Deliverable T3.1.1

Inter-Connect Roadmap

"Passengers' intermodality and rail Renaissance"

12/2020

Inter-Connect project Doc. TYPE/No/Title	Activity T3.1 / Intermodal Strategy for ADRION - Roadmap
WP	WPT3: Intermodal Passenger Transport Roadmap formulation
Authors	CERTH/HIT
Contribution	All

Contents

1. Introduction 3
1.1 Work package 3; “Intermodal Passenger Transport Roadmap formulation” 3
1.2 Activity 3.1; “Intermodal Strategy for ADRION - Roadmap” 4
2. Refreshing on Transport & Mobility in EU 5
2.1 The role of transport 5
2.2 Transportation & mobility in EU 5
2.3 Role and impacts of transportation 7
2.4 The policy background for transportation & mobility 9
2.5 Threats & opportunities for the sustainability of transportation & mobility 14
3. Intermodality; capitalizing on the knowledge gained from Inter-Connect 16
4. From local to transnational connectivity; measures identification 8
4.1.1 High level cooperation / agreements 10
4.1.2 Stakeholders' engagement & actions/ initiatives synergies 12
4.1.3 Awareness raising for sustainable mobility & crowd-learning 14
4.1.4 Sustainable tourism promotional campaigns & initiatives 15
4.1.5 ICT / apps 17
4.1.6 Advanced (harmonized, integrated, of high quality) services provision at local level . 18
4.1.7 Advanced (harmonized, integrated, of high quality) services provision at transnational level 20
4.1.8 Hard 'rail' measures – infrastructures 21
4.2 Measures’ ranking 23
5. Inter-Connect Roadmap 33
References 38

List of Figures

Figure 1: Roadmap formulation approach 5
Figure 2: Energy consumption in transport sector [10] 8
Figure 3: Total emissions per sector, EU [8] 8
Figure 4. "European Commission 2013 – Urban Mobility Package" objectives [19] 11
Figure 5. The Urban Agenda for the EU [25] 11
Figure 6. SDG goals, United Nations 12
Figure 7: Industrial revolutions [13] 15
Figure 8: Chronological ruler of EU strategies on transport 16
Figure 9: National and regional/local policies and strategies reviewed in Del. 1.1.1 17
Figure 10: Categories of Good Practices identified for Inter-Connect 19
Figure 11: Inter-Connect cases as transnational hubs 21
Figure 12: Rail clusters, Rail4See project 23
Figure 13: Main cruise routes in the Adriatic Sea, 2017 24
Figure 14: Trip’s attributes significance (all modes) 27
Figure 15: Number of answers in the SP survey per Inter-Connect case 29
Figure 16: Trips clustering 29
Figure 17: Inter-connect ‘‘intelligence’’ 0
Figure 18: Top-5 public transport attributes, stakeholders’ perception 1
Figure 19: Citizens’ engagement magnitude & ideas, data from the 1st dissemination event 2
Figure 20: The 11 thematic objectives of Cohesion Policy 2014-2020 [29] 10
Figure 21: EUSAIR pillars [35] 13
Figure 22: The psychological continuum model [50] 15
Figure 23: ICT solutions and impacts [52] 17

Figure 24: An ICT based approach to passengers' sustainable transport, CROWD4ROADS project [48] 18
Figure 25: An example of a door-to-door trip (urban level) [Rail4SEE project] 20
Figure 26: TEN-T rail network and TEN-T/CEF projects position (https://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html) 23
Figure 27: Measures ranking per case [Inter-Connect Del. 3.2.2] 33
Figure 28: Inter-Connect Roadmap on reaching intermodality vision 36

List of Tables

Table 1: Activity 3.1 deliverable 4
Table 2: Comparison of transport statistics [6] 6
Table 3: Externalities of transport sector 9
Table 4. Sustainable mobility interventions and their link to UN's Sustainable Development Goals and EU2020 goals 12
Table 5: The Inter-Connect case studies main goals & scale of examination 9

Introduction

1.1 Work package 3; "Intermodal Passenger Transport Roadmap formulation"

WPT3 concentrates all the work done in the previous two technical WPs and goes steps further by providing Inter-Connect's Roadmap on ADRION's passengers' intermodal transport and rail enhancement. Based on the previous experience (Rail4See) which proves that enhancement of regional services (integrated services, improved quality, better facilities) accompanied with the development of synergies among key players at bilateral and multilateral level (neighbouring countries) can support transnational connectivity, this WP exploits the cases examination and cooperation schemes identified for mining proposals for transnational connectivity.

The '**Intermodal Strategy for ADRION – Roadmap' (Act. 3.1 - respons. partner CERTH**) comes as an extension of the cases key generalized messages (Act. 2.4), policies and best practices review (Act. 1.1& 1.2), current and future connectivity at regional (Act. 2.1) and transnational level (Act. 1.3) and partnerships' experience gained over Inter-Connect project. In order to assess the nature and performance of the collected measures, a survey was designed, in which experts' from various sectors and fields were asked to evaluate them **(Act. 3.2 'Stakeholders' consultation' - respons. partner CEI)**.

Within Act. 3.2, two technical round tables were organized:

- The 1st during July 2018
- The 2nd in August 2019

From a technical point of view, the 1st RT, serve among others, traffic data collection that are necessary for the traffic flows analysis (**Act. 1.3 and 2.1 - respons. partner CERTH**)– demand and supply data at ADRION and local/regional level. The stakeholders were also consulted as for the identification of the cases' catchment area (area from which they attract trips). Furthermore, as for the most important factors attracting users to PuT, stakeholders verification during the RT were valuable (for allocating weights in each characteristic e.g. reliability, frequency). Furthermore, the stakeholders discussed along with the partners the case studies and were engaged for supporting cases' examination.

During the 2nd RT, that came approximately with the finalization of cases' examination was the channel to evaluate cases' results and further capitalize for next steps. It also supported ROADMAP preparation. Stakeholders were consulted so as to evaluate the interventions proposed by **CERTH/HIT (resp. of Act. 3.1) and the rest partners**; a user-centered methodology is implemented to direct collection of self-reported data. The main objective was to identify how experts in the field of passengers transport, representing different disciplines, value the importance of each reported measure. Furthermore, the survey is aimed at gathering feedback by stakeholders from the public and private sector on how already implemented measures have managed to enhance passengers' transport so far. This approach aimed to reveal the exact placement of each measure in the respective roadmap, as all measures:

- start of implementation period (left edge of each measure's box)
- time needed for its implementation (extent of each measure's box on the x-axis)

- financial resources needed for its implementation (indication on a high-medium-low scale, depending on the mode of transport under examination)
- contribution of measure to the enhancement of intermodal&rail transport

The ROADMAP, a kind of strategy for ADRION, aims to give input to future policies, generalizing and translating project's results into recommendations for future public and private actions for intermodal and rail transport promotion. Further than providing the roadmap as a useful guide for authorities and other interested parties, organizations' capacity building is enhanced through the second important deliverable of WPT3; the **"Intermodal Transport Capacity Building Toolkit" (Act. 3.3 – respons. partner CERTH)** serves Inter-Connect's principle objective of training authorities on intermodal transport and rail promotion actions. CERTH/HIT's experience, on strategic documents preparation and authorities supportive role, will be fully exploited since it will lead and manage WPT3 activities and actively contribute in recommendations formulation and training activities (**Act. 3.4 'Capacity building activities- respons. partner LP**) implementation. The toolkit of Inter-Connect project is available at https://interconnect.imet.gr/ .

The training material of the project follows project's deliverables production;

- 1st webinar content: policies and strategies
- 2nd webinar content: best practices and funding mechanisms
- 3rd webinar content: cases presentation and first results
- 4th webinar content: ROADMAP

1.2Activity 3.1; "Intermodal Strategy for ADRION - Roadmap"

The analysis of the current situation, the feedback from stakeholders' plans and passengers' needs along with the identification of future trends and opportunities formulate the roadmap for ADRION's intermodal/rail development. The roadmap, a prioritization of interventions, is estimated to be a useful tool in the hands of authorities so as to prepare an efficient and realistic agenda. Among the proposed interventions of the roadmap are found integrated solutions (e.g. information), new cooperation schemes, services' optimization, new services, harmonized procedure/management structures and funding enablers' mobilization.

The goals of activity 3.1 are served by one deliverable (Table 1) – the Roadmap.

Table 1: Activity 3.1 deliverable

Deliverable	Short description
Deliverable T3.1.1 Inter-connect Roadmap "passengers; intermodality and rail Renaissance" formulation	The analysis of the current situation, the feedback collection from stakeholders and passengers as for their needs, plans and goal setting, cases examination results along with the identification and recording of future trends and opportunities will form the Inter-Connect ROADMAP with prioritized interventions for improving passengers intermodality in the whole ADRION area, The Deliverable (and the activity as a total) takes into account the results of the previous technical WPs and the results of the cases examination and concludes into specific measures to be undertaken.

The selection procedure for the measures mining to form the Inter-Connect Roadmap on enhancing intermodality in ADRION Region, is based on a three-step approach; (i) desktop

research (in the framework of previous Inter-Connect activities but also accompanied by further research), (ii) internal consultation and (iii) stakeholders' wisdom mixture were activated (Figure 1).

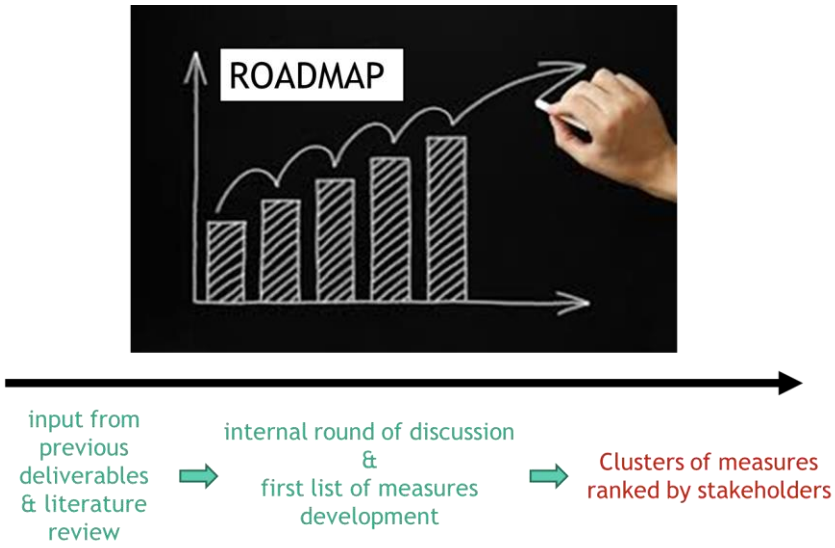


Figure 1: Roadmap formulation approach

2. Refreshing on Transport & Mobility in EU

2.1 The role of transport

Transport and connectivity play a pivotal role for global economies providing or enhancing access to various locations for businesses and individuals, for both freight and personal movements [1]. Transport sector provides the essential distribution for production, as well the necessary path to personal mobility at local and transnational levels boosting economic growth and competitiveness [2]. Being such a crucial parameter of development while in parallel representing one of the core pillars upon which EU is built, wide scale accessibility and mobility were and still strongly remain on the crux of EU agenda [4].

2.2 Transportation & mobility in EU

Numbers that are showing the 'radius' (significance) of the sector in EU, as depicted in the Statistical pocketbook 2019, are [6]:

- *In 2017, total passenger transport activities in the EU-28 by any motorized means of transport are estimated to amount to 6 913.3 billion pkm or on average around 13 505 km per person. This figure includes intra-EU air and sea transport but not transport activities between the EU and the rest of the world. Passenger cars accounted for 70.9 % of this total, powered two-wheelers for 1.8 %, buses & coaches for 7.4 %, railways for 6.8% and tram and metro for 1.6%. Intra-EU air and intra-EU maritime transport contributed for 11.2% and 0.4% respectively.*
- *In 2017 total goods transport activities in the EU-28 are estimated to amount to 3 731 billion tkm. This figure includes intra-EU air and sea transport but not transport activities between the EU and the rest of the world. Road transport accounted for*

50.1 % of this total, rail for 11.3 %, inland waterways for 3.9 % and oil pipelines for 3.1 %. Intra-EU maritime transport was the second most important mode with a share of 31.5 % while intra-EU air transport only accounted for 0.1% of the total.

A comparison of the above numbers (approximation) with global ones is depicted in Table 2.

Table 2: Comparison of transport statistics [6]

Comparison EU-28 - World

Passenger and Freight Transport

	EU-28	USA	Japan	China	Russia
	Passenger transport billion pkm				
	2017	**2017**	**2016**	**2017**	**2017**
Passenger car	*4 901,4*	7 751,0 (1)		9 765,2 (2)	
Bus + trolley-bus + coach	*510,4*	588,0	70,1		128,6
Railway	469,7	39,0	431,8	1 345,7	123,1
Tram + metro	*107,2*	24,3	(3)		48,4
Waterborne	*24,3*	0,8	*3,1* (4)	7,8	0,7
Air (domestic / intra-EU-28)	*776,9*	1 116,6	90,6	951,3	259,4
	Freight transport billion tkm				
	2017	**2016**	**2016**	**2017**	**2017**
Road	1 870,1	2 953,2	210,3	6 677,2	255,0
Rail	*421,0*	2 314,7 (5)	21,3	2 696,2	2 493,0
Inland waterways	147,0	445,3			67,0
Oil pipeline	*114,0*	1 308,6		478,4 (6)	1 315,0
Sea (domestic / intra-EU-28)	1 175,9	*257,0* (7)	180,4	9 861,1 (8)	46,0

Source: Eurostat, Japan Statistics Bureau, US Bureau of Transportation Statisitics, Goskom STAT (Russia), National Bureau of Statistics of China, International Transport Forum, estimates (*in italics*)

Notes:

(1): USA: Including light trucks / vans
(2): China: including buses and coaches
(3): Japan: included in railway pkm
(4): Japan: 2015 value
(5): USA: Class I rail
(6): China: oil and gas pipelines.
(7): USA: refers to coastal shipping, 2015 data.
(8): China: both coastwise and inland waterway transport.

The above table, taking into account the urbanization level in EU countries as well as the actual population numbers, so that we have still a lot to do in the Old Continent in order to get in a deep sustainability path.

2.3Role and impacts of transportation

Impacts of transport sector touch almost all dimensions of sustainability, wellbeing and daily operation;

- **Economic role and impact of transportation**

Transport infrastructures are connecting people to jobs, education, and health services enabling goods' supply and services while allowing people to interact with one another, share and generate experiences, solutions and produce self as well as systemic growth [3]. The transport industry directly employs around 10 million people and accounts for about 5% of gross domestic product (GDP), number that represents around 5.2% of the total workforce.

Effective transport systems enforce the role of EU companies not only at local but also at global level making them competitive – injecting innovation and research in transport sector is placed at the top of identified needs and opportunities. Logistics, such as transport and storage, account for 10–15% of the cost of a finished product for European companies. The quality of transport supply gives upgraded experience to everyday life of EU citizens. Average spending for mobility (goods and people) per household reaches the 13.2% of the total household's budget [5].

- **Social role of transportation**

Transportation has always influenced the formulation of settlements; proximity to main transport infrastructures and access to transport services is vital for daily operations [7].

Social equity and social inclusion is facilitated through the access to upgraded transport services [27].

- **Environmental side of transportation**

Concerning the environmental impacts of transport, negative effects are mainly referred.

<u>Energy consumption & pollution</u>
As depicted in Figure 2, annual energy consumption in transport in the (European Economic Area) EEA-33 grew by 38 % between 1990 and 2007 (32 % in EU-28). The shipping sector saw the greatest decline of 10 % in energy consumption between 2008 and 2009 alone, with a total decrease of 19 % between 2007 and 2017, while energy use in air transport increased by 7 % between 2007 and 2017. Road transport accounts for the largest proportion of energy consumption in the transport sector, accounting for 73 % of the total demand in 2017 [10].

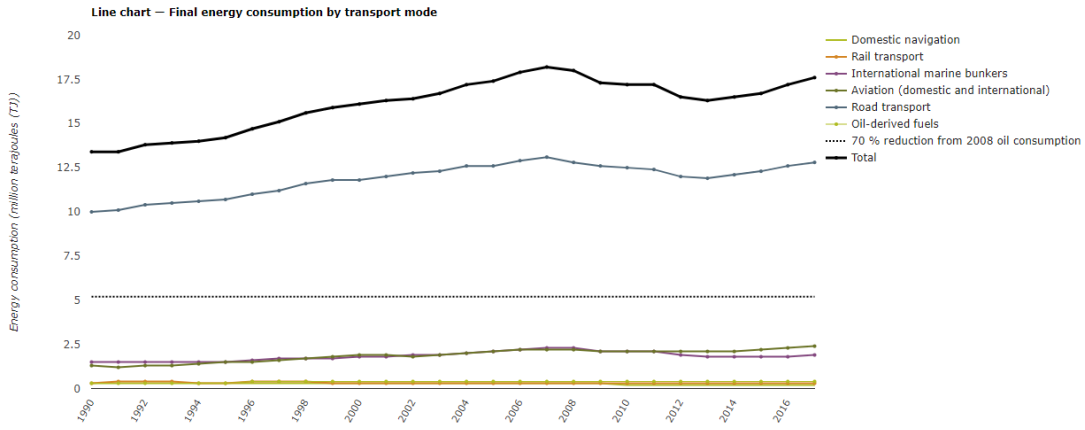


Figure 2: Energy consumption in transport sector [10]

Consuming fossil fuel energy is linked with pollution; carbon monoxide, hydrocarbons, oxides of nitrogen, and other particulate matter.

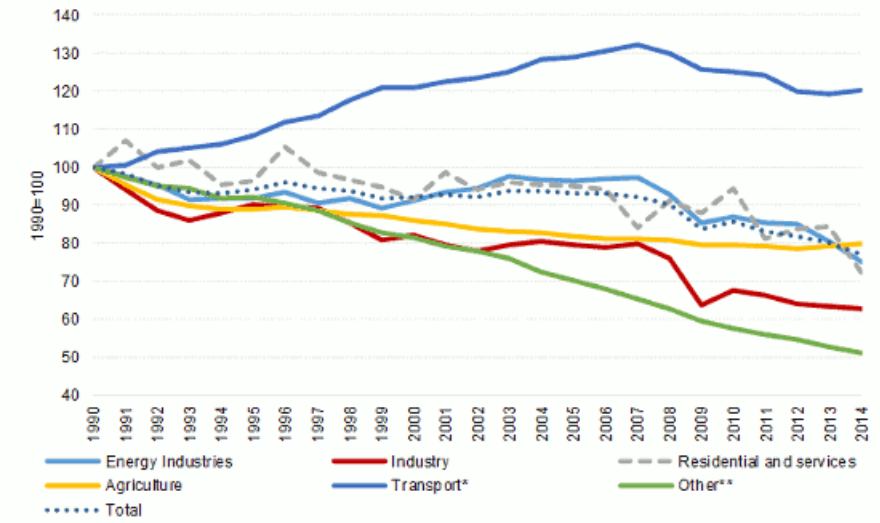


Figure 3: Total emissions per sector, EU [8]

Transport represents almost a quarter of Europe's greenhouse gas emissions and is the main cause of air pollution in cities with road transporting being by far the largest emitter [8].

<u>Noise pollution</u>

Congestion other than being a strong determinant of pollution also contributes in noise pollution, a phenomenon which influences inhabitants' lives especially in urban areas. Noise is generated also during the operational phase (noise generated by the engine and exhaust systems of vehicle, aerodynamic friction, and the interaction between the vehicle and the support system (road-tire, rail-wheel).

Both air and noise pollution extended exposure is proved to produce physical and psychological damage, therefore totally linked to social (health) and economic issues [11,12].

Based on the above, Table 3 summarizes crucial negative sides – negative impacts of transportation (usually referred with the term 'externalities'):

Table 3: Externalities of transport sector

Economic impacts	Environmental impacts	Social impacts
• Congestion • Bottlenecks • Low accessibility • Accidents • Increased costs	• Pollution • Noise • Climate change	• Social inequity • Health problems • Lower quality of life • Aesthetic damage

Internalisation of Transport Externalities is a main issue also well defined and studied at EU level. The term refer to the external costs and how should pay for them; linked to "user pays" and "polluter pays" principles while also associated to the need for incorporating these effects in the decision-making process of transport users. The interesting reader is referred to reference [59] for studies on this topic.

2.4The policy background for transportation & mobility

The European Commission (EC) has emphasized the inherent and increasing value of mobility to boost European cities economic growth and development and very early recognized its substantial role on territorial cohesion.

The EC Green Paper on Urban Environment [14] was one of the first devoted attempts on enhancing urban environments in EU; it concludes that integrated approach from all policy levels is required and that the urban environments are both the source of environmental problems and the framework of solutions identification [15]. Following, and in line with the Treaty of Amsterdam (which introduced sustainable development as an objective for the Community) and the Gothenburg European Council (which agreed on a strategy for sustainable development), the EU published the White paper 2001 – 'European transport policy for 2010: time to decide' [16]. In this paper, the EC proposes some 60 measures aimed at developing a European transport system capable of modal shift towards friendlier modes of transport than private car, revitalising railways, promoting sea and inland waterways based transport and controlling air transport growth. The starting point of the 2001 White Paper on Transport Policy is that a modern transport system must be sustainable from an economic and social as well as from an environmental viewpoint. In 2006, the mid-term review of the White Paper introduced two important shifts compared to previous Commission position:

- The position that mobility must be disconnected from its negative side-effects rather than from economic activity;
- The introduction of the concept of co-modality ("use of different modes on their own and in combination" in the aim to obtain "an optimal and sustainable utilisation of resources").

In 2006, when the mid-term review of the Transport White Paper was presented, the European Commission announced its intention of presenting an Urban Transport Green Paper. The Green Paper "Towards a new culture for urban mobility" published in 2007 [17] agreed on the necessity to join actions and forces towards achieving the goal of free-flowing and greener cities. With the Green Paper, the Commission set a new European agenda for urban mobility, respecting local, regional and national authorities' responsibilities and trying to reinforce citizens and stakeholders engagement in the common target of successful urban mobility management. The launching of the new era of accessible, safe and secure urban transport was planned in parallel with the identification of the obstacles hindering successful urban mobility and of ways to overcome problems. Issues as the improved quality of collective transport, clean and energy efficient technologies support of walking and cycling and respect of passengers' rights on public transport were among the core discussion subjects of the Green Paper.

10 years after the 'European transport policy for 2010: time to decide' White Paper, the Commission adopted a new Transport White Paper, which defines its transport policy agenda for the next decade. In the "Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system", White Paper 2011 [18] the EC adopted a roadmap of 40 concrete initiatives for the next decade to build a competitive transport system that will increase mobility, remove major barriers in key areas and fuel growth and employment. At the same time, the proposals will dramatically reduce Europe's dependence on imported oil and cut carbon emissions in transport by 60% by 2050.As major emission contributor, urban transport greening holds a central position in the goals list.
In December 2013, via the Urban Mobility Package [19], the Commission reinforces its supporting measures in the area of urban transport by:

- Sharing experiences, show-casing best practices, and fostering cooperation
- Consolidation and dissemination of experiences and best practices (studies, web portals): Urban Mobility Portal (Eltis); Platform on Sustainable Urban Mobility Plans; Member States Expert Group
- Providing targeted financial support, i.e. Structural funds, ESI-Funds, TEN-T
- Focusing research and innovation on delivering solutions for urban mobility challenges i.e. CIVITAS Initiative (2002), Smart Cities and Communities, Clean Vehicles Initiative
- Involving the Member States and enhance international cooperation.

The central element of the Urban Mobility Package is the communication "Together towards competitive and resource efficient urban mobility" that aims at providing the basis for a continuous debate on urban mobility at EU and member states levels (figure 4).

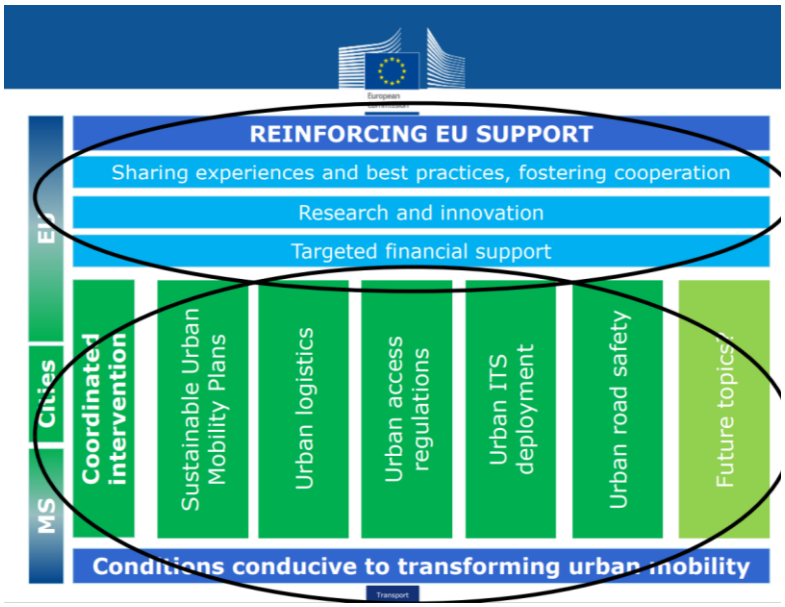


Figure 4**. "European Commission 2013 – Urban Mobility Package" objectives [19]**

All these years, EC Multiannual Financial Frameworks have supported projects and ideas implementation at EU cities for sustainable urban mobility. Transnational European Cooperation Programmes (e.g. Interreg MED, Europe, SEE, ADRION) and Framework Programmes for research and technological development have given the opportunity to partners from different EU countries to come close, discuss, conduct research and implement policies in transport field.

Coming in today, smart, green and integrated transport has been identified as one of the major societal challenges and simultaneously of EU2020 goals ("A European strategy for smart, sustainable and inclusive growth" [20]). EU flagship initiative "Resource efficient Europe" concentrates on helping decouple economic growth from the use of resources, by decarbonizing economy, increasing the use of renewable sources, modernizing the transport sector and promoting energy efficiency (figure 5).

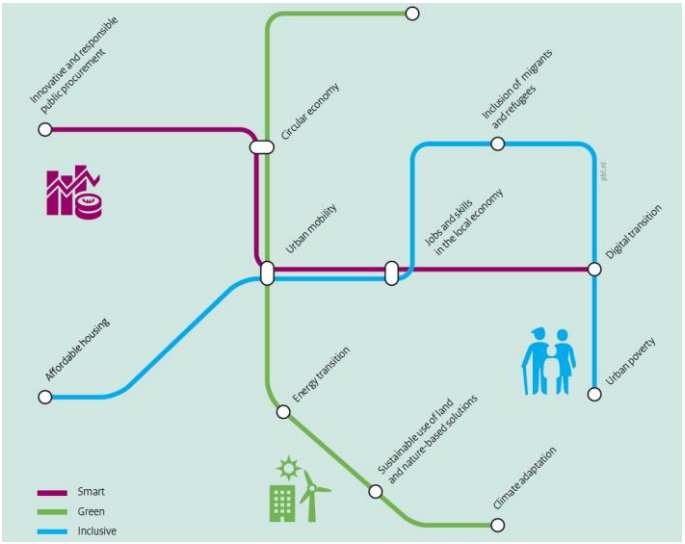


Figure 5. **The Urban Agenda for the EU [25]**

At global level, on the 1st of January 2016, the 17 Sustainable Development Goals (SDGs - figure 6) [21] of the 2030 Agenda for Sustainable Development — adopted by world leaders in September 2015 at an historic UN Summit — officially came into force.

Figure 6**. SDG goals, United Nations**

Although not legally binding the SDGs are expected to be taken into account by countries and take integrated measures for ending all forms of poverty, fight inequalities and tackle climate change, while ensuring development for all.

table 4 presents in brief the (desired) connection to UN's Sustainable Development Goals and EU2020 goals [28].

Table 4. **Sustainable mobility interventions and their link to UN's Sustainable Development Goals and EU2020 goals**

Sustainable Mobility Interventions	**Relation with UN's Sustainable Development Goals (in some cases indirectly related to the transport sector)**	**First level connection to EU2020 goals (and to flagship initiatives)**
NEW MOBILITY SCHEMES & ENHANCED REGIONAL CONNECTIVITY and PERFORMANCE **New forms of mobility (soft mobility schemes, drive-sharing, ride-sharing, crowd shipping, crowd delivery, connected and automated vehicles, innovative flying vehicles, Mobility as a Service)** **Balanced development between urban and rural areas (increased inter-modality and higher resilience of the transport system between the metropolitan region and the neighbouring cities and rural areas)** **Meeting the challenge of reducing the**	Goal 11: Sustainable Cities and Communities "Make cities and human settlements inclusive, safe, resilient and sustainable." Goal 8: Decent Work and Economic Growth "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all." Goal 3: Good Health and Well-Being for people "Ensure healthy lives and promote well-being for all at	SUSTAINABLE GROWTH • Resource efficient Europe • An industrial policy for the globalisation era

environmental impact of commuting and inter-urban transport **Overall regional development (including connectivity to TEN-T corridors)** **Daily performance upgrade (competitiveness, sustainability, social cohesion, equity, and citizen well-being)**	all ages." Goal 7: Affordable and Clean Energy "Ensure access to affordable, reliable, sustainable and modern energy for all." Goal 10: Reduced Inequalities "Reduce income inequality within and among countries. Goal 5: Gender Equality "Achieve gender equality and empower all women and girls."	
INNOVATION **Introduction of innovative transport technologies** **Information systems exploitation** **Market up-take of innovations (also supporting company logistics)**	Goal 9: Industry, Innovation and Infrastructures "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation."	SMART GROWTH • Innovation Union • Youth on the move (ended in December 2014) • A digital agenda for Europe
"HAND BY HAND" SPATIAL & MOBILITY GROWTH **Increased coordination between multimodal infrastructure mobility and spatial-economic development, including reduction of inequalities** **Reduced congestion, energy, emissions of air pollutants, carbon footprint, noise and land-use within the identified metropolitan regions**	Goal 7: Affordable and Clean Energy "Ensure access to affordable, reliable, sustainable and modern energy for all." Goal 13: Climate Change "Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy."	SUSTAINABLE GROWTH (as above)
CITIZENS ACTIVE ENGAGEMENT **Behavioural change towards sustainable mobility**	Goal 12: Responsible Consumption and Production "Ensure sustainable consumption and production patterns."	INCLUSIVE GROWTH • An agenda for new skills and jobs • European platform against poverty and social exclusion
EFFECTIVE COOPERATION SCHEMES **Operational and business models** **Aid to decision makers for efficient planning** **Cooperation schemes**	Goal 17: Partnerships for the Goals "Strengthen the means of implementation and revitalize the global partnership for sustainable development."	SMART-SUSTAINABLE-INCLUSIVE GROWTH (all the above)

2.5 Threats & opportunities for the sustainability of transportation & mobility

Among the threats for the future of transport system – externalities arisen are [23, 24, 26]:

- Environmental constraints: reduction of greenhouse gas emissions is a real target for EU
- Competition from fast developing world transport markets: coordinated plans of fast growing countries seem to pose additional pressure on EU performance.
- Scarcity of resources: decarbonisation of EU transport sector seems appropriate for sectors sustainability
- Congestion: delays are linked to cost and time loss and costs about 1% of gross domestic product (GDP) each year
- Ageing: according to Eurostat, by 2060, the median age of the European population is projected to be more than 7 years higher than today and the number of people aged 65 or more is expected to represent 30 % of the population as opposed to 17 % today that poses accessibility in the center of mobility planning (very specific needs)
- Migration and internal mobility: net migration to the EU might add 56 million people to the EU's population in the next five decades – special needs are also posed at the center of discussions as well as equity issues
- Urbanization: it is estimated that the 84 % of EU population in 2050 will live in cities which is a deep pressure for the urban networks; traffic management becomes a pivot issue
- Unbalanced development; unequally developed infrastructure in the eastern and western parts of the EU and among older and newer EU members
- 'Shock' situations: situations like the COVID-19 pandemic in 2020 that hit among else also the transport system are real threats that require rapid responses

And as in all situations, threats are strongly linked with opportunities; therefore being proactively ready for hitting the abovementioned threats provide the foundations for development. Technology, research and innovation are the basic parameters for building a sustainable future. New technologies or more efficient use of existing resources will be the key to address those threats without curving mobility. An innovative transport sector will become the pillar to sustain the economic competitiveness of European countries across the world.

Sustainability has arisen as the first challenge for the future as it seems and transport as well as the rest 'building blocks' of daily operations face challenges arising from the rapid changes linked with the global trends and associated with the concurrent situation; we live the 4th industrial revolution (Figure 7) – thus it is really interesting the connection of transport with industrial revolutions and the 'change of challenges' at each step (mechanization, mass production, automation, robotization) [13].

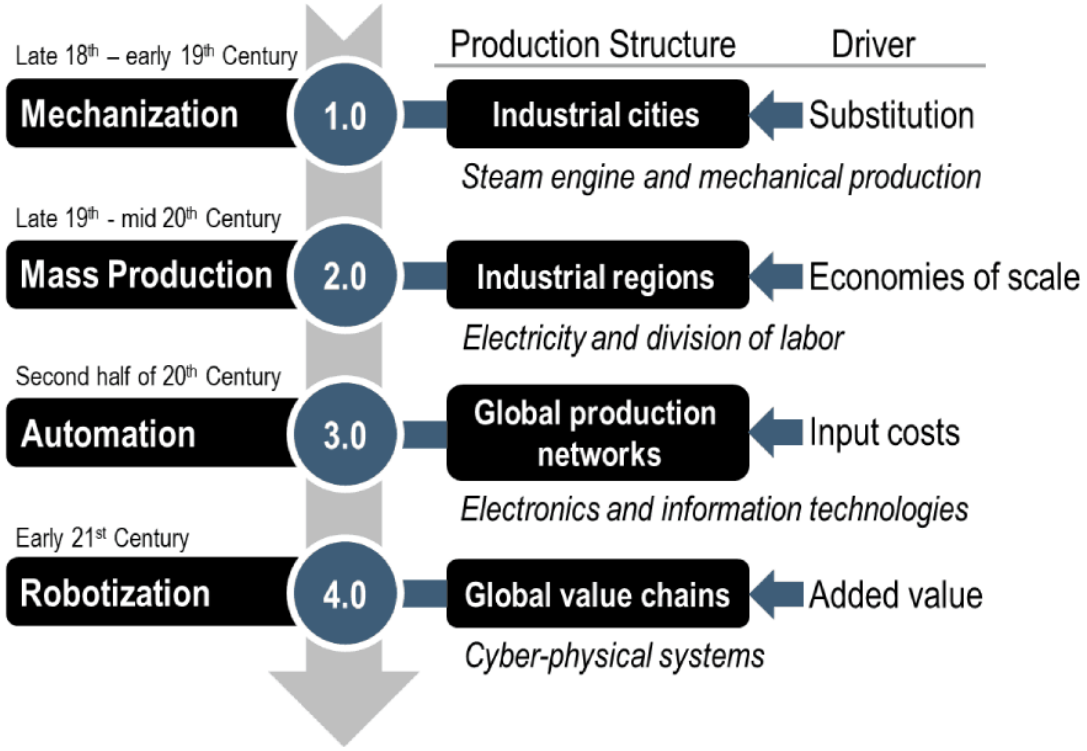


Figure 7: Industrial revolutions [13]

According to the latest EU news on policy regarding transport, we can note the reference to the Strategy on Sustainable and Smart Mobility that is linked to great and ambitious goals; 90% reduction in emissions by 2050 coming from real deep contribution from **four principles** having to do with European Green Deal:

- *Making the transport system as whole more sustainable;*
- *Making sustainable alternative solutions available to EU citizens and businesses;*
- *Respecting the polluter-pays principle in all transport modes;*
- *Fostering connectivity and access to transport for all.*

Actions to achieve the wide goals are categorized also in 4 pillars:

- *Boost the uptake of clean vehicles and alternative fuels for road, maritime and aviation. In this regard, we are already looking into specific initiatives to ensure the availability of marine alternative fuels and sustainable aviation fuels;*
- *Increasing the share of more sustainable transport modes such as rail and inland waterways, and improving efficiency across the whole transport system;*
- *Incentivising the right consumer choices and low-emission practices;*
- *Investing in low- and zero-emissions solutions, including infrastructure.*

Big data, digitalization (Mobility as a Service) and opportunities arisen through the exploitation of innovative technological achievements i.e. Artificial Intelligence would without saying transform the background and generate further exploitable valuable knowledge. Vision for cleaner, seamless, smart and safe mobility across all transport modes will be the case [22].

3. Intermodality; capitalizing on the knowledge gained from Inter-Connect

The previous deliverables upon which the Roadmap is built and the respective conclusions that were taken into consideration are summarized in the current subchapter.

a. Deliverable T1.1.1: Intermodal transport background; strategic and policy documents review

Deliverable T1.1.1 summarizes regional/national and EU strategic and policy documents supporting both rail use and interventions towards passengers' intermodal transport. Among the main documents reviewed were Transport White Papers, EUSAIR, EC Guidelines for the Trans-European Networks, EU 2020 Strategy with focus on Western Balkans, the 4 railways packages and the SEECP initiative. Figure 8 presents an overview of the documents reviewed at EU level.

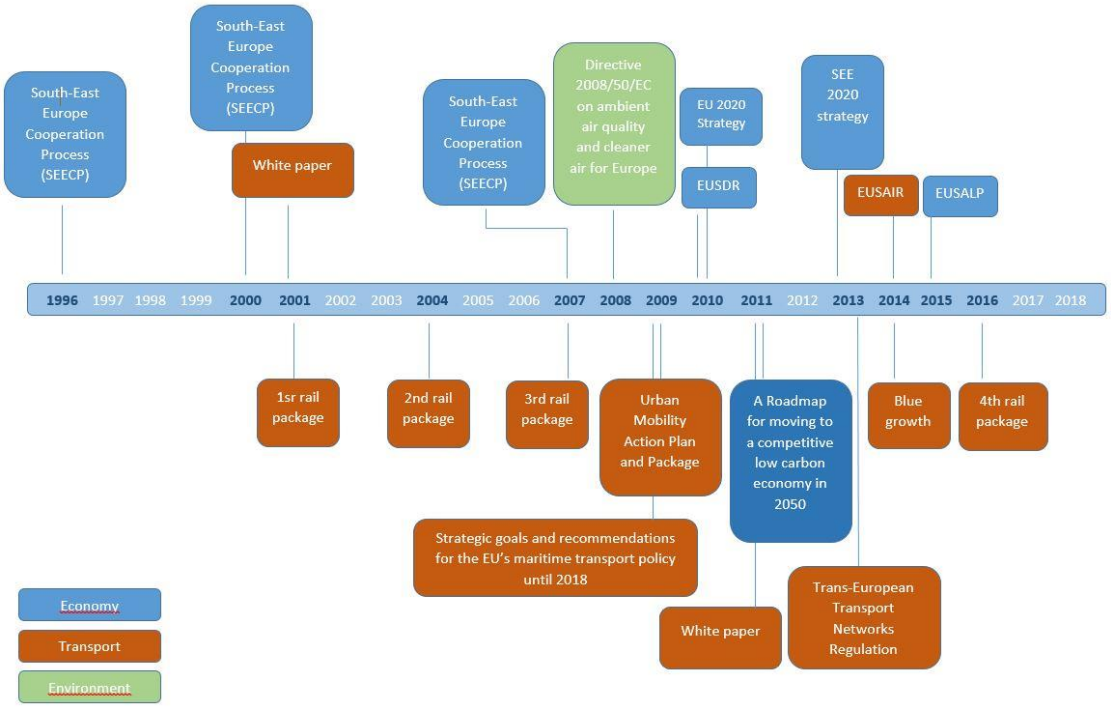


Figure 8: Chronological ruler of EU strategies on transport

Accompanying the EU documents, Del. 1.1.1 presents also the review of, in total, 26 policy documents at national and regional/local level (for the Greek, Italian, Croatian, Slovenian, Montenegrin, Albanian and Serbian cases).

Figure 9: National and regional/local policies and strategies reviewed in Del. 1.1.1

The report reveals the abundance of EU policy documents towards achieving intermodality in transport sector with an ultimate goal to support shift towards a low carbon economy respecting accessibility needs:

* Decouple economic growth from the use of resources
* Support the shift towards low carbon economy
* Increase the use of renewable energy sources
* Modernize the transport sector
* Promote energy efficiency.

Referring to transport related issues, core actions noted as necessary to be taken at EU level include:

* Mobilization of EU financial instruments as part of a consistent funding strategy
* Presentation of proposals for modernization and decarbonisation of the transport sector towards increased competitiveness, that indicatively could include electrical mobility, better logistics etc
* Acceleration of implementation of strategic projects with EU importance to address critical bottlenecks, in particular cross border sections and intermodal nodes (cities, ports, logistic platforms), in non-EU regions included

* Enhanced efficiency and effectiveness of transport by ensuring a better modal integration across the network, in terms of infrastructure, information flows and procedures
* The trans-European transport network must ensure efficient multi-modality in order to allow better and more sustainable modal choices to be made for passengers and freight and in order to enable large volumes to be consolidated for transfers over long distances
* Make multimodality economically more attractive for passengers, users and freight forwarders
* Develop sectors that have a high potential for sustainable jobs and growth (i.e. aquaculture, coastal tourism etc.)
* Essential components to provide knowledge, legal certainty and security in the blue economy (i.e. maritime spatial planning, integrated maritime surveillance etc.)
* Sea basin strategies to ensure tailor-made measures and to foster cooperation between countries
* Invest in urban sustainable mobility planning

Smart, sustainable and inclusive growth are the basic pillars on which EU sets sub-objectives in each field – these starting pillars are also incorporated in macro-regional strategies as EUSAIR (EU Strategy for the Adriatic and Ionian Region). Coming from the latter, main obstacles in intermodal transportation for the area that can be reported are:

* ADRION Region has significant infrastructure deficits
* Western Balkan road and rail network needs urgent rehabilitation
* Maritime traffic congestion is increasing, while surveillance and coordination capacity needs upgrading
* Multi-modal transport is little developed

Indicative targets for the mobility in 2020, thus for the current year were:

* 50% increase in off-season tourist arrivals;
* 5 new macro-regional tourist routes created;
* doubling the Adriatic-Ionian market share of container traffic, while limiting environmental impacts;
* reducing the time at regional border crossings by 50%.

The review of the policies at all three levels, reveals the need for national governments activation towards supporting the real transformation of transport systems. **The countries of Adriatic-Ionian Region should stimulate the take up of innovative strategies** and the application of smart solutions to come closer to the sustainability vision as posed by Europe's 2020 targets. Improving Region's "accessibility", a broader term for referring to transport services, as indicated in EUSAIR strategy can be a decisive drive towards achieving this objective. What is mainly missing in the area, as proven by the failure past stories, is the **capacity of key players and different decision making levels to establish strong cooperation schemes** able to enable the desired growth in a territory consisting of countries presenting great differentiations (in socioeconomic terms). Based on the principles of **smart specialization**, that is built on regional strengths, competitive advantages and cooperation, and following a well-defined forward-looking agenda towards intermodality promotion, transportation negative side effects can be handled and environmental performance in Adriatic-Ionian Region can be improved.

b. <u>Deliverable T1.2.1: Best practices on intermodal promotion and rail reform report</u>

Del. 1.2.1 continues the review part of the project with identifying good practices from previous projects regarding pilot activities and initiatives (i.e. establishment of cooperation schemes) for supporting the use of rail and maritime in South East Europe and in ADRION area. The good practices collected refer to three grand categories; governance related, soft measures and hard measures.

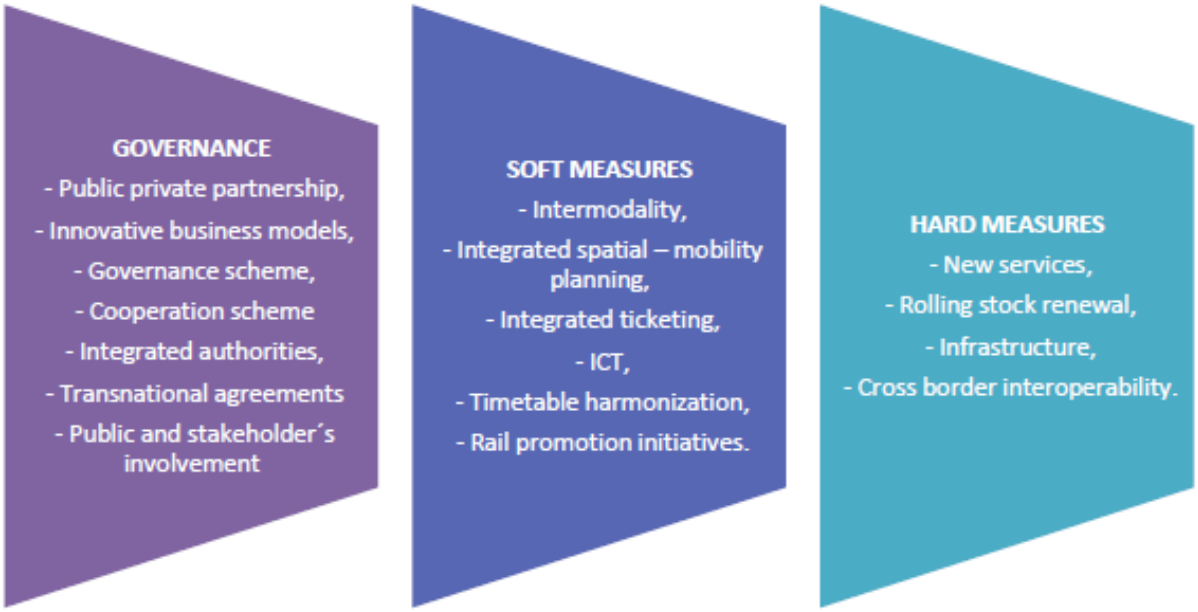


Figure 10: Categories of Good Practices identified for Inter-Connect

The majority of practices are comprised from rail promotion initiatives and other activities to revitalise the rail market, improvement in the governance schemes and intermodality rail – bus which improves interconnectivity of provided PT services with focus on touristic market. Good practices also included **cross border cooperation** in the field of mobility improvement which is crucial for transnational connectivity of transport operation, integrated ticketing, intermodality rail-bicycle (example from Italy on Mi.co.tra train) and improvement of PT assessment processes (Greek example on Integrated methodologies and systems for the control, analysis and assessment of the quality and performance of transport systems). Also well-presented are the railway revitalisation processes (Gemona Sacile railway line, heritage train in Slovenia, railway revitalisation in Montenegro) and other incentives that initiate revitalisation of sustainable mobility. What is missing are more examples of private public partnership, especially in the process of intermodality (only example of P+R in Belgrade is presented), intermodality of railway with demand responsive transport services (DRTS) and more examples of integrated spatial - mobility planning (only example is Transport Development Strategy in Montenegro).

Regarding the financial schemes to support local initiatives, a series of mechanisms seem to be available to support multilateral project cooperation in the ADRION region and are also presented within the analysed best practices. The most important funding sources for presented practices are **European Territorial Cooperation Programme funds** (Greece-

Bulgaria 2007-2013, Central Europe, Interreg IV Italy – Austria Programme 2007-2013) and **regional funds from specific regions that have invested in the sustainable mobility practices** (among other examples are FVG Region, Emilia-Romagna Region, Land Carinthia). For some actions (Croatia, Italy, Slovenia, Greece) funds were also collected from various transport operators (Italian railways Foundation, HZ PP, SŽ-PP and bus operators) or rail infrastructure managers. For IPA partners majority of resources for case studies was derived from International Financial Institutions (among others are: EBRD Technical Cooperation Funds, European Bank for Reconstruction and Development, European Investment bank, EU assistance program) and ministries of specific countries (Albania, Montenegro, Serbia).

From the examples and lessons learned, it can be seen that many of the underlying difficulties in meeting the associated infrastructure and other implementation challenges in the field of **seamless transport** can be attributed to governance and coordination issues that can influence infrastructure planning, policy, regulation, financing, procurement and management.

Presented good practices also indicated the importance of **effectiveness of information exchange, learning, communication and co-ordination across policy sectors**. Including different policy sectors in implementation of actions (be it on regional, national or transnational level) determines how transport interests are balanced in tourism policies and how effective implemented measures will be. Also, it is of great importance for effective management of transport and tourism synergies that can improve visitor's mobility to and within destinations, enhance visitor satisfaction and additionally help to secure the economic viability of local transport systems and services servicing both residents and tourists.

There are many bright examples (Italy, Slovenia, Croatia and Serbia) that **combination of effective transport policies (e.g. integrated multimodal transport systems) and successful promotion of intermodal hubs and gateways** (at the national and trans-national level) can not only help attract, manage or direct visitor flows, but can also facilitate a shift to more eco-friendly transport options. Sustainably oriented pilot implementations in Inter-Connect project can help to consolidate a destination's reputation as sustainable and tourists friendly region.

Additionally, from the examples of Greece-Bulgaria and Serbia-FYR Macedonia it can be clearly seen that border regions are sometimes recognised as functional regions that can only exploit the potential for transport flows and economic growth and if there is sufficient **connectivity between the two sides of the border**. However, there is a **lack of information** on fundamentals such as cross-border flows of workers, trade and tourism, cross-border use of public services or technological border clusters. Only a few cross-border regions have succeeded in building cross-border observation systems and this is a thing to be improved in the whole ADRION area.

From the good examples in A.T.1.2.1 we can clearly conclude that the provision of effective rail and maritime services are fundamental requirements to facilitate the mobility of tourist within and among countries in the ADRION region. **In order for tourism to deliver on its potential as an engine for economic growth,** it is dependent on multimodal transport systems that offer convenience, capacity, reliability and connectivity to suit specific

destination types from maritime area to hinterland. Public transport hubs in cities and regions are designed for different purposes and scale but all play an important role in increasing access to regions and beyond. In next activities within Inter-Connect project (e.g. Pilot actions within WP T2, ADRION Roadmap) we will clearly see that the efficient operation of these transport systems directly reduces costs and opens up new opportunities for further tourism development which is also one of the important strategic goals of EUSDR Strategy and Europe2020 strategy.

c. Deliverable T1.3.1: Demand and Supply analysis of current situation in ADRION

Del. 1.3.1 presented the analysis of ADRION transnational transport supply (offered services and characteristics) as well as main transnational tourism data (flows by origin country) defining in this way region's intermodal reference network (operational positioning of hubs). Through the insight of the supply and demand, the report concludes in key remarks as regards the strengths and the opportunities for upgrading areas' tourism attraction power while at the same time respecting sustainability goals (via promoting environmental friendlier ways of transport).

A first categorization of Inter-Connect cases as for their transnational role (terminals, services and flows) is depicted in Figure 11. Local authorities and stakeholders would be in a constant contact with the latest global developments trying to re-assess their role while taking advantage of their inherent position as ADRION basic urban nodes.

Bologna		☑	☑
Trieste	☑		☑
Igoumenitsa	☑		
Zagreb		☑	☑
Ljubljana		☑	☑
Bar	☑		
Durres	☑		
Belgrade		☑	☑

Figure 11: Inter-Connect cases as transnational hubs

In terms of supply, that in many cases reflects the demand, the situation is:

- Italy is characterized by a high level of maritime connectivity (some of them being seasonal and some regular services) with the other ADRION countries in the Balkans and South-East Europe. Especially with reference to the southern part of the country, the maritime links are particularly relevant since they allow bypassing a long detour in reaching the Balkans. Northern Italy presents also good rail connectivity with the

Western Balkans (WBs) and central European countries, although the supplied services still have a high margin of improvement.

- The rest 7 sea surrounded ADRION countries are not well connected among each other.
- Serbia from the other side seems to be the major rail hub in ADRION presenting direct or either indirect (with transfers) connectivity to the last leg of Europe – Greece and the rest Inter-Connect countries.
- Croatia and Slovenia have good rail connection among them and with Serbia and regular maritime services to Italy. Recently, a new cross border train service started operating between Trieste and Ljubljana linking Italy with Slovenia.
- Almost all Inter-Connect cases are well-served by air (38/56) and road (48/56) transport
- On average for reaching Inter-Connect cases 7h are required by air, 13h by combining rail and maritime services, 25h in case of using maritime services, 13h by rail and around 9h by road – of course the real situation per case is slightly different since we refer to average values. Even however with average values we can say from a first sight that maritime services are not an attractive alternative – the situation is different when the distances are short and when high speed ferries are used.
- The last message for the maritime services (not attractive alternative) can be further supported while comparing average trip costs – 208€ for maritime services, 360 for air transport, 153€ in the cases where combination of rail and maritime services are feasible, 90€ for road transportation and 70€ for the cases that rail can be used. Road transport seems still (even with the increase of fuel costs) a convenient travel choice, a choice that is greatly cost-efficient when more than one persons are travelling. Furthermore, new travel options as the low cost bus services attract an increasing number of travellers.
- In almost all cases, although air transport is the most expensive selection, the shorter trip duration counterbalances the situation while making air mode selection the most preferable choice (message verified also through Inter-Connect surveys). When direct air connections and low cost airlines serve hub-to-hub connectivity, it seems that air is the most effective mode.
- Maritime and rail based transportation presents high trip durations (not affordable in some cases) accompanied with comparatively high cost. The need for transfers also decreases the attractiveness of selecting maritime and rail based multimodal connections. Even when maritime and rail direct connections exist among hubs (nearby hubs/countries in the majority of cases) road competition is high and probably accompanying incentives should be given in order to achieve the desired modal shift.

Strong opportunity is presented for railway exploitation in the North part of the examined area – *Bologna, [Venice], Trieste, Ljubljana, Zagreb (called also Northern Cluster) gathers the hubs northern Adriatic area, which are close each to another with strong economy and social ties between Italian hubs and also between capitals of Slovenia and Croatia.* Belgrade remains the main rail hub connecting the Northern and Southern countries of Inter-Connect project.

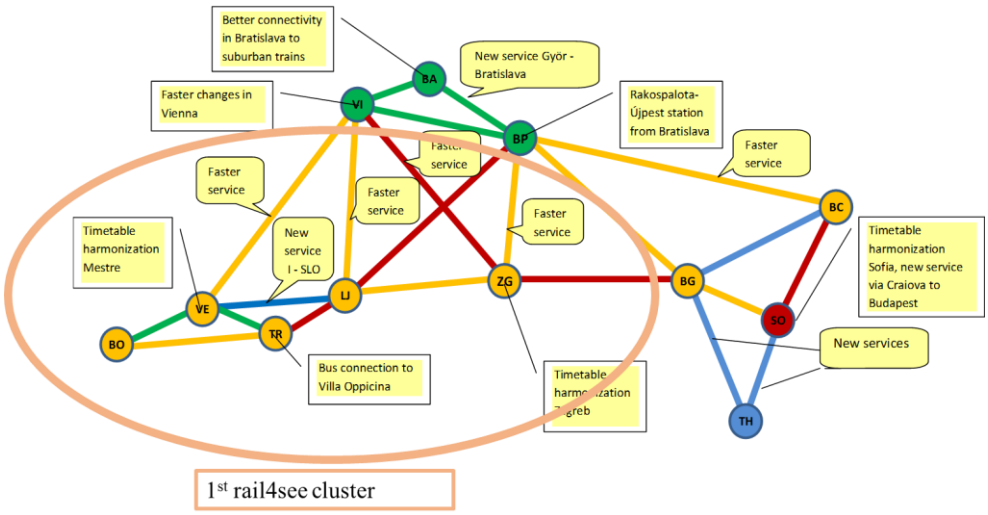
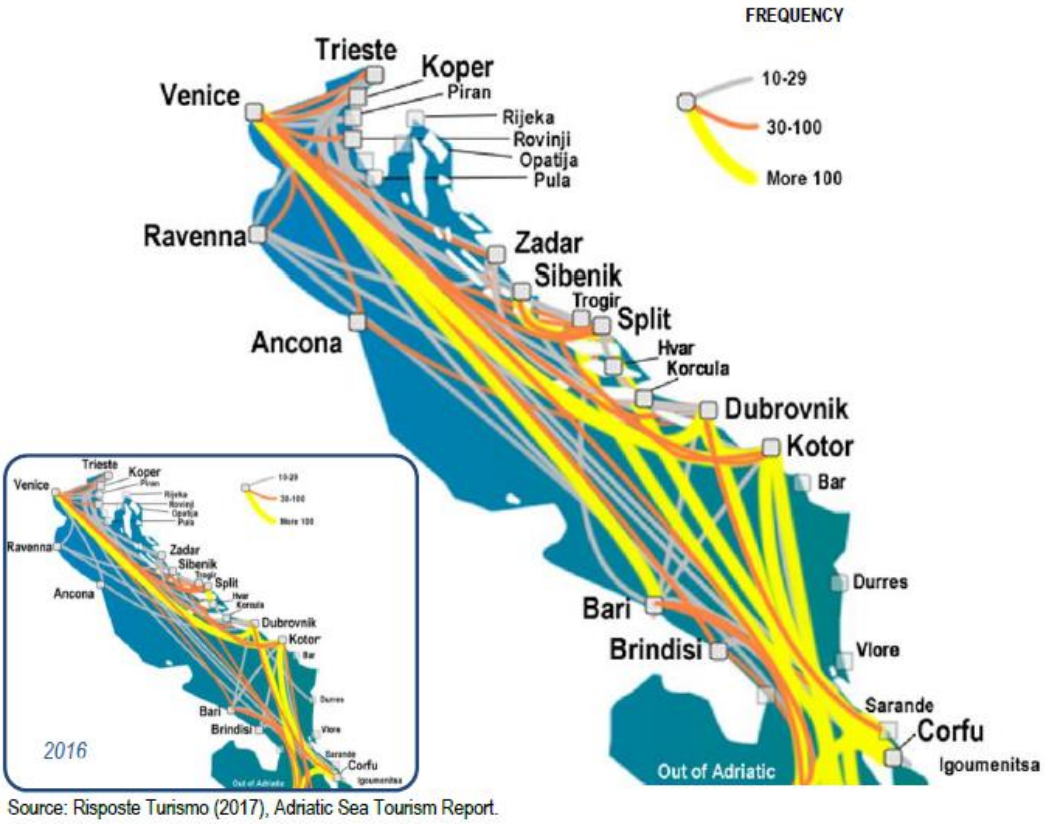


Figure 12: Rail clusters, Rail4See project[1]

- There is much to be done in the provision of rail services for Eastern Europe and Western Balkans: this commercial choice is mainly caused by the strong competition with long distance flights consequently long distance trains (national and international) have been cancelled. Additionally there is a concrete difficulty of **establishing partnerships and commercial agreements with foreign companies**
- **Technical difficulties due to the non-interoperability** seems to be a major problem for rail boost in ADRION area other than the positioning of countries around a sea that can be an obstacle to rail promotion. However, political will, consistency and continuity remains the main challenge in the wider area. **Missing rail links completion, commercial oriented railway companies, fair infrastructure charging systems, fully liberalization and stable regulatory frame can guarantee rail traffic increase** (The World Bank, "Railway Reform in South East Europe and Turkey On the Right Track?").
- There is still a large percentage of **investments** to be completed both as regards the TEN-T conventional rail core network as well as for the High Speed network (where applicable).\
- **Maritime tourism shows an increase** (intensity increased on average and emerging power regions are obvious)
- **Cruise tourism seems to be also an opportunity for the area** – supported by each long coastline and natural beauty areas. Cruise challenge should be faced at an upper level, transnational ministerial level with the involvement of multisectorial stakeholders and experts. It is an opportunity for the area not to be lost.

[1] *(existing connections are these coloured in green) - Changes from 2014 as regards the rail connections;* ***Trieste is directly connected to Ljubljana***



Source: Risposte Turismo (2017), Adriatic Sea Tourism Report.

Figure 13: Main cruise routes in the Adriatic Sea, 2017

- **Long travel times of maritime transportation** that is a main disincentive for travellers could be balanced by other benefits and offers to travelers (e.g. integrated touristic packages, discounts on PuT).

As food for thought from the analysis done, Inter-Connect team concluded in the following:

- **ADRION should take advantage of its position, in the cross road of TEN-T networks** (Mediterranean, Orient/East – Med, South – Med, Rhine - Danube) by offering advance Public Transport services for tourists (harmonized timetables, offers, integrated tickets, touristic packages, tours on historic paths and civilizations, new eco-tourism models). Depending on the Western Balkan (WB) countries efforts (Serbia, Montenegro, NORTHERN MACEDONIA, Albania, Bosnia and Herzegovina and Kosovo) to meet criteria, the year 2025 is set as the deadline for EU enlargement in the Western Balkans. The extension is estimated to achieve *closer integration with the EU as well as the basis for leveraging investment in infrastructure, such as EU support through the Western Balkans Investment Framework (WBIF) and the Connecting Europe Facility (CEF).* Focusing on ADRION area and on the objectives of Inter-Connect project, the extension of the TEN-Ts will change the picture as we show it above by:
    - posing attention to short ship shipping (Durres and Bar ports to be part of the core network), bringing benefits for the region's economy as well as for the citizens daily life (travel needs, entrepreneurship, mobility)
    - involving inland waterways as part of the transport network

  - even enhancing road connectivity
  - opening the path for rail transport share increase and finally
  - entering in a new era the air transport by adding WBs airport in the Core Network Definition Airports (indicative extensions in http://europa.eu/rapid/press-release_STATEMENT-15-4826_de.htm)
- **Maritime – rail intermodality options** could be part of an integrated touristic package offered to travellers. Offers (discounts) at destinations for using public transport could complete the touristic packages. Multistakeholder approach is necessary within a clear framework of role, responsibilities and benefits.
- **Services financing** should be assured even from the pilot phase of services.
- Since Adriatic- Ionian has started **being a brand in tourism**, wider cooperation schemes among private and public sectors at transnational level would help develop the foundations of a sustainable integrated transport –tourism model. The testing of touristic packages via maritime and rail modes could show the way for transformation and further investments.
- **Cultural and natural heritage touristic clusters or other types of eco-tourism promotion** schemes could be an answer to the challenging tourism industry. A common strategy for the whole area is considered as necessary for achieving desired results.
- **Bilateral agreements** like the ones developed in the framework of Rail4See project (MoUs among rail operators) can also be a case in ADRION area – latent demand may exist and therefore, supply is a prerequisite for revealing it
- **Information provision apps** and integrated route planners are proven to be effective tools for unlocking latent demand
- **Capacity building for authorities** regarding the advantages of sustainable transport promotion and citizens engagement is necessary for effective decision making – policy makers should listen to users' and operators' needs, find their position inside the global tourism industry and bring stakeholders together in an attempt to find mutual benefits and work for them

d. Deliverable T1.3.2: Users need surveys & experts opinion capturing

Deliverable 1.3.2 presents the analysis of the users' needs and experts' opinions for higher interconnectivity & accessibility at transnational level in an intermodal perspective with a special focus on PuT, maritime and rail based. The basic input came from user surveys and stakeholders' consultation.

The development of the survey questionnaire to tourists was part of the current deliverable. The main results of the joint analysis of the questionnaires reveal the following:

- The 75% has the possibility to use a private vehicle for its trips (car owners)
- For the **majority of travellers, leisure was the trip purpose** (57.2%), 24.8% travels for business purposes and there is another 18% not clearly defining the purpose of trips (probably combining leisure-work, health, religious tourism etc)
- **Airplane and car** seem to be the most preference modes for transnational trips in ADRION, fact that could hide rail and maritime ineffectiveness.
- **Maritime services are mostly selected for leisure related trips**, where also car is dominant.

- The level of satisfaction from the trips should be considered separately for each mode. There is a percentage of interviewed people that didn't answer or stated little satisfaction from the mode they used – this percentage can reveal potential problems i.e. **the majority of answers regarding overall satisfaction from ferry services preferred not to state level of satisfaction** and a similar percentage expresses middle level satisfaction.
- **Car is selected in the majority of cases** even if the cost seems not to satisfying a lot the travellers – therefore other issues shift travellers in car use although not satisfied by the total trip cost
- Travellers that have chosen ferry services (mainly for leisure trips) are very satisfied from total trip duration which is partly attributed to the short distance trip (majority of answers refer to Trieste – coastal areas of Slovenia trips)
- **Flexibility and reliability** consist motivation for travellers to select transport mode.
- There is a **considerable percentage of travellers that expressed middle and lower levels of satisfaction** for road transportation even if selected at the end – even if inefficiencies in road transportation exist, road transportation dominates in traveller's choice which can be 'read' as an additional 'alert' more the other more sustainable modes.
- The **number of intermediate stops is an inherent drawback of public transport services because it increases the total trip duration** – the travellers in our survey stated their (relatively high) satisfaction of the number of intermediate stops for all modes. Since the trip was conducted with the specific mode they are assessing, it can be attributed to the fact that the travellers have based their choice on the existence of direct services. It is however peculiar the fact that for some travellers that used their car there is a middle satisfaction arising from the number of intermediate stops since car's main advantage is seamless transportation.
- Satisfaction from easiness of travel, comfort and accessibility levels is (on average) relatively high for all selected modes.
- From the other side, travel attributes significance could be considered cumulatively for all modes since significance is a more stable notion that characterizes traveller's needs in general (not per mode) – the most interesting fact is that cost is placed in the last position revealing in this way structural drawbacks in ADRION connectivity (i.e. absence of services, network of low quality, low level of connectivity)

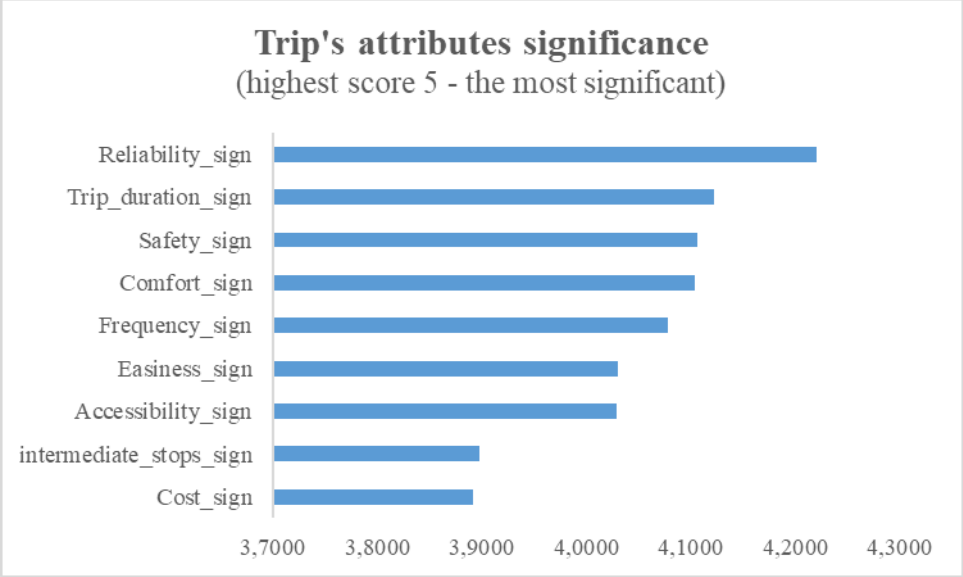


Figure 14: Trip's attributes significance (all modes)

According to the answers received, **the current transnational situation is characterized by relatively low level of connectivity – rail connection that are proven ineffective** (long trip durations, interoperability issues, low quality of network) **and maritime services serving specific pairs of port-cities**. The truth is that demand is a driving force for planning and operating services therefore, with the current **low demand levels**, at least as regards the maritime services, as expressed by stakeholders, these cover existing critical mass needs. From the other side, joint campaigns and common ADRION branding could reveal latent demand. **And since transnational transportation is strictly related to tourism sector, bilateral discussions involving representatives from both fields would add on the list of prioritized and efficient measures that should be taken.**

As regards rail services, much should be done at network level **– harmonized procedures, timetables and interoperability issues should be accelerated.**

Information provision is a crucial parameter that facilitate transnational trips – information flow should be seamless and continue also at local level in order to guarantee a good (feeling of trust) traveller experience.

From the other hand, **intra-country public transport connectivity is the first prerequisite if we want to promote the vision of an integrated ADRION growth**. As revealed from the round tables, faster development of detailed plans and infrastructure development in general is crucial for future development of sustainable and environmental friendly transport solutions is the first step for IPA countries while as regards the EU member states of Inter-Connect project, cooperation schemes and more 'innovative' (ICT based) solutions are to be considered in priority. Services reliability, travel time and cost are the most important parameters able to change travellers' perception and make them shift to more sustainable ways of transport (compared to the current situation where the majority of travellers use their private vehicles for local and regional trips).

Concluding and taking into account survey's outputs, the following considerations arise:

- **A single ticket for railway and maritime transport** is perceived by travellers as a good idea able to facilitate their trip / Development of common electronic ticketing system (contactless systems) that would make use of intermodal ticket easier;
- **Cooperation with maritime carriers** to identify measures for removing obstacles when introducing new services is essential, such as harmonizing timetables and establishing a single tariff system, introducing a common information system for passengers who decide to use intermodal travel option;
- **Cooperation among stakeholders** that influence the design of national strategies and action plans and establishment of working group to adequately weight the priority of improving existing or building new railway infrastructure which would facilitate the implementation of new intermodal travel modes, including the establishment of funds that will help to introduce new intermodal services in Croatia and beyond;
- **Cooperation with tourist boards** who would address potential users by adequate promotional messages and communication strategies to familiarize them with more sustainable ways of travel;
- **National and international cooperation with tourist agencies** for increasing the visibility of new/integrated mobility service;
- Introduction of **new communication channels with users** - most users believe that today the most effective way of promotion and communication is made through modern media such as Internet, and many of them also emphasize social networks as effective communication channel. Internet advertising tools enable adequately targeted, cost-effective communication with customers and significantly wider visibility of door-to-door service;
- Implementation of **marketing strategies** which would emphasize benefits of rail travel in terms of environmental protection;
- Establishment of a **permanent monitoring of foreign travellers' (tourists) satisfaction**, with special emphasis on currently unsatisfied needs;
- Introduction of **integrated technology transfer processes** based on quality traffic management and monitoring and quality information system;

e. <u>Deliverable T1.3.3: Future scenarios development for ADRION's connectivity</u>

Deliverable 1.3.3 presented the development of modal split models that were based on the results of Inter-Connect's transnational stated preference survey (described in T1.3.2). *The stated preference survey is a method of finding out about the attitudes of a transport system users in case where a new alternative that users have not yet had the opportunity to try is offered [57].* As Ben Akiva et al. (2015) mentions *stated preference elicitation methods collect data on consumers by "just asking" about tastes, perceptions, valuations, attitudes, motivations, life satisfactions, and/or intended choices [58]* and this is what happened similarly in the case of Inter-Connect project. The combination of stated preference survey and logit model was estimated to shed light to whether and how possible is for travellers in ADRION area to shift from the dominant current mode (private car) to more sustainable options – transnational model split models are not so.

In total 2.515 answers were collected during the Stated Preference survey conducted in the framework of Inter-Connect Activity 1.3.2 (Figure 15).

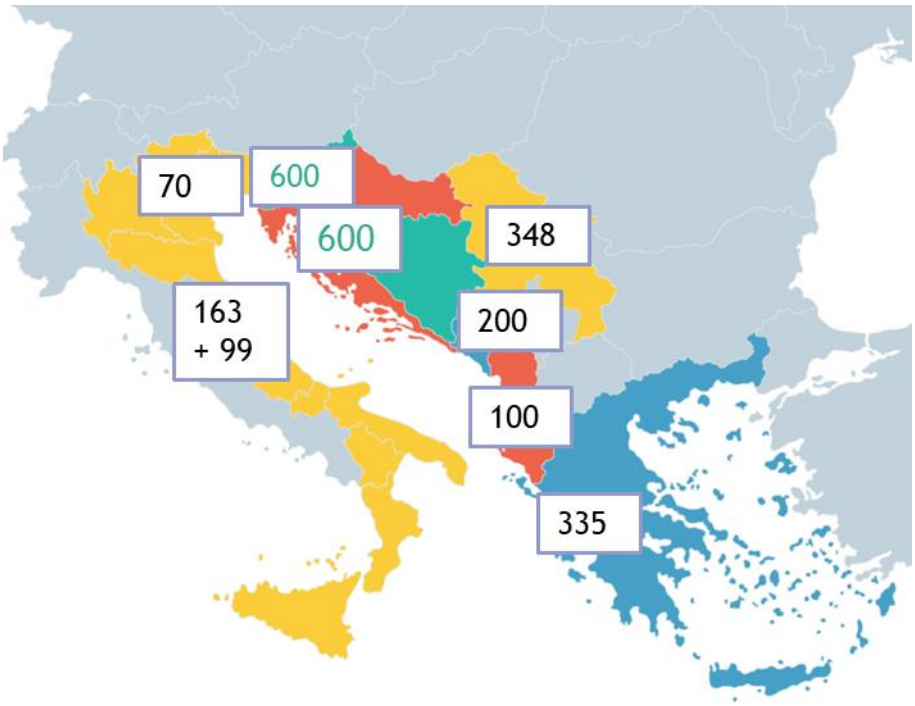


Figure 15: Number of answers in the SP survey per Inter-Connect case

The first overview of collected data, via a basic statistical analysis, reveals the current travellers' choices – travel behaviour;

- **Car and air transport consist the main choices of travellers**
  - **Car for short and medium distances dominates choices – road transportation is selected also in some long distance trips showing the low level of connectivity via mass transport in ADRION**
  - **Air transport is the most preferable way when distance is longer**
- **Trip travels in ADRION are mostly for leisure (92%)**

The Adriatic - Ionian Region has been divided into three sub – regions with similar travel time (duration) characteristics – this is a clustering made by CERTH according to connectivity understanding, of course other categorizations would differentiate the results. The three sub – regions include origins and destinations of shorter, medium and longer duration. The Tables below demonstrate the classification of the trips, with duration criteria.

Shorter trips /more 'affordable'	Medium duration trips	Longer trips / not 'selectable'
0,5 – 9 hours	11 – 15h	17 – 39 hours

Figure 16: Trips clustering

For each one of the three classification of trip duration - shorter, medium and longer- has been developed a mode choice model. In order to develop the mode choice models socio – economic data from the travelers and Stated Preference Cards were completed.

After a significant number of tests and iterations that conducted, 3 mode choice models were created verifying the main weakness of rail and maritime connections; mainly the large travel times. It seems that **investing in fast and seamless trips** is the main gate to market share increase. Main outcomes of the analysis as regards the future of ADRION connectivity are:

- **Large reduction in travel time and cost** of the more sustainable modes is required in order to attract travelers from road and air transportation (more than 15% reduction is necessary and especially for longer trips and trips with many legs – i.e. rail transfers)
- Work trips are far more inelastic – leisure trips should be taken probably taken into account when drafting a sustainable modes promotion in the current situation
- **Offers at the destination points** seem an interesting provision for the 25% of the travelers that participated in the survey.

f. Deliverable T1.3.4: Cooperation Platform

8 Memorandum of Understanding, one per case among local stakeholders for the promotion of Inter-Connect case specific context as well as one transnational MoU among project partners and other supporting bodies form the context of Del. 1.3.4.

For the case of the transnational Letters of Support, all partners agreed to continue their cooperation also after the official closure of Inter-Connect project in order to further promote results and capitalize on outputs;

- *the joining of forces at local, regional and cross-border level – stakeholders' engagement in mobility planning*
- *further promote Inter-Connect policy recommendations and case study results*
- *the critical role of capacity building within achieving the EU sustainable development goals – making at mobility and related fields (cross-sectorial planning approach and holistic sustainable development goal)*
- *cross – border transport facilitation and integration, encompassing both hard infrastructure investment as well as improved coordination and harmonisation, Trans-European Transport Networks (TEN-T) policy implementation and efficient connectivity*
- *the fully exploitation of the powers of Information and Communication Technology and of new technologies in mobility sector (open data, advanced information provision, harmonized services etc.)*
- *working towards promoting a more connected ADRION Region as a common brand with joint efforts in sustainable mobility and tourism sectors*
- *development of recovery plans in case of shock – situations as the recent caused by COVID-19 pandemic, support the area's resilience and sustainability*

g. Deliverable T2.1.1: Stakeholders and citizens engagement

The first deliverable of WPT2 that is devoted in cases' examination, describes the engagement procedure followed by each case in order to involve in a participatory approach both stakeholders and citizens for reaching Inter-Connect goals.

For stakeholders' engagement, Round Tables and unofficial meetings took part. For citizens' engagement, communication activities and local dissemination events are used in order to reach the wider audience (liaison with WPC). Del. T2.1.1, summarizes the outcomes of stakeholders' interviews (during the round tables as well as from face-to-face interviews) and citizens' and local communities' needs (captured during the Round Tables). The passengers/citizens surveys for identifying local needs, either on spot survey or through online channels for the majority of cases were conducted in parallel with the survey for passengers' needs at transnational level (DT1.3.2) - the reason for this is twofold; to slightly show them that transnational – regional needs are/can be linked (sustainability as a way of life refers to all levels) and not to repeatedly bother them with questionnaires that are not so highly-accepted in passengers' perception.

The main findings of the analysis of the stakeholders and users' needs are:

- **Stakeholders' matrix – interest matrix**

Inter-Connect's project power is built on stakeholders' participation in mobility interventions planned, piloted and proposed. The aim of Inter-Connect partnership is to augment 'Inter-Connect intelligence' that so far arises from 8 categories of representatives by augmenting the list of participants and even by adding new categories of stakeholders and actors that are mutually served and serving sustainability and connectivity goals.

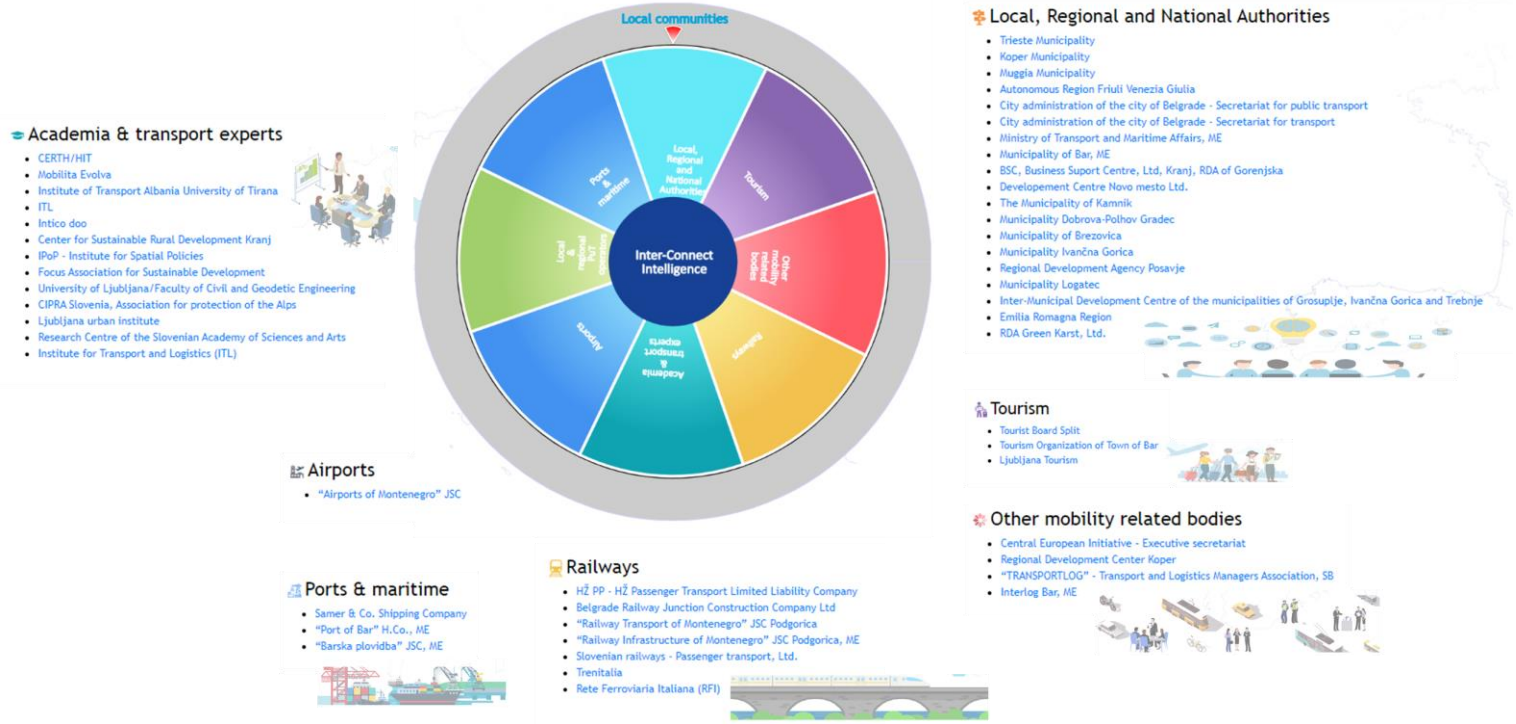


Figure 17: Inter-connect ''intelligence''

The (living) list of close stakeholders to Inter-Connect project has fed the functionality 'Cooperation' of the Inter-Connect toolkit (WPT Act.3.3) that is available on https://interconnect.imet.gr/Pages/Tool02 .

- **Needs of Inter-Connect cases for a better and more sustainable future of mobility**

The **high use of private cars in almost all Inter-Connect cases** shows the way towards a potential recovery path; there is an impelling need to invest on public transport connectivity and in the promotion of sustainable ways of travel (i.e. integrated cycling – walking paths). For the cases that are more PuT oriented developed, e.g. RER, investments on more advanced services are considered as essential for attracting more travellers to PuT services whereas for cases that PuT services are almost missing, e.g. Igoumenitsa's case, a strong involvement of public and private sector in order to offer frequent and of high coverage bus lanes are prerequisite for starting thinking of the era of change (behaviour change, shift in sustainable ways of transport). In all cases, information provision is becoming even more increasingly important for travellers since, beyond the fact that reliable information increases the likelihood that travellers reach their final destination on time, it also increases the good perception of travellers towards the PuT services. Intelligent Transport Systems is part of the future and therefore, local communities should gradually invest on them.

Port – hinterland and main transport hubs – hinterland (airports, rail stations) connectivity by PuT should be a targeted direction for increasing PuT modal share. In the same rational, given the character of ADRION and it's growing role as worldwide tourist attraction pole, urban - rural and urban - coastal connectivity seems also of vital importance for the future development of Inter-Connect regions for achieving Europe 2020 goals of smart, sustainable and inclusive growth. Per case it is recommended that innovative demand-response transport management systems should be further examined mainly when seasonality plays crucial role.

In every attempt to promote sustainability related goals like in Inter-Connect cases, **stakeholders' engagement is (and should be) placed at the top of territorial agendas** so as to unlock opportunities and achieve long-lasting changes. For Inter-Connect cases, as it seems from the 1st RTs and the dissemination events results, we are 'walking' on a good path having with our side the main involved actors in mobility interventions scheduled.

Finally, in almost all cases it is a common conclusion that **complementarity among financial resources (national projects, cohesion policy funds, projects from the same or different programmes, private funds etc) should be achieved and synergies should be promoted for multiplying positive effects.**

- **The top five Public Transport characteristics**

According to the mapping of significant features of Public Transport that are able to contribute in modal shift towards more sustainable urban mobility are the cost, travel time and services quality (reliability, coverage and frequency). The figure below present the top five features per case.

Figure 18: Top-5 public transport attributes, stakeholders' perception

We can say that **areas that present stronger PuT profile are more willing to achieve services of better quality (i.e. frequency, reliability, reduced travel times) while others need to highlight the difference in cost of public and private transport.** It is also important that for Durres, that is a port city with high private car and trucks use, they need also to invest on noise and pollution alleviation measures.

- **Citizens' engagement level and wisdom**

The results of the dissemination events, therefore of the contact with the local communities revealed **real needs on urban connectivity that will also support transnational tourism**

boost. The following figure concentrates the main outputs of this contact clustered in grand categories of necessary interventions.

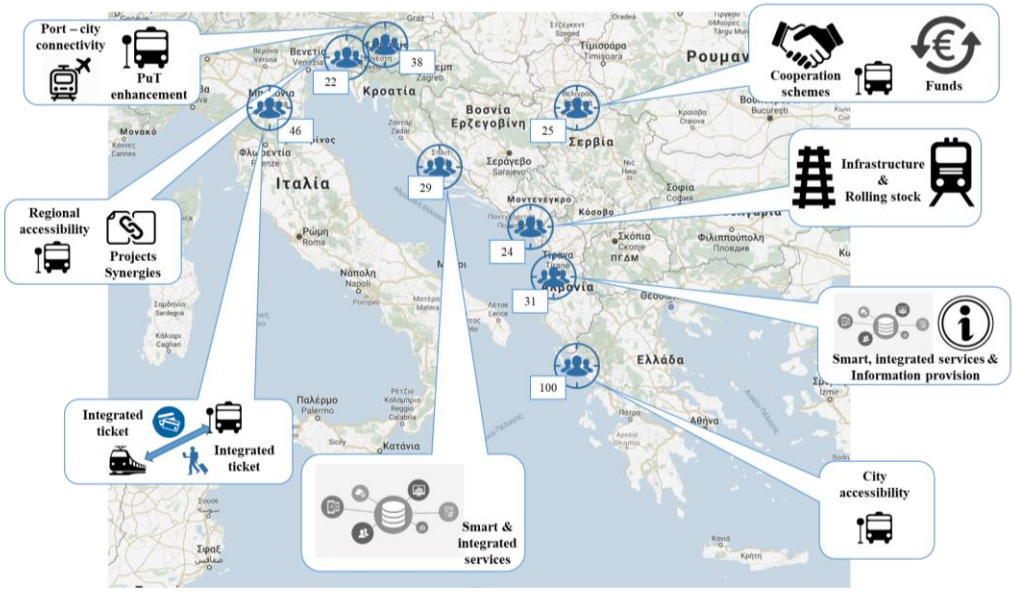


Figure 19: Citizens' engagement magnitude & ideas, data from the 1st dissemination event

Concluding, we can say that an **integrated approach at urban level** for achieving sustainability levels in mobility will promote the sustainable ADRION transnational profile. Primary needs are investments in integration of current sustainable modes and ICT integration in daily PuT operation. After that, linking urban services to interurban stations while also investing on joint promotional campaigns is estimated to contribute towards ADRION tourism increase.

h. Deliverable T2.1.2: Regional demand - supply analysis

The second derivable of T2.1 deals with the deep qualitative and quantitative analysis of transport demand and supply will be carried out at cases' level. Regional demand data analyzed herein refer to passenger trips conducted between the catchment area of each hub and the hub itself. Modal split data and other transport related indicators at regional level are part of the current deliverable. The identification of the catchment area of each case entails (and in parallel, arrives from) the identification of the attractiveness of the case, either the current or the potential one while it reveals the positioning of the case inside ADRION (the dynamic of the case/hub). Furthermore, the current modal split at regional level accompanied with other transport indicators, will show light on the weaknesses and hidden threats in intermodality promotion. Key results of the analysis of transport data are presented at the closing chapter and feeds the 3rd deliverable of the activity T2.1 (AS-IS situation in Inter-Connect cases).

According to the data collected by partners in the framework of the current deliverable and also from deliverables in WPT1 (strategies, best practices) and to additional normalized sources (e.g. United Nations Statistics Division data), we can say that Inter-Connect cases present differentiations (population, growth rate, status e.g. EU member state – IPA countries, advanced multimodal services) that affect multimodality level.

Since the c.a. of each case does not cover areas of same extent (Del. 1.3.1, Table 4), the population varies also significantly which means that mobility needs differ also significantly (daily commuters, trip purposes, mode choice, seasonality – intra-regional tourism to coastal areas).

Car use is significantly high in almost all cases where data are available. The only exception is met in Region Emilia Romagna case (Bologna c.a.) where rail keeps a high percentage in modal split.

When it comes to **intra-city modal split, private cars still keeps a predominant position** in Trieste, Bologna, Igoumenitsa and Ljubljana, in Zagreb we have an equal percentage for private cars and Public Transport while in Belgrade the situation seems more encouraging according to the EPOMM Modal Split Tool (49% for PuT).

Based on the above, there are many opportunities for Inter-Connect cities to get in a more sustainable path by investing in intermodality and Public Transport services upgrade. From the best practices review (Del. 1.2.1) as well as from the strategies orientation (Del. 1.1.1), soft actions can be a key to promote sustainability even in cases where the economic background is not so stable or of high level. As also supported through the findings of the previous deliverables, g**overnance and coordination issues facilitation and stakeholders' engagement and cooperation as well as capacity building activities** for sustainable mobility planning can act as major contributors for area's growth.

i. **Deliverable T2.1.3: Cases AS-IS situation description**

Based on the conclusions of D.2.1.1 and D.2.1.2, D.2.1.3 deliverable provides an overview of the current situation (intermodal, sea and rail based transportation) in the 8 Inter-Connect cases. The deliverable aimed to act as an introduction for WPT2 that looks connectivity and sustainability at regional level. The current situation, the strong and the weak points in each case, will reveal the opportunities of ADRION and potential threats in its sustainable future.

Car is the dominant mode in all 8 cases examined in the framework of Inter-Connect project as revealed with the data collected in Del. 2.1.2 and as derived also through the SWOT analysis and Round tables' input while the 2nd (relevant and related to the car dominance) common, for the majority of cases, characteristic regarding connectivity in Inter-Connect cases is the need to further upgrade public transport services (attributes like coverage, reliability, frequency, intermodality). Furthermore, **it seems that stakeholders and citizens' engagement in mobility planning, although supported through EU directions (e.g. SUMP cycle), is not at the desired level.**

From an initial diagnostic territorial analysis based on the collected input in Act. 2.1 (RT, data collected, SWOTs, citizens' proposals) we can conclude in the following main drawbacks:

- **Low level of stakeholders cooperation** and limited participatory approach on future mobility interventions design and implementation
- **Low level of provided public transport services (quality, coverage, reliability)**
- **Lack of open data & integrated data and information provision**
- **Lack of integration – e.g. integrated tickets**

- **Seasonality issues – highly increased demand during specific periods that calls for focused interventions and probably on demand services**
- **Low connectivity of intermodal stations (transport hubs)**
- **Lack of political will and plans' continuity – lack of a common vision**

Intermodal accessibility (and connectivity among transport nodes; ports, airports, rail stations and hinterlands) at ADRION regions is significantly low as derives from the Round tables and data collection efforts in the framework of Act. 2.1 with the exception of the two Italian Inter-Connect cases – Region Emilia Romagna and Fruili Venezia Giulia – a fact that is supported also through larger in extent data collection and analysis efforts e.g. TRACC set of accessibility indicators.

The level of accessibility seems to vary greatly between ADRION Inter-Connect cases with the ERDF cases to be a step forward and IPA cases to have recently entered in a development path regarding interconnectivity. **The port- hinterland and rail hubs – hinterland connections** need to attract decision makers' and market's interest in order to enhance interconnectivity profile of Inter-Connect cases.

Finally, and in order to present success stories through Inter-Connect project, the partnership recognizes the **significant role of stakeholders'** (transport operators, hubs managers, decision makers, tourist related bodies and marketing and communication experts) and travellers' (citizens and tourists) engagement for designing effective and acceptable mobility interventions. Without the active role and the feeling of ownership of local communities and transport related actors, the viability of the proposed mobility interventions would be at high risk.

j. <u>Deliverable T2.3.1: Cases examination & evaluation report</u>

Del. 2.3.1 contains all the information on the cases' examination steps along with the evaluation of the feasibility (financial, political and institutional sustainability).

The Inter-Connect project pursues the promotion of integrated sustainable transport and the reduction of bottlenecks in public transport infrastructures, all by increasing the capacity of existing transport services and promoting integrated and connected solutions across the Adriatic and Ionian sea.

The common results obtained within the case studies development and analysis phase are further analysed and assessed in the report DT2.4.1 (Transferring Protocol) and DT2.4.2 (Cases key generalized messages) related to the Inter-Connect main results transferability analysis and definition of the implications for future actions in the Adrion Level aimed to guide authorities and stakeholders on the incorporation of the project's cases' examination main results into policies, through formulating draft agreements for passengers' intermodal and rail transport promotion.

The results obtained within the Inter-Connect project showed that the common objectives pursued, both at national and regional levels, concern the following aspects:

- **promotion of more attractive public transport services capable of involving an increasing number of users (both commuters and tourists);**
- **creation of hub to hub connections between railways, ports and bus stations;**

- **creation of integrated fares systems and ticketing for tourists in order to facilitate the intermodal solutions both for passengers and tourists;**
- **soft and technological solutions aimed to improve the railway network without major investments;**
- **improvement of the real-time information and time table integration.**

The achievement of these objectives to promote rail and maritime intermodality within the ADRION regions is possible only if the financial, political and institutional sustainability of projects are guaranteed. There are different solutions in order to build solid and durable projects as evidenced in the single Inter-Connect case studies.

The analysis of the Inter-Connect case studies shows that one of the fundamental prerequisites for the success of **an intermodal transport strategy** is the level of integration with existing national, regional and local policies. This integration must be achieved through strategic plans that aim to improve accessibility to all the territories, considering not only the transport dimensions but also the role of transport in sustaining local economies and people equity (in particular in relation to elderly people).

One of the most important political support for the promotion of sustainable transport solutions, as evidence in the case studies analysed, are the **Sustainable Urban Mobility Plans (SUMP)** whose main objective is to satisfy the varied demand for mobility of people and businesses in urban and peri-urban areas to improve the quality of life in cities. The added value of SUMP is related to the possibility to integrate the others existing planning tools (not only related to transport), to allow a better participatory process in the policy making processes and to better monitor and evaluate the implemented measures. When the required action operate a wider geographical scales (regional or national), as evidenced in the Slovenian case, it is necessary to go beyond the SUMPs and planning a wide participatory process involving actively national, regional and local organizations. But this is not only the case of Slovenian case study. In all the Inter-Connect pilot cases it has been found that the creation of an intermodal public transport strongly depends on the collaboration between several interested stakeholders (both public and private) in order to offer new efficient and attractive services for users. Without these wide collaboration networks it is impossible to promote reliable and attractive train and ship services for tourists and local population. For this reason one of the main output of the Inter-Connect project is related to the definition of Memorandum of Understanding among local partners aimed to activate collaborations and operational schemes between local, regional and national operators in order to extend the transport network and improve intermodal solutions.

Good collaborations required an efficient and clear governance scheme. A good governance scheme allow to share the political and technical responsibilities among the different stakeholders and allow to share a common action plan. An example is the case of Emilia-Romagna case study, where the governance scheme adopted see a clear competences sharing among regional authorities, national rail operator and the local bus operators in order to create a common integrated ticket valid for all the public transport services operating at regional level. In this case there is not a technological innovation but a governance innovation related to a written agreement among different public transport operators in operating a common service with a single ticket.

From the financial point of view, all the case studies are mainly based on public investments deriving from different EU, national and regional sources. The financial analysis of the case studies revealed that, **without public funds available, the actions envisaged by the Inter-Connect project are difficult to achieve** since many of these involve relevant investments not always available.

As can be seen in the Greek and Montenegrin cases, the financing needs of investments for sustainable mobility exceed the available resources. But as evidenced in the case studies where bigger investments are required, when a solid and precise business model is developed, with an accurate evaluation of the potential revenues, can help in overcoming these financing problems. Others case studies, as for example the Emilia-Romagna integrated ticket, show as also low cost soft solutions could be activated waiting for bigger infrastructural investments.

The measures analysed in the Inter-Connect project focuses on interventions both relating to the infrastructures improvements and soft improvements more related to operational and organizational aspects. The Inter-Connect case studies shown as isolated interventions on the infrastructure not always have a great impact on increase of passengers (both tourists and local population) if they are not accompanied by synergies with the user needs and others relevant planning and political processes. As evidenced in Croatian and Friuli-Venezia-Giulia case studies, a strategical approach is required in order to reach ambitious targets.

All the case studies analyzed in the Inter-Connect project shown as private car is still the first transport solution both for tourists and the major part of commuters (mainly for the commuters living outside the main cities in the rural areas).

Each case study work develop different soft solutions aimed to increase the attractiveness of the public transport by increasing the travel comfort, reducing the travel time, improve the main interchange hubs, improving the public transport offer and quality and so on. Different solutions for the same problem: increase the number of people using public transport in order to reduce the negative externalities related to the usage of cars.

The main problems tackled by the Inter-Connect case studies are:

- **Perceived low level of public transport services (in terms of service quality, network coverage, reliability);**
- **Lack of reliable, real time and integrated information for final users on the different transport solutions (e.g. integrated tickets and timetables, etc.);**
- **Seasonal problems related to the increase of public transport demand during specific periods. During these peak period it is possible to register conflicts among tourists and commuters' transport needs;**
- **Low connectivity between different intermodal hubs (bus-train nodes and port hubs with the rest of the urban area);**
- **Long time required to implement the required investments aimed to improve the public transport infrastructures (more efficient train lines infrastructures, etc.);**
- **Low level of participation of the main stakeholders (in particular private companies) in the definition and implementation of new sustainable public transport solutions.**

All these sustainable transport monitored in the Inter-Connect case studies assessment shown as urban/local problems and weaknesses in public transport provision as a relevant impact on a national and transnational level. For example port hubs not adequately linked with the main public transport hubs (train stations, international bus stations, etc.) reduced the possibility to offer integrated and more sustainable travel solutions at cross-boarders level. For this reason it is fundamental to work on these political and technical aspects at local/urban level in order to promote better accessibility and sustainable connections at ADRION level.

Thanks to the analysis carried out in the previous chapters, valuable strategies and soft solutions have been analyzed in order to improve public transport services without the need of big investments. The key soft solutions founded in the Inter-connect project in order to improve intermodality and sustainable public transport are:

- better planning of interchanges among local/urban public transport hubs;
- time tables integrations;
- real time information systems;
- better information systems for final users (dedicated app, etc.);
- a comprehensive public transport systems integrated also with cycling and walking networks;
- integrated ticketing and e-ticketing;
- on-demand public transport solutions.

As shown in the Croatian, Montenegrin and Slovenian case studies for example, real-time information, accessible to everyone (also in foreign languages), easy to understand and collected in a single place (e.g. websites regularly updated, dedicated app, etc.). The information to be provided to final users have to be not only related to timetable or real time data, but also to the ticketing and fare systems. Often it is not easy for a tourists to understand the different fare system and rules operating in the different countries.

In relation to this topic first of all it is important to simplify the public transport fares systems and provide in a more easy way all the relevant information to final users. This is a first step for a public transport better promotion. The second step is related to define and implement integrated ticketing system using a Mobility as a Service (Maas) approach. The Emilia-Romagna Region case study is a valid example that shows the importance of integrated ticketing to promote public transport (train and bus) making public transport more attractive and easy to use for tourists.

When considering the ADRION region, it is evident as problems related to intermodality are not only related to inland transports but also to maritime connections. As evidenced in almost all the Inter-Connect case studies, it is essential to improve the integration among inland and sea transport services. This require to work on strengthen the connections at regional and urban level, focusing on create new links and/or improve existing one among port hub and main train and bus stations. All these interchange hubs have to be improved in order to guarantee high service and quality standards.

At the infrastructural level, the improvement of existing infrastructures (mainly train infrastructures) is a key aspect for the promotion of better connections and in order to have more tourists and commuters using public transport. As evidence for example in the Serbian, Emilia-Romagna and Albanian case studies, when big investment in infrastructures are not

available in the short term, it is possible to start working on soft solutions able to improve the existing services and provide them in a more efficient way.

Finally it is necessary also to work more on cross boarder public transport connections, both by train and ships. As evidenced in the Trieste and Croatian case studies it is possible to plan new cross boarder services. These services in ADRION areas are very weak, the demand not always is so relevant to justify such measures. But as evidenced in the Inter-Connect case studies, it is fundamental to create cross boarder train and ship services and to better connect the main train and port hubs with the existing inland and urban public transport networks. The Inter-Connect project, as evidenced in this report and in the following report 2.4, provide some evidences on how this important challenge at ADRION level can be addressed.

k. Deliverable T2.4.1: Transferring Protocol & Deliverable T2.4.2: Cases key generalized messages

The analysis of the Inter-Connect case studies therefore provides relevant information and a clear vision of the main specific problems and threats in promoting intermodality. In general, the various technical solutions tested in the Inter-Connect project can be summarized in the following points:

- Urban planning solutions (e.g. transport hubs accessibility);
- Integration of ticketing solutions (e.g. integrated train-bus ticketing system at regional level);
- Different solutions for the integration of the transport mode;
- Flexible public transport solutions (DRT);
- Better information solutions for end users (e.g. train timetables optimization aimed at reducing travel times, train timetables, real time information);
- Solutions of transnational agreements (e.g. cooperation scheme for the promotion of a new cross boarder ship line service);
- Solutions of multi-stakeholder agreements (e.g. collaborative strategies among key stakeholders).

One of the key points founded within the project is the involvement of key stakeholders. In fact, it has been seen that making the various stakeholders involved is fundamental in order to reach the objectives, not only in order to have a good technical result of the project activities, but also to guarantee the duration of the project actions and their effectiveness. In synthesis, in order to develop more effective and sustainable intermodal public transport solutions it is essential to have:

- High involvement of all the key stakeholders, both public and private, since the beginning of the project's life;
- Regular and effective exchange of information and coordination with existing/ongoing projects already working on public transport intermodality promotion;
- Actively involve the main stakeholders through round tables, dedicated technical events and whenever it is possible with memorandum of understanding;
- A participatory approach that allows to establish synergies and develop a global vision of the projects among all the parties involved.

4. From local to transnational connectivity; measures identification

The Inter-Connect project pursues the promotion of integrated sustainable transport and the reduction of bottlenecks in public transport infrastructures, all by increasing the capacity of existing transport services and promoting integrated and connected solutions across the

Adriatic and Ionian sea. The measures analysed in the Inter-Connect project focuses on interventions both relating to the infrastructures improvements and soft improvements more related to operational and organizational aspects. The Inter-Connect case studies shown as isolated interventions on the infrastructure not always have a great impact on increase of passengers (both tourists and local population) if they are not accompanied by synergies with the user needs and others relevant planning and political processes [Inter-Connect Del. 2.3.1].

The Inter-Connect cases examined are presented in the following table:

Table 5: The Inter-Connect case studies main goals & scale of examination

Case Study	Main Goals	Local Scale	Regional/ National Scale	Transnational Scale
Igoumenitsa	- Promotion of more attractive public transport service for tourists (accompanied by an offer of integrated tour packages). - Create a hub to hub regular connection between the port and the inter-city public transport terminal. - New PT service having two bus lines: one regular and one based on the Demand Responsive Transport model to serve seasonal needs during summer peak period.			
Emila-Romagna Region	- Increase rail passenger attractiveness reducing the travel time among Bologna, Ravenna and Rimini adopting soft solutions. - Develop a train-bus integrated ticket for tourists visiting the Romagna region using public transport.			
Ljubljana	- Iimprovement of the connections from maritime areas to Ljubljana Airport and Ljubljana urban region. - Improvement of info-mobility services (on-board and in the interchanges points) for tourists. - Improvement on fare integration and integrated ticketing systems. - Definition of organisational and regulation aspects aimed to improve public transport operation and the interconnectivity at regional level.			
Trieste & Fruili – Venezia Giulia Region	- Improvement of public transport urban interchanges between buses/train hubs and the maritime passenger's terminal. - Understand the potential of a new maritime public transport connection from Trieste (Muggia) to Koper (Slovenia).			
Zagreb	- Improve information provision relate to timetables, punctuality and others problems during the trip (delays, unexpected events, etc.). - Facilitate and improve faster and cheaper train travels for tourists from coastal to inland areas.			
Port of Bar	- Harmonization of the timetables. - Integrated ticketing service - Providing real-time and reliable information. - Improve port to city connectivity. - Improve the role of port of Bar as gate at ADRION level.			
Durres	- Better train services information to final users thanks to the development of new			

	technological solutions. - Improvement of the train connections among inland and coastal areas (Tirana and Durres).			
Belgrade	- Definition of new solutions for urban promotion of intermodal bus and rail solutions. - Definition of innovative solutions to improve the movement of passengers between two main transport nodes (Central railway station and central intercity/ international bus station).			

As depicted in the table below, 4 out of the 8 Inter-Connect cases dealt (not exclusively) with intra-city connectivity by PuT, 6/8 with regional connectivity and 3 cases approached also the examination at transnational scale.

However, the results of the pilots are considered as valuable building block of the total level of ADRION's connectivity (even with city-focused connectivity upgrades, the whole picture of the Regions is upgraded and it is possible, throught transferring activities and knowledge exchange, to further upgrade ADRION's as a whole profile - gentrification phenomenon).

The clusters of interventions identified as for enhancing ADRION connectivity are presented in the following subchapters. It should be mentioned here that ovelaps can be identified since there is no chance for a measure to exist as stand-alone solution; i.e. ICT is a technological issue that however cannot apply at large and integrated scale if agreements among different stakeholders are not in place – a platform offering integrated information for Public Transport modes asks for stable coperation among the providers, awareness raising campaigns without the existence of car alternatives is meaningful etc. For this reason, measures were clustered based on the principle axis rather on the accompanying, necessary however, measures.

4.1.1 High level cooperation / agreements

Top – down well scheduled agendas are sometimes the basis for triggering also the necessary participatory bottom – up approach. EU central policy for transport as well as for cohesion are on the right path; EU Commission closely working with Member States for drawing up Partnership Agreements and Operational Programmes that entail investment priorities based on real identified development needs in order to support cohesion [29].

Figure 20: The 11 thematic objectives of Cohesion Policy 2014-2020 [29]

Celebrating more than 30 years of life, transport policy is a cornerstone of EU policy. Opening-up of transport markets and the completion of the Trans-European Transport Network while investing on resource efficiency and on the transition to a low carbon ecomony is offering an opportunity for sustainable transport. The latest strategy for 'A European Strategy for Low-Emission Mobility' (COM(2016)0501), that proposes measures to accelerate the decarbonisation of European transport, sets the foundations and poses the goal of reaching a zero emissions, as established in the 2011 White Paper on the future of transport, with a view to adequately contributing to achieving the COP 21 Paris Agreement goals [30].

Specifically for rail transport, EU policy has set the basis for [31]:

- Interoperability
- Safety
- Social harmonisation / working conditions for mobile workers engaged in interoperable cross-border services in the railway sector
- Access to infrastructure for railway undertakings
- Railway noise

As regards the maritime transport, EU regulation focuses on the application of the principle of free movement of services and the correct application of competition rules, while in parallel establishing a high level of safety, good working conditions and environmental standards [32].

In the resolution on a European strategy for low-emission mobility adopted in December 2017, the EU Parliament highlighted the need for active contribution from transport sector to climate goals showing the direction towards:

- The need for investment in **multimodality and public transport**;
- The need for sending clearer price signals across all transport modes in order to better reflect the **polluter pays and user pays principles**;
- The role of **digitalisation** in sustainable mobility [30].

Transport sector is strongly linked also with tourism industry and market; Since December 2009, tourism policy has had its own legal basis. Basic steps for boosting tourism industry are considered:

- Supporting competitive and sustainable growth in the tourism sector;
- Promoting and developing products and services in the sport and wellness sectors as well as supporting Europe's cultural and industrial heritage;
- Facilitating EU transnational tourism flows for senior citizens and young people in the low and medium seasons
- Maximising synergies between tourism and high-end and creative industries [36].

Regarding the application of EU laws, regulations and decisions become binding automatically throughout the EU on the date they enter into force and directives must be incorporated by EU countries into their national legislation. The incorporation and the right implementation of the EU law is upon Member States. Just to mention here that in 2015, the

policy areas with the highest score of infringements by Member States were environment (20%), transport (18%), financial services (13%), internal market (9%) and migration (8%) [33].

Reflecting on the above regarding the implementation of EU policy and the cooperation among Member States, high level agreements and political continuity for achieving high connectivity at national level that is strictly linked with transnational level seem to be necessary for ADRION:

- National level decisions: intermodal terminals categorization, definition of national terminals' transnational role and identification of potential clusters/alliances
- Transferring programme development of 'best practices of intermodal solutions' at national and regional level – make the matching of terminals / cases and adopt best practices
- Assuring / allocating dedicated budget per year with a long term timeplan - allocation of various re-sources (funds) to enable competent authorities to subsidise cross-border services during the start-up phases
- Develop an integrated approach of transport policy (to achieve sustainable transport—integration horizontally among sectors, institutions and modes, and vertically among levels of jurisdiction and authorities.)
- Encourage territorial integration—aligning goals and responsibilities of neighbouring cities and towns, and countries—can also help create effective governance frameworks and policies (e.g. MoU signed- among ADRION Countries)
- Fostering the integration of Intermodality policies for passenger travel
- Legislative actions to promote joint operation of an international service (contracts among national PSO's) - Considering the fact that passenger transport is non profitable, it can't survive without financial support from States. Public Service Obligations in transnational transport services should be further examined
- Elaboration of a multilevel protocol at regional, national level and transnational level to promote maritime-rail intermodality

4.1.2 Stakeholders' engagement & actions/ initiatives synergies

The EU Strategy for the Adriatic and Ionian Region (EUSAIR), the macro-regional strategy adopted by the European Commission and endorsed by the European Council in 2014 that is connected to Interreg ADRION programme, was jointly developed by the Commission and the Adriatic-Ionian Region countries and stakeholders, which agreed to work together on the areas of common interest for the benefit of each country and the whole region. One of the 4 core pillars of the strategy refers to transport; Connected Region – however transport is also embedded in the other 3 pillars (Figure 21) [35].

Figure 21: EUSAIR pillars [35]

Strong cooperation among Member States and key stakeholders for the promotion of sustainable transport can act as leverage for keeping financial support also alive; example is the work behind the launching of the POSITION PAPER 'Supporting the transport Policy Objective for the European Territorial Cooperation Programming Period 2021-2027' that aims to highlight the strategic nature of transport priority and to introduce and suggest some further advices on how to properly address such priority within the upcoming programming period, 2021-2027 [34].

The Transport Community, an international organisation composed of the EU and the six Western Balkan Parties (Republic of Albania, Bosnia and Herzegovina, Kosovo*, Republic of North Macedonia, Montenegro and Republic of Serbia) works for cooperation and is built upon this principle; it aims to extend the EU transport market rules, principles and policies to the Western Balkan Parties through a legally binding framework. Based on the South East European Transport Observatory (SEETO), the organisation was founded by the Treaty establishing the Transport Community, signed on 12 July 2017 in Trieste (Italy) and ratified by all partners (Council Decision (EU) 2019/392). It applies in the field of road, rail, inland waterway and maritime transport and aims also at developing the transport network between the EU and the six Western Balkan Parties [37].

It supports that transport issues are horizontal across the Western Balkan countries and points the need for enhancing transport systems efficiency in the area by hitting fragmentation. The regional rail strategy, border crossing projects and road safety are the first core issues that are being discussed while funding mechanisms identification and mobilization is a main objective. Transport Community has started its actions and seems to be a good starting point for improving area's connectivity and accessibility [38].

As obvious from the above, building on connectivity is born on good neighbourhood and cooperation. Sub measures in this category can be:

- High level of stakeholders' engagement (guaranteeing cooperation)
- Public Private Partnerships (i.e. for improving intermodal hubs)
- Establishing a regular communication, information and initiatives exchange and coordination of joint projects within the intermodal PuT sector
- EUSAIR – TEN-T: from macro-regional strategies to development; *Strengthening North-South and East-West relations by means of the identification of multi-modal corridors alongside the TEN-T network including, in particular, maritime connections between the coasts of the Adriatic and Ionian Seas and intermodal connections between the seaports and the hinterland of the region* [35]

- Establish a firm communication to the relevant stakeholders through regional organisations / Transport Community active role – monitoring and continuity/stability in area's plans and projects
- Synergies among cross-border and territorial development projects for implementing pilot projects and guarantee continuity of financing for a long period

4.1.3 Awareness raising for sustainable mobility & crowd-learning

Sustainable urban mobility era seems that can only be reached if innovative approaches that strongly engage citizens in the decision making and in the plans implementation phases apply. The term "innovative" here refers to the adoption of ICT based channels able to motivate citizens in being part of the transition era. ICT based tools for encouraging citizens' involvement in the sustainable planning procedure refer to, free of time and location constraints, technology-mediated forms of citizens' participation; no need for physical attendance at conventional stakeholders events where citizens are usually represented by just few members taking the role of simple observers [39- 42].

Awareness raising and citizens' & stakeholders engagement is a crucial issue when trying to promote sustainability. Without the active support of the end users and beneficiaries, therefore citizens, tourists and key actors in sustainable mobility, sustainability plans will remain papers without a practical value. From the other side, the feeling of ownership from the end users is necessary in order for the plans to be acceptable and viable. Awareness raising is also linked to policy crowdsourcing and participatory planning approaches. Crowdsourcing supports idea-generation, and production model that leverages the dispersed knowledge of groups and individuals to produce heterogeneous resources while resulting in interventions that are well accepted and respected [38].

e-smartec Interreg Europe 2014-2020 project is a very interesting initiative collecting and sharing good practices on engagement methods. The first report of the project, where interested readers are redirected, provides a non-exhaustive, nonetheless a significant, cross-section of the techniques used for increasing citizens' and stakeholders' awareness raising and for engaging them to decision/ policy making [43].

Tailoring the awareness raising to tourism boost in ADRION, the 4A of commitment that should be built among tourists is very interesting [51]; tourists that trust the ADRION cities and citizens and not only have the willingness to revisit the cities but also to transfer this experience to other tourists for multiplying the effects.

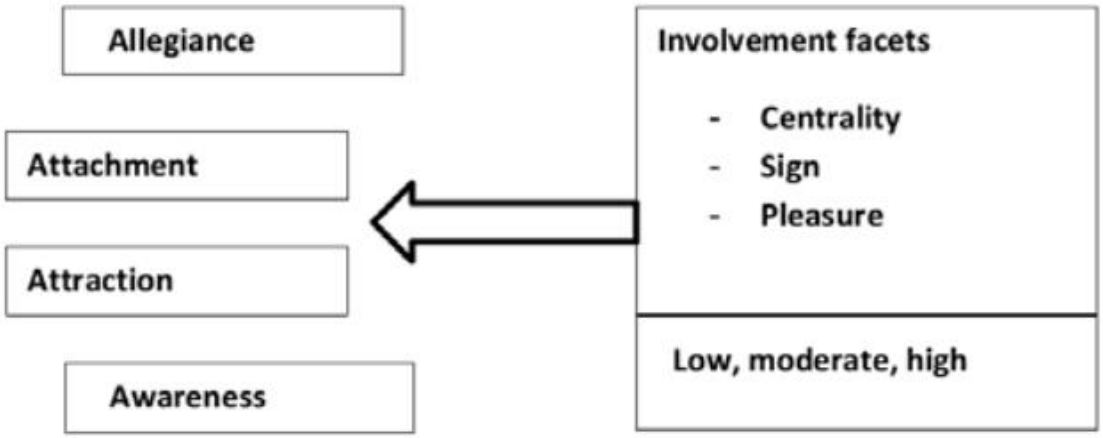


Figure 22: The psychological continuum model [50]

Therefore awareness raising – participatory planning and crowd-learning is a principal building block for sustainability and connectivity – subareas are:

- Providing motivation for ADRION citizens to travel inside ADRION with rail and maritime modes
- Investment on travellers' behaviour change – towards eco-tourist profile development
- participatory planning via injecting the knowledge of the crowds

4.1.4 Sustainable tourism promotional campaigns & initiatives

Increasing off-season (all year tourism) and out of city-known travelling in order to spread tourist flows as well as limit the externalities of demand seasonality seem to be very significant for the future of the ADRION region – sustainable mobility (connectivity) and sustainable tourism are two interrelated sectors to be jointly treated. Furthermore, ADRION cities can mutually support tourism growth.

As mentioned in the Roadmap for the Adriatic-Ionian Region Heritage protection, cultural tourism and transnational cooperation through the Cultural Routes, generalized ideas for the future are:

- joint brand building
- awards
- common ADRION portal [44].

Special services can also mutually support tourism boost as well as sustainable transport;

- Combined Services – this type of transport executed via two at least different means of transport, but through a single contract. (e.g. TRAINOTAXI service in Greece)
- Thematic trains and event trains (e.g. TRENOSKI in Greece, field trips in Croatia, BALATON MIX in Hungary)
- Provision of discounts with the purchase of public transport tickets

- Trains that can carry cars, bikes (e.g. the case of night trains in Athens – Thessaloniki route, Nextbike in Croatia, Slovenia)
- Combined tickets for mutual promotion of public transport means [45]

EU cities recognizing the role of sustainable tourism and its connection to sustainable transport, have launched very interesting initiatives, some of which have also been awarded – the COMPENDIUM OF BEST PRACTICES '2019 European Capital of Smart Tourism competition' present significant steps taken by EU candidate cities for Smart Tourism Awards. Sustainability, Digitalization, Cultural Heritage & Creativity and Accessibility are the four categories of innovative and intelligent solutions that have been showcased. Among them; Whim app as a one-stop-shop information and ticketing app for all modes (whimapp.com), smart integrated cards offering discounts in Public Transport and at other points of interest, services tailored to people facing mobility problems, personal volunteers – helpers offering personalized information to tourists, pedestrianization and cycling routes extension and rewarding systems for responsible behaviours [46].

Summarizing the 4th identified cluster of intervention referring to Sustainable Tourism promotion includes:

- Campaigns for promotion of new types of tourism – finding ways to reduce seasonality (e.g. winter visit places campaigns), sport tourism, religious tourism, eco-tourism etc
- Joint promotional campaigns among ADRION countries for increasing flows (trips within ADRION Region)
- Special services e.g. old rail trip in SEE, connected to marine life via ferry experience

It is really interesting that the 'brother' sector of transport –tourism and bodies representing it and dealing with the sustainable growth arising from sustainable tourism is strongly supporting Rail Renaissance for transnational connectivity through initiatives led by stakeholders' cooperation. Taking into account also the post COVID-19 effect, the White Paper on Rail Transport for International Tourism in Europe defines sustainable growth models that accelerate the transformation to a sustainable, digital and innovative tourism sector;

- *Strong political and financial support to promote the benefits of rail travel for leisure purposes among travellers from Europe and overseas, through dedicated educational and promotional campaigns.*
- *Promote and support sector-wide initiatives lead by railways and national tourism boards to engage all relevant actors across the industry and secure support for joint action.*
- *Commitment to invest and support railways to enable carriers provide quality transport services that meet the specific needs of leisure travellers at an adequate price that leaves no one behind.*
- *Promote smart mobility models with railways as integrators for a seamless, sustainable, affordable and accessible mobility for residents and visitors alike* [55].

4.1.5 ICT / apps

ADRION region is an area undergoing radical changes the last years; its cities, although fragile from the recurrent effects of economic crisis, are timidly moving on a recovery path and are trying to catch up with the rest European hubs. The development of a powerful Public Transport Network in European cities is just upon the road to future sustainability and is strictly connected with soft investments, unburdened from the need for large funds that sound as utopia in the austerity backdrop being experienced in Europe. Investing in technological solutions that could lead in advanced services provision to travellers, could steer a secure and successful recovery path.

ICT (information and communications technology) systems are one of the aspects adopted by the operators in order both to facilitate their daily operation and increase their market share. Based on the experience, it is generally considered that traveller information has the potential to reduce travel times and improve their reliability and that advanced traveller information systems (ATIS) are among the most cost-effective investments to be done by a transport provider [47].

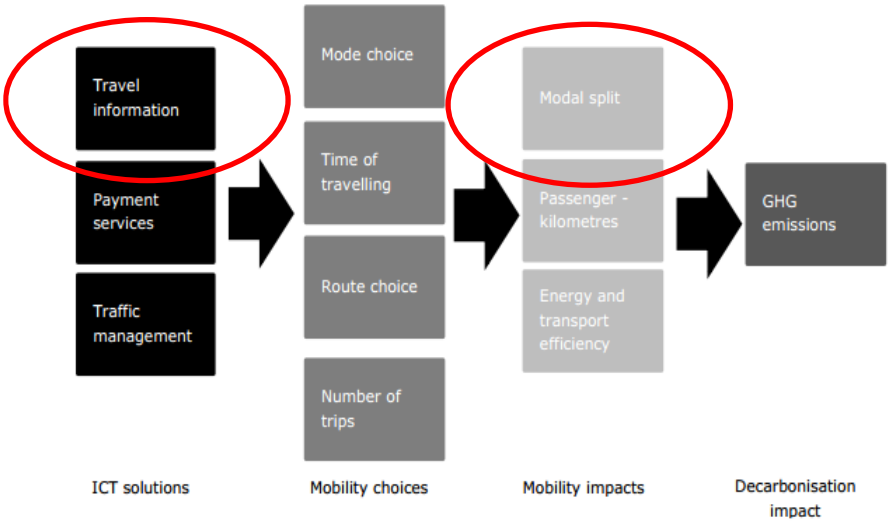


Figure 23: ICT solutions and impacts [52]

Real time reliable information provision to passengers can support the increase of cars occupancy rate and by engaging drivers and passengers in road monitoring, can shift them to Public Transport (perceived waiting time is reduced), can therefore reduce congestion and bring relevant social, economic and environmental benefits.

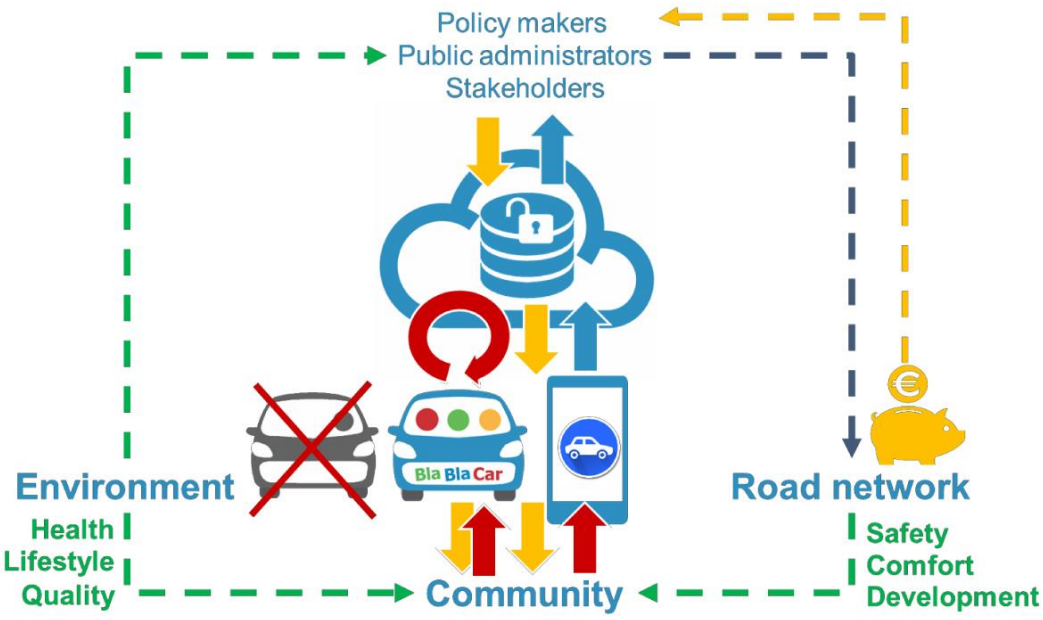


Figure 24: An ICT based approach to passengers' sustainable transport, CROWD4ROADS project [48]

The digitalization and innovation is also well supported through the Trans-European Transport Network (TEN-T) policy which other than physical infrastructures supporting, shows also the direction of adopting new technologies [56].

ICT interventions for Inter-Connect project include (not exhaustively) the following:

- Digital tools exploitation for making ADRION cities more accessible, sustainable and attractive (e.g integrated APPs presenting the city, museums, areas of interest, public transport itineraries)
- ICT exploitation at terminals
- Transnational intermodal journey planners
- Early warning services and information services for travellers

4.1.6 Advanced (harmonized, integrated, of high quality) services provision at local level

Just as for the whole Europe where urban areas are the building blocks of each core (transport and of course overall) system, ADRION cities consist the main nodes of ADRION region.

According to the Work Programme 2018-2020, Horizon 2020, *Europe's urban areas are struggling to develop themselves into well-connected multimodal and multi-usage nodes for smart and clean mobility. Multiple trends affect urban and inter-urban areas: urban growth, densification, digitalisation, increasing pressure from freight movements and a shift to a service-oriented economy. Moreover, many European cities and regions areas are committed to develop into zero-emission areas. New technologies and innovative measures are emerging, but they are not taken up at a scale that is necessary to meet our climate targets and European transport policy objectives. In many instances, the responsible authorities*

(often operating at different governance levels) cooperate with public and private stakeholders. But the full integration and implementation of new solutions lags behind because little information, data and tested, innovative solutions are available on their effectiveness and on how to overcome the barriers to successful implementation into older legacy systems and ageing infrastructures [49].

Similarly to the above, at a smaller level, ADRION cities should led by example by recognizing their importance and upgrading and modernizing internal connectivity (city-level and city-to-region) on the basis of sustainability. This cluster of measures is composed of different soft based measures as well as Public Transport/mass transport and sustainable transport services provision:

- Harmonization of PuT timetables within cities and related catchment areas (linking also Points of Interest)
- New services / enhanced PuT services connecting intermodal nodes (e.g. ports/airports) with cities
- Innovative forms of mobility inside ADRION cities – e-bikes, shared bikes, micromobility etc
- Early warning and information services for travellers
- Regional railway for speedy regional connections
- Tramway/light rail to move high numbers of passengers within conurbations
- Area services to feed rail-bound services
- Online tickets purchase
- Upgraded services and plans for PuT support in case of 'shock variations' – sustainable and resilience recovery plans

With the term shock variations in transport demand we refer to transport demand limitation arising from unprecedented situations (lockdown) like the one caused COVID-19 pandemic and the reaction of the systems after such situations. As POLIS network (https://www.polisnetwork.eu/), the network of European cities and regions working together to develop innovative technologies and policies for local transport, characteristically mentions that *crisis is being tackled in our hospitals, but also in our streets and plazas, on our buses, trains and subways* [51]. The recent experience (and still unclear and with results that are still hidden) showed that sustainable forms of mobility (i.e. walking, cycling, e-scooters) can show the path towards recovery. And although walking, cycling and micro-mobility can be the alternative to such crisis, PuT is under a real threat; well – structured recovery plans for re-attracting citizens in Public Transport seem to be more than necessary in order to gain their trust while different operation and financial models are to be searched. The problem is associated with aspects as:

- increased costs for performing PuT (i,e, disinfection, additional controls)
- strong reduction of revenues (i.e. decreased number of passengers, limited capacity)
- management of passenger in peak hours with limited capacity
- extreme difficulties in increasing the frequency of some PuT services as for example rail services (limited capacity, limited and already fixed railway paths etc)
- citizen's behavior (in terms of potential decreased demand of PuT services and increase of private means)

4.1.7 Advanced (harmonized, integrated, of high quality) services provision at transnational level

Widening the viewing angle, transnational services should also be provided (and upgraded) in order to complement Region's connectivity.

Critical mass among ADRION countries seems to be considerable low (according to Inter-Connect Del. 1.3.1) however national agreements and joint campaigns as presented in the previous clusters of measures could mutual support demand generation. ADRION countries and cities extroversion should be strongly supported by getting involved in transnational networks and forums so as to build a really engaged community of tourists coming also from outside ADRION.

Very significant for the transnational travel experience is the limitation of the perceived trip duration including the transfer and waiting times that are the most discouraging aspects for all other than private car alternatives. Having access in the information the traveller needs before and on the trip, the passenger gains time savings; information before the trip can decrease waiting time while on route information can help to reduce the perceived waiting time. The following figure depicts the potential effect of ICT solutions in a transnational trip, including trip planning data, integrated ticketing provision, and existence of harmonized timetables, in total travel time (access, waiting and travel).

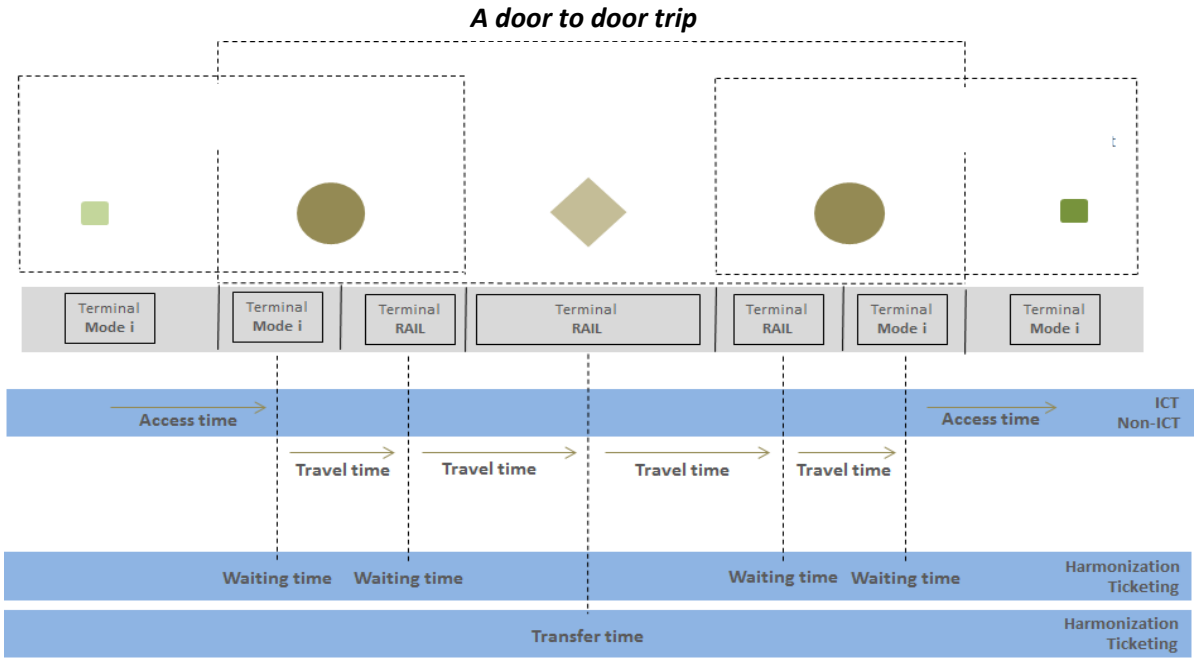


Figure 25: An example of a door-to-door trip (urban level) [Rail4SEE project]

Another aspect of the transnational connectivity of ADRION would be the development of port clusters and airport clusters strongly connected to the hinterlands that can further join forces for mutual support intra-ADRION tourism. Ports – Airports connectivity is also a good example for promoting cruise tourism – INTER-PASS Intermodal Passengers Connectivity between Ports and Airports, ADRION 1st call 2014-2020 project, is resulting in an Integrated

Strategic Plan for better connections of ports and airports in Adriatic-Ionian Region (https://interpass.adrioninterreg.eu/).

Retrieving experience also from other Interreg Programmes, transnational connectivity can be also supported via the activation of PSOs/PSCs; Rail4See project has implemented an in depth analysis of the PSO opportunities (Regulation (EC) No 1370/2007 Public Service Obligations). The regulation, in force since December 3rd of 2009, applies to publicly obligated passenger transport services, in particular rail services. A great number of local, regional and urban passenger rail services could not be operated without public funding. Also for some long-distance services operating costs cannot be covered by ticket revenues, esp. when ticket price level or demand are low and here is where PSO comes. More recently, CONNECT2CE project (https://www.interreg-central.eu/Content.Node/CONNECT2CE.html) has focused also on PSO, examining Cost-border PSO financial model between Slovenia and Croatia and developing a public service obligation (PSO)/a transport service contract for cross-border bus traffic between Austria and Hungary (AT-HU).

Also this cluster of measures refer to a combination of solutions in order to support transnational connectivity;

- New transnational services / enhanced transnational services connecting ADRION hubs – PSO implementation
- Integrated tickets for 'transnational' mode (for the transnational trip e.g. rail, ferry) and local PuT modes (last mile), combined services
- Cooperation among rail & maritime sector and air transport providers (e.g. Bologna as an airport node connected via rail with the rest Italian cities and Slovenia)
- Cruise cities alliances which would also promote sustainable mobility in port towns.
- Early warning services
- Online tickets purchase
- Coordinated and fully communicated actions to support rail and maritime connectivity arising also as opportunity through crisis

In accordance to the previous cluster of measures, COVID-19 pandemic has limited the transnational passengers' transport demand to the absolutely necessary. The EC Communication on 'Covid-19: Guidelines on the progressive restoration of transport services and connectivity' points out the impact that the sanitary crisis would have passenger transport. The COVID-19 pandemic, the second major crisis of globalization in a decade after the global financial crisis of 2008-2009 from which the global economy took years to get in a recovery path, has brought temporary wide scale travel restrictions. Especially for Western Balkans as mentioned by the Transport Community, *in absence of a competitive rail offer and while air connections (in the pre-COVID-19 situation) were not covering homogenously all Western Balkan partners, transport trends in Western Balkans show that road transport was the preferred mode of transport, with passenger road transport counting for almost 80-85% of all movement in the region* [53].

4.1.8 Hard 'rail' measures – infrastructures

Other than cooperation and soft technologically born measures for supporting connectivity, 'hard' interventions are needed in order to upgrade the transport supply.

The Trans-European Transport Network (TEN-T) policy supports and symbolises connectivity and accessibility for all regions of the Union. The completion of the core Europe-wide network of railway lines, roads, inland waterways, maritime shipping routes, ports, airports and railroad terminals has met many challenges (e.g. liberalisation, standardisation, technological innovation) and is still under completion. Apart from the physical infrastructure principal dimension TEN-T policy supports also the injection of innovation and digitalization to all modes of transport for reaching the joint goals of improved use of capacity, reduced environmental footprint and increased resource efficiency as well as enhanced safety levels [56].

Benefiting from financial mechanisms like CEF is very significant. The Connecting Europe Facility (CEF) is the EU funding instrument for strategic investment in transport, energy and digital infrastructure. In the transport sector, CEF is dedicated to the implementation of the TEN-T and aims at supporting investments in cross-border connections, missing links as well as promoting sustainability and digitalisation. During the period 2014-2019, CEF Transport has awarded EUR 23.3 billion in grants to co-finance projects of common interest, out of which EUR 11.3 billion was transferred from the Cohesion Fund. Open priorities as for 2021-2027 are:

- Advance work on the European transport network, while helping the EU transition towards connected, sustainable, inclusive, safe and secure mobility.
- Decarbonise transport, e.g. by creating a European network of charging infrastructure for alternative fuels and by prioritising environmentally friendly transport modes.
- Invest in transport projects offering high added-value in cohesion countries, through a dedicated budget.
- In the context of the Action Plan on Military Mobility: adapt sections of the transport network for civilian-military dual-use (for instance technical requirements on dimensions and capacity), using a dedicated budget [54].

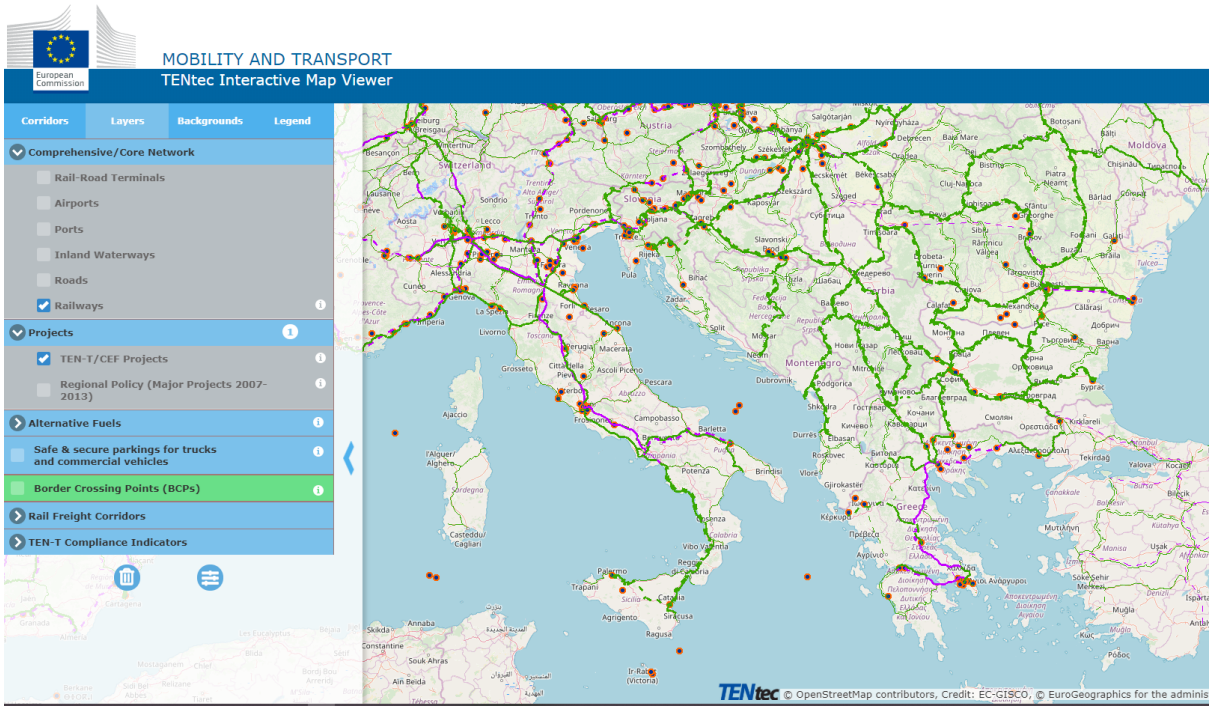


Figure 26: TEN-T rail network and TEN-T/CEF projects position (https://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html)

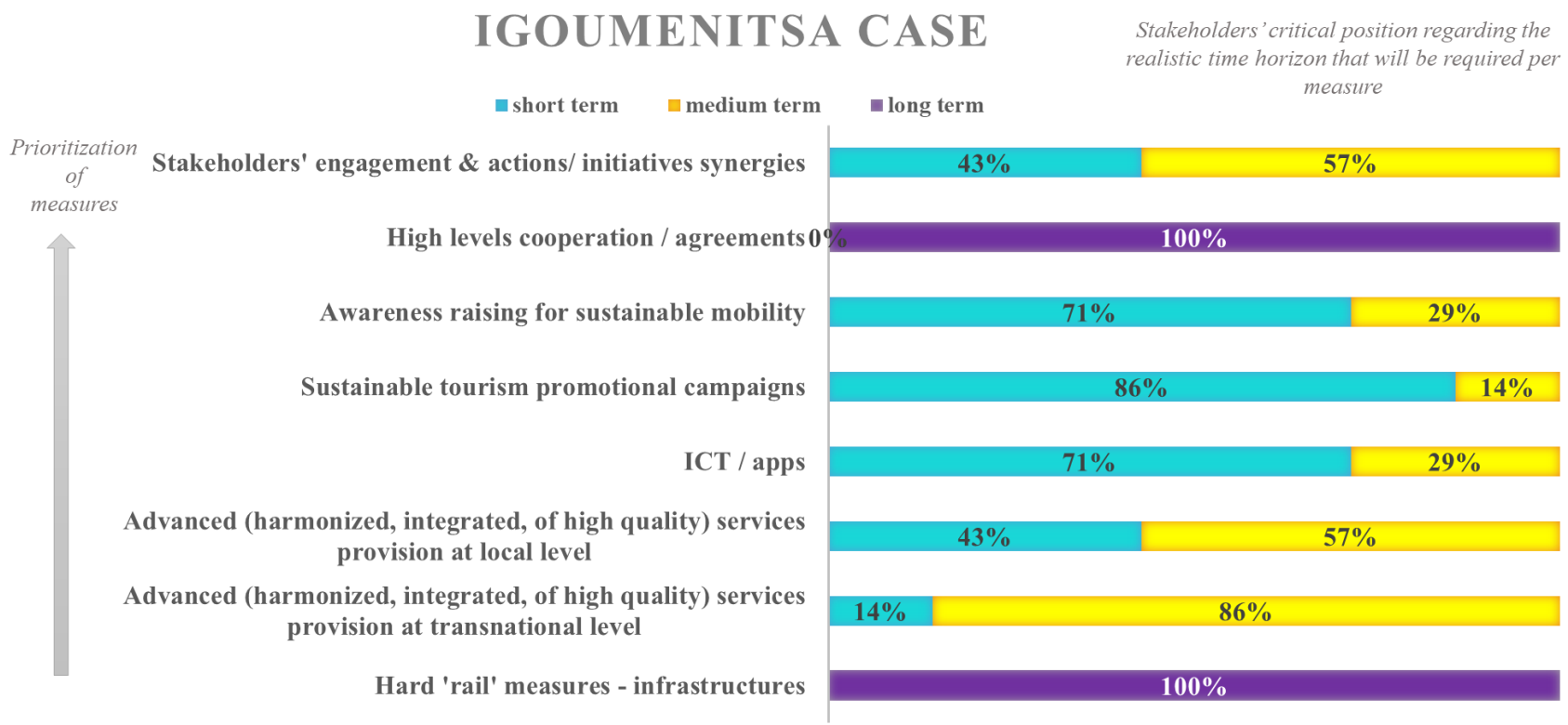
While mentioning therefore 'hard' measures we refer to:

- Interoperability issues for rail transport (– or technical compatibility - of infrastructure, rolling stock, signalling and other subsystems of the rail system, as well as less complex procedures for the authorisation of rolling stock across the European Union's rail network)
- Infrastructure projects for rail – completion and interconnection of the national and cross border network
- Connecting peripheral ADRION areas with the TEN-T core network (present and future network, referring in particular to the extension in the western Balkans)
- Infrastructure projects for terminals – facilities, connectivity port – hinterland or rail main stations – hinterland
- Facilitation of border crossing in rail transport

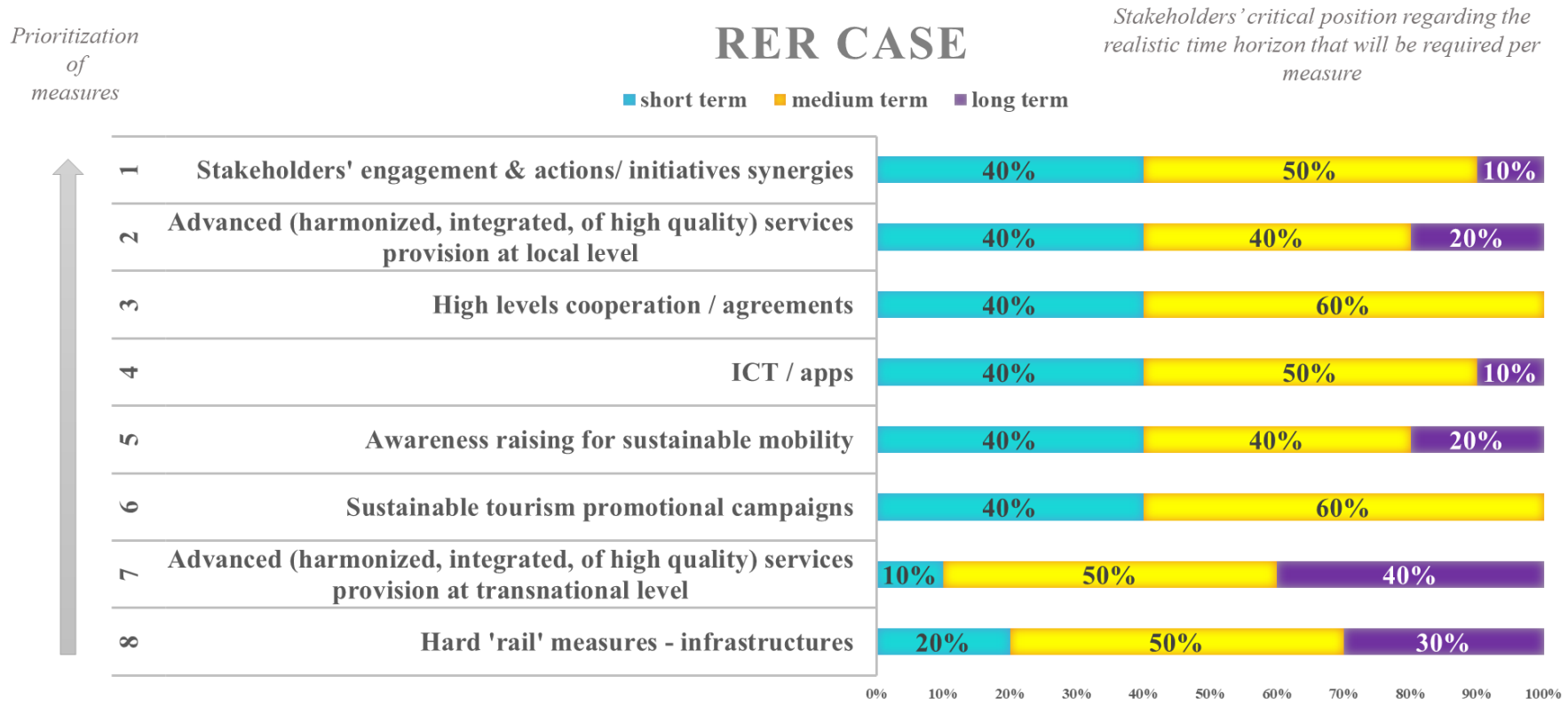
4.2Measures' ranking

Among the selected measures, each of them has to be analysed from local perspective. There are certain specifics of each country and the region regarding measures' feasibility, activities already on-going, priority and overlapping or dependency (predecessors) and different level of development of infrastructure, organizational issues and equipment. Another issue visible in terms of ADRION Region composed from EU member states and non-EU countries is level of harmonization and interoperability achieved, where some countries already have in place all or many of the necessary preconditions (legal, infrastructural etc.) and where system upgrade only is needed and on other side, countries without or at low level of infrastructure quality, missing legal framework and other basic requirements.

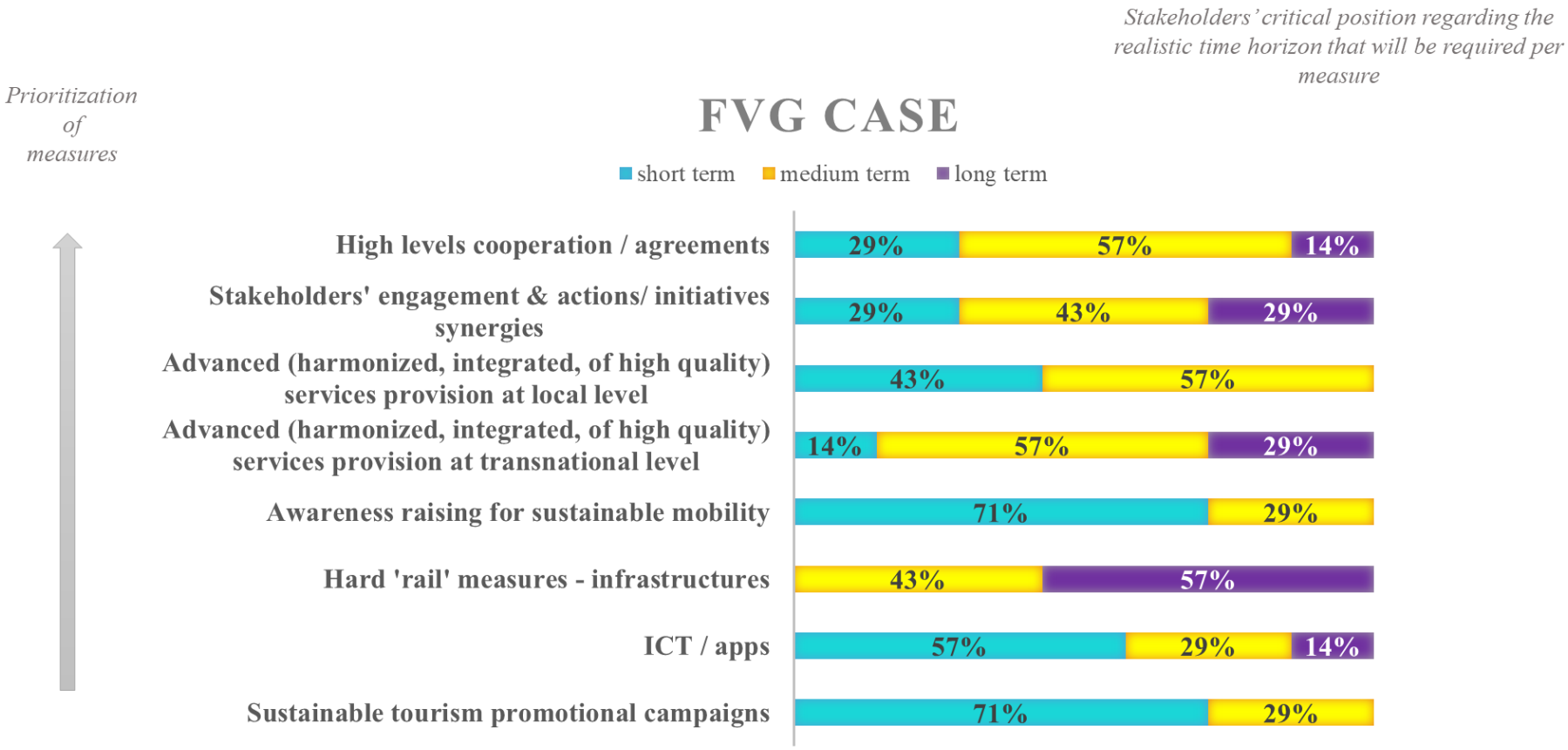
- **The case of Igoumenitsa, GR**



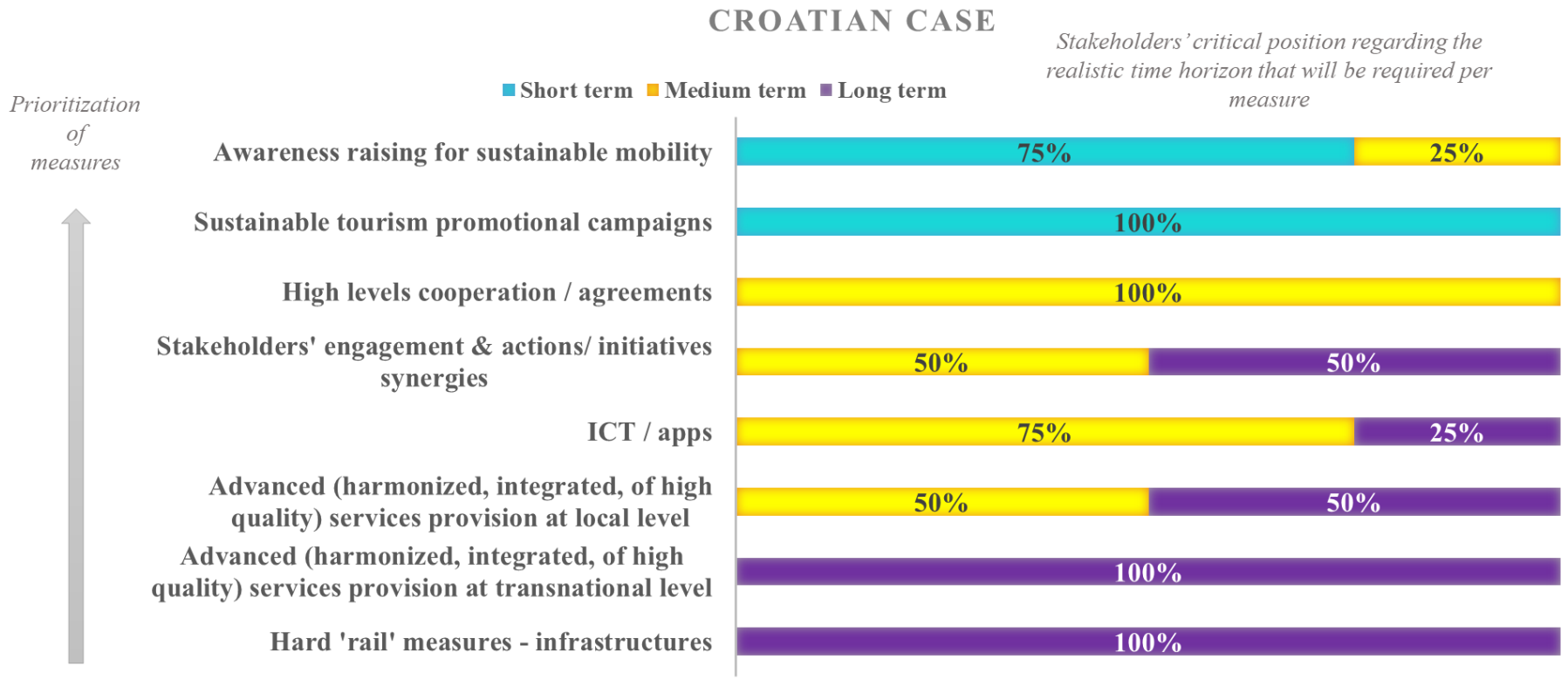
- **The case of Bologna and Region Emilia Romagna, IT**



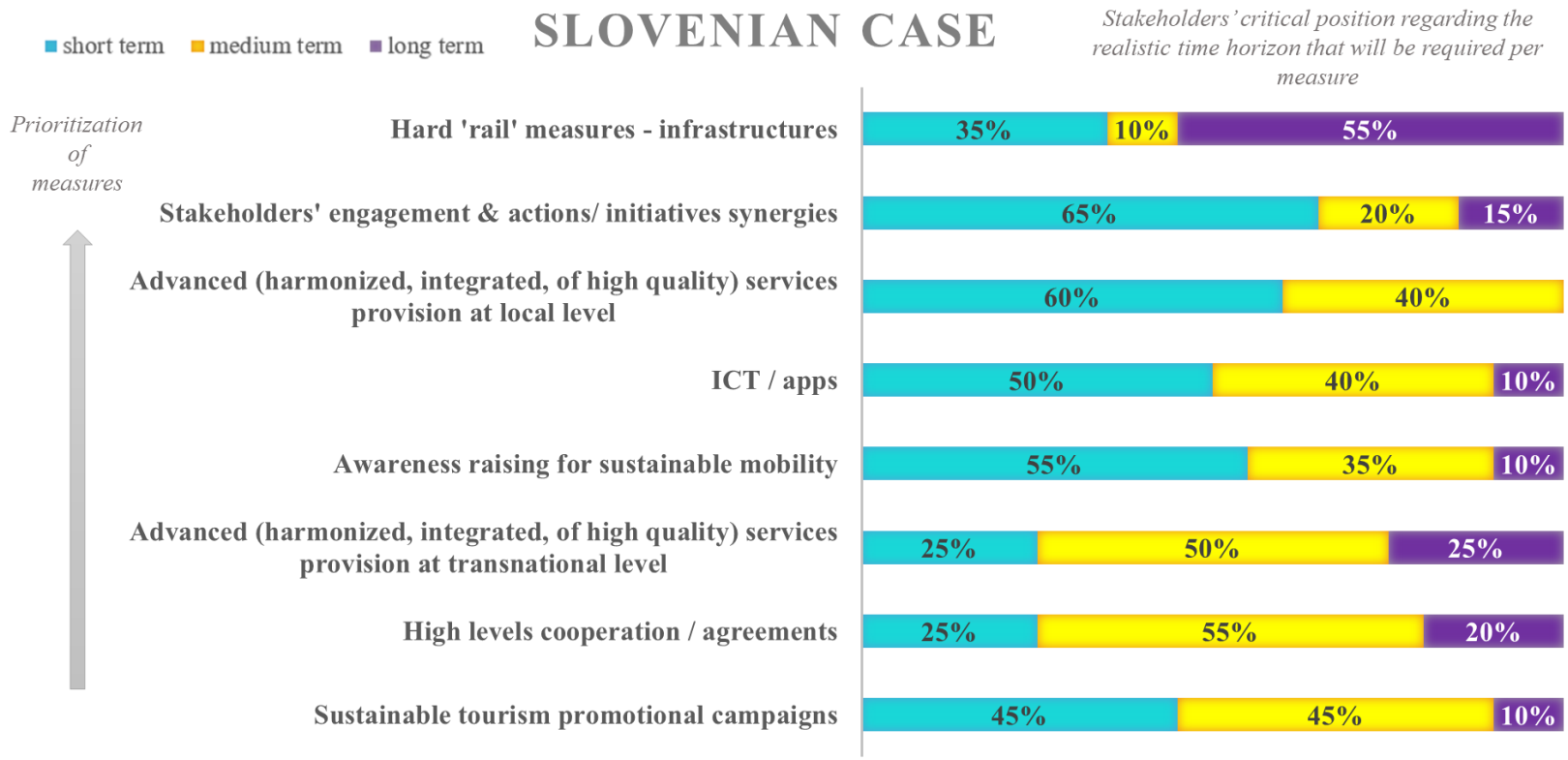
- **The case of Trieste and Friuli-Venezia Giulia, IT**



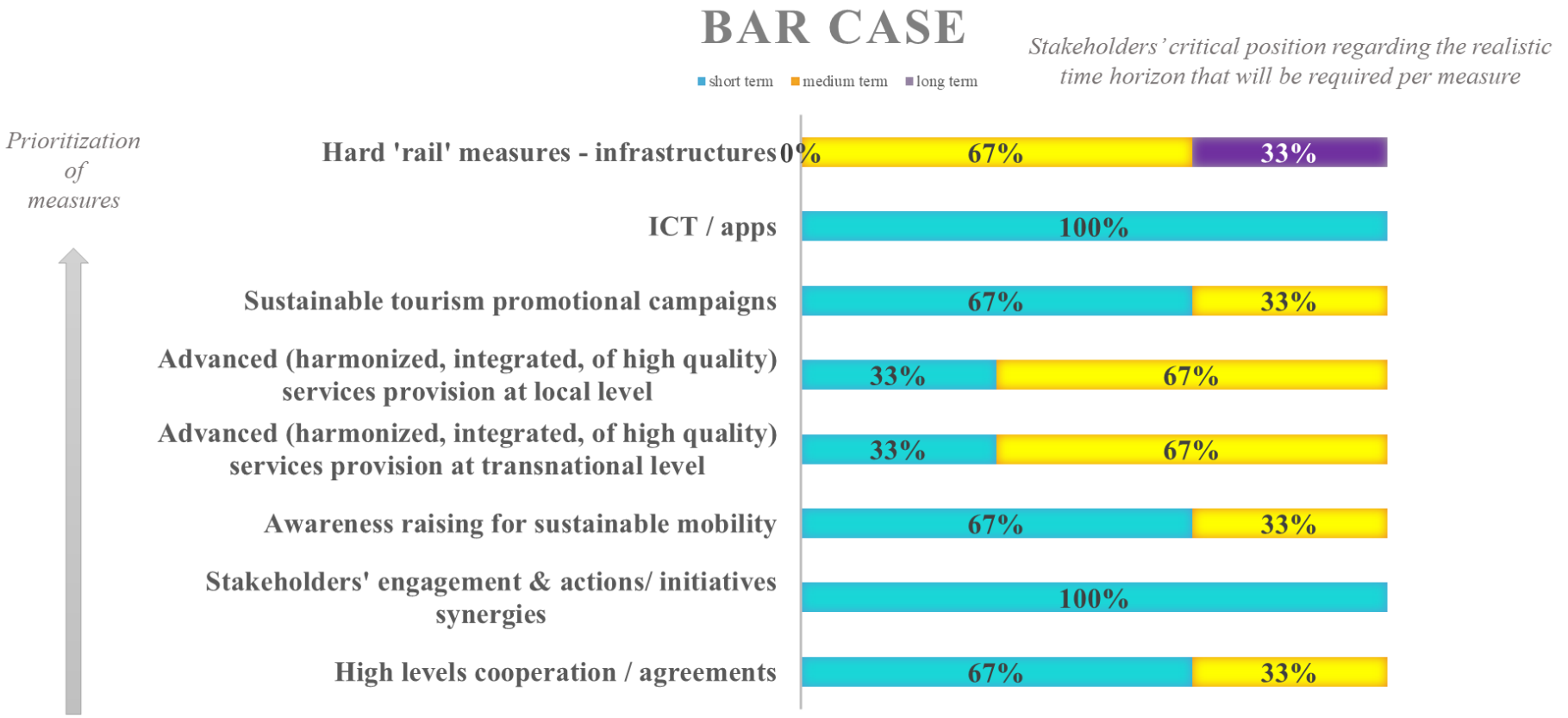
- **The case of Zagreb, HR**



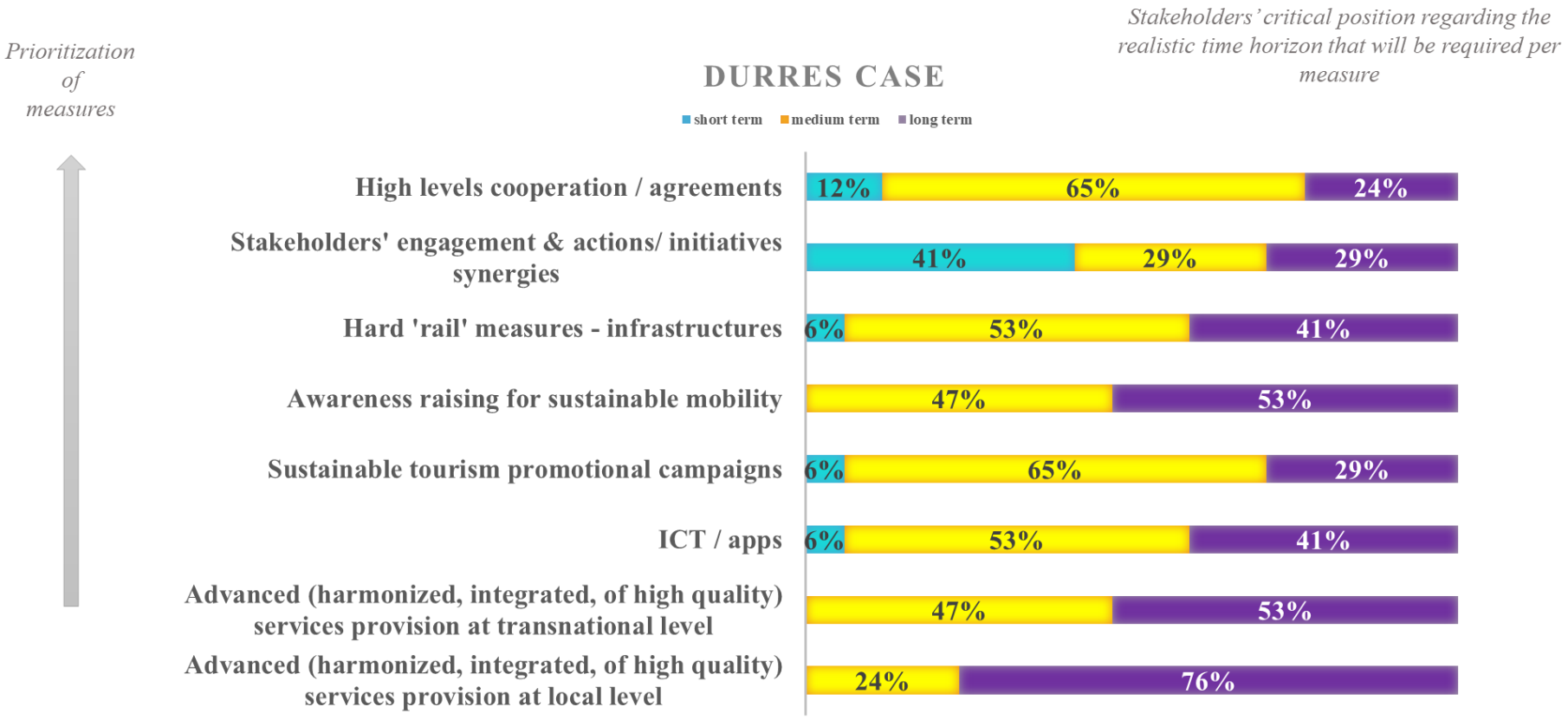
- **The case of Ljubljana, SI**



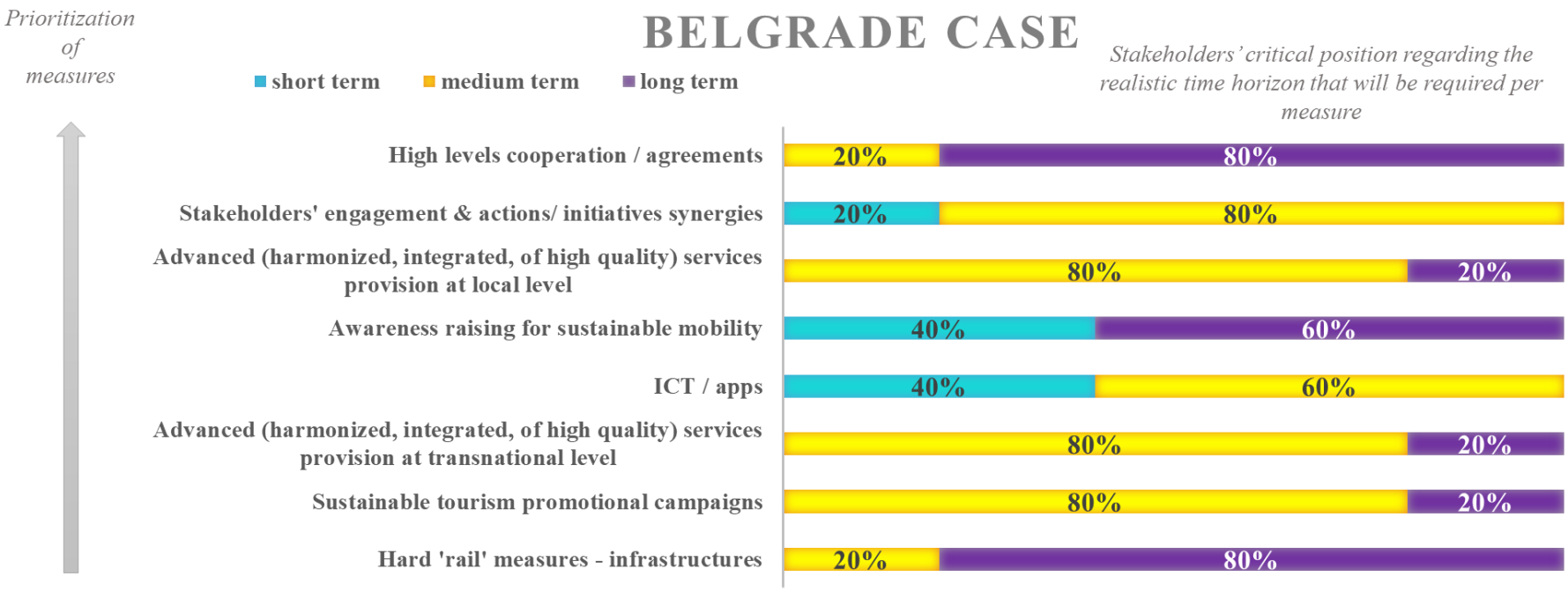
- **The case of Bar, ME**



- **The case of Durres, AL**



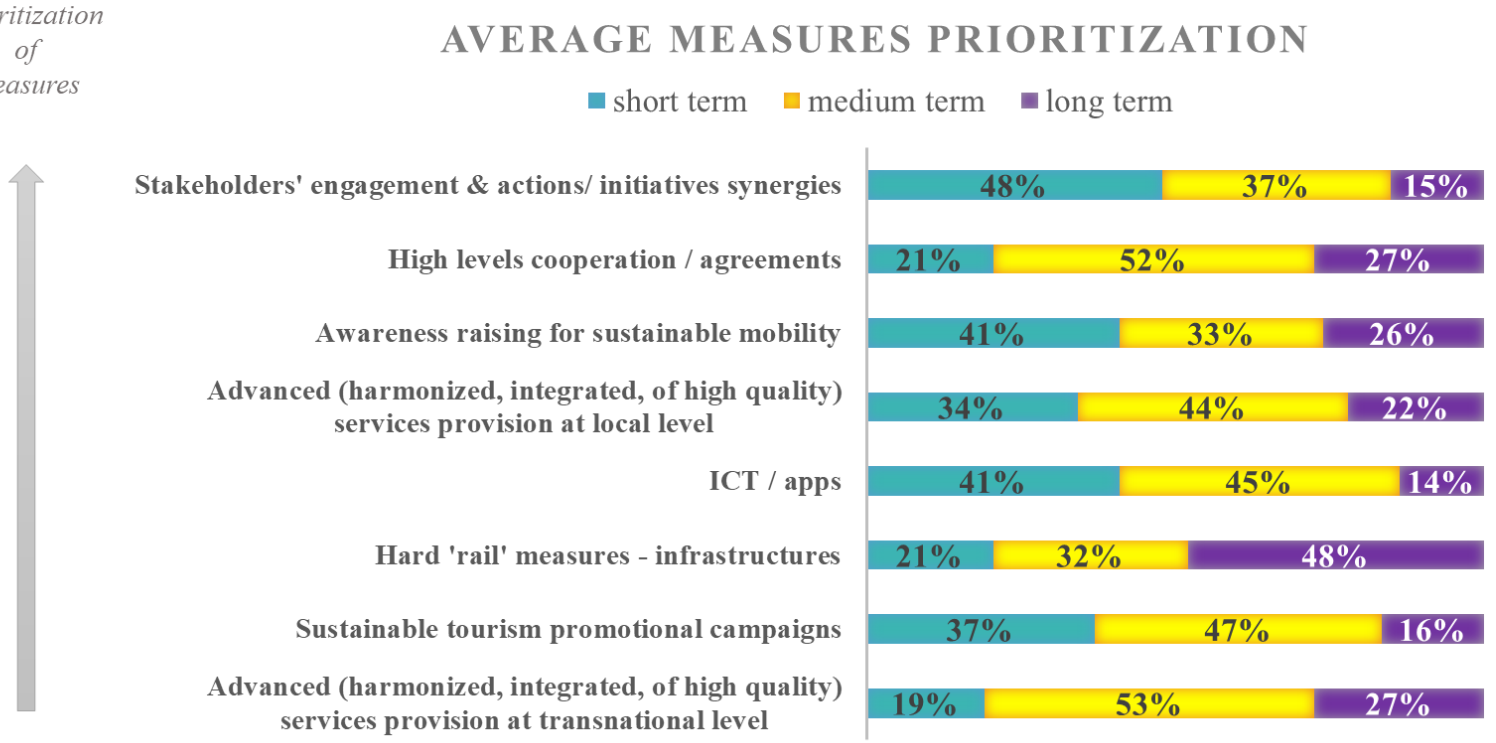
- **The case of Belgrade, SB**



- **Measures hierarchical order – joint analysis**

Stakeholders' critical position regarding the realistic time horizon that will be required per measure

Prioritization of measures



According to the special needs of each case, the stakeholders is obvious that have prioritized the measures in a different way; for example as regards the hard measures priority is really interesting that 2/8 cases ranked it as of first priority while 4/8 as of last priority. From the other side, there are cases that seem to present similar enough rankings i.e. Zagreb and Igoumenitsa (same measures as the 4 last priorities). Stakeholders' engagement as well as high level cooperation agreements rank for almost all cases at the very first places (for engagement 2/8 as 1st, 4/8 as 2nd,1/8 as 4th while for cooperation 3/8 as 1st, 1/8 as 2nd, 2/8 as 3rd).

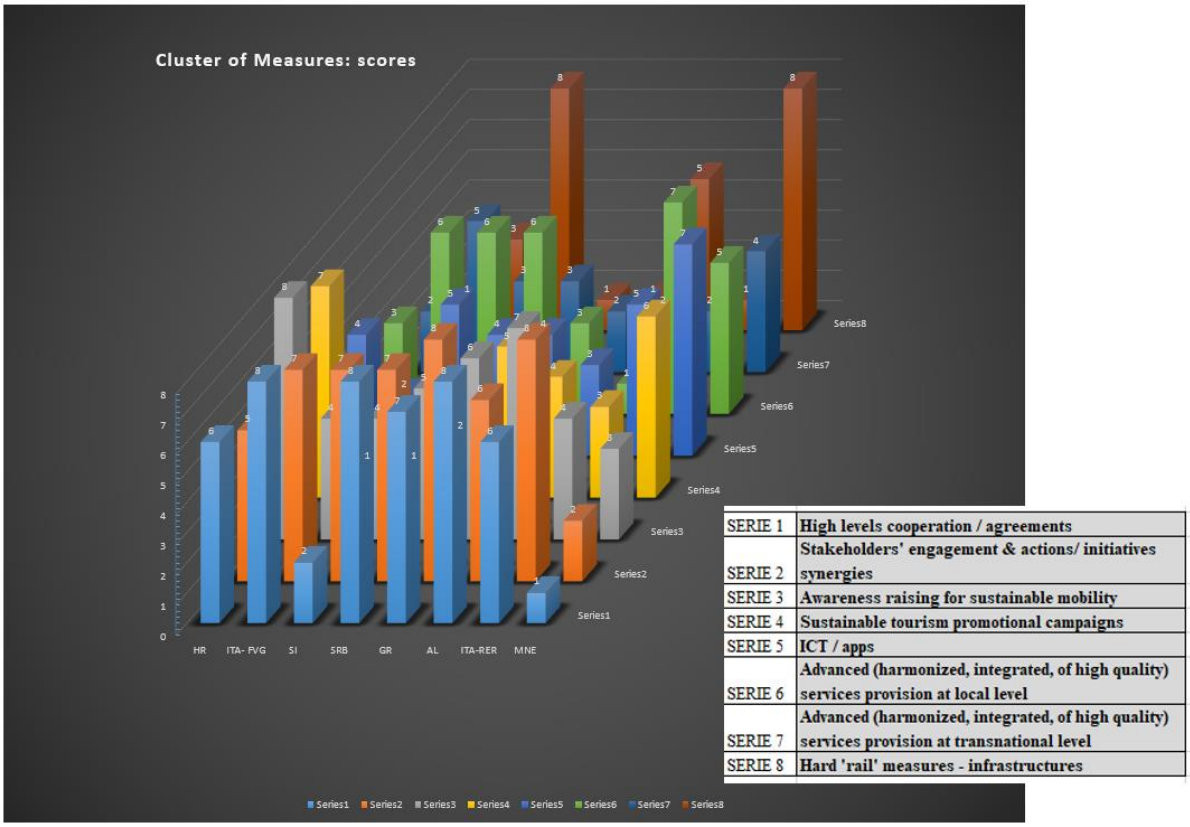
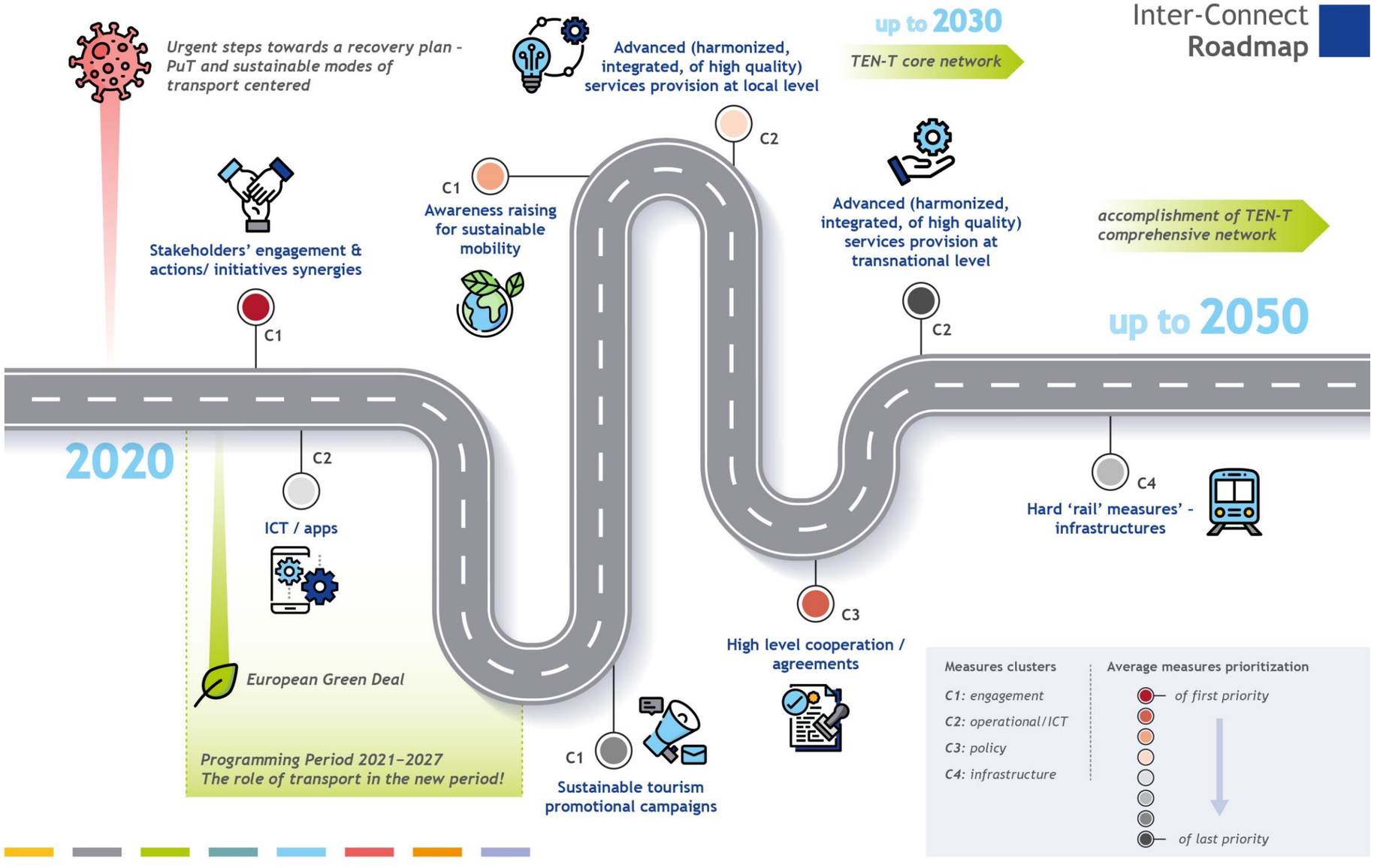


Figure 27: Measures ranking per case [Inter-Connect Del. 3.2.2]

5. Inter-Connect Roadmap

Based on the input received by the stakeholders, averaging of prioritization took place giving birth to the Inter-Connect Roadmap. This participatory approach with the injection of further critical assessment by the partners resulted in the Inter-Connect Roadmap that is presented in the following figure.

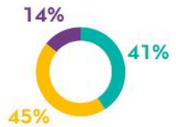

Inter-Connect Roadmap
Urgent steps towards a recovery plan - PuT and sustainable modes of transport centered
Advanced (harmonized, integrated, of high quality) services provision at local level
up to 2030
TEN-T core network
C2
C1
Awareness raising for sustainable mobility
Stakeholders' engagement & actions/ initiatives synergies
Advanced (harmonized, integrated, of high quality) services provision at transnational level
accomplishment of TEN-T comprehensive network
up to 2050
C1
C2
2020
C2
ICT / apps
C4
Hard 'rail' measures' - infrastructures
European Green Deal
C3
High level cooperation / agreements
Programming Period 2021–2027
The role of transport in the new period!
C1
Sustainable tourism promotional campaigns
Measures clusters
C1: engagement
C2: operational/ICT
C3: policy
C4: infrastructure
Average measures prioritization
of first priority
of last priority

Inter-Connect (1/2) Roadmap

Stakeholders' critical position regarding the realistic time horizon that will be required per measure

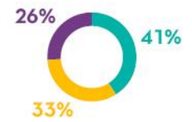
ICT / APPS

- Digital tools exploitation for making ADRION cities more accessible, sustainable and attractive (e.g integrated APPs presenting the city, museums, areas of interest, public transport itineraries)
- ICT exploitation at terminals
- Transnational intermodal journey planners
- Early warning services and information services for travellers



AWARENESS RAISING FOR SUSTAINABLE MOBILITY

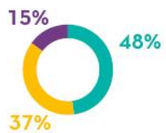
- Providing motivation for ADRION citizens to travel inside ADRION with rail and maritime modes
- Investment on travellers' behaviour change – towards eco-tourist profile development
- Participatory planning via injecting the knowledge of the crowds



2020 — **2050**

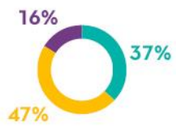
STAKEHOLDERS' ENGAGEMENT & ACTIONS/ INITIATIVES SYNERGIES

- High level of stakeholders' engagement (guaranteeing cooperation)
- Public Private Partnerships (i.e. for improving intermodal hubs)
- Establishing a regular communication, information and initiatives exchange and coordination of joint projects within the intermodal PuT sector
- EUSAIR – TEN-T: from macro-regional strategies to development
- Establish a firm communication to the relevant stakeholders through regional organisations / Transport Community active role – monitoring and continuity/ stability in area's plans and projects
- Synergies among cross-border and territorial development projects for implementing pilot projects and guarantee continuity of financing for a long period

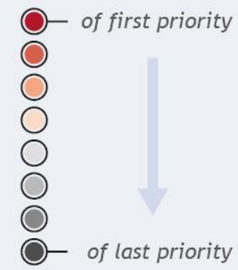


SUSTAINABLE TOURISM PROMOTIONAL CAMPAIGNS

- Campaigns for promotion of new types of tourism – finding ways to reduce seasonality (e.g. winter visit places campaigns), sport tourism, religious tourism, eco-tourism etc
- Joint promotional campaigns among ADRION countries for increasing flows (trips within ADRION Region)
- Special services e.g. old rail trip in SEE, connected to marine life via ferry experience



Average measures prioritization



Time horizon

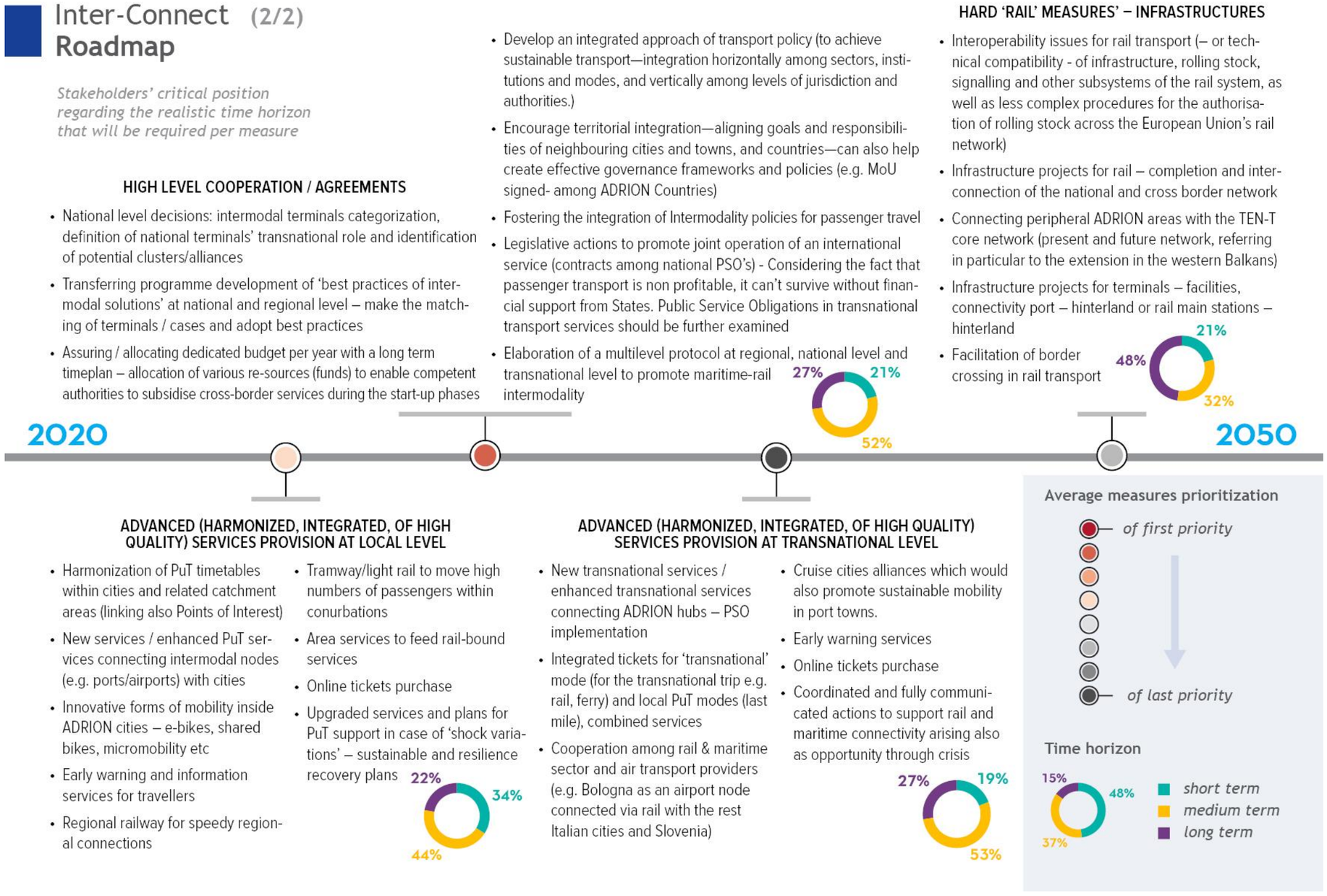


Figure 28: Inter-Connect Roadmap on reaching intermodality vision

The Inter-Connect Roadmap was validated once again by partners and by stakeholders and is estimated to getting further enhanced through a living round of contacts with stakeholders in ADRION as well as by getting regularly updated with the latest EU and global dimensions.

References

1. Webpage: https://www.transport.govt.nz/assets/Uploads/Our-Work/Documents/03f6cc62af/edt-Contribution-of-transport-to-economic-development.pdf
2. Webpage: https://www.itf-oecd.org/sites/default/files/docs/09highlights.pdf
3. Webpage: https://www.worldbank.org/en/topic/transport/overview
4. Webpage: https://ec.europa.eu/social/main.jsp?catId=457
5. Webpage: https://ec.europa.eu/transport/sites/transport/files/pocketbook2017.pdf
6. Webpage: https://ec.europa.eu/transport/facts-fundings/statistics/pocketbook-2019_en
7. Webpage: https://www.civil.iitb.ac.in/tvm/1100_LnTse/102_lnTse/plain/plain.html
8. Webpage: https://ec.europa.eu/clima/policies/transport_en
9. Noise and environmental pollution from transport: decisive problems in developing ecologically efficient transport systems Marianna Jacyna1 , Mariusz Wasiak2 , Konrad Lewczuk , Grzegorz Karoń, Warsaw University of Technology, Faculty of Transport, Warsaw, Poland Silesian University of Technology, Faculty of Transport, Katowice, Poland, 2017, DOI https://doi.org/10.21595/jve.2017.19371
10. Webpage: https://www.eea.europa.eu/data-and-maps/indicators/transport-final-energy-consumption-by-mode/assessment-10
11. Fuks K., et al. Long-term urban particulate air pollution, traffic noise, and arterial blood pressure. Environmental Health Perspectives, Vol. 119, Issue 12, 2011, p. 1706-1711.
12. Stokols D., Novaco R. W., Stokols J., Campbell J. Traffic congestion, Type A behavior, and stress. Journal of Applied Psychology, Vol. 63, Issue 4, 1978, p. 467-480.
13. Webpage: https://transportgeography.org/?page_id=1363
14. GREEN PAPER ON THE URBAN ENVIRONMENT: COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND PARLIAMENT, https://publications.europa.eu/en/publication-detail/-/publication/0e4b169c-91b8-4de0-9fed-ead286a4efb7/language-en
15. Marvin, S. J. (1992). Towards sustainable urban environments: the potential for least-cost planning approaches, Journal of Environmental Planning and Management, 35:2, 193-200, DOI: 10.1080/09640569208711920
16. COMMISSION OF THE EUROPEAN COMMUNITIES, COM(2001) 370 final, WHITE PAPER European transport policy for 2010: time to decide, Retrieved from https://ec.europa.eu/transport/sites/transport/files/themes/strategies/doc/2001_white_paper/lb_com_2001_0370_en.pdf
17. COMMISSION OF THE EUROPEAN COMMUNITIES, COM(2007) 551 final, GREEN PAPER Towards a new culture for urban mobility, Retrieved from https://eur-lex.europa.eu/legal-content/DE/TXT/?uri=CELEX:52007SC1209
18. European Commission, COM/2011/0144 final, White Paper on transport, Roadmap to a Single European Transport Area – Towards a competitive and resource – efficient

transport system, Retrieved from https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A52011DC0144

19. EUROPEAN COMMISSION, COM(2013) 913 final, COMMUNICATION FROM THE COMMISSION TO THE EUROPEANPARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIALCOMMITTEE AND THE COMMITTEE OF THE REGIONS Together towards competitive and resource-efficient urban mobility, Retrieved from https://ec.europa.eu/transport/sites/transport/files/themes/urban/doc/ump/com(2013)913_en.pdf
20. EUROPEAN COMMISSION, COM(2010) 2020, COMMUNICATION FROM THE COMMISSION EUROPE 2020 A strategy for smart, sustainable and inclusive growth, Retrieved from http://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf
21. United Nations. (2015).Sustainable Development Goals, https://www.un.org/sustainabledevelopment/development-agenda/
22. Webpage: https://ec.europa.eu/transport/themes/strategies/news/2020-02-03-commissioner-valeans-speech-eu-strategy-mobility-and-transport_en
23. Condeço-Melhorado A., Vieira J., Krail M., Reichenbach M., Schippl J. (2013) The European innovation system in transport and current state of the competitiveness of the EU transport sector. FUTRE Deliverable D2.1. Project financed by the 7th Framework Programme
24. Webpage: https://ec.europa.eu/commission/presscorner/detail/en/MEMO_11_197
25. URBAN AGENDA FOR THE EU, Partnership on Innovative and Responsible Public Procurement Final Draft ACTION PLAN, 10th June 2018, Retrieved from http://www.astrid-online.it/static/upload/2187/218785fbfc2c037492650a69a62068b1.pdf
26. Webpage: https://ec.europa.eu/transport/sites/transport/files/media/publications/doc/2009_future_of_transport_en.pdf
27. Webpage: https://www.vtpi.org/equityagenda.pdf
28. Myrovali, G., Morfoulaki, M., Output 2 – Ebook on transportation sustainability, SUSTAIN Erasmus + project, 2017-1-EL01-KA203-036303
29. Webpage: https://ec.europa.eu/regional_policy/sources/docgener/informat/basic/basic_2014_en.pdf
30. Webpage: https://www.europarl.europa.eu/factsheets/en/sheet/123/common-transport-policy-overview
31. Webpage: https://www.europarl.europa.eu/factsheets/en/sheet/130/rail-transport
32. Webpage: https://www.europarl.europa.eu/factsheets/en/sheet/124/maritime-transport-strategic-approach
33. Webpage: https://www.statewatch.org/news/2017/nov/ep-study-implementation-eu-law.pdf

34. Webpage: https://sites.google.com/view/transport4cohesion
35. Webpage: https://www.adriatic-ionian.eu/about-eusair/
36. Webpage: https://www.europarl.europa.eu/factsheets/en/sheet/126/tourism
37. Webpage: https://ec.europa.eu/transport/themes/international/enlargement/western-balkans/transport-community_en
38. Webpage: https://www.transport-community.org/wp-content/uploads/2019/11/transport-community-2019-wb-summit-connectivity-panel.pdfPrpić, J., Taeihagh, A. and Melton, J. (2015) The Fundamentals of Policy Crowdsourcing. Policy & Internet 7 (3). doi: 10.1002/poi3.102
39. Misra A., Gooze A., Watkins K., Asad M. and Le Dantec C.A., "Crowdsourcing and Its Application to Transportation Data Collection and Management", Georgia Institute of Technology. TRB 2014 Annual Compendium of Papers. (2014)
40. Slotterback, C.S. Public Involvement In Transportation Project Planning and Design, 558 Journal of Architectural and Planning Research, Vol.27, No.2, pp.144, (2010)
41. Wagner, J. Measuring the Performance of Public Engagement in Transportation 575 Planning: Three Best Principles. In TRB 2013 Annual Meeting, Vol. 954, (2013)
42. Myrovali G., Tsaples G., Morfoulaki M., Aifadopoulou G., Papathanasiou J. (2018) "An Interactive Learning Environment Based on System Dynamics Methodology for Sustainable Mobility Challenges Communication & Citizens' Engagement", Decision Support Systems VIII: Sustainable Data-Driven and Evidence-Based Decision Support, pp.88-99, DOI: 10.1007/978-3-319-90315-6_8
43. e-smartec Interreg Europe Project 2014-2020, Del. State-of-the art on marketing techniques for citizens' and stakeholders' engagement in e-smartec Regions, available at https://www.interregeurope.eu/e-smartec/library/
44. Roadmap for the Adriatic-Ionian Region Heritage protection, cultural tourism and transnational cooperation through the Cultural Routes, available at https://www.adriatic-ionian.eu/wp-content/uploads/2019/01/Roadmap.pdf
45. Rail4See SEE Interreg project 2007-2013, Del. Action 6.4: Harmonization platforms
46. COMPENDIUM OF BEST PRACTICES '2019 European Capital of Smart Tourism competition', available at https://smarttourismcapital.eu/wp-content/uploads/2019/07/Compendium_2019_FINAL.pdf
47. «Increasing the attractiveness of public transport by investing in soft ICT based measures: Going from words to actions under an austerity backdrop - Thessaloniki's case, Greece», Morfoulaki, M., Myrovali, G., Kotoula, K., Research in Transportation Economics, 51, pp. 40-48, 2015
48. CROWD4ROADS project, http://www.c4rs.eu/
49. Work Programme 2018-2020, Horizon 2020, 11. Smart, green and integrated transport, available at https://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-transport_en.pdf
50. Funk, D. (2008). Consumer Behaviour in Sport and Events: Marketing Action (1 ed.). Oxford: Elsevier
51. https://www.polisnetwork.eu/document/resources-covid-19-mobility/

52. Grinsven A.H., Schroten A., Essen H.P. (2012), Towards optimal passenger transport: the role of ICT solutions in promoting co-modality, Bijdrage aan het Colloquium Vervoersplanologisch Speurwerk 22 en 23 november 2012, Amsterdam
53. Working document of TCT, Facilitation of road passenger transport post COVID-19, available at https://www.transport-community.org/wp-content/uploads/2020/05/20.05.21-TCT-pax-transport-proposal_post-COVID.pdf
54. Connecting Europe Facility, available at https://ec.europa.eu/transport/themes/infrastructure/cef_en
55. White Paper on Rail Transport for International Tourism in Europe, available at https://etc-corporate.org/reports/white-paper-on-rail-transport-for-international-tourism-in-europe/
56. Webpage: https://ec.europa.eu/transport/themes/infrastructure/ten-t_en
57. Kroes, E. P., Sheldon, R. J.: Stated preference methods, Journal of transport economics and policy, 22, pp. 11-25, 1988.
58. Ben-Akiva M, McFadden D, Train K. Foundations of stated preference elicitation consumer behavior and choice-based conjoint analysis. In: 2015, Society for economic measurement annual conference, Paris, 24 July 2015.
59. Webpage: https://ec.europa.eu/transport/themes/sustainable/internalisation-transport-external-costs_en