PROMARES

Promoting maritime and multimodal freight transport in the Adriatic Sea

Interreg
Italy - Croatia
PROMARES

EUROPEAN UNION

FINAL PUBLICATION

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TOTAL BUDGET

€

2,778,200 €

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Foreword by the Lead partner

Over 42 months of strong cooperation, the Port Management bodies of the ports of Bari, Ancona, Ravenna, Venezia, Trieste, Rijeka and Ploče, supported by universities and research centres, strove to answer the following questions:

1. how can ICT improve the port's efficiency?
2. which ICT measures do ports need to implement in the short, medium and long-term?
3. how can cooperation among ports of Italy and Croatia yield long-term benefits?

This publication summarises the results achieved during the project's lifetime.

All in all, European Territorial Cooperation has proven essential in answering the questions here below: the institutional and operational cooperation between the Adriatic ports of Italy and Croatia and the exchange of good practices and mutual learning have allowed project beneficiaries to achieve the expected results and the respective territories to become more competitive and more resilient.

For my part, I can only congratulate the colleagues of the Port Network Authority of the Eastern Adriatic Sea and project partners for the excellent job, and thank the Interreg Italy-Croatia Programme Authorities for believing in and funding PROMARES.

Mr. Alberto Cozzi
Special Projects Unit Port Network Authority
of the Eastern Adriatic Sea

1 Project Objectives

PROMARES aimed to enhance the maritime and multimodal freight transport gathering all the ports generating intermodal and multimodal transport flows, as well as the most relevant intermodal logistic node in the Programme Area, facing the same challenges concerning the multimodal transport accessibility and network efficiency on the TEN-T Corridor sections in the region (from the port to the hinterland) and to increase the cooperation and coordination among them.

It did so by:

- means of an in-depth cross-border study analysing each territory in detail, a dedicated training seminar and the elaboration of a cross-border action plan, to be tested through pilot actions;

- testing of Information and Communication Technology (ICT) solutions for streamlining freight transport in the ports and the most relevant intermodal logistic node of the Programme Area, from the port to the hinterland and at cross-border level;

- setting up an enduring cross-border cooperation network, simultaneously and innovatively combining a bottom-up (from stakeholders to policy makers) and top-down (from policy makers to concrete action) approach.

PROMARES was led by the Port Network Authority of the Eastern Adriatic Sea and involved the main ports of the Adriatic area, as well as other relevant research centres and public bodies and lasted between January 2019 and June 2022, with a total budget of 2,778,200.00 euros (2,361,470.00 euros of ERDF).

The partners of the project are the following. Since some of the partners are commonly called with a shorter name, in this publication both will be used.

1. Port Network Authority Of The Eastern Adriatic Sea – Port of Trieste

2. North Adriatic Sea Ports Authority – Port of Venice

3. Venice International University

4. Interporto Di Trieste

5. Institute For Transport And Logistics Foundation - ITL

6. Ravenna Port Authority

7. Central Adriatic Ports Authority – Port of Ancona

8. Southern Adriatic Sea Port Authority – Port of Bari

9. Ram Logistica Infrastructure And Transport S.P.A.

10. Rijeka Port Authority

11. Ploce Port Authority

12. University Of Rijeka - Faculty Of Maritime Studies Rijeka

2   The value of interregional cooperation and testing

PROMARES (Promoting maritime and multimodal freight transport in the Adriatic Sea) aimed to tackle the challenges of the freight transport sector in the Italy-Croatia area. In fact, when it comes to maritime transport, this area is among the leading regions at European The level, hosting a large number of ports with a long history and elevated traffic. Some of them are important hubs for goods and passenger transportation.

PROMARES identified three main challenges, hampering the competitiveness of freight transport:

1. Unbalanced level of hard and soft infrastructural development, both in terms of last mile bottlenecks and missing links along the main networks;

2. Fragmentation of institutional framework, at two levels: within each country, between ports/ intermodal logistic nodes and public institutions (e.g. customs); between the two countries, where a coordinated crossborder development strategy for enhancing maritime and multimodal transport is missing;

3. Insufficient communication and coordination between freight operators and the logistic nodes, especially in the port-inland interface.

These conditions hinder the development of efficient cross-border maritime and multimodal freight transport and logistics chains, leaving road transport as a preferred solution for the transport of goods but not the best for decarbonisation.

3 The Context

PROMARES gathered several entities, organisations and port authorities in its consortium. For each area, a territorial need assessment was carried out.

The implementation and/or upgrade of ICT and Port Community Systems (PCS) are examples of territorial needs that have already been identified by several partners. Over the last decades, transport hubs have faced the need to manage the evolution of the international trade and container throughput, the changes in freight agents' requests, and the development of IT systems. Regarding the growing role of IT in seaports, organizations perceive an increasing need to adopt IT tools to support all their processes, in particular, the requirements related to containerized and passengers' traffic. IT makes carriers and terminals to work together assuming a collaborative orientation as parts of an integrated infrastructure. Thus, in the nodes implementing IT systems, all the actors involved, i.e. port administrations, terminal operators, truckers, customs, freight forwarders, carriers, ship agents, and other organizations, are electronically linked, thus improving this information and data sharing within the port community. In order to facilitate these communication processes and the development of the inter-organizational relationships among stakeholders in the freight agent community, ICTs such as port community systems (PCSs) have been introduced.

Not all PPs are port or port-related entities that can be involved into collaborating to PCS. Different types of ICT tools might also arise, in that case the same indications for the evaluation of port community systems can be adapted to describe IT systems, concerning their architecture, implementations level and usage type.

The main function recognized for ICT consists of making the users to manage the service requests and directly upload their information into the hub's information system. Indeed, IT systems significantly reduce paperwork, improve data quality, allow integrating data among different stakeholders, and support the port management for operations. Even if an important role has clearly been assigned to IT systems, some actors still show strong resistances to adopting them.

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3.1 Port of Trieste / Interporto di Trieste-Fernetti

The public body in charge of the Ports of Trieste and Monfalcone is the Port Network Authority of the Eastern Adriatic Sea, whose primary task is to direct, plan, coordinate, promote and control port operations and commercial and industrial activities in the port[1]. **The Port of Trieste** is a terminal of regular and direct oceanic connections with the Far East, with calls in several ports in the Mediterranean basin, carried out by the main world shipping companies.

More than 200 trains per week connect Trieste to the productive and industrial areas in North-East Italy and in Central Europe, with several destinations, serving an extremely varied economic hinterland with a growing development.

The main favourable features of the Port of Trieste are:

• Deep seabed and optimal nautical accessibility (18 meters depth)

• Availability of disused industrial sites that can be reconverted

• High operating margins for the container traffic, Ro-Ro and various goods sectors.

• Multifunctionality of the port, operating in all traffic sectors

• Excellent location with respect to the markets in Central and Eastern Europe.

Shortcomings concern primarily:

• Insufficiency of parking areas

• Limitations of the internal and backbone railway network.

The Port of Monfalcone is located in the most northern part of the Mediterranean Sea and overlooks the inner part of the Gulf of Trieste. The access channel is 4500 meters long and 11.70 meters deep. The Portorosega pier is 1460 meters long with a variable depth from 6.5 meters of the old part to 11.70 of the new one. The main goods treated are cellulose, paper, timber, forest products, steel products, kaolin, marble, coal, cereals and cars.

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1   according to the Law no. 84/1994 as amended by the Legislative Decree no. 169/2016

The railway connection to the Venice - Trieste and Tarvisio - Trieste lines is ensured by a special railway siding. Moreover, an additional railway ring has been built, that allows the formation of trains already inside the port.

Trieste intermodal terminal located close to the Italian - Slovenian border of Fernetti (Trieste), is an infrastructure dedicated to intermodal logistics. It plays an important role as dry port of Trieste, Monfalcone and Capodistria and its second shareholder is the Port of Trieste.
Terminal areas has a total of 350,000 square meters: 160,000 square meters are covered by infrastructure areas, 30,000 square meters of covered warehouses, both domestic and foreign for storage of goods under ADR and HACCP, 50,000 square meters of aprons and 80,000 square meters of parking areas for heavy vehicles. For railway services, six tracks are available, divided into two operational beams.

Port of Trieste

Trieste Inland Terminal

3.2 Port of Venice

The Port of Venice is the northernmost terminal of the Motorways of the Sea that cross the Eastern Mediterranean and connect Central Europe with North Africa and the Middle East. The Port of Venice is one of the major European ports for project and general cargo, and one of the main ports in the Adriatic for the number of containers handled. A leader in many traffic segments, it is the only port in Italy to benefit from a river port providing freight transport by barge along the Po river.

Given its the location, the Port of Venice, plays a relevant role as a gateway and logistics service provider to the North of Italy and more specifically the Eastern Lombardy, and other international destinations, such as Central and Eastern Europe (e.g. Southern Germany, Austria, Switzerland, etc).

The role of the Port of Venice as key interconnection node of transport flows between the South-Eastern countries and the Central-North countries is recognized by the inclusion of the port in the list of "Core seaports" of the new TEN-T Regulation (EU Regulation n. 1315/2013). The Port is a crossroads of three out of the nine multimodal TEN-T Core Network Corridors:

1. the Mediterranean Corridor, that links the Iberian Peninsula with the Hungarian-Ukrainian border, including also the Po river and other inland waterways in Northern Italy; it allows the connection of Venice with the North of Italy and with the Balkans;

2. the Scandinavian-Mediterranean Corridor, that is connected with the previous corridor in Verona allowing the flows of goods and passengers towards Germany and Scandinavian countries;

3. the Baltic-Adriatic Corridor that connects the Baltic and the Adriatic Sea, linking Venice with the Central Eastern European countries.

The port has been also considered as core inland port in the TEN-T core network.

3.3   Port of Ravenna

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. 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.

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. It is also an important point of arrival for various goods, such as timber and metallurgical products, in particular coils.

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. 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.

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.

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.

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.

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.

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.

Port of Ravenna

3.4 Port of Ancona

The Port of Ancona is located in the middle of the Italian Adriatic coast, in the Gulf of Ancona, between two hills. Its natural position allowed since roman period to be a strategical point of reference and a natural safe shelter for navigators and sailors.

The city of Ancona is connected to the national railway network, precisely to the Adriatic railway line, through the central station situated near the port along via Flaminia. The current markets of the Port of Ancona are mainly related with passenger transport and cargo transport. Indeed, the port is the main logistic hub of central Adriatic coast and it is one of the main Italian port for international passenger traffic by ferries. The main market is represented by Ro-Ro traffic, with intense traffic flows of trucks and therefore Ro-Ro freight. The main routes involve the Adriatic Sea and the Adriatic ports. Port of Ancona current markets mainly include:

• Passenger traffic (ferry and cruise);

• Freight traffic (bulk, general cargo, container);

• Fishing;

• Shipbuilding;

• Pleasure boating.

Beyond the maritime routes, the Port of Ancona has intense freight traffic flows towards the hinterland, especially in Marche region and central Italy. From the point of view of infrastructures, the Port has 26 quays, including wharfs, piers, docks, layovers and a first inner harbour. Most of them are used for passenger traffic and freight traffic. The average draft is around 11.80 meters, while the allowed maximum length of the ships is about 275 meters.

The quays are equipped with stationary cranes, unloading cranes, electric mobile cranes, hydraulic mobile cranes, pneumatic grain elevators.
The shipyards involve more than 1,000 workers which are operative in activities with over 700 units mainly deal with the oceanographic research ships, ferries, tugboats, supply vessels, fast luxury yachts and coastal fishing vessels.

The Port of Ancona is equipped with medical facilities and ICT tools like a VTMIS system, an ICT system for traffic information, an app for the passengers in transit, free wi-fi for port users, a monitoring system for customs activities and the check of sediments and excavations in the port area, and a tracking system for boarding and disembarking of ferries.

Ancona is included as core node in the TEN-T network, specifically in the Scandinavian-Mediterranean Corridor. Moreover, the requalification of Italian Motorways of the Sea (MoS) has allowed to consider the Port of Ancona as a strategic point for the trade between South West Europe and West Mediterranean countries, of which imports and exports are foreseen to increase, and Italy, Central and North West Europe.

This intense traffic and high consideration of the last years for the Port of Ancona highlighted the pivotal necessity to find out a sustainable solution for handling and faster these traffics to their destinations, without negative impacts in urban area, mainly related to congestion and pollution.

Port of Ancona

3.5 Port of Bari

Southern Italy and Apulia specifically favours maritime traffic due to the extension of its coast (865 km), which is 60% of the entire transport chain, with a value significantly higher than the national average. The overall movement of solid (46%) and liquid (47%) bulk represents on average 43% of the entire national movement, with a positive impact on the presence of maritime enterprises equal to 33% of the national figure.

The existence of a massive infrastructure system serving the movement of goods and passengers in the region - six major ports in Puglia (Bari, Brindisi, Manfredonia, Barletta, Monopoli, Taranto), four international airports in Bari, Brindisi, Grottaglie, Foggia and three military airports operating in Gioia del Colle (BA), Amendola (FG) and Galatina (LE), the Interporto of Bari, logistic platforms, railway networks of FS and Railways under concession, highways and state roads). This system needs completions, technological improvements, functional connections, 'last mile' interventions, but it is already endowed with a significant consistency, thanks to massive investments made over the last thirty years, underway for some time or just started, in ports and on roads, airports and railways - and of intermodal articulations of increasing use. Most of the movement of goods produced in Basilicata, moreover, gravitates on port and railway nodes of Puglia, while a smaller part - but no less significant for some goods, such as cars built in S. Nicola di Melfi and destined for export to the United States - gravitate towards the ports of Civitavecchia, Naples and Salerno. The Southern Adriatic Sea Port Authority gathers together the Ports of Bari, Brindisi, Manfredonia, Barletta and Monopoli all along the western Adriatic coast of Italy. The five-port infrastructure includes 57 quays of approximately 10km of total quay length, all connected to the rail and road network and served by two major international airports.

The newly formed Southern Adriatic Sea Port Authority is a public body having as its primary task to direct, plan, coordinate, promote and control port operations and commercial and industrial activities in the port. Located in the Puglia region, the Authority's geographical scope comprises several ports: Bari, Brindisi, Manfredonia, Barletta, and Monopoli.

Port of Bari is traditionally considered Europe's door to the Balkan Peninsula and the Middle East, and is a multipurpose port able to meet all operational requirements. It is located in the city

center between the historic city center and the San Cataldo area and covering area of about 260 thousand square meters. Historical port and rich in historical and cultural relevance including the Bourbon dock.

The port area extends for about 285 hectares with a total development of operational docks of approximately 3,800 ml, affected by different and heterogeneous types of traffic in transit, which have the exchange both of goods (conventional, black and white bulk, Ro-Ro and cars and steel products), both of passengers (cruises and ferries), increased in recent years thanks to the new Terminal structure Cruises, and ferry traffic with Croatia, Montenegro, Albania and Greece.

The Port of Bari is not connected to the national railway network, so its modal share is represented by 100% of road transport. To encourage rail transport, the Interporto Regionale della Puglia offers to logistics companies and freight forwarders the opportunity to use its intermodal terminal. This comprises of 4 tracks used to organize trains to transport all types of containers, swap bodies and semi-trailers on national and international routes. The terminal also offers a storage area for containers and other facilities (groupage, maintenance, etc.).

The main features of the port of Bari are the following:

- 285 hectares of basin

- Docks equipped for all types of commercial traffic (dry and liquid bulks, containers, goods in packages, steel products, etc.)

- Docks serving Ro-Ro and ro-pax ferry boats (Albania, Greece, Croatia and Montenegro)

- Docks serving cargo (from/to Mediterranean Sea and Black Sea)

- Docks serving cruise ships and related accommodation

- Port Core along the Helsinki-Valletta corridor

- Services of mooring, pilotage, security, and other services related to passengers

- Port Community System (GAIA)

- PMIS - Port Management Information System

- Collection and disposal service for ship-generated waste and cargo residues

Port of Bari

3.6 Port of Rijeka

Port of Rijeka is a multi-purpose port whose manipulations include all kinds of cargo along with the passenger movement.

In March 2010, the port authorities of Trieste, Ravenna, Venice and Koper established the North Adriatic Ports Association (NAPA) based in Trieste with the aim to enhance the position of the ports in the European Union and its transport patterns. The Port of Rijeka joined the NAPA in November 2010, aiming to harmonize information systems and organizational setup of the member ports in order to attract shipping. Except the NAPA, the Port of Rijeka is also a member of the EcoPorts network of the European Sea Ports Organisation, the International Harbour Masters' Association, Association Internationale Villes et Ports, the Croatian Association of Port Authorities and the International Association of Ports and Harbors. NAPA has a common goal of transport container development and becomes a multifunctional bridge between Asia and the economies of central and eastern Europe.

The port system is organized within the Kvarner Bay through several basins that are dislocated and, in some cases, remote. Therefore, port of Rijeka is dispersed in multiple locations, with more entries to the ISPS area and a significant basin parts (Rijeka and Sušak) situated in the very city core.

Rijeka is predominantly oriented towards Central European countries and in a strong competitive environment with other Northern Adriatic ports (mostly Koper and Trieste). As far as logistics in Rijeka is concerned, there are several types of processes (e.g. transfer of livestock and wood in Raša port), and with larger traffic there is a greater amount of information in the exchange.
All of this has an impact on the technological level of the solution, its complexity and price.

Port of Rijeka is the largest and most important port in the Republic of Croatia and has a direct impact on all modes of transport. It is located in well-sheltered Gulf of Rijeka and due to its favorable geographic position, this port has become an important traffic and industrial headquarters and the main transit port in Croatia. Rijeka has the opportunity to attract transit cargo from the hinterland and to set up the foundation for its future successful development.

Rijeka is the port of the European Union, open to domestic and international traffic. Port's vision is to become a port of high efficiency and a key hub for connecting the Far East and Central European markets due to its favorable geographic position.

Thanks to its geographic position, the Port of Rijeka has a strategic advantage over the ports of the North Sea as it connects Europe with the Far East via the Suez Canal. The distance to the main Asian ports is shorter for 5 to 7 days compared to the North Sea ports (eg. Hamburg, Rotterdam), which reduces the length of travel time or transit time from Far East ports to destinations in Central Europe.

Rijeka is a multifunctional port for handling almost all types of cargo. It is equipped for handling all types of goods, which include terminals specializing in containers, general cargo, cereals, air-conditioned cargo and wood in Rijeka basin, bulk cargo and Ro-Ro terminal at the Bakar Pool, oil terminal and petroleum products and also liquefied petroleum gases (LPG).

Port of Rijeka belongs to the Mediterranean transport corridor, an important transport route connecting the port of Rijeka with the European rail and road network.

Equally important is Corridor X connecting to Zagreb by connecting Austria (Salzburg and Graz) to the port of Rijeka. Along with road and rail connections, oil pipeline is important, which enables connecting refinery capacities in Croatia, Hungary, Austria, Bosnia and Herzegovina, Serbia, Czech Republic and Slovakia. The international airport is located near Rijeka, on the island of Krk.

The port area of the Port of Rijeka consists of the following terminals for the transshipment of goods:

- terminal for general cargo - Rijeka
- grain terminal - Rijeka,
- wood terminal - Rijeka,
- frigo terminal - Rijeka,
- bulk cargo terminal - Bakar,
- Bršica terminal,
- container terminal - Rijeka,
- liquid cargo terminal - Omišalj (island of Krk),
- industrial port Bakar,
- logistic terminal Škrljevo,
- logistic terminal Kukuljanovo.

3.7 Port of Ploče

The Port of Ploče is situated at the Central Adriatic coastline, approximately 120 km south from the city of Split and 100 km North from Dubrovnik. Through a 24 km railway line and road, the port is linked with its immediate hinterland of Bosnia and Herzegovina and further to the North-East of Croatia and Central Europe. Further, it is the end/starting point of the Corridor Vc (Budapest-Osijek-Sarajevo-Ploče). Through the Adriatic Highway (as part of the European route E65), it is connected to the Northern cities of Split, Rijeka and Trieste; and to Montenegro in the South.

The Pelješac peninsula to the South and West of the port provides for a natural breakwater. Equally important is the connection to Corridor X via Corridor Vc, connecting the Port of Ploče also with Serbia to the East and even Austria to the North-West.

The Port of Ploče is also connected to international inland waterways. They are the Sava River from Sisak to Belgrade and the Danube River, constituting pan-European transport Corridor VII. Through the latter, a connection to other European inland waterways, such as the Rhine is possible via the Rhine-Main-Danube Canal.

The port is an EU port and open to domestic and international traffic.

The road network in Bosnia and Herzegovina covers more than 8,000 km, more than 1,000 km of which are European routes. Most of this network has been designed to accommodate a two-way single carriageway with a maximum speed of 80kph. Traffic lane width varied from 3.50 to 3.75m, and road shoulders from 0.5 to 1m wide. As average daily traffic volumes grew to over 9,700 vehicles, with a corresponding increase in freight volumes, Bosnia and Herzegovina embarked on a motorway construction program in cooperation with its neighbors.

In terms of bottlenecks, the only relevant physical restriction is the parking/waiting space for lorries and busses which is mostly due to administrative (non-physical) barriers.
The lack of parking space and the waiting time at the borders is rather the result of the success of international road transport in the SEETO region to the detriment of international rail transport that has not managed yet to efficiently organize its border crossing.

It is considered that the major physical bottleneck within the port is the insufficient length of quays to accommodate large ships, especially on container terminal and on liquid cargo terminal. With development plans for new liquid cargo berth already ongoing, it is expected that this physical bottleneck will be annulled by 2020, when the construction of new jetty is scheduled to be completed.

Container terminal quay is 280 meters long and it is not able to accommodate mother vessels carrying 5000 TEU and more. Second phase of construction of container terminal should overcome this obstacle, but in order to commence construction, there should be enough throughput of containers, which is currently low (around 21.500 TEU's in 2015, expected to be 23.000 TEU's in 2016).

In terms of passenger terminal, major bottleneck is non adequate width of Ro-Ro ramps, which results in inability of simultaneous operating of ferry line Ploče – Pelješac peninsula and possible ferry line Ploče – Italy. This bottleneck is planned to be removed by extending the width of one Ro-Ro ramp so it could accommodate bigger ferries.

Other physical bottlenecks within the port are:

- There is a road and pedestrian crossing on the railway;

- Road and railway crossings but railway has priority;

- Parking spaces at terminal are not adequately signposted;

- non-existence of areas adequately arranged, with different areas for waiting and pre-embarkation and the interior traffic (will be done till end of 2015);

- not existence of dedicated Ro-Ro passenger terminal.

Stakeholders mostly consider non-physical barriers as the greatest obstacles to their businesses - and as such, to the development of the Corridor Vc and the Port of Ploče.

An integral part of the Port of Ploče is the Port of Metković. Situated 25 km upstream on the banks of river Neretva in the town of Metković, situated along the BiH-HR border. The terminal disposes of a connections to the rail and road systems and provides facilities for the transshipment of cement (silo), cinder and granulized stone.

Port of Ploče is geographically the biggest cargo port and the second largest cargo port in Croatia in total throughput volume, after Rijeka, and it is a classical landlord port. The capacity of the port is presently estimated to be at approximately 10 million tons per anno for dry bulk and general cargo and amounts to 1.2 million tons for liquid bulk.

Port of Ploče

4.1 Pilot action 1 - Port of Trieste

Responsible: Port Network Authority Of The Eastern Adriatic Sea
– Port of Trieste
Completed in: 2020

4.1.1 Part A

Title: creating a new module of the Sinfomar PCS, dedicated to the management of the movement of goods between external Free Zone areas outside the Port of Trieste, using data from existing cameras, both for rail and road transportation to ensure the traceability of goods

Background

The main feature of the Port of Trieste is represented by its legal status of Free Port, in application of the rules of the Paris Peace Treaty (Annex VIII). According to it, the Free Zones of the Port of Trieste enjoy the legal status of customs clearance exception and do not belong to the customs territory of the European Union.

In 2014, the Port Network Authority of the Eastern Adriatic Sea launched the design of a dedicated ICT platform, developed with the collaboration of all prominent actors in the Trieste maritime transport activity, achieving the implementation of "Sinfomar", the Port Community Systems. Focus of the system in on intelligent and secure exchange of information between both private and public organizations, with the main aim to improve the competitiveness of the port of Trieste. "Sinfomar" is an online platform for the management of all procedures regarding administration, taxation and customs related to port logistics. In the design of "Sinfomar" it was necessary to consider the special legislative situation due to its position as a Free Port.

Another relevant IT platform in production on the local territory is "Sinfosec", the system currently in use at the Interporto di Trieste "Fernetti" dry port area.
In the design of the Port Community System PCS "Sinfomar", it was necessary to consider the special legislative situation due to its status as a Free Port. The Free Port of Trieste currently

includes five distinct Free Zones, three of which reserved for commercial activities (Old Free Zone, New Free Zone, Timber Terminal) and two used for industrial activities (Mineral Oils Free Zone, Zaule Channel Free Zone). As regards the customs regime, the Free Zones of the Port of Trieste enjoy the legal status of customs clearance exemption, which involves a whole series of beneficial operating conditions for the Free Port of Trieste. This is undoubtedly the biggest area of difference between the regulations of the Free Port of Trieste and national and EU ones.

Against this background, it is necessary to allow the free flow of goods between Free Zone areas also outside the Port areas and, at the same time, reduce the road congestion due to the increasing traffic flows, thus optimising the use of the existing infrastructures.

Pilot action description
The new module of the Sinfomar PCS would manage the goods arrived in a Free Zone area to be transferred to another Free Zone area using road or rail transportation in a controlled way, without implementing traditional customs operations, but using ICT procedures and tools (such as cameras or virtual gates).

This module would manage at the same time logistical data (e.g., plate of the trailer and semitrailer, type of vehicle, container number, train tracks,...), data to identify the subject responsible of goods (e.g., personal identification data of the driver and of the freight forwarder) and customs data (e.g., type of goods using HS (Harmonized SysteM) standard, initial and foreseen final date of transport, weight, type of customs document, MRN - Movement Reference Number, ...).

Also, a complementary activity focuses on the extension of the PCS Sinfomar to manage the external buffer areas belonging to the zone under the control of the Port Network Authority of the Eastern Adriatic Sea. These areas are authorised spaces where vehicles directed to the Port of Trieste can stop with the aim of a better and integrated management of the traffic flows to the Port of Trieste and to track in advance the vehicles (through the utilisation of the pre-arrival notification). The buffer areas are of different types: public (such as the Interporto di Trieste – Fernetti), Free Zone areas (such as the Industrial Free Zone called FREEeste) and private ones. In accordance to the activity already foreseen, this extension of the PCS would allow the management of such external areas and the movement of goods between them and the Port of Trieste.

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The peculiarity of the Port of Trieste, as an International Free Zone Area, has to be carefully taken into account in the implementation of the activities. The Port Network Authority is the body entrusted with the management and control of all Free Zone areas in the territory of the province of Trieste and the activities carried out in PROMARES project exploit the outputs achieved in another project, named "ISTEN – Integrated and Sustainable Transport in Efficient Network", co-financed by the Adrion Programme. Thanks to the synergy between the two projects, some functionalities to manage Free Zone areas through the Sinfomar PCS are already under definition and development. More specifically, additional functionalities are established in Sinfomar concerning the management of pre-arrival notifications in the Free Zone areas, management of vehicles in the Free Zone areas and management of vehicles directed to the port of Trieste using and without using a customs corridor.

At operative level, to properly utilise the functionalities enabled in the module "External Free Zone Areas" (literally "Punti Franchi Esterni") in the PCS Sinfomar, it is necessary to update the registry of the warehouses in Sinfomar, by registering in the PCS the data concerning the free zone area/s.

Sinfomar homepage

Results & impact

The impacts are:

1. the increase of data accuracy and the certification that goods moving between Free Zone areas do not change path;

2. reduction of road congestion due to the increase in traffic flows and optimisation of the use of the current port infrastructures.

4.1.2 Part B

Title: Inbound & outbound transportation flows management in the FreeESTE area
Extension of the PCS Sinfomar to manage the external buffer areas belonging to the zone under the control of the Port Network Authority of the Easter Adriatic Sea

Description

The pilot action of Interporto Trieste concerns the inbound/outbound transportation flows management in the FreeESTE area, in particular:

• Railway Gate Automation in the FreeESTE Free Zone area enabling train composition data recognition and train transit (gate in/out) recognition;

• Data sharing with the IT platform currently in use at Interporto di Trieste (owner of the FreeESTE area);

• Data sharing with the port community via interoperability with the Port Community System SINFOMAR;

The data sharing is relevant for the freight movement monitoring among Free Zone areas (i.e., FreeESTE inland terminal and Trieste Punto Franco Nuovo port area).

Thanks to the ICT pilot action that will test the cross-border action plan for enhancing maritime and multimodal freight transport, the RRT of Trieste will improve the management of the rail cargo to/from the terminal, mainstreaming traffic flows. This will enhance the competitiveness and productivity of intermodal transport, benefitting both the RRT and the surrounding territory.

The focus of this pilot action is the extension of the PCS Sinfomar to manage the external buffer areas belonging to the zone under the control of the Port Network Authority of the Eastern Adriatic Sea. In particular, the pilot action focuses on the private external buffer areas that are named as "Authorized Buffer Area – A.B.A.". Hereafter, the main activities carried out are listed:

- Definition of the official regulations and guidelines: the General Secretary of the Port Network Authority of the Eastern Adriatic Sea approved the guidelines that have been sent to all the operators that stated their interest to be authorized to operate as "A.B.A". These guidelines indicate the rules to be applied and the processes to be followed to obtain the authorization;

- For the time being, the Port Network Authority of the Eastern Adriatic Sea officially received five complete requests. All of them are positively evaluated and five operators are authorized to be "A.B.A" to manage, accordingly to the guidelines and established rules, the road traffic of Ro-Ro trucks directed to the Port of Trieste;

- In addition to the guidelines, an operative manual (see attachment) has been prepared. It has been presented in a dedicated meeting with the operators (on the 30th July 2020) and distributed to them. Moreover, specific training activities have been performed directly in the offices of the different authorized operators;

- Constant support is offered to the operators in order to use properly the PCS Sinfomar and to align their operations to manage the traffic flows in accordance to the availabilities of the port terminals and the department of the Port Network Authority of the Eastern Adriatic Sea dedicated to the management of the road traffic.

Results & impact

The results gained with this pilot actions have important impact on the Port Community, since this initiative helped to support the management of the traffic in a particular period like the lockdown caused by the Covid-19. Therefore, this action is really appreciated by the operators.
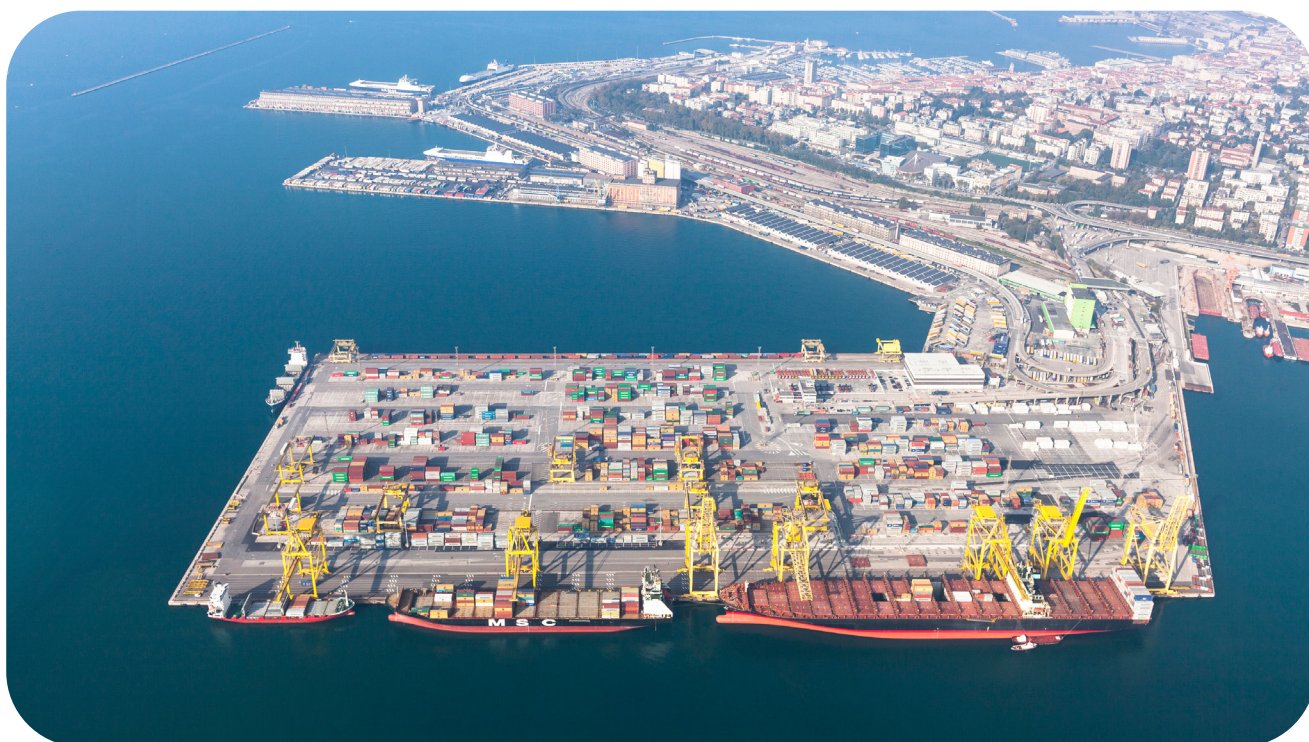
Port of Trieste - credits @Fabrizio Giraldi

4.2 Pilot action 2 - Port of Venice

Responsible: North Adriatic Sea Ports Authority – Port of Venice
Completed in: 2022
Title: Re-engineering of the existing Integrated System for the Management of the Railway Shunting (SIMA) implementing new functionalities

Background

The Port of Venice has experienced recent interest and growth in rail traffic. Connected to the national network through the Venice Marghera Scalo port and through the Venezia Mestre station, to keep up this growth, there is a need to boost railway accessibility, both through new infrastructural interventions and ICT investments. To support the increase of railway flows and potentialities, NASPA tackles the re-engineering of the software component related to the railway shunting operations (SIMA) with the aimed to optimize the management of these operations in the port area.

In framework of general push to the multimodal transport, the Port of Venice, in fact, has planned several investments, such as the building of a new railway bridge, upgrading of Venezia Marghera Scalo station capacity and railway sidings, that need to be supported by likewise investments in the ICT tools that allow the management of shunting operations and maneuvering in the part areas.

In particular, the investments undertaken by NASPA are focused on the enhancement of railway telematics systems for shunting operations (SIMA) and its integration with PCS and information systems of other operators involved in developing rail services. The SIMA retrieves, processes and stores data during the maneuvering procedures and the wagons positioning operations inside a port area or a railway hub, aiming to support management and real time monitoring of the operations. Existing SIMA barely meets the operational management needs. The most critical aspects concern, above all, the limited friendliness for users, as non-intuitive graphic interfaces, the absence of wizards, the absence of some useful correlations between the different modules of the system and the presence of unused data and functions. In addition, there is also the need to make the system usable by portable devices.

Description

The Port of Venice has developed the re-engineering of the existing Integrated System for the Management of the Railway Shunting (SIMA): new functionalities of the system have been implemented and now the new SIMA2 could better interoperate with other IT systems used by port community, such as the Infrastructure Manager, Railway Undertakings and Terminals.

Specifically, SIMA2 system optimizes planning procedures efficiency through an optimization of train placement in railway yard and their relative movements using machine-learning techniques and logistic algorithms.

After the upgrading, SIMA2 comprehends the following functional modules:

1. **Manoeuvres Management;**
2. **Manoeuvres Monitoring;**
3. **Reporting;**
4. **Account management;**
5. **Mobile and GPS infrastructure.**

Although the software is primarily used by ERF, the holder of the service of rail shunting at the Port of Venice, all the relevant regional and international stakeholders will benefit from the improved logistic efficiency.

The re-engineering process has been developed thanks to the support of two INTERREG projects in which NASPA has been involved: the TalkNet project (Central Europe Programme) provided for the preliminary analyses and the definition of new functionalities, while PROMARES project provided for the implementation of new functionalities and the reporting procedures.

Results & impact

The re-engineering of the SIMA into SIMA2 allows the Port of Venice to play a more relevant role as a gateway and logistics service provider to the North of Italy and more specifically the Eastern Lombardy, and other international destinations, such as Central and Eastern Europe. On fact, the optimization of shunting services can lead to considerable cost savings, more efficient planning of routes and resources, and increased transport quality (punctuality, predictability) and safety, also opening for further new investments in port facilities to increase the intermodal capacity. Lastly, the Increase of freight traffic by rail and the decongestion of the internal railway system, thank to a better menagement ensured by the SIMA2 contributes to achieve the broadly shared objective in CO_2 reduction.

Port of Venice

4.3　Pilot action 3 - Interporto di Trieste

Responsible: RRT-TS Interporto di Trieste
Completed in: 2022
Title: Realisation of a gate automation-based infrastructure for railway traffic management in the FreeESTE area

Background

Interporto di Trieste S.p.A. is a company active in intermodal logistics and offers logistics services as dry port of the Port of Trieste. Alongside these historic flows of goods, Interporto - developing the activity of dry port for the Port of Trieste and benefiting from the competitive advantage deriving from the "Free Port" - will potentially be able to intercept also the flows of goods deriving from the Asian Far East directed to Europe or elsewhere. Interporto has planned significant investments in order to develop its activity concerning dry port services for the Port of Trieste, in synergy with the Port Network Authority of the Eastern Adriatic Sea.

Description

Interporto di Trieste's pilot action aimed to enrich the railway opportunities on the global market by enhancing train operations from/to FreeESTE (its own area), also exploiting the strengths of the International Free Zone. This pilot action consists in the realisation of a gate automation-based infrastructure for railway traffic management in the FreeESTE area. The new gate has been located at the entrance of the FreeESTE dry port area, in correspondence with the rail network already in place.

The railway gate automation is a combination of innovative technological components that allow for:

1. Data collection: The hardware components installed on the gate are able to collect on-filed data concerning inbound / outbound trains. The main data types refer to the following groups:

   - Railcars gate in /out: the system is able to detect on-field data concerning wagons

sequence and wagons id. Moreover, images can also be captured in order to monitor the status of the railcars, for example evidencing if a damage is present;

- Intermodal Transport Units (ITUs) gate in / out: the system is able to detect on-field data concerning ITUs id and type. Moreover, images can also be captured in order to monitor the status of the railcars, for example evidencing if a damage is present;

- Train composition: the system is able to detect the assignment wagon / ITUs, thus detecting data about the train composition for inbound and outbound flows;

- Train direction: the system is able to detect the train direction (inbound / outbound) data;

- Damages monitoring: the system is able to detect damages images concerning wagons and /or ITUs.

2. Data processing: Once the data has been collected, it is shared with a virtual machine on a remote server in which appropriate software procedures elaborate them in order to refine data quality and produce relevant outputs for final users.

3. Data sharing: The solution also provides the possibility to share via interoperability services the elaborated data with:

- Sinfosec IT platform: the operating system used by Interporto di Trieste S.p.A for inland terminal management;

- Sinfomar IT platform: the Port Community System of the Trieste Port Authority (AdSP MAO) which has specific information requirements in order to enable the software procedures embedded in the train management modules. Hereafter the Sinfomar train management module dedicated to railway manifest declarations is reported. All the data collected in FreeESTE and shared with Sinfomar are listed in similar pre-existing section.

Results & impact

The impacts of this action will increase the data accuracy and the certification that goods moving between Free Zone areas do not change path reducing the data entry processing concerning inbound/outbound of the trains, enhancing data visibility along the supply chain.

The pilot action is fully replicable in other contexts, even beyond the Programme Area.
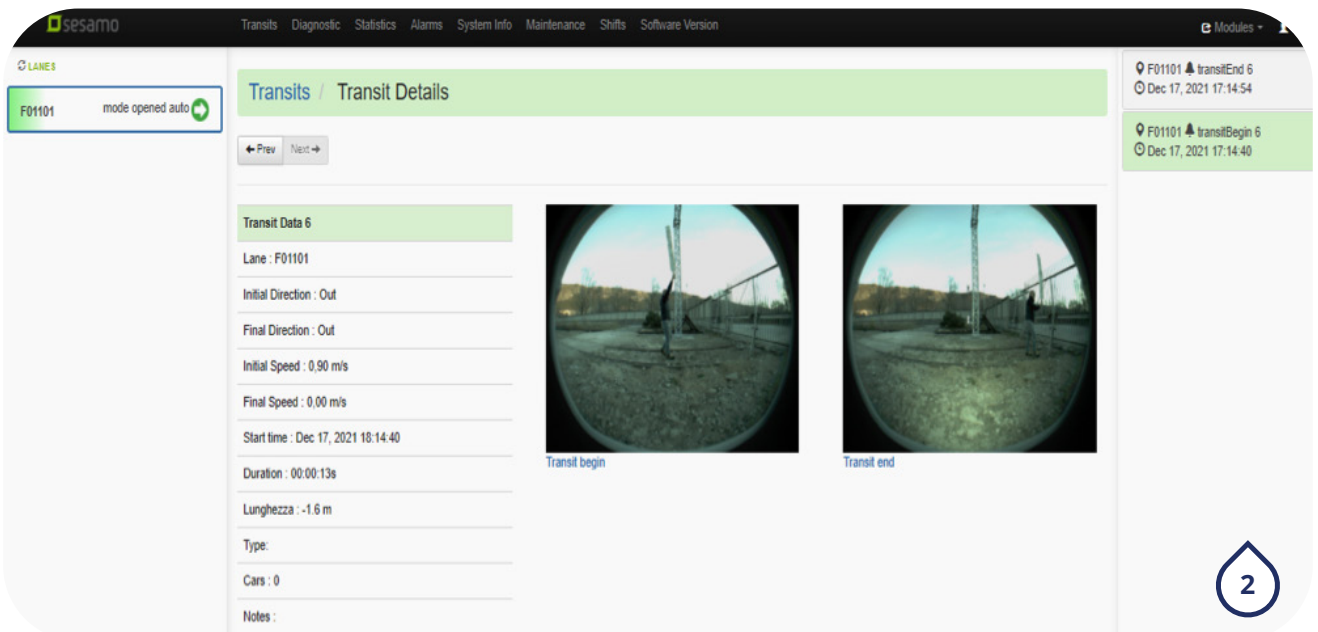

Figure 1: Automated gate position in FreeESTE area
Figure 2: User interface example - transit details example

4.4 Pilot action 4 - Port of Ravenna

Responsible: PP05-AdSPMACS – Port of Ravenna
Completed in: 2022
Title: Development a new "Rail Module" for the PCS of the port of Ravenna

Background

The PCS of the Port of Ravenna is designed according to the "central hub" architectural model. In this model the system operates 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.

One of the main objective for the Port of Ravenna is to optimize and improve the rail infrastructure. In the next years are foreseen seven main interventions:

- Rails extension on the right side of the Candiano Canal

- Suppression of the level crossing in via Canale Molinetto

- Adjustment of the silhouette of the overpass Teodorico

- A new station at the base rail track

- Activation of junction on the left side of the Candiano Canal

- Realization of other seven tracks and their electrification

- Transformation of the base rail track into tracks for arrivals and departures

The investment in physical infrastructures must be supported by the implementation of adequate digital infrastructure in terms of digital services gave to the port operators in order to improve the efficiency of the logistic processes and, specifically, of the processes related to the transportation of goods by rail.

Therefore, the Port Community System of Ravenna need to be implemented with a function devoted to share information about the train circulation and to give to the stakeholders (terminals, freight forwarders, ship agents, MTOs, …) all the data necessary to optimize the timing in the see-rail intermodal transportation.

Description

The object of the pilot was to develop a new "Rail Module" for the PCS of the port of Ravenna. The module must respect the following main characteristics:

- interoperability with the IT system of RFI (the rail infrastructure managing company)
- interoperability with the IT system of the railway shunting operators
- interoperability with the other PCS's modules in order to acquire the information about the customs clearance and, in general, about the status of the goods
- interoperability with the MTOs
- interoperability with the Terminal Operator Systems

The pilot will be tested on a scenario related to the container traffic even if the module must be ready for the management of all the types of package of the goods (containers, general cargo, solid or liquid bulk, …).

The module must support the following processes:

- train schedule
- shunting schedule
- goods status querying
- gate verification
- train tracking

Results & impact

The realization of the pilot has allowed the Port of Ravenna to show how ICT implementations can have positive effects on multimodal logistics within a port system.

The main results are:

1. optimization of the logistic process for intermodal transportation;

2. improvement of accuracy in the coordination of the operations related to transportation by rail;

3. reduction of the time to complete the customs operations.

Pilot action 5 - Port of Ancona

Responsible: Central Adriatic Port Authority -Port of Ancona
 Title: Definition of the technical, operational and ICT requirements for the tracking and monitoring of the container traffic at the commercial dock of the Port of Ancona

Background

In the last years the Central Adriatic Port Authority has invested in developing information systems with the aim to support the efficiency and competitiveness. The PCS "LISy" is able to communicate with the Customs Agency ICT system (AIDA), the Port Management Information System (PMIS) of the Corps of Port Captaincies and the TRAMAR system of ISTAT (Italian National Institute of Statistics). It is still a system fully interoperable with software utilized by different shipping agents and customs freight forwarders for giving them the possibility to exchange data regarding customs procedure without the mandatory necessity to use the system of Port Authority. Despite the success, the system is continuously under developing in order to guarantee the adaptation of its functionalities to the dynamic changes occurring in the world of transport and logistics.

Description

The objective of the pilot action is the realization of technical studies for the adoption of the Artificial Intelligence (AI) technology to track and monitor the containers embarking and disembarking at the port of Ancona. The AI technology is now applied for the tracking of trucks embarking and disembarking at the ferry terminal of the port of Ancona. This technology is able to process the images of cameras installed along a path and recognize, track and monitor vehicles from point A to point B to identify dangerous situations and anomalous behaviors with respect to user-defined standards, to guarantee the safety of the cargo.

This AI sytem is integrated with the IT system of the National Customs Agency (AIDA) to digitalize customs procedures and to reduce time and costs of maritime traffic operations.
The main challenge is represented by the high level of technological innovation requested to develop the Artificial Intelligent system and integrate it with the AIDA system of the National

Customs Agency. The Artificial Intelligent system is developed on the specific needs of the container embarking and disembarking flows at the port of Ancona and on the specific legal requirements requested by the National Customs Agency to perform the customs checks on the freight in transit. In addition, this system must be made interoperable with the already existent AIDA system, thus increasing the level of technological innovation of the project.

Specifically, the pilot action aimed to:

- Improve, innovate and digitalize maritime traffic formalities, in line with the main European digitalization strategy, and in agreement with the National Customs Agency, thus allowing a reduction of timing and costs for the logistics operations of the operators involved;

- Increase security of the containers traffic flows, and of the surveillance and tracking of the containers thanks to the use of Artificial Intelligence system able to detect any suspected behaviors with reference to a pre-defined indication.

Results & impact

The pilot action was aimed at transferring this technology to the commercial terminal of the Port of Ancona in order to guarantee the security of container cargo and the smoothness, efficiency and digitalization of customs procedures for the container traffic.

The project of digitalization of the customs procedures is at the core of a Memorandum of Understanding signed between the National Customs Agency and the Central Adriatic Ports Authority, aimed at promoting the digitalization of customs procedures in the ports under the competences of ADPSMAC with particular regards to the main freight ports Ancona and Ortona.

The results of the application in Ancona will be used to extend the AI tracking system also to the port of Ortona where the AI will be applied for the tracking of trucks at the embarking and disembarking phase and it will be integrated with the AIDA system.

The results will also be used to replicate the project to other Italian and European ports in order to push the deployment of innovative technologies as a mean to increase the efficiency of maritime traffics.

Port of Ancona

4.6 **Pilot action 6 -
Southern Adriatic Sea Ports Authority**

Responsible: PP07 AdSPMAM – Southern Adriatic Sea Ports Authority
Completed in: 2022
Title: Development of a software solution able to monitor the embarkation and disembarkation from ferry boar of people and private/ commercial vehicles (trailer/container). The solution provided provide structured data regarding the transit flows

Background

The pilot action that ADSPMAM carried out within the PROMARES project aims to find a solution to the challenges and problems that hinder the full development of the maritime and multimodal transport sector. This is mainly caused by the unbalanced development of multimodal transport options, weak coordination and poor communication between stakeholders, between those responsible for territorial development policies at the port-hinterland interface. The digitization of port logistics and the implementation of the GAIA Information System has made it possible to give greater impetus to the activities of tracing, connecting and streamlining the processes of exchange processes for ships, people and goods, and to speed up the timing of control of goods and passengers. The pilot action carried out by the project has laid the foundations for improving the management of multimodal transport to / from the port, favouring the development and continuous improvement of the knowledge and skills needed for employment and personal fulfillment both for private people and public bodies, including the whole maritime and multimodal transport community.

Description

PROMARES project has foreseen the upgrade of the Port Community System GAIA (Generalized Automatic exchange of port Information Area), an IT platform, active for some years not only in the Port of Bari but also in Barletta, Brindisi, Manfredonia and Monopoli. The PCS GAIA allows to trace, connect and facilitate the exchange processes of ships, people and goods and was created with the aim of implementing the intelligent and secure exchange of information

between public and private entities of the maritime-port cluster, to optimize, manage and automate port and logistic services by creating efficient processes, reducing procedure times and minimizing the use of paper documents. Detailed information, in particular on traffic conditions, is also made available to haulers who can thus decide the best possible route to reach boarding, and request online authorizations for accessing the port and security areas. GAIA also constantly monitors the entire port process in real time, provides for information on the status of boardings, weather conditions, departure and arrival times of ships through the tracking function by which passengers are also aware of the travel information, which they can instantly view on their mobile devices for free with constant and timely updates, making the travel experience more peaceful.

The PROMARES project has enabled the Southern Adriatic Sea Port Authority (ADSPMAM) to implement targeted interventions capable of improving and strengthening IT security, in relation to:

- Perimeter security: strengthening the technological safeguards for the protection of networks and their perimeters with the aim of increasing the ability to promptly identify an intrusion attempt and to improve their defensive capabilities. In fact, PCS Gaia, in the five ports of the ADSPMAM, was equipped with a technological solution known as NGFW Firewall "Next-Generation Firewall" able to guarantee continuous protection through the functionalities of Web Content, Filtering, Anti-Virus, Anti-Spam, Intrusion Detection and Prevention, Application Intelligence, SSL VPN Client, Web Application firewall (WAF), SD-WAN "Software-Defined Wide Area Network" solutions;

- Backup and Disaster Recovery: with the aim of guaranteeing the continuity and operational availability of the Gaia PCS, and its rapid recovery following serious damage caused by cyber-attacks, accidental events, sabotage, natural disasters or other problems. In particular, it was necessary to equip the five ports of the ADSPMAM with a new hardware server capable of meeting the minimum-security objectives in terms of:

    - storage capacity: in order to ensure a longer period of data preservation/maintenance (RPO - Recovery Point Objective) as well as high disk performance in I/O operations (read/write cycles)

    - size and performance: capable of guaranteeing high performance in terms of data

processing and network speed to support backup and/or recovery activities, ensuring at least one daily copy of the entire virtual infrastructure, as well as small physical dimensions capable of being hosted in high density environments

• recovery time: RTO (Recovery Time Objective) refers to the concept of ensuring adequate recovery times for core services between the occurrence of the damaging event and the complete restoration of the systems themselves.

Results & impact

The construction and upgrade of the GAIA Port Community System had a positive impact in the intervention area, improving some services already present and implementing others. In particular, the system allows for the digitization of embarkation and disembarkation and entry and exit procedures from port nodes, the tracking of the status of goods within the port space and the computerization of port tax payments. The implementation of the system allows you to manage the services present with maximum security and traceability and with a significant reduction in waiting times. This will make it possible to have real-time statistical data on the nature, origin and final destination, as well as all the administrative information regarding customs procedures. A series of facilities that significantly enhanced the attraction of investments to the area, strengthening its strategic importance.

The PROMARES project has made it possible to develop intelligent solutions and a general management model that make it possible to exploit innovative technologies in favor of ports and related services.

There are several concrete advantages and positive effects that the pilot action has brought to the

port and their stakeholders. These include the verification and location of goods, the verification of customs control operations for goods, the obtaining of detailed data on port taxes and on the nature, origins and destinations of goods, the streamlining of the flows of vehicles, containers and goods with digital tracking, to streamline the flow of people.

The PCS GAIA system represents a model with a high potential for replicability: the use of ICT solutions to optimize freight transport in ports will allow ports to have innovative and powerful tools capable of increasing communication and coordination between terminal operators and logistics and public institutions, reducing transit times and increasing the competitiveness and productivity of multimodal transport.

4.7 Pilot action 7 - Port of Rijeka

Responsible: PP09 PRA – Port of Rijeka Authority
Completed in: 2022
Title: Update of the existing passage control system on different entrances

Background
Port of Rijeka is a multi-purpose port whose manipulations include all kinds of cargo along with the passenger movement. Its geographic gravitates towards central European countries, covering the following countries: Croatia, Bosnia and Herzegovina (especially northwest), Serbia (especially central and northern part), Hungary, Slovakia, the Czech Republic, Poland (especially the southern part), Romania (especially the western part) and Germany, the province of Bavaria. Analysis of IT systems consists of IT architecture models, IT systems implementation stage description and analysis of usage and impact of identified IT systems on freight agents. Port of Rijeka Authority has passage control system derived on six locations: Mlaka entrance, Žabica exit, Brajdica – service entrance, Brajdica – main entrance/exit, Lukobran (breakwater), Administrative building. Each of protected locations are communicational connected through different communicational technologies (LAN via optics, wireless LAN), coordinated from one center, into the one unique

system. Each location is in fact local access control system that can work fully autonomously and independently.

The basis of access control system is GRANTA controller, to which a maximum of 8 independent readers can be connected. These controllers are set on each of protected locations and contain access control readers connected to them and located at the entrance of each location. At each port area entrance there are two readers (entrance and exit), so the entrance and exit from the port area can be recorded separately. As GRANTA controller receive maximum of 8 independent readers, that means that one controller can direct maximum of four entrances/exits. If there is a location with more than four entrances that should be protected, then one controller is added to another one in series, so additional 4 doors (entrances) can be protected. Each reader is connected to controller with UTP cable. The cable is used as control cable for opening and closing entrances in port area.

At the entrances with non-existent physical barrier for entrance-exit control in port area, there are corresponding electromechanical barriers that can control entrances and exits in port area in a quality way. These barriers are tripods for the pedestrian entrances and ramps for the vehicular entrances. Each of protected entrances in port area has readers which are installed depending on type of entrance.

Description

With the implementation of the pilot action in the framework of the PROMARES project, the existing passage control system at the following locations: Mlaka Entrance, Žabica Exit, Brajdica - service entrance, Brajdica - official entrance / exit, Breakwater and the Administrative Building has been modernized as follows:

• replacement of existing GRANT controllers,

• replacement of all passage control elements that are damaged or worn out,

• installation of new elements of passage control in accordance with the current situation and needs,

• construction and craft works for the realization of the full functionality of control of the passage at the subject locations.

Modern equipment was procured, which is used today for the mentioned purpose. These solutions are in line with the latest world practice for the protection of areas of similar purpose (ports). The new control devices are microprocessor controlled and network oriented.

Results & impact

Involved stakeholders are all users in the Port of Rijeka Authority. The building of PCS has a significant impact on all port of Rijeka stakeholders and their IT systems, and they have been involved in the process from the very beginning, even before than EU funding was secured. PCS will have several dedicated modules for various concessionaires, and they will have to adjust their systems as part of regular planned internal growth and maintenance activities.

The implementation of the pilot project has completed the process of digitization of the procedure for obtaining approval to enter the port area under the management of the Port of Rijeka.

Users received a fully automated system for submitting applications for entry into port areas managed by the Port of Rijeka Authority. They can submit and track the status of the request online. After approval through their own user page, they can see the status of all requests. The possibility of all types of payments has been implemented, even the prepaid variant. Users have access to the records of entry and exit for trucks with the aim of optimizing and planning the operation of trucks. The introduction of the "booking" system for the needs of the container terminal affected the balancing of the traffic pressure of trucks during the working day. The goal was to reduce traffic peaks and thus relieve the port operational area from unnecessary detention and entry of trucks to the same.

4.8 Pilot action 8 - Port of Ploče

Responsible: PP10 PPA – Port of Ploče Authority
Completed in: 2022
 Title: Digitalization of the port operations and improving security in the Port of Ploče area

Background

The pilot action that Port of Ploče Authority carried out within the PROMARES project aims to find a solution to the challenges and solve problems that hinder the full development of the maritime and multimodal transport sector. This is mainly caused by the unbalanced development of the multimodal transport options and ICT solutions, especially regarding the solutions which exists in port of Ploče area.

The digitalization of port logistics and the implementation of the Port Community System has made it possible to give greater inputs to the activities streamlining the processes for ships, terminal cargo manipulations, trucks organization and administrative Custom and port authorities' procedures.

Within the PROMARES project Port of Ploče Authority has upgraded the Port Community System (PCS) Ploče as a ICT platform for message exchange and port operations. PCS represent the intelligent and secure platform for exchange of information between public and private entities of the maritime-port cluster with aim to optimize, manage and automate port and logistic services. Usage of this kind of systems are based on process optimization by reducing procedure times and minimizing the use of paper documents.

PCS Ploče monitors the entire port process in real time and provides information on the status of porta operations, departure, and arrival times of ships through the tracking function, cargo manipulation and monitoring truck announcement and cargo transport.

Port of Ploče Authority PCS system will be integrated with the national Croatian Integrated Maritime Information System (CIMIS) with the aim of exchanging information in maritime business. Integration is based on defined provisions and standards agreed within the Project of the National Port Information System (nPCS) development. NPCS system will be used in all Croatian ports. Information exchanged between PCS and CIMIS will be further exchanged at the local level with existing systems and subsystems used by users in the Port of Ploče. Based on defined provisions and standards during the development of nPCS for Croatian ports, within the PROMARES project pilot actions have been implemented.

Description

The PROMARES project provided wider scope of possibilities to Port of Ploče Authority regarding the needed digitalization of the port operations and security in the Port of Ploče area. It has enabled to implement targeted interventions capable of improving and strengthening IT security, in relation to:

- **Perimeter security and cyber security:** strengthening the technological safeguards for the protection of networks and their perimeters with the aim of increasing the ability to optimize and balance the network traffic with the aim for optimizing data exchange in the port area and resolving bottlenecks of transport flows of goods while using PCS systems.

- **Backup and Disaster Recovery:** port of Ploče Authority has upgraded the virtualization platform with the aim of ensuring better management of transport flows in port areas which can guarantee the continuity and operational availability of the PCS Ploče, and its rapid recovery following serious damage caused by cyber-attacks, accidental events, sabotage, natural disasters, or other problems.

Through project Port of Ploče Authority implemented PCS pilot related system upgrade and development services and development of the integration API-s, in relation to better exchange of data in the port area and resolving bottlenecks of transport flows of goods:

- Integration of PCS system and module for truck announcements with other control access subsystems and systems from other terminal operators. PCS system was for example integrated with truck cargo scale management system from terminal operator and data regarding cargo and truck weight have been exchanged to PCS truck announcement module.

Based on PCS Truck announcements truck and cargo data have been exchanged to terminal operating system for the truck and cargo scale management.

- Integration of PCS module general cargoes, Customs with the system of TOS main concessionaires.

- The Port Authority of Ploče is a user of the ERP system, which needed to be integrated with PCS system to exchange the necessary data and automate procedures. The integration of the system affects the port entrance procedures. Based on incidental situations in the maritime part, and the monitoring of the maritime aspect through the PCS system, based on the announcement of ships, truck and operational procedures, financial documents have been issued through ERP system and PCS system. With a aim of automating procedures and improving and optimising them, it is necessary to develop data exchange services and interfaces in the data receipt/transmission system in order to avoid unnecessary data overtaking.

Among the stakeholders involved in the project are the public bodies Ministry of Finance (Customs), Ministry of the Sea, transport and Infrastructure, Port of Ploče Authority, Security Guards, port operators and companies in the logistics sector (freight forwarders, transport companies). The PCS system allows the implementation of numerous services, and it is a tool for the public and private stakeholders which can facilitate and speeding up the operations to be carried out within the port.

Port of Ploče Authority PCS system will be integrated with the national Croatian Integrated Maritime Information System (CIMIS) with the aim of exchanging information in maritime business. Project of Integration is based on defined provisions and standards

Figure 1: PCS Ploce system login screen

agreed within the Project of the National Port Information System (nPCS) development. This project supervised under the Ministry of Finance (Customs), Ministry of the Sea, transport and Infrastructure and nPCS system will be used in all Croatian ports.

Information exchanged between PCS and CIMIS will be further exchanged at the local level with existing systems and subsystems used by users in the Port of Ploče.
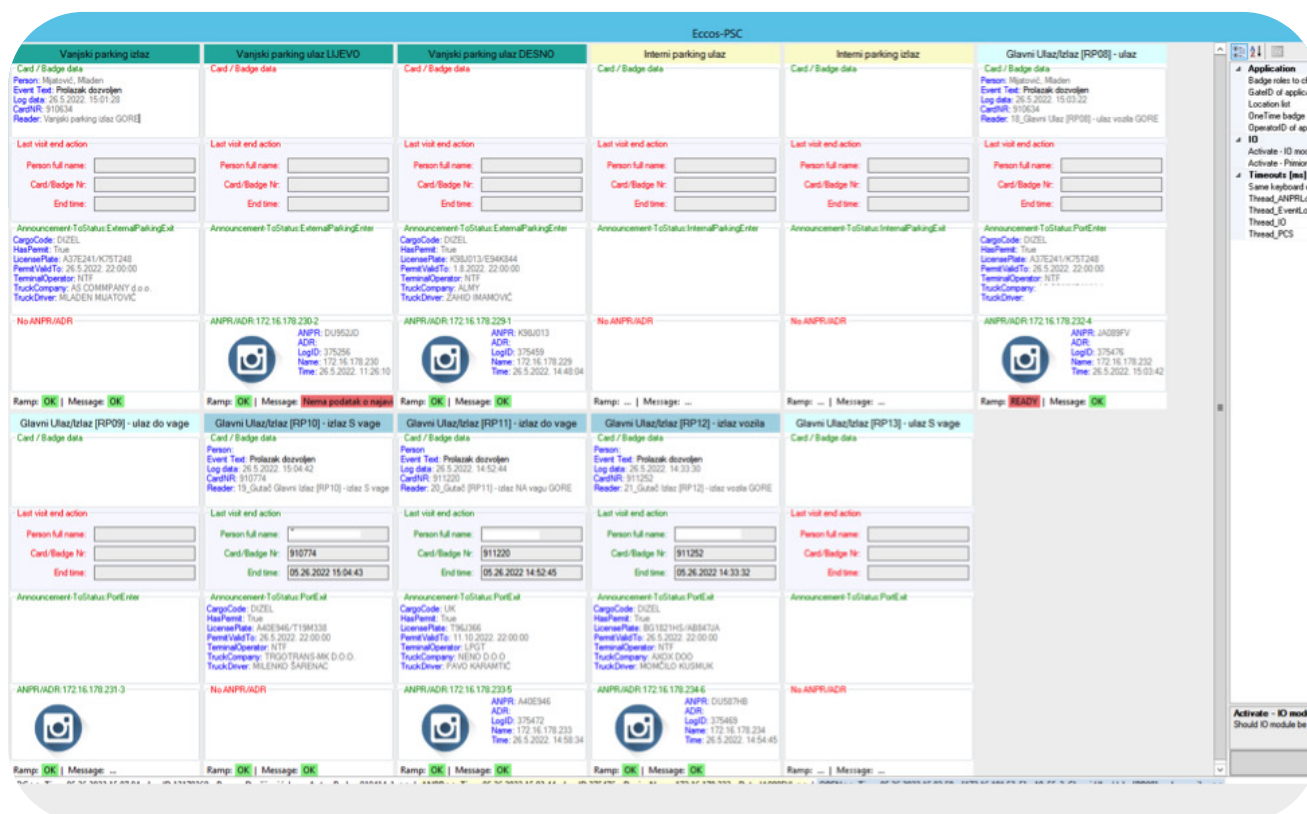
Figure 2: PCS System Ploče Integration with Control Access system and LPR recognition system

Results & impact

The PROMARES project has made it possible to develop intelligent solutions and a general management model that make it possible to exploit innovative technologies in favour of ports and related services.

The digitalization of port logistics and the implementation of the Port Community System has made it possible to give greater inputs to the activities streamlining the processes for ships, terminal cargo manipulations, trucks organization and administrative Custom and port authorities' procedures. PCS system Ploče represent the intelligent and secure platform for exchange of information between public and private entities of the maritime-port cluster with aim to optimize, manage and automate port and logistic services. Usage of this kind of systems are based on process optimization by reducing procedure times and minimizing the use of paper documents. Port of Ploče Authority PCS system will be integrated with the national Croatian Integrated Maritime Information System (CIMIS) with the aim of exchanging information in maritime business. Project of Integration is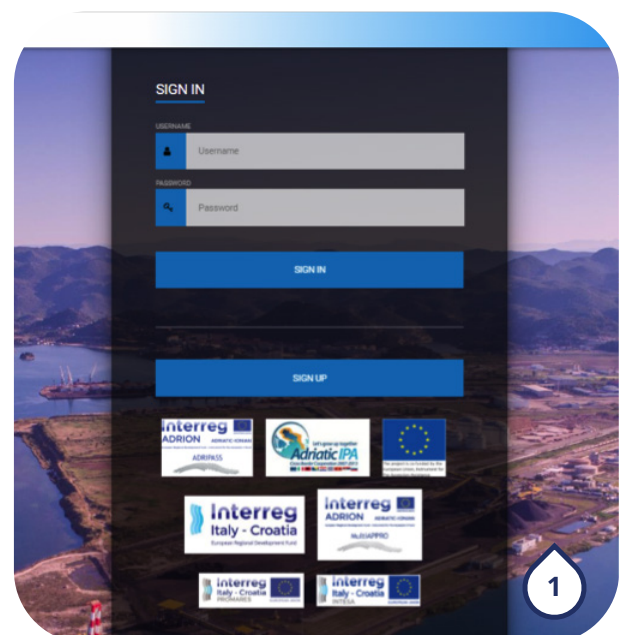 based on defined provisions and standards agreed within the Project of the National Port Information System (nPCS) development.

Information exchanged between PCS and CIMIS will be further exchanged at the local level with existing systems and subsystems used by users in the Port of Ploče.

The PCS system allows the implementation of numerous services, and it is a tool for the public and private stakeholders which can facilitate and speeding up the operations to be carried out within the port. It monitors the entire port process in real time and provides information on the status of porta operations, departure, and arrival times of ships through the tracking function, cargo manipulation and monitoring truck announcement and cargo transport.

PCS System in port environment will improve many parts of the processes in the port:

- Reporting to authorities is simplified. Information is distributed to the respective authorities in compliance with effective directives (very important because supply chain performance is increasingly driven by governmental regulations).

- Coordination of operations is enhanced at the physical, information, and financial layer. This means that cooperating and competing firms are bound together. PCSs enhance the efficiency

and effectiveness of interactions between port community members and thus help to reduce processing costs by providing a central information network which increases visibility and data quality.

- Better data quality:

  - The intrinsic category of data quality is related to data accuracy, objectivity, and reputation. PCSs enhance the accuracy of information by checking for input mistakes.

  - Data accessibility is enhanced by centralizing community information as much as possible. The structured approach of information exchange via PCSs is better than information exchange through informal information channels. Information is detached from personal communication and thus made available on a 24/7 basis. PCSs also ensure data security by managing access rights and tracing unauthorized access attempts.

    Information is only made available to authorized members of the port community.

  - The contextual category of data quality comprises the dimensions of data relevancy, timeliness, completeness, and data complexity. Besides assuring accuracy, input validations performed by PCSs also enhance data relevancy and completeness. PCSs also help to reduce data complexity by capturing information once and reusing it for different applications, so the need to re-type data can be avoided ("single submission"). Information also becomes more transparent because changes can be traced back to individual organizations or users. Regarding data processing, PCSs can enhance the automation of core workflows and processes based on captured information.

  - Representational data quality. Its main dimensions are data interpretability, ease of understanding, concise presentation, and consistent representation. PCSs standardize the message exchange among port community members. All companies involved use the same language in terms of data formats and transmitting services.

  - Possibility to launch alert messages/status reports.

  - Possibility to implement collaborative planning.

  - Higher efficiency and speed regarding port processes for all parties involved.

  - Reduction of paperwork. In this way, PCSs contribute to sustainable transport logistics and support the ambitions to meet global carbon reduction requirements.

- Using electronic data exchange, the PCS is an effective real-time information system; fast, focused, flexible and multi-faceted, it aims to improve efficiency at all stages of the process of manifesting, through vessel discharge and loading, Customs clearance, port health formalities and delivery in and out of the terminal. PCS offers also improved security, cost reduction and potentially more competitiveness for each user.

5   Cross-border results

PROMARES has developed a consistent package of studies and pilot actions on the main ports of Adriatic area, that – especially in the peculiar last years – helped to develop and keep an active network in the cross-border area Italy-Croatia, improved the cooperation among the involved and related subjects and stimulated the research and application of winning solutions in terms of coordination measures, governance and supporting tools to sustain maritime and multimodal freight transport.

Particularly PROMARES has led to multiple results functional for enhancing maritime and multimodal freight transport within the Programme Area:

1. Increase the **technical knowledge and transport planning competences** of all the ports and the intermodal logistic nodes generating multimodal freight transport;

2. Improve the **capacity to streamline freight flows through the use of low-cost and highly efficient ICT tools** of all the ports and the intermodal logistic nodes generating multimodal freight transport, also by upgrading the Port Community Systems and ICT systems aiming at a better communication and coordination with port stakeholders (private and public) both at node and at cross-border level;

3. Establish a **multilevel and multidisciplinary cooperation network among transport stakeholders and policy makers**, especially bringing some of the concrete needs of the territories to the policy actions, also through the means of the WP5 of PROMARES that includes apart from this Strategic Document, the involvement of main institutional Subjects within dedicated interviews, the fulfilment and sign of a Memorandum Of Understanding among relevant stakeholders and the Final Project Conference.

Given the **articulated governance** of a system, compounded by transport stakeholders of different nature in the private (enterprises, operators, logistic hubs, infrastructure providers, transport associations, education and training organizations) and public (local, regional and national public authorities) sectors, an important focus has been put within the set-up of an omni-comprehensive framework, able to reach and involve these broaden groups of stakeholders and to communicate effectively the key messages identified with several communication means.

PROMARES – according to its Project's experience and furthermore from the dialogue held within its cooperation network – gathers some policy recommendations for the European Macro Strategies EUSAIR, EUSALP, EUSDR, that can sustain the strategic development process to foster Intermodality.

With the main objective to tackle the challenges and develop more efficient and rapid intermodal and multimodal transport flows, **the following Policy Recommendations have been identified and represent the high-level strategical heritage left by PROMARES Project.**

N°1: SUPPORTING AN INTEGRATED GOVERNANCE

The need to sustain an integrated governance, that enables a factual sharing of best practices, transport planning competences, data and ICT solutions to overcome the weak coordination and communication of all stakeholders, both between each port and its hinterland and between ports at cross-border level.

N°2: INTEGRATING PORT IT SYSTEMS

The uppermost importance of the Port Community Systems in the capacity to manage effectively and co-ordinately both people and freight transport flows that are going in and out from the nodes of the logistic multimodal chain and the integration of the other systems of the port community.

N°3: FOCUSING INVESTMENTS ON ICT

The powerful effect of ICT lever, compared in terms of investment cost with the physical infrastructures. Lower costs can produce bigger results especially in the first phases of a process re-engineering.

N°4: FOCUSING ON CYBER SECURITY

The great attention that, nowadays, has to be paid for ensuring a solid Cyber Security of PCSs and related suites, especially in the direction of a higher opening-up with stakeholders and new players.

These remarks are especially important whenever they acquire a lendable meaning to be exploited within the new upcoming financing opportunities of EU and National Programs, that address the efforts on environmental challenges and design a new freight and people transport paradigm.

Will we be able to organize our social and economic structures according to a primary green goal, despite the different interests and related conflicts? The harmonization of all these pushes is the hardest part of the job, that is the responsibility not only of the institutional entities but also of all the other players in the logistic chain.

A real European Green Deal is possible only if a **collective network among all involved stakeholders will overcome the simple concept of interest**, valuing instead the usage of monetary resources as a powerful mean to implement a sustainable change.

To enhance cross-border maritime and multimodal freight transport makes sense only if the **strategical and the operational level start to become a very frequent intersection and the network mechanism become a praxis** that enables to share really the best practices, that have been demonstrated to finally shift the freight flows towards intermodal and multimodal solutions.

As a result, no further indulge should be observed in making the European Financial Programming converge to the priorities pursued by the EU Macro-Regional Strategies and for the Adriatic-Ionian area specifically under the Pillar 2 'Connecting the Region' of EUSAIR: **developing competitive regional intermodal port system that offer reliable transport networks and intermodal connections with the hinterland** is not only anymore a scope but a necessity for the territory.

In fact, the way we will be able to move people and goods in the next few decades will determine the opportunity to keep flourishing economies in accordance with an **environment**, that will allow them to be still possible, or not.

PROMARES has tried to implement concrete upgrade actions on the ICT infrastructure in order to obtain an increase in terms of multimodal logistic opportunities coming from maritime transports; but especially to sustain the idea that every single initiative is important and is empowered by cooperation if a coherent framework has been assessed beneath.

The achievement of significant results in the shift of freight moving through the sea from road to rail cannot be thought only in the short-medium term.

It is requested to have a common and continuative effort, promoted by all relevant institutional subjects, sustained by high-level strategies and implemented through cooperative networks.

In coherence with the EU policies and priorities and with the factive approval of national and regional governments, a **timeframe of 15-20 years** could consent to develop full-scale improvements of intermodal solutions. Of course this estimation is subject to those risks coming

from the current instable geopolitical situation, that can change rapidly the main definitory elements and prolong the path.

Despite the example brought by PROMARES, hard infrastructure connections have to be empowered on those connections that appear to have a poor development. But this has to be addressed according to global priorities, considering as reference points TEN-T Corridors, Motorways of the Sea and the EU transport guidelines.

Apart from hard infrastructure the match of the soft infrastructural systems is open and more easily reachable, if the stakeholders are pushed towards a shared goal. **Communication and exchange of data and practices can be facilitated if ICT architectural elements, such as Port Communities Systems**, are driven to move closer economic subjects and their related interests. Within this sphere resources could be invested into new technologies to sustain a winning change and could be oriented towards product, process or business model innovation. Whereas both product and process innovation can be incremental and moderate, business model innovation is almost always radical, risky, and transformative.

PROMARES has studied some **disruptive innovations** and identified the following ones as applicable to multimodal transport & ICT development projects. Out of these some of them are hereafter marked with a bold type, because they appear to be more mature in the application field of intermodal and multimodal solutions development.

1. 3D Printing
2. **4FOLD Foldable Container**
3. On-Demand Trucks
4. Self-driving Vehicles
5. **Robotics & Automation**
6. Augmented Reality
7. Distributed ledger technologies
8. **IoT-sensors-big data-digital twins**
9. **Other concepts: digitalization, adaptive sourcing, decarbonization**

The whole experience conducted within PROMARES Project highlighted some general remarks, coming both from the implementation phases and especially from the **dialogue with the institutional subjects.**

In fact, with the aim to establish an effective and real cross-border institutional cooperation on maritime and multimodal freight transport in the Programme Area, the creation of a **Cooperation Network** for sharing the strategy of PROMARES has been pursued.

The objective was to identify all the technical elements necessary for the definition of a correct cross-border strategy, envisaged in the framework of PROMARES, involving and integrating the point of view of some of the **most relevant stakeholders and institutional subjects** in the field of maritime and multimodal freight transport.

At the same time, the creation of a Cooperation network, facilitated both **an operational and an institutional dialogue**, with the ultimate goal of continuing to promote maritime and multimodal freight transport in the reference areas and beyond.

The following **general remarks** can be considered as points of reference in the strategic definition process within national and transnational organizations and also as hints for the development of future Projects in the field of maritime and multimodal freight transport.

SHARING INFORMATION AS COMMUNITY   R1

Concept Description

Knowledge has become fundamental, especially referred to those new technologies that can ensure successful logistic processes.
Port Community Systems nowadays can embrace a higher number of players and modules, putting them together under the same I&C umbrella.
Some Port Authorities or Relevant business entities are already experimenting significant benefits from the implementation of new tech applied to business and logistic processes, while some others can have more difficulties mainly due to a lack of knowledge of the better opportunities to exploit, much more than a lack of money to invest.
But what really can make a difference is to share this knowledge, to leave the access of these pieces of information to the other ports or hubs, that, nevertheless their different characteristics, can integrate some features and adapt them to their own operative model.
Creating modern repositories of best practices and knowledge, e.g. by using a social network communication, can represent a possible way to facilitate the dialogue among all the subjects and to move close to a concept of Community. It is crucial to overcome the bottleneck due to the risk of losing control on data; this can be only guaranteed by a strong institutional approach on cyber-security matter.

TRANSNATIONAL THROUGH NATIONAL LEVEL

R2

Concept Description

It is fundamental to have effective cross-border cooperation to develop winning multimodal solutions. Sometimes these opportunities are coming by their own with common interests on business, but some others potential good opportunities can remain unexploited.

The cohesion of national networks has to be solid upstream to sustain a successful transnational level of cooperation. This is especially true in bigger Countries, where the fragmentation of territories, cultures and business approaches is stronger.

Transnational entities such as Macro Strategies, despite their low operative impact, have an important role in terms of "moral suasion", especially in crisis and difficult situations.

Supranational entities as the European Commission can instead give a strategic direction, fixing common objectives that have to be pursued.

However in the current scenario it is essential to establish the cooperation first of all on a national level, which is the premise for a transnational one.

This could be guaranteed by a governance structure held by Ministries, with the scope of collecting all main national stakeholders that can contribute to the growth of multimodal connections on freight transport sector, facilitating the communication process and promoting thematic networks.

It is important to manage requirements and priorities so as to offer a single point of contact and possibly coordinate the different stakeholders towards a shared vision on Intermodality.

SOFT & LEAN GUIDANCE APPROACH

R3

Concept Description

If on one side there is a strong need to rely on national and supranational institutional structures that offer a guidance and address the needs and priorities of the development processes, on the other the type of sustain has to be based on a soft-skilled approach, that can be recognized as "lean" by the different stakeholders.

Once again it is business and more specifically market interests that finally drive and orient the choices of each investor, for this reason all the institutional subjects should be seen as an opportunity, as a key driver factor towards successful and shared targets.

Functions and powers can even weigh down the governance process, while any institutional body that is able to guarantee knowledge, spreading of information and best practices can be seen as an opportunity. Financed programs and projects make the big deal to ensure all of this plus money to be invested on specific pilot actions, but they are time-limited and their vision is often finishing within the project's line. To sustain initiatives that foster multimodal transport solutions it is necessary to expand the above concept to a continuative framework, that can manage the needs and orient them towards innovative solutions, like the one on implemented by PROMARES.

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