Review session on pilot action replicability report

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D.5.4.2

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1. Introduction

1.1. Deliverable description

The deliverable 5.4.1 "Review Sessions on pilot actions replicability report" aims to summarise the key points for the replicability of the Pilot Action (PA) that have been carried out by the involved Partners of FRAMESPORT Project. The description of each PA is taken from the replicability report drafted by the Partner responsible for the PA. In the introductive section of this deliverable, some generalities are resumed from the consolidated documentation in order to introduce the classification of the PAs, according to which following sections are structured. In particular, the following aspects are reported for each PA:

- Aim of pilot action
- Step-by-step procedure
- Final considerations, tips&tricks

The contents of these replicability reports from partners provided input and insights to develop the FRAMESPORT Toolbox (D.5.4.2).

1.2. Clustering of the pilot actions

The aim of the pilot actions is to test technical solutions and experimental initiatives to identify innovative paths to solve existing problems and to drive small ports towards a sustainable growth. Partners involved in the project are responsible for one or more pilot actions that fall into specific macro-themes. As described in the deliverable 5.1.1 "Pilot action development methodology", the 25 PAs are clustered as follows (Figure 1-1) by their macro-theme, and, in the ICT case, by their sub-topic:

- ICT application and service development (ICT)
    - o Promotion of ports' resources and territory
    - o Monitoring of seaside and landside port areas
    - o Management of port operations and services
    - o Harbour and navigation safety
- Spatial planning and management (P&M)
- Business oriented aspects

- Training and knowledge aspects (T&K)

- Environment and energy aspects (E&E).
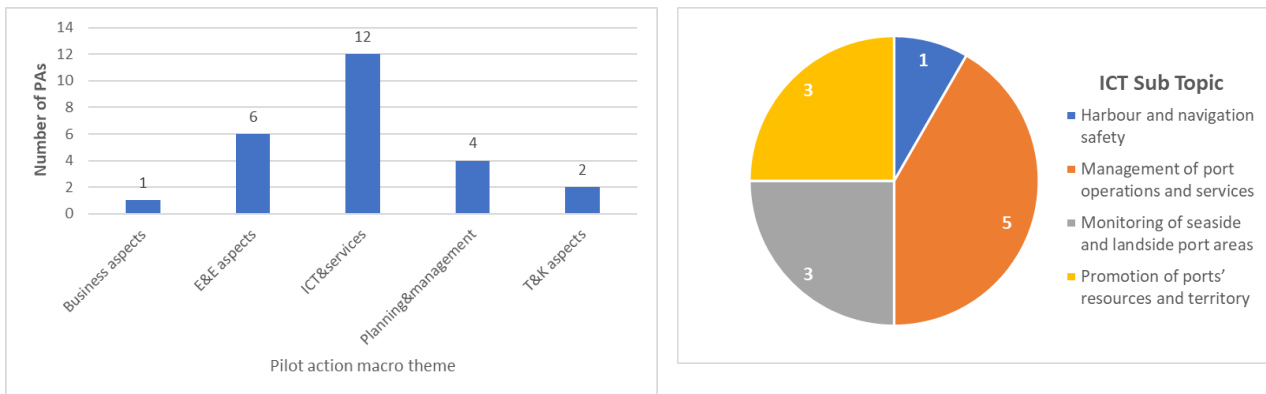
Figure 1.2-1 Macro-themes of the Pilot Actions and ICT sub-topics

2. Contributions from Project Partners

2.1.   ICT application and service development

2.1.1. Harbour and navigational safety

PA 3.3 – Development of a meteo-oceanographic forecasting system for sea shipping activities - PP3 ASSET, PP13 CMCC

The aim of the pilot action "3.3 - Harbour and navigational safety: development of a meteo-oceanographic forecasting system for sea shipping activities" was to improve safety conditions of harbours and navigation. It acted on the macro theme "ICT applications and services development". The purpose was to develop a meteo-oceanographic forecasting system based on atmospheric forecasts and hydrodynamic forecasts and VISIR ship routing for sea shipping activities.

Regarding the meteo-oceanographic forecasting system, numerical forecasting models have been developed and kept operational, in order to provide information on the hydrodynamic-thermodynamic fields, from the open sea to the scale of ports of Apulia. The OPA division of the CMCC, starting from the forecasting system on a regional scale with a space of about 4km, called MFS (Mediterranean Forecasting System resolved, kept operational and with distribution of products from within the European Copernicus-CMEMS https://marine.copernicus.eu/) worked on the development on a sub-regional and coastal scale of a very high spatial resolution modelling system in MFS. Specifically, the CMCC-OPA has enhanced the hydrodynamic forecasting system,

from the sub-regional scale to the Apulian coastal scale called SANIFS (Southern Adriatic Northern Ionian Coast Forecasting System, http://sanifs.cmcc.it/) and has developed the new systems SOAP and Otranto. The models are available at https://otranto.cmcc.it/ for the port of Otranto and at https://soap.oceanity.eu/ for the ports of Vieste and Trani. The prediction system is based on the deterministic finite element numerical model with an unstructured grid SHYFEM (Shallow water HYdrodynamics Finite Element Model). The SANIFS, SOAP and Otranto domains includes the South Adriatic and North Ionian seas and the relevant ports with a horizontal grid with variable resolution from 3000m in the open sea to 100m along the eastern Italian coasts (Puglia, Basilicata, and Calabria) and even at higher resolutions (up to 30 m) int the relevant ports. The vertical resolution has an uneven grid characterised by 99 levels. The model is initialised and nested in the MFS prediction system, forced to the boundary conditions by MFS and OTPS (OSU Tidal Prediction Software, code capable of providing the tide signal) and forced to the surface by the ECMWF fields. The complete set up of the model will be implemented in terms of: (i) initial conditions: temperature, salinity, sea level, currents (from MFS); (ii) surface boundary conditions: dew point at 2m, air temperature at 2m, wind speed at 10m, atmospheric pressure, cloud cover and total precipitation (from ECMWF); (iii) open boundary conditions: currents, temperature and salinity (from MFS), sea level (from MFS and OTPS); (iv) climatology of river flows.

Meteorological forecasts are available on the website https://ecmwf.oceanity.eu The website provides wind, atm pressure, rain and air temperature for the areas of interest.

The output of the second part of the pilot action is VISIR-2, a ship routing software that can be used in any geographic region. In order to use the software, the inputs needed are bathymetry for the designated region and forecasts for environmental fields such as waves, currents, and winds which are all open-access data. Furthermore, a model that links a vessel's speed and emissions to sea state conditions is required.

- The first phase involved creating a graph that represents the area of interest. This requires determining the spatial resolution, taking into account factors such as the level of connectivity between nodes and the distance between them. Higher resolutions produce more accurate results, but come at a higher computational cost. Bathymetry data is important to avoid land masses and shallow areas during the routing process.
- Next, the environmental fields are interpolated onto the grid of the graph at a predefined common time step which is selected based on the available datasets. This information is then used to evaluate the vessel's speed and emissions.

- The vessel sea-keeping model utilised in this project is based on a dataset from UNIGE, an external expert. This dataset is used to train an AI system to fill in the missing operating conditions. As a result, the model is able to provide a complete and continuous representation of the characteristics of the maritime behaviour of ships.
- An adaptation of Dijkstra's algorithm is implemented to identify optimal paths, prioritising factors such as least distance, time, and emissions. All relevant details about the voyage plans are collected and compiled.
- The software has been deployed on HPC to ensure that the software operates seamlessly and reliably, providing valuable outputs on a daily basis.
- Finally, a user-friendly web application was developed to present the results in a consolidated manner, simplifying user access and facilitating consultation.

2.1.2. Management of port operations and services

LP 2 – Set of ICT tools (DSS) about the quality of service within the Programme Area to support competitiveness and sustainability of small ports - LP CORILA

The FRAMESPORT DSS – called STEADFAST (System fosTEring sustAinable Development oF Adriatic Small porTs) - serves as a decision support system specifically tailored to the needs of the FRAMESPORT project. By providing essential data, analysis, and a user-friendly interface, this comprehensive toolbox acts as a powerful resource to enhance decision-making processes and guide strategic actions.

The accomplishment of the planned activities for the pilot action in STEADFAST can be summarized in the following chronological order:

1. Identification of obstacles: The initial step involved identifying potential obstacles that could affect the implementation and use of the DSS tool. One of the main obstacles identified was the collection of relevant data from various sources, along with challenges related to data integration and analysis. Additionally, stakeholder engagement was recognized as crucial but could present difficulties.
2. Data integration: After the data collection phase, the next step involved integrating the collected data from different sources into a unified system. This required harmonizing data formats, eliminating duplicates, and assigning appropriate metadata. Data integration was a complex process due to differences in data structures and inconsistencies in terminology used.

3. Data analysis: The collected data was subjected to analysis using appropriate analytical methods and techniques. The goal was to extract meaningful insights and generate useful results for decision-makers. This step demanded specialized skills in statistics, machine learning, and artificial intelligence.

4. DSS construction: The construction of the DSS involved identifying the participating ports in the Adriatic basin and defining specific objectives to be achieved through the implementation of the tool. Systematic data collection, integration, and analysis were conducted to support decision-making processes in the ports. Steps were taken to standardize data formats, resolve discrepancies, and ensure overall data quality.

5. Analysis and presentation of results: Using the analytical capabilities of the DSS tool, in-depth analyses were performed to assess potential scenarios, travel impacts, and other relevant variables for port decision-making processes. The results were presented in a comprehensible and meaningful manner for users.

6. Evaluation and improvement: At the end of the pilot action, a thorough evaluation of the DSS tool's performance and the achieved results was conducted. User feedback and evaluation results were considered to make adjustments and improvements to the tool, aiming to better adapt it to the specific needs.

Through this step-by-step procedure, the pilot action in STEADFAST aimed to demonstrate the effectiveness of the DSS system in supporting decision-making for sustainable development in small ports. The process addressed obstacles, including data collection, integration, analysis, and stakeholder engagement, to achieve significant stakeholder involvement and overcome challenges.

PA 3.2 – Regional ports networking and their connections: Promotion of the territory, ICT app for boat berth booking services, marine connectivity (sailboat) - PP3 ASSET

The aim was to develop a mobile App that collects booking services and technical information for all port networks is improving cultural and touristic aspects of Apulian Region, making them accessible by maritime tourists; improving connections among ports and the internal parts of the region; creating an ICT application that collects booking services and technical information for all port networks; improving maritime connectivity, also regarding sailboat activities.

For the accomplishment of the planned activities, the necessary steps have been the following:

1. Definition of the App services;
2. Definition of the domain and hosting needs;

3. Definition of the homepage with information on the Project, its objectives and goals, as well as what users will find in the Portal;

4. Connection of the Platform with the main project Portal (if any);

5. Development of a dedicated section on the project: more details about the project, its expected results, Pilot actions, the partnership;

6. Development of the section dedicated to the "promotion of the Territory" presenting the main Points Of Interest (POI) of the Pilot areas described. In this section a description of the city, the cultural activities, traditions and information on the seaside are required. This information should be delivered by official/institutional organizations (i.e. Puglia Promozione);

7. Development of the section regarding the following services:

    a. Booking area with all the information needed to find a berth: name of the Agency, website, email address, telephone number;

    b. Meteo-marine information: providing useful information related to wind speed, weather, wavy way, etc;

    c. Ship routing: optimal routing for leisure boats providing information regarding the route with different types of boats (sailing, vessels, engine load, etc.) such as length, duration, speed, route, true wind direction, wind speed, etc.;

8. Development of the section including the contacts (email, address, contact form, etc.);

9. Publishment of the App on the Android/Apple Stores.

PA 6.1 – Development of a prototype of a software application for the identification, booking and payment of available spots at Adriatic small ports. Testing phase at Port of Termoli - PP6 AAST

The Pilot action was aimed at introducing new digital tools and methodologies, for the benefit of both the personnel of the marina and its activities, and for guests of the marina, including yachtsmen.

The Pilot action was made through two complementary integrated interventions defined in the supplier's project proposal:

• the development of an application software (app);

• the improvement of port/marina digital network.

The app has been published on the Android and Apple stores. The back-end is on-line and accessible to registered and approved users belonging to a marina.

Currently the App has been realized and can be downloaded as a testing version (APK), it has also been uploaded on Google Play and App Store and is waiting to be approved by the systems according to the new policy. The Wi-Fi hi-perf network has been installed in Marina di San Pietro for a total of 1,1 km length.

The main objectives now are to contact the whole network of Adriatic marinas present in FRAMESPORT database to make them aware of the existence of the App and its possibilities, involve them and possibly add them to the berth booking App thus extending its use from Molise to a wider area. To do it, beside a communication effort, it will be necessary to organize some meetings to explain the App but also, according to the level of digitalization of each marina, to teach them how to use it and to add marina's data thus making them aware of its potential. After this dissemination phase among the offer side, it will be necessary to promote the App among users, also encouraging its use through tools such as discounts, vouchers etc.

PA 7.1 – Improvement of the available technologies for port management - PP7 LUUN

The aim of the pilot action by the Port Authority of Umag-Novigrad was to improve the available technologies for the port management and to enhance the services necessary for more efficient management of small ports. The objective was to create a Port Management Program Platform that will provide supervision of vessels in ports managed by the Port Authority of Umag-Novigrad, and consist of several connected modules - applications, with the possibility of upgrading to new modules-functionalities together with their data exchange with other systems. The new services were designed to improve the communication with the port guards, make the service more accessible and comfortable for customers, and facilitate the work of the port authority.

The pilot action involved several steps, including hiring an external expert to prepare a document containing all fundamental needs for the project, conducting market research, and dividing the projects into several main areas for procurement procedures. The thematic equipment was then acquired and integrated into the existing information system and port operations, which included a video surveillance system, an application for port management, and a berth monitoring system. Electric vessel for the facilitation of movement in the port area was also procured.

The stakeholders involved in the pilot action included the Port Authority of Umag-Novigrad, the customers of the small ports and harbours, and the port guards (employees of the port authority). The stakeholders were involved through consultation and communication throughout the pilot

action development, and a locally organized targeted event, and their feedback was taken into account during the implementation and monitoring phases.

The monitoring phase involved the use of several KPIs to facilitate the process of tracking progress. The results of the monitoring phase showed that the pilot action had achieved its intended goals, with an improvement in the management and services of the small ports and harbours under management, and an increase in communication between the Port Authority and its stakeholders.

To replicate the pilot action in another territory, it is recommended to follow a similar approach to that adopted by the Port Authority of Umag-Novigrad, including the hiring of an external expert to prepare a document containing all fundamental needs for the project, conducting a thorough market research, and dividing the projects into several main areas for procurement procedures. It is also recommended to involve stakeholders throughout the pilot action development and use KPIs to monitor the progress and effectiveness of the pilot action.

PA 8.1 – Improvement of the small ports monitoring system (mooring management, billing system, analysis of customer habits) - PP8 PGZ

The aim of the pilot action led by Primorje-Gorski Kotar County in the FRAMESPORT project was to enhance the monitoring and management of small ports through the implementation of innovative smart systems and technologies.

The main considerations and tips for the replication of the pilot action in another territory are:

- Comprehensive Project Documentation: The pilot action emphasized the importance of thorough project documentation, including analysis of the current situation, proposed conceptual solutions, SWOT analysis, risk analysis, and a conceptual project. This documentation serves as a foundation for decision-making, procurement, and implementation processes. Replication should prioritize the creation of comprehensive project documentation specific to the new territory.
- Stakeholder Engagement: Effective involvement of stakeholders, including the target group and relevant entities such as port authorities and external experts, played a crucial role in the success of the pilot action. Replicating the pilot action requires active engagement and collaboration with stakeholders, ensuring their input, expertise, and support throughout the project.
- Adaptation to Local Needs: When replicating the pilot action in another territory, it is essential to tailor the solutions and methodologies to address the specific needs and

challenges of the new context. Conducting a thorough analysis of the target territory's small port infrastructure, existing systems, and regulatory requirements will help identify the necessary adaptations for a successful implementation.

- Technological Considerations: The pilot action utilized innovative information and communication technologies, such as surveillance cameras, Bluetooth devices, and real-time data processing. Replication should consider the technological requirements and feasibility in the new territory, ensuring compatibility with existing infrastructure and evaluating the availability of skilled technicians or external expertise for installation and maintenance.

- Monitoring and Evaluation: Implementing a robust monitoring and evaluation framework is crucial for assessing the progress, outcomes, and impact of the pilot action. Replication should prioritize the establishment of appropriate Key Performance Indicators (KPIs) and mechanisms for monitoring, tracking, and evaluating the performance and effectiveness of the implemented solutions.

- Collaboration and Knowledge Sharing: Replication of the pilot action can benefit from collaboration and knowledge sharing with similar initiatives or organizations in other territories. Leveraging existing networks, partnerships, and cross-border cooperation programs can provide valuable insights, best practices, and lessons learned for a more effective implementation.

- Budgeting and Resource Allocation: Adequate budgeting and resource allocation are essential for successful replication. Identifying and securing sufficient financial resources, as well as allocating human resources and expertise, are critical factors in ensuring the smooth implementation of the pilot action.

- Continuous Improvement: The pilot action highlighted the importance of ongoing monitoring, testing, and refinement of the implemented solutions. Replication should prioritize a culture of continuous improvement, actively seeking feedback from users, monitoring system performance, and addressing any identified issues or areas for enhancement.

By considering these tips and suggestions, the replication of the pilot action in another territory can increase the likelihood of success and promote the sustainable development of small ports through the implementation of smart monitoring systems.

2.1.3. Monitoring of seaside and landside port areas

PA 2.2 – Development of monitoring system for port operations and public events in the canal port's area - PP2 ITL

The Pilot Action achieved the objective of improving the safety in the area by extending and upgrading (with three cameras) the existing video surveillance system which is connected to all security organisations: port authority, local police, local army command that can access real time and stored videos streams and timely react in case of emergency.

The activities carried out consisted of:

- **Final design of the Pilot Actions,** determined after conducting site inspections and summarising discussions with relevant stakeholders. The "as-is" contextual situation showed an existing video surveillance system that frequently experiences malfunctions due to poor connectivity. Moreover, the area had limited coverage under the current system.
- **Technology scouting** conducted to identify the best solution: cameras were deemed as the most suitable system, as they do not require manual operation 24/7. Also, an upgrading of the current system was necessary. The video analysis feature, which enables automatic detection of exceptions and alarms, was considered an interesting option. However, due to its complexity and budget constraints, it was not included in this action. Based on this analysis, the decision was made to enhance the existing system by adding three more cameras and upgrading one existing camera. The upgrade involved replacing the previous radio connection with a more reliable optical fiber connection.
- **Preparation of technical specifications** needed to procure the necessary equipment, ensuring compliance with existing regulations and compatibility with the current IT infrastructure.
- **Tender procedures**, to select the provider.
- **Roadworks** to prepare the site for cabling.
- **Installations, connections and setup** of cameras, along with pre-tests in the control center.
- **Final test and approval of the system** along with the official release to the Local Police and Port Authority, that have their control center connected to the system.

PA 5.3 – Creation of Innovation Lab to promote development and planning of small ports along the Adriatic coasts: ICT Platform for monitoring and supervision of freights/passenger - PP5 ARAP

The creation of Innovation Lab has been started from the analysis and the systematization of information collected both from desk and on-site research in a sample port. Research consisted of

discovering main information all around the Vasto port area keeping track of the current situation and opportunities that have potential in the existing state of the ports.

All the information will be an agenda for the discussion with relevant stakeholders so the outcome can reflect a common vision for the future sustainable development of small ports.

After the phase of sharing of values and vision and common programming, different activities were planned, namely:

1) Feasibility study for possible eco-sustainability solutions to reduce the environmental impact of port to rediscover ports value;
2) ICT platform for monitoring and supervision of freights/passengers;
3) Work experience programmes.

For the realization of each of them Arap adopted the following procedures:
- analysis of the starting point;
- identification of goals and objectives;
- strategy definition;
- implementation of the activity, resorting where necessary to assignment procedures;
- monitoring, feedback and control activities.

The sub-phases of the programming can be summarized as follows:

a) Assignment of responsibilities (tasks responsibilities matrix);
b) Carrying out the network programming of the project;
c) Creation of the Gantt diagram;
d) Analysis of potential problems of the project;
e) Analysis of available resources;
f) Economic evaluation of the project.

PA 10.1 – Feasibility Studies on alternative moorings for ship and on the use of electric ro-ro passenger ships - PP10 LUS

The main purpose of the Feasibility Study of alternative ways of mooring ships in the port of Šibenik is to create strategic documentation that will be an integral part of the comprehensive project of sustainable development of the port infrastructure and superstructure in the port area under the administration of the Port of Šibenik Authority. The increased intensity of cruise ship arrivals and

the limited mooring capacity on the available operating shores in the passenger part of the Šibenik port require the Port of Šibenik Authority, which manages the port area, to establish alternative mooring methods that would enable faster and safer mooring and provide additional port capacity to accommodate a larger number of cruisers.

The main activities carried out can be summarised as follow:

- analysis of the socio-economic, institutional and political context relevant to the project at the macro (Republic of Croatia) and micro (county/city) level relevant to the scope of the study itself;
- comparison of the alignment of the basic goals of the project with the applicable legislation and strategic documents;
- identification of the users who have a direct or indirect interest in the implementation of the project;
- a detailed analysis of the current state of the passenger part of the port of Šibenik and the characteristics of the cruise ships that have sailed into the port of Šibenik since 2019 and those that have announced their arrival by 2026;
- analysis of alternative models of mooring systems: automatic mooring devices, mooring buoys, mobile pontoon piers and sensor lighting of operating shores. The level of their impact on the environment has been determined;
- financial analysis;
- qualitative economic analysis was carried out with an overview of the indicators of the economic impact of the project for society as a whole, especially the impact on economic development and jobs, the financial position and standard of the local population, and the positive impact on the environment;
- risk assessment analysis;

To evaluate the performance and progress of the project, a comprehensive questionnaire was distributed to stakeholders, including Port Authorities, Port Users, National Bodies, Development Agencies, Research Institutions, Regional Authorities, Associations, and others. The questionnaire focused on evaluating various key performance indicators (KPIs) within seven categories: Port Operations and Management, Environment and Sustainability, Customer Service and Satisfaction, Technological Advancement and Digitalization, Safety and Security, Financial Performance, and Social and Community Responsiveness.

Each category consists of five specific KPIs that were assessed on a Likert scale from 1 to 10, indicating the stakeholders' evaluation of the performance within each KPI. The data collected from the stakeholders provides valuable insights into their perspectives and assessments, enabling a comprehensive understanding of the current status and potential improvements in the targeted areas.

For the pilot actions of the Port of Šibenik Authority, the most important results are within the category Safety and Security. In the ever-evolving landscape of port operations and marinas, maintaining a safe and secure environment is crucial for the well-being of all stakeholders involved. The Safety and Security category sheds light on the industry's dedication to ensuring the highest standards of safety and security. Within this category, stakeholders evaluated and provided their valuable insights on various key performance indicators (KPIs) that directly impact safety and security measures.

2.1.4. Promotion of ports' resources and territory

PA 1.2 – Promotion of the territory linked to Nautical clubs through development of extended reality application - PP1 MMON

The aim of the pilot action was to facilitate the users of sailing and nautical centers through the development of tourism attractiveness and promotion in the territory of the Gulf of Panzano through an AR Augmented Reality system. The challenge faced by the pilot action is the inclusion of sailing and nautical centres in the circuit of tourist activities in the area, in order to create a web portal for the promotion of cultural and natural elements to integrate the services and opportunities of the territory of Monfalcone.

The implementation of the action was entrusted through a public tender procedure to the company ETT Spa and was carried out between December 2022 and June 2023.

- September - November 2022 → Service contract tender
- December 2022 → Start of design work for the digital platform (website Scopri Monfalcone)
- January 2023 – May 2023 → Work of collecting and selection of points of interest (POI) in the area of Monfalcone, in agreement with the Contracting Authority. For each point, work was carried out to collect the relative textual and photographic materials, useful to the realisation of the panels, the website, the mobile app and the touch totems.
- May – June 2023 → Implementation of content in the planned digital formats and realisation of the physical material of the totem circuit.

PA 2.3 – Realization of initiatives for the promotion of the canal port activities, especially during the low touristic season - PP2 ITL

The Pilot Action 2.3 "Realization of initiatives for the promotion of the canal port activities", implemented by PP2 – ITL Foundation, was aimed at promoting the Canal Port of Rimini through the organization and implementation of a dedicated exhibition event to showcase the diversified range of activities and operators that are based within the Port's area, in order to better strengthen their attractiveness and display their value, thus also increasing the presence of people who are not directly involved in the Port's operation even beyond the high-peak summer season. The main activities that have been realized during the implementation of pilot action are:

- Phase 1. Preliminary phase: analysis of the territory related to the Canal Port of Rimini, including its activities and stakeholders;
- Phase 2. Direct involvement of relevant stakeholders to assess the needs of the Canal Port;
- Phase 3. Preparation of the administrative procedure to select a subject to be entrusted with the organization of promotional event;
- Phase 4. Selection of a suitable subject and award of the contract;
- Phase 5. Organization of the promotional event and the launching press conference, as well as the promotional campaign;
- Phase 6. Execution of the press conference and promotional event;
- Phase 7. Closure of activities and payment of the balance.

PA 5.2 – Creation of Innovation Lab to promote development and planning of small ports along the Adriatic coasts: Port attractiveness - PP5 ARAP

The creation of Innovation Lab has been started from the analysis and the systematization of information collected both from desk and on-site research in a sample port. Research consisted of discovering main information all around the Vasto port area keeping track of the current situation and opportunities that have potential in the existing state of the ports.

All the information will be an agenda for the discussion with relevant stakeholders so the outcome can reflect a common vision for the future sustainable development of small ports.

After the phase of sharing of values and vision and common programming, different pilot activities were planned, namely:

1) Feasibility study for possible eco-sustainability solutions to reduce the environmental impact of port to rediscover ports value;
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The sub-phases of the programming can be summarized as follows:

a) Assignment of responsibilities (tasks responsibilities matrix);
b) Carrying out the network programming of the project;
c) Creation of the Gantt diagram;
d) Analysis of potential problems of the project;
e) Analysis of available resources;
f) Economic evaluation of the project

2.1.5. ICT application and service development – comments

All 13 pilot actions under the ICT macro-theme produced exploitable results with a high potential for replicability and transferability. From these actions, it was possible to identify 10 tools that contribute to the FRAMESPORT toolbox (D.5.4.2), some of them resulting from two or three complementary pilot actions; in one case, it was possible to identify two different tools from the same pilot action.

These tools include guidance and learning documents such as model frameworks, checklists and case studies, which can be used to replicate the actions in other contexts. Moreover, there are fully operational web applications that are openly accessible and "ready to use" for anyone.

The table below shows the tools derived from the pilot actions, fully described in D5.4.2.

PILOT ACTIONS	TOOLS
LP2_CORILA	Decision Support System STEADFAST
PP1.2_MMON	Model framework for a territorial tourism management system
PP3.2_ASSET	
PP2.2_ITL	Model framework for a video surveillance monitoring system
PP2.3_ITL	Promotional event planning Checklist
PP5.2_ARAP	
PP5.3_ARAP	Model framework for gate access control system
PP6.1_AAST	IT application for booking berths
PP7.1_LUUN	Model Framework for system management platform
PP8.1_PGZ	
PP10.1_LUS	
PP13.1_CMCC	Meteo-oceanographic forecasting model to support navigation
	Weather routing and navigation IT application
PP10.1_LUS	Alternative mooring systems guidance

2.2. Environment and energy aspects

LP 1 – Development of an Ecolabel criteria proposal for small ports to be submitted to the EU Ecolabelling Board (EUEB) - LP CORILA

The objective of this pilot project was to draft an Ecolabel proposal for small ports. In this way, it was possible to deliver guidelines for a sustainable development of this sector. In particular, the activities were related to involving the relevant stakeholder (i.e., the small ports), creating the quantitative study to define the main environmental impacts and mitigation strategies, and preparing the needed documentation to send to the draft proposal to the Joint Research Center (JRC).

The following activities were carried out to implement the LCA phase of the pilot project:

1. Literature review: analysis of academic publications, national and international regulations on port and touristic activities sustainable management.
2. Goal and scope: Definition of the objective, focus and system boundaries of the project.
3. Stakeholder involvements: Involvement of two Italian small ports that are representative of the Adriatic basin environment.
4. Inventory analysis: Gathering of the data needed for the LCA study. Visit of the small ports to understand how they operate and to collect the required information to scientifically analyse their life cycle.

5. Impact assessment: Calculation of the environmental impacts of the life cycle according to the selected impact categories (e.g. global warming potential, ecotoxicity, resource depletion, water usage…).

6. LCA report: Report that presents the result of the LCA study, the way it was conducted, the environmental impacts and their sources, and opportunities of improvement.

7. Standards & Certifications: The main standards related to small port management (e.g., Gold Anchor, Blue Flag, ISO 13687-1/2/3-2017, Ecolabel for touristic activities) are analysed to get an understanding of their requirements and get valuable references for the delineation of the Ecolabel for small ports' criteria.

8. Ecolabel Criteria: Definition of the main environmental criteria for excellent small port management.

9. Documentation: Prepare the documentation related to the criteria of the Ecolabel.

10. Coordination with Project Partners (PP): collection of the outcomes and experiences from the various pilot projects of the FRAMESPORT initiative to gather valuable know-how, tools and methodologies that can be adopted to further improve the Ecolabel requirements.

11. Draft on Ecolabel requirements: Creation of the draft on the Ecolabel requirement and guidelines. Collection of ports' suggestions on how to improve the Ecolabel proposal.

12. Submission to JRC: Submission of the aforementioned draft to the JRC (Joint Research Center) to get their feedback and create the final version of the Ecolabel requirements, which then will be submitted to the EU Ecolabelling Board (EUEB).

PA 3.1 – Implementation of Port sustainability best-practices - PP3 ASSET

The aim of the pilot action was to improve ports conditions by touristic point of view. For this, ASSET realized a best practices (plastic free kit) and information campaign in three Apulian ports (Vieste, Trani, Otranto). On one hand, the objective was to reduce CO_2 emissions and waste from port operations and boaters. On the other hand, ASSET tried to collect existing services addressed to boat tourists.

For the accomplishment of the planned activities, the following steps have been followed, in a chronological order:

1. Sharing the methodology (5.1.1);
2. Analysis of the selected target group;
3. Preparation of SWOT analysis and Potential risks;

4. Creation of a Database including direct target information (contacts, email addresses, phone numbers etc.);
5. Study and analysis of possible materials to use for the plastic-free kit, in view of its full environmental sustainability;
6. Service provider company selection;
7. Customization and production of the materials for the plastic-free kit;
8. Organisation of the implementation of an awareness event in each port, where the plastic-free kit will be distributed, in collaboration with the n. 3 ports;
9. Realization of the event in port areas and distribution of plastic-free kits;
10. Preparation of the Final Report.

PA 4.1 and 4.2 – Sustainable and local mobility interventions (ex. electric bus and bike services) - PP4 SVEM

The aim is related to investigate smart mobility solutions to improve the connections of the small Ports with other inland destinations, in order to improve the tourist vocation of the ports and at the same time develop sustainable transport modality to reduce energy consumption and environmental impact.

Considering the specific context and needs of local territories, the following services were implemented for the summer season:

- an E-Bus Service of Vallugola port: execution of the EBUS service from 22nd of July to 7th of September 2021;
- an E-Bike Service of Numana port execution of the EBike service from 3th of August 2021 to 3th of October 2021.

Step 1 – Context and territorial analysis

A preparatory activity in order to define the pilot action details. It was based on desk analysis, comparison through interview with the main stakeholders, especially the port's manager, and local mobility / transport manager (for example of the municipality), if any. This activity could be supported by an initial questionnaire to collect the following information :

- information on local ports (management, services, possible ongoings initiatives and or investments);

- current assets on mobility services (availability of transport connections with the ports, other mobility services or infrastructures similar to the ones proposed);
- presence of local associations, companies and more in general Stakeholders with interests on the topic.

<u>Step 2 – Procurement process for external services selection</u>

Considering that the Action is related to transport services, it is necessary to engage operators to guarantee the execution of the mobility services.

Preliminary would be helpful to sign a Framework Convention with the ports Managers, local municipalities, or any stakeholders that need to be involved during the development of the mobility service. For example, SVEM realised:

- a convention with Gabicce Mare Municipality for the E-bus of Vallugola port to guarantee: the E-Bus stop station, assignment of a transport BUS line, etc;
- a convention with Numana Municipality for the E-bike to guarantee: the E-bike station area, installation of charging cable in a dedicated port area, etc.
- two preliminary market researches (for each service tender), in order to identify the Operators interested in being invited in the next Call for tender;
- two Call for tenders, in order to select the Operators for service providing.

<u>Step 3 – Start and implementation of mobility services</u>

This is the period of effective activation of the mobility solutions. Dedicate enough time to collect information needed to evaluate the action; from 1 to 3 months could be the solution, considering that this type of service are necessary during the summer season

Pay attention to define if the services must be free of charge for users, for example considering that there is a public grant to support the activity, in this case, find a way to give priority to ports sailor clients.

<u>Step 4 – Monitoring activities</u>

The monitoring activities need to be performed during the execution of the mobility services, to evaluate the effectiveness of the pilot action through quantitative and qualitative indicators.

PA 5.1 – Creation of Innovation Lab to promote development and planning of small ports along the Adriatic coasts: environmental impact - PP5 ARAP

The creation of Innovation Lab has been started from the analysis and the systematization of information collected both from desk and on-site research in a sample port. Research consisted of discovering main information all around the Vasto port area keeping track of the current situation and opportunities that have potential in the existing state of the ports.

All the information will be an agenda for the discussion with relevant stakeholders so the outcome can reflect a common vision for the future sustainable development of small ports.

After the phase of sharing of values and vision and common programming, different pilot activities were planned, namely:

1) Feasibility study for possible eco-sustainability solutions to reduce the environmental impact of port to rediscover ports value;
2) ICT platform for monitoring and supervision of freights/passengers;
3) Work experience programmes.

For the realization of each of them Arap adopted the following procedures:
- analysis of the starting point;
- identification of goals and objectives;
- strategy definition;
- implementation of the activity, resorting where necessary to assignment procedures;
- monitoring, feedback and control activities.

The sub-phases of the programming can be summarized as follows:

a) Assignment of responsibilities (tasks responsibilities matrix);
b) Carrying out the network programming of the project;
c) Creation of the Gantt diagram;
d) Analysis of potential problems of the project;
e) Analysis of available resources;
f) Economic evaluation of the project

PA 10.2 – Testing IT system for the forecast of possible geographical dispersion of the pollutants in case of accident - PP10 LUS

The pilot action focused on the forecasts of possible geographical spread of pollution. The pilot installed buoys with sensors and an IT tool to predict the possible geographical spread of pollution, allowing the Port of Šibenik Authority to predict the geographical spread of pollution and respond properly in case of pollution.

The Port of Šibenik Authority acquired an aerial and underwater drone, installed buoys with sensors and tested an IT tool for predicting the possible geographical spread of sea pollution caused by a sudden event. Given that the Adriatic Sea is a very sensitive area that requires exceptional protection, the installed system will enable the Šibenik Port Authority to predict the geographical spread of sudden sea pollution, which will greatly contribute to quick reaction and proper reaction and will result in direct benefits not only for the local community, but also for the entire Adriatic area.

The main activities carried out can be summarised as follow:

- acquisition of aerial and underwater drone;
- procurement and installation of buoys with sensors for pollution detection;
- testing phase;
- results of testing.

To evaluate the performance and progress of the project, a comprehensive questionnaire was distributed to stakeholders, including Port Authorities, Port Users, National Bodies, Development Agencies, Research Institutions, Regional Authorities, Associations, and others. The questionnaire focused on evaluating various key performance indicators (KPIs) within seven categories: Port Operations and Management, Environment and Sustainability, Customer Service and Satisfaction, Technological Advancement and Digitalization, Safety and Security, Financial Performance, and Social and Community Responsiveness.

Each category consists of five specific KPIs that were assessed on a Likert scale from 1 to 10, indicating the stakeholders' evaluation of the performance within each KPI. The data collected from the stakeholders provides valuable insights into their perspectives and assessments, enabling a comprehensive understanding of the current status and potential improvements in the targeted areas.

For the pilot actions of the Port of Šibenik Authority, the most important results are within the category Safety and Security. In the ever-evolving landscape of port operations and marinas, maintaining a safe and secure environment is crucial for the well-being of all stakeholders involved. The Safety and Security category sheds light on the industry's dedication to ensuring the highest standards of safety and security. Within this category, stakeholders evaluated and provided their valuable insights on various key performance indicators (KPIs) that directly impact safety and security measures.

2.2.1. Environment and energy aspects – comments

All 6 pilot actions under the Energy and Environment macro-theme provided significant input and insights for developing guidance tools for replicability of results in other context, contributing to the FRAMESPORT Toolbox. It was possible indeed to identify 6 tools (complemented by case studies), two of them resulting from the merging of results from two pilot actions, while in one case, two different tools derived from the same pilot action.

The table below shows the tools derived from the pilot actions, fully described in D5.4.2.

PILOT ACTIONS	TOOLS
LP1_CORILA	Life Cycle Assessment (LCA) Guidelines
PP5.1_ARAP	Sustainability Checklist
PP3.1_ASSET	Sensitisation campaigns Checklist
PP4.1_SVEM	Practical guidance on e-mobility connection services
PP4.2_SVEM	
PP10.2_LUS	Model Framework for a pollutant dispersion forecasting system

2.3. Spatial planning and management

PA 2.1 – Development of Master Plan for the development of a regional-level port system in Emilia-Romagna region - Project proposal for the renewal of Rimini canal Port - PP2 ITL

The aim of the Pilot Action 1 was to analyse the urban planning, technical, environmental, socio-economic and cultural framework of the Canal Port of Rimini and the subsequent drafting of a project proposal for the redevelopment and the enhancement of services and infrastructure. This must be scalable and replicable in other similar cases of minor ports, so that the know-how acquired through the activities on this pilot can be transferred to other similar cases.

The essential steps for the replicability of the procedure are:

1) Context analysis through archival sources, on-site surveys, stakeholder questionnaires, open data, etc;
2) Data processing through a SWOT analysis to identify potentials and criticalities of the project area;
3) Identification of a set of indicators from the collected data and assessment of their score for a pre-project phase (and possible future monitoring);
4) Elaboration of a BOCR model to identify a priority scale of urban regeneration actions;
5) Elaboration of an urban regeneration project based on the outcomes of the previous phases.

The combination of different analysis methodologies, such as stakeholder involvement, SWOT analysis and the ANP-BOCR method, allowed for an objective and reliable result. A set of indicators described in a simpler and more detailed way the current state of the study area obtaining a qualitative and quantitative evaluation of the analysed aspects. The selected indicators follow the parameters provided at national and European levels adapted to the context considered. Such indicators can be used in other similar contexts since they evaluate the environment under consideration not only to the current state but also after the future requalification of the area, monitoring the progress of the project and comparing the two different scenarios.

Then, an urban regeneration project was developed according to the proposed priority scale. The design phase began with the identification of the height to lift the docks in order to solve the problem of frequent flooding due to tides and adverse weather conditions. Access to platforms and public spaces were designed to identify new functions for the benefit of the community. As a result of the raising of the docks, the cycle and pedestrian paths along the two banks of the Canal Port were revised accordingly. To verify the effectiveness of urban regeneration actions and the validity of the design choices made, the same indicators used in the planning phase will be reused in the monitoring phase to verify changes in relation to the starting situation. These changes should also aim to increase the economic productivity of the area.

PA 4.3 – Strategic document for the development of tourist ports in Marche Region - PP4 SVIM

The PA 4.3 "Strategic document for the development of tourist ports in Marche Region" aimed to support the updating of planning and management of tourist ports in Marche region, according to the regional tourism policy. Indeed, the PA addresses the Macro Theme Spatial planning and management.

Through pilot action 4.3, SVEM intended to carry out an analysis and a study aimed at understanding the system of tourist ports of the Marche and analyzing their needs in terms of growth and sustainability and in supporting the regional tourism policies.

Based on the experience developed by SVEM, the implementation of the pilot activity could be summarized in the following main step:

- STEP 1: Sharing of the new proposal of pilot action with FRAMESPORT project partner and the Associated Partner Marche Region.
- STEP 2: Design of action activities details.
- STEP 3: Procurement procedure and assignment of the service to an external company (Pool Engineering).
- STEP 4: Development of the activities included public events to share and present the results of the action.

The timing, especially for the first 2 steps, depends on specific local factors; consider enough time to involve initially the stakeholder mainly interested in the theme (in this case Marche Region), in order to define a list of detailed activities based on realistic needs. The step 3 depends on whether the need of specialistic support emerges from the previous activity.

The provided methods of analysis has been:

- desk research and analysis;
- questionnaire directed to the managing bodies of Marche ports;
- online survey aimed at trade associations (Assonautica, local nautical clubs ...), supported with meeting;
- focus groups with managing bodies of tourist destinations in other Adriatic states.

In addition, it has been realized a monitoring tool, a structured questionnaire derived from the experience of the pilot action, useful to update the data used in this analysis in case of future updates.

PA 9.1 – Development of Master Plan for the development of a county-level port system in Zadar County - PP9 ZLUZ

The aim of Pilot Action was to classify the county level port system and create necessary development steps for Zadar County ports, of which the final result is Master Plan.

Masterplan structures reflects what steps and in which order were taken:

1) Introduction
2) Legal framework and strategic documents (subject of description and analysis)
3) Analysis and assessment of the state of ports open to public traffic of county and local importance
4) Proposal of criteria for the classification of ports of county and local significance (existing criteria and proposal of a new classification)
5) Analysis of the spatial planning documentation of ports of county and local importance
6) Elaboration of development criteria and guidelines for planning
7) Proposal of the concept of port development of county and local importance, including the proposal of measures until 2030
8) Conclusion

The master plan implies a comprehensive document created on the basis of the broadest insight into the problem with the aim of providing general guidelines based on which it is possible to optimize the analyzed thematic area in the future. As such, these types of documents can be quite extensive. As a basis for carrying out the analysis of future development possibilities, it was primarily necessary to make an analysis of the current state of the selected port areas, an overview of the current situation, which is the basis of the analysis of ports open to public traffic.

For each of the relevant ports, the following elements were analyzed - the geographical position of the port and the port area, the area of the port area and its relation to the total area of other port areas, the content and activities that are available and performed in the port, the technical and technological features of the operational shores and moorings places, mooring capacity for different types of vessels, equipped with equipment which enables the safe stay of vessels in the port, existing traffic and potential future demand, navigational and meteorological-oceanological conditions of the location of the port and associated anchorages, additionally it was necessary to take into consideration the existing/valid criteria that determine the way of categorizing port areas.

PA 14.1 – Development of Master Plan for the development of a county-level port system in Ličko-Senjska County - PP14 LUSE

The aim of the activities envisaged for this pilot action consists of extensive research activities encompassing a lot of smaller-scale surveys and research whose final purpose leads to the creation of the Master Plan for the development of a county-level port system in Ličko – Senjska County, or to be more specific the ports managed by the Port of Senj Authority.

The structure of the document itself points out to the fact what steps and in which order were taken to achieve the final product.

1. Introduction part (the reasoning behind the creation of the master plan and its basic structure)
2. Provision of basic information about the client of the study
3. Analysis of the applicable legislation and strategic documentation that regulate the entity
4. Researching activities (the focus on analysis and assessment of the current state of the ports which are going to be the main topic in the document)
5. Setting out the basic criteria for assessing ports
6. Multi-criteria analysis of arc valuation in accordance with the set criteria
7. Development criteria for evaluating port development plans and the spatial-planning plans of ports are presented, which were developed in accordance with the conclusions reached on the basis of the conducted research.
8. Setting out four possible basic development scenarios of ports
9. Final remarks on the conducted research and the basic guidelines for efficient and sustainable development of ports

To summarize it is necessary to mention how extensive these kinds of documents need to be. Master plans are basic strategic documents on the basis of which any kind of future developments can be planned. Systematization of the current states the ports and port areas are, alignment with the regulatory framework, reasonable development suggestions etc. The analysis and assessment of the state of the ports were carried out in order to assess the relevant development needs in the ports, but expert assessments were additionally given in terms of meeting the existing needs for port capacities in the relevant area, i.e., in terms of meeting qualitative standards in the port. However, in order to determine the development potential of these ports, it is necessary to rearrange these criteria and to qualitatively and quantitatively assess the potential of individual ports within the county maritime transport system. Therefore, in accordance with the methodology used, the position is taken to choose separate sets of criteria, which according to their basic characteristic are called classification criteria and development criteria. In the elaboration of these two sets of criteria, sub-criteria were used that were extracted from previously analyzed legal, strategic, and other documents, which regulate the maritime and transport system, ports and port activity, coastal regular transport, nautical tourism, fisheries, but also other characteristics that are directly related to ports open to public traffic of county and local importance.

2.3.1. Spatial planning and management – comments

The 4 pilot actions under this macro-theme provide valuable planning documentation that can serve as a guideline for stakeholders responsible for development of ports and surrounding areas in any other context. From this documentation, it was indeed possible to identify 3 guidance tools (complemented by case studies), one of which resulting from the merging of two pilot actions. All pilot actions represent as well useful case studies that complement the tools.

The table below shows the tools derived from the pilot actions, fully described in D5.4.2.

PILOT ACTIONS	TOOLS
PP4.3_SVEM	Strategic Guidelines for the development of touristic ports
PP2.1_ITL	Planning Guide for regeneration of urban port areas
PP9.1_ZLUZ	Small ports system master planning Guidelines
PP14.1_LUSE	

2.4. Training and knowledge aspects

PA 1.1 – Develop / refine professional skills for refitters and shipwrights for the classic and historical boat sector - PP1 MMON

Regarding the macro-theme T&C PP1 Municipality of Monfalcone realized a first Pilot Action called: "Develop/ refine professional skills for refitters and shipwrights for classical boat sector". The goal was to develop interest, especially among the younger generations, towards the skills and knowledge of the shipwrights, in order to continue in the future this important tradition and develop it thanks to new technologies.

The action consisted of two main activities within the "Maestri d'Ascia" (axe masters) platform specifically created:

- Training course "Learning the ancient craft of the shipwright" through online training modules and also available later on the platform;
- Database of classic and historic boats, a tool for the exchange of expertise and a "database" of classic and historic boats, in order to create a census of them (formulated through self-reporting by interested parties).

The implementation of the pilot action was entrusted to the company "Polo Tecnologico Alto Adriatico Andrea Galvani" of Pordenone, following a tender procedure through a negotiated procedure:

- June 2021 - February 2022 tender procedure for the assignment of the service for the realisation of the pilot action;
- February 2022 - October 2022 realisation of the software for the digital platform and setting up of the training modules (with selection of teachers) and realisation of the database Participation in events and promotion of the pilot action;
- November - December 2022 running of the course;
- December 2022 final presentation and conclusion of the pilot action.

PA 5.4 – Creation of Innovation Lab to promote development and planning of small ports along the Adriatic coasts: training and learning events

The creation of Innovation Lab has been started from the analysis and the systematization of information collected both from desk and on-site research in a sample port. Research consisted of discovering main information all around the Vasto port area keeping track of the current situation and opportunities that have potential in the existing state of the ports.

All the information will be an agenda for the discussion with relevant stakeholders so the outcome can reflect a common vision for the future sustainable development of small ports.

After the phase of sharing of values and vision and common programming, different pilot activities were planned, namely:

1) Feasibility study for possible eco-sustainability solutions to reduce the environmental impact of port to rediscover ports value;
2) ICT platform for monitoring and supervision of freights/passengers;
3) Work experience programmes.

For the realization of each of them Arap adopted the following procedures:

- analysis of the starting point;
- identification of goals and objectives;
- strategy definition;
- implementation of the activity, resorting where necessary to assignment procedures;
- monitoring, feedback and control activities.

The sub-phases of the programming can be summarized as follows:
a) Assignment of responsibilities (tasks responsibilities matrix);

b) Carrying out the network programming of the project;
c) Creation of the Gantt diagram;
d) Analysis of potential problems of the project;
e) Analysis of available resources;
f) Economic evaluation of the project

2.4.1. Training and knowledge aspects – comments

The potential for replicability and transferability of the results of the 2 pilot actions under this macro-theme is significant not only as a model for non-conventional training, complemented by valuable case studies, but also for the training resources produced and made openly available for anyone interested in the topic of traditional maritime activities and craftsmanship.

It was possible to identify 1 complete guidance tool from both pilot actions. Moreover, a digital database of classic boats represents an additional tool openly available via the web to anyone wishing to consult or even to contribute to it.

The table below shows the tools derived from the pilot actions, fully described in D5.4.2.

PILOT ACTIONS	TOOLS
PP1.1_MMON	Database of classic and vintage boats
PP5.4_ARAP	Training plan on traditional maritime activities and craftmanship

2.5. Business oriented aspects

PA 12.1 – Development of small port prototype. Identification of opportunities to be taken in order to develop a single port and convey outcomes to stakeholders for the future development and investment plans - PP12 LOGO

The aim of the pilot was to educate the port authorities on the possibilities of upgrading ports at infrastructure level, super-structure, user services and / or port management organization. The final goal was to provide a comprehensive document containing the best practices from ports and similar infrastructural areas worldwide.

The main steps accomplished are:

- Conducting thorough desk and occasional field research on the existing state of the Adriatic ports;

- Creating a draft document containing non-exhaustive examples and best practices from all over the world that would help achieve the project's ultimate goal of sustainability;
- Conducting a detailed analysis of the best practices from ports and similar infrastructural areas worldwide, keeping in mind the project's focus on efficient business practices, renewable energy, waste management solutions, and other eco-friendly measures;
- Creating several chapters or paragraphs, each containing one of the aspects that could potentially be transferred to the Adriatic coast, such as informatization, ecology, services, safety, tourist offering, infrastructure, and superstructure;
- Integrating the best practices identified during the research activities and creating a comprehensive and insightful document outlining these practices that would serve as a vital resource for the stakeholders in the Adriatic port community, including policymakers, port authorities, and other interested parties.

2.5.1. Business oriented aspects - comments

The pilot action under this macro-theme developed a comprehensive collection of best practices encompassing all possible strategic areas of intervention for the sustainable development of small ports. That collection, that is the main outcome of the pilot action, represents a tool to be included, as it is, in the FRAMESPORT toolbox, to be used as a guidance in any other context.

The table below shows the pilot action and the corresponding tool, fully described in D5.4.2.

PILOT ACTIONS	TOOLS
PP12.1_LOGO	Best practices guide to increase the ports' attractiveness