

**DT.2.2.1 – Technical studies on  
infrastructure/non-infrastructure works in  
the transport and logistics sector of the  
Adriatic-Ionian area**



**NEWBRAIN**



***PP10 –BEP***

## Document Control Sheet

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## EXECUTIVE SUMMARY

This deliverable is part of the WP2 (Task 2.2) of the NEWBRAIN project. Task 2.2 aim is each Project partner to implement overall or detailed technical studies (e.g. feasibility studies, technical design of non-infra/infrastructure works, environmental assessment studies, cost and benefit analysis on non-infra/infrastructural works) on one of the measures/interventions of the action plan (act T2.1) with the aim to concretely push forward the implementation of the TEN-T network in the Adriatic-Ionian Macro-region in line with environment-friendly and low-carbon requirements of the EU policies

To this end, the scope of this deliverable (Deliverable 2.2.1), which is submitted on behalf of PP10-BEP, is to present an overall technical study (with emphasis on platform technical design and cost-benefit analysis) of the TRANSBASE intervention that was selected as the most promising intervention to be developed in Tasks 2.1.1 and 1.2.4 respectively.

Initially a brief description of the TRANSBASE intervention is presented. The main objectives of TRANSBASE are described, followed by the actors and stakeholders that will use the proposed intervention. Furthermore, the impact that TRANSBASE will have in national and European level with emphasis on the Adriatic-Ionian area is presented.

Subsequently, the technical design and services of the proposed Logistics Community System (LCS) are described. More specifically, the TRANSBASE system development guidelines are presented followed by the proposed system architecture. In addition, the main services of the proposed LCS are presented together with a series of technical requirements that should be taken into consideration during system development.

Then a cost-benefit analysis (CBA) for the TRANSBASE Logistics Information System (LCS) is performed. We present the CBA methodology that is adopted for this analysis followed by the implementation of CBA for the proposed initiative. We calculate the Net Present Value (NPV) as well as the Internal Rate of Return (IRR) for 10 and 15 years respectively in order to evaluate the investment. We perform a sensitivity analysis with variable discount return rates in order to test the robustness of the CBA results. The results of the NPV calculations (for 10 years period) show that the investment is worth with a discount return rate of up to 1.5% (positive NPV). For the case of NPV calculations for 15 years period, the investment has a positive result with any discount return rate (between 0%-5%).

Last but not least, we selected 5 appropriate innovative tools that can be used in order to support the design and development of the TRANSBASE LCS, namely ERDF, H2020, EFSI, EIB and PPP. An analysis of their main characteristic is made in order to be able to understand what type of

projects they fund and how this is accomplished. Subsequently, we assess the aforementioned tools in order to identify the one that best suits to the TRANSBASE LCS. The multi-criteria analysis shows that the EFSI tool is the most suitable one followed by the EIB funding schemes.



# 1. INTRODUCTION

## 1.1 Improving intermodality of the Adriatic-Ionian area: the role of NEWBRAIN

According to EUSAIR Action Plan, intermodality goes beyond technical aspects and infrastructure. It includes organisational issues, meeting overall transport demand and seasonal/daily traffic peaks, spatial planning, life-styles, innovations, etc. Together with inland waterways, road and rail provide important international connections within the Region. Ports of the Adriatic and Ionian Seas, as well as railway lines and airports, are immediate entry points to the Region from abroad. An appropriate transport policy must take into account all these considerations, promoting multimodality, while also taking into account environmental aspects (e.g. air emission, etc.), economic growth and social development.

Concerning the development of the South East Mediterranean Motorway of the Sea Master plan, the latter is intended to concentrate flows of freight on sea-based logistical routes. This should improve existing maritime links or establish new viable, regular and frequent maritime links for transporting goods between participating countries so as to reduce road congestion and/or to improve access to peripheral regions or islands.

To this end, NEWBRAIN project aims at boosting the relevance of the Adriatic-Ionian core nodes system for the economic and social integration of the programme area, in the framework of the European transport policy and TEN-T network as key gates connecting Central and Western Europe with the South-East Europe and Mediterranean countries. The project addresses various infrastructural gaps and technological, procedural and organisational bottlenecks detected at local level and impacting on the smoothness of the regional transport system, by adopting a joint and transnational approach aimed at stimulating the coordinated development of physical and non-physical infrastructure and to enhance the capacity to launch feasible investments. The transnational cooperation of the 9 logistics and transports nodes project partners, key institutions for the planning of infrastructural investments in transport and logistic sectors of the Adriatic-Ionian macro-region area, is expected to unlock the potential for investments through the participation to EU funding schemes for the implementation of efficient, environment-friendly and low carbon transport systems, and to ensure active and long-term cooperation in different financing initiatives.

TRANSBASE is the intervention that is proposed by PP-10 (BEP) with the aim to concretely push forward the implementation of the TEN-T network in the Adriatic-Ionian Macro-region in line with environment-friendly and low-carbon requirements of the EU policies. TRANSBAE intervention

focuses on measures aimed at improving the intermodality of the Adriatic-Ionian area.

## 1.2 Scope and objectives of the deliverable

This deliverable is part of the WP2 (Task 2.2) of the project entitled NEWBRAIN. WP2 aims at boosting the investment capacity of project partners to speed up the upgrading of physical and non-physical infrastructure Adriatic-Ionian nodes through the design of technical, financial and environmental studies and the preparation of joint transnational initiatives, thus enhancing projects maturity. WP2 (T2) allows to go beyond the strategy adoption and to bridge the gap between transport and logistics projects planning (Action Plans), preparation (designs and technical studies) and implementation (financial schemes and funding opportunities) phases.

Task 2.2 aim is each Project partner to implement overall or detailed technical studies (e.g. feasibility studies, technical design of non-infra/infrastructure works, environmental assessment studies, cost and benefit analysis on non-infra/infrastructural works) on one of the measures/interventions of the action plan (act T2.1) with the aim to concretely push forward the implementation of the TEN-T network in the Adriatic-Ionian Macro-region in line with environment-friendly and low-carbon requirements of the EU policies. The studies focus on measures aimed at improving the intermodality of the Adriatic-Ionian area; moreover, they aim at verifying the feasibility of the activation of innovative financial tools (e.g. PPP, EIB, EFSI) to foster the private sector participation to the financing of infrastructural works. Act 2.2 contributes to enhance the technical, financial, economic maturity level of infrastructural projects in the Adriatic-Ionian area speeding up the realization of projects also through act 2.3 outputs

To this end, the scope of this deliverable (Deliverable 2.2.1) is to present an overall technical study (with emphasis on platform technical design and cost-benefit analysis) of the TRANSBASE intervention that was selected as the most promising intervention to be developed in Tasks 2.1.1 and 1.2.4 respectively.

The main objectives of this deliverable are as follows:

- Briefly present the TRANSBASE intervention (for more details please refer to Deliverable T1.2.4)
- Present the technical design and architecture of TRANSBASE platform
- Perform a cost benefit analysis (CBA) for the development and operation of the proposed platform
- Select the suitable financial tools that can be used in order to support the investment

### 1.3 Structure of the deliverable

The deliverable is structured as follows:

Chapter 1 is an introductory chapter that presents the scope and objectives of the deliverable showing also the link between EUSAIR Action Plan, NEWBRAIN project and TRANSBASE intervention that is proposed by PP-10 (BEP).

Chapter 2 presents a brief description of the TRANSBASE intervention. Initially the main objectives of TRANSBASE are presented, followed by the actors and stakeholders that will use the proposed intervention. Furthermore, this chapter presents the impact that TRANSBASE will have in national and European level with emphasis on the Adriatic-Ionian area.

Chapter 3 describes the technical design as well as the platform architecture of TRANSBASE. More specifically, the main functions of the proposed platform are presented followed by an indicative list of TRANSBASE services that will be provided to interested parties.

Chapter 4 presents the cost-benefit analysis (CBA) for the development of the proposed platform. Initially the CBA methodology is presented followed by implementation steps. Then, the CBA is used for the case of TRANSBASE in order to sum the benefits of such intervention and then subtract the costs associated with taking that action.

Chapter 5 focuses on the selection of innovative financial tools that can be used to support the TRANSBASE intervention. Initially such tools are presented and analysed. Subsequently, a selection of best suited tools for the case of TRANSBASE intervention is described.

Finally, Chapter 6 concludes this deliverable by making a summary of this report and by presenting the way forward to the project (i.e. tasks to follow).

## 2. BRIEF DESCRIPTION OF TRANSBASE intervention

### 2.1 Introduction

This chapter provides a brief description of the TRANSBASE intervention. Initially the main objectives of TRANSBASE are presented, followed by the actors and stakeholders that will use the proposed intervention. Furthermore, this chapter presents the impact that TRANSBASE will have in national and European level with emphasis on the Adriatic-Ionian area. It is also important to mention that this intervention is in-line with the EUSAIR strategy.

### 2.2 TRANSBASE objectives

The TRANSBASE project aims to develop a Logistics Community System (LCS), that will be based on the “Single Window” principle, namely a software platform that allows parties involved in trade and transport to lodge standardized information and documents with a single-entry point to fulfil all import, export, and transit-related regulatory requirements and allow a sound cooperation and communication between multiple transport nodes (e.g. ports, freight villages, etc.) with the local businesses (e.g. Chambers of Commerce and Industries). The project targets at improving the effectiveness of the procedures for the management and movement of freight in port areas and their transfer to hinterland (dry ports), through the design, development and testing of an innovative platform that will provide a toolkit with various services such as ship arrival and departure alert, customs clearance, logistics services, truck parking management, inland transportation and profiles of local businesses.

More specifically, the TRANSBASE project aims at:

- designing and developing an advanced Community System supporting smart, sustainable and integrated movement of goods within Adriatic Ionian countries,
- developing port and logistics services, guaranteeing functionality and integration and communication among ports of Adriatic Ionian area,
- building a successful model to promote a system of sustainable freight transport services to improve links between the Adriatic Ionian area,
- developing a common infrastructure to promote transport, information and communication services,
- assisting in the recognition of obstacles that hinder the implementation of appropriate approaches in proposing and assessing solutions,

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- promoting close and efficient cooperation between ports and local businesses towards the development of a cluster responding to the needs of maritime transport and logistic services
- raising awareness and disseminate research results and best practices at Adriatic, national, regional, and European level,
- cooperating in the assignment of best practices to maritime transport & logistics' activities and in making recommendations regarding their deployment,
- identifying emerging technologies that address maritime transport and logistics issues,
- organising workshops and case studies to assist in achieving objectives set out above
- providing a dissemination programme to raise visibility of the project and to establish increasing participation of users
- establishing an evaluation programme to measure compliance of project outputs in relation to the specification and recommendation for future actions

### 2.3 Involved actors and stakeholders

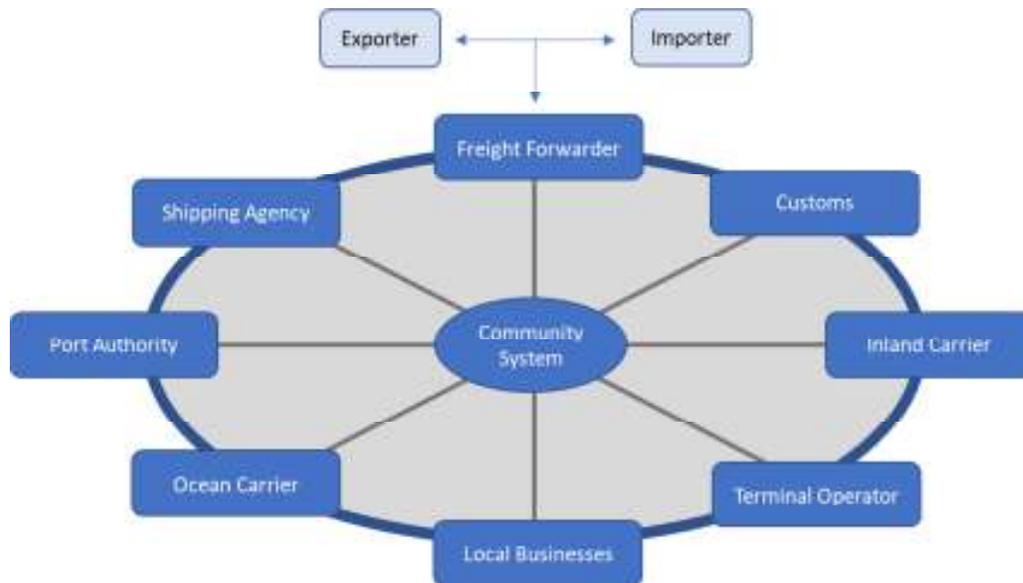
The logistics community area could vary from port to port, depending on the size and development of the seaport, but generally, it includes a surrounding or wider area close to the developed logistics-transport network (dry port). The recommended logistics community consists of members, private and public entities, operating in the port area and the hinterland providing logistics services towards the efficient transfer of goods.

The recommended Logistic Community System will host the following groups:

- shipping companies and shipping agencies
- freight forwarders
- third-party logistics operators (3PL)
- transport carriers: rail and road freight transport operators
- local companies connected with the import and export of the goods
- companies that do not participate directly in the operations carried out in the port, such as banks and insurance companies.
- the port authority, the naval authority and the port master's office -the port control centre, responsible for the planning, coordination and control of port activities
- customs, port police and various inspection services, who carry out activities to maintain a high level of security in the seaport

Figure 2.1, presents the main members of the proposed TRANSBASE Logistics Community System (LCS).





**Figure 2.1** TRASBASE involve actors and stakeholders (Source: Deliverable DT.1.2.4)

## 2.4 Impact of TRANSBASE in the Adriatic-Ionian area

The design and development of the proposed intervention will have the following impact to Adriatic-Ionian region freight movement as well as to the business relations between the main stakeholders of transport and logistics operations.

- Increased communication between relevant stakeholders operating in ports,
- Increased standardization and performance of the customs clearing procedures,
- Increase the role of local businesses in the effectiveness of logistics chains,
- Increased efficiency of the port and logistics operations, by reducing the dwell time in port terminals,
- Increase attractiveness of the Adriatic ports to access the EU markets,
- Improved security level, via a more effective system of freight customs clearance in ports,
- Common platform for the information sharing between relevant public authorities, aimed at improving the effectiveness of the logistic chains, respecting the privacy rules,
- Guidelines for the transferability of best practices for the freight flows clearing,
- Reports on the operating port management systems in the Adriatic Ionian area, including focus on the innovative approaches adopted in each case,
- Guidelines for the improvement of the interoperability between the port management

- systems,
- Guidelines for the definition of a set of common quality standards and the transferability of the system in other ports in the Med area,
  - Development of an operating manual which will provide not only a reference book for the best practice introduced by the proposed platform (TRANSBASE), but will recap the criteria for the adoption of the system solution in other areas

## 2.5 Summary

The aim of this chapter was to briefly describe the TRANSBASE intervention. Initially the TRANSBASE objectives were presented followed by the actors and stakeholders that will interact with the proposed platform. Subsequently the impact of the TRANSBASE platform in national, regional and European level was presented.



## 3. TRANSBASE technical design and services

### 3.1 Introduction

The aim of Chapter 3 is to present the technical design and services of the proposed Logistics Community System (LCS). Initially, the TRANSBASE system development guidelines are described followed by the proposed system architecture. Subsequently the main services of the proposed LCS are presented together with a series of technical requirements that should be taken into consideration during system development.

### 3.2 TRANSBASE system development guidelines

The proposed LCS will provide the electronic exchange of information between all interested ports (initially the port of Piraeus and the Port of Lavrion) and logistics sectors in Greece and will be acknowledged as the most advanced method for the exchange of information within a single or national port community infrastructure. The proposed LCS will have the ability to act as a National Single Window in response to recent Directives and policy from the European Commission. TRANSBASE LCS will therefore be pivotal in the Single Window concept and will reduce duplication of data input through efficient electronic exchange of information.

Below a guideline is presented that includes 12 actions. This guideline is based on the European Port Community Systems Association (EPCSA) on how to develop a Port Community System. We strongly believe that these actions should be also followed during the development of the proposed LCS. For that reason, we describe them below in detail (adapted for the proposed LCS).

#### Twelve actions for system development

##### **Action 1 – Create a Common Understanding of a Logistics Community System**

To start the development of a Logistics Community System, it is critical that a common understanding is agreed of what a LCS is and can do in the local region.

##### **Action 2 – Why choose to have a Logistics Community System?**

The reason

- To reduce inefficiencies in port-logistics business processes
- To facilitate the smooth flow of electronic data
- To integrate and achieve compliance with national and EU Directives

#### Community

- It is formed by the community for the community
- The community are, in general, shareholders of the LCS Operator
- Electronic facilitation of goods through improved data exchange will mean fewer delays in cargo movements.

#### Action 3 - How to start developing an LCS

##### Community “buy-in”

- Bring together the community around the port, including port authorities, users, shipping lines, Customs, logistics operators, freight forwarders, and other business or government agencies that have an interest.

##### Agree a lead

- Identify a lead in the project (in our case the lead is BEP) with the responsibility to bring the community together and act independently of its own interests to act in the interests of the community.

##### Identify the legal and business model, including finance:

- Identify the development finance to create a legal and business model that the community will see as a “trusted and honest broker”.

#### Action 4 – Ambassadors

- Identify one or more “Ambassadors” to promote the LCS concept and development within the local community (in our case BEP will be the basic ambassador).
- Through the Ambassadors, gain an understanding of how other Community Systems operate and how this relates to your local circumstances

#### Action 5 – Communication

- Keep all stakeholders advised of progress – for example, ports, government ministries, shipping lines, port users, Customs, OGAs, etc.
- Open the communication as a two-way approach, taking examples and asking opinions.

#### Action 6 – Identification of Core Business Processes to be addressed

All locations are different. There will be significant similarities, but different regions have different stakeholders with varying interests and, of course different business processes. Although this is not the case for TRANSBASE in its initial phase, the designers should take into consideration Action 6 when the system will be expanded.

- Agree with community core processes
- Outline key challenges relating to existing processes and outline benefits of a simplified electronic approach.

### Action 7 – Customs integration

- It is all about Customs procedures reforms
- Work through World Customs Organisation (WCO) guidance
- Stakeholders moving to Authorised Economic Operators (AEO)

### Action 8 – Legal framework

Consider within which legal frameworks the LCS will need to work – for example, Data Protection Acts, Marine Acts and Directives, Customs Acts and procedures. The legal framework of the LCS must consider regulations, legislation and Directives in context:

- International /Worldwide
- European
- Member State
- Regional/local, e.g. local municipal rules

### Action 9 – LCS Organisation

- Model – private, public or joint public/private
- Shareholding and types of shares
- Financing
- Governance

### Action 10 - Development groups

Identify key community stakeholders to work in development groups to resolve and develop the electronic solution to the identified business processes.

- Experts in groups for each business process
- Timeline and process management

### Action 11 – Use existing knowledge of Logistics Community Systems

- Don't start from scratch
- Share knowledge and experience
- Import knowledge where necessary

### Action 12 - Long-term operation

To create a sustainable LCS and LCS Operator, it is imperative to identify the following:

- Revenue Streams
  - ✓ Most Port Community Systems use a mixed revenue stream mainly around:
    - annual or monthly subscription fee by services or for all services
    - fee per unit charge (tonnage, Customs declaration, TEU, barrel, vessel, hour...)
    - or per service charge
    - or per EDI transaction charge

- fee per stakeholder
- Ongoing development
- Updating systems to comply with international, EU and National regulations and Directives

### 3.3 TRANSBASE architecture

TRANSBASE introduces a Logistics Community System (LCS) operated by the Piraeus Chamber of small and medium sized industries (BEP). TRANSBASE is an electronic platform that will connect the logistics community members (stakeholders) towards smart, sustainable and integrated transfer of goods in cooperation with the ports of Piraeus and Lavrion (both ports are located in Attica Region).

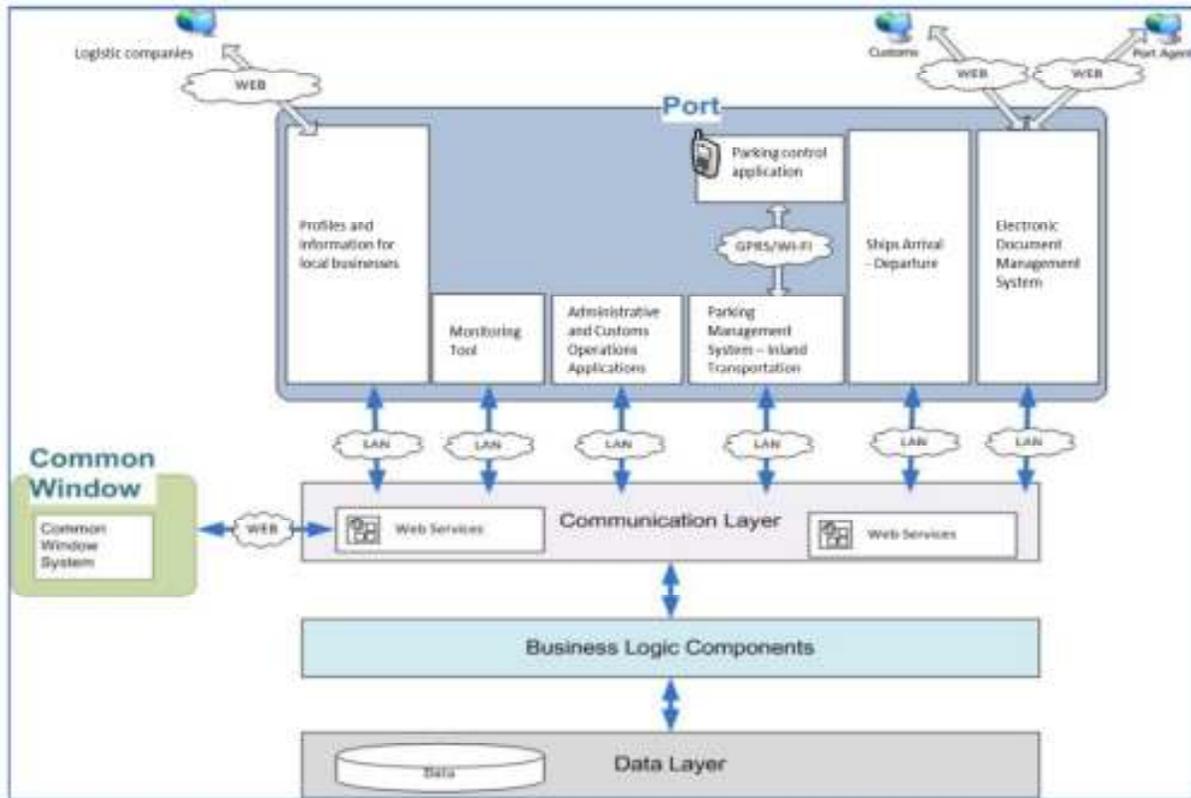
Key drivers for the establishment of the Logistics Community System are the need for a standardized communication platform to improve the logistics supply chain systems in terms of punctuality, reliability and operational costs, as well as the need to increase the competitive position among businesses and ports. The LCS will have the ability to bridge electronically various other systems as the local, national or international regulations require or port official websites. The proposed LCS will support real-time business-to-business information exchange and will also provide a gateway for business-to-government processes. To this end TRANSBASE LCS is therefore both complementary as well as supplementary to the Single Window at both national and international level. TRANSBASE LCS will optimise, manage and automate seamless logistics processes through a single submission of data and will connect transport and logistics chains.

Figure 3.1 presents an indicative architecture of the TRANSBASE LCS. The architecture of the system meets the requirements of the logistics community around and within the port area with increased demand on reliability, integration with existing systems, regular communication among the members, information security, compliance with national and international rules and regulations, future system extensions, etc. The system features a modular design and all communications between applications are made via Web Service interfaces and through shared access to the database. The use of standards included in the solution is the only way for seamless integration of the sub-systems and their collaboration with other existing or future information systems. More specifically, the standards followed are:

- OpenGIS for the management and exchange of spatial data
- XML / SOAP & WSDL to exchange other data
- Open Database Connectivity (ODBC) to interface with the database system

These standards mentioned above, ensure easy and simplified interconnection of the various sub-systems with any external system logic in an open architecture, enabling in that way possible future expansion of the TRANSBASE platform.





**Figure 3.1** Overall Architecture of the TRANSBASE Logistics Community System

### 3.4 TRANSBASE Services

Figure 3.2 depicts the main services of LCS according to the users' requirements. These services are indicative and further analysis will take place in order to develop additional services that will support the business community in both tactical as well as operational level.



Ships Arrivals and Departure Management

Electronic Document Management System

Custom Operations Management

Parking Management System - Inland Transportation

Monitoring Tool for flow of operational and historical informatio

Information about the available local logistic businesses

**Figure 3.2** Indicative services of TRANSBASE Logistics Community System

Within the main services of LCS, some important requirements should be taken under consideration during the design process. The latter are presented below as follows:

- The system should be flexible. Logistics operations must run smoothly and may not be hindered by the system
- The system design should allow the LCS to maintain a level of pragmatism that the stakeholders have. It must be possible for the administrator to change the authorization of persons (add/delete the possibility to send messages)
- The system must follow the agreed business a series of rules that will be set by the administrator
- Access to the web application must only be granted to registered users. An audit trail must be available to enable trace back
- Access to message handling is only granted to a registered organization. Formally, messages are exchanged between organizations. If an organization makes a connection between the LCS and their own systems, then it is the responsibility of the organization that this connection is used in a proper way
- Every person is member of an organization. When a person has been given access, they are always considered to be acting on behalf of exactly one organization
- An organization has one or more roles
- Every message has 1 sender and 1 or more recipients
- The administrator must be able to authorize a user to send certain message types
- Digital signatures (through digital certificates / Public Key Infrastructure) are defined on the level of (the formally authorized person) the organization. Electronic signatures must be based on digital certificates approved by the Hellenic Government.

- The LCS will be Internet based
- The PLS will use XML as a basis and EDIFACT where necessary
- The administrator of the system will be the BEP
- It must be possible for a sender to indicate that the LCS sends the same message to different parties at one time.

### 3.5 Summary

Chapter 3 presented the technical design and services of the proposed Logistics Community System (LCS). Initially, the TRANSBASE system development guidelines were described followed by the proposed system architecture. Subsequently the main services of the proposed LCS were presented together with a series of technical requirements that should be taken into consideration during system development. The following Chapter presents the Cost-Benefit Analysis (CBA) performed for this project.

## 4. COST-BENEFIT Analysis

### 4.1 Introduction

The aim of this chapter is to perform a cost-benefit analysis (CBA) for the TRANSBASE Logistics Information System (LCS). Initially, we present the CBA methodology that is adopted for this analysis followed by the implementation of CBA for the proposed initiative. We calculate the Net Present Value (NPV) as well as the Internal Rate of Return (IRR) for 10 and 15 years respectively in order to evaluate the investment. Last but not least we perform a sensitivity analysis with variable discount return rates in order to test the robustness of the CBA results.

### 4.2 Cost-benefit analysis (CBA) methodology

Cost benefit analysis (CBA) is a process used primarily by businesses that weighs the sum of the benefits, such as financial gain, of an action against the negatives, or costs, of that action. The technique is often used when trying to decide a course of action, and often incorporates monetary amounts for intangible benefits as well as opportunity cost into its calculations.

Typically, when the same benefits are received each period, the payback period can be calculated by dividing the projected total cost of the project by the projected total revenues. The formula that can be used is as follows:  $\text{Total cost} / \text{total revenue (or benefits)} = \text{length of time (payback period)}$ .

When performing a cost benefit analysis (CBA), it is generally helpful to weight the total benefits and total costs of a future project at their present value - which is where net present value comes in. Given that CBAs are often done with a long-term view in mind, the value of money often changes due to inflation and other factors, making it helpful to factor in the net present value of the figures you are analyzing when conducting a CBA.

Net present value, as the name suggests, is a method used to determine the benefits of undertaking an investment by calculating the future benefits or costs in terms of their present value. If the net present value is positive for the calculation (meaning the benefits outweigh the costs), the action or decision will generally be a good investment. If negative, the opposite is likely true. In CBA, net present value is used to calculate net present costs and net present benefits.

The steps that should be followed for a CBA are presented below.

### Step 1: Compile lists

The first step deals with the compilation of a comprehensive list of all the costs and benefits associated with the potential action or decision.

### Step 2: Give the costs and benefits a monetary value

Once the comprehensive lists of costs and benefits for the action are developed, then monetary values to each individual cost or benefit should be assigned. Once monetary values for each cost and benefit are assigned, all the costs and benefits should be added respectively and the equation should be set up.

### Step 3: Set up the equation and compare

The sum of the benefits (the sum of all the monetary values assigned to the benefits of the action) and the sum of the costs (all the monetary values of the costs of the action) should be plugged into the benefit/cost equation. The equation should be a numerical equation, and if the numerical benefits (the sum of the fiscal values for the benefits of the action) outweigh the costs, it is advisable to proceed with the decision. If not, the company or individual should re-examine the potential action and make adjustments accordingly. This equation can also be set up for multiple different options or projects and can help companies compare options side by side.

### Step 4: Net Present Value

In this step we consider the difference between the total discounted benefits minus the total discounted costs, which gives the Net Present Value of a project. Projects with positive net benefits are considered to be viable and a project with a higher NPV as compared with another project with a lower NPV is measured to be less lucrative. In other words, the higher the NPV, the greater the calculated benefits of the project.

### Step 5: Sensitivity Analysis

The last step embraces performing a sensitivity analysis (also known as a “what-if”) to predict outcomes and check accuracy in the face of a collection of variables. This is due to the fact that information on costs, benefits, and risks is rarely known with certainty, especially when one looks to the future. A sensitivity analysis (with different values of discount return) tests the robustness of the CBA results.

The following section describes the implementation of CBA in the TRANSBASE LCS.

### 4.3 Implementing CBA in the TRANSBASE LCS

Below the implementation of the CBA methodology is presented (following the Steps described in Section 4.2).

#### Implementation of Step 1: Compile lists

Initially, we compiled a list of all the costs (i.e. direct and indirect costs) and benefits (i.e. revenues) for the TRANSBASE Logistics Information System. We took into consideration the initial investment cost that deals with the design and development of TRANSBASE system.

#### Implementation of Step 2: Give the costs and benefits a monetary value

We analyse the costs and benefits (revenues) by giving them a monetary value. More specifically we took into consideration all the initial investment cost (see Table 4.1) as well as the costs that deal with labor (for the operation of the TRANSBASE LCS) (see Table 4.2 and Table 4.3b). We also assumed a fixed indirect cost (overheads) of 10K euros per year for system maintenance and other typical overheads. We also calculated the income from the services provision of the TRANSBASE LCS. We identified 3 subscription plans: a) Gold with unlimited use of all services: 3.000 euros/year, b) Silver with 3-5 services: 1500 euros/year, and c) Bronze with up to 2 services: 850 euros/year. The income for 15 years is presented in Table 4.3a.

#### Implementation of Step 3: Set up the equation and compare

In Step 3 we added the cost and revenues (for each year) in order to calculate the net cash flow (see Table 4.4). As it can be seen, the numerical benefits (the sum of the fiscal values for the benefits of the action) outweigh the costs, thus it is advisable to proceed with the decision.

#### Implementation of Step 4: Net Present Value

In this step we applied the NPV for 10 and 15 years respectively (see Table 4.4). As it can be seen the investment is acceptable for certain discount return rates (for the 10 year period) and for all discount rates for the 15 year period. IRR was also calculated for both cases with positive value as well.

#### Implementation of Step 5: Sensitivity analysis

In order to test the robustness of the CBA results, we made a sensitivity analysis by implementing different discount rates. The results of the NPV calculations (for 10 years period) show that the investment is worth with a discount return rate up to 1.5% (positive NPV). For the case of NPV calculations for 15 years period, the investment has a positive result with any discount return rate (between 0%-5%).

**Table 4.1** Initial investment cost

Cost Categories	Amount (€)
<b>TRANSBASE Logistics Information System - Initial investment cost</b>	<b>2,031,750.00 €</b>
Feasibility study	80,000.00 €
System requirements analysis	125,000.00 €
System design (blueprints)	240,000.00 €
System development	950,000.00 €
System integration with other Information systems	195,000.00 €
System testing	85,000.00 €
Creation of manuals and user training	40,000.00 €
Hardware for system operation	85,000.00 €
Software for system operation	45,000.00 €
3-year support	90,000.00 €
Unforeseen expenses	96,750.00 €

**Table 4.2** Labor cost (for the 2 first years)

	Total labor cost	2019		2020	
		No. of staff	Total annual	No. of staff	Total annual
TRANSBASE LCS User	31,550 €	2	63,100 €	3	94,650 €
IT Officer	45,600 €	1	45,600 €	1	45,600 €
<b>Total annual personel cost</b>		<b>3</b>	<b>108,700 €</b>	<b>4</b>	<b>140,250 €</b>

**Note:** Apart from the labor cost, we also assume a fixed indirect cost (overheads) of 10.000 euros per year that include maintenance of the hardware/software equipment, and other typical indirect costs.

Table 4.3 (a) Total income from the TRANSBASE LCS services for 15 years

TRANSBASE LCS Subscription plans	2019	2020	2021	2022	2023	2024	2025
Subscription fee - Bronze (up to 2 services)	46,750	63,750.00	73,950.00	109,650.00	137,700.00	170,000.00	188,700.00
Subscription fee - Silver (from 3-5 services)	42,000.00	72,000.00	90,000.00	123,000.00	138,000.00	156,000.00	165,000.00
Subscription fee - Gold (unlimited services)	81,000.00	96,000.00	102,000.00	126,000.00	144,000.00	162,000.00	174,000.00
<b>Total Income</b>	<b>169,750.00</b>	<b>231,750.00</b>	<b>265,950.00</b>	<b>358,650.00</b>	<b>419,700.00</b>	<b>488,000.00</b>	<b>527,700.00</b>

TRANSBASE LCS Subscription plans	2026	2027	2028	2029	2030	2031	2032	2033
Subscription fee - Bronze (up to 2 services)	227,800.00	271,150.00	296,650.00	322,150.00	349,350.00	377,400.00	389,300.00	395,250.00
Subscription fee - Silver (from 3-5 services)	183,000.00	204,000.00	216,000.00	225,000.00	238,500.00	252,000.00	273,000.00	282,000.00
Subscription fee - Gold (unlimited services)	195,000.00	219,000.00	231,000.00	246,000.00	261,000.00	276,000.00	288,000.00	294,000.00
<b>Total Income</b>	<b>605,800.00</b>	<b>694,150.00</b>	<b>743,650.00</b>	<b>793,150.00</b>	<b>848,850.00</b>	<b>905,400.00</b>	<b>950,300.00</b>	<b>971,250.00</b>

(b) Total expenses from the TRANSBASE LCS services for 15 years

Expenses categories	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Staff expenses	108,700 €	148,250 €	141,853 €	143,069 €	144,300 €	145,045 €	147,494 €	148,878 €	150,347 €	151,871 €	153,399 €	154,923 €	156,472 €
Variaoperational costs	10,000 €	32,200 €	10,404 €	10,652 €	38,824 €	11,045 €	11,262 €	11,487 €	11,717 €	11,951 €	12,190 €	12,434 €	12,682 €
<b>Total expenses</b>	<b>118,700 €</b>	<b>180,450 €</b>	<b>152,257 €</b>	<b>153,721 €</b>	<b>183,124 €</b>	<b>156,090 €</b>	<b>158,756 €</b>	<b>160,365 €</b>	<b>162,064 €</b>	<b>163,822 €</b>	<b>165,589 €</b>	<b>167,357 €</b>	<b>169,154 €</b>

**Table 4.4** Net Cash Flow NPV for 10 and 15 years with variable discount return rates (in €M) and IRR

Initial investment	- 2.031.750.00 €
Year	Net Cash flow
2019	51.050 €
2020	81.300 €
2021	113.894 €
2022	181.097 €
2023	217.558 €
2024	299.132 €
2025	381.777 €
2026	530.563 €
2027	386.013 €
2028	425.811 €
2029	445.772 €
2030	480.098 €
2031	515.005 €
2032	542.294 €
2033	553.647 €



IRR - 10 years	1.02%
IRR - 15 years	0.56%

Discount return	0.0%	0.5%	1.0%	1.5%	2.0%	2.5%	3.0%	3.5%	4.0%	4.5%	5.0%
NPV - 10 years	286,240.24 €	207,151.58 €	131,457.55 €	58,992.07 €	-16,404.56 €	-76,843.10 €	-140,586.12 €	-201,848.81 €	-260,197.06 €	-316,352.84 €	-370,229.65 €
NPV - 15 years	2,822,997.75 €	2,582,405.70 €	2,358,186.48 €	2,146,895.64 €	1,947,093.48 €	1,759,458.19 €	1,582,715.51 €	1,428,143.84 €	1,298,077.77 €	1,110,898.97 €	971,055.44 €

IRR-10 years	343,569.23 €
IRA-15 years	1,059,961.38 €

	0.0%	0.5%	1.0%	1.5%	2.0%	2.5%	3.0%	3.5%	4.0%	4.5%	5.0%
NPV-10	0.29 €	0.11 €	0.13 €	0.06 €	-0.01 €	-0.08 €	-0.14 €	-0.20 €	-0.26 €	-0.32 €	-0.37 €
NPV-15	2.82 €	2.58 €	2.36 €	2.15 €	1.95 €	1.76 €	1.58 €	1.42 €	1.26 €	1.11 €	0.97 €

## 4.4 Expected results

The main benefits for BEP as well as for the users of the TRANSBASE LCS implementation will consist in improved informational data flow and a shortage of administrative procedures which will allow, as direct consequence, general cost reduction and increased activity efficiency. There are several other improvement and advantages for the two ports that will be engaged (i.e. Port of Piraeus and Port of Lavrion) derived from overall increase of traffic due to berth activity improvement, cargo optimized flow, improved storage management, advanced statistics and future AI assisted decision as well as a better interface with rail and road transportation.

Specific potential benefits of implementing a Logistics Community Systems (LCS) platform have been identified (based on research made in similar projects e.g. Danube Transnational Programme – DAPhNE – Danube Port Network). The potential benefits identified are presented as follows:

1. **Integration with other similar systems in the European Union and beyond:** These are in correlation with the logistics chain services, primarily providing visibility and data security elements. In case of a container that is shipped through an intermediate port, the integration of an LCS can improve visibility and data access: (1) The type of cargo exists in the container which is being transported (2) In case of transshipment, identifying the place of transshipment, the next ship carrying the container, the changes for the following real-time shipping route. (3) In case of losing the link with the cargo, which are the other possibilities of addressing the transport. All of these data will lead to a better estimation of container delivery to the delivery port.
2. **Big Data Applications:** An LCS platform is a rich source based on various data typologies. The advantage given by the "network effect" or "network effect" (increasing the amount of information with the number of squares) will thus be possible, also ensuring the possibility to make the data anonymous. Large business data can be extracted from business data, but also from statistical analysis, useful for processing by authorities at different levels (port authorities, local governments, national government).
3. **From the perspective of the sender/recipient/owner of the goods:** If a freight carrier or a cargo owner manages/directs the cargo to a certain number of ports, they will manage the routing of the cargo to the ports themselves, provided they connect to the PCS of that port. An integrated LCS will make it possible to provide (1) container status information and dispensing the container from a single source; (2) viable integration of the bank with regard to payment messages; (3) speeding up the release of containers.
4. **From the perspective of the shipping company - shipping line:** The perspective of the shipping company is centered on the idea of transmitting information once, unlike

transmission to each port (EU). For example, the list of dangerous goods on board is the same at the port of departure and at the port of arrival. In addition, terminal information can only be transmitted one time only, assuming that an integrated LCS can take care to remove or add container data items because the physical containers are removed from the ship and/or loaded onto the ship. The shipping company will also benefit from the operational efficiency of vessel agents working on behalf of the shipping company.

- 5. Backbone network:** Acting like "physical Internet" to older logistics information systems, it is possible today to extend the concept taking into consideration the future developments in communication technology using cloud computing and end-to-end security paradigm. We can further extend the principle to apply to every other secure network infrastructure with increased degree of communication redundancy.

## 4.5 Summary

The aim of this chapter is to perform a cost-benefit analysis (CBA) for the TRANSBASE Logistics Information System (LCS). Initially, we present the CBA methodology that is adopted for this analysis followed by the implementation of CBA for the proposed initiative. We calculate the Net Present Value (NPV) as well as the Internal Rate of Return (IRR) for 10 and 15 years respectively in order to evaluate the investment. Last but not least, we perform a sensitivity analysis with variable discount return rates in order to test the robustness of the CBA results. The results of the NPV calculations (for 10 years period) show that the investment is worth with a discount return rate up to 1.5% (positive NPV). For the case of NPV calculations for 15 years period, the investment has a positive result with any discount return rate (between 0%-5%).

## 5. SELECTION OF FINANCIAL TOOLS TO SUPPORT TRANSBASE LCS

### 5.1 Introduction

The aim of this chapter is the selection of the appropriate innovative tools that can be used in order to support the design and development of the TRANSBASE LCS. Initially a thorough description of five (5) EU Funding programmes namely ERDF, H2020, EFSI, EIB and PPP are presented. An analysis of their main characteristic is made in order to be able to understand what type of projects they fund and how this is accomplished. Subsequently, we assess the aforementioned tools in order to identify the one that best suits to the TRANSBASE LCS. The chapter concludes with a summary with the main findings.

### 5.2 Available innovative financial tools

The EU provides funding for a broad range of innovative projects and programmes covering areas such as, regional and urban development, employment & social inclusion, agriculture and rural development, maritime and fisheries policies, research and innovation and humanitarian aid. The recommended intervention meets the requirements of five EU funding programmes; ERDF, H2020, EFSI, EIB, and PPP. Below a short description of each funding programme is given.

#### European Regional Development Fund (ERDF)

The ERDF aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions. The ERDF focuses its investments on several key priority areas. This is known as 'thematic concentration':

- Innovation and research
- The digital agenda
- Support for small and medium-sized enterprises (SMEs)
- The low-carbon economy

The ERDF resources allocated to these priorities will depend on the category of region.

- In more developed regions, at least 80 % of funds must focus on at least two of these priorities
- In transition regions, this focus is for 60 % of the funds
- This is 50 % in less developed regions

Furthermore, some ERDF resources must be channelled specifically towards low-carbon economy projects:

- More developed regions: 20%
- Transition regions: 15%
- Less developed regions: 12%

Under the European Territorial Cooperation programmes, at least 80 % of funds will be concentrated on these four priority areas mentioned above. The ERDF also gives particular attention to specific territorial characteristics. ERDF action is designed to reduce economic, environmental and social problems in urban areas, with a special focus on sustainable urban development. At least 5 % of the ERDF resources are set aside for this field, through 'integrated actions' managed by cities. Areas which are naturally disadvantaged from a geographical viewpoint (remote, mountainous or sparsely populated areas) benefit from special treatment. Lastly, the outermost areas also benefit from specific assistance from the ERDF to address possible disadvantages due to their remoteness.

#### EU Framework Programme for research and Innovation (H2020)

Horizon 2020 is the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract. It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market. Horizon 2020 is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness.

Seen as a means to drive economic growth and create jobs, Horizon 2020 has the political backing of Europe's leaders and the Members of the European Parliament. They agreed that research is an investment in EU's future and so put it at the heart of the EU's blueprint for smart, sustainable and inclusive growth and jobs. By coupling research and innovation, Horizon 2020 is helping to achieve this with its emphasis on excellent science, industrial leadership and tackling societal challenges. The goal is to ensure Europe produces world-class science, removes barriers to innovation and makes it easier for the public and private sectors to work together in delivering innovation.

Horizon 2020 is open to everyone, with a simple structure that reduces red tape and time so participants can focus on what is really important. This approach makes sure new projects get off the ground quickly – and achieve results faster. The EU Framework Programme for Research and Innovation is complemented by further measures to complete and further develop the European Research Area. These measures aim at breaking down barriers to create a genuine single market for knowledge, research and innovation.

#### European Fund for Strategic Investments (EFSI) – Juncker Plan

EFSI is an initiative launched jointly by the EIB Group – the European Investment Bank and

European Investment Fund – and the European Commission to help overcome the current investment gap in the EU. EFSI is one of the three pillars of the Investment Plan for Europe that aims to revive investment in strategic projects around the continent to ensure that money reaches the real economy.

EFSI is a EUR 26 billion guarantee from the EU budget, complemented by a EUR 7.5 billion allocation of the EIB's own capital. The total amount of EUR 33.5 billion aims to unlock additional investment of at least EUR 500bn by 2020. EFSI is implemented by the EIB Group and projects supported by it are subject to usual EIB procedures.

With EFSI support, the EIB Group is providing funding for economically viable projects, especially for projects with a higher risk profile than usually taken on by the Bank. It will focus on sectors of key importance for the European economy, including:

- Strategic infrastructure including digital, transport and energy
- Education, research, development and innovation
- Renewable energy and resource efficiency
- Support for small and mid-sized businesses

EFSI is demand-driven and provides support for projects everywhere in the EU, including cross-border projects. There are no geographic or sector quotas. Projects are considered based on their individual merits.

### European Investment Bank (EIB)

The European Investment Bank is the lending arm of the European Union. EIB is the biggest multilateral financial institution in the world and one of the largest providers of climate finance. It helps the economy, creates jobs, promotes equality and improves lives for EU citizens and for people in developing countries. The EIB Group has two parts: the European Investment Bank and the European Investment Fund. The EIF specialises in finance for small businesses and mid-caps. EIB has more than 60 years' experience and expertise in project financing. Headquartered in Luxembourg, EIB has a network of local and regional offices in Europe and beyond.

The European Investment Bank focuses on four areas:

- Innovation and skills
- Small businesses
- Infrastructure
- Climate and environment

All the projects EIB finances must be bankable. But they also must comply with high technical, environmental and social standards. The combined expertise of EIB's economists, engineers,

financial analysts and climate specialists ensures the success of the projects. In turn, the stamp of approval from EIB's specialists triggers more investment from the private sector.

### Public-Private Partnership (PPP)

A public-private partnership (PPP) is a cooperative arrangement between two or more public and private sectors, typically of a long-term nature. They are primarily used for infrastructure provision, such as the building and equipping of schools, hospitals, transport systems, water and sewerage systems. PPPs have been highly controversial as funding tools, largely over concerns that public return on investment is lower than returns for the private funder. It is closely related to concepts such as privatization and the contracting out of government services. Evidence of PPP performance in terms of value-for-money (VfM) and efficiency, for example, is mixed and often unavailable. Common themes of PPPs are the sharing of risk and the development of innovation.

There are several different types of public-private partnership contracts depending on the type of project (for example, a road or a prison), level of risk transfer, investment level and the desired outcome.

#### Build – Operate – Transfer (BOT)

A BOT model is generally used to develop a discrete asset rather than a whole network, for example a toll road. This simple structure provides the most freedom for the private sector partner during construction and the public sector bears the equity risk.

#### Build – Own – Operate (BOO)

This is a similar structure to BOOT (below), but the facility is not transferred to the public sector partner. A BOO transaction may qualify for tax exempt status and is often used for water treatment or power plants.

#### Build – Own – Operate – Transfer (BOOT)

The private sector builds and owns the facility for the duration of the contract, with the primary goal of recouping construction costs (and more) during the operational phase. At the end of the contract the facility is handed back to the government. This structure is suitable when the government has a large infrastructure financing gap as the equity and commercial risk stays with the private sector for the length of the contract. This model is often used for school and hospital contracts.

#### Design – Build

The contract is awarded to a private partner to both design and build a facility or a piece of infrastructure that delivers the performance specification in the PPP contract. This type of partnership can reduce time, save money, provide stronger guarantees (as the work is with a single

entity rather than a consortium) and allocate additional project risk to the private sector

#### Design – Build – Finance

The private sector constructs an asset and finances the capital cost during the construction period only.

#### Design – Construct – Maintain – Finance (DCMF)

Design, Construct, Maintain and Finance is very similar to DBFM (Design-Build-Finance-Maintain). The private entity creates the facility based on specifications from the government body and leases it back to them. This is generally the convention for PPP prison projects.

#### O & M (Operation & Maintenance)

In an O&M contract, a private operator operates and maintains the asset for the public partner, usually to an agreed level with specified obligations. The work is often sub-contracted to specialist maintenance companies. The payment for this contract is either via a fixed fee, where a lump sum is given to the private partner, or more commonly a performance-based fee. In this situation, performance is incentivised using a pain share / gain share mechanism, which rewards the private partner for over-performance (according to the agreed SLAs) or induces a penalty payment for work which has fallen short.

Table 5.1 presents in detail the main characteristics of these five programmes.

**Table 5.1** Main characteristics of the proposed innovative funding programmes  
(Source: Adapted by Deliverable DT.1.2.4 – Revised and enhanced in this deliverable)

	NO.1	NO.2	NO.3	NO.4	NO.5
INNOVATIVE FUNDING PROGRAMMES	ERDF (European Regional Development Fund)	H2020 (EU Framework Programme for Research & Innovation)	EFSI (Junker Plan)	EIB (European Investment Bank)	PPP (Public-Private Partnership)
OBJECTIVE(S) OF THE INNOVATIVE FUNDING PROGRAMME	The ERDF aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions.	Horizon 2020 is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness.	EFSI support projects that make a significant contribution to sustainable growth and employment in Europe and beyond. The	The EIB Group has two parts: the European Investment Bank and the European Investment Fund. The EIF specialises in finance for	A public-private partnership (PPP) is a cooperative arrangement between two or more public and private sectors,

	NO.1	NO.2	NO.3	NO.4	NO.5
			activities focus on four priority areas: 1) Innovation and skills, 2) Small and medium sized enterprises, 3) Infrastructure, 4) climate and environment	small businesses and mid-caps	typically of a long-term nature. They are primarily used for infrastructure provision
<b>NAME OF THE PERTINENT SPECIFIC PILLAR(S)</b>	Innovation and research/ Support for small and medium-sized enterprises (SMEs)	Societal Challenges- Smart, Green and Integrated Transport	Innovation and Skills	The European Investment Bank focuses on four areas: 1)Innovation and skills 2)Small businesses 3)Infrastructure 4) Climate and environment	Infrastructure provision, such as the building and equipping of schools, hospitals, transport systems, water and sewerage systems
<b>OBJECTIVE(S) OF SPECIFIC PILLARS</b>	Reduce economic, environmental and social problems in urban areas, with a special focus on sustainable urban development	Horizon 2020 aims at a better mobility, less congestion, more safety and security with a substantial reduction of traffic congestion; with a substantial improvement in the mobility of people and freight; by developing new concepts of freight transport and logistics and by reducing accident rates, fatalities and casualties and improving security	1) innovative projects from large-scale research to small, specialised spin-out or digital networks 2) support on investment that is geared towards innovation, skills and greater	Enhance EU competitiveness , provide a real support for growth and job creation, and contribute to solving current political challenges inside as well as outside the EU	To deliver improved services and better value for money, primarily through appropriate risk transfer, encouraging innovation, greater asset utilization and an integrated whole-of-life management, underpinned by private financing

DT2.2.1 - Technical studies on infrastructure/non-infrastructure works in the transport and logistics sector of the Adriatic-Ionian area



	NO.1	NO.2	NO.3	NO.4	NO.5
			competitiveness 3) foster sustainable growth and jobs in Europe		
RESULTS EXPECTED BY THE PROGRAMMES SELECTED	Support industrial transition towards a low-carbon economy and reinforce multimodal and environmental-friendly transport and regional mobility	This programme aims to boost the competitiveness of the European transport industries and achieve a European transport system that is resource-efficient, climate-and-environmental-friendly, safe and seamless for the benefit of all citizens, the economy and society	The proposed projects must comply with high technical, environmental-friendly, safe and seamless for the benefit of all citizens standards.	The proposed projects must comply with high technical, environmental and social standards.	1)Ensure the necessary investments into public sector and more effective public resources management 2)Ensure higher quality and timely provision of public services 3)Mostly investment projects are implemented in due terms and do not impose unforeseen public sectors extra expenditures;
TYPE OF PROJECTS THAT MAY BE FINANCED BY THE FUNDING PROGRAMME(S)	Design studies, infrastructure, node equipment, pilot studies	Design studies, infrastructure, node equipment, pilot studies	Infrastructure, node equipment, soft skills (training), Information systems	1) Investment less than EUR 20-25M: Applications for the financing of small-scale projects should be sent directly to the financial institutions or	Mainly infrastructure

DT2.2.1 - Technical studies on infrastructure/non-infrastructure works in the transport and logistics sector of the Adriatic-Ionian area



	NO.1	NO.2	NO.3	NO.4	NO.5
				commercial banks receiving EIB intermediated loans.  2) Investment is more than EUR 20-25M: Direct loans and risk capital financing can be requested directly from the EIB. As a general rule, a comprehensive feasibility study should be submitted	
TIMELINE OF THE NEXT CALL	MED ENI – 7/2019	9-10/2019	Open for loan request	Open for loan request	Open
SHARE OF THE EU FINANCIAL CONTRIBUTION	50-90%	100% financed projects	low interest loans	low interest loans	Pending on the type of PPP

### 5.3 Assessment and selection of suitable financial tools to support TRANSBASE LCS

This section presents the assessment and selection of suitable financial tools to support TRANSBASE. For the assessment phase we will use the multi-criteria decision analysis method. Multiple-criteria decision-making (MCDM) or multiple-criteria decision analysis (MCDA) is a sub-discipline of operations research that explicitly evaluates multiple conflicting criteria in decision making (both in daily life and in settings such as business, government and medicine). Conflicting criteria are typical in evaluating options: cost or price is usually one of the main criteria, and some measure of quality is typically another criterion, easily in conflict with the cost.

We have identified five (5) criteria in order to assess the programs namely: a) suitability of programme, b) Low financial contribution, c) Support of investments between €3M-€5M, d) Easiness for TRANSBASE LCS to be funded, and e) Flexible timeline for proposal submission. The scale that is used for the assessment is between “1-5” (where 1-low, and 5-high).

The criteria selected are described as follows:

- **Suitability of programme:** This criterion evaluates how suitable each programme is concerning the support of the design and development of the proposed LCS. The suitability can be identified in Table 5.1 where the description of each programme as well as its objectives and type of projects financed are stated. For instance H2020 focus mainly in research and innovation or innovation projects whereas EFSI focus on innovation projects with high and immediate impact on business and social level.
- **Low financial contribution by the investors:** Another criterion which should be also taken into consideration is the amount of money (financial contribution) that the funders should invest. The proposed funding schemes have different approaches from 100% EU funding (e.g. H2020) to zero or a small amount of initial funding (e.g. PPP).
- **Support of investments between €2M-€5M:** The proposed funding programs have different budgets per project and this is crucial for our case. For instance, H2020 usually supports small-scale projects (i.e. between €2M-€7M), whereas PPP focus on large multi-million projects.
- **Easiness for TRANSBASE LCS to be funded:** Another important criterion of the easiness of the proposed project to be financed. For instance H2020 focus on research projects and the reviewers expect to see the research impact of each proposal submitted. Furthermore this criterion assesses also the whole procedure that is needed in order for a project to get funded (in terms of complexity and time).
- **Flexible timeline for proposal submission:** The last criterion deals with the flexibility that is given by each programme to submit a proposal. For instance ERDF and H2020 calls for proposals are fixed and have a specific deadline whereas EFSI, EIB, and PPP funding programmes are more flexible and they are open continuously.

The assessment results of the five innovative funding programmes are presented in Table 5.2.

**Table 5.2** Assessment of five innovative funding programmes

#	Criteria	ERDF	H2020	EFSI	EIB	PPP
1	Suitability of programme	3	2	5	4	1
2	Low financial contribution by the investors	3	5	4	4	1

#	Criteria	ERDF	H2020	EFSI	EIB	PPP
3	Support of investments between €2M-€5M	4	3	4	2	2
4	Easiness for TRANSBASE LCS to be funded	2	1	4	3	2
5	Flexible timeline for proposal submission	1	1	5	5	4
<b>Total Score</b>		13	12	<b>22</b>	18	10

As it can be seen by the Table above, the EFSI funding programme seems to be the most appropriate one for the TRANSBASE LCS initiative. A second option, which was evaluated positively (and was very close to the first option), is the EIB funding scheme. H2020 focuses more on research projects thus is not suitable for our proposed project, ERDF usually deals with projects that request a lower funding and mainly support demonstration projects (i.e. systems that are not turn-key solutions). Last but not least, PPP funding programmes focuses on infrastructure projects and not on information systems.

## 5.4 Summary

The aim of this chapter was to select the appropriate innovative tools that can be used in order to support the design and development of the TRANSBASE LCS. Initially a thorough description of five (5) EU Funding programmes namely ERDF, H2020, EFSI, EIB and PPP were presented. An analysis of their main characteristic was made in order to be able to understand what type of projects they fund and how this is accomplished. Subsequently, we assessed the aforementioned tools in order to identify the one that best suits to the TRANSBASE LCS. The multi-criteria analysis showed that the EFSI tool is the most suitable one followed by the EIB funding schemes.

## 6. CONCLUSIONS

### 6.1 Summary of the deliverable

This deliverable was part of the WP2 (Task 2.2) of the project entitled NEWBRAIN. Task 2.2 aimed at each Project partner implementing overall or detailed technical studies (e.g. feasibility studies, technical design of non-infra/infrastructure works, environmental assessment studies, cost and benefit analysis on non-infra/infrastructural works) on one of the measures/interventions of the action plan (act T2.1) with the aim to concretely push forward the implementation of the TEN-T network in the Adriatic-Ionian Macro-region in line with environment-friendly and low-carbon requirements of the EU policies

To this end, the scope of this deliverable (Deliverable 2.2.1) was to present an overall technical study (with emphasis on platform technical design and cost-benefit analysis) of the TRANSBASE intervention that was selected as the most promising intervention to be developed in Tasks 2.1.1 and 1.2.4 respectively.

Initially a brief description of the TRANSBASE intervention was presented. The main objectives of TRANSBASE were described, followed by the actors and stakeholders that will use the proposed intervention. Furthermore, the impact that TRANSBASE will have in national and European level with emphasis on the Adriatic-Ionian area was presented.

Subsequently, the technical design and services of the proposed Logistics Community System (LCS) were described. More specifically, the TRANSBASE system development guidelines were presented followed by the proposed system architecture. In addition, the main services of the proposed LCS were analysed together with a series of technical requirements that should be taken into consideration during system development.

Then a cost-benefit analysis (CBA) for the TRANSBASE Logistics Information System (LCS) was performed. We presented the CBA methodology that was adopted for this analysis followed by the implementation of CBA for the proposed initiative. We calculated the Net Present Value (NPV) as well as the Internal Rate of Return (IRR) for 10 and 15 years respectively in order to evaluate the investment. We performed a sensitivity analysis with variable discount return rates in order to test the robustness of the CBA results. The results of the NPV calculations (for 10 years period) showed that the investment is worth with a discount return rate of up to 1.5% (positive NPV). For the case of NPV calculations for 15 years period, the investment has a positive result with any discount return rate (between 0%-5%).

Last but not least, we selected 5 appropriate innovative tools that can be used in order to support the design and development of the TRANSBASE LCS, namely ERDF, H2020, EFSI, EIB and PPP. An analysis of their main characteristic was made in order to be able to understand what type of projects they fund and how this is accomplished. Subsequently, we assessed the aforementioned tools in order to identify the one that best suits to the TRANSBASE LCS. The multi-criteria analysis showed that the EFSI tool is the most suitable one followed by the EIB funding schemes.

## 6.2 Next steps

The following actions of the project concern the implementation of Activity T2.3 that deals with the “Set-up of transnational cooperation actions”. More specifically, Activity T2.3 is aimed at the concrete implementation of NEWBRAIN transnational strategy (Act 1.4) and of Action Plans (Act 2.1) measures through the elaboration of transnational cooperation initiatives (TCIs) (e.g. project ideas) in the framework of the main EU and national/international financing schemes (e.g. CEF programme, EFSI, EIB, etc.).

At least 3 TCIs will be drafted, in line with the strategic priorities detected in the previous project phases by using also Act.2.2 deliverables. TCIs are drafted on the basis of the existing calls for projects and financing initiatives available in the transport and logistics fields and may involve different partnership composition within the project Consortium.

TCIs will ensure the sustainability of the NEWBRAIN network by going beyond the same definition of strategic priorities and planning of interventions and contributing to jointly raising funds as leverage for the macro- intervention categories identified in Action Plans.