CROSS-BORDER STRATEGY

Activity 5.2

DELIVERABLE D.5.2.5

PEOPLE the key,

technology sustaining COMMUNICATION

AGILE governance,

COMMUNITY embracing business.

1-ABSTRACT

1.1-THE PROJECT IN A NUTSHELL

PROMARES Project (Promoting maritime and multimodal freight transport in the Adriatic Sea), co-funded by the Interreg Italy-Croatia Programme, has the main objective to enhance cross-border maritime and multimodal freight transport, by involving transport stakeholders and policy makers facing the same cross-border challenges, from both a strategic and operational perspective, through an increased cooperation among them to be pursued through an upgrade of the Information and Communication Technologies and Systems.

All ports and intermodal logistic nodes generating intermodal and multimodal freight transport were able within the project to share best practices and develop common methodologies for ICT applications, to be tested in concrete pilot actions significantly improving the efficiency and competitiveness of the operations in the cross-border maritime and multimodal transport logistic chains.

Moreover, Ministries and Institutions have been endowed with a wealth of data, in-depth analyses and results of concrete ICT pilot actions improving their decision-making processes for enhancing the competitiveness of the maritime and multimodal freight transport sector at national and cross-border level.

Thus 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.

1.2-KEY MESSAGES

With the main objective to tackle the challenges and develop more efficient and rapid intermodal and multimodal transport flows, 4 pillars have been identified and represent the high-level strategical heritage left by PROMARES Project:

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

the uppermost **importance of the Port Community Systems** in the capacity to manage effectively and coordinately both people and freight transport flows that are going in and out from the nodes of the logistic multimodal chain

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

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.

2-PROMARES FRAMEWORK

2.1-HIGH-LEVEL VISION

PROMARES main approach is to anchor cross-border cooperation by gathering competent key operators and stakeholders in policy, legal and institutional frameworks, as well as national policy makers, for **enhanced networking** on cross-border maritime and multimodal transport, with a specific focus on the port-hinterland interface, through the use of Information and Communication Technology (ICT), as a powerful and efficient tool to overcome administrative bottlenecks.

This wants to be achieved through the stocktaking of existing studies and solutions under a new approach.

In particular, through the sharing of best practices on ICT tools for enhancing maritime and multimodal freight transport, to be applied both between each port and its hinterland and between ports at cross-border level; strengthening the role of ports and intermodal logistic nodes as roots and gateways of the TEN-T networks and increasing the competitiveness and productivity of maritime and multimodal transport.

Because of the cross-border cooperation framework and transnational nature of TEN-T corridors where it is tested, this approach goes well beyond the regional and national approaches, coordinating project partners with different and complementary expertise: core and comprehensive Adriatic ports and one strategic intermodal logistic node as Trieste, national policy makers and academic/competent research institutions, resulting in a cross-border multidisciplinary and institutional multilevel cooperation.

Based on the results of the work done within the technical project's work packages, where respectively the baseline situation was delineated and feasibility studies and pilot actions were tested in the different territories, the present document is addressing the definition of a **strategy for enhancing cross-border multimodal transport** through the creation of a long-term cross border institutional cooperation framework, by capitalizing the efforts made so far.

How can we guarantee that the strategic goals on maritime and multimodal freight transport sector are effectively pursued despite the different interests of all the stakeholders involved?

The answer to this question is emblematic and for sure represents the starting point that PROMARES tried to face, not only investing on PCS modules and suites to improve the level of information & communication between the subjects that play significant roles in the logistic chain, but also bringing it up to an higher cooperation level, that could be advantageously transformed into a **stable cross-border network**, not only limited to Italy-Croatia, but gradually enlarging to the other Adriatic Countries, according to the Adriatic and Ionian Macro Region spirit.

This is fully coherent with the principle beneath the vision of EUSAIR Macro Strategy that pursues the fulfillment of **joint multi-level solutions for common challenges** towards a stronger Adriatic and Ionian region

> Reinforce through the new ICT opportunities the approach of **Community** in the Adriatic and Ionian Region, identifying and involving all the key points of contact in a well-structured institutional framework

2.2-RELEVANT OBJECTIVES

Considering the outcomes of the analyses conducted and much more of the interactions observed both within the project partnership and towards the institutional stakeholders interviewed, PROMARES aims at setting relevant objectives to be pursued, so as to contribute to the topic of the development of freight transport at cross-border level.
It is important first to highlight and then to focus on those aspects that appear to be decisive in the assessment of a Community with homogeneous values.
In this purpose, PROMARES Project suggests to consider the following objectives as fundamental to be taken into account by all Institutions and Subjects that can determine the successful development of the maritime and multimodal freight transport:

- **OBJECTIVE_1: Create long-term and "agile" governance structures, with the scope of addressing correctly the priorities;**
- **OBJECTIVE_2: Reduce fragmentation by ensuring communication and coordination at national level, in order to guarantee a related and efficient cooperation at higher cross-border level;**
- **OBJECTIVE_3: Digitalization is a key step, but a new technology should be adopted only if it is mature (everybody can use it) and enables a better communication among stakeholders, improving their level of interaction.**

3-PROMARES RESULTS

3.1-BACKGROUND AND AREA OF INTEREST

Through the technical implementation activities, PROMARES was able to foster the enhancing of cross-border maritime and multimodal freight transport planning capacities in the Adriatic Area and more specifically with the major goal to **improve the planning capabilities of key players and policymakers** in maritime and multimodal freight transportation through territorial analysis and training, culminating in a cross-border action plan.

The territorial involvement has generated the following results in terms of entities/subjects directly touched by the project fulfillment:

- 8 municipalities – Trieste, Venezia, Monrupino, Ravenna, Ancona, Bari, Rijeka and Ploče
- 7 regions – FVG, Veneto, Emilia-Romagna, Marche, Puglia, Primorje-Gorski Kotar and Dubrovnik-Neretva
- 7 ports – Trieste, Venezia, Ravenna, Ancona, Bari, Rijeka and Ploče
- 2 intermodal logistic nodes – Trieste, Padova
- 2 scientific subjects – University of Rijeka, ITL Emilia-Romagna

Figure 1 - Geographical area of interest of PROMARES

Furthermore some institutional subjects have been involved into the project on a cooperation level:

- 3 European Macro-strategies – EUSAIR, EUSALP, EUSDR
- 2 national Ministries of Transport – Italy, Croatia
- 2 international institutions – IPCSA, ESPO
- 1 national institution – ASSOPORTI

3.2-METHODOLOGICAL ASSESSMENT

After conducting a technical study to analyze the current situation on maritime and multimodal freight transport, by analyzing each territory in details, the University of Rijeka elaborated a cross-border action plan, to be tested through Pilot actions within the ports and intermodal logistic nodes. This was achieved by testing ICT solutions for streamlining freight transport from the port to the hinterland and at cross-border level; setting standards which may be replicated to other logistic nodes. This all required a thorough assessment of current territorial infrastructures and technologies.
Project Partners (Ports/Port authorities) delivered their clear territorial needs assessment for each region, including SWOT analyses, future scenarios for the activation of new maritime/multimodal freight links and customs fast corridors, clustering and cross-border potential, stakeholder mapping, and feasibility studies.

More in detail the **cross-border action plan** included an analysis of the *best practices on ICT tools and policies* along with *disruptive technologies* applicable to multimodal transport for enhancing maritime and multimodal transport. The intermediate results of the **territorial needs assessments** and best practice analysis have been discussed during ad hoc meetings, whereas a *training seminar* has been held on the most recent policies and practices enhancing maritime and multimodal transport best practice examples on system architectures for deployment of maritime and multimodal ICT systems, also outside the Programme Area. Study also resulted in ***basic guidelines for implementation of the maritime and multimodal ICT systems*** to be applied into further development actions, within and outside the framework of the Project.

Some reference points have been identified during the development of the cross-border action plan of PROMARES and they represent significant

themes to be referred to, potential challenges and opportunities to be taken into consideration into the multimodal and maritime freight transport sector:

1. Keep individual stakeholders' tradition (traditional vs. new technological development approach);
2. Analyze involved ICT systems in order to adopt/react according to market needs identified in supply/demand section of submitted TNAs;
3. Encourage stakeholders to undergo change by implementation of new ICT systems, interconnections and synergies;
4. Highlight benefits for PPs & external stakeholders;
5. Improve existing networks / motivation of stakeholders;
6. Offering incentives;
7. Adopt requirements of changing (legal) rules & regulations;
8. Include the topic of intermodal shift in strategies (i.e. sectoral policies);
9. Cross-border cooperation between PPs;
10. Set the cross-border action plan as promotion campaign for the next WP;
11. Find right group of stakeholders who should be involved during execution of the cross-border action plan and creation of the strategy;
12. Take advantage of already implemented and ongoing ICT and digitalization projects;
13. Screening of ongoing projects to identify realistic possibilities.

3.3-IDENTIFICATION OF TERRITORIAL NEEDS

PORT OF TRIESTE

The FVG Region has different logistics nodes that need more coordination at governance level and in the operativeness and ICT data exchange. the Port of Trieste is the first Italian Port in terms of maritime and intermodal traffic, and this gives competitive advantage to the whole system. The intermodality is becoming fundamental in the business strategies of the Port and of the infrastructures related to it. Intermodality also plays an important role in the medium and long-term development strategies carried out by the Port Network Authority of the Eastern Adriatic Sea and the private terminal operators of the Port of Trieste. Moreover, it is essential for implementing the catchment area of the Port of Trieste in order to reach the Central and Eastern European markets.

From TNA analysis (including SWOT) emerged some possible future activities related to PROMARES project:

- it is necessary to overcome the problem of the bottlenecks that stops the development of the intermodal traffic;
- it is fundamental to invest in new technologies able to optimize the existing infrastructures;
- it is important to develop the links among the logistic nodes of the Region supporting the intermodal transportation.

PORT OF VENICE

The shipping business is a very competitive business with low (and declining) margins. As such, shipping lines are strongly focused on cost-efficiency of their services. Next to the main global trend of attaining economies of scale by increasing vessel sizes, a second major development is the focus on reducing the idle time of vessels. In order to reduce the idle time of vessels, the total turn-around time of the vessel need to be improved. The turn-around time of a vessel depends on three factors: time at anchorage, towage

(in and out of the Port) and time at berth. These shipping trends could represent a challenge for the Port of Venice due to the impact that the new vessels dimensions could have on the Port's infrastructures and on its efficiency. In order to respond to these new logistic needs and improve its multimodal terminal efficiency, the Port of Venice has planned a series of investments aiming at upgrading the existing port infrastructures in order to increase its logistic and multimodal efficiency.

With reference to the multimodal transport, the Port of Venice has planned a several investments with the scope of increase its railway traffic capacity. In particular, these investments are focused on:

1. railway infrastructure improvements
2. enhancement of railway telematics systems for shunting operations (SIMA) and its integration with PCS and information systems of other subject involved in developing rail services.

These investments are part of NASPA's strategy aiming at improving the port infrastructures and enhancing the railway accessibility services as indicated in the National Strategic Plan for Ports and Logistic and stated in the Port Operational Programme 2018-2020.

The upgrade of the port rail network and last mile connections will allow to:

- eliminate to interfere with Mestre railway station in shunting phase;
- improve both the capacity and the safety of port railway system;
- reduced drastically the number of interferences between road and rail network within the port area;
- reduce drastically the rail shunting time in the southwest area of the Port in which is generated about the 40% of the total rail traffic of the Port.

INTERPORTO DI TRIESTE

In addition to introduction done for Port of Trieste, it is important to know that Interporto di Trieste offers logistics services and acts 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.
The Intermodal Terminal of Trieste plays an important role as a "buffer area" for the management of the relevant traffic of Turkish semi-trailers reducing traffic congestion both in the city of Trieste and in the Port. Moreover, a railway shuttle service from the Port of Trieste to the Trieste freight terminal was activated: more than 500 trucks have been removed from the road in order to continue the journey by train with RoLa service to Salzburg.
Statistics show a significant increase in the number of containers (expressed in TEU) both in global terms, with a double-digit growth within the four-year period, and in terms of full containers. This data/information, non-often mentioned in the official statistics, is a good indicator of the attractiveness of a port since it refers to containers containing goods that are loaded/unloaded and received/forwarded from the final destination. Empty containers and those in transshipment, on the other hand, do not particularly contribute to the development of the Port and of its territory, in terms of benefit. From this point of view, it is interesting to note that in the four-year period 2015-2018 the number of full containers grew more than the general increase of the containerized traffic in the same period (+60.39% compared to +44.75%). Furthermore, there is a huge increase in intermodal traffic (+62.74 % in the four-year period) that confirms the Port of Trieste the first Italian Port in terms of number of trains.
Unlike other Italian ports, the Port of Trieste serves only in minimal part the regional and national territory focusing rather on markets in Central and Eastern Europe. The Port Network Authority of the Eastern Adriatic Sea and the terminal operators of the Port of Trieste have realized that the most suitable mean of transport to reach those markets is by train. It allows limiting the congestion of port terminals both in terms of reduction of road traffic and of emissions of polluting and greenhouse gasses.

In order to support the multimodality also in this phase, Region FVG has allocated some incentives under the “de minimis” regime.
The main infrastructural investments for the Port of Trieste aim at extending the capacity of cargo handling, in particular the railway capacity and the intermodality.
Main takeaways from TNA:

- it is necessary to pass the problem of the bottlenecks that stops the development of the intermodal traffic;
- it is fundamental to invest in new technologies able to optimize the existing infrastructures;
- it is important to develop the links among the logistic nodes of the Region supporting the intermodal transportation.

Hence, to alleviate intermodal congestion and increase the potential in the Port of Trieste, Interporto di Trieste is installing new gate for inbound/outbound trains in the Interporto di Trieste.

PORT OF RAVENNA

The Port of Ravenna is mainly a logistics import node. The current flows of the Port of Ravenna are one-sixth (14%) of the flows of its potential market. The Emilia-Romagna region is the core of the main corridors between the north and south of the Country. The Port of Ravenna and its catchment area occupy a central role in the transport and logistics context of the region, being inserted in the regional, national, and European transport planning documents.
The interventions inserted in the planning documents will allow to improve the connections of the Port of Ravenna with its hinterland and with the great part of the potential national catchment area, improving at the same time the multimodal transport system of the Port.
The three interventions are necessary to adapt the railway connections of the Port of Ravenna to the standards required by European legislation regarding railway infrastructure (according to the Ten-T guidelines). In addition, at the Port of Ravenna, there are other interventions (identified with RFI) necessary

to improve the last mile rail connections. Nevertheless, also ICT interventions should be performed in the port, in order to fasten and simplify the administrative procedures of the goods arriving and departing from the port but also the logistics chain of goods. In particular, this goal could be realized by implementing solutions such as the interconnection of the Ravenna Port community system with the National Maritime Single Window and the improvement of the data connection infrastructure for the services for the port community. More details of these interventions are mentioned in the TNA analysis.

Another important intervention to improve the efficiency of the logistics process within the port will be the possibility of exchanging information via PCS for the transport of goods from and for the port by rail. Such a possibility will avoid errors and misunderstandings and reduce the time of operations and it will therefore contribute to solve one of the main constraints of the rail operations above mentioned.

This intervention will be realized within the PROMARES project as a pilot by the Port of Ravenna Authority. More in detail, the goal of the pilot is to offer the possibility of sharing and exchanging information between the rail shunting operators and all the other actors involved in the logistics process of the goods arriving or departing the port of Ravenna by rail, within the Ravenna Port community system. This service already exists for the goods transported by road.

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

PORT OF ANCONA

Establishment of the Port Network Authority of Central Adriatic Sea as strategic opportunity for realization new partnerships and strategic cooperative activities. The institution allows the possibility to get critical dimension thresholds useful to be more influencing for the formation of economies of scale and to compete in national and international scenarios.

The centralization of different activities (customs and administrative) allows also the reduction of overlapping structures and the reduction of losing time. The Port of Ancona is the leader port for international 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. Precisely, intense relations are entertained with north Adriatic Italian ports, especially for cargo transport and container traffic, while, for international routes, intense traffic flows are recorded with Greece, Croatia and Albania, especially regarding passenger transport and Ro-Ro freight transport.
Marche region suffers a lack of road and railway infrastructures compared to ports of north Adriatic. In order to be more competitive regarding connections with Central Europe is necessary to plan an improving campaign of regional infrastructures.
The main modal shift in Ancona is represented by Sea-Road intermodality and during TNA analysis partners have identified the necessity to overcome the idea of single autonomous nodes at service of the territories in favour of an integrated system hence the investment in the ICT system which will integrate and enable better coordination and alignment in the port community.

PORTS OF BARI AND BRINDISI

Ports are among the main elements of territorial competitiveness. This is the reason why we expect to improve the services offered to the users, by increasing security and quality of life to those who daily or occasionally interact with the Port.
The port of Bari constitutes regular feeder connections with the ports of Gioia Tauro, Piraeus, Damietta / Port Said while the Port of Brindisi has developed a strong specialization in ro-ro and ro-pax ferries connections in the segment of the Motorways of the sea on the north route - south linking the Upper Adriatic to Sicily. As well as for ro-pax connections with Albania, thanks to the

lines with Durres and Vlora, as well as with Greece and its Ionian islands especially in the summer to support cross-border tourist flows

The geographical positioning of the port, the presence of a lively economic system, the drive for innovation and higher education carried out by the Apulian universities are elements that can constitute a significant starting point for the attraction of investors, especially foreigners, oriented to stabilize production aimed at expanding markets in the southern and eastern Mediterranean.

The first weakness is difficult to overcome, even if an efficient "last mile" connection with the nearby interporto that should include the Ferruccio airport could mitigate this criticality.

As for the second aspect, the focus on the port of Bari shown below identifies the possible and partial solution to the problem in a fill outside the outer pier. In any case, the impossibility of finding adequate spaces that guarantee high standards of safety and working efficiency, makes it necessary to find important retroport areas that allow the development of the port.

Furthermore, port will necessarily try to overcome the challenge of quality and territorial integration with a model of governance based on innovation and institutional cooperation:

a. new opportunities for port growth
b. expansion of intermodal transport services and solutions for passengers
c. develop the sustainable mobility and strengthen the collaboration with all possible stakeholders improve
d. extend the pre-existing services to other ports of Southern Adriatic Ports Authority
e. Therefore necessary to have a clear picture of the convergent objectives
f. Development and safety of city-port link infrastructures.
g. Improvement of reception and transport services for passengers.
h. Realization of an integrated information / enhancement system
i. Improvement of the competitiveness of economic activities

PORT OF RIJEKA

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.

Railway transport in Rijeka port has been growing steadily for more than past decade and further increase of cargo manipulations in port of Rijeka can be expected with introduction of a new concessionaire for the Zagreb Deep Sea Container Terminal. Thank to the geopolitical location and a fact thst Rijeka is becoming a port serving its hinterland there's a great opportunitz to increase capacities but also poses a challenge and requires solution to avoid possible bottlenecks.

In order to facilitate these communication processes and the development of the interorganizational relationships among stakeholders in the freight agent community, ICTs such as port community systems (PCSs) have been introduced. The implementation and/or upgrade of ICT and Port Community Systems are examples of territorial needs that have already been identified by several PPs.

PORT OF PLOČE

The port of Ploče is the first/last node of the supply chain on the southern part of Corridor Vc. The investments in the bulk terminal, the container terminal and other areas have improved the port's physical capacity and efficiency. However, it cannot be considered independently from the corridor itself where 90 percent or more of the traffic is carried on Corridor Vc. From customers' perspective, where the time is spent on the corridor, whether in actual transportation time or handling and processing at a port/border/marshalling yard, is irrelevant. What matters is the ability of the corridor to deliver reliable and price-competitive logistics services in a

seamless manner. Although it is difficult to regulate and coordinate processes between Croatia and BiH, even more because Croatia is an EU member state and BiH is not, Port of Ploče Authority aims to achieve even bigger lever of coordination and cooperation, in order to promote the Corridor Vc and remove as many bottlenecks as possible.

Existing cargo traffic flows between port of Ploče and Italy are significant, there are big possibilities for improvement of passenger traffic flows. The main opportunity is to establish a permanent direct fast line between Termoli and Ploče, which can be tenable because of more than 500.000 Italian tourists visiting Međugorje every year. Decreasing transit time from 14 hours to 4 hours and 45 minutes and decreasing travel costs could provide that a direct fast line between Termoli and Ploče becomes permanent.

After the new entrance terminal has been built, the flow capacity of cargo traffic meets all requirements and can be evaluated as extremely good. With direct access to the highway, the port of Ploče is able to attract more cargo in transit.

Cargo traffic flows between the port of Ploče and Italy can also be improved and increased without congestion, especially since new container, dry bulk, and entrance terminals have been built within the port.

3.4-METHODOLOGY TOWARDS THE ACTION PHASE

As anticipated the main objective of PROMARES was to improve planning capacities of key stakeholders and policymakers of maritime and intermodal freight transport using delivered territorial needs assessment and action plan for overcoming them for the respective region.

The planning methodology was based on the results of the territorial needs assessments, the best practice analysis and held training sessions, and aligned with identified geographical constraints and requirements of involved participants,
Goal of the subsequent activities instead was the implementation of **pilot actions on ICT tools** to enhance maritime and multimodal freight transport in the Programme Area. Participating logistic nodes implemented concrete and identified pilot actions on their Port Community Systems to streamline freight traffic flows between the ports and the hinterland, ***by improving communication and coordination with private companies*** (e.g. terminal/logistic operators, freight forwarders) ***and public institutions*** (e.g. customs agencies).
Guidelines for implementation of key pilot actions were addressed against imbalanced development of multimodal transport options, weak coordination and communication of stakeholders and policy makers in the port-hinterland interface and uncoordinated measures and tools at cross-border level.
All of this translates in the high-level objectives to reduce road transport and its negative consequences on the Programme Area in terms of pollution, GHG emissions and noise, plus the willingness to handle always bigger freight amount through sustainable transport systems.

During the project stages Partners identified and tested ICT solutions with the aim at streamlining freight transport in the involved ports and the most relevant intermodal logistic node of the Programme Area (RRT of Trieste),

from the port to the hinterland and at cross-border level, setting standards which may be replicated to other logistic nodes, also beyond the project's geographical scope.
In particular, in the identification phase of the key pilot actions, Partners and thus Ports focused on their **Port Community Systems**, as ***scalable and powerful tools to increase communication and coordination among terminal and logistic operators and public institutions*** (e.g. port authorities, customs agencies, public administrations), resulting in lower transit time and increasing the competitiveness and productivity of the multimodal transport. They proposed key pilot actions that appeared as an extension of existing capabilities of their PCS, or similar IBIS (Integrated Business Information Systems) used in operations related to freight processing.
Positive externality of the project has set up an **enduring operative 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.

3.5-FROM TERRITORIAL NEEDS TO PILOT ACTIONS

PROMARES has foreseen the development of cutting-edge ICT solutions in order to implement **8 pilot actions** in all ports generating intermodal and multimodal freight transport (Trieste, Venice, Ravenna, Ancona, Bari & Brindisi, Rijeka and Ploče) an in the intermodal logistic node of Trieste.

These pilot actions have represented a powerful tool to streamline freight traffic flows at cross-border level:

- improving the role of the ports and the logistic nodes as gateways and corridor roots for the transport of goods;
- using new technologies as enablers;

- enhancing coordination between terminal operators, logistics operators, freight forwarders companies and public institutions.

Ports has focused on the **upgrade of their own Port Community Systems** (PCSs) in different forms, modules and options, whereas the intermodal terminal of Trieste has improved multimodal operations through digital data exchange and the deployment of a new gate for inbound/outbound trains.

These 8 pilot actions on the cross-border transport network represented the most concrete outcome of PROMARES, which tested the cross-border action plan in order to streamline transport flows in the Program Area and sustained the role of ports and inland terminals as gateways. At the same time, enhanced their competitiveness and productivity for supporting sustainable freight transport and modal shift of transported goods from road to rail.

Partner	Location	Pilot Action description
Port Network Authority of the Eastern Adriatic Sea	Trieste	1. Creation of a new module of the PCS Sinfomar 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. 2. 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
North Adriatic Sea Ports Authority	Venice	1. Enhancement of the railway telematics system for shunting operations (SIMA) and its integration with PCS and information system of other subjects involved in the developing rail services. 2. Purchase of a dedicated licenced software to streamline control systems at port gates, allowing supervision and optimisation of road traffic and multimodal operations.
Interporto Trieste	RRT of Trieste	Installation of an OCR gate.

Port of Ravenna Authority	Ravenna	Installation of an automated gate for rail and container terminal in Ravenna (equipment/sensor + SW component to connect to the PCS and AIDA).
Central Adriatic Ports Authority	Ancona	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.
Southern Adriatic Ports Authority	Bari, Brindisi	Firewall in the ports of Bari and Brindisi + enhancement of PCS + back-up and disaster recovery
Port of Rijeka Authority	Rijeka	Upgrade of the existing passage control system on different port gates.
Port of Ploče Authority	Ploče	Improvement of ICT solutions within existing PCS so as to help solving bottlenecks and to be also used as prerequisites in the requirements engineering process for the purchase of AIS Base Stations and a Traffic Image Application (application for VTS and SAR operations).

Table 1 – Implementation Actions within PROMARES project

Nowadays a Port Community System represents the way the different stakeholders related to port logistic environment communicate each other.

New technologies applied to PCSs can produce significant results in terms of **simplification**, **time-reduction**, **safety** and furthermore can increase the **level of cooperation**.

The improvement and optimization of rail and multimodal operations is possible through the digital data exchange with operators and the upgrade of the IT systems.

3.6-FINAL COOPERATIVE LEVEL LED BY PROMARES

PROMARES brought technical and operative achievements within the framework of Adriatic Ports, but this was not designed as the end of the story.

In its final stage the Project's team – held by RAM and led by its technical partner Sinergia Consulenze – have worked towards a more strategic level: assessing a methodological approach for disseminating project's activities and defining the work done through the present document as possible point of reference for future development.

Last but not least a potential **cooperation network** has been identified, by involving institutional subjects who play a relevant role in the field of maritime and multimodal transport solutions.

Targeted interviews have been performed with the apical figures, responsible to promote political and strategic initiatives, pursuing a double objective:

- ✓ Informing, disseminating and creating the awareness on PROMARES and especially on its ambitious continuation goals;
- ✓ Collecting in a reverse way the opinions and the vision of these relevant subjects in order to design a shared strategy that is not a stand-alone object, but something that was created from an active dialogue and a discussion on specific topics of interest.

An additional sheet containing the output of this interview activity has been summarized and is available as attachment to the present document.

4-PRIORITY MEASURES IDENTIFIED

Within this paragraph, the aim of identifying advices and priority measures coming from the experience of PROMARES is pursued. Particularly, so as to provide some extensive messages originating from the lessons learned of the Project implementation, a list of measures and guidelines is provided.

4.1-KEY PILOT ACTION GUIDELINES AND MEASURES

Taking into account all gathered and described prerequisites, TNAs, reals demand and outlined methodology aligned with the project as a whole, it is possible to derive and outline the following key pilot action guidelines, as a part of the cross-border strategy:

1. Preferably, best practices of ICT tools for enhancing maritime and multimodal freight transport is applied both between each port and its hinterland and between ports at cross-border level;
2. Ports and PPs are advised to propose key pilot actions as a part of cross-border cooperation planning and strategy that rely on already existing and identified ICT infrastructure as a part of individual TNA analysis, and that will further enhance connectivity and interoperability within scope of the PROMARES project;
3. Goal of the key pilot actions is aligned with the primary project goal, which is strengthening the role of ports and intermodal logistic nodes as roots and gateways of the TEN-T networks;
4. Main targets of the proposed actions are increase of the competitiveness and productivity of maritime and multimodal transport and submitted key pilot action proposals should be aligned with the main target;
5. Every target may contain a set of suitable sub-targets enhancing the main target, for example, secondary or „external “effects like reduction of GH emissions or secondary optimizations and enhancements of productivity of transport efficiency;

6. Considering the cross-border cooperation framework and transnational nature of TEN-T
   corridors where pilot actions will be tested, ports and PPs can be encouraged to propose and follow up execution of those pilot actions whose effects in case of successful completion will well extend beyond the regional and national borders, preferably affecting not only core and comprehensive ports or one intermodal logistic node but tentatively national policy makers and academic/competent research institutions, which might result in a cross-border multidisciplinary and institutional multilevel cooperation;
7. Ports and PPs are be advised to propose key pilot actions that will increase the technical knowledge and transport planning competences of the particular ports, keeping in mind previously identified lacking points and territorial needs and bottlenecks that might be improved within scope of the PROMARES projects;
8. Final goal of the proposed key pilot action should be generation of intermodal and multimodal freight transport, even when initial effect is increase of productivity, efficiency, or timely information delivery;
9. Proposal and implementation process of individual key pilot action should clearly lead in the increase of competences of particular port/PP;
10. Ports and PPs should strongly prefer to propose those key pilot actions that support the «port clustering», whereby ports, inland terminals and public authorities jointly work as to develop an efficient co-modal network and streamline transport flows between ports and their hinterlands;
11. Considering Port Community Systems and related ICT systems (examples: TOS, TMS) are aiming at a better communication and coordination with port stakeholders (both private and public) at a node and cross-border level, their upgrade, introduction of new modules, information exchange or analysis conduits using big data paradigm, Web forms or structured XML message exchange, can be treated as obvious candidates for key pilot actions across all ports and PPs;

12. Some other such systems that may be supporting project goals, may be thematic subjects of aforementioned subjects, including but not limited to modules related to goods and persons egress and ingress control, CCTV, VTS/VTMIS systems, UHF over VoiP, meteorological, ISPS supporting and similar systems, that operate in close conjunction with other top level port and cargo management IT systems, and if there is sufficient data supporting use-case within context of the project and if inefficiencies are clearly identified and present at the beginning of the pilot action;
13. Key pilot actions are of special interest for the project if proposed enhancements aim to increase level of connectivity towards national and supranational intelligent transport systems, related also to customs operations, like NSW or future MNSW systems;
14. Some clearly identified systems towards or within which there is a high level of desirability of key pilot action proposals, if they lead to increased level of connectivity and data interexchange for the ports/PPs are (the list is not final, and not in order of importance):
    a. MNSW (example: CIMIS, PMIS2 Harbor Master's Offices),
    b. Freight Village Systems,
    c. PCS systems (examples: Sinfomar, Port of Ploče PCS, PCS-Ravenna, LogIS),
    d. Integrated VTS/VTMIS/access control systems (Kongsberg Norcontrol IT/Consilium/Elman VHF/Vaisala meteo system),
    e. Access control /gate in gate out (Siemens Granta access control, Digital Port i-Gate),
    f. TOS systems (examples: NAVIS, F4B, Combis, Rathmann, SINFOSEC),
    g. UIRNet (PLN – National Logistics Platform),
    h. National level PCSs (example: MUPCS),
    i. Customs agencies SW systems (example: SUDOCO-AIDA, TROVATORE, ECS/ICS, NCTS),

j. Railway management systems (ERTMS (European Rail Traffic Management System), CH30 module),
k. Integrated Traffic Platform (example: Piattaforma Integrata Circolazione - PIC).
l. Other.

4.2-KEY PERFORMANCE INDICATORS

Some relevant KPIs have been identified within the framework of the PROMARES Project and some of them can be considered as general. This can be useful for any further replication or initiatives that aim at fostering maritime and multimodal freight transport through an upgrade of the Information & Communication Technologies, of Port Community Systems, or the enhancement of data exchange flows among logistic subjects.

N° Indicator	Indicator	Description
1	Number of ICT systems upgraded/enhanced as a consequence of project involvement	At least one ICT system identified by PP/ports within TNA should be upgraded/enhanced within the scope of the key pilot action
2	Amount of funds leveraged based on project achievements	Maximum available fund utilization within the project scope enables the best possible envisaged project outcome
3	Number of secondary affected ICT systems as a consequence of the key pilot action execution	Inclusion of this indicator empowers involved PPs to apply for those key pilot actions whose secondary effects are transferred also to other interconnected ICT systems
4	Number of improved internal PP/port processes as a	Inclusion of this indicator empowers involved PPs to apply for those key pilot actions that

	consequence of the key pilot action execution	enhance the largest number of internal processes directly benefitting from the project
5	Number of affected port terminal, basin or land terminal locations as a consequence of the key pilot action execution	Inclusion of this indicator encourages involved PPs to apply for those key pilot actions that will affect the largest number of port terminal, basin or land terminal locations as a consequence of the proposed key pilot action
6	Number of key pilot actions involving local PCS as a chosen ICT system	Inclusion of this KPI entices involved PPs (ports) to apply for those key pilot actions that will further enhance local PCS functionalities and modules
7	Number of executed key pilot actions directly enhancing PP (port) security	Inclusion of this KPI entices involved PPs (ports) to apply for those key pilot actions that will enhance PP (port) security
8	Number of executed key pilot actions directly or indirectly lowering GHG emissions	Inclusion of this KPI entices involved PPs (ports) to apply for those green key pilot actions that will lower GHG emissions
9	Percentage of proposed key pilot actions enhancing intermodality	All PPs (ports) should strive to apply for those key pilot actions which are enhancing intermodality as a primary project goal
10	Timely submitted key pilot action completion/closeout reports	Proper project management of the Interreg PROMARES project requires timely reporting on key pilot action completion/closeout

5-CONCLUSIONS AND FINAL REMARKS

Generally speaking, the definition of a reliable timing when such complex processes and subjects are involved is hardly estimable.

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 from the dialogue with the institutional subjects.

These pieces of advice 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.