

DigLogs

4.2.1 - Definition of steps to be taken for innovative solutions deployment both from market and policy perspective

CFLI

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Introduction

According to the application form, this deliverable is a first draft of the roadmap and defines the steps to be taken for innovative solutions deployment from market and policy prospective, based on selected innovations analysed in the previous work packages.

In this document issues are defined as they underlie each strategic objective and action that can be carried out, but details about them are not deepened in order not to limit the consultation process. Furthermore, as the application form states, since a consultation process will be at the base of the deliverables and that, at the initial point, the draft of road map leaves the descriptions of the issues deliberately unclear in order not to affect or bias stakeholders' interaction.

According to the lead partner and Rijeka Port Authority contribution¹, the first version of the draft roadmap is more a strategic planning tool than a planning or design tool, basically aiming at bridging PPs from the analysis stage to the deployment stage, deepening the relationships between objectives and actions to be included in the pilot action and beyond, including the wider innovation deployment pathway. Indeed, strategic planning is more related to the objectives that lie behind the execution of an action, while the plan is related to the way of doing it instead. In other words, the roadmap definition starts from the assumption that “what” and “why” relate to strategic vision, and “how” belongs more to the planning stages.

¹ Diglogs - isporuka - 2 -13.03.2020.pdf / Diglogs - LUR 4.3.1 v3 drafted by Aksentijević Forensics and Consulting, Ltd.

1 Objectives of this document

In this document, the first version (V1) of the roadmap draft refers to the strategic planning technique of “road mapping” and comes as an overall “what-why-how” list, including both physical and intangible elements that can be changed later during the deployment phase, in order to achieve the goal of the innovation deployment.

Roadmap V1 provides the basic framework for the subdivision of pilot, as well as the subsequent innovation deployment actions in sight, into deployment actions and activities and their first basic arrangement into a timeline.

According to strategic planning literature, the roadmap “what-why-how” list is based on the following questions:

- WHAT elements of the context can be changed in order to achieve the objectives expected from the innovation deployment?
- WHY a context element must be changed? Which specific objectives are to be achieved by changing that element?
- Briefly, HOW to change the context element? Which tools, methods and procedures could be deployed in order to change it?

The V1 version of roadmap draft answers to the above questions include, at the moment, the following **11 context elements**:

1. Knowledge and awareness about internal assets and resources
2. Products and services
3. Organisational model
4. Employees’ skills and capabilities
5. Processes and procedures
6. Information assets
7. Machinery and equipment
8. IT infrastructure
9. Financial resources
10. Goods and real estate

11. Corporate image

1.1 Deployments roadmaps to increase competitiveness of multimodal transport services

The main objective of the 4.2 activity is to define a road map for innovative solutions deployment in freight sector segment.

Following is the list of pilot actions to be implemented within the WP5 Testing phase of the DigLogs project:

- Action 5.1 – Freight pilots
 - 5.1.2 - Warehouse Management System 4.0 (aimed at implementing multimodal transportation solutions)
 - 5.1.3 - PCS Automation (new automation functions to be applied on existing PCS systems)
- Action 5.2 – Passenger pilots
 - 5.2.2 - Mobile APP for passenger security (mobile app and beacon WSN implementation)
 - 5.2.3 - APP for data flows management of passengers (data integration for the development of new passenger services)
 - 5.2.4 - New PCS (transfer of PCS implementation Know-how to Sibenik port)
- Action 5.3 – Combined pilots
 - 5.3.2 - Management solution for passengers and freight transport combination (Maritime Transport Management by linking PCS and national maritime single window for Croatian ports)
 - 5.3.3 - Big Data / Data management solution for planning (Spatial Data Infrastructure version 1 and skill enhancement for Venice port)

Since this deliverable is focused on the freight sector, it will include freight pilots 5.1.2 and 5.1.3 roadmaps, as well as combined pilots 5.3.2 and 5.3.3 for what concerns multimodal transport services.

2 Roadmap strategic “what-why-how” list

This chapter is divided into 11 paragraphs, one for each context element.

For each context element, it is provided a brief description, a list of strategic objectives that forms the “why change” list, and a list of type of actions that can be carried out to achieve the goals, as well as a short sample list of possible actions useful to better understand the possible changes.

2.1 Knowledge and awareness about internal assets and resources²

Internal assets and resources are the core value of an organization and include all physical and intangible resources, from financial, knowledge and organizational resources to machinery, technologies, workforce and real estate.

This first context element is about the knowledge referring to both intrinsic values of items and their productivity and performances.

It is very important to have the most accurate and detailed report of available resources in order to develop any subsequent planning and design action.

2.1.1 Why change

- Better understand performance and lacks in the organization model
- Better understand skills, capabilities and productivity of workforce
- Better know the quality, accuracy and completeness of data and information
- Better understand the adequacy of available technologies
- Better know the regulation framework
- Better know the adequacy, performance and lacks in methods, procedures and protocols
- Better know the amount of financial resources and funding opportunities
- Better know the value and adequacy of machinery and work tools

² To be defined if it is also external assets should be included (e.g. a market analysis is about something external from the organization)

- Better know the value of owned real estate

2.1.2 How to change

- Perform assessments
- Make prototypes
- Run tests and experimentations
- Perform monitoring and benchmarking
- Carry-out make-or-buy analyses
- Make censuses of available resources
- Make needs analyses
- Make requirement analyses

Change actions examples

- *Production process analysis*
- *Market scouting*
- *Data sources census*
- *Relationship issues assessment*
- ...

2.2 Products and services

Products and services are the core business of a company or an institution. Changing a product or a service does not mean changing the production or the provision process (processes are another context element) but changing the specific features of a product or a service. Changing products and services is often a response of some modification of the broader context of the production and provision process.

2.2.1 Why change

- Meet the new needs emerging from customers and users
- Make product or service cheaper and/or more effective

- Make product or service more compliant to the broader context
- Replace non-digital parts with digital or add new digital-based parts
- Make product or service more attractive or usable
- Make products or service more integrated with other products or services

2.2.2 How to change

- Add a new product or service to portfolio
- Redesign a product or a service
- Redesign products packaging
- Use different products or services delivery/provision ways and channels

Change actions examples

- *New information service development for customers or suppliers*
- *Design of a new packaging with identification system*
- *Document dematerialization*
- *Porting of service to web-oriented systems*
- ...

2.3 Organisational model

Organisation model is how responsibilities and activities are assigned to persons or groups of persons referring to specific areas, but it can also include relationships network, materials' sharing, information exchange and communication models.

2.3.1 Why change

- Meet the new needs emerging from employees and decision-makers
- Ease integration of processes
- Motivate employees
- Exploit workforce skills and capabilities
- Improve information exchange

2.3.2 How to change

- Reassign roles
- Reassign activities
- Redefine groups, internal areas and relationships
- Improve information exchange and reduce redundancy and inconsistency
- Increase internal and external communication

Change actions examples

- *Centralized information and data access policy plan*
- *Common protocol for institutional/corporate communication*
- *New/revised organization chart*
- *New/revised internal areas subdivision*
- ...

2.4 Employees' skills and capabilities

Skills and capabilities refer to human resources and they are one of the primary production factors of a company or an institution.

2.4.1 Why change

- Make employees able to use tools and apply procedures
- Increase employees' cooperation
- Increase workforce productivity
- Increase decision-makers capability to define workgroups and internal areas subdivision
- Increase decision-makers capability to understand/assess inputs, outputs and times of production and service provision processes
- Increase decision-makers capability to forecast skills and capabilities needs

2.4.2 How to change

- Carry on educational and training activities for employees and decision-makers

- Support tools and methods adoption and utilization
- Provide self-training materials
- Hire new professionals

Change actions examples

- *Refresher courses*
- *Workshops*
- *Training on the job / coaching*
- *E-learning systems development*
- *Recruiting plan*
- ...

2.5 Processes and procedures

Processes, procedures, protocols and regulations concerning how products and services are provided. Changing processes and procedures does not mean changing assets, infrastructures, materials, workforce which are other factors, but changing the way they are integrated to get to the final product instead.

2.5.1 Why change

- Increase overall productivity
- Make processes faster and/or more effective; eliminate bottlenecks
- Make processes more compliant to the broader context and exploit digital innovations
- Make processes easier for employees
- Make processes more integrated with other processes
- Embed new tools or methods inside existing processes or define new processes based on the use of new tools and methods

2.5.2 How to change

- Redefine the combination of the production factors

- Re-allocating resources or including new resources
- Redefine times and sequence, scheduling, relationships between resources or with other processes
- Make new regulations or review existing ones
- Replace obsolete activities
- Develop integrated procedures to eliminate redundant activities
- Include interoperability

Change actions examples

- *Production process revision plans*
- *Time scheduling, GANTT charts and other time-optimization tools*
- *Replacement of non-digital tools with new generation digital tools*
- *System Integration projects*
- *Laws / rule books*
- ...

2.6 Information assets

In logistics decision-making processes, the information assets are the main support resource. In this era, it is mostly called “the new oil” with reference to data sources and data streams flowing through the IT networks.

2.6.1 Why change

- Avoid bad decisions caused by bad data
- Better support processes
- Increase product and services quality
- Increase analysis, forecast and estimation capability
- Improve resources management
- Provide new services to customers, users and suppliers

2.6.2 How to change

- Collect new data
- Optimize available data
- Process and integrate data
- Define extraction, transform and load algorithms
- Connect to data sources

Change actions examples

- *Data collection campaigns*
- *Data purchasing*
- *Data geocoding*
- *Data classification*
- *ETL system development*
- *Big Data extraction*
- ...

2.7 Machinery and equipment

Machinery and other equipment are the set of physical production tools of the organization. Notice that we consider IT hardware tools as another element of the list.

2.7.1 Why change

- Increase productivity
- Allow a new product or service provision
- Increase a product or service quality or intrinsic value
- Ease work procedures
- Increase work safety
- Obtain new working process functions

2.7.2 How to change

- Purchase or rent a new tool or machine
- Modify or integrate an existing tool or machine
- Integrate a tool or machine with another one or with a system

Change actions examples

- *Purchase of box for sensor installation*
- *Machinery stock update plan*
- *Installation of energy distribution slots*
- ...

2.8 IT infrastructure

The IT infrastructure of an organization usually includes hardware devices, software tools and network connectivity.

2.8.1 Why change

- Obtain or increase digital information storage capacity (increase room)
- Obtain or increase computer processing power (increase speed)
- Obtain new digital information processing functions or update existing (improve results)
- Obtain or increase digital information network exchange capability (improve sharing)

2.8.2 How to change

- Purchase or rent storage devices
- Purchase cloud-based storage services
- Purchase or rent server computers, workstations, client or personal computers.
- Purchase cloud-based computing solutions
- Purchase and install sensor devices and actuators
- Purchase software licenses
- Update operating systems and applications

- Purchase and install network devices and infrastructures
- Perform systems and applications update, tuning and maintenance

Change actions example

- *Wireless Sensor Network implementation*
- *Mobile APP development*
- *Web hosting service purchasing*
- *Server computer empowerment*
- *Wireless network devices installation*
- ...

2.9 Financial resources

Available financial resources, in terms of budget and financing funds.

2.9.1 Why change

- Allocate resources for the needed actions
- Re-allocate resources according to new available funds and resources
- Re-allocate resources according to actions progress and results

2.9.2 How to change

- Define budgets
- Make an economic and financial plan
- Make purchases, contracts and payments
- Make economic and financial progress reports and plans
- Make in-progress and final economic and financial balances

Change actions example

- *Project budget plan*
- *Purchase orders*

- *Public procurements*
- *Budget revision report*
- ...

2.10 Goods and real estate

Excluding machinery and equipment, goods and real estate are tangible assets that have intrinsic or operational value which can be considered part of production or service provision processes.

2.10.1 Why change

- Meet the needs of assets of production or service provision processes
- Redefine the use of assets according to production or service provision process
- Increase assets value
- Improve asset features

2.10.2 How to change

- Obtain real estate
- Add functions or equipment to real estate asset
- Increase needed assets and movable properties quantity
- Improve needed assets and movable properties quality, usability, durability

Change actions example

- *Purchase a warehouse*
- *Make a rooms or office barrier-free*
- *Electrify a dock*
- *Purchase a stock of warning signs*
- ...

2.11 Corporate image

Corporate image is how a company or institution is evaluated and considered by others. Corporate image is known to have an intrinsic value related to several factors like communication strategy, marketing strategy, identity design, customer relationship, social responsibility, products and services portfolio and others.

2.11.1 Why change

- Make improvements, new products, services and features known to the public
- Increase competitiveness and attractiveness
- Improving relationships with partners, customers and suppliers
- Entering new market sectors
- Entering new market segments

2.11.2 How to change

- Design / re-design brands
- Modify products and services portfolio
- Promote products and services through the media
- Use social media
- Make advertising
- Make social events
- Disseminate research results
- Involve people, companies, institutions and professionals in activities
- Promote social initiatives

Change actions example

- *Brochures*
- *Logo design*
- *Virtual games, contests*
- *Digital advertising (web/mobile app)*
- *Newsletters*
- *Public conferences*

- *Websites*
- ...

3 Freight sector roadmap V2

Roadmap V1 described in the previous chapter is intended as the first step of DigLogs WP4 road-mapping pathway.

The **next step** aims leading to a time planning of implementation steps for each pilot action which is not intended to be a detailed work plan but a pre-design stage between strategy and implementation instead.

Pre-design time planning draft is done by each action pilot owner, choosing from the described 11 context elements the ones that are most applicable depending on the nature of the innovation, and trying to select appropriate objectives from the “why change” section, appropriate actions types from “how to change” and then defining a list of needed actions that will be the main input for the implementation work plan.

3.1 First questions for innovation deepening

Since it is necessary to analyse the scope of each innovation in each deployment context, thinking about deployment spanning 5 years, the first two questions to deepen this aspect are the following:

- What is it planned to do in the first phase (pilot phase)? What is it planned (or wish) to do in the later phases? What do you expect to cover during first/second/third/fourth/fifth year?
- What is the scope of the pilot? How can it be described in as many details as possible?

3.2 Innovation deployment pathway deepening

Roadmap V2 first draft takes into account the time horizon of at least 5 years implementation pathway according to the application form pilot action description and its matching innovation context.

To meet this requirement, the first list of required actions to be included in roadmap V2 will be a lightweight and “scope based” list, helpful to better know what is planned to do in the 5 years by each pilot owner. An example of action types to be included in roadmap V2 could be the following:

- Analyses (such as preliminary assessment stages, market analyses, etc)
- Design and plans (such as design reports, work plans, financial plan, etc.)
- Implementation and deployment stages (such as services and material procurement, hardware and software installation, etc)
- Tests and evaluations (such as monitoring, prototyping, reviews, tuning etc.)
- System maintenance (review and update assessment, market monitoring to update services and products etc.)
- Communication and stakeholders’ involvement
- Education and training

NOTE: in V2 roadmaps, the labels CE1, CE2 CE11 refer the Context Elements listed in chapter 2.

3.3 WMS Warehouse Management System 4.0 V2 roadmap

WMS is a software application, designed to support and optimize warehouse functionality and distribution centre management. These systems facilitate management in their daily planning, organizing, staffing, directing, and controlling the utilization of available resources, to move and store freight into, within, and out of a warehouse, while supporting staff in the performance of material movement and storage in and around a warehouse.

A relevant functionality of the WMS that will be implemented is a DSS (Decision Support System), consisting in an open source platform. This DDS, linked with the WMS (and the Inland terminal involved) will provide an "intermodal transport network IT interface" and allow the logistics operators to be informed and choose among different possible intermodal solutions.

The pilot action will be implemented and run in the context of dry ports within the Programme area, it will consist in the implementation of a web application that will be deployed in a dryport located in FVG region and will then be open to other dry ports and MTOs in the Programme area willing to upload their data.

The system will serve as a Decision Support System for key logistics stakeholders (carriers, logistic providers, transport operators and authorities) enabling them to optimize freight transport and interchange processes by finding the best solutions for transport services combining different parameters like prices, CO2 emissions, load factor and others. The system could also function as a module integration for the WMS and TMS that could add this new source of information in order to improve the planning process, including the intermodal solutions available.

The need for such a system in the broad context of inter and multi-modality can be found in the inefficiency of freight transports which is mainly due to the lack of real-time information between the actors and the subsequent lack of coordination. All these issues lead to high operational costs and complexity

Moreover, the current situation of Northern Italy logistic hubs and dry ports, shows a proliferation of stand-alone and proprietary ICT systems which are not integrated and, thus, cannot exchange useful and already available information between them and with external entities.

The aim of the pilot system is to improve the efficiency with which available data are currently managed by integrating them through specific algorithms and making them dynamically available as optimal real-time solutions in the complex space of freight transport problems (e.g. best price of combined transport, lower emissions of entire chain, e-procurement tools for maritime transport services, higher bi-directional load factor).

The deployment process of the pilot will imply the implementation of software components and will be mainly focused in developing and tuning a pool of specific algorithms for the solution of routing and scheduling problems. On the top of that, an expert system will support the user to the solution that suits him best.

3.3.1 Preliminary assessment

- Current situation analysis
 - CE1. Identification of pilot project candidates
 - CE3. Administrative processes analysis
 - CE3. Operation processes and information source analysis
 - CE1. IT infrastructure assessment
- Overall Design
 - CE1. Interview with operators and actors of the system
 - CE1. SWOT analysis
 - CE1. Pilot project requirements analysis
 - CE1. Overall software architecture definition
 - CE1. Hardware and software technologies selection
 - CE1. Overall resources and time planning
 - CE9. Overall budget definition

3.3.2 Pilot action “Intermodal Services Information System”

- Pilot planning
 - CE1. Use case definition
 - CE1. Component definitions
 - CE6. Data model definition
 - CE6. Test data gathering
 - CE8. Test environment setup
- Pilot implementation
 - CE6. Data model implementation
 - CE8. Detailed functions definition (with different granularity: activities, sequences)
 - CE8. Unit tests definition
 - CE8. Functions implementation
 - CE8. Tests execution
 - CE8. System parameters tuning
 - CE8. Deployment process definition

3.3.3 Post – project activities

- Promotion, dissemination, and consultation
 - CE11. Publications on sector reviews
 - CE11. Web site publication and placement
 - CE11. Newsletter and social network dissemination
 - CE11. Participation in relevant events
 - CE11. Direct contacts

3.3.4 System Exploitation and Maintenance

- System exploitation planning and execution
 - CE4. Internal resources allocation and training
 - CE9. Budget allocation
- System maintenance planning an execution
 - CE4. Assistance and IT teams definition
 - CE8. IT technologies/system update policy
 - CE5. Helpdesk and maintenance procedures definition
 - CE9. Budget allocation

3.4 PCS Automation V2 roadmap

The current situation of Mid-Adriatic ports on the Italian side is characterized by a general lack of large-scale PCS, mainly due to small infrastructure dimensions and traffic flows. For these reasons, and for the general lack of information, transport operators have high operational costs and complexity due to the activities connected with the management of intermodal shipments. At the same time, the decision-making process when setting a specific route for a service could be affected by the personal opinion of the operator, not supported by actual numbers. Inefficient routing processes could lead to unsustainable and wrong choices.

The creation of an automated Deliveries Planning system can prevent these issues, guiding the operator throughout the decision-making process, showing the various alternatives for an intermodal service, allowing to book in advance the service needed, simplifying the procedures

for Custom Declarations and the processing of Dangerous Goods. At the same time, the system would allow a track and trace system to guide the whole service, reprocessing ETD considering traffic and weather conditions.

In order for the system to work, Polo Inoltra considers essential the participation of all the actors of the supply chain to the system. Ports, Transport Operators, Terminal, MTOs, Shipping Companies and Shippers. The more actors do take part in the system creation, the better the information would be. Also, in order to fully make use of the system potential, it is necessary to have updated and real-time information from the various actors of the chain, making it essential in the mid to long run to connect the ERP Systems of the operators to the main system.

Due to the various nature, dimension and some times the absence of PCS in port communities, Polo Inoltra has decided to create an independent module, that would be included in existing PCS, automatizing processes, or, for smaller ports which do not have a PCS in place, a stand-alone system that could still function without a PCS.

The Deliveries Planning system would need several routes, ports and transport operators in order to fully function. During the Pilot Phase, due to the current absence of RoRo routes in the central Adriatic, it will be lab-simulated the presence of multiple RoRo routes, starting from several ports of the Adriatic, in particular, the simulation will consider at least three different RoRo Services. These three services will have different time schedules, different booking procedures and availabilities. On the other hand, the system will consider actual intermodal rail-road connections to local Terminals. Actual Transport Operators and Shipping Companies will participate in the Pilot Test as operators needing to plan intermodal services, rail-road-sea or sea-road-sea one, from Italy to Croatia. They will access the Deliveries Planning platform, compare the different options available, book the chosen service, proceed with the operational organization of the service. Ports and Sea Liners will receive the information, integrating them into their system.

Once booked, it will also be considered in the Pilot the re-routing of service due to traffic or other issues. This process will happen based on real-time information. The system, once ended the journey, will also provide basic admin information and the CO2 saving certificate.

It is clear that in the Pilot Phase the system will be considered as an external module, while in the mid to long term it could be integrated with the existing systems of the Transport Operators

and Shipping Companies. By doing that, and fully advertising the potential of the platform, it will be possible for operators to join the system at a later stage, fully benefiting from the saving provided and starting a process of organizational change, once the automatization of processes will have given for granted and job roles would have been positively impacted by the system.

3.4.1 Preliminary assessment

- Current situation analysis
 - CE1 - Analysis of DigLogs Pilot Project Requirements
 - CE1 - Analysis of the current technology available for Ports, Terminals, Transport Operators, MTOs and Shipping Companies
 - CE8 - Analysis of Pilot Requirements in terms of IT capabilities
 - CE6 - Analysis of Pilot Requirements in terms of information
 - CE1 - Identification of Pilot candidates
 - CE8 - Study of the current IT systems available for the pilot candidates
 - CE3 - Study of the organizational model in place for pilot candidates
 - CE4 - Study of the Employees capabilities of the pilot candidates
 - CE5 - Study of the Processes and Procedures of the pilot candidates
- Overall Design
 - CE1 - SWOT analysis
 - CE1 - Workshop with the pilot actors
 - CE1 - Selection of the Technologies to be applied
 - CE1 - Overall Planning
 - CE1 - Feedback from stakeholders
 - CE1 - Required resources mapping (staff/time/quality)
 - CE9 - Overall Budget definition

3.4.2 Pilot action

- Pilot planning
 - CE2 - Identification of the Pilot Areas of Action (Operational and Geographical)
 - CE1 - Identification of actual sea and rail routes available in the areas of action

- CE1 - Definition of the lab-based integrations to enrich the system while on Pilot Phase
- CE8 - Definition of the stakeholders IT systems in detail with areas of integration
- CE4 - Definition of the staff of the Pilot Actors that will be nominated for the use of the system
- CE5 - Definition of the Processes and Procedures of the Pilot Actors in order to use the system
- Pilot implementation
 - CE2 - Definition of the Test Scenario
 - CE6 - Check the variables and data for the IT real-time update
 - CE5 - Testing of re-routing processes
 - CE8 - Check the real-time information flow
 - CE4 - Check the impact on staff response to the routing options and track&trace information
 - CE8 - Check errors of the system connected to PCS integration with other systems

3.4.3 Post-project activities

- Pilot Review
 - CE3 Evaluate Organisational Changes the System would bring on a wider scale on organizations, considering the savings that could be brought
 - CE4 Define the impact of the system on jobs roles and the productivity increase
 - CE5 Define the impact of the system on processes and procedures
 - CE6 Define the information integration needed to increase the performance of the system
 - CE8 Define the IT infrastructure needed to perform a complete system integration across the supply chain to make the system more effective
- Promotion, dissemination, and consultation
 - CE11 Definition of a promotion campaign and promotional channels to be used
 - CE11 Definition of the dissemination material
 - CE11 Dissemination of the pilot results
 - CE11 Pilot actors testimonial
 - CE11 Social networks dissemination
 - CE11 Digital newsletters publishment
 - CE11 Relevant Events participation

- CE11 Direct contact with relevant stakeholders

3.4.4 System Exploitation and Maintenance

- System exploitation planning and execution
 - CE2 System Services Map Definition
 - CE3 Organisational Model definition and integration
 - CE4 Staff identification
 - CE5 Processes definition
 - CE6 Stabilizing information flow
 - CE7 Needed equipment acquisition
 - CE8 IT Integration with PCS and other stakeholders' systems
 - CE9 Financial Planning
 - CE11 Marketing Plan for the System Services
- System maintenance planning and execution
 - CE4 Definition of the assistance team
 - CE5 Assistance/maintenance procedures definition
 - CE7 Acquisition of the material/infrastructures required for assistance
 - CE8 System update definition
 - CE9 Budget allocation

3.5 Management solution for passengers and freight transport combination V2 roadmap

Reference selected innovation: Management solution for passengers and freight transport combination – Rovinj Port Authority.

The greater part of the port area of the Rovinj Port Authority is intended for passenger traffic and mooring of nautical boats, passenger and excursion boats, yachts, and cruisers, but one part of their operation also pertains to fishing boats and transshipment of fish, which represent freight transport. Regarding this, improving the operations of the Rovinj Port Authority and introducing IT innovation can be considered as a combined pilot activity.

The operation and functioning of the Port Authority are very complex, especially given the need to communicate with a large number of stakeholders. It needs to be balanced between the

administrative requirements of the state on the one hand and the private interest of the users on the other. The function of the Port Authority is to manage the port area in such a way that it optimizes the operation of all processes and always strives to maximize commercial results. Of course, taking into consideration the business conditions prescribed by the state government and which all port users must satisfy and fulfil.

In that sense, the Port Authority must strive to improve all processes in order to provide users with the best conditions. This especially concerns functioning and administrative operation. First and foremost, whether concerning the fishing boats (freight) or cruisers/yachts/nautical boats (passengers), their users require information from the Port Authority about the availability of berths, the possibility of booking berths and, later on, information regarding the water and electricity supply. This operational information must be accurate and prompt, as well as approved in the National Single Window System (CIMIS). Furthermore, in administrative terms, the usage of berths should be formalized by signing a contract and issuing an invoice that must be accurate and transparent. This is just one segment of interaction and communication between the users, the State Administration (NSW - CIMIS), and the Port Authority. Unfortunately, it currently includes several separate and unrelated applications. This results in unnecessary piling up of documents, the longer procedure duration, and, consequently, reduced efficiency of the port and economic competitiveness of the users.

Rovinj Port Authority will implement an application that integrates the operational and accounting system of the Port Authority's operations and it will serve as PCS. The application enables mooring reservation system, graphic mooring occupancy management, billing via mobile application, creating daily, monthly and annual reports, generating mooring contracts, automatic invoicing, CRM-Integrated Email System, accounting, paying invoices and automated importing of bank statements.

Rovinj Port Authority currently uses several different unrelated software systems that make it difficult to operate and monitor all business processes. The implementation of a system that integrates all aspects of the Port Authority's operations will enable optimal control over the operations of the Port Authority in all port areas it manages, and at the same time, enable the control of the mooring capacity occupancy. The application enables better integration of the operational part of business and management. Additionally, it solves the problem of duplicate data entry and possible errors that occur during the input, facilitates access to the data since all

the data is digitized and in one place, the software is also available through the mobile application, statistical reports on traffic in the port are generated, significantly reduces the paperwork, radically speeding up processes, digitizing business and enabling better financial control.

The application's output documents are a prerequisite for future automation of the communication process with NSW, which is not technically possible at this time. As soon as NSW - CIMIS enables electronic data to be automatically entered and accepted from an external application/source, this system will be ready to establish M2M dialogue.

3.5.1 Preliminary assessment

- Current situation analysis
 - CE1. Analysis of DigLogs AF pilot project requirements
 - CE1. Identification of resident technologies
 - CE1. Analysis of fit of the pilot project with IT and project portfolio
 - CE1. Outline of pilot project candidates
 - CE1. Enumeration of pilot project candidates
 - CE1. Selection of the viable pilot project
 - CE1. Listing of initial project considerations

- Overall Design
 - CE1. Workshops with stakeholders
 - CE8. Select technologies for application
 - CE1. SWOT analyses
 - CE1. Overall planning
 - CE1. Feedback from stakeholders
 - CE4. Definition of required resources (time/personnel/quality requirements)
 - CE9. Overall budget planning

3.5.2 Pilot action

- Pilot planning
 - CE1. Definition of pilot action targets

- CE8. Definition of pilot installation requirements
- CE3. Analysis of all operation processes
- CE3. Analysis of all administrative processes
- Pilot implementation
 - CE8. Procurement and installing of equipment
 - CE8. Modification of the application to the needs of the Port Authority
 - CE5. Definition of the internal test scenarios
 - CE5. Identification of the test scenarios
 - CE3. Define development/testing team
 - CE4. Training of employers
 - CE4. Training of stakeholders

3.5.3 Post-project activities

- Promotion, dissemination and consultation
 - CE11. Definition of a promotion campaign
 - CE11. Decision on the dissemination of project visibility materials
 - CE11. Dissemination of pilot results (publications, conferences, events)
 - CE11. Creation of digital newsletters
 - CE11. Web information placement
 - CE11. Social networks pilot project reach
 - CE11. Direct contact with stakeholders
 - CE10. Exploration of venues to reach end-users (passengers and freight)
 - CE11. Decision of expositions participation

3.5.4 Commencing with operative system exploitation and maintenance

- Exploitation and maintenance planning
 - CE5. Assistance/maintenance procedures definition
 - CE8 System update definition
 - CE3. Definition of the assistance team
 - CE9. Budget allocation
- Exploitation and maintenance execution
 - CE8. Acquisition of the material/infrastructures required for assistance

- CE3. Internal resources reallocation
- CE4. Internal resources training
- CE8. Corrective maintenance deployment

3.6 Big Data / Data management solution for planning V2 roadmap

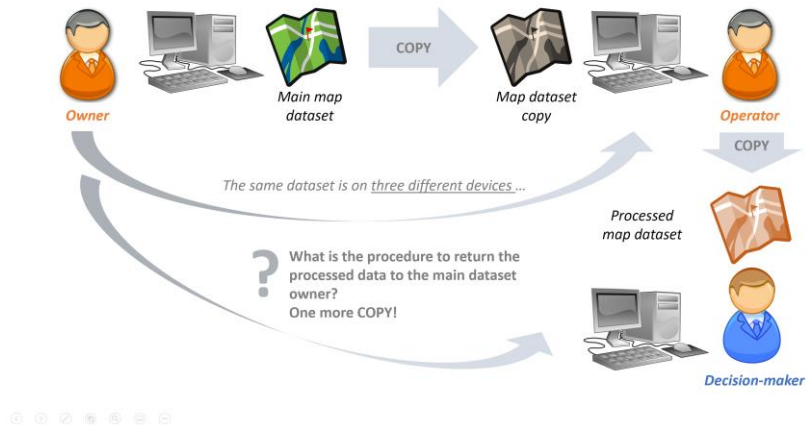
The pilot action is to be implemented in the context of the North Adriatic Sea Port Authority and it regards the adoption of a centralized and interoperable spatial data repository aimed at giving a robust structure to the information and data used within the internal processes and to provide services to external operators and institutions.

The pilot belongs to the innovation named “Maritime Big Data / Data management” aimed at obtaining the best results from integrating different data sources in terms of added value in knowledge and management capability.

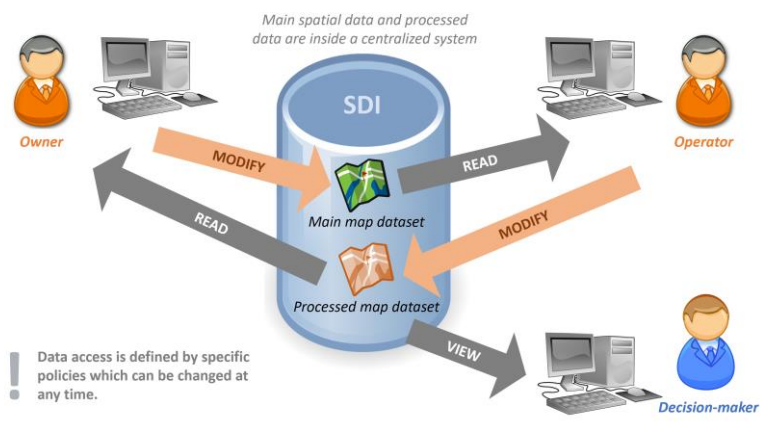
Within the broader context of the innovation, the narrower objective of the pilot action is to enable an integrated management and utilization of standard data, real time data and georeferenced (spatial) data both to support decision making processes and improve Port Authority services overall quality.

The pilot action is mainly aimed at making a transition from a current situation in which data is ineffectively managed and used to an improved condition in which more different data can be integrated and dynamically accessed by several users according to different policies and objectives without replication and corruption.

In the current situation of the Port Authority, the decision-making support based on the use of spatial data is provided copying several times the main datasets and the processed datasets, due to the utilization of different storage systems and processing techniques within the same organizational context. This makes difficult both to keep dataset up-to-date and share it in an effective way, and it significantly reduces processes performance.



Port Authority data management process current situation



Port Authority data management improved situation

For the innovation deployment, a Spatial Data Infrastructure will be implemented integrating existing tools and platforms. It will perform both the storage and dynamic processing functions, making different users able to directly access data and processing results and visualization according to a special policy management protocol. This Spatial Data Management System will

allow to store the processed data and maps either as new datasets or as algorithms that process data in real time, without forcing operators to change the already known working tools.

The suggested activities don't need any software development, therefore the pilot action will have a "training-empowered" approach in order to achieve both an organizational improvement and a workforce skill improvement, fostering the awareness on how spatial data visualization and dynamic data processing can support decision-making process.

3.6.1 Preliminary assessment

- Current situation analysis
 - CE1. Organizational assessment
 - CE1. Data source assessment
 - CE1. IT infrastructure assessment
- Overall design
 - CE1. Long-term targets definition
 - CE1. Pilot objectives
 - CE1. Stakeholders consultation
 - CE1. Pilot objectives review
 - CE9. Overall time and resources plan

3.6.2 Pilot action "Spatial Data Management System" (year 1)

- Pilot planning
 - CE1. Target definition
 - CE1. User needs analysis
 - CE1. Involved processes and services analysis
 - CE6. Spatial data set to be used for the pilot implementation
 - CE8. Hardware/Software prerequisites definition
 - CE2. Definition of data-driven processes to be included in the pilot
 - CE4. Training and educational program
- Process and services optimization
 - CE2. Definition of processes and services to be re-designed
 - CE2. Identification of spatial-data-driven support to processes and services

- CE4. Workshop with involved users / first educational programme
- CE2. Process / service re-design
- CE2. Performance assessment and evaluation
- CE2. Final review
- Spatial datasets acquisition
 - CE6. Definition of the spatial data packages for the pilot test
 - CE6. Data acquisition
 - CE6. Optimization and pre-processing training on the job
- Spatial Data Infrastructure implementation
 - CE8. Data model design
 - CE8. Performance requirements analysis
 - CE8. IT infrastructure implementation (HW/SW)
 - CE8. Network configuration
- Data migration
 - CE4. Workshop with involved users
 - CE5. Spatial data conversion and migration training on the job
- Procedures implementation
 - CE1. Objectives analysis
 - CE5. Procedures development training on the job
 - CE5. Information design and delivery workshop
 - CE5. Decision support effectiveness assessment and review workshop
- Dissemination
 - CE11. Publications, conferences, events
 - CE11. Websites, newsletter, social media
 - CE11. Stage 2 promotion
- Found raising
 - CE9. Scouting workshop for founding opportunities to implement stage 2

3.6.3 Stage 2: implementation of real-time data and whole department core dataset (year 2)

- Stage planning
 - CE1. Involved processes and services analysis
 - CE6. Spatial data set to be migrated

- CE6. Real-time data to be integrated
- CE2. Definition of data-driven processes to be improved
- Processes and services optimization
 - CE2. Definition of processes and services to be re-designed
 - CE2. Identification of spatial-data-driven support to processes and services
 - CE2. Process / service re-design
 - CE2. Performance assessment and review
- Spatial datasets acquisition
 - CE6. Definition of the spatial data packages to be migrated
 - CE6. Definition of real-time data protocols to be implemented
 - CE6. Data acquisition/integration
 - CE6. Optimization and pre-processing
- Data migration
 - CE5. Spatial data conversion and migration training on the job
 - CE5. Real-time data sources connection training on the job
- Procedures implementation
 - CE1. Objectives analysis
 - CE5. Procedures development
 - CE5. Information design and delivery
 - CE5. Decision support effectiveness assessment and review
- Metadata system implementation
 - CE9: Make-or-buy analysis
 - CE8: System design
 - CE8: System implementation
 - CE4: Training-on-the-job
- Dissemination
 - CE11. Stage 3 promotion

3.6.4 Stage 3: inter-department implementation (year 3)

- Stage planning
 - CE1. Target and inter-department strategy definition
 - CE1. Involved processes and services analysis
 - CE6. Spatial data set to be migrated

- CE2. Definition of data-driven inter-department processes to be improved
- CE4. Inter-department training and educational program
- Processes and services optimization
 - CE2. Definition of inter-department processes and services to be re-designed
 - CE2. Identification of spatial-data-driven support to processes and services
 - CE2. Process / service re-design workshop
 - CE2. Performance assessment and evaluation
 - CE2. Final review
- Spatial datasets acquisition
 - CE6. Definition of the spatial data packages for inter-department support
 - CE6. Data acquisition
 - CE6. Optimization and pre-processing training on the job
- Data migration
 - CE4. Workshop with involved users
 - CE5. Spatial data conversion and migration training on the job
- Procedures implementation
 - CE1. Objectives analysis
 - CE5. Inter-department procedures development training on the job
 - CE5. Information design and delivery workshop
 - CE5. Decision support effectiveness assessment workshop
 - CE5. Procedures review
- Dissemination
 - CE11: Stage 4 promotion

3.6.5 Stage 4: interoperability protocols deployment for external actors' cooperation (years 4-5)

- Stage planning
 - CE1. Target definition
 - CE1. Actors analysis and stakeholder's involvement and consultation
 - CE1. Stakeholders needs analysis
 - CE1. Involved processes and services analysis
 - CE6. Related spatial data set to be integrated

- CE5. Needed interoperability protocols identification
- CE8. Hardware/Software prerequisites definition
- CE2. Definition of data-driven processes to be improved
- CE4. Definition of training modalities and programme
- Process and services optimization
 - CE4. Workshop with stakeholders
 - CE2. Identification of spatial-data-driven support to processes and services
 - CE2. Process / service re-design workshop
 - CE2. Performance assessment, evaluation and review workshop
- Spatial datasets acquisition
 - CE6. Definition of the spatial data packages to support selected processes
 - CE6. Data acquisition
 - CE6. Optimization and pre-processing workshop
- Spatial Data Infrastructure improvement and adaptation
 - CE8. Data model review
 - CE8. Performance requirements test and assessment
 - CE8. IT infrastructure implementation (HW/SW/Network)
- Data migration
 - CE5. Spatial data conversion and migration workshop
- Procedures implementation
 - CE1. Objectives analysis
 - CE5. Procedures development workshop
 - CE5. Information design and delivery workshop
 - CE5. Decision support effectiveness assessment and procedures review workshop
- Educational program for executives and decision-makers
 - CE4. Spatial-data-driven management and processing workshop
 - CE4. Spatial-data-driven decision-making workshop
- Dissemination
 - CE11. Publications, conferences, events, web and social media