by investing in technology, which is less expensive than infrastructure. PCS solutions can contribute to the creation of modern logistics chains as they are a "one-stop shop" where the whole port community can share information.

The main benefits of a PCS are based on a network effect and are exponential to the number and role of the stakeholders connected to the system. The motivations for implementing a PCS include many potential benefits. For example, PCSs can:

- reduce the administrative costs of documentation, communication, and information flows;
- enable timeliness, accuracy, and make information available 24/7;
- enhance the efficiency and productivity of port operations;
- increase a port's national, regional, and global competitiveness;
- foster intermodal competitiveness leading to more balanced modal distribution;
- fulfil customers' and stakeholders' requirements (eventually leading to increased satisfaction levels);
- fulfil the ports' policy requirements;
- enable the optimal use of expensive and often physically constrained port infrastructure;
- increase the security of vessel and cargo flows and improve monitoring of these by public bodies; and
- increase customers' satisfaction by monitoring and tracking container flows.

PCS solutions help simplify, standardize, and accelerate information exchange between Supply Chain Participants (SCPs). They are also responsible for increasing the efficiency of interactions between private SCPs and government bodies such as customs, maritime and port authorities, and so forth for authorizing, monitoring, controlling, and verifying port processes.

A PCS is commonly regarded as a strategic asset rather than a profit-oriented initiative. The complexity of PCS solutions and the number of stakeholders involved mean that traditional cost-benefit analysis is

not the best way to assess their value. Direct and derived costs and benefits are attributed to a wide range of SCPs and hence are not easily quantified. Typical indirect economic benefits include:

- the decreased cost of information access;
- lower communication costs for shipping lines;
- more accurate taxation and overall additional government revenue, namely through more transparent information, thus boosting revenue from taxes and user fees;
- prevention of smuggling; and
- prevention of illegal activity.

In addition, the flow-on benefits are not exclusively financial and hence are difficult to anticipate. PCS solutions also provide increased competitiveness, increased information quality, improved operational performance, and safe paperless document exchange procedures for port authorities. All these gains have the potential to reduce time and cost to trade and contribute positively to country indicators for international benchmarking initiatives such as the World Bank's Doing Business index.

In financial terms and in order to make a rough conservative estimate of total savings per year, it is assumed that each of the stakeholders that handle containers save approximately €2/TEU. This estimate is subject to high variability depending on the specific conditions for each port and on the number of stakeholders participating in the community. Nevertheless, in general it's a widespread experience that the adoption of an IT solution like a PCS implicate a saving in time, efficiency, services quality and money.

6 Section E – SWOT Analysis

The SWOT analysis seeks to set out the key strengths and weaknesses of the Port of Ravenna and summarises the key potential opportunities and threats up to 2020. These strengths, weaknesses, opportunities and threats are reported in the table below.

Strenghts ● Well-located to connect East Med foreland to a supra-regional hinterland including much of Northern and Central Italy. ● Strong supra-regional hinterland (Emilia-Romagna, Lombardia, Veneto). ● Adequate depth of water for feeder/short sea container ships, most deep sea RORO vessels and a reasonable range of bulk vessels. ● Rail-linked quays, with established flows of rail freight such as steel coils and raw materials for the ceramics industry. ● Land available close to the quay for the storage of goods, including trade cars and containerised goods.	**Weaknesses** ● Lack of adequate depth of water to receive direct calls from increasingly large deep sea container ships and also bulk vessels. ● Lack of critical mass of LOLO traffic to justify a network of intermodal rail freight services to and from the target hinterland. More remote from the Austrian and Southern German markets than regional competitor ports.
Opportunities ● Ravenna HUB project close to the deployment phase will increase water depth of the Candiano Channel ● Ravenna HUB project will relocate the container terminal increasing the production capacity up to 500.000 Teus/year ● Securing additional feeder traffic by developing more feeder services to and from East Med hub ports. ● Developing rail freight infrastructure in port to increase efficiency (and reduce costs) of operating services to/from Austria and Southern Germany. ● Efficiency gains from improvements to	**Threats** ● Regional competition from other North Adriatic ports and Tyrrhenian ports. ● Competition from Northern Range ports as they expand terminal capacity and the range of intermodal rail freight network. ● Trans-alpine base tunnels offering additional rail freight capacity to/from Northern Range ports. ● Unbalanced inbound & outbound flows run the risk to affect economic sustainability of the rail connections between port terminals and hinterland ● General market inertia.

customs and other administrative procedures. • Developing port-centric distribution and terminal(s) for trade. Trans-alpine base tunnels offering additional rail freight capacity to Austria and Southern Germany.	

Table 29 - SWOT Analysis

As already mentioned in the table above, the Port of Ravenna has two key geographic trends:

1. It offers a direct route between the East Mediterranean and Central and Eastern Europe for short sea container services, RORO services and bulk services
2. It serves a rich supra-regional hinterland covering the wealthy, populous and industrialised Northern regions of Italy. This means that the port is able to be a multi-purpose port, handling both high value RORO and LOLO traffic and also bulk cargoes for processing or that are raw materials for manufacturing processes.

However, Ravenna is further from the hinterland (e.g. about 630 km to Munich) than some of other regional ports.

An advantage is given by the topography of Ravenna, for the significant amounts of flat land close to the quayside allow both the storage of goods and the development of rail connections. At the same time, the biggest weakness of the Port is its low water, and the lack of naturally deep water means that the Port can only accommodate deep sea feeder container services (via a Mediterranean transhipment hub), which adds costs to the door-to-door cost compared to a direct call by a large container ship at a port such as Trieste in the North Adriatic. This is unlikely to be enough to allow the port to receive several direct calls from container ships in the next years.

While the port is already rail-connected and there are mature and funded plans for improving its infrastructure significantly, the critical mass of traffic is currently not enough for justifying the development of intermodal rail freight services between Ravenna and Austria or Southern Germany. Given the distances involved, high quality rail links will be required between Ravenna, Verona and the Brenner in order to allow Ravenna to develop markets in Austria and Southern Germany. The Brenner base tunnel will provide additional capacity through the Alps and therefore generate a significant

opportunity for Ravenna and the other North Adriatic ports; however, it could also be used by the Northern Range ports to further penetrate the Northern Italian market.

7 The ceramic district of Emilia-Romagna Region

Within the framework of this activity, ITL and the Port of Ravenna have conducted a more specific analysis for the ceramic district, which is particularly important for the Port. The analysis is reported below. The Emilia-Romagna region accounts for about 82% of the national production of ceramic tiles, floor slabs and ceramic coatings. The production of tiles is mostly focused in the so called “ceramic district”, located in the area included in the territory of several contiguous municipalities, at the foothills of the provinces of Modena and Reggio Emilia. Other production sites are located in the municipality of Finale Emilia and in the area of Imola.

The ceramic district, despite having scaled back the overall volumes produced in the last years, maintains a value leadership thanks to its key success represented by the high-quality production.

7.1 Preliminary Assessment

The transport and logistics activities related to the production and distribution of tiles represent an important service operated by the Port of Ravenna in favour of the regional ceramic industry. The Port represents the main port of arrival for the raw material (bulk minerals) direct to the district, also performing functions of storage, processing and distribution to the ceramic companies. The transport of raw materials occurs by truck and by train, with an increasing use of the railway (about 900 “clay trains” linked the Port and the district in 2018). On the contrary, for the shipment of the finished product the Port undergoes the competitiveness of other Italian ports, in particular those located in the north Tyrrhenian Sea (La Spezia, Genoa and Livorno).

7.2 Object of the analysis

The Port of Ravenna, together with ITL, is carrying out an analysis is to investigate ways to determine a possible increase in relations between the Port of Ravenna and the ceramics district for overseas shipping of tiles containers. The analyses was carried out together with the involved parties (freight forwarders, MTOs, tiles producers…) has allowed the identification of the bottlenecks presented in Table 30 and Table 31 .

It is expected that this will allow:

- a rebalancing of the Port functions for incoming raw materials and outgoing finished tiles, with the identification of services targeted to tiles overseas shipping;

- a future repositioning of the district in the world markets by reducing the incidence of logistics costs as well the increase in the level of service required by the market in terms of reliability and timeliness.

Time & cost	
Land side: • Costs: Intermodal transport is more expensive than road transport; • Costs & Time: Trains subjected to double shunting in Ravenna;	Maritime side: • Time: Poor direct connections, limited to the East Med destinations. Middle east + Far East destinations require one or more transhipment with a consequent problem in terms of higher transit times and, moreover, of risky correspondences; • Costs: Transhipments are generally expensive

Table 30 - Identification of Time and cost bottlenecks for the ceramic district

Identified Actors & Levers	
Land Side: • Strengthening and qualifying rail infrastructure and services for cost reduction of intermodal transport to Ravenna Port • Evaluation of a scheduled service by using the "clay train" who currently returns empty to Ravenna (only occasionally some wagon containers are added). Technical (equipment in terms of rolling stock, capacity, rail plans, etc.) and economic feasibility will follow. • Evaluation of other services to be activated from Marzaglia railway yard; • Railway infrastructure improvements in Ravenna to avoid double shunting (works are about to start?) • Assessing the impact of regional incentives for modal rail shift.	Maritime side: • Attraction of new shipping lines for improving the Port attractiveness (new connections), direct or with reliable transhipment connections; New shipping lines services can generate additional demand. • Incentives for port fees and services; • Infrastructural improvements (i.e. draft), which can accommodate vessels of greater capacity.

Table 31 - Identification of actors and levellers for the ceramic district

Further steps will include:

- assessment of the current market share of the Port of Ravenna with respect to the export flows coming from the ceramic district and estimation of the potential market that could be intercepted by the Ravenna Port, in the view of a regional economic internalization;
- technical working groups with the stakeholders and the involvement of a panel of companies and shippers, aiming to assess the current conditions (in terms of cost and time) for containers overseas shipment and to identify the critical bottlenecks for Ravenna;
- identification of the short-term levers that may occur for the containment of the logistics costs in favor of Ravenna Port, especially addressing to intermodal transport in the view of sustainability.
- Definition of a future scenario with actions to be taken;

8 Section F – Main Results

Based on the total flows, the port of Ravenna is mainly a logistics import node. In recent years, 22 million tons of freight have been get off ships each year, while less than 4 million tons of goods have been loaded on ships to be transferred elsewhere.
However, if only the container flows are considered, import and export are equivalent, and considering only full containers (excluding empty ones), exports over imports prevail.
2015 was a special year for the port: it recorded very high levels of loading and unloading of goods compared to previous years, but also compared to the following years. In fact, from 2016 to 2018 there were negative trends compared to 2015, which brought the values back to those of 2014 and the early years of 2010.
However, these values are higher than those recorded in the last years of the first decade of 2000 (from 2000 to 2009).

The current flows of the port of Ravenna are one-sixth (14%) of the flows of its potential market.
Several times in the previous chapters it has been said that the potential market of the port is divided into a potential foreign basin and a potential national basin. The potential foreign market is made up of 80 countries distributed across the five continents (in the appendix the list), the national one is composed of 21 provinces in northern Italy, belonging to the regions of Emilia-Romagna, Lombardy, Veneto (with 2 provinces) and Marche (with two provinces).
Imports of the national potential market (the 21 provinces) have been growing steadily for many years (since 2009 they grow by 2.5% per year on average). Imports come mainly from East Asia (China), from non-EU European countries (Turkey), from Central Asia (India). Chemicals and metal products come from China, about half of the imports. The same products also come from South Korea and Taiwan, while from Indonesia come agricultural and agri-food products. The same products imported from China also come from India. From Turkey in particular kaolin for construction, metal products, electrical products and food products.
These are routes widely used by ships arriving in Ravenna, and these are also the same products that are currently being handled in the port of Ravenna. The market identified as potential for the port of Ravenna has characteristics suitable for becoming an effective market in the medium term.

The Emilia-Romagna region is the core of the main corridors between the north and south of the Country. The port of Ravenna and its catchment area occupy a central role in the transport and logistics context of the region, being inserted in the regional, national and European transport planning documents.

The interventions inserted in the planning documents will allow to improve the connections of the port of Ravenna with its hinterland and with the great part of the potential national catchment area, improving at the same time the multimodal transport system of the port.

Together with the Global project, aiming at: dredging the port canal, upgrading the quays and developing new multimodal platforms, other physical interventions are planned to improve the efficiency of the multimodal transport in the node.

In particular, these are the rail projects foreseen:

1. rails extension on the right side of the Candiano Canal;
3. suppression of the level crossing in via Canale Molinetto;
4. adjustment of the silhouette of the overpass Teodorico.

These three interventions are necessary to adapt the railway connections of the port of Ravenna to the standards required by European legislation regarding railway infrastructure (according to the Ten-T guidelines).

In addition, at the port of Ravenna, there are other interventions (identified with RFI) necessary to improve the last mile rail connections, namely:

1. Activation of junction on the left side of the Candiano Canal;
2. Realization of other seven tracks and their electrification;
3. Transformation of the base rail track into tracks for arrivals and departures.

The main constraints are:

a) To identify the Single Operator of the railway shunting operator;
b) To guarantee an organization of the service of the railway shunting operator adapted to the needs of the port and to improve the shunting service for the benefit of the port system.

Moreover, in order to be able to benefit from the maritime traffic growth that could take place in the port of Ravenna over the next years, all the above mentioned physical interventions are essential. Nevertheless, also ICT interventions should be performed in the port, in order to fasten and simplify the administrative procedures of the goods arriving and departing from the port but also the logistics chain of goods.

In particular, this goal could be realized by implementing solutions such as the interconnection of the Ravenna Port community system with the National Maritime Single Window and the improvement of

the data connection infrastructure for the services for the port community. More details of these interventions have already been mentioned in the previous sections of that document.

Finally, another important intervention to improve the efficiency of the logistics process within the port will be the possibility of exchanging information via PCS for the transport of goods from and for the port by rail. Such a possibility will avoid errors and misunderstandings and reduce the time of operations and it will therefore contribute to solve one of the main constraints of the rail operations above mentioned. This intervention will be realized within the PROMARES project as a pilot by the Port of Ravenna Authority. More in detail, the goal of the pilot is to offer the possibility of sharing and exchanging information between the rail shunting operators and all the other actors involved in the logistics process of the goods arriving or departing the port of Ravenna by rail, within the Ravenna Port community system. This service already exists for the goods transported by road.

The realization of this pilot will allow to show how ICT implementations can have positive effects on the multimodal logistics within a port system.

9 Annexes

9.1 Products and sectors classified according to the 2007 ATECO codes

AA - agriculture, forestry and fishing products
BB - Mining products from quarries and mines
CA - food, beverages and tobacco
CB - textiles, clothing, leather and accessories
CC - wood and wood products; paper and printing
CD - coke and refined petroleum products
EC - chemicals and substances
CF - pharmaceutical, chemical-medicinal and botanical articles
CG - articles in rubber and plastic materials, other non-metallic mineral processing products
CH - base metals and metal products, excluding machinery and equipment
CI - computers, electronic and optical devices
CJ - electrical appliances
CK - machinery and equipment
CL - means of transport

CM - products of other manufacturing activities

9.2 Catchment area of the port of Ravenna

Italian province	Italian region
Bologna	Emilia-Romagna
Ferrara	Emilia-Romagna
Forlì-Cesena	Emilia-Romagna
Modena	Emilia-Romagna
Parma	Emilia-Romagna
Piacenza	Emilia-Romagna
Ravenna	Emilia-Romagna
Reggio Emilia	Emilia-Romagna
Rimini	Emilia-Romagna
Bergamo	Lombardy
Brescia	Lombardy
Cremona	Lombardy
Lodi	Lombardy
Mantua	Lombardy
Milan	Lombardy
Monza e della Brianza	Lombardy
Pavia	Lombardy
Ancona	Marche
Pesaro-Urbino	Marche
Rovigo	Veneto
Verona	Veneto

9.3 Foreign catchment area of the port of Ravenna

Country	Geographical area

Country	Geographical area
Algeria	North Africa
Egypt	
Libya	
Morocco	
Sudan	
Tunisia	
Angola	Other African Countries
Benin	
Botswana	
Cameroon	
Cape Verde	
Congo	
Eritrea	
Ethiopia	
Gabon	
Guinea	
Equatorial Guinea	
Kenya	
Mali	
Mauritania	
Maurizio	
Mozambique	
Namibia	
Democratic Republic of Congo	
United Republic of Tanzania	
South Africa	
Uganda	
Zambia	
Bangladesh	Central Asia
India	
Kazakhstan	
Pakistan	
Sri Lanka	
Tajikistan	

Country	Geographical area
Turkmenistan	
Uzbekistan	
China	
South Korea	
Philippines	East Asia
Japan	
Hong Kong	
Indonesia	East Asia
Laos	
Malaysia	
Singapore	
Taiwan	
Thailand	
Vietnam	
Saudi Arabia	Middle East
Armenia	
Azerbaijan	
Bahrain	
United Arab Emirates	
Georgia	
Jordan	
Iraq	
Israel	
Kuwait	
Lebanon	
Oman	
Qatar	
Islamic Republic of Iran	
Syria	
Yemen	
Australia	Oceania
New Zeland	
French Polynesia	
Albania	European Countries

Country	Geographical area
Bosnia Herzegovina	non-UE
former Yugoslav Republic of Macedonia	
Kosovo	
Montenegro	
Republic of Moldova	
Serbia	
Turkey	
Bulgaria	EU28 (only four Countries)
Cyprus	
Greece	
Malta	