STRATEGY FOR FOSTERING COORDINATED MULTIMODAL FREIGHT TRANSPORT THROUGHT ICT SYSTEMS – KOPER

DELIVERABLE D.T1.3.6 **Version 1**

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1. Introduction

Within the COMODALCE project, outputs of the WPT1 include a “Strategy for fostering coordinated multimodal freight transport through ICT systems” (D.T1.3.2-10)”, described as “strategy for fostering multimodal transport through ICT systems setting a vision, objectives and priorities in a mid- to long-term perspective, including a detailed wish list of measures to be tested in the pilot action”.

This document includes the strategy elaborated for the node of Koper, including the contributions of PP05-Luka Koper and PP06-Adria Kombi which were merged in one single document.

From many years, but especially in the last decade, the maritime freight flows represent the most important segment of international trade in the world, being the engine of the economies and of the multimodal transport in logistics. At this regard, ports represent an essential link between the connection of industrial, transport and commercial hubs. Ports are strategic points, as they play an important role in relations between countries, as well as interconnections of different cultures and logistical hubs between land and maritime transport. In recent years, ports in the southern part of the Central European region have greatly intensified connections with the Far East, as they represent an important window in the centre of Europe for both export and import of all kinds of goods. What is more, China is currently opening up to the world with its "One Belt, One Road" initiative, and is looking for foreign markets that will boost the economy in addition to domestic consumption.

European countries are resolving relations with economic powers from other continents through a variety of common cooperation platforms, backed also by strong bilateral cooperation. The OECD predicts balanced growth by 2025, with just under 1.5 percent of annual GDP growth per capita, and a slow increase in growth to just over 1.5 percent annually in 2030. Many of major international advisory and audit networks predict that the global economy will grow by about 130 % between 2016 and 2050 when China and India are expected to take over the global economy. Added to this analysis is HSBC's forecast that China will economically be the fastest in growth by 2030.

With such assumptions, we can concretely take the potential of the Central European region as being in growth and with a very good starting point in the face of new infrastructural and operational challenges for all countries in the region, extending their relationships and improving infrastructures to keep up with the times and the growing volumes of freights, both for import and export purposes.

Inevitably, from an economic and geopolitical point of view, the southern CENTRAL EUROPEAN ports are increasingly representing an alternative to the ports of Northern Europe, for reaching the markets of central and southeast Europe. In line with the increase in the volumes of goods coming by sea, even the technologies for faster and operationally lean handling require an update of existing ICT technologies.

The digitization of the operations accompanying the goods, the databases to be constantly available to the stakeholders included in the logistics chain, the real-time updates on the status of the goods, the information obtained in advance regarding the goods to be handled, are just some of the interventions that modern Logistics requires to keep ports or logistic centres in step with the times and at the forefront worldwide.

Furthermore, the CENTRAL EUROPE region is crossed by several corridors that are part of the TEN-T network of the European Union and, even more so, they must be considered of primary importance, when it comes to the development of the transport network, both at the level of infrastructure and at the technological / digital level.

For what regards the COMODALCE project, it is going to take advantage from the analysis, elaborations, studies and pilot actions that are going to be developed through the next two years, with contributions related to activities T1.2.7, T1.3.1, T2 and all the pilot actions included under the activity I2. They will serve as starting point for the definition of strategies at national and regional level, as well as for future development plans in the Central European region.

The contribution to the success of project's activities provided by the project partners is going to be huge and all the efforts will be spent to analyse the current situation at regional level and for the definition of lacks, needs and proper solutions to be developed in line with the current infrastructural, geographical and political situation in the countries concerned by the Action. The researches and solutions that are going to be made at local level will allow the development of tools that will serve for the consideration and definition of proper solutions at larger scale, at regional level, to demonstrate how operative improvements and processes' digitization can speed up the operation also on the whole logistic chain.

Infrastructural lacks or shortages due to geomorphological constraints cannot be resolved through solutions developed for single/ specific/ local areas and with small financial contributions. That's why the different types of contributions are going to be provided by all the partners in different forms (studies, questionnaires, pilots etc.), to follow the global aim of the project, which is the development of digitalized solutions for data sharing on the logistic chain, the reduction of lacks at operational level through the development of ICT tools that will speed up local procedures and will contribute to the better link between the ports and the hinterland as well as the improvement of the multimodal transport and the intermodal connections between countries in the Central European region.

2. Aim of document

One of the COMODALCE final goals is to promote the development of ICT tools at Central European level in order to improve transport links between ports and hinterland logistic centres, as well as multimodality in the region. Results should be transferred from locally developed scenarios, for specific ports, to national levels first and regional level (CE) in the last phase.

The process to be followed for the improvement of the tools developed initially at local level, foresees the adoption of similar or compatible solutions that would be linked between each other allowing the interchange of data for all the actors involved in the logistic process. For this reason, the development of the ICT tool and equipment in the port of Koper will be developed by testing it on Adria Kombi's trains.

The port of Koper is a multipurpose port. It operates through 12 different terminals, which are all linked through the PCS provided and maintained by external experts. The analysis made in last decade shows how the cargo groups leading port's development are cars and containers. The strong link with neighbouring countries in Central Europe, allows the port to have quick responses and deliveries for all the types of goods but the accent is put on cars and containers, which are constantly increasing their volumes in the port. The development of ICT solutions through project pilots in the Port of Koper will focus on the containers' transport by train, which represents an important indicator for the growths of throughputs and trends. In fact, cars and containers are representing the flywheel of the huge investments planned in infrastructures in the port. These investments must be accompanied by proper systems and equipment on which COMDALCE activities focused their attention.

The Port of Koper has prepared through the last decade many analyses of existing IT equipment in the port and worked on the development of ICT tools for the upgrade of operative systems and for the streamlining of the administrative procedures at gates and at the terminals, mainly to serve the container and the car terminal, which are increasing the volumes more than other terminals.

In the specific of COMODALCE, the intention is to develop an OCR scanning system for the railway transport at the container terminal, for which implementation is expected to be completed in Spring 2021. Containerization around the world increased the percentage of goods transported in containers, increasing the trust in such a storage methodology. The impact of this was also felt by Luka Koper, which in the last 5 years increased the number of transhipped TEUs by 65%. Increased number of basic operations requires a growing standardization of business processes and an unambiguous delimitation of the responsibilities of individual stakeholders. The logistic chain itself is based on a fast and accurate data exchange, which enables the company to manage operational processes more efficiently, which consequently means faster transit of goods through the port area. In this respect, the inclusion of an OCR system at container terminal's gate would help speeding up operational procedures, would feed a digital database for the registration of incoming and outgoing containers at container terminal, which will help also the disputes related to containers' damages, weights and loading on wagons.

Going into details, the development will focus on two portals for a double-track OCR system for the automatization of the registration of containers and wagons at terminal's gate. After this first intervention, the focus will be on the building of portals and iron construction for the equipment that is going to be installed. The second intervention will be vaster and will include the connection of the terminal with the other actors working on the logistic chain – Adria Kombi will contribute with their block-trains and containers transported by their wagons to/from the port of Koper. At the end, it will be tested for the upgrade for the link with the whole port's system. There are going to be implemented some functionalities included in the system, developed for the port, but not co-financed by COMODALCE, with upgrades touching the following systems:

- TINO - Marketing and Operations: it is the key operating system of Luka Koper d.d., linked with the EDIFACT International standard. It includes planning of works, planning of berthing, calculating costs, orders' viewing etc.;

- DEPO: it's an entry point module for the container terminal that enables direct communication of shipowners with TOS - Terminal operating system - at the Container Terminal using the EDIFACT international standard. The system is connected both to the TINO system and to the TOS system Tideworks,
- TOS Tideworks: is a specialized container terminal management system that is connected both to the TINO system and to the EDIFACT Center system. It allows to plan the containers' positioning at the yards, to define cargo plans, to check the availability of containers, machinery and equipment for the fastest operational solutions at the container terminal etc.

Next steps foreseen are the integration of the systems with the opening of the new gates in Sermin and Bertoki at the end of 2020. The experience and know-how obtained through the COMODALCE project and the installation of the OCR scanning system at the container terminal, will help the port to optimize such an equipment for next installations at port's gates, both for railways and trucks' transport of containers and in the future also for the transport of goods through different types of storage.

We can find of course a link between the described activity and the needs at regional level, because with these upgrades, the port's system will allow quicker detection of containers' and wagons' serial numbers and the loading lists of goods transported, with digitalization of procedures, which will reduce administrative timeframes per train both at the gates and at the container terminal. It will also meet some of the demands of the stakeholders working with Luka Koper on a daily basis and of course also some national entities like Customs Administration and other inspection entities, considering that the operations are being performed in the port as a free zone.

In addition, at a higher level and after the end of the project, the solutions will be comparable for further implementations at regional level for other users, and of course, will have the possibility to be integrated with other equipment like cameras and detectors at the main gate or on cranes at the terminal, which will allow better control on goods transport as well as at security level, for a double check before the goods enter/leave the port's area.

It will open the possibilities to different scenarios for short or medium-term and for long-term periods. The possible developments in this sense can be described as follows:

- In the **short-medium period**: the assessment design should address solutions and consultations between internal operators and with stakeholders directly involved in the process of containers' railway transport, regarding the selection of ICT tools to be adopted at COMODALCE level, including: type of stakeholder involvement, selection of indicators, data collection requirements and the elaboration of the financial consequences with eventual socio-economic and environmental impact assessment, which should lead to the preparation of a SWOT analysis. In this respect, the technical identification of equipment to be provided, results to be obtained, operative issue to be solved and financial implications for the port will be fundamental, for a successful execution of the pilot activity.

  The solutions provided at project level will be tested in limited areas (entrance of the container terminal) and for specific types of transports (containers on wagons/railway). The introduction of new tools for users requires more time to be implemented at regional or national level because all the solutions must be tested through a certain period and they must show the related lacks during a certain period. What can be useful at this step, in a short-medium period, is the planning of possible scenarios and the foreseen issues and mitigation activities in order to reduce the loss of time while facing potential problems.

- In the **long period**: the current operational situation, will be developed based on the concrete activities implemented through the framework of the COMODALCE project and its pilot in the port of Koper. It aims at identifying clear steps for supporting the long-term impacts of ICT applications in Central Europe even beyond the project closure.

Nevertheless, the strategy's concrete implementation and monitoring depends on the uptake of the COMODALCE results and recommendations not only by the partners (project partners and associated partners) and the project's cooperation network, but also by the EU, the national ministries of transport from the Central European region and by the frameworks of the ICT transnational toolbox.

In particular, considering the key role played by the ICT toolbox regarding the governance of the transport policies in the CE area, an active consideration of this toolbox in the process of monitoring and implementing the COMODALCE results would be recommendable. CE could benefit from the solutions adopted in COMODALCE to see the replicability of the obtained results in the wider area of Central Europe (out of the local areas where the COMODALCE piloting activities are going to be implemented).

3. Methodology

3.1. Setting vision, mission, key values

The following table includes the so-called definition of vision statement, which is focused on the statement expected in the future and sets some targets that Luka Koper is going to achieve in the near future. The vision is followed by the "mission" statement which focuses on today's activities and expected challenges to be faced in order to achieve the results targeted in the future. In the end, there are the key values providing the vision of the strategic framework for the planned measures.

VISION **(Vision statement focuses on tomorrow and set the target aims to be achieved)**
The work that is expected in next years will be more and more oriented on the IT businesses and data transfer in real time. The logistics will not differ from other businesses in the world and if any logistic operator aims to become successful in its job, the investments in IT cannot be avoided. Digitization of procedures, automatic scanning and recognition of registration numbers or faces, enormous databases, security firewalls for the business information are only few of the interventions that are going to be operated in logistic hubs, in order to keep the business flows alive. The unification of operating systems and communication tools for the just-in-time sharing of information related to the transported freights, between the operators is something that is becoming real in bigger centres and that needs to be realized all over Europe. One of the solutions chosen by the port of Koper to speed up administrative and operative activities is the installation of an OCR system to the gate of the container terminal. Being the transport of containers one of the fields with the highest rate of growth in the last decade, the implementation at ICT level has been focused on this type of transport. The target for the port of Koper was already defined in the Port's Development Plans until 2025, when the completion of the second railway track to the port of Koper is panned to be completed. In that case, the target in terms of volumes is about 2MLN of TEUs to be handled through the port of Koper. With the OCR system, the operations will become faster and the digitization of data stored and transferred will help the automation of procedures for the transport by train. The pilot activities will help in achieving the target, which will be focused also on the improvement of the link between the port of Koper and the railway operators, by unifying the communication systems and using digital data for the administrative as well as for the traceability point of view.
MISSION **(Mission statement focuses on today, what challenges shall we face towards the vision today)**
Today the challenges are represented mostly by the digitization of operations and information. By scanning the containers and wagons through the OCR system, the port of Koper will save time on operational processes, will improve data accuracy, will have immediate overview of the status of the freight, will have a big database for analytics, will have ad-hoc solutions but with the aim to introduce or develop existing system to an alignment of interfaces and tools between countries all over EU. Challenges that actually the port of Koper has to face are not only operational or limited to the port's

area, but they depend also by national strategies and spatial plans. The port's development plan foresees, as said above, that in the next few years the container terminal will reach the impressive 2MLN of TEUs which are not going to be handled if the second track from Koper to Divača will not be completed until 2025 – as planned. The infrastructure of the hinterland is also fundamental for the development of the port and considering actual logistic limitations, what can be done by the port is to improve its operative processes and ICT tools, in order to have an optimization of the work and of the employees on the field as well as in the offices or on machinery.

The most important operative challenges are strictly linked with the digitization of documentation and of procedures accompanying the freights coming/leaving the port. By upgrading ICT tools and introducing a scanning system for the automatic recognition of registration numbers or damages on containers, it would speed up the gate's procedures: considering that in 2020 the port of Koper is going to open two new gates, it will be fundamental to align all the information from three gates to a unique database not only for port's employees but for all the actors on the logistic chain (forwarders, railway operators, customs, transporters etc.).

KEY VALUES
(The principles and values that are the basis of the vision of the strategy)

The basic principles defined in order to reach the vision strategy are all dictated by the development plans of the port in the next decade and more. What is fundamental at this regard, is the reduction of waiting times and improvement of digitization of processes. They're very few but really important if the goals want to be achieved:

- To maintain the level of services for the customers;
- To improve digitization of the transfer of information on the whole logistic chain;
- To obtain an even higher level of safety and security in the port and especially at container terminal, where the volumes are constantly growing. The aim is to move the labours from the field to other safer areas and avoid accidents;
- To specialize some types of employees in order to make the service in a better way;
- To limit the damages at the terminal or reduce the disputes about the status of containers and wagons arriving/leaving the port (potential damages will be detected by scanners and not left to human checks in different weather conditions.

3.2. Setting strategic goals

The strategic goals that Luka Koper, d.d. wants to achieve in the domain of ICT tools for fostering multimodal transport in the medium (5 years) and long term (10 years) are indicate below.

Medium term (5 years):

1. Goal no. 1: digitization of processes at container terminal
2. Goal no. 2: better planning of yards' positions and machinery handling containers
3. Goal no. 3: improve storage areas and number of gates in order to increase the capacities, being able to achieve the expected volumes of cargo.

Long term (10 years):

1. Goal no. 4: automation of processes at container terminal and port's gates;
2. Goal no. 5: unification of systems (port's and other collaborators on the logistic chain);
3. Goal no. 6: favour the fast movement of cargo to the hinterland, reduce the time that cargo stays in the port.

For each goal, please fill in the following table

Perspectives	Goal	Measurement
1. Environmental and safety perspective	From the environmental point of view, what can be done now is the unification of clearance procedures in order to reduce the waiting times and the pollution caused by waiting vehicles out and in the port.	The progress can be measured through the sensors for pollution installed all around the port, by the analysis of waiting times and reasons for these waiting.
2. Internal processes perspectives	With the installation of an OCR system, the procedures can be speeded up just by recording the videos of the arrival/departure of wagons and containers. It will be recorded and will show clearly the status of the incoming/leaving wagon.	The efficiency can be measured through the number of trains handled per day or per month, which can be considerable higher, after the installation of the OCR system, which offers also an accurate view of the incoming wagons and containers.
3. Innovation and growth perspective	One of the goals in the port of Koper is the progressive digitization of all the procedures in the port. By installing the OCR system it will be a further step towards the digital data transfer and collection, for a future automation of processes in the port.	The progress is measurable again through the number of completed trains per day or per month, while comparing it before and after the installation of the OCR system.
4. Customer / Partner perspective	The customers should be constantly informed about the progresses and the innovations provided in the port operations. If a new tool is available,	The progress can be measured simply by recording the number of customers using the new tools and being linked with the new service

	it should be presented to the partners during a specifically dedicated meeting, with instructions provided with the new tools or by offering the support of the experts, which will guide the customers through the new processes.	offered by the port.
5. Financial perspective	The innovations and new tools adopted for the achievements of the defined goals can represent a revenue in terms of time gained, operative faster procedures, reduction of employees working on the field for the registration of wagons and containers, safer work and less damages and accidents etc.	The progress is measurable through the financial achievements in terms of saved money or better through the profits made after the installation of the new tools and the introduction of the new system.

VISION:

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The unification of operating systems and communication tools for the just-in-time sharing of information related to the transported freights, between the operators is something that is becoming real in bigger centres and that needs to be realized all over Europe.

One of the solutions chosen by the port of Koper to speed up administrative and operative activities is the installation of an OCR system to the gate of the container terminal. Being the transport of containers one of the fields with the highest rate of growth in the last decade, the implementation at ICT level has been focused on this type of transport.

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3.3. Wish list of ICT measures

The local strategy for the port of Koper and its hinterland includes a "wish list of ICT measures to be tested in the pilot actions (WPT2)".

Accordingly, they're included in the wish list in the table here below:

Wish list of ICT measures			
Title	**Short description**	**Link to the strategic goal**	**Link to the pilot action**
1. Digitization	The introduction of OCR system will considerably change the operations at the container terminal, while a train with containers arrives/leaves the port. The scanning of wagons and containers will reduce the checking time and will optimize the port's resources. Last but not the least, it will make the checks safer because it will move the employee for the check, from the field to the office.	Goal no. 1 Digitization of processes at container terminal	It will represent one of the main testing fields of the pilot action
2. Unification of the database for all the logicians	Actually, most of the information about the cargo transported by train is transferred to the other actors on the logistic chain by e-mail or physically through paper documentation	Goal no. 5 unification of systems	Partially the solution is linked with the pilot action. Considering that the goal described here aims to include all the actors on the logistic chain the common system, the pilot action will include just the railway operators in the implementation of the system and further steps, following the vision described in previous paragraphs, will be made after the end of the project.
3. enlarge the capacity of the scanning systems to the whole port	The OCR installed through the COMODALCE project will serve just for the scanning of wagons' and containers' registration numbers and in 90% of cases for the detection of damages. In the near future, the larger	Goal no. 4 automation of processes at container terminal and port's gates	It's not part of the actual pilot activity but it represents a potential further implementation after the end of the project – maybe for a new project following the steps of COMODALCE.

	picture can also show the connection of the OCR system with the cranes and with the cameras at the entrances of the port, which would allow to check every movement and status of the specific type of freight (not only containerized).		