INTESA

Improving Maritime Transport Efficiency and Safety in the Adriatic

FINAL PUBLICATION

Interreg
Italy - Croatia
INTESA
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12	€ 2.896.480	01/19 > 06/22
PARTNERS	TOTAL BUDGET	PROJECT DURATION

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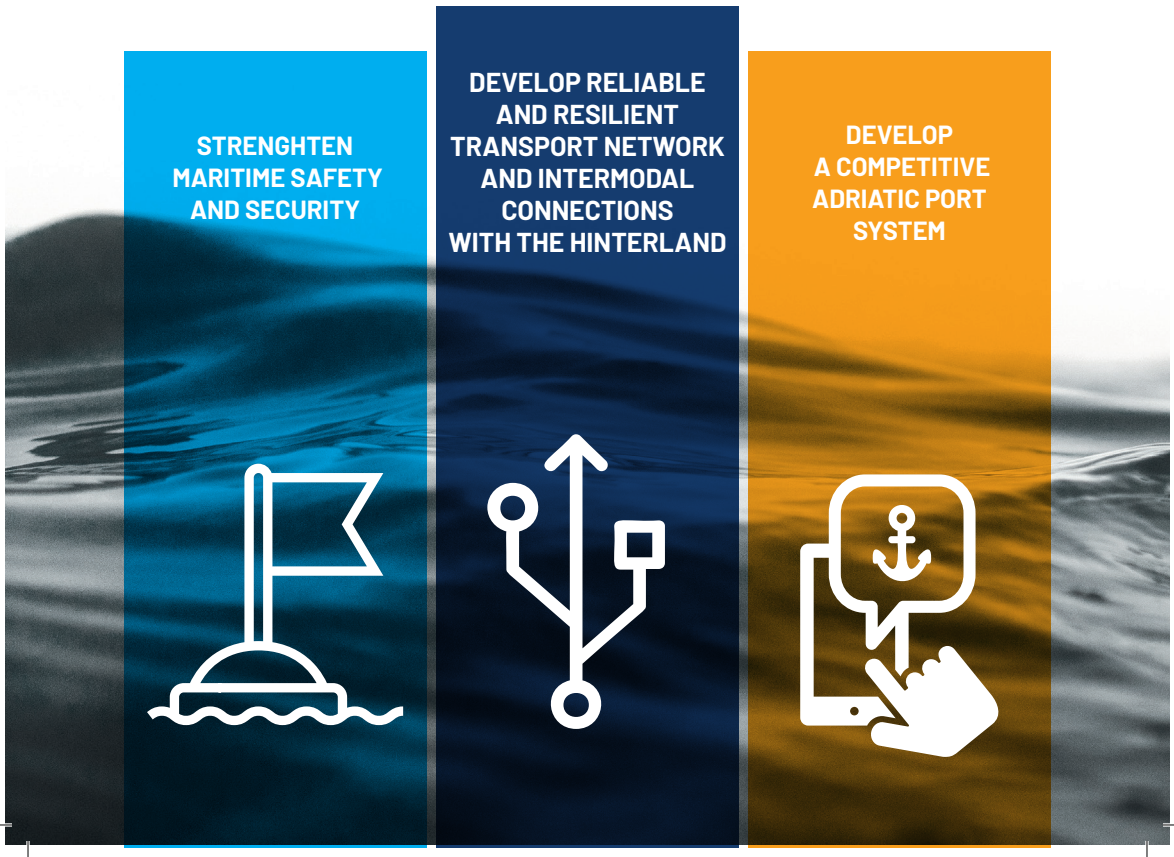
Executive Summary

INTESA Project involves the National Maritime Administrations of Italy and Croatia and main port authorities of the Adriatic Sea (Venice, Trieste, Ravenna, Ancona, Bari, Rijeka, Ploce and Split) with the scope of harmonizing and optimizing the procedures of the complete maritime transport process in order to make port and maritime transport system more efficient and safe. The project aims at optimizing the port procedure from unload of the cargo from the ship to the forward by train or truck, at optimizing the procedure to enter and exit from the port; at increasing port performances in bad weather conditions safeguarding safety and security requirements; at designing and implementing integrated ICT tool for the management and broadcast of the information on Maritime Safe.



Il progetto INTESA coinvolge le Autorità Marittime Nazionali italiane e croate e le principali Autorità Portuali dell'Adriatico (Venezia, Trieste, Ravenna, Ancona, Bari, Rijeka Ploce e Spalato) con l'obiettivo di armonizzare ed ottimizzare le procedure dell'intero processo di trasporto marittimo al fine di rendere il sistema portuale e di trasporto marittimo più efficiente e sicuro.

Il progetto mira ad ottimizzare le procedure portuali dallo scarico della merce dalla nave all'inoltro su treno o camion; ottimizzare la procedura di ingresso e di uscita dal porto; aumentare le prestazioni del porto in condizioni meteorologiche avverse salvaguardando i requisiti di sicurezza; progettare e implementare uno strumento ICT integrato per la gestione e la trasmissione delle informazioni sulla sicurezza marittima.

Projekt INTESA uspostavlja mrežu između nacionalnih pomorskih uprava Italije i Hrvatske i glavnih lučkih uprava Jadranskog mora (Venecija, Trst, Ravenna, Ancona, Bari, Rijeka, Ploče i Split) s ciljem usklađivanja i optimizacije postupaka svih procesa pomorskog prometa, kako bi lučki i pomorski prometni sustav bili učinkovitiji i sigurniji. Projekt ima za cilj optimizaciju lučkog postupka od iskrcaja tereta s broda dalje prema naprijed vlakom ili kamionom, optimizaciju postupka ulaska i izlaska iz luke; na povećanje performansi luke u lošim vremenskim uvjetima čuvajući zahtjeve sigurnosti i zaštite; pri osmišljavanju i implementaciji integriranog ICT alata za upravljanje i slanje emitiranje informacija o pomorskoj sigurnosti.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Introduction

The Intesa (Improving Maritime Transport Efficiency and Safety in Adriatic) project, which lasted 30 months from 2019 to 2022, is a European project co-financed by the Interreg Italy-Croatia 2014-2020 Program with the aim of improving the efficiency of maritime transport, navigation safety and the harmonization of procedures in intra-Adriatic traffic, as well as increasing accessibility to the main ports of the Adriatic through the adoption of computer systems for the exchange of data in real time and navigation aids.

The project has involved the Italian and Croatian Ministries of Transport, the General Command of Harbour Offices, the Metereological and Hydrographic Institute of Croatia and the main Adriatic ports: ports of Venice, Chioggia, Trieste, Monfalcone, Ravenna, Ancona, Pesaro, San Benedetto del Tronto, Pescara, Ortona, Bari, Brindisi, Manfredonia, Barletta and Monopoli on the Italian side, and the Croatian ports of Rijeka, Ploce and Split, on the Croatian shore.

The outcome of the project's Work Package 4.2 is the "Cross-border Action Plan", which aims at analysing all the pilot actions identified and implemented by the project partners with the objective of providing useful final recommendations to improve safety and efficiency in the port context.

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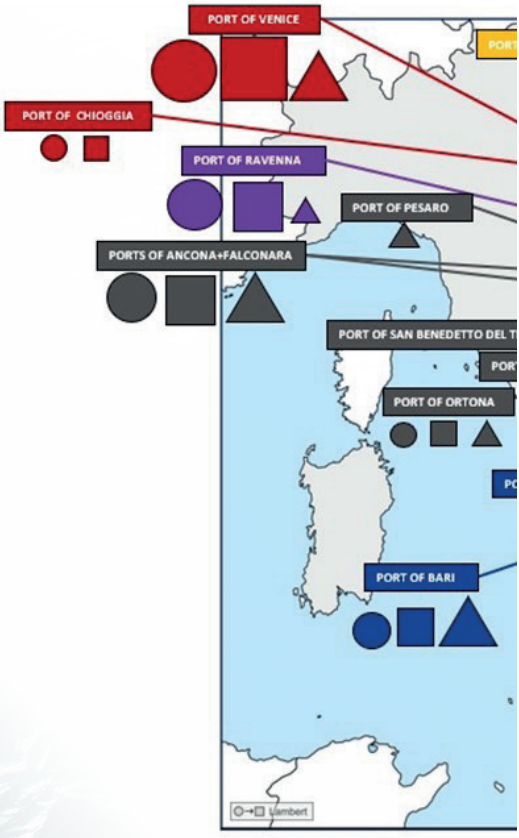
Freight and passengers volumes of the INTESA ports



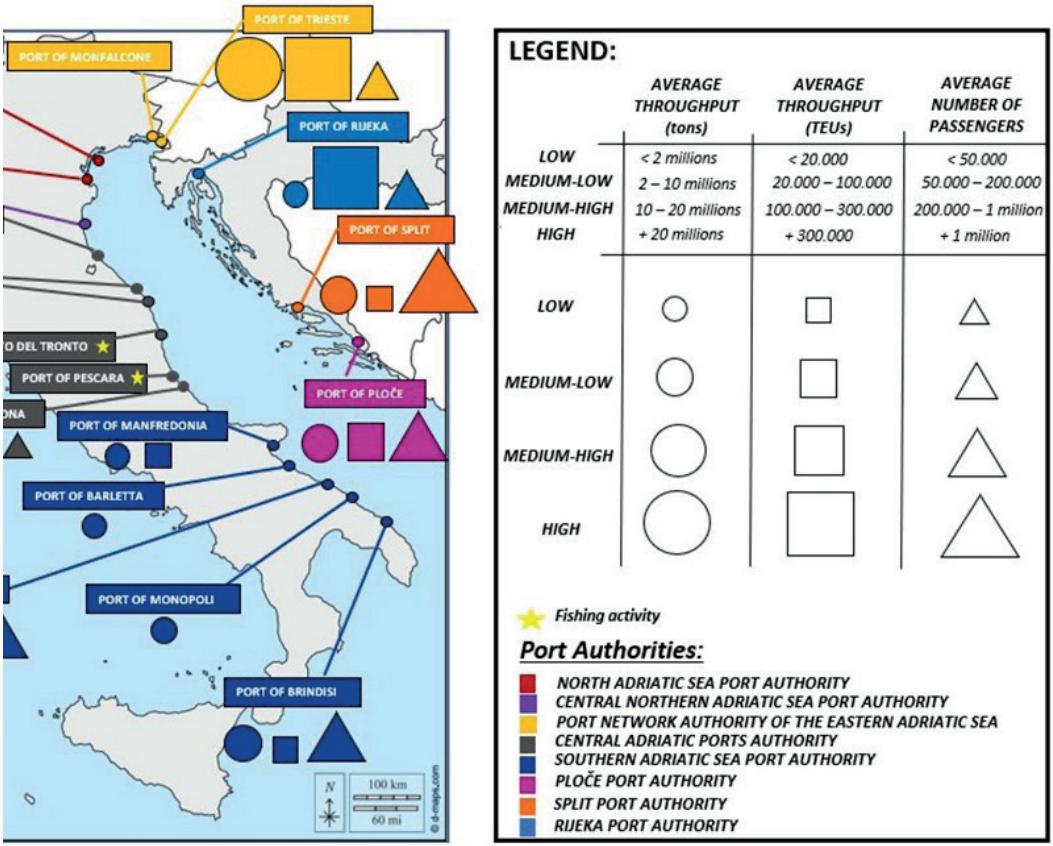


Fig.1 | *Comparison of traffic volumes of different ports included in the project*

A comparison on the volumes of goods and passengers handled by the ports involved in the INTESA project may provide some insight on how to interpret the pilot actions implemented by the project partners.

For the comparative analyzes, the average values over the years 2019, 2020 and 2021 were considered for each port.

Figure 1 highlights the different type of goods, freight and passengers (expressed in tons, TEUs, and number of passengers) handled by the ports included in the project. The ports of Trieste, Venice and Rijeka are the ports that handle the largest quantity of freight traffic while the Port of Split is the largest in terms of number of passengers handled.

Cross Border Action Plan

All the pilot actions were analyzed according to different aspects:

- **Pilot action types**
- **Weaknesses addressed by the pilot actions**
- **Impacts generated by the pilot actions**
- **Stakeholders involved in the pilot actions**
- **Requirements for implementing the pilot actions**

Pilot action types

Starting from the description of the pilot actions implemented by the project partners, four main pilot action categories were identified:

1. Purchase of highly technological equipment;
2. High level training;
3. Integration of Italian and Croatian Transnational IT system for maritime safety in the Adriatic;
4. Transnational harmonization and optimization of procedures of the complete maritime transport process.

The diagram in **Figure 2** shows the number of pilot actions carried out by all project partners, divided by type of pilot action.
Most of the pilot actions involved the purchase of high-tech equipment. In particular, all Port Authorities have implemented at least a pilot action that involves the purchase of highly technological equipment. The Croatian Ministry of the Sea, Transport and Infrastructure (MSTI) focused on the integration of the Italian and Croatian transnational IT system for maritime safety in the Adriatic and on the transnational harmonization and optimization of the procedures of the entire transport process.

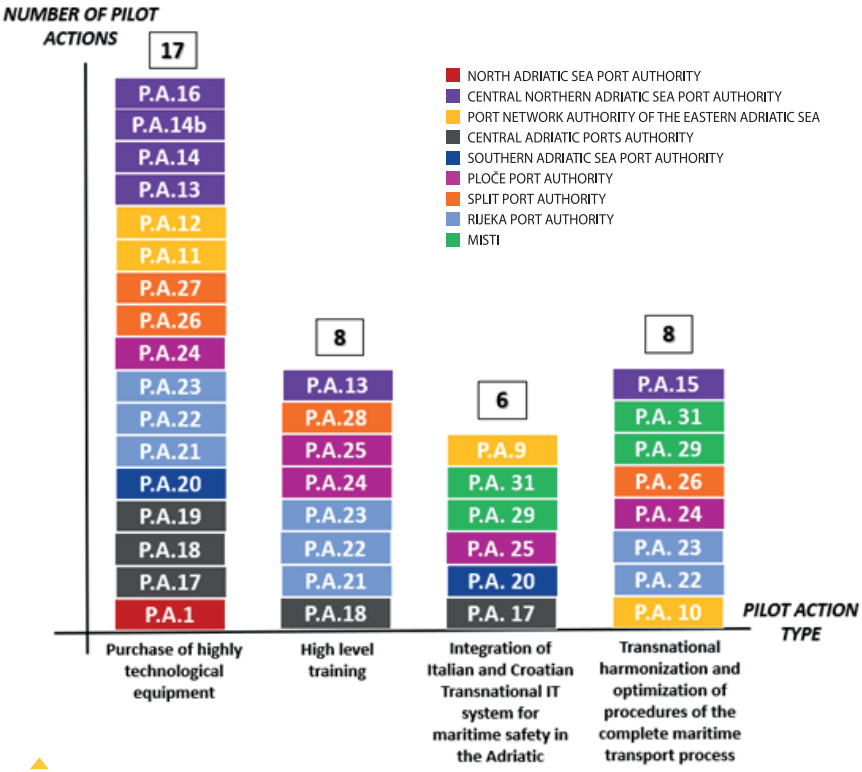


Fig.2 | *Number of pilot actions implemented,divided by pilot action type*

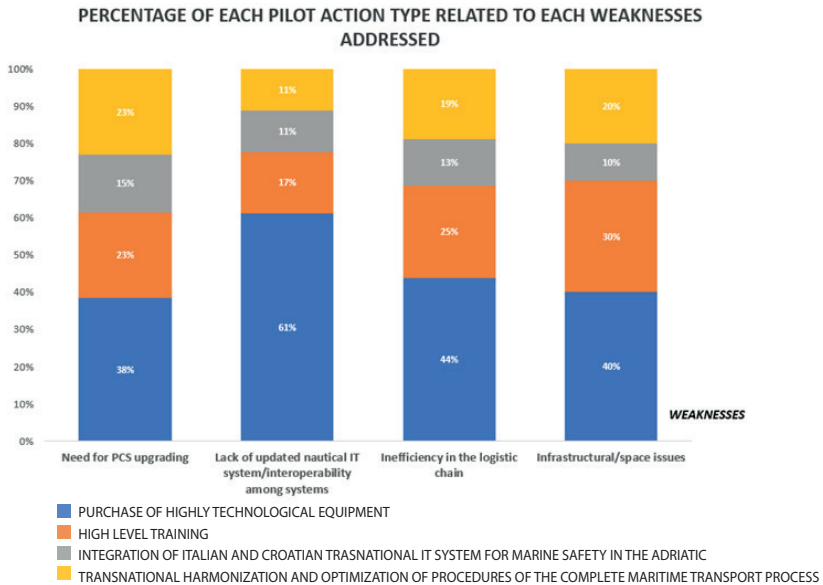
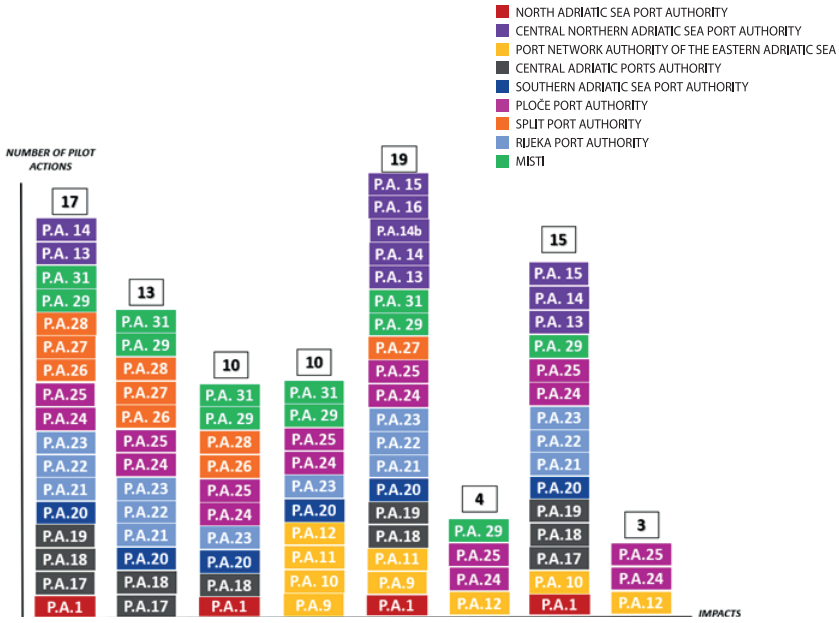


Fig.3| *Percentage of each pilot action type related to each weaknesses type addressed*

Fig.4| *Number of implemented pilot actions divided by impact*



Weaknesses addressed by the pilot actions

For the purposes of the present analysis, the weaknesses addressed by the pilot actions were divided into 4 macro-categories:

1. Need for PCS upgrading;
2. Lack of updated nautical IT systems/ interoperability among systems;
3. Inefficiencies in the logistic chain;
4. Infrastructural/space issues.

Figure 3 shows that the purchase of highly technological equipment is the most adopted solution regardless the weaknesses faced, which confirms the previous analysis. The equipment purchased was used in most cases to compensate for the lack of updated nautical IT systems/interoperability between systems (61%). High-level training appears to be of great importance in addressing the weaknesses identified. This is probably due to the fact that the purchase of highly technological equipment results in the requirement for more specialized training. With reference to infrastructural/space issues, high level training is evaluated as valuable (30%) as it can provide more skills to pilots.

The percentage of "Transnational harmonization and optimization of procedures of the complete maritime transport process" pilot action type is low (11%) in addressing the lack of updated nautical IT systems/interoperability among systems.

Impacts generated by the pilot actions

The diagram presented in **Figure 4** reports the type of impacts generated by the pilot actions implemented by the project partners. The main results obtained by implementing the pilot actions are: greater safety and security, digitalization and maritime/nautical accessibility. It also emerges that the pilot actions implemented have little impact on the optimization of the land-side supply chain (lower costs and road/ rail accessibility).

As also emerged from the analysis relating to the types of pilot actions (Figure 2), a correlation between the size of the port in terms of traffic volumes and the impacts achieved with the solutions implemented does not appear to be evident.

The reduction of costs seems to be a secondary impact for the Port Authorities involved in the project since only 4 pilot actions concern the achievement of "lower costs".

One of the main objectives of the Port Network Authority of the Eastern Adriatic Sea - including the ports of Trieste and Monfalcone - seem to be the achievement of greater efficiency in terms of time reduction, as most of the pilot actions had the impact of "lower time to perform operations".

Since, of the ports considered, Trieste is the one with the highest throughput, it is clear the need to prioritize efficiency to speed up operations, reduce bottlenecks and delays in operations.

Increased digitalization, as mentioned above, turns out to be of great importance: 19 pilot actions result in having this impact. Through increased digitalization it is certainly possible to obtain, as a side effect, the achievement of the other impacts pursued. This may be the reason why, although the ports included in the project have medium-high levels of digitalization, an attempt is made to increase the level of digitalization regardless of the level of traffic volumes.

Stakeholders involved in the pilot actions

The diagram presented in **Figure 5** provides an overview of the stakeholders involved for each category of pilot action. In addition to Port Authorities, the most involved stakeholders are Coast guards/Harbor masters and Shipping companies/Maritime agents. Indeed, the majority of the pilot actions are devoted to increase safety at sea and improve maritime and nautical accessibility.

Only a minor portion of pilot actions include Customs among the stakeholders, in particular the pilot actions implemented by the port of Trieste and Ploce whose goal is to improve their PCS and increase the overall efficiency of port operations.

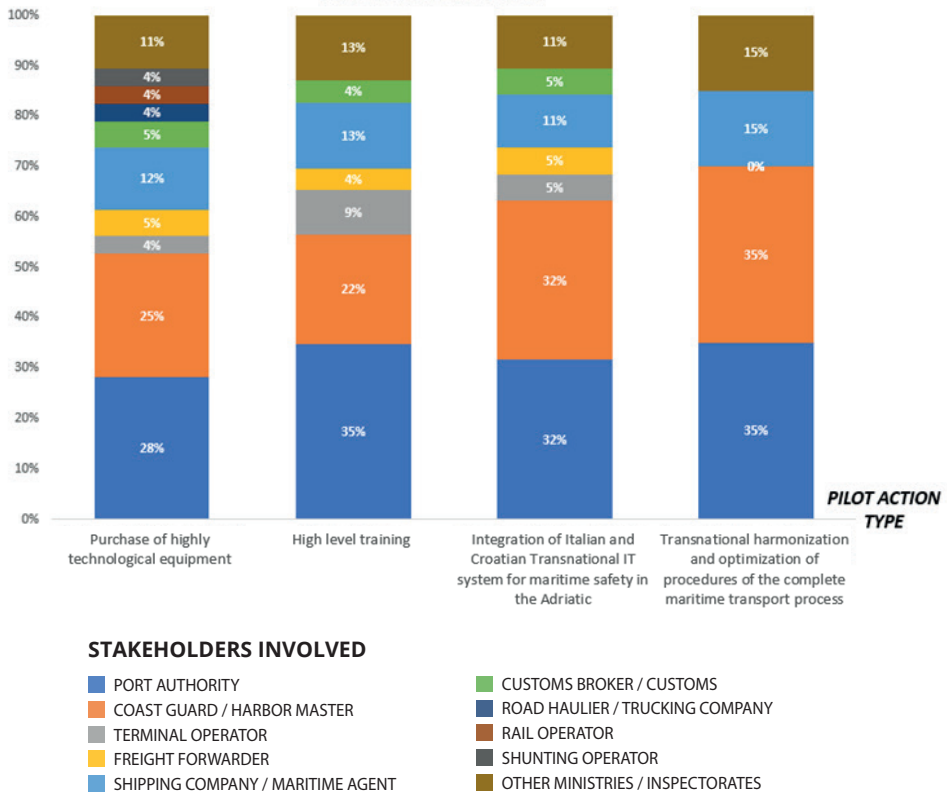


Fig.5 | *Stakeholders engaged in each pilot action type*

Requirements for implementing the pilot actions

The diagram presented in **Figure 6** provides a detail of the factors required to implement the various pilot action type.

High economic investment and IT competences are the main important requirements needed to implement the pilot actions identified. On the contrary, time seems not to represent a big issue.

A strong coordination is needed in the pilot actions involving "Integration of Italian and Croatian Transnational IT system for maritime safety in the Adriatic" (29%) and "Transnational harmonization and optimization of procedures of the complete maritime transport process" (20%).

As mentioned above, the requirement relating to "IT competences " is the most relevant requirement by far for all types of pilot actions implemented: this is consistent with what was stated in previous analyzes in which "increased digitization" emerged as one of the more impacts pursued.

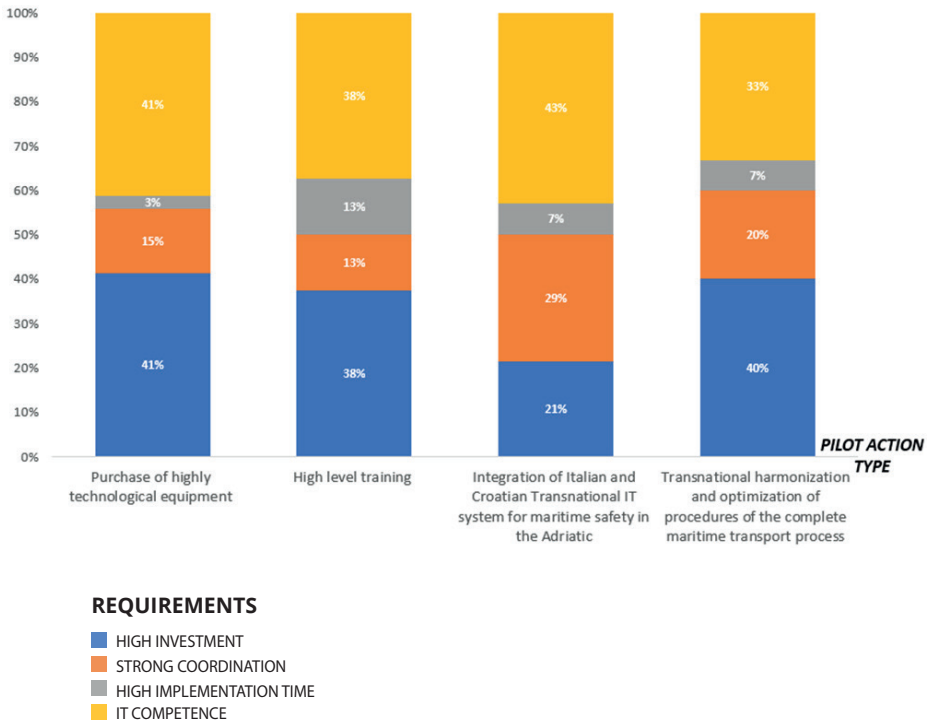
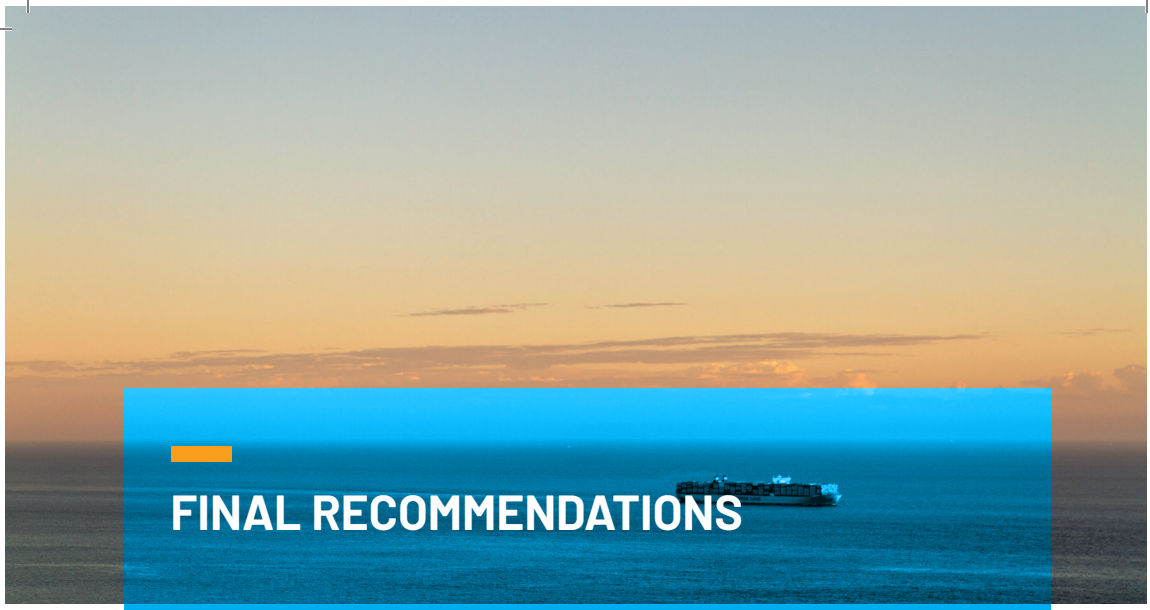


Fig.6| *Percentage of each requirement related to each pilot action type*



FINAL RECOMMENDATIONS

From the analysis carried out, all project partners are pursuing increased safety and maritime/nautical accessibility, in response to their needs, regardless of the size and level of traffic of the port in question.

These goals have been effectively achieved mainly through:

- **the purchase of highly technological equipment** (such as tide gauges, met-ocean moored buoys with AISAtoN dissemination and Pilot Portable Units);
- **high level training** involving stakeholders in sea-side operations.

In addition to the above mentioned technologies, other technologies may be of help in order to increase increased safety and maritime/nautical accessibility in ports:

- **IoT - Internet of Things,** i.e., is a network of items that includes sensors and embedded systems which are connected to the Internet and enable physical objects to gather and exchange data. A best practice related to the use of IoT in ports is provided by the Port of Rotterdam, which uses a meteorological and oceanographic system initially consisting of 44 sensors that measure wind speed, humidity, water turbidity and salinity, water flow and levels, currents and tides. It allows the data collected to be used and analyzed with the goal of reducing waiting time and optimizing mooring, loading and unloading operations while also increasing safety.
- **Drones,** which are robots that collect data: they can be aircrafts or aquatic drones, remotely controlled or fully autonomous. A best practice related to the use of drones in ports is provided by the Port of Antwerp, in which aquatic drones are used in the port to inspect infrastructures and carry out depth measurements in hard-to-reach places with heavy traffic in order to indicate which parts of the quay need dredging.

The analysis in the previous sections also show that for ports affected by large throughputs, (e.g., the port of Trieste) it is also important to increase efficiency. This suggests that, alongside the increased safety and increased maritime/nautical accessibility, for ports that are affected by large traffic, it is appropriate to implement solutions that will decrease port operation's time and bottlenecks. In this perspective, a suitable solution could be for example the implementation of a **Truck Appointment System** (TAS) as suggested in WP 3.4 and 3.5. In fact, TAS - also called Gate Appointment System or Vehicle Booking System - is a digital platform that allows transport companies to book a precise time slot when the truck can enter the terminal gate. This allows to increase port terminals efficiency and productivity, as well as reducing congestion inside and outside the port areas.

From the analysis summarized in **Figure 5,** it appears that Customs is only marginally included in the pilot actions considered (only the ports of Trieste and Ploce have mentioned it). However, in the perspective of improving overall port efficiency (both seaside and landside) and increasing the level of digitalization (**Figure 4)**, it is recommended for ports to consider the use of Fast Corridors. Fast corridors are immaterial infrastructures (by road or rail) that allow to simplify and streamline customs procedures, which are carried out in inland logistic nodes instead that in the ports.

The benefits related to Fast Corridors are:

- **reduce** transit times of goods from the ports to their catchment areas
- **decrease** overall costs
- **increase efficiency** in the ports, thanks to a reduction of dwell times of goods in ports. This in turn, enable to handle higher volumes and to provide higher service levels to customers
- **enhance security,** thanks to the combination of documentary checks and physical monitoring of the flow of goods along the entire route
- **decongest** port areas

Few pilot actions dealt with the improvement and extension of PCSs (Trieste and Ploce) with the aim of improving safety but also efficiency. Another solution to be suggested regards the use of **Blockchain** in order to improve the efficiency of PCSs. A blockchain is a shared and immutable ledger that facilitates the process of recording transactions and monitoring assets in a business network.

In **Figure 7**, the priority level of the suggestions mentioned above is considered to identify whether the main goal is increasing safety or increasing efficiency.

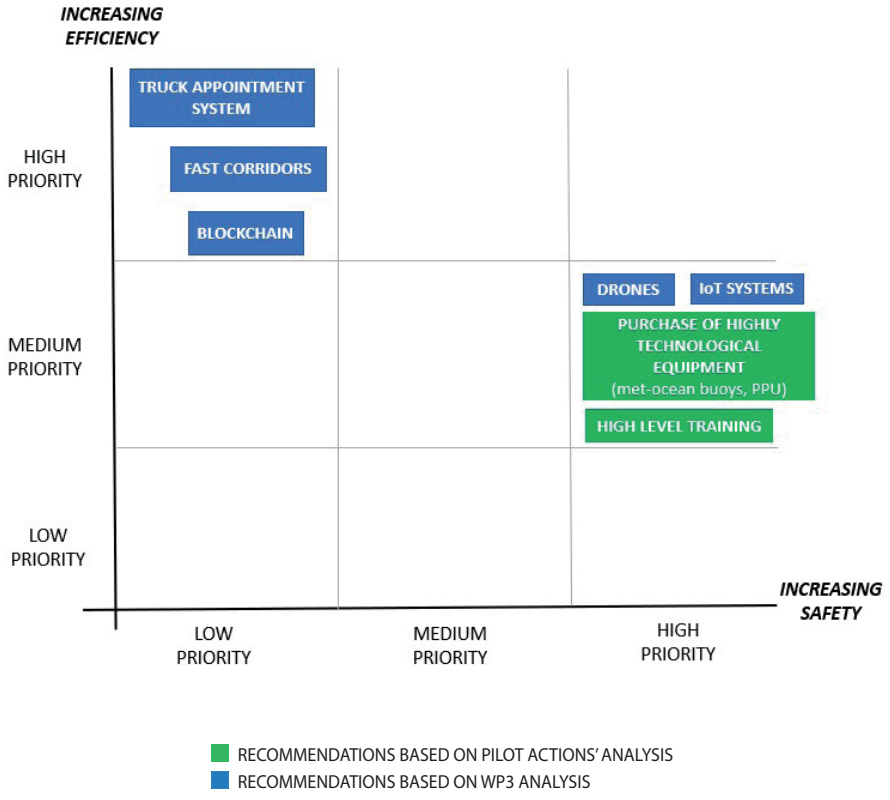


Fig.7 | *Recommendations' priority levels in terms of safety and efficiency*

Finally, in **Figure 8** each recommendation proposed is detailed in terms of implementation difficulty and stakeholders coordination needed.

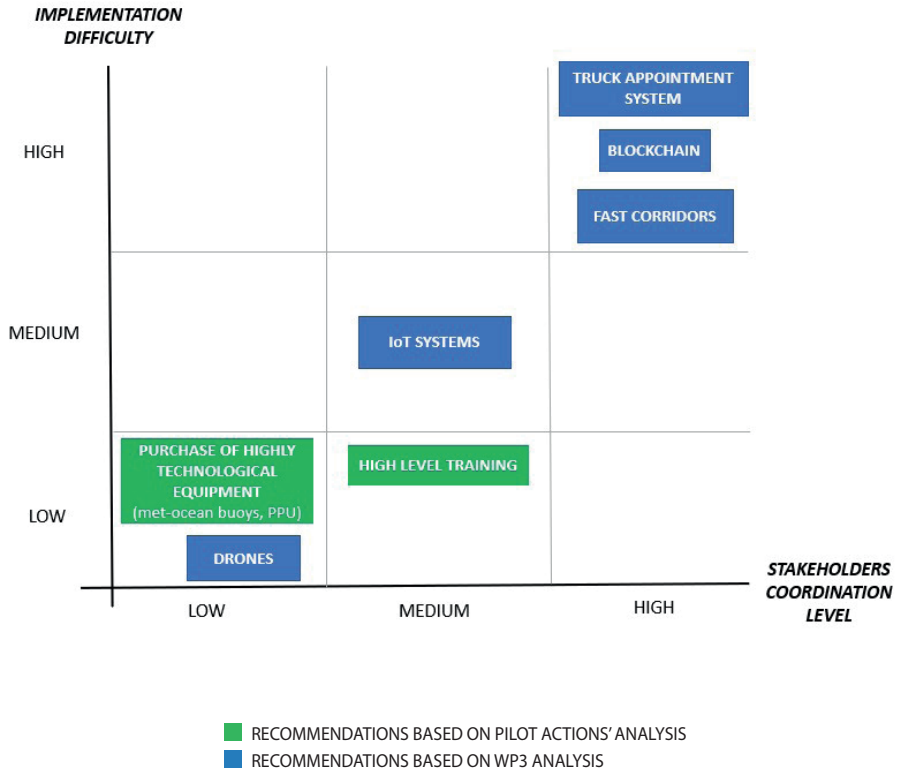


Fig.8 | *Recommendations' level of implementation difficulty and coordination needed*

LEADING PARTNER

Interreg Italy - Croatia INTESA
European Regional Development Fund

EUROPEAN UNION

North Adriatic Sea Port Authority
Ports of Venice and Chioggia

NORTH ADRIATIC SEA PORT AUTHORITY
(Ports of Venice and Chioggia - NASPA)

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