O.3.5.1 - Report su quadro di riferimento strategico transfrontaliero

O.3.5.1 - Poročilo o čezmejni strateških okvirih

THIRD RELEASE – ENGLISH VERSION

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Table of Contents

Introduction

Within the framework of **WP3.1- ATT5** (“*Analisi e strumenti a supporto della definizione di un quadro di riferimento strategico transfrontaliero/ “Dejavnost 5 – Analiza cezmejnega strateškega okvira in orodij”*), the CROSSMOBY project is **providing an overall and unifying framework at cross-border level** based on a thorough data collection and analysis.

This framework is also allowing to summarise as well as briefly showcase and put into context the different pilot activities that are being implemented in CROSSMOBY (and, in particular, related main outcomes). In this purpose, the actual definition of **the contents to be collected cannot be carried out a priori**. In fact, it will be the result of an assessment of the available data (or that could/will be made available in the future) that has been **carried out together with the project partners and stakeholders that are making available such materials**. This has implied an **interactive process,** which has been developed starting from the first months of the actual implementation of the activity.

In particular, WP3.1- ATT5 is starting from the **idea of systematising available information** also providing some **effective representations** summarising the **status of connectivity in the cross-border area** (e.g. travel times, costs, number of interchanges for travelling between main centres) **focusing on a limited set of themes** (e.g. rail connectivity and bus services across the border) **that could be further integrated**, either in the next steps or in future follow-ups, by a wider set of information (e.g. the whole set of bus services belonging to the multimodal transport system of the whole ITA-SI cooperation programme area and beyond).

The proposed approach is fully in line with the indications of the Italia-Slovenia Border Orientation Paper[1], which underlines how “good public policies must be based on evidence (i.e. data, studies, mapping)” and that such proves to be particularly challenging at regional/local level and, especially, at cross-border level.

In this purpose, the present activity is fully addressing the strategic dimension of the CROSSMOBY project by addressing a dimension that is advocated among the key orientations for the new programming period.

This objective is addressed within CROSSMOBY WP 3.1 according to a process that is meant to support stakeholder dialogue and decision-making on the basis of sound technical elements.

[1] The Border Orientation Paper can be seen at https://www.ita-slo.eu/sites/default/files/BOP_IT-SI.pdf.

These elements are providing a deeper and shared knowledge and understanding on the functioning of the transport system of the IT-SI cross-border area (and related needs).

The process of reaching such knowledge recalls the DIKW (Data, Information, Knowledge and Wisdom) pyramid. In fact, it includes gathering and sharing data, their organisation in a database as to provide shared information, which is further elaborated as to reach a deeper knowledge supporting the development of a shared vision (see Figure 1). In this purpose the present deliverable represents a key element in reaching a shared knowledge by focusing on the analyses of the transport system on the basis of the data collected and structured according to the D. 3.5.2.

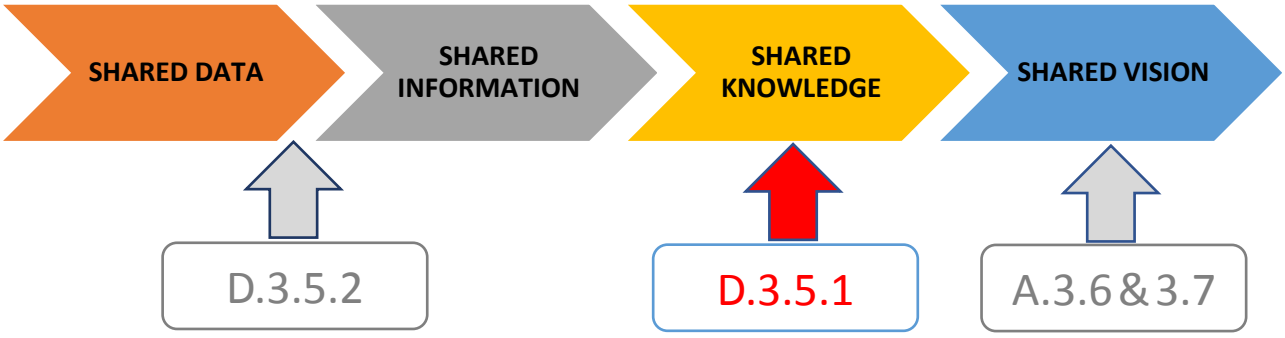


Figure 1 – O.3.5.1 and other CROSSMOBY 3.1 outputs as part of a DIKW process

Moreover, it is to underline how different themes are organised in the different paragraphs making reference to the transport modelling conceptual framework where the overall transport system is subdivided into two main components: supply (networks and public transport services) and demand (persons or goods travelling, or aiming to, between different zones). Their mutual interactions determine the traffic flow that can be ascertained in the real network or estimated through simulation.

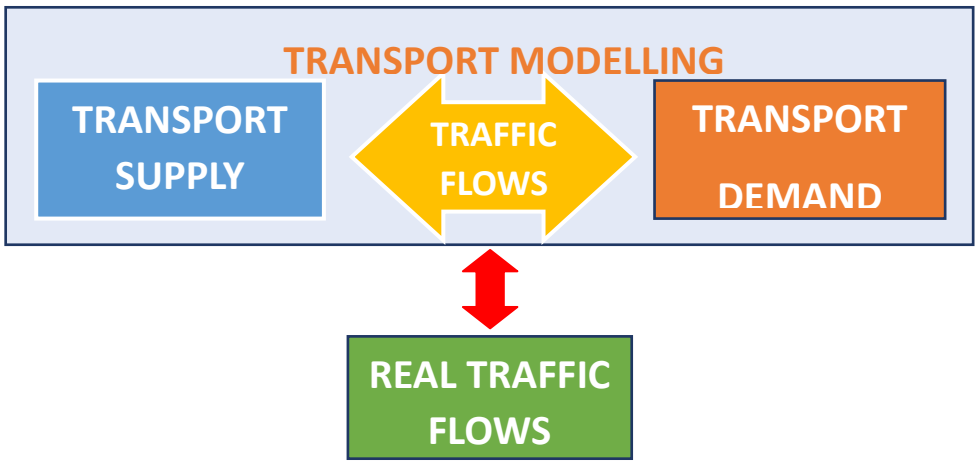


Figure 2 – The components of a transport system according to a general modelling framework

Each component is, then, further subdivided as to take into account different specific aspects and modes of transport.

For each of the addressed theme, in the paragraphs a focus on the key aspect making reference to the whole IT-SI cross-border area is provided. Furthermore, specific insights are provided through:

- In-Depth Information Boxes;
- Lessons Learned & Recommendations.

1. THE ITALY - SLOVENIA CROSS BORDER AREA

The present document addresses the whole IT-SI Cross-border Area as identified by the Italy-Slovenia Interreg cooperation Programme 2014-2020.

The Programme area extends over a total surface of 19,841 km² and has a total population of approximately 3 million inhabitants.

Figure 3 – The Programme area of the CBC Programme Italy – Slovenia 2014-2020

The entire Programme area includes:

- 5 Italian NUTS 3 level regions (the Metropolitan City of Venice and the former provinces of Udine, Pordenone, Gorizia and Trieste)
- 5 Slovenian NUTS 3 level regions (statistical regions of Primorsko-notranjska, Osrednjeslovenska, Gorenjska, Obalnokraška and Goriška).

Overall, on NUTS2 level on the Italian side, the regions involved are those of Veneto (partly, i.e. with only 1 out of the total 7) and Friuli Venezia Giulia (completely). Concerning the Slovenian side (thus with reference to "Kohezijske regije", made up by clusters of NUTS3 statistical regions), Slovene Western Cohesion Region is completely included, with all its 4 regions (Osrednjeslovenska, Gorenjska, Obalnokraška and Goriška), while the Eastern Cohesion Region is participating only with one region (Primorsko-notranjska) out of a total of 8.

Hereafter the whole Programme area – including the above-mentioned NUTS 3 level regions – will be identified as "IT-SI area".

As represented in Figure 4 the IT-SI area is characterised by a high heterogeneity in terms of geographical characters and density of settlements. In fact, along with several urban areas a high deal of peripheral and rural context, including mountainous ones, are to be reported. The main urban areas Trieste, Udine, Gorizia, Ljubljana, Pordenone, Venice, conurbation Koper-Izola-Piran, Nova Gorica, Kranj and Postojna.

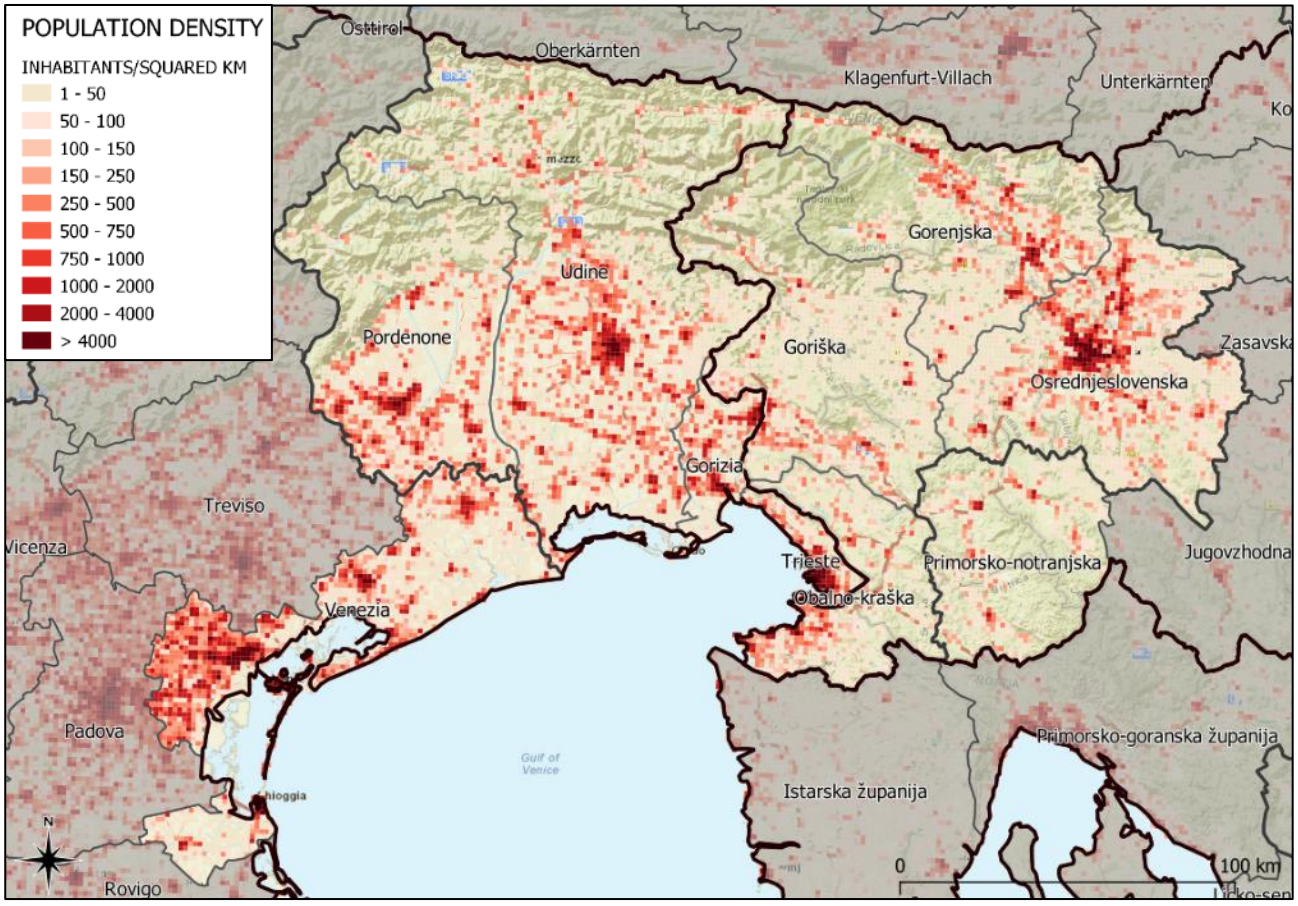


Figure 4 – Distribution of population density in the Italia-Slovenia Programme Area. Source: ISTAT, SURS, EUROSTAT.

Moreover, relevant suburban contexts and urban sprawl phenomena characterise, for instance the south-western portion of the IT-SI area (especially in the part between Venice and the neighbouring provinces of Padova and Treviso). On the other hand, other context (e.g. Trieste), also because of the geomorphological context, are characterised by a quite sharp gradient between highly urbanised and rural/peripheral areas.

These differences are also represented in the following figure, which shows a thematic representation according to a classification by EUROSTAT of the municipalities in the following typologies:

- Cities - Densely populated areas: at least 50% of the population lives in urban centres;
- Towns and suburbs – Intermediate density areas: at least 50% of the population lives in urban clusters and less than 50% of the population lives in urban centres;
- Rural areas – Thinly populated areas: more than 50% of the population lives in rural grid cells.

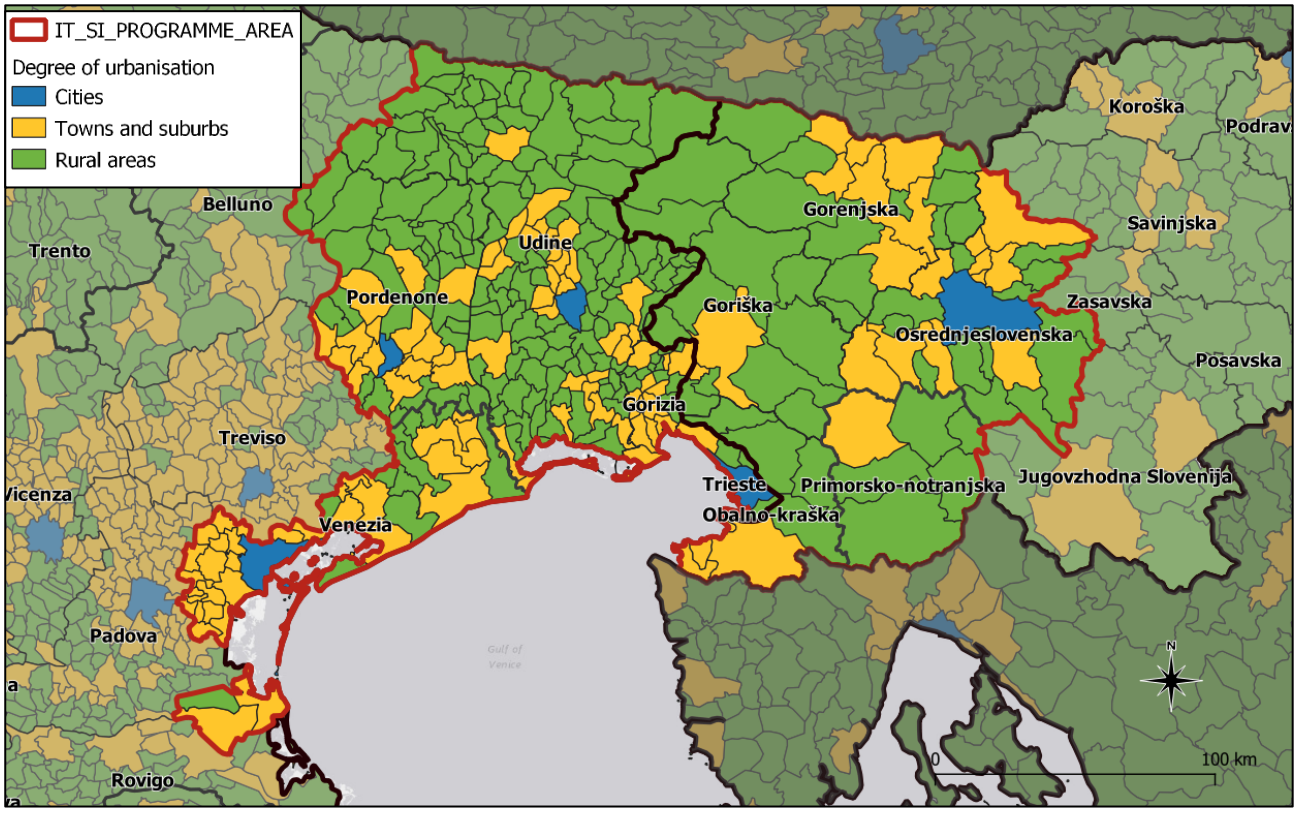


Figure 5 – Degree of urbanisation of municipalities. Source: EUROSTAT.

2. GOVERNANCE AND PLANNING INITIATIVES

In this chapter we address different levels of planning and Integrated governance as key target of the CROSSMOBY strategic project.

Hence, in the following chapter a brief review is made ranging from the EU to the local level administration is provided. Doing this, specific differences between the Italian and the Slovenian side are highlighted.

Furthermore, a specific deal is paid to the dynamics of CB dialogue and to bodies that are particularly relevant in this purpose (e.g. EGTC).

2.1. THE EU LEVEL

The development of a common transport policy has been acknowledged as a key driver for the whole European integration process and establishment of an internal Single Market since its early stages (Treaty of Rome, 1957). Throughout the years, harmonisation has taken on ever-increasing importance as to provide the basis for fair competition and effective stages as to provide the basis for fair competition and effective inter-operability and integration at operational level; moreover a growing and dynamic transport sector, experiencing increased volumes of transported goods and passengers, has been facing ever tighter social and environmental constraints, thus making the approach towards a 'sustainable mobility' more important than ever before.

Therefore, different regulations have been established at EU level with reference to different themes such as (with particular reference to surface transports) international and cabotage road transport, harmonisation of road transport national legislations, road traffic and safety provisions, rail transport. Obviously, these regulations have to be thoroughly taken into account, also in the light of their possible impact on specific aspects or measures to be implemented even at cross-border level. For instance, among others, a relevant example is given by the regulation on cabotage[2] (i.e. the provision of road haulage services within a Member State by a carrier

[2] Regulation (EC) No 1072/2009 of the European Parliament and of the Council of 21 October 2009 on common rules for access to the international road haulage market.

established in another Member State), which can have remarkable effects on the feasible approaches in developing cross-border transport services. In this regard, also regulations belonging to different fields could have a remarkable effect on cross-border transport related initiatives and, consequently, have to be duly taken into account. A remarkable example in this purpose is represented, for instance, by the State Aid[3] (advantages in any form whatsoever conferred on a selective basis to undertakings by national public authorities that are distorting competition and affecting trade between Member States) regulation.

Nowadays, the key strategic reference at EU level has to be considered the White Paper "Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system" issued in 2011, which still represents a formal address of the European Commission and defines a long-term vision until 2050 for the transport sector. This vision is meant developing an integrated, sustainable and efficient transport system for the EU, thus tackling challenging issues such as:

- an increasing oil price and persistent oil dependency;
- growing congestion and poor connectivity;
- a deteriorating climate and local environment (i.e. pollution).

In this purpose, the 2011 White Paper spells out 10 strategic goals and benchmarks for achieving 60% greenhouse gases emission reduction target by 2050 with respect to 1990 levels.

Furthermore, in order to actively pursue the identified 10 goals, the European Commission defined a detailed work programme comprising 132 initiatives, both legislative and non-legislative, which were grouped around 40 different action points.

This general framework provides a general framework which encompasses various themes, to be further deepened by more specific addresses pursuing specific goals. This is the case, for instance of the Urban Mobility Package, encompassing the Commission communication "together towards competitive and resource-efficient urban mobility" (COM(2013)0913), and the Guidelines for

[3] As from Article 107 of Treaty on the Functioning of the European Union "any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member States, be incompatible with the internal market".

Sustainable Urban Mobility Planning, issued in 2013 and 2019 (see also paragraph 3.4 in the following).

Moreover, in this purpose it is to report the development of the Trans-European Network – Transport (TEN-T), advocated by the White Paper (esp. Goal 5), has been specifically and deeply addressed by subsequent EU regulations issued in 2013.

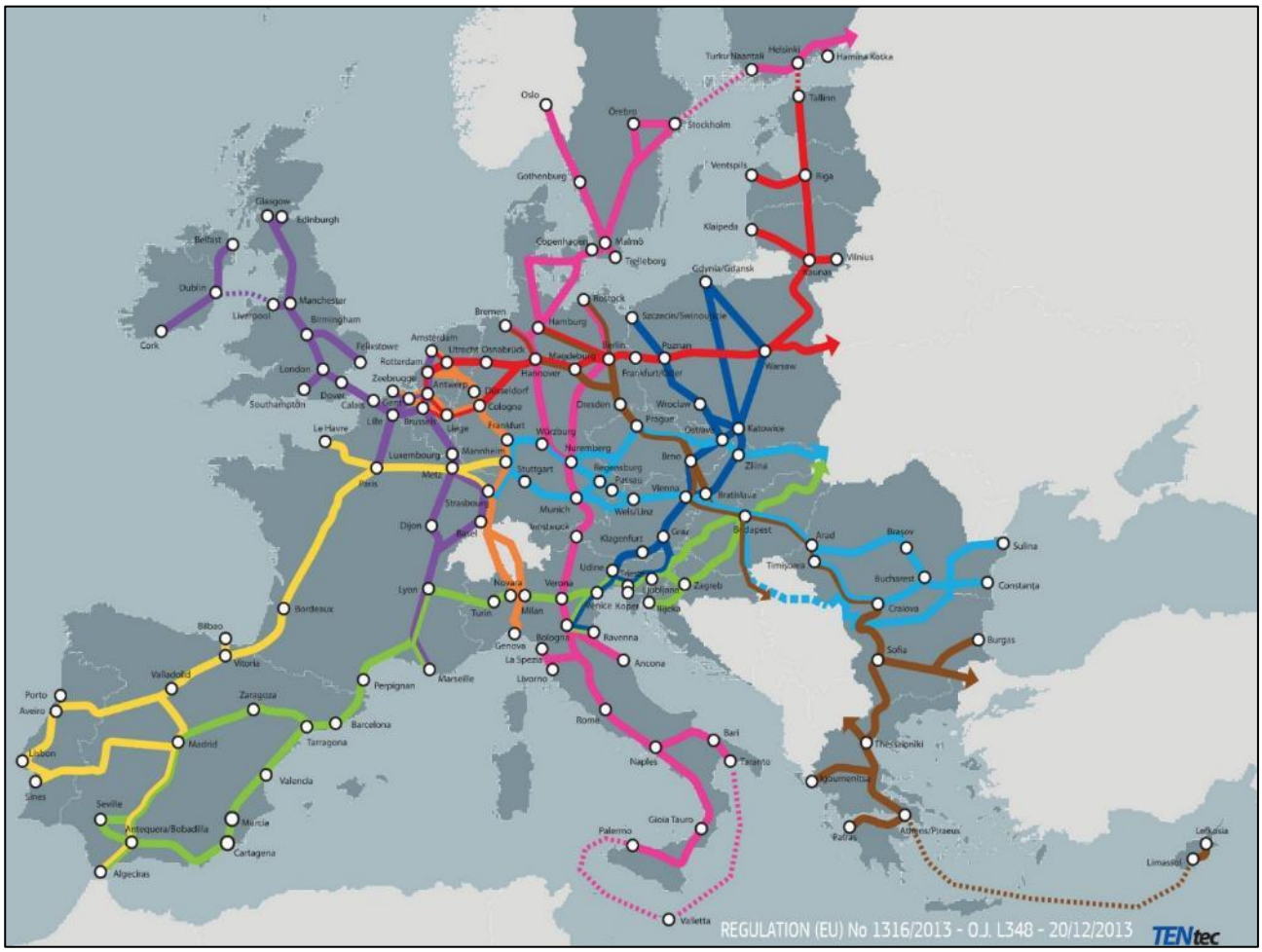


Figure 6 – TEN-T Core Network corridors. Source: TENtec.

In particular, the (renewed) TEN-T policy based on Regulation (EU) No 1315/2013 introduced the concept of 2 layers: a Comprehensive Network and a Core Network. While the Core network constitutes a basic element of the European transport system supporting developing EU single market with expected completion by 2030, the Comprehensive network is a more complex and denser layer aiming at ensuring better accessibility of regions throughout the continent, and its completions is assumed by 2050.

In order to support the implementation process of the TEN networks, among different EU funding initiatives, the Connecting Europe Facility Programme was established through Regulation (EU) No 1316/2013 (and subsequent amendment) with reference to EU the period 2014-2020 (EU Multiannual Financial Framework 2014-2020).

Since EU bodies are focusing on priority developments across the TEN-T Core network and, to better support achieving overall goals of a new European transport policy the Core Network Corridors (CNC) as a governance instrument to streamline facilitate the coordinated implementation of the TEN-T was also introduced.

Figure 6 presents the identified 9 Corridors, representing the backbone of the Core Network.

In particular, 2 CNCs are crossing the IT-SI area (being almost completed overlapped within this area): the Mediterranean and the Baltic-Adriatic.

Within the managing of the corridor's implementation a report on the workplan[4] and status is regularly updated, which is also providing an overview of the level of traffic with reference to each mode of transport.

In fact, it is important to exploit and maximise opportunities arising from such elements by providing smart and innovative solutions pivoting on opportunities related to core nodes and corridors facilities. Furthermore, it is relevant to complement such EU-wide vision with a thorough analyses of sustainability and accessibility goals at cross-border/regional and local level. In this purpose, a specific deal is to be paid to appropriately fully functionally linking secondary networks with the comprehensive and core TEN-T layers.

In this purpose, the ideal framework to pursue a "win-win" approach is represented by an integrated governance advocated among the objectives and strategies set at different level.

[4] The updated version of the Mediterranean and Baltic-Adriatic corridor workplans are available at:

https://ec.europa.eu/transport/sites/transport/files/4th_workplan_med.pd
fhttps://ec.europa.eu/transport/sites/transport/files/4th_bac_workplan.pdf

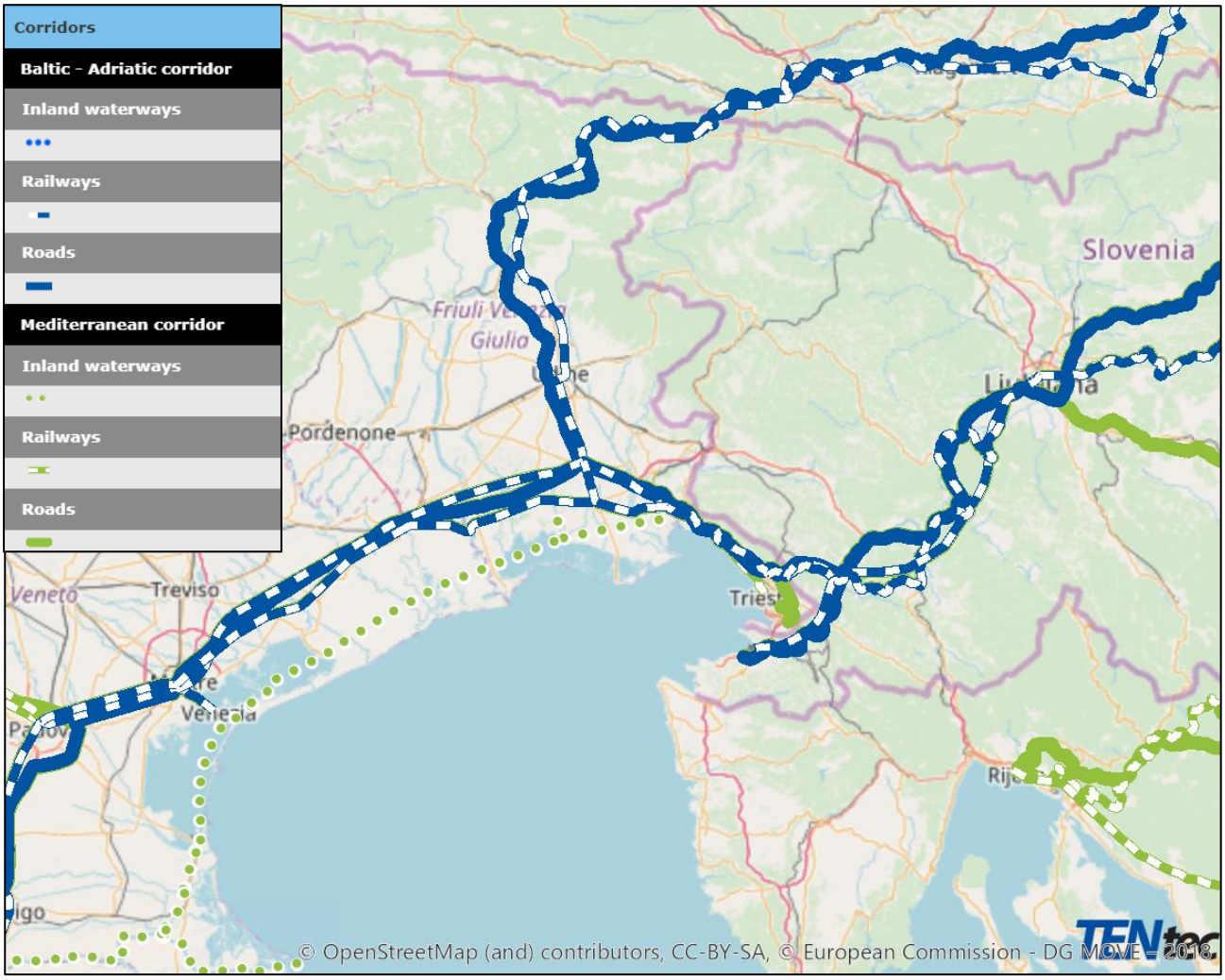


Figure 7 - The Baltic-Adriatic and the Mediterranean TEN-T corridors – zoomed view

In the meanwhile, it is to recall that both regulations ruling the TEN-T and the CEF programme are currently facing a review process leading to a revision of the TEN-T core network as well as the launch of the new CEF Programme for the EU programming period 2021-2027.

Moreover, it is to underline the remarkable update at strategic level that is leading to the development of a new comprehensive Strategy for a Sustainable and Smart Mobility. The Strategy, which announced as part of the European Green Deal and expected to be released before the end of 2020, is superseding the 2011 Transport White Paper as the European Commission's vision for transport.

In this purpose, it is to underline that the enhanced emphasis tackling the climate change threat is further calling for sustainable intermodal services as advocated also by CROSSMOBY.

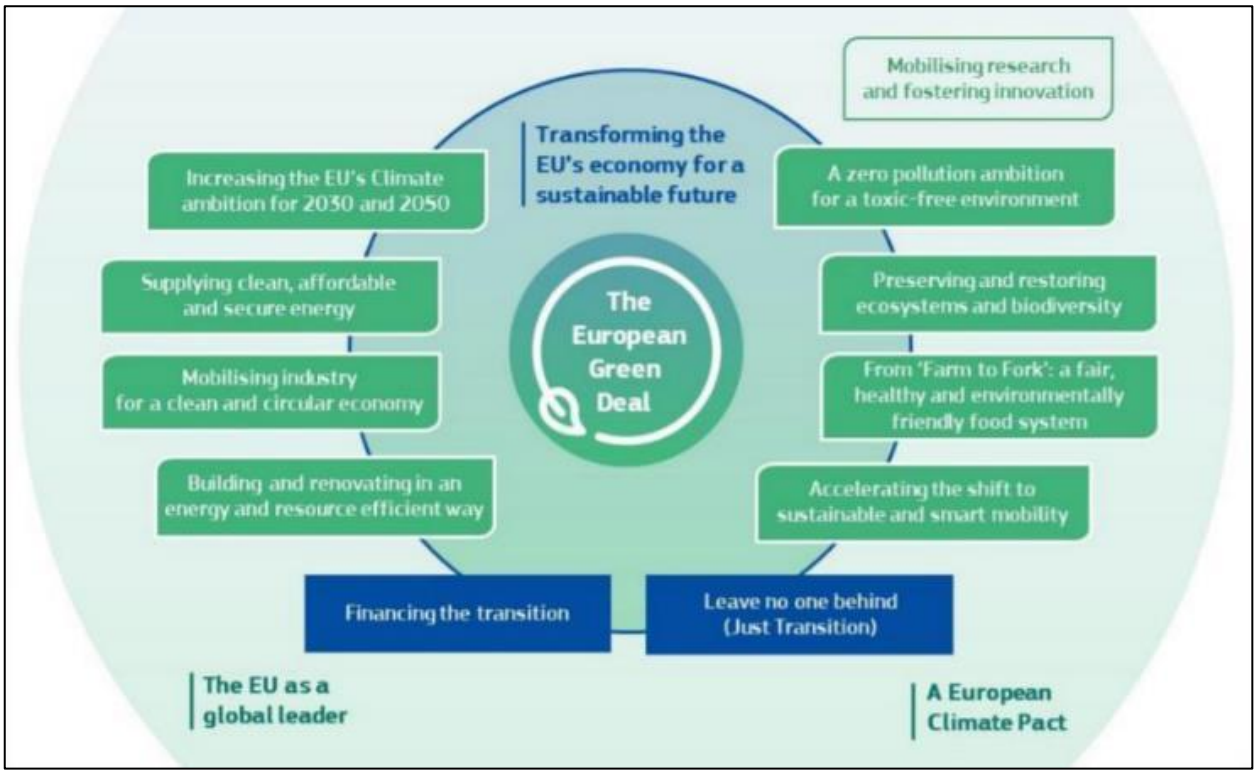


Figure 8 - The European Green Deal

2.2. THE MACRO-REGIONAL LEVEL

Within this complex framework, a particular deal is to 'Macroregional strategy', representing an integrated framework endorsed by the EU and aiming to address common challenges faced by a defined geographical area (relating to Member States and third countries) by strengthening cooperation contributing to economic, social and territorial cohesion.

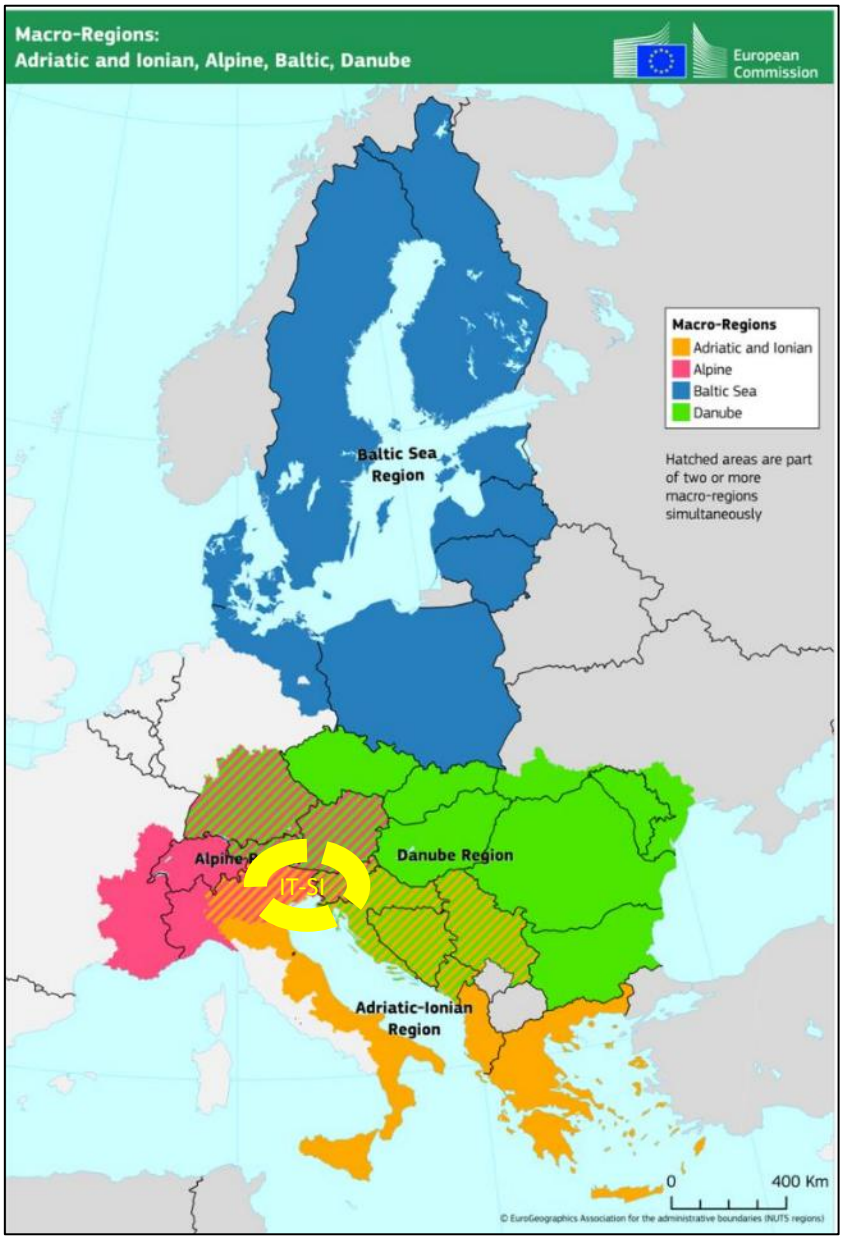


Figure 9 – European Macro-Regions and the Italy-Slovenia area. Source: EU DG REGIO

As shown in Figure 9, the IT-SI area is at least partly interested by 3 European Macro-regional strategies (out of a total of 4 at European level)[5]:

- The "EU Strategy for the Alpine Region" (EUSALP), which includes the whole IT-SI area;
- The "EU Strategy for the Adriatic-Ionian Region" (EUSAIR), which includes the whole IT-SI area;
- The "EU Strategy for the Danube Region" (EUSDR), which includes the Slovenian part of the IT-SI area.

2.2.1. EUSAIR

As far as the IT-SI includes areas belonging or close to the Northern arch of the Adriatic Sea and related ports (esp. the Venezia, Trieste and Koper ports), the EU Strategy for the Adriatic and Ionian Region (EUSAIR) is also to be taken into account. In fact, EUSAIR represents a macro-regional strategy adopted by the EC in 2014 with the support of the Adriatic-Ionian Region countries and stakeholders, which agreed on the general objective of promoting economic and social prosperity and growth in the region. Such objective called for the need to define areas of mutual interest thus identifying common challenges or opportunities, leading to the identification of four thematic pillars.

Among them, the most pertinent to the CROSSMOBY objective is represented by "Connecting the Region", where three main topics were defined:

1. *To strengthen maritime safety and security and develop a competitive regional intermodal port system.*
2. *To develop reliable transport networks and intermodal connections with the hinterland, both for freight and passengers.*
3. *To achieve a well-interconnected and well-functioning internal energy market supporting the three energy policy objectives of the EU – competitiveness, security of supply and sustainability.*

[5] Moreover, it is worth mentioning that Slovenia is the only EU country belonging to 3 macro-regions.

2.2.2. EUSDR

With particular reference to the Slovenian part of IT-SI area, EUSDR is also to be taken into account.

The EUSDR, adopted by the European Commission in December 2010 and endorsed by the European Council in 2011, was the second EU macro-regional strategy to be developed (after the EU Strategy for the Baltic Sea Region). In doing this the EU acknowledged the importance of tackling the relevant cooperation needs and issue of such a relevant area as the whole Danube Basin. Such goals are addresses though 4 pillars and 12 priority areas.

Among them, the most pertinent to the CROSSMOBY goals is PILLAR 1 "Connecting the Region", where three main priorities (with the first one split into two main parts) areas were defined:

- *Priority Area 1a — To improve mobility and multimodality: inland waterways of the EU Strategy for the Danube Region;*
- *Priority Area 1b – to improve mobility and multimodality: Rail, Road and Air links;*
- *Priority Area 2 – More sustainable energy;*
- *Priority Area 3 "Culture, tourism and people to people contacts".*

2.2.3. EUSALP

The macro-regional strategy EUSALP, is more focused on the peculiarities of the area related to the presence of the Alps. The macro-regional strategy here provides an opportunity to improve cross-border cooperation in the Alpine States as well as identify common goals to be jointly tackled through transnational collaboration.

Given its specific geographical position in Europe, the Alpine area is a transit region but also as an area with unique geographical and natural features, which set the frame for all future developments and where the theme of connectivity and transport represents very strategic issues.

In this purpose, a dedicated Action Group (AG4) was organized to jointly work at promoting intermodality and interoperability in passenger and freight transport across the Alps which worked in order to define the most important challenges and opportunities concerning mobility, thus highlighting three main Specific Objectives:

A. *To promote inter-modality and interoperability in passenger and freight transport*

by supporting and fostering the removal of infrastructure bottlenecks, by bridging missing links, coordinating planning and timetables of public transport, modernizing infrastructure and enhancing cooperation. AG4 is addressing this objective by focusing on infrastructure for sustainable transport in passenger- and combined transport as well as interconnecting public transport systems, focusing on operations and information and ticketing services.

B. *To support the modal shift from road to rail.*

The Alpine regions are particularly sensitive to negative environmental and social impacts caused by the excessive traffic flow of freight and passenger transport through the Alps. In order to tackle this challenge, the AG4 promotes the harmonization and implementation of modal shift policies with a focus on toll systems.

C. *To develop cooperation and greater integration between the existing bodies and structures in the field of transport.*

The close collaboration of the AG4 with different actors involved in the transport and mobility sectors of the Alpine Regions guarantees an improved coordination and ensures consistency between existing initiatives in order to avoid duplications and encourage the alignment of funding. Strong links have already been established with the Alpine Convention, the Suivi de Zurich Process, as well as the iMONITRAF! network.

2.3. NATIONAL FRAMEWORKS

While addressing the national framework, it is important to underline a fundamental difference between the Italian and the Slovenian legislative systems.

In fact, while Italy is one of the 7 EU member States with legislative powers at the sub-national level, Slovenia, instead, belongs to the majority of 20 Member States that are without legislative powers at sub-national level.

2.3.1. General overview

ITALY

In particular, the Italian system encompasses the following bodies with reference to the different NUTS (acronym from the French "Nomenclature des Unités Territoriales Statistiques", meaning Nomenclature of Territorial Units for Statistics) level and LAU (Local Administrative Units) European classification:

- NUTS 2- Regions
- NUTS 3 - Provinces and Metropolitan Cities (e.g. Metropolitan city of Venice)
- LAU - municipalities

Regions can be either endowed with either an Ordinary (e.g. Veneto) or a special Autonomous Status (as in the case of Friuli Venezia Giulia). Hence, a certain difference is to be mentioned in terms of specific competences and legislative process at regional level.

Regarding the local level (i.e. Provinces and Municipalities and Metropolitan Cities), after the entry into force of Law 56/2014 a complex re-organisation process meant to suppressing Provinces (or, at least, reducing their power) has started. Meanwhile, it implied enhancing the role of Regions and Municipalities as well as, in correspondence of the 14 main agglomerations at national level, fully establishing the Metropolitan Cities as wide-area administrative bodies ("*ente territoriale di area vasta*") in substitution of the former provinces.

Outside of the areas recognised as Metropolitan cities, provinces (which have lost their status of elective bodies) remain as wide-area administrative bodies responsible of certain aspects of wider territorial planning and programme delivery. Moreover, smaller municipalities were encouraged to merge together.

In particular, within Friuli Venezia Giulia (being an autonomous region) this process has been carried out according to a separate process. In this purpose, starting from 2017 (on the basis of

the Regional Law 26/2014) the former 4 provinces (Udine, Pordenone, Gorizia and Trieste) were formally suppressed and substituted by 18 "Unioni Territoriali Intercomunali" (UTI), a type of inter-municipal administrative unit unique to the FVG Region. More recently, following the regional law 21/2019, the UTI have been substituted by the "Enti di Decentramento Regionale" (EDR), which are covering the same territorial areas of the former provinces (though with reduced competences and no political decisional body). This process also affected coordination bodies grouping together neighbouring municipalities belonging to certain mountainous or hilly areas (which has been previously cancelled on the basis of the Regional Law 26/2014). In fact, still on the basis of regional law 21/2019, 5 "Comunità di Montagna" and 1 "Comunità Collinare" have been established.

SLOVENIA

Within the Slovenian framework, in addition to the national level there is only the municipal one, which is endowed with specific competences dedicated to the local level administration.

Within the municipal level ("občina") a certain internal differentiation is due to the fact that the 11 main centres are endowed with the city status ("mestna občina"). In particular, in the field of transport and planning, municipalities are in charge of aspects specifically related to the local level and urban transport. In fact, the city municipalities are compelled to issue a sustainable urban strategy, which encompasses also traffic-related themes.

The other layers (NUTS2 and NUTS3), instead, do not have the character of administrative bodies with political representation. Nonetheless, for analytical purposes 12 NUTS3-level "statistical regions" have been used in Slovenia since mid-1990s for statistical and analytical purposes.

Moreover, since year 2002 these 12 NUTS 3 regions have also been known as "development" regions, providing "the basic functional territorial unit for planning regional policy and implementing regional development" in the new national and regional policy documents[6].

Within each of these regions, in order to provide an institution aimed to promote business and economy development, regional development agencies/centres have been established. They perform the role of regional co-ordinator of interests on local as well as national level in the fields of regional development, economy, human resources and environment protection.

[6] As from art. 6 of the Promotion Of Balanced Regional Development Act (ZSRR-2) - Official Gazette of the Republic of Slovenia, No. 20/2011).

NUTS 3 REGION	REGIONAL DEVELOPMENT AGENCY	WEBSITE
GORENJSKA	Regionalna razvojna agencija Gorenjske, BSC Kranj d.o.o.	info@bsc-kranj.si
GORIŠKA	Regional Development Agency of North Primorska[7]	www.prc.si
OBALNO-KRAŠKA	Regional Development Centre Koper	www.rrc-kp.si
OSREDNJESLOVENSKA	Regional Development Agency of the Ljubljana Urban Region (RRA LUR)	www.rralur.si
PRIMORSKO-NOTRANJSKA	RRA Zeleni kras, d.o.o. (RDA Green Karst, Ltd)	www.rra-zk.si

Table 1 – Slovenian Regional development agencies/centres within the IT-SI Programme Area

With reference to the IT-SI Programme area, the Table 1 is reporting the 5 statistical regions together with the corresponding regional development bodies.

SYNOPSIS

Summarising what foreseen by the two national frameworks, in the following table the different administrative levels in both countries are provided. In particular, the numbers of institutions belonging to each specific level located within the IT-SI are reported in squared brackets.

LEVEL	ITALY			SLOVENIA
National (NUTS 0)	National level [1]			National level [1]
Regional (NUTS 2)	Ordinary Regions [1]		Autonomous Regions [1]	-
Provincial (NUTS 3)	Metropolitan Cities [1]	Provinces [0]	EDR [4]	Statistical Regions [5][8]
Municipal (LAU)	Municipalities [44]	Municipalities [0]	Municipalities [215]	Municipalities [70, including 4 "*mestne občine*"]

Table 2 – Number of administrative divisions and bodies according to different NUTS levels in the IT-SI area

[7] It includes 4 development agencies in the North Primorska (the Goriška statistical) region. Soča Valley Development Centre/Posoški razvojni center (PP6) had (in the period 2014-2020) and is still having a leading role within this network (for the period 2021 – 2027).

[8] It is to recall here that, as described in the previous paragraph, the statistical regions do not have the character of full-fledged administrative bodies with political representation.

2.3.2. Transport planning at national level: Italy

As far as intermodality and sustainable transport are concerned a key reference at national level is provided by Connettere l'Italia ("Connecting Italy"), a strategic plan adopted by the Ministry of Infrastructure and Transport. Four main objectives represent the directions towards which "Connettere l'Italia" should go:

1. Accessibility to territories, Europe and Mediterranean Sea
2. Safe and sustainable mobility
3. Quality of life and competitiveness of urban and metropolitan areas
4. Sustain industrial commodity chain development with policies

Regarding intermodal transport, three broad actions are set:

1. Network nodes accessibility and network inter-connection
2. Mode share shift towards sustainable modes of transport
3. Intermodality promotion

The document is providing an updated planning framework, emphasising the importance of thoroughly assessing the need and role of each intervention, including the importance of even small interventions capable to eliminate gaps hampering the connectivity. This approach is also emphasising the synergies and complementarity of the different modes approach, thus fostering co-modality and sustainability.

This planning framework is regularly updated (as an Annex) within the more general one provided by the Economic and Financial Document ("Documento di Economia e Finanza" - DEF), which is the main instrument for financial and economic planning. The last release, DEF 2019, has been recently issued.

In this overall framework, a relevant deal is paid to sustainable tourism and related mobility needs.

In this purpose, it is to mention the transport policy plan "Piano straordinario per la mobilità turistica 2017-2022", investigates accessibility from entry points within Italian territory (port,

airports, and railway stations) and focuses on multimodal accessibility within Italy and abroad. The Plan establishes 4 objectives:

- Increase tourists' accessibility to revitalize tourism
- Promoting transport infrastructures as a fundamental element of tourism
- Digitalizing touristic sector, which includes mobility
- Promoting sustainable and safe transport modes

To integrate mobility and touristic services the Plan enhances the creation of integrated ferry-bus-rail fare system, for summer season and bus-rail-ski pass, for winter season.

2.3.3. Transport planning at national level: Slovenia

The key reference documents for transport planning at national level in Slovenia are:

- The Transport Development Strategy of the Republic of Slovenia until 2030, adopted in 2015.
- The "National Programme for the Development of Transport of the Republic of Slovenia until 2030" (National Programme)

The *Strategy* addresses the transport system in a comprehensive manner, fostering synergies in pursuing different objectives belonging to transport policy as well as other themes (e.g. spatial planning). In this purpose, the overarching vision is meant to ensure sustainable responses to the mobility needs of the population and support the economy by:

- Improving mobility and accessibility;
- Improving supply to the economy;
- Improving traffic safety and protection;
- Reducing the use of energy
- Reducing the cost to users and operators;
- Reducing environmental burdens.

On the basis of a thorough transport modelling activity and environmental impact assessment, a total of 108 measures were identified. More in detail, with reference to each specific transport mode, they encompass:

- 29 measures for rail transport;
- 37 measures for road transport;

- 22 measures for public passenger transport or sustainable mobility;
- 14 measures for waterborne transport (sea and inland waterways);
- 6 measures for air transport.

	Measures on the elements (sections) of the network	Measures on the network	Organisational (horizontal)
Railway network	11	4	14
Road network	22	7	8
City (urban) network	4	7	11
Waterborne transport	6	3	5
Air transport	3	2	1
Total	**46**	**23**	**39**

Table 3 – Number of measures. Source: "Transport Development Strategy of the Republic of Slovenia until 2030"

As from Table 3, the measures do not only refer to infrastructure interventions but also to other aspects such as organisation, traffic management, traffic safety and vehicle fleet.

In order to effectively implement the Strategy, the National Programme goes more into detail specifying implementation methods, required funds, timeline and deadlines of the interventions as well as entities responsible for implementing the measures. In particular, the National Programme is meant to ensure stable funding for the field of transport (without significant annual fluctuations), as support a smooth realisation process.

2.4. REGIONAL ADMINISTRATIONS AT NUTS 2 LEVEL

The regional administrative layer is present only in the Italian legislative framework. Accordingly, the two regions are both in charge of planning and tendering regional level PT services, encompassing different modes of transport as well as the realisation of regional-level infrastructural networks (even though with particular differences also related to the fact that FVG is an autonomous region).

2.4.1. Friuli Venezia Giulia Autonomous Region

Two key documents are providing the strategic reference concerning transport planning for Friuli Venezia Giulia Autonomous Region (FVG):

- The FVG Regional Plan of transport infrastructure, freight transport and logistics issued in 2012
- The FVG regional Public transport plan issued in 2013 according to the guidelines of the related plan (approved by Decree of the President of the Autonomous Region n. 80, 15 April 2013).

It is important to underline that the attention paid within this document to cross-border accessibility and connectivity.

In case of FVG Autonomous Region, the subdivision of competences in the fields of road network and (multimodal) transport between the national and the regional level is ruled by the Legislative Decree n. 111/2004. In this purpose, it prescribes that cross-border transport within a specified range is ruled by the Region.

In particular, public bus services are qualified as cross-border and are tendered under the rule of the Regional Administration when connecting origin and destinations in territorial areas within 40 km radius (i.e. distance calculated through a straight line, as the crow flies) with respect to at least one of the 9 road CB passes located along the state border marked as red points in the following Figure 10 (which includes also 3 crossings related to the ITA-AU border).

With reference to maritime transport, instead the threshold is set at 150 km from the borders in case of maritime transport (which is enough for covering all possible connections with any port located in the Slovenian coast).

The actual operation of the PT service (encompassing regional and cross-border ones) is implemented by tendering procedures. In this purpose, it is to recall the recently accomplished ones:

- Tendering to a sole operator of the overall bus and maritime regional service for a 10-years period accomplished in 2019, which imply also the possibility of setting-up cross-border services within the flexibility level foreseen (as to adapt to new/emerged needs);
- Tendering, carried-out and accomplished still in 2019, of the international (cross-border) seasonal maritime services (see INFOBOX 06) for the three-years period 2019-2021.

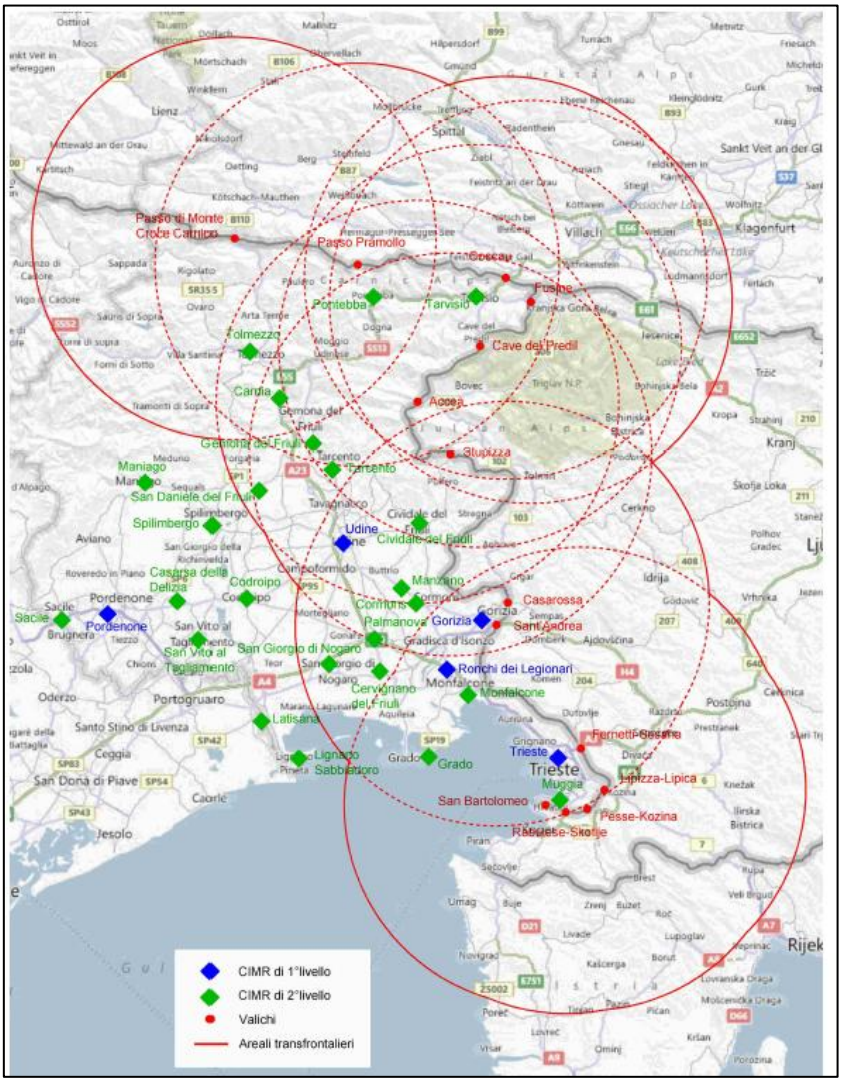


Figure 10 – Overview of relevant transit points (in red) acknowledged in the FVG regional PT plan. Source: Piano Regionale del Trasporto Pubblico Locale – PRTPL, 2013

2.4.2. Veneto Region

Veneto Region has recently issued and adopted (July 2020) its new Regional Transport Plan, after about 30 years from the previous adopted one. Obviously, this has implied taking into account the consequences of profound changes and transformation ranging from the geopolitical to the economic, regulatory framework as well as implemented planning and intervention decisions in such a long timeframe. Hence, the new overall planning activity has been developed on the basis of a through technical analysis as well as a renewed overall vision through the identification. This vision is articulated according to a programmatic hierarchical framework structured in:

- 8 Objectives, setting key goals to be pursued;
- 8 Strategies, providing interventions areas devised in order to reach the stated objectives;
- 37 Actions, each one representing a specific issue being tackled within a certain strategy.

In particular, the envisaged strategies encompass:

- S1 - Framing Veneto region sprawled metropolitan area in the “Metro network of Italy”;
- S2- Promoting the waterborne- rail-road transport co-modality as well as re-balancing modal split in freight transport;
- S3 - Realising infrastructures and services for an integrated, intermodal and efficient regional public transport;
- S4 - Completing the road transport network and raising its efficiency;
- S5 - Improving the accessibility of tourist areas;
- S6 - Supporting the energy transition of the transport system towards a sustainable mobility;
- S7 - Promoting and supporting the development of new technology for mobility
- S8 – Governance, planning and control strategies

This comprehensive set of strategies is being implemented according to a dynamic process, implying a continuous fine-tuning process on a 10 years perspective (2030 horizon).

2.5. NUTS 3 REGIONS AND LOCAL LEVEL: SUMPS

With particular reference to NUTS 3 region or the local level a key reference and stimulus in transport planning is given by the innovative SUMP planning approach, which is briefly recalled here (see CROSSMOBY WP 3.2 for a more thorough and in-depth deepening).

In this purpose, it is to underline the strategic nature of SUMP as well as its comprehensive approach aimed at satisfying the mobility needs of people and businesses in cities and their surroundings for a better quality of life. While capitalising existing planning practices it enhances the deal paid integration, participation, and evaluation principles.

As previously described in chapter 1, this innovative approach has been strongly promoted by the EU Commission, thus leading to the publication in 2013 of "Guidelines for the development and implementation of Sustainable Urban Mobility Plans" (SUMPs), which was followed by a comprehensive revision with the publication of the second edition in 2019[9].

However, it is to recall that "while hierarchical steering through the EU environmental legislation directly targets cities and urban agglomerations, the existing transport legislation does not systematically address urban mobility planning". Consequently, EU mobility Package encompassing the SUMP guidelines was delivered in a non-binding Communication from the Commission and not through a (legally binding) Directive.

Then, different kinds of official documents and guidelines have been issued at national level in order to foster the development of this new planning approach in each Country.

2.5.1. Italy

In particular, Italy adopted the approach[10] to make Sustainable Urban Mobility Planning compulsory for all Metropolitan Cities as well as for municipalities with more than 100,000 inhabitants. In this purpose, the national guidelines were issued by the Italian Ministry of Infrastructure through the Ministerial Decree of 4 August 2017 (and related updates).

Currently, the Metropolitan City of Venice is developing its own SUMP, as well as specific more sectoral planning documents (related to Public Transport Planning, sustainable logistics and cycling-related mobility).

[9] https://www.eltis.org/sites/default/files/sump_guidelines_2019_interactive_document_1.pdf
[10] A similar binding approach has been chosen also by France, the UK, Italy, Romania, Catalonia, and Flanders.

With reference to the municipality level, a thorough investigation on planning activities has been carried out by PP2-UNIVE (see **INFORMATION BOX 01**). It allowed identifying 8 SUMPs in the Italian being developed in the Italian part of the IT-SI area. Moreover, other mobility-related planning activities (e.g. PUT, as from the Italian acronym of Urban Traffic Management Plans) have been registered and specific typologies of interventions have been ascertained and mapped.

IN-DEPTH INFORMATION BOX 01 - <u>Urban Sustainable Mobility Planning in the 259 Italian Municipalities of the ITA-SLO Programme Area: state of the art and implementation level.</u> (by PP2 - UNIVE)

- **Mapping and analyzing the State of the Art: targeted objectives and survey design**

The overarching targeted objective of the research analysis implemented by Cà Foscari University of Venice - Department of Management (PP2) - in the framework of WP3.2 of the CROSSMOBY project - it has been to obtain the most detailed, in-depth and updated picture as possible concerning the state of the art of sustainable urban mobility planning throughout the whole Italian territory of the Interreg ITA-SLO Programme Area (Autonomous Region Friuli Venezia Giulia and Metropolitan City of Venice). This has meant the design, modelling and implementation of a wide survey conducted by means of a research questionnaire addressed/delivered to all the 259 municipalities included in the reference area (215 FVG municipalities (see T1, T3) and 44 municipalities of the former Province of Venice (see T2, T4), now reconfigured as the Metropolitan City of Venice district) (IR Law 56 of April 7, 2014).

Friuli Venezia Giulia Autonomous Region	
Total Municipalities	215
Total Inhabitants	1,215,220
Surface Area (sq. Km)	7,924.17
Population density per sq. Km	153.4
Source: Processing on Ancitel/ISTAT 2019 - web source: www.comuniverso.it	

Table 1

Metropolitan City of Venice	
Total Municipalities	44
Total Inhabitants	853,338
Surface Area (sq. Km)	2,472.91
Population density per sq. Km	345.07
Source: Processing on Ancitel/ISTAT 2019 - web source: www.comuniverso.it	

Table 2

Friuli Venezia Giulia Region	TRIESTE (NUTS 3)		UDINE (NUTS 3)		GORIZIA (NUTS 3)		PORDENONE (NUTS 3)		FVG Region (Totals & %)			
Population Classes by Municipalities (No.Inhabitants)	Tot. Municip.	Tot. Inhab	Tot. Municip.	Tot. Inhab.	Tot. Municip.	Tot. Inhab.	Tot. Municip.	Tot. Inhab	Total Municip.	% Municip.	Tot inhab.	% tot. Inhab.
0 – 1,999	1	865	56	52592	12	15548	20	19027	89	41,4%	88032	7,2%
2,000 – 4,999	1	2068	48	139738	5	13829	10	34093	64	29,8%	189728	15,6%
5,000 – 9,999	2	14231	22	146607	5	35309	10	75533	39	18,1%	271680	22,4%
10,000 – 19,999	1	13062	7	90477	1	11928	9	132513	18	8,4%	247980	20,4%
20,000 – 59,999	0	0	0	0	2	62789	1	51367	3	1,4%	114156	9,4%
60,000 – 249,999	1	204267	1	99377	0	0	0	0	2	0,9%	303644	25,0%
> 250,000	0	0	0	0	0	0	0	0	0	0,0%	0	0,0%
Total	6	234493	134	528791	25	139403	50	312533	215	100,0%	1215220	100,0%
Source: Processing on Ancitel/ISTAT 2019 - web source: www.comuniverso.it												

Table 4

Metropolitan City of Venice (NUTS3)				
Population Classes By Municipalities (No.Inhabitants)	Tot. Municip.	Tot. Inhab. (by classes)	% (Municip.)	% (Inhab.)
0 – 1,999	0	0	0,0%	0,0%
2,000 – 4,999	8	28749	18,2%	3,4%
5,000 – 9,999	9	64137	20,5%	7,5%
10,000 – 19,999	18	242044	40,9%	28,4%
20,000 – 59,999	8	257888	18,2%	30,2%
60,000 – 249,999	0	0	0,0%	0,0%
> 250,000	1	260520	2,2%	30,5%
Total	44	853338	100,0%	100,0%
Source: Processing on Ancitel/ISTAT 2019 - web source: www.comuniverso.it				

Table 5

- ***Methodology***

The relevant differences between FVG Region and MCV district (and within each one of them) in terms of surface, % Municipality classes, urban, peri-urban and rural concentration of the population, % density, entail crucial challenges for transport and mobility planning, at urban,

regional and cross-border level. Even more this territorial heterogeneity has been forced the survey execution methodology to be accurate and to go in depth in terms of data collection, questionnaire design and testing (on-line and offline version, interviews), identification of targeted respondents, design and setting of database models (both for the statistical population and the survey data results), implementation of several rounds of the questionnaire distribution and phone re-call of the recipients, sample determination. Furthermore, at the end of first round main questionnaire distribution, related phone re-call campaign and data collection - the research team has been designed and distributed an additional questionnaire focused on Cross-border mobility and transport issues to a specific and representative sample of respondents within the whole statistical population: all the 25 municipalities located on Italian side (FVG Region) of the border with Slovenian Republic, whose key outcomes are reported in the Information Box 10.
The main questionnaire consisting of 4 thematic macro-groups of questions within a total of 72. Before the official distribution were conducted 5 face-to-face/virtual interviews within a specific sample of municipalities (Tarvisio - Chiusaforte - Udine - Trieste - Portogruaro) in order to test the effectiveness/validation of the tool.

- ***Main achieved results: processing the collected data and in-depth analysis***

More than 600 contacts of mobility and transport technicians, senior officers and local administrators (mayors and deputy mayors) of the municipalities have been selected and collected. On Dec. 7, 2020 it has been officially concluded the questionnaires collection (Urban Mobility SoA main questionnaire + the Cross-border mobility additional one) within the 259 total municipalities. The capillary work carried out - in spite of a time extension forced by the COVID-19 pandemic emergency – it has been produced excellent results. **A total amount of 160 questionnaires were filled in out of in 259 municipalities, equal to 61.78% of the whole statistic population of the ITA-SLO Programme Area, with the following territorial response percentages:**

- **Autonomous Region Friuli-Venezia-Giulia**: **127** questionnaires received out of 215 municipalities, equal to **59.7%** territorial coverage;

- **Metropolitan City of Venice district: 33** questionnaires received out of 44 municipalities equal to **75%** territorial coverage;

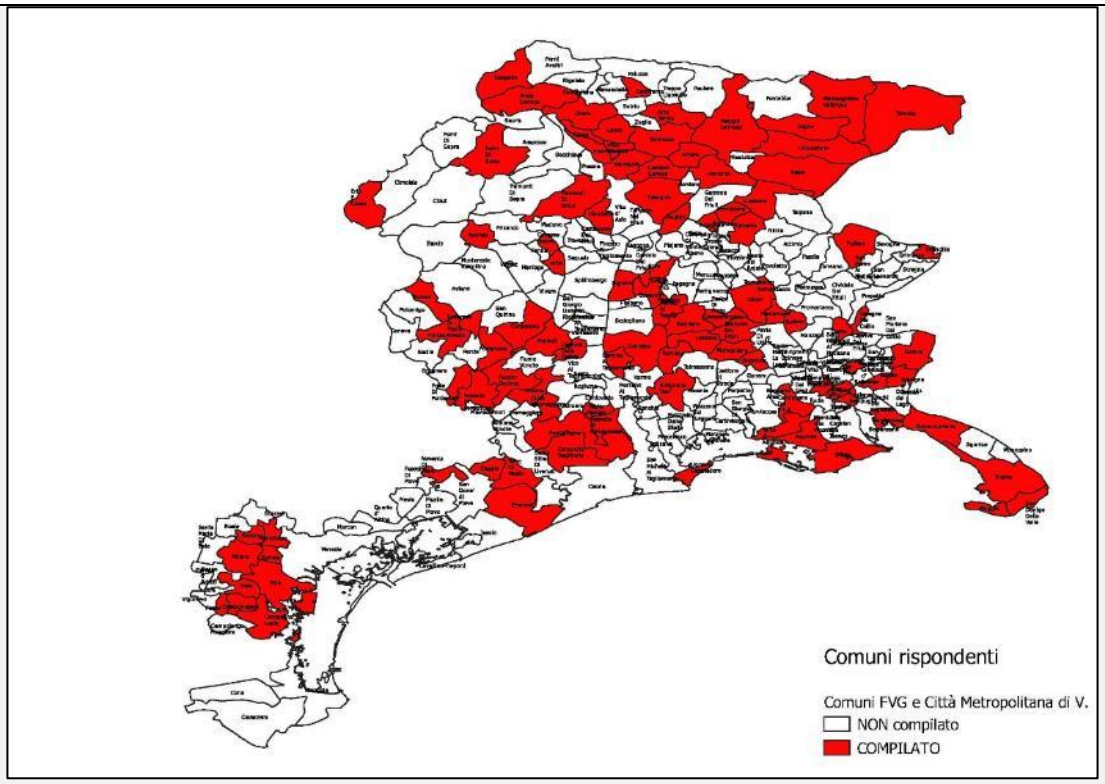


Fig. 1 (Dec 4, 2020)

The relevant number of respondents within the wide survey made it possible to create a really accurate database, with an excellent level of detail for the related analysis. In the following representations (**Fig. 3 - 4**) some of the main processed data and analysis of the results concerning urban sustainable mobility planning state of the art and on the related focus concerning cross border mobility.

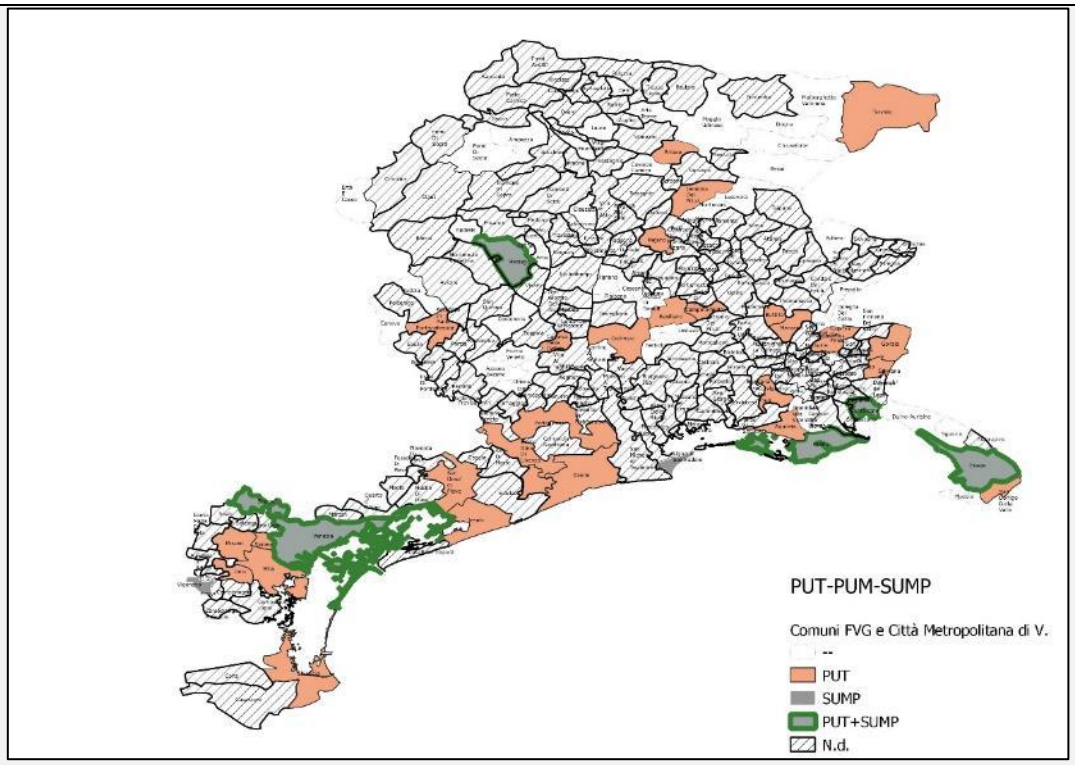


Fig. 2 (Dec 4, 2020)

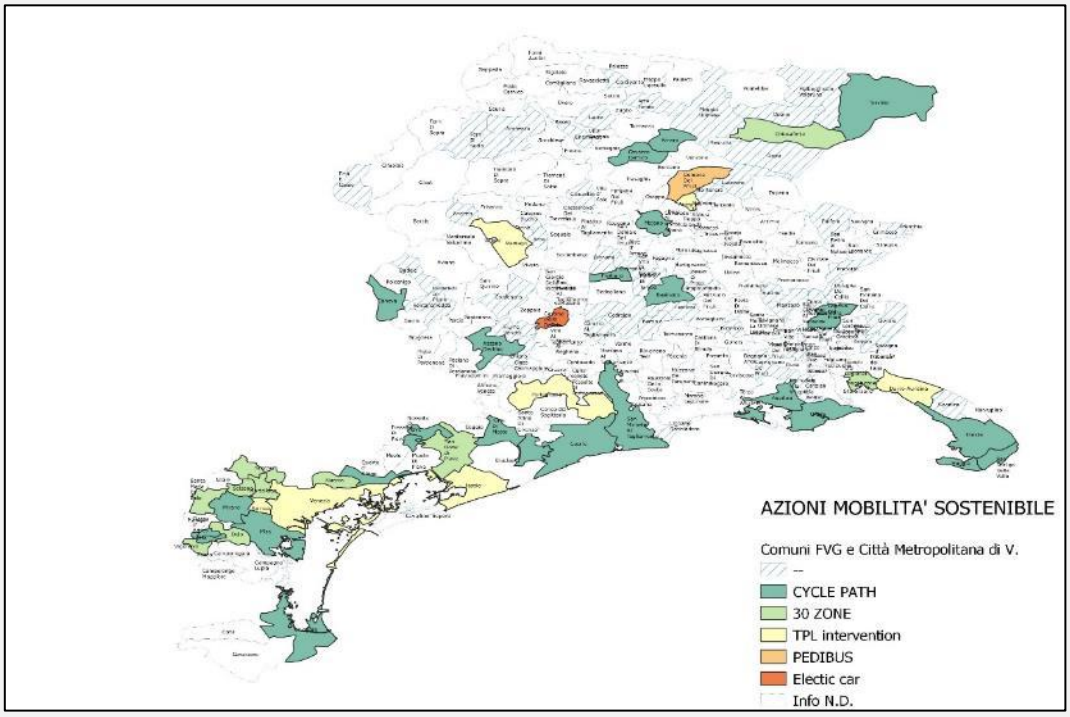


Fig. 3 (Dec 4, 2020)

2.5.2. Slovenia

In Slovenia, instead, the national level did not issue mandatory prescriptions. Nonetheless the spread of this innovative planning approach has been actively promoted[11]. In this purpose, the Ministry of Infrastructure of Slovenia (starting from 2016) has allowed municipalities to co-finance their SUMP development up to 85% from the European Cohesion Fund. To date, (out of a total of 212) 85 municipalities have now adopted a sustainable urban mobility plan (Figure 11).

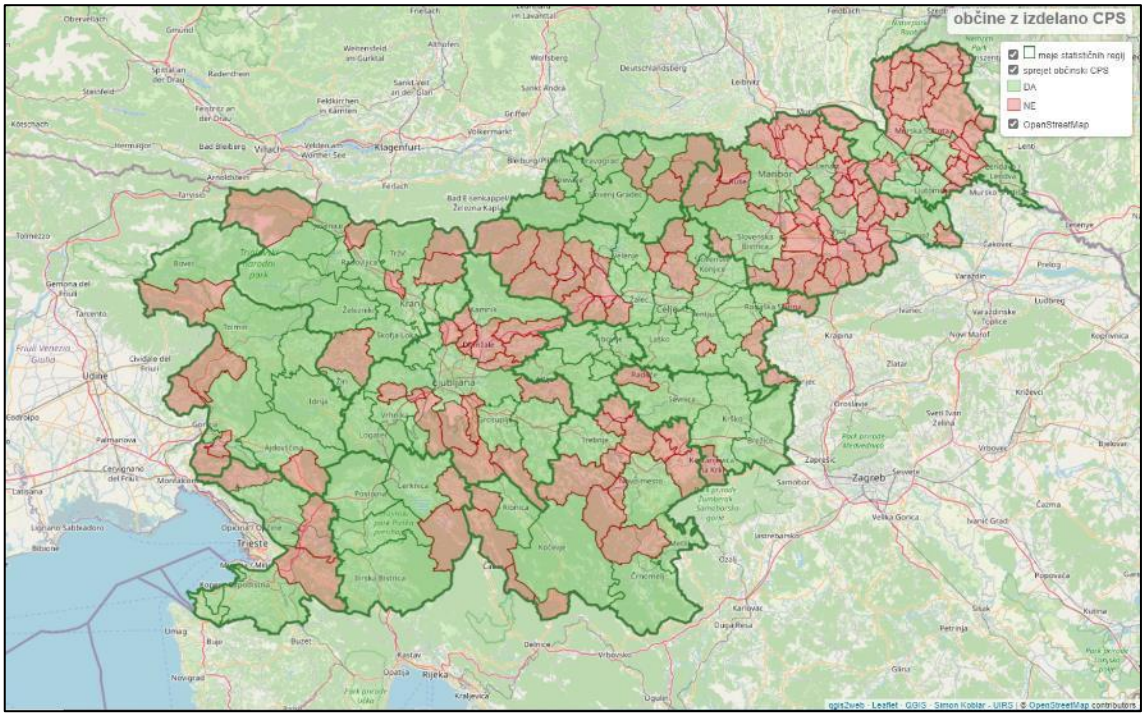


Figure 11 – Municipality with (in green) of without (in red) SUMP in Slovenia.
Source: elaboration made by UIRS

The need for carrying-out technical analyses supporting stakeholder decisional process is calling for relevant efforts, which can be particularly challenging and could be particular demand in terms or requested resources (and data availability), especially in case of small municipalities. In this purpose, the indicators and methodology reported in the following IN-DEPTH INFORMATION BOX 02, making use of open source software and open data sources (e.g. OpenStreetMap) are providing remarkable opportunities.

[11] National guidelines: http://sptm.si/wp-content/uploads/2019/05/TM_Brosura_FINAL_Civitas.pdf

IN-DEPTH INFORMATION BOX 02 – Indicators and opportunities from open-source tools for planning sustainable mobility (by PP04-UIRS)

We developed 4 indicators to support municipalities with sustainable mobility planning. All indicators are calculated with free and open-source software (OpentripPlanner, QGIS, PostgreSQL), with freely available OpenStreetMap data and public transport schedules in standard GTFS format. This enables calculation of indicators for any city/region that has this data available. One indicator was fully developed and displayed on project's web GIS. Other indicators were not fully developed, but methodological framework and initial testing was completed – laying the groundwork for future projects.

- **Travel times with public transport**

Public transport provides universal accessibility. However sometimes it takes too much time, transfers or walking to reach the destination. In this indicator we calculate travel time to selected cities in pilot area. We consider trips in both ways (5:00–9:30. am and return 4:00–9:30. pm.) on average weekday (2. 12. 2020) and calculate average travel time. Results are shown in webGIS platform.

Analysis is performed for two scenarios, one with cross-border public transport connections and other without these connections. Cross border connections considered were Crossmoby train (Udine-Trieste-Ljubljana) and city bus line (Gorizia-Nova Gorica).

- **Opportunity for active mobility**

Indicator is based on European commission's indicator, but methodology is changed to enable easy calculations using OpenStreetMap data. Indicator calculates length of roads and streets with pavements, bike lanes, 30 km/h zones and pedestrian zones related to total length of city road network (excluding motorways).

Calculation is possible for whole area covered by CROSSMOBY project. However, OpenStreetMap data should be checked for missing information and edited before calculation of the indicator. This step can be time consuming but is crucial for reliable results.

- **Multimodal integration**

This indicator is also based on European Commission's indicator, but adapted to use OpenStreetMap data and GTFS schedules. An interchange is any place where a traveler can switch from one mode of travel to another, with a minimum/reasonable amount of walking or waiting. More modes available at an interchange, higher the level of multimodal integration.

Share of population with appropriate access to mobility services (public transport)

Indicator is based on Swiss and Austrian methodology, where this indicator is used in spatial planning practice. Indicator includes distance to transit stop/station, transit mode available and frequency. In first step, stops are categorized based on frequency between 6 am and 8 pm.

Average interval from the sum of all departures per direction (between 6. am and 8. pm)	Transport category of the stop according to the highest level of transport			
	Long-distance trains	S-Bahn / Subway, regional train, express bus, local railway	tram, metrobus, O-Bus	Bus
< 5 min.	I	I	II	III
5 ≤ x ≤ 10 min.	I	II	III	III
10 < x < 20 min.	II	III	IV	IV
20 ≤ x < 40 min.	III	IV	V	V
40 ≤ x ≤ 60 min.	IV	V	VI	VI
60 < x ≤ 120 min.	V	VI	VII	VII
120 < x ≤ 210 min.1)		VII	VIII	VIII
> 210 min.1)				

In the next step these categories are combined with the distance to stop/station, to reflect walking time.

Stop category	Distance to the stop				
	≤ 300 m	301 – 500 m	500 – 750 m	751 – 1000 m	1001 – 1250 m
I	A	A	B	C	D
II	A	B	C	D	E
III	B	C	D	E	F
IV	C	D	E	F	G
V	D	E	F	G	G
VI	E	F	G		
VII	F	G	G		
VIII	G	G			

Indicator is useful for spatial planning, as it shows current accessibility to public transport. Activities that generate more traffic demand, should therefore be planned in areas with better score. If there are areas with high traffic demand and low score, this can be addressed with changes in public transport supply.

Going beyond the municipality level, planning activity grouping together different municipalities are reported in the following Figure 12.

These plans can be referred to significant portions of NUTS3 statistical regions, though they do follow strictly these subdivisions (and in some cases neighbouring municipalities from different NUTS3 region are grouped together).

Within the IT-SI Programme are located 3 out of a total of 4 approved regional plans. Moreover, it is worth mentioning the SUMP Julian Alps currently being developed (represented through hatch in orange colour in the figure).

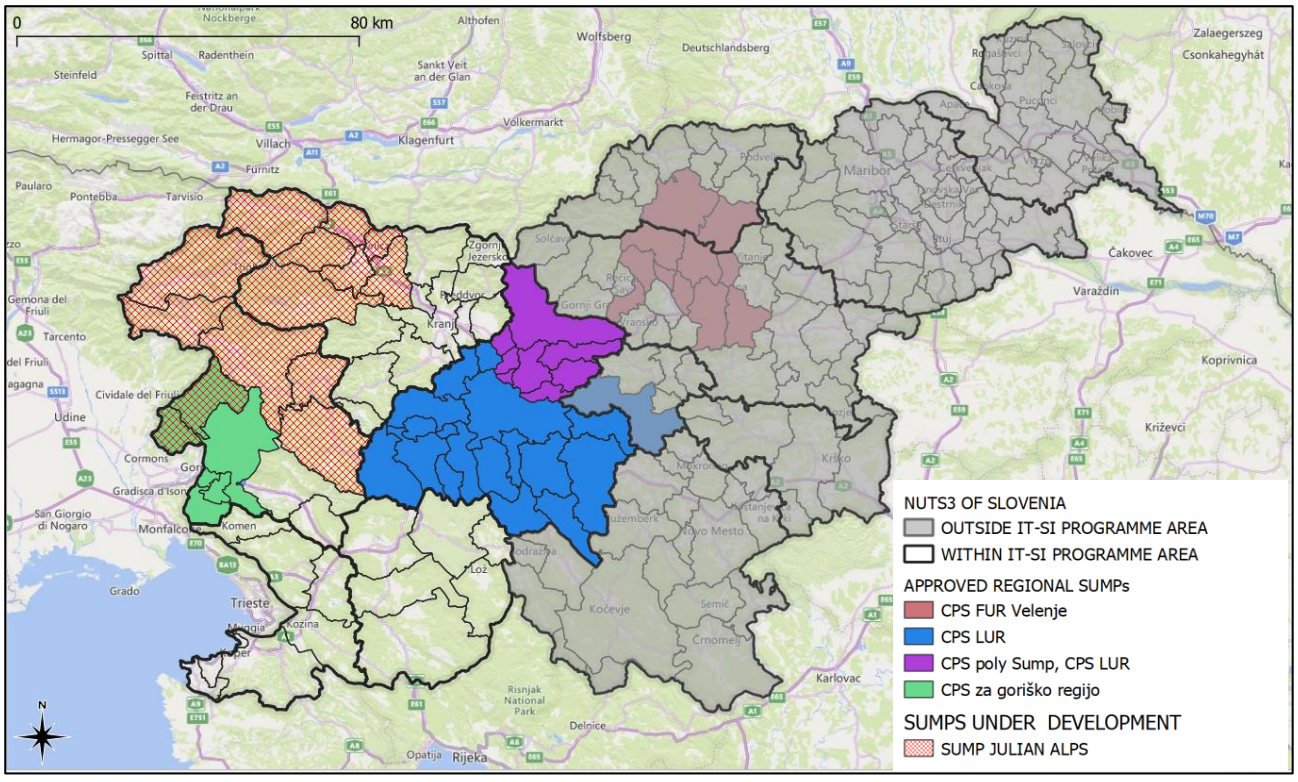


Figure 12 – regional SUMPs in Slovenia within or outside the Italia – Slovenia CBC Programme Area. Source: elaboration on data provided by UIRS

2.6. THE CROSS-BORDER LEVEL: EGTCs

2.6.1. The EGTC concept

The European Grouping for Territorial Cooperation (EGTC) is a European cooperation structure defined by European Law that allows public entities of different Member States to come together under a new entity with full legal personality. It was recognised at first by EU Council Regulation 1082/2006 and then further supported by the release of Regulation 1302/2013 EC, which amended and simplify their establishment and functioning.

At the time being, 77 EGTCs are officially registered[12] with the same purposes of facilitating and promoting territorial cooperation (cross-border, transnational and interregional cooperation), in view of strengthening the economic and social cohesion of the European territory. In particular, they focus on common projects beneficial for both side of the borders, promoting good practices and allowing more efficient use of public resources within the different common themes of interest.

Among these last ones, transport and mobility theme is one of the key pillars supporting the socio-economic development of the cross-border areas.

2.6.2. The EGTC concept

As for what concerns the cross-border area defined within the Italy-Slovenia Programme, two cooperation initiatives should be highlighted and briefly presented in the following paragraphs:

- the EGTC “Euregio Senza Confini r.l.- Ohne Grenzen mbH”, which is the two Italian regions involved in the IT-SI Programme plus the neighbouring area of Austria;

- the EGTC “Territory of municipalities: Municipality of Gorizia (IT), Mestna občina Nova Gorica (SI) and Občina Šempeter-Vrtojba (SI)”, which is specifically involving the more local dimension of on the IT-SI border.

[12] https://portal.cor.europa.eu/egtc/CoRActivities/Documents/Official_List_of_the_EGTCs.pdf?Web=0

2.6.3. The EGTC "Euregio Senza Confini r.l.- Euregio Ohne Grenzen mbH"

The origin of this EGTC dates back to 2001 when the first bilateral agreement was signed between Carinthia and Friuli-Venezia Giulia regions. Then, after further consultations, Veneto Region joined the agreement thus leading to the foundation, in November 2012, of the EGTC "Euregio Senza Confini r.l.- Euregio Ohne Grenzen mbH".

Currently, it is composed by three members: the Veneto Region, the Friuli-Venezia Giulia Region and the Carinthia Region (Figure 13), thus including almost 36.000 km^2 and over 6.5 million inhabitants.

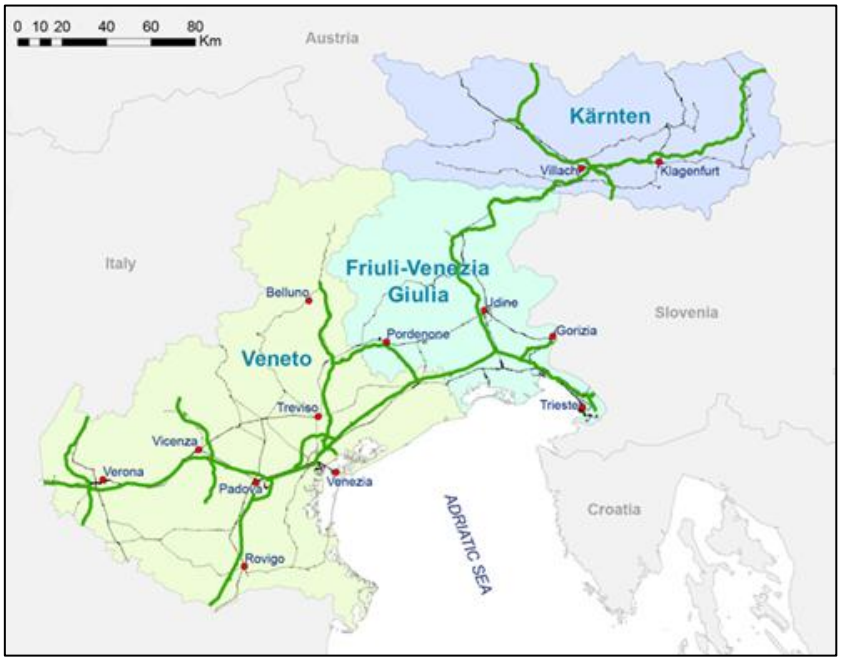


Figure 13 – EGTC "Euregio Senza Confini r.l.- Euregio Ohne Grenzen mbH" geographical coverage

Financed through the annual contribution from the three regions as well as actively involved in the participation to EU Programmes and initiative thus collecting funds to implement several cooperation initiatives, the EGTC was born with the main aim of promoting cross-border and interregional cooperation between its partner's regions as to strengthen social and economic cohesion of the entire area.

More in particular, the EGTC aims at conveying priorities underlined at regional level on an interregional and international context, thus matching them with macro-regional strategies and contributing to leverage the cooperation initiatives among its members, with specific reference to some main fields of interest.

Among those ones, transport and mobility topics were one of the priorities that since one of the first Assembly of the EGTC was underlined as strategic. In this purpose, a technical board was organized with reference to transport (including synergic horizontal priorities such as tourism) with the main aim to identify potential financial opportunities and develop common strategic initiatives. This board paid attention to both themes of passenger and freight, prioritizing in particular topics such as the development of ICT system supporting smart mobility, real time information and ticketing as well as new and innovative cross-border transport initiatives (train, car/bike sharing, etc.) and infrastructures (e.g. cycle paths).

Moreover, additional priorities were then underlined with special reference to rail accessibility in the mountainous area of the EGTC, thus including the long-run objective of supporting the re-activation of dedicated cross-border connectivity to implement overall accessibility of the area. As for what concerns the cross-border area defined within the Italy-Slovenia Programme, two cooperation initiatives should be highlighted and briefly presented in the following paragraphs:

2.6.4. EGTC GO

Since the start of the preparatory work for its establishment (late 2009) the EGTC "Territory of municipalities: Comune di Gorizia (I), Mestna občina Nova Gorica (Slo) and Občina Šempeter-Vrtojba (Slo)" – EGTC GO – was registered as a legal entity on 15 September 2011, after the signature of the funding acts by the mayors of the three participating municipalities.

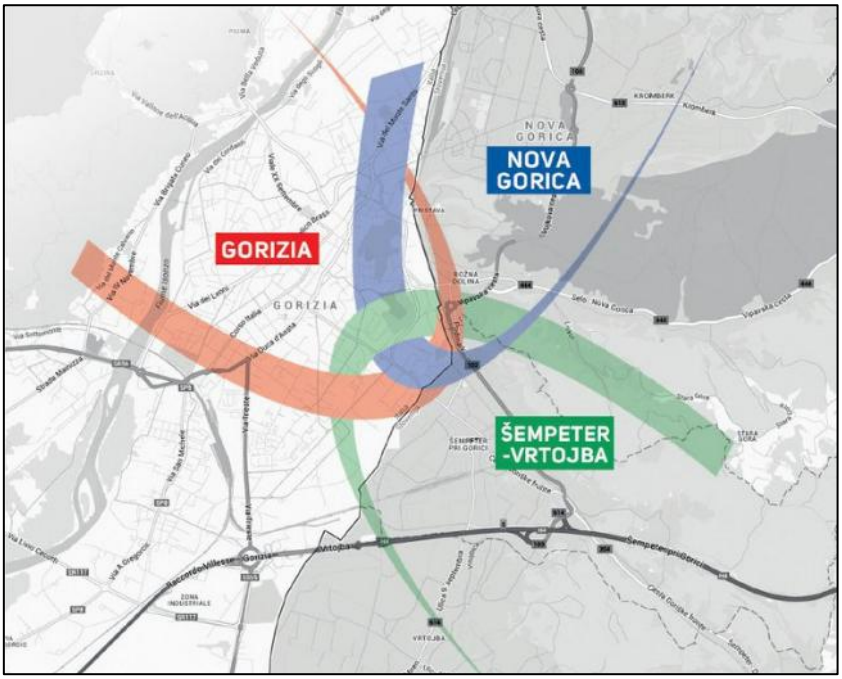


Figure 14 – EGTC GO area

Such collaboration resulted in a partnership between Slovenia and Italy, covering an area of indicatively 365 km² with almost 74,000 inhabitants (Figure 14).

Since the EGTC is a tool designed to overcome the difficulties encountered in implementing and managing projects subjected to different legislation and procedures, as well as to facilitate the implementation of common tasks, EGTC GO was established to overcome difficulties in developing and managing territorial cooperation activities as to strategically coordinate the policies relating to the metropolitan area.

In particular three to-be developed pillars have been highlighted with reference to the Italy-Slovenia cross-border cooperation programme: a first one aimed at promoting and developing natural and cultural heritage, a second one aimed at providing a joint use of the health systems and a third one aimed at launching new economic perspectives in the field of transport and logistics by connecting the missing railway link between Italy and Slovenia in the area of Gorizia-Nova Gorica-Šempeter-Vrtojba.

Among these ones, the theme of transport and logistic is representing the most challenging one to be further developed, thus leading the discussion at cross-border level with particular reference to the following objectives:

- management, implementation and modernization of transportation infrastructure, systems and services, mobility and logistics;
- coordination of the public transport policies, also by jointly managing transportation services;
- management of intermodal logistic nodes in the metropolitan area;

Needless to say, such priorities are jointly tackling the improvement of economic and social cohesion of EGTC involved area.

2.7. Synopsis

On the basis of the overall picture of the governance and planning initiatives provided in the previous chapter some key messages and guidelines meant to foster the integrated cross-border governance are outlined in the following recommendation box.

RECOMMENDATION BOX 01 – Remarks on the overall the IT-SI Cross-Border area governance framework

The cross-border framework is inherently characterised by a relevant deal of complexity, with a different typology of stakeholder to be involved in the development of sustainable transport solutions backing an actual cross-border integration. In this purpose, it is to recall how related challenges affects different context encompassing both the local level and long-distance corridors and ranging to the urban dimension and remote rural context. Hence, in order to appropriately address this framework a multilevel governance approach must be fostered and pursued.

Furthermore, such decision process is to be supported by thorough technical assessment and forecasts based on actual data/facts. Hence, data availability and integration as key driver of this process, must be further enhanced and developed.

3. TRANSPORT NETWORK SUPPLY

3.1. ROAD NETWORK

The road network is characterised by relevant heterogeneity, also for the morphological and socio-economical characteristics of the ITA-IS area. Moreover, it is to underline the presence of relevant motorway axis along the Venice-Trieste-Ljubljana axis.

Making reference to Italian NUTS 2 regions the following Table 4 shows the statics about the road network density (in terms of kms of road per 100 squared kms overall surface of the NUTS area). It must be noted that, in comparison with national-level averages, Friuli Venezia Giulia and, especially, Veneto region shows higher values of motorway density. On the contrary, for other national roads and regional/provincial ones, lower values with respect to the national averages are to be reported.

REGION	Motorways	Other national relevance roads	Regional and provincial roads
Friuli Venezia Giulia	2.6	2.4	41.8
Veneto	3.2	4.0	43.5
Italy	2.3	7.7	44.9

Table 4 – Road network – km/100 km^2 per typology. Source: Veneto and FVG Regional Statistical offices

REGION	Motorways & Expressway	Primary roads	Regional roads	Municipal
Gorenjska	2.4	1.3	22.9	118.2
Goriška	1.8	5.3	24.3	107.1
Obalno-Kraška	6.1	4.9	31.1	113.8
Osrednjeslovenska	5.5	3.3	20.4	174.1
Primorsko-Notranjska	1.9	3.7	18.5	63.4
TOTAL	3.4	3.6	22.8	121.6

Table 5 – Road network – km per typology. Source: ECGT and UIRS elaborations on SURS data

Table 5, instead, present data on the Slovenian context (also including the other categories of roads) referred to the NUTS 3 region included in the IT-SI programme area. With reference to motorways and expressway they show higher values than the Italian regions. In this purpose,

Obalno-Kraška and Osrednjeslovenska show peculiarly high values. With reference to national roads the average value is comparable to the ones of Veneto and FVG region. Nonetheless, a remarkable variability can be seen among different NUTS 3 regions, with Goriška and Obalno-Kraška showing remarkably high values. Going to regional-level roads Obalno-Kraška is still ranking at 1st position, beyond a value of 30 kms of roads per 100 squared kms, while Primorsko-Notranjska is the only NUTS 3 region showing a less than 20 value. With reference to municipal roads, instead, the higher value is associated to Osrednjeslovenska, presumably due to the presence of the Ljubljana agglomeration[13] and related urbanised areas.

In general, graph representation endowed with relevant attributes (describing the key characteristics of each link) are the key instrument for performing overall network analysis and transport modelling (which is beyond the scoped of the present activity) a graph representation of the existing network. In this purpose, with particular reference to transport modelling activities allowing to perform traffic simulations, specific attributes are requested in order to describe the performance and functional characteristics of each link (e.g. the capacity expressing the maximum number of vehicles that can travel across a section of the link during a certain time interval).

IN-DEPTH INFORMATION BOX 03 - Integrated graphs for road transport supply modelling

A relevant experience in developing an integrated graph at cross-border level for road transport supply modelling network graph is represented by the TrIM project (Italia-Austria Programme 2007-2013). TrIM addressed the development joint datasets at cross-border level as to provide shared tools for supporting a common vision in tackling transport management and planning.

In particular, it aimed at testing the implementation at cross-border level the approach developed within the Austrian Graph Integration Platform initiative (GIP). This long-lasting initiative (started in 2008) has been implemented with the aim of developing a nationwide transport graph, as to provide a digital map of Austria's transport network. The resulting shared graph is meant as a basis allowing digital management of the traffic data in compliance with standardised rules. In particular, according to a cooperative approach involving the authorities at different level (national, regional, municipal, etc.) as well as infrastructure manager operators allowing for a decentralised updating process (each participating body is updating its own

[13] In this purpose it is to recall that Ljubljana is an international hub crossed by 2 EU corridors also endowed with a ring road, and highways converging from 4 different sides.

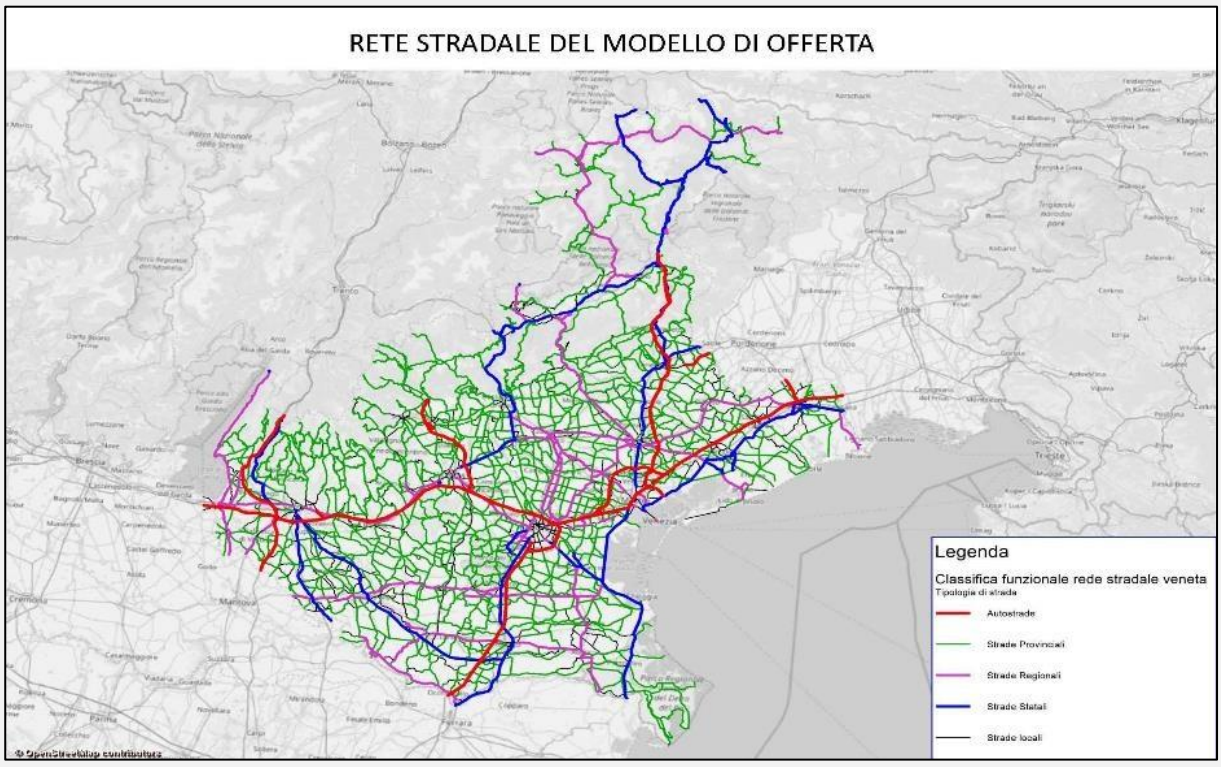
portion of the network).

During TrIM project implementation, each participating region (Carinthia, Friuli Venezia Giulia and Veneto) developed an updated version of its own graph. Hence, their integration according to an agreed data interface format (based on the standard developed within the GIP initiative) was successfully tested.

In the following years the outcomes of the project were further capitalised (e.g. EDITS projects – Central Europe Programme 2007-2013, participated by FVG region)

In the case of Veneto Region, the developed graph was obtained by elaborating on a subset of the links of the Regional Cartographic Unit (i.e. not taking into account minor roads) and updating the related informative content with particular reference to attributes expressing the functional aspects of the road (e.g. maximum speed, capacity, etc.).

A major updated of Veneto Region graph was carried out, through the participation of Veneto Strade to the TALKNET project (Central Europe Programme), which also was beneficial to the development of the Veneto Region Transport plan issued in 2019.



Then, the Veneto region graph was further implemented for the specific goal of traffic assignment focusing on the Metropolitan City of Venice by UNIVE (see related INFORMATION BOX 09 in the following).

IN-DEPTH INFORMATION BOX 04 – Opportunities from OpenStreetMap

OpenStreetMap (OSM) project was launched in 2004 with the aim of creating "a free, editable map of the whole world that is being built by volunteers largely from scratch and released with an open-content license" (http://wiki.openstreetmap.org/wiki/About). Due to its growing development and success, it now represents the most significant example of Volunteered Geographic Information (VGI) and it now provides a detailed and constantly updated map of the whole world.

As testified from the name itself, OSM was initially developed with particular reference ton mapping streets and roads. However, the scope has been widened thus encompassing a very rich variety of geographical objects (e.g., buildings, facilities, Points of Interest and Land use).

As regards, the road network, the information content is structured in: Ways (representing streets), nodes (representing the presence of changes in the characteristics or intersections between two or more streets) and relations (containing information regarding two elements, such as turn restrictions from one way to the other).

Nowadays, OSM is largely used for various applications: mapping, routing, network and accessibility analyses, location-based services etc. In particular, it can also provide the basis for transport modelling and simulation even though it is to point-out that, along with the need for checking data related to a voluntary-based contribution, some specific attributes (e.g. link capacity) are to be integrated in a preliminary pre-processing phase.

3.2. RAIL NETWORK

The railway network of the cross-border Italia -Slovenia programme area is characterised by the presence of main corridors belonging to the TEN-T network (see chapter 1). In particular, it includes the main axis linking Venice, Trieste and Ljubljana (belonging to both the Baltic-Adriatic and the Mediterranean Core Network Corridors).

Widening the perspective to the whole network (encompassing also secondary lines), Figure 15 shows a thematic map representing the number of tracks and the presence (or not) of a railway electrification system (as to supply electric power to trains). Notably, these two aspects are key drivers for the performances of rail link. In particular they represent fundamental aspects for assessing the capacity of a link (i.e. the maximum number of trains that can travel across a section of the link during a certain time interval).

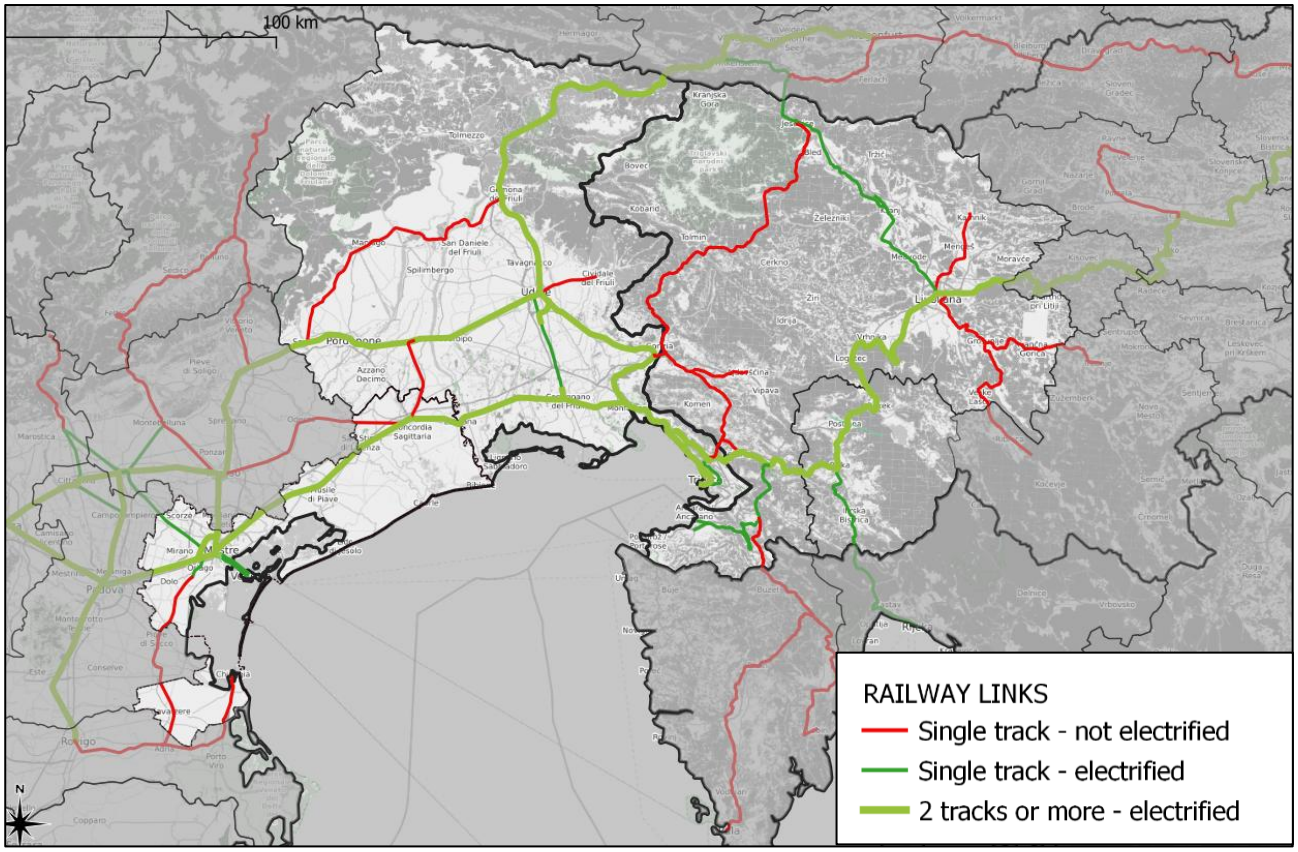


Figure 15 – railway network across the IT-SI Programme area

The relevant information about the various characteristics (e.g. maximum allowed speed, the module expressing the maximum length of train, etc.) of each link is made available through the "Network Statement" issued by the railway infrastructure management operators.

In this purpose, it is to report that the analysed railway network, apart from limited portions of regional/local level relevance managed by regional companies in Italy, is managed by national operators (i.e. RFI and SŽ).

NAME	COUNTRY	MANAGED NETWORK
RETE FERROVIARIA ITALIANA (RFI)	Italy	Italian national network
SLOVENSKE ŽELEZNICE (SŽ)	Slovenia	Slovenian national network
FERROVIE UDINE-CIVIDALE	Italy	Udine-Cividale line
INFRASTRUTTURE VENETE	Italy	Mestre- Adria line

Table 6 – railway infrastructure managers in the IT-SI Programme Area

As from shown in Figure 15 representation, there are only two cross-border rail crossings:

- Villa Opicina - Sežana – a two-tracks electrified link along the Trieste- Ljubljana line belonging to TEN-T Corridors;
- Gorizia- Šempeter pri Gorici (- Nova Gorica) – a single-track not electrified link that, at the time being is not allowing all the possible connections due to the lack of specific tracks in correspondence of the junctions of the bypass across the border

When addressing the cross-border level, interoperability-related aspects need to be particularly focused on. In fact, they usually provide peculiar examples of cross-border obstacles and gaps in the rail transport.

In this purpose, as far as electrification system is concerned, it is to underline that both Italy and Slovenia adopt a 3 kV DC electricity supply.

On the other hand, each Country has its own safety and signalling system (namely, SCMT in Italy and INDUSI in Slovenia), thus implying relevant interoperability issues. In particular, it implies the need for certain technical requirements on the rolling stocks as well as specific procedures (also including the change of the crew) to be carried out at the train border crossing (i.e. Villa Opicina), thus causing up to 20 minutes waiting time. In this purpose, a relevant improvement is related to the (ongoing) adoption of the "European Railway Traffic Management System" (ERTMS) that, among other things, is providing a unifying framework to the TEN-T core network corridors.

3.3. CYCLE NETWORK

Relevant long-distance itineraries are acknowledged at EU level through the EUROVELO network encompassing, in the Italy-Slovenia CB area:

- Eurovelo 8 “Mediterranean route”, including the cross-border section Venezia-Trieste-Koper-Pula along the Adriatic coast.
- Eurovelo 9 “Amber route”, starting from the Baltic Sea and reaching the Adriatic in Trieste, before linking to Koper and Pula.

Figure 16 – EuroVelo Schematic Diagram (2021). Source Eurovelo

Moreover, with reference to the Italian context, the strategic role of cycleway according to a synergic vision encompassing both tourism promotion and sustainable transport has been fully acknowledged through the Decree 517/2018.

In fact, along with the prescription of specific criteria for the design and classification of cycleways, it encompasses the identification of a system of 10 national-level touristic cycleways. Among them, with reference to the IT-SI Programme Area, it is to mention the "Ven-to" (Venezia – Torino) cycleway, mainly developed along the Po River (while, after Rovigo reaches Chioggia and then, the islands of Pellestrina and Lido di Venezia), the "Adriatica" linking Gargano (in Apulia Region) with Lignano Sabbiadoro (in Friuli Venezia Giulia Region) as well as the cycleway "Trieste-Lignano Sabbiadoro-Venezia".

Figure 17 – The Italian national tourist cycleways. Source: "Connettere l'Italia", 2017

With reference to Slovenia, the "Transport Development Strategy of the Republic of Slovenia until 2030" highlight the importance of developing a strategic plan "to arrange cycling connections at the level of the State, functional regions and towns, taking into account the following priorities:

- cycling connections which facilitate sustainable mobility and intermodality, with particular refence to the urban and suburban dimension;

- national cycling network, connected to the international cycling routes and its usage for promoting sustainable tourism.

Moreover, cycleways have been the object of growing attention and commitment for regional and local-level planning as well. In the case of both Veneto[14] and Friuli Venezia Giulia regions, it encompassed also a particular deal paid to systematising and making available data about the existing and planned cycleway network both for supporting stakeholders' discussions and for information provision to the travellers.

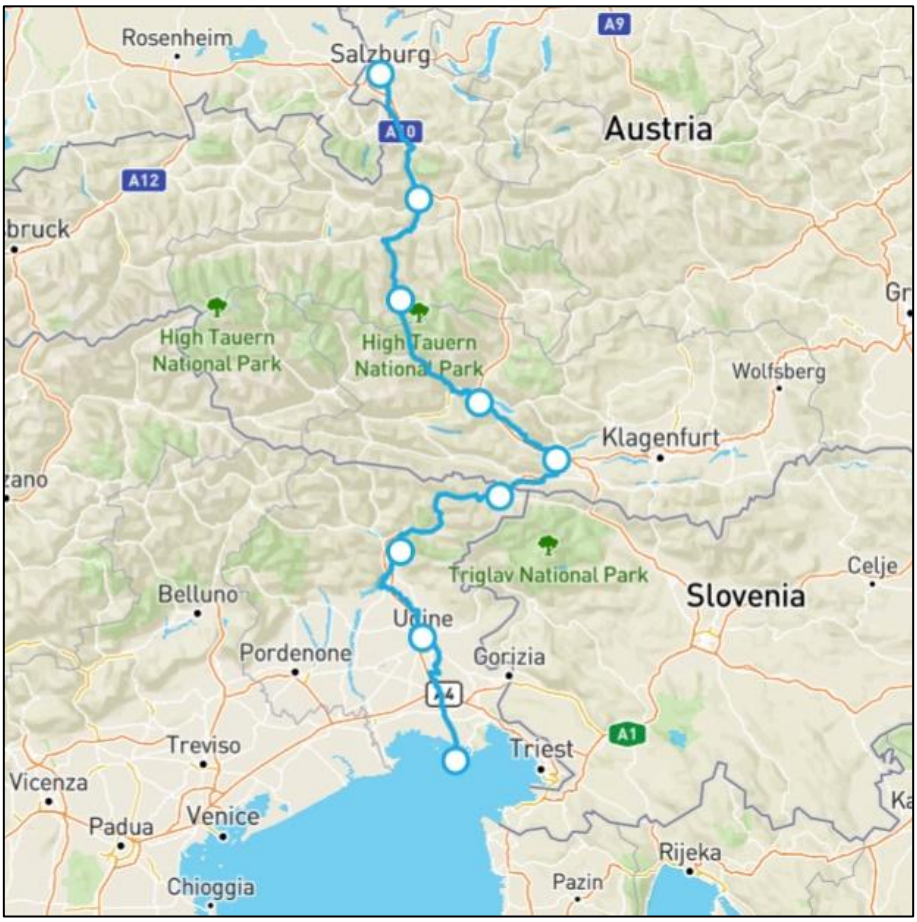


Figure 18 – The Alpe Adria cycleway. Source: https://adriabike.eu/en/map/

[14] The Veneto Region webGIS portal with the thematic representation of the cycleways is available at https://idt2.regione.veneto.it/idt/webgis/viewer?webgisId=82.

Moreover, it is to underline that Friuli Venezia Giulia Region has preliminary adopted (May 2021) its Regional Plan of cycle mobility ("Piano Regionale Della Mobilità Ciclistica", PREMOCI). The Network of Cycle Routes of Regional Interest ("Rete delle Ciclovie di Interesse Regionale", RECIR) proposed by PREMOCI is made up of ten cycle routes which cover a total of about 1,300 kilometres, of which 450 km have already been built. The definition of these regional-level cycleways includes a high deal paid to cross-border itineraries. In this regard, the following figures shows two key cycleways that are characterised by a cross-border route: Alpe-Adria (across Austria and Italy) e Interbike (across Italy and Slovenia) and are mutually crossing in FVG Region.

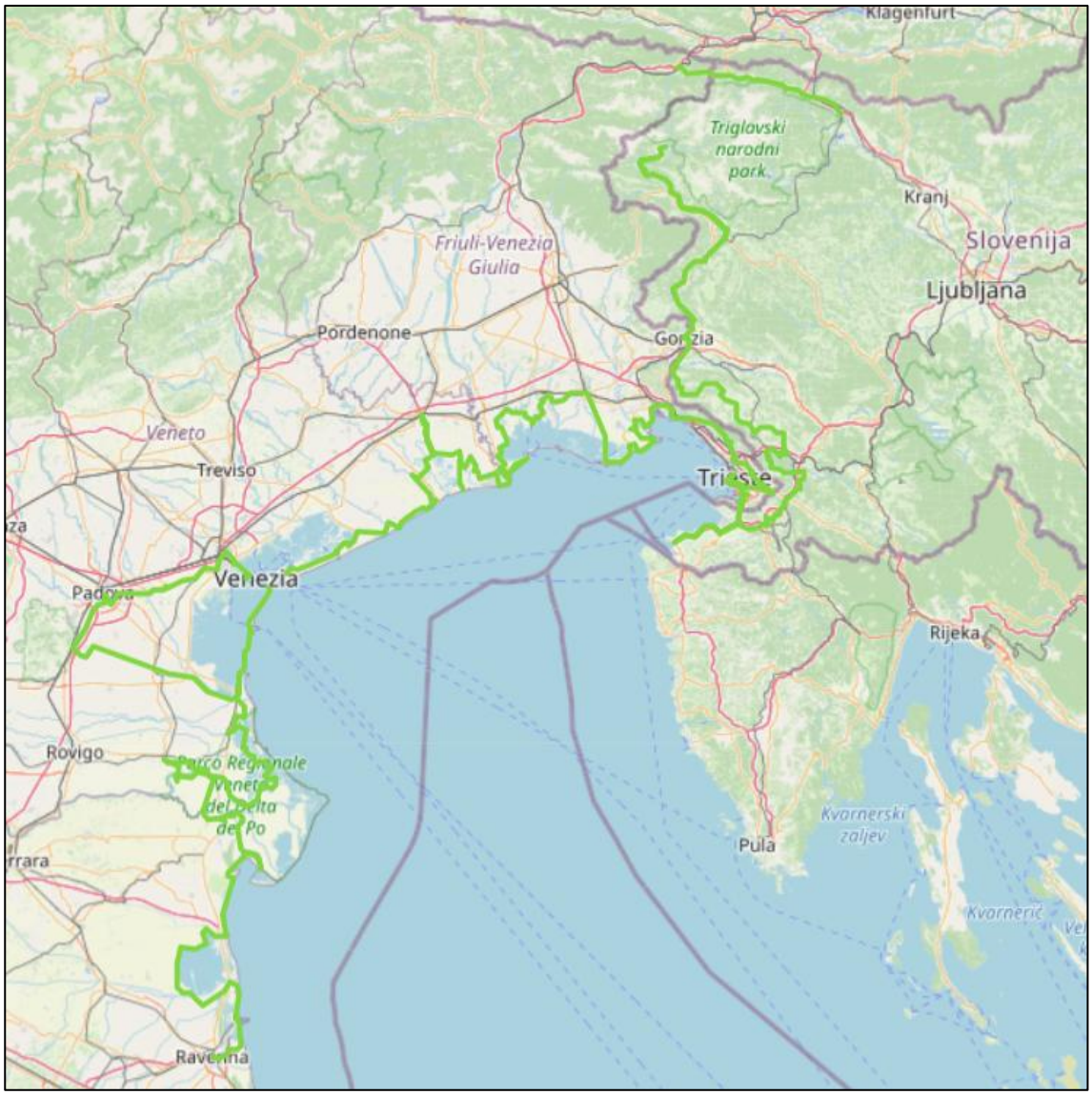


Figure 19 – The AdriaBike cyle route. Source: https://adriabike.eu/en/map/

More in general, these commitments are testified by various initiatives in the different areas of the IT-SI Programme area aiming to the actual development of cycle itineraries and related intermodal solutions. In this regard, it is to mention also the related pilots developed by PP5 - Regional Development Centre Koper, PP6 - Posoški razvojni center and PP7 - Obcina Ilirska Bistrica (see related descriptions and map representations reported in the Annex 2).

Other relevant examples are also provided by various synergic (past and ongoing) projects, at least partly addressing the IT-SI area (while belonging also to different Interreg Programmes). A not exhaustive list is presented in the following table.

Project	Programme	Brief description	Begin	End	Web Link
INTER BIKE II	*ITALIA-SLOVENIA*	*Promote the use of sustainable types of transport along the Adriabike cycle path*	*09/2017*	*12/20*	*https://www.ita-slo.eu/it/INTER%20BIKE%20II*
ISONZO-SOČA CROSS-BORDER PARK	*ITALIA-SLOVENIA*	*creation of a cross-border cycle and pedestrian paths in the areas of Gorizia, Nova Gorica and Šempeter-Vrtojba*	*01/2017*	*04/2021*	*https://www.ita-slo.eu/en/isonzo-so%C4%8Da*
MOBITOUR	*ITALIA-SLOVENIA*	*Sustainable mobility of cross-border coastal and hinterland tourist areas*	*10/2017*	*06/2020*	*www.ita-slo.eu/en/mobitour*
BIKENAT	*ITALY-AUSTRIA*	*improving accessibility to places of interest along the Alpe Adria cycleway path and launching new intermodal and "bike Friendly" services.*	*01/2017*	*12/2021*	*https://www.interreg.net/*
EMOTIONWAY	*ITALY-AUSTRIA*	*promotion and development of eco&soft mobility through innovative and optimized network of cross-border natural and cultural ways*	*01/2018*	*06/2022*	*https://www.interreg.net/*
ICARUS	*ITALY-CROATIA*	*Intermodal Connections in Adriatic-Ionian Region to Upgrowth Seamless solutions for passenger transport*	*01/2019*	*06/2021*	*https://www.italy-croatia.eu/web/icarus*

MIMOSA	*ITALY-CROATIA*	*Strategic project on MarItime and MultimOdal Sustainable pAssenger transport solutions and services*	*01/2020*	*12/2022*	*https://www.italy-croatia.eu/web/mimosa*
MEDCYCLETOUR	*MED PROGRAMME*	*Promoting sustainable mobility and tourism along the coastal areas crossed by the Eurovelo 8 cycle route*	*2016*	*2020*	*https://medcycletour.interreg-med.eu/*
MOBILITAS	*MED PROGRAMME*	*MOBIlity for Nearly-zEro C02 in MedITerranean Tourism DestinAtionS - Climate change, scenarios of tourism trends, C02 emission to 2035 and 2050*	*2016*	*2019*	*https://www.rrc-kp.si/en/who-we-are/3-projekti/aktualni/513-mobilitas-2.html*
CYCLEWALK	*INTERREG EUROPE*	*Sharing best practices and experience on data collecting and processing and involvement of users in order to improve planning of cycling and walking as modes of transport in urban and functional urban areas*	*01/2017*	*12/2021*	https://www.interregeurope.eu/cyclewalk/

Table 7 – Synergic Interreg projects addressing the cycleways development and promotion

Among others, it is also to mention the flagship ADRIONCYCLETOUR project of the EUSAIR, addressing the realisation of a cycle route running along the coast that connects all the countries of the Adriatic-Ionian region (from Sicily to Greece) and its main cycle connections to the hinterland areas (whose relevance is testified also by its inclusion in the Italy-Slovenia Programme 2021-2027).

Moving to the local level the cycling network, a general remark to be taken into account is that their consistence is quite heterogenous and unevenly distributed depending on local conditions. Furthermore, related data are also to be checked against possible discrepancies and incoherent data provision.

3.4. SYNOPSIS

On the basis of the overall analysis of the multimodal transport network and related information sources provided in the present chapter some key recommendation can be outlined in the following box with particular reference to data availability.

RECOMMENDATION BOX 02 – Remarks on the data availability on the networks of the IT-SI Cross-Border area multimodal transport system

Relevant information about transport network characteristics have been growingly made available in recent years (especially with refence to the road network) through georeferenced graphs endowed with relevant attributes for describing key characteristics of each node and links. However, relevant systematisation efforts are still needed in order to adequately and homogenously cover all the themes, especially at cross-border level. In this purpose relevant initiatives and projects are to be reported, though addressing only part of the IT-SI area. Furthermore, it is to recall that the update and maintenance of the related dataset call for relevant commitments and efforts by the involved public bodies. In this regard a remarkable opportunity can be also related to the availability of open-source data sources, such as OSM and shared standards. In this regard, it is to mention the relevance of GTFS for the description of the public transport network characteristics and whose relevance is also related to the services being operated (as discussed in the next chapter).

4. PUBLIC TRANSPORT SERVICES

Relevant data about public transport service for transport planning purposes mainly consists of information allowing to describe:

- The public transport network, thus describing paths and stops;
- Timetables, according to the planned service (i.e. not taking into account real-time monitoring or how the service is facing contingent delays or changes during its actual operations).

In general, data on public transport services are made available through different formats (see also D5.3.2). Nowadays, among different formats and standards, the "General Transit Feed Specification" GTFS format provides well-spread de-facto standard.

During the data collection process carried-out within CROSSMOBY a relevant deal of data about public transport services have been made available through the GTFS format. With refence to rail and road public transport services, at the time being, only a portion of the bus services in the Eastern part of the Province of Venice and neighbouring areas is not yet covered by the collected datasets.

4.1. RAIL SERVICES

As far as rail is concerned, rail services are contracted out to the following operators:

NAME	COUNTRY	SERVICES NETWORK	WEBSITE
TRENITALIA	Italy	Italian national network	https://www.rfi.it/
SŽ-Potniški promet d. o. o.	Slovenia	Slovenian national network	https://potniski.sz.si/en/
FERROVIE UDINE-CIVIDALE	Italy	Udine-Cividale line	http://www.ferrovieudinecividale.it/
INFRASTRUTTURE VENETE	Italy	Mestre- Adria line	https://www.infrastrutturevenete.it/

Table 8 – railway PT operators in the IT-SI Programme Area

As far as international services area concerned, it must be noted that the initiative represented by the CROSSMOBY pilot (see related Information Box 05) has allowed to re-activate a rail service along the whole cross-border connection Trieste-Ljubljana (i.e. the only cross-border railway line currently between the two Countries currently open to passenger services).

IN-DEPTH INFORMATION BOX 05 - The CROSSMOBY cross-border rail service between Friuli Venezia Giulia Region and the Republic of Slovenia (by LP-FVG)

The reactivation of a passenger cross-border rail service between Friuli Venezia Giulia Region and the Republic of Slovenia represents the backbone of the whole CROSSMOBY strategic project and the concrete result of a long-term cross-border cooperation, which has in the Joint Committee FVG Region - Republic of Slovenia its point of reference. Making the most of the previous experiences and of the lessons learnt with Mi.Co.Tra. train, launched in 2012 as a pilot project in the framework of the Interreg IV project cofinanced by Italy-Austria Programme 2007 – 2013 (http://www.interreg.net/interreg4/it/progetti/progetti-approvati.asp - https://www.regione.fvg.it/rafvg/cms/RAFVG/infrastrutture-lavori-pubblici/infrastrutture-logistica-trasporti/FOGLIA21/), the new cross-border rail connection with Slovenia was agreed first at the level of the working table Transport, Energy, Environment and Spatial Planning, in the framework of the mentioned Joint Committee, and then designed with the direct involvement of the two chosen operators, Trenitalia S.p.a. and SŽ-Potniški promet d. o. o. / Slovenian Railways – Passenger Transport, in the framework of the service contract between FVG Region and Trenitalia. All was made possible by the competence of FVG Region in terms of cross-border public transport services.

The strategic relevance of such a cross-border connection lies in its capacity of making more accessible, to citizens and tourists, the whole Italy-Slovenia Programme area - thanks to the train connections available in Trieste to and from Venice - as well as all the locations and the main attractions along that railway line, pushing for a further development of the intermodality bike-train, being 30 the maximum number of bicycles which can be transported on the trains (ETR 563 'Civity', a five-unit electric train, with 276 seats, built by CAF, owned by FVG Region and made available to Trenitalia).

Two couple of trains per day, seven days a week, were set up along the axis Udine-Trieste-Ljubljana. The services started on September 8th 2018 and were available until the end of 2019, as a pilot project within CROSSMOBY WP3.3. Moreover, in 2020 and 2021 the CROSSMOBY train was suspended for several months due to the Covid emergency and, in August 2020, for maintenance

on the Italian railway network.

One couple of trains had, among its stops, the new railway stop of Trieste Airport, being one of the most important passenger intermodal nodes in FVG Region.

The monitoring on the data of passengers was provided jointly by the two mentioned operators based and focused only on cross-border passenger figures.

The following table, provided by Trenitalia S.p.A., shows the data on cross-border passengers transported per train on a monthly basis:

train	timetable	Sept. 2018	Oct. 2018	Nov. 2018	Dec. 2018	Jan. 2019	Feb. 2019	Mar. 2019	Apr. 2019	May 2019	Jun. 2019	Jul. 2019	Aug. 2019	Sept. 2019	Oct. 2019	Nov. 2019	Dec. 2019
1824 Ljubljana Udine	6.00-9.52	285	449	131	337	139	116	208	204	358	338	640	841	268	636	150	117
1825 Trieste - Ljubljana	9.02-11.36	571	575	452	1039	174	308	275	460	633	578	998	2055	704	495	350	352
1891 Udine - Lubiana	17.54-21.48	773	450	499	438	123	184	312	458	317	486	1409	1672	595	412	408	322
1896 Ljubljana Trieste	16.10-18.53	348	469	367	637	119	228	216	394	285	375	656	1297	596	482	368	290
	Total	**1977**	**1942**	**1448**	**2450**	**555**	**836**	**1011**	**1516**	**1593**	**1776**	**3703**	**5865**	**2163**	**2025**	**1277**	**1081**

31,2018 is the total number of passengers transported during the pilot duration (17 months), out of which 23,401 are the figures if only the whole 2019 is considered (January – December).

On the contrary, the data related to bicycle transported are missing because not available.

A first recommendation is therefore based on the missing data on bicycle, to be able of monitoring the usage of the intermodality bike-train, regardless the availability of bikes and e-bikes rental stations set up in some railway stations along the line, part of those provided by other CROSSMOBY pilot actions (see also APPENDIX 1).

A second recommendation is to enhance the availability of integrated data about these services at cross-border level on a regular basis (even beyond the testing phase co-financed by CROSSMOBY). In this purpose, it is to consider that the train services never stopped since September 2018, COVID-19 (emergency permitting).

The daily average number of passengers are listed in the following table, made available by Trenitalia S.p.A. too:

train	timetable	Sept. 2018	Oct. 2018	Nov. 2018	Dec. 2018	Jan. 2019	Feb. 2019	Mar. 2019	Apr. 2019	May 2019	Jun. 2019	Jul. 2019	Aug. 2019	Sept. 2019	Oct. 2019	Nov. 2019	Dec. 2019
1824 Ljubljana Udine	6.00-9.52	10	15	4	11	5	4	7	7	12	11	21	28	9	21	5	4
1825 Trieste - Ljubljana	9.02-11.36	19	19	15	35	6	10	9	15	21	19	33	68	23	17	12	12
1891 Udine - Ljubljana	17.54-21.48	26	15	17	15	4	6	10	15	11	16	47	56	20	14	14	11
1896 Ljubljana Trieste	16.10-18.53	12	16	12	21	4	8	7	13	10	13	22	43	20	16	12	10
	Total	**66**	**65**	**48**	**82**	**19**	**28**	**34**	**51**	**53**	**59**	**123**	**196**	**72**	**68**	**43**	**36**

As highlighted by the above figures, the summer months, as well as the month of December proved to be the periods when the numbers of passengers are higher, despite the lack of specific marketing campaigns and the low level of information available at the railway stations (both with reference to the train service and with reference to the mobility options and services for reaching or leaving the railway stations).

Also qualitative data and feedbacks from passengers were collected only during two short surveys carried out in February 2019 and in December 2019, using a dedicated questionnaire composed in three languages (Italian, English and Slovene).

For the above reasons, the main lesson learnt is that there is still room for improving the usage of that cross-border service, acting both on the demand and on the offer side, exploiting the growing interest towards such services by people interest in making a travel experience, without forgetting its relevance for a limited number of commuters who could avoid travelling by car.

4.2. BUS SERVICES

With reference to the bus services the GTFS file gathered during the allowed data collection process allow to cover almost all the Italia-Slovenia Programme Area. In this purpose the following figure shows the map with the stops (georeferenced points represented by circles in thematic representation) and related connections (links represented through georeferenced polylines).

The colours of the thematic map allow to distinguish the three main datasets covering:

- TPL FVG, covering all the FVG region bus services and as well as waterborne service mainly in Trieste area;
- ACTV services (including a relevant deal of waterborne transport) in the Venice area;
- Slovenian PT operators.

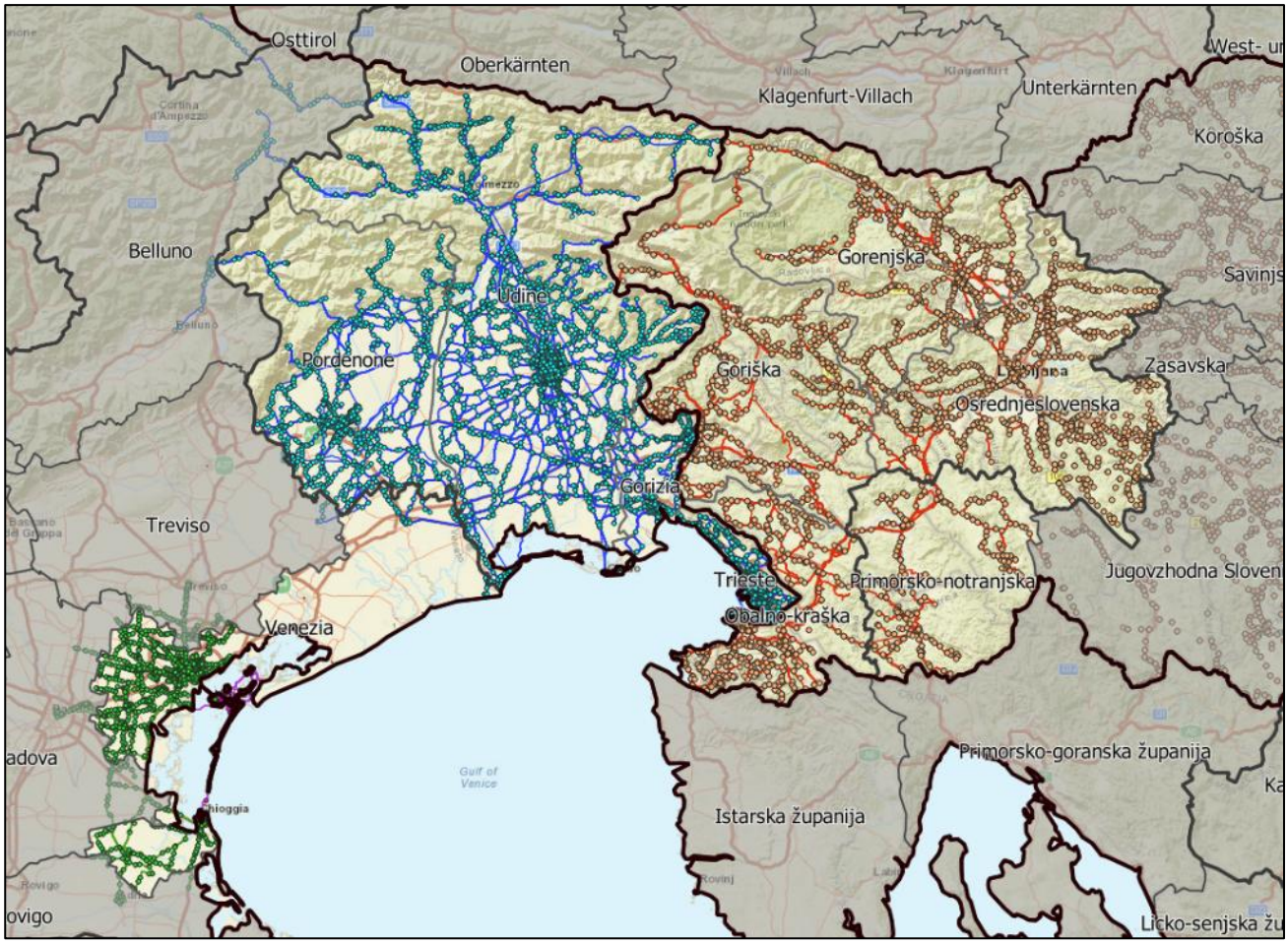


Figure 20 – GTFS dataset providing information on LPT services in the IT-SI Programme Area

The information provided though the GTFS allows to perform different kinds of analyses.

In particular, the provided datasets allow to map and effectively visualize the gaps affecting the PT network in correspondence of the CB[15], in correspondence of the IT-SI border.

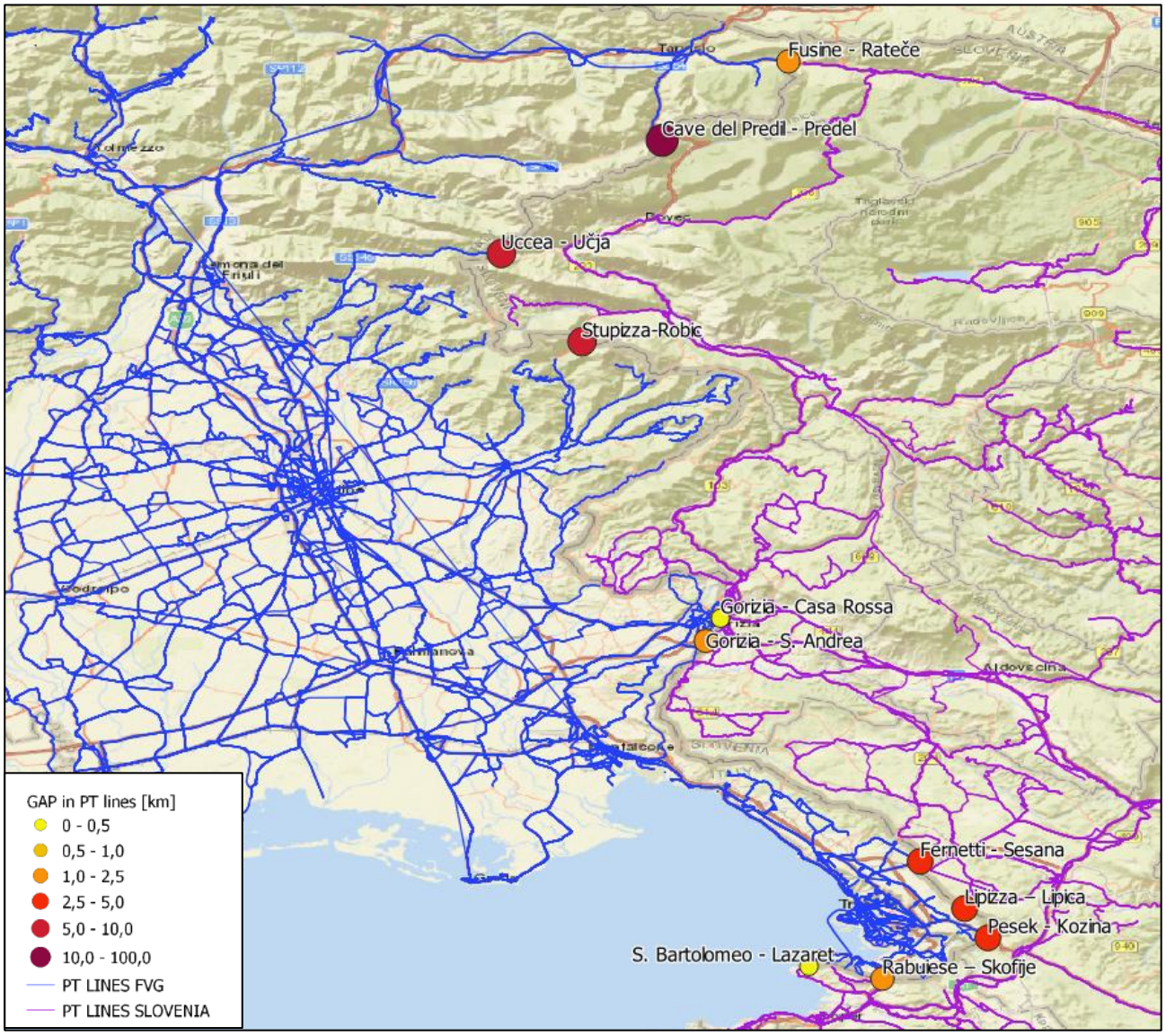


Figure 21 – Overview of relevant transit points acknowledged in the FVG regional PT plan.

[15] In this purpose, it is to underline that the exiting international lines are linking the main centres, thus not providing the usual density of stops and providing accessibility to the peripheral areas across the border.

Figure 22 – Detailed view of gaps between the PT service across the border in the area.

In this purpose, it is to recall that currently, apart from limited exceptions (i.e. international urban line linking Gorizia and Nova Gorica and a Slovenian line running with no stops for less than 2 kms on the Italian territory for reaching Podsabotin area near Gorizia) no bus public transport is operated across the border.

In particular, the Figure 21 and Figure 22 provide a thematic representation of the gaps expressed in physical distances (in kms) between PT services in the Italian and Slovenian side with referenced to the list of relevant border transit points identified in the FVG PT plan. More in general, about 40 crossing (with no PT services) have been identified along the whole IT-SI border. In this purpose, considering that border is stretching over 232 km, it is also to report a limited number of total available cross-border links.

To achieve a deeper insight into the level of connectivity and accessibility provided by public transport the actual number of services must be evaluated and represented. In this purpose, it is also to recall how a higher number of services is not only supplying a higher transport capacity but also representing a key feature of the level of service perceived by a user. In fact, it contributes to reduce average waiting times and allows a higher flexibility in carrying out the trip (for instance, with reference to the possibility of performing the trip back in a convenient or at least acceptable timing threshold). Hence, the number and frequency of services plays a key role in fostering a higher propensity to choose the public transport by the users.

In this regard, the following figure is showcasing two kinds of analyses, respectively providing a thematic representation on the number of services at each stop (on the left) and the number of services running on a specific road link (on the right). Further elaboration made possible will be assessing the theme of accessibility (see the related final chapter).

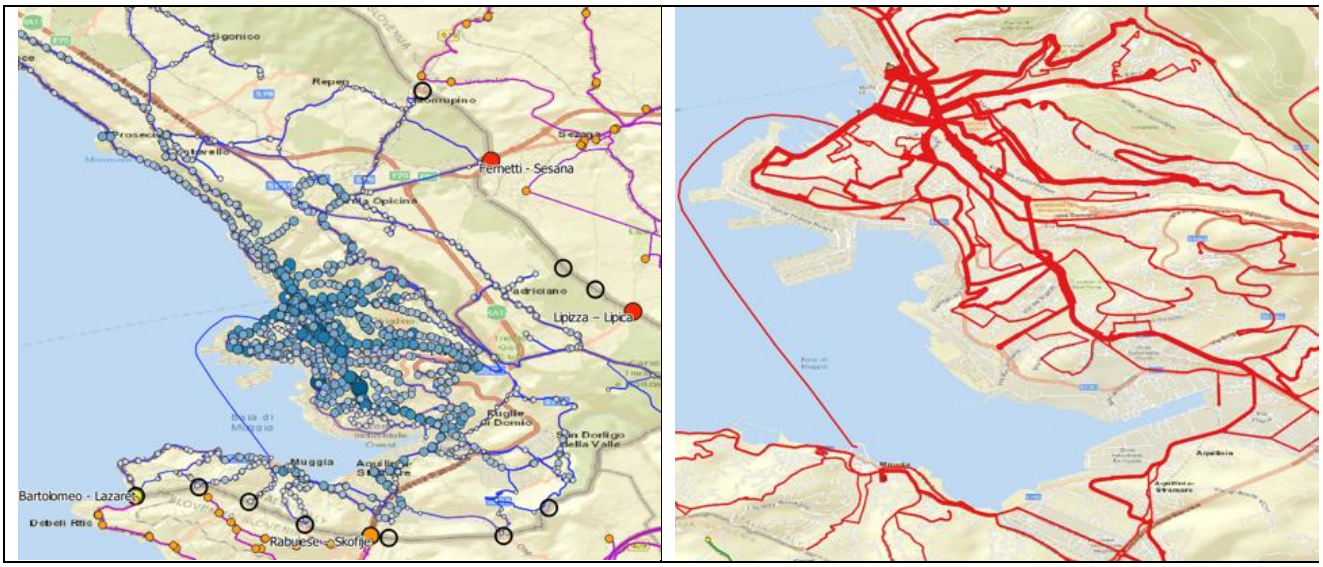


Figure 23 – Example of elaboration on the number of services serving each stop (left) and travelling along each road link (right)

When representing the overall number of services within a region, a great variability in the number of services and their frequencies can be ascertained between high frequencies characterising urban services of main cities and those serving low-demand rural/mountainous areas (whose number is particularly limited out of the peak-hour).

Hence, acting in compliance with the scope of a wide area analysis, a particular deal must be paid to connection between different municipalities. In this regard, the Figure 24 is providing a synopsis of the daily bus connection between the different municipalities in the Friuli Venezia Giulia region (summing up the two opposite directions linking each couple of municipalities).

Obviously, also this representation and analyses emphasises the major role of connections from/to the main centres, starting from Trieste and Udine. In particular, it shows the relevant connectivity to their hinterland. Moreover, it worth mentioning the contrast between the conspicuous number of services close to the border in the Trieste and Gorizia areas in comparison with the lack of connectivity across the border due to the gaps descried in the previous pages and figures (even though these differences are not only due to the "border effect" by also to the heterogeneity of the geo-morphological and urbanisation characters moving from the coastal area to the Karsts). More in general, remarkable differences are also to be ascertained with other rural

and mountainous contexts within the FVG region itself. These differences are particularly related also to the corresponding differences in the demand side between different areas (see Figure 26 in the related chapter). In fact, ensuring at least partial economic viability to services in low-demand areas is particularly challenging. On the other hand, the need for ensuring accessibility need is fostering the search for cost-effective solution or to highlight the social character of ensuring an alternative to car-dependency also for remote areas.

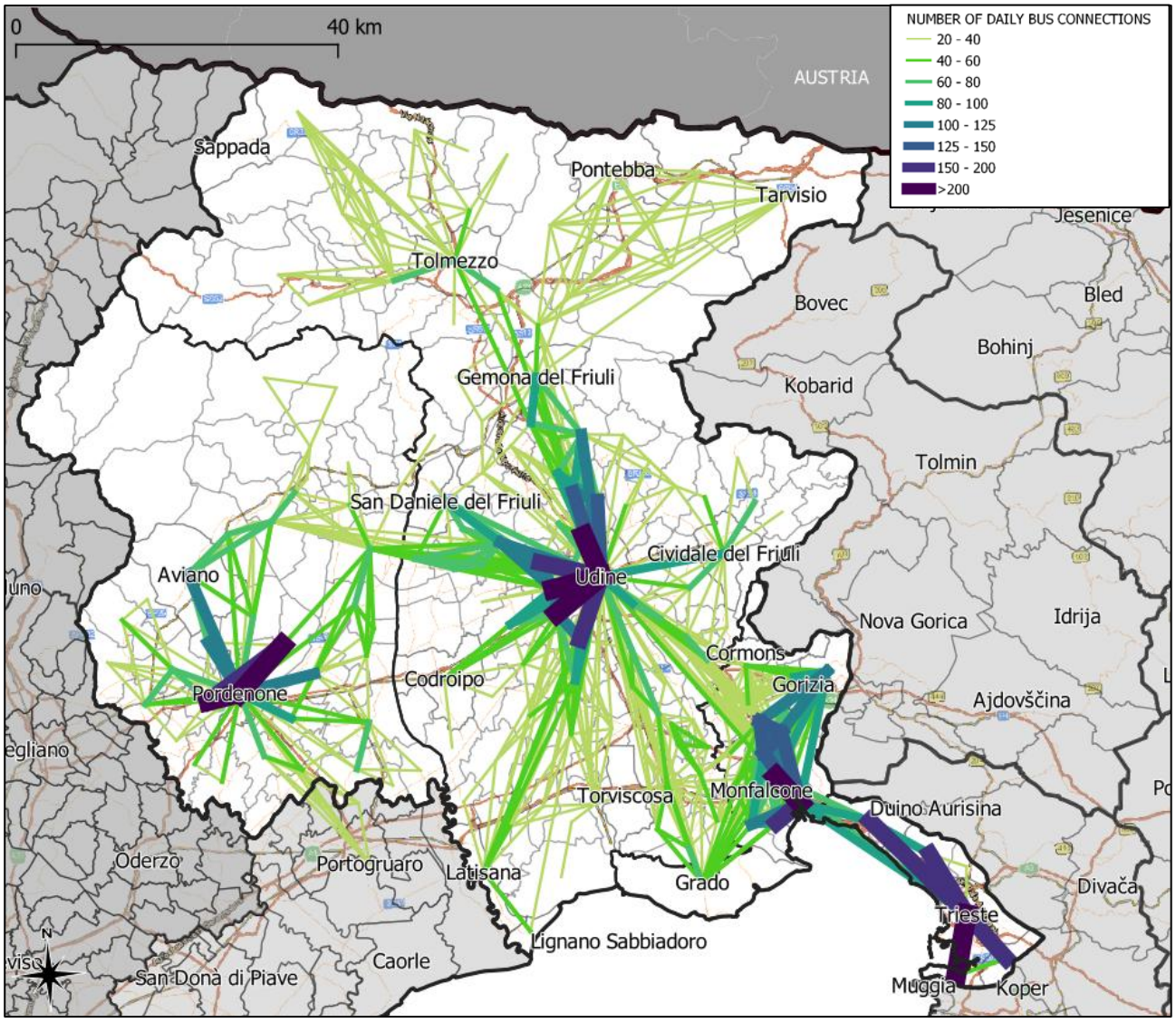


Figure 24 – Thematic representations of daily PT connections between different municipalities in FVG region.

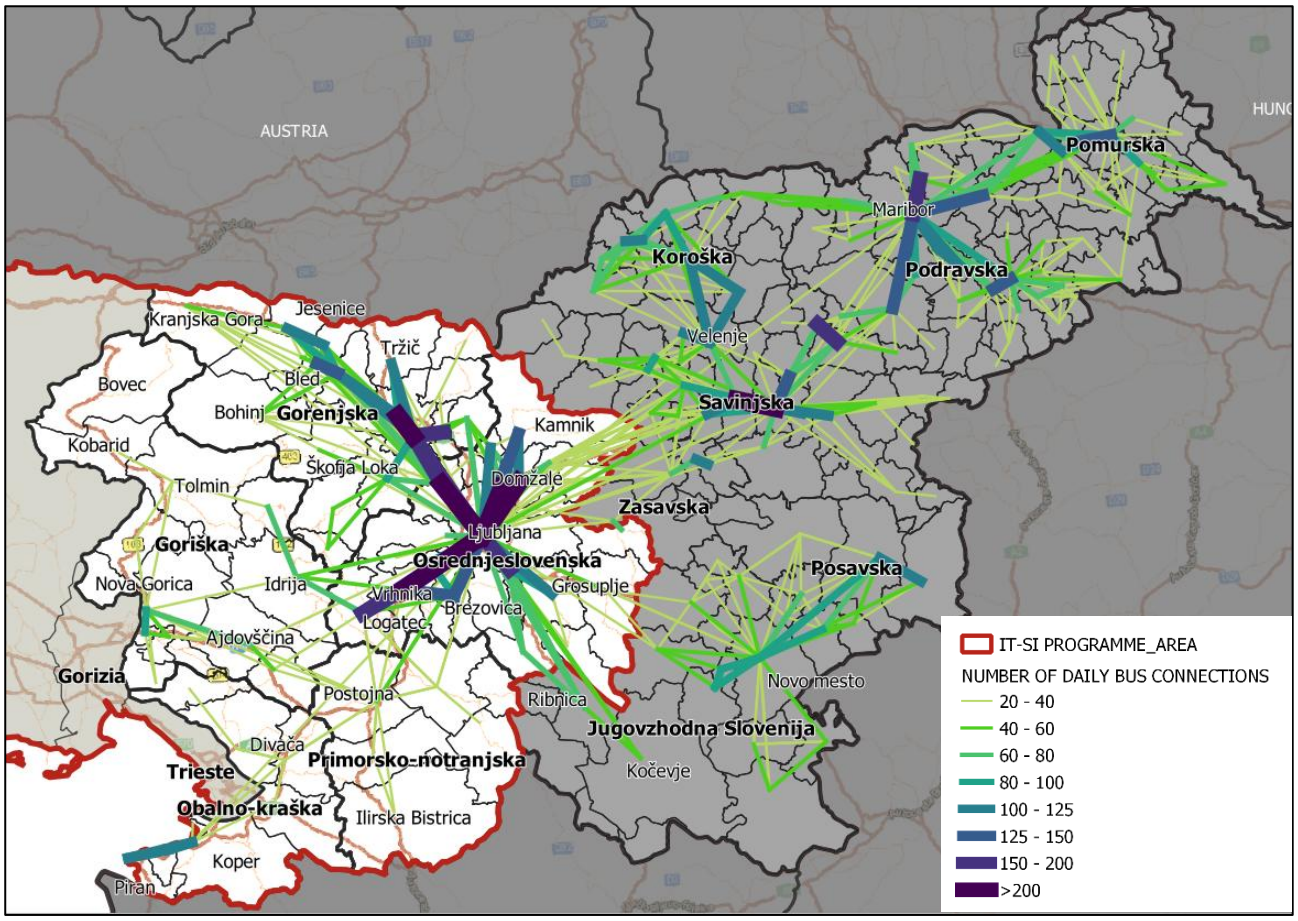


Figure 25 – Thematic representations of (bi-directional) daily PT connections between different municipalities in Slovenia.

Similar remarks have to be made with reference to the Slovenian context, where remarkably higher number of connections can be ascertained in relation to Ljubljana. Closer to the IT-SI border, a relevant number of services is running in the coastal area, especially between Koper and Piran. Moreover, though characterised by lower values, a certain number of connections is associated with the relation linking Nova-Gorica with Šempeter-Vrtojba and Ajdovščina.

4.3. MARITIME SERVICES

The maritime PT services carried out all the year round are mainly limited to the case of waterborne transport operated in the Venice area and related lagoon as well as in the Trieste area with reference to the Trieste-Koper service.

However, during the summer period relevant seasonal services are carried out. In this purpose, a particular deal is to be paid to the cross-border services to the services linking Trieste and various destination in the Slovenian and Croatian coast, which have been developing through various synergic initiatives and EU projects. In this purpose, it is to underline the particular relevance of waterborne connections between Trieste and the Istrian coast also considering that it provides the only alternative to solution based on road transport along the coastal area between Trieste and the Slovenia coast (given the substantial absence of a rail network).

IN-DEPTH INFORMATION BOX 06 – Synergic EU Cooperation project fostering seasonal Cross-border maritime service between Friuli Venezia Giulia Region and the Republic of Slovenia

The FVG Regional Plan for Local Public Transport issued in 2013 has highlighted the relevance of the two maritime connections shown in the following figure I.

These connections have been addressed by various projects stemming from the EA SEA-WAY project, co-funded by the CBC IPA-Adriatic Programme 2007-2013, through which it implemented a new maritime service between Trieste, Piran (Slovenia), Rovinj (Croatia) and Pula (Croatia). More recently, the extension to Mali Lošinj Island was introduced through the MOSES Project (Italy Croatia Programme) while the stop in Pula, instead, was cancelled. Moreover, INTER-CONNECT project (Adrion Programme) case study proposed further improvements of intermodal connections and accessibility pivoting on the existing maritime services connections through two sub-cases:

• SUB CASE A – focused on the existing cross-border maritime service and aiming to enhance its accessibility and (land-side) interconnection with public transport services as well as its usability;

• SUB CASE B – addressing the assessment of the potential and development of a new maritime service linking (Trieste-)Muggia-Koper.

Notably, the INTER-CONNECT sub case B has paved the way to a pilot activity being developed within FORTIS project, dedicated to the feasibility of the new IT-SI maritime connection.

Figure I – The international (blue) and ITA-SI CB line (red) as envisaged in the FVG regional PT plan. Source: Piano Regionale del Trasporto Pubblico Locale – PRTPL, 2013

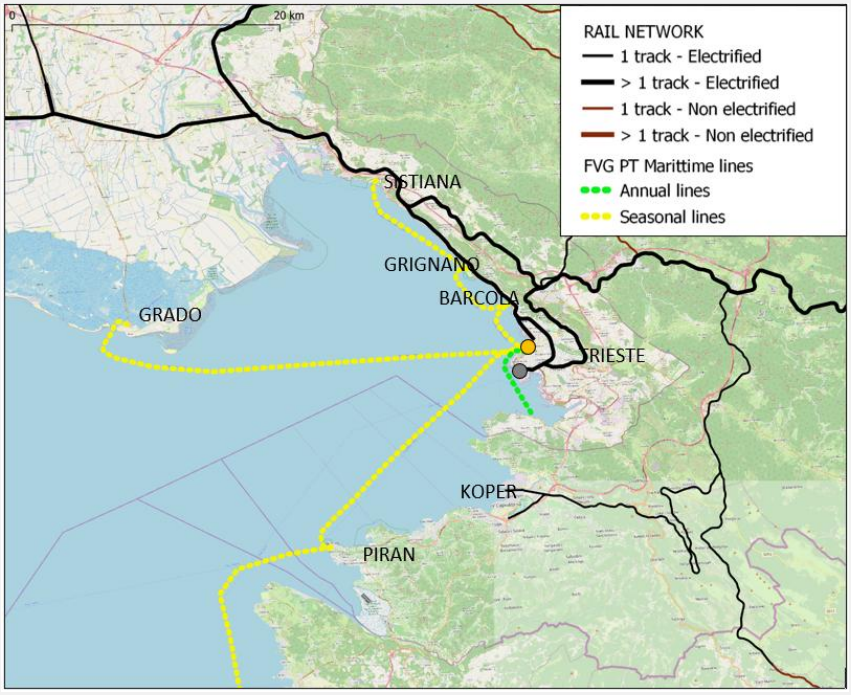
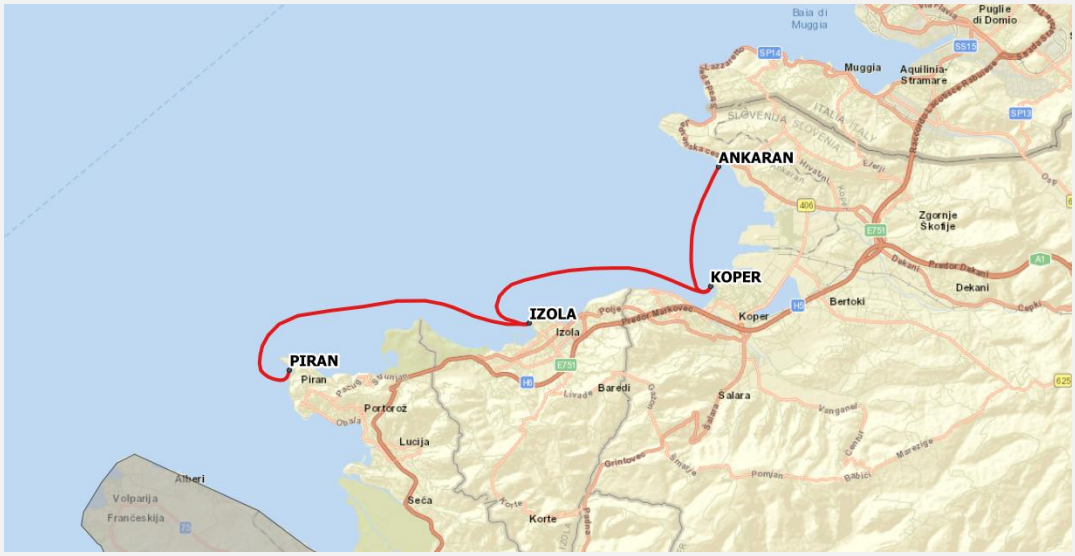


Figure II - Rail Network and maritime PT connection in the Trieste area and Slovenian Coast

Furthermore, it is strictly linked and synergic with a pilot activity carried out within CROSSMOBY by PP5 – Regional development centre Koper providing a synergic service linking Ankaran – Koper – Izola – Piran (and return). In particular during the 2020 and 2021 summer seasons, it has provided free transport for passengers and (6) bikes on Saturdays and Sunday, twice in the morning and twice in the afternoon. It is to report a successful outcome also in term of media coverage and interest, in spite of the critical contingent situation due to the COVID-19 pandemic emergency (that, among other things implied a limitation to 42 passengers, instead of 70, due to the social distancing rules).



Moreover, additional opportunities arise also from the case study, widening the connection from Grado to Lignano, being addressed through the MIMOSA project (Italy-Croatia Programme), where a pilot service linking has been carried out in July-September 2021.

4.4. SYNOPSIS

On the basis of the overall analysis of the public transport services in the IT-SI area and related information sources provided in the present chapter some key recommendation can be outlined in the following box with particular reference to data availability.

RECOMMENDATION BOX 03 – Remarks on the data availability on the public transport services of the IT-SI Cross-Border area (multimodal) transport system

Nowadays, data on the public transport service supply are becoming more and more available also through the usage of the General Transit Feed Specification (GTFS), which provides a well-spread common format for public transportation schedules and associated geographic information.

In fact, during the data collection process carried-out within CROSSMOBY, even though a full coverage was not possible to be achieved, it allowed to gather the information about a major part of the IT-SI area. Hence, a key recommendation is aiming towards ensuring a full coverage of data making them easily/openly available for different purposes. In fact, apart from information provision, they can enable a wide set of technical analyses ranging from elaborating key statistics about the PT services and the related multimodal accessibility to the full-fledged transport modelling and simulation of different development scenarios.

5. TRANSPORT DEMAND

Transport demand represents the key side of the transport system expressing the mobility needs to be met. Unfortunately, it proves particularly difficult to have reliable and complete data on this purpose. In fact, available statistics are usually lacking and/or limited to particular areas or components of the overall mobility.

In this purpose national census data represent a key reference for data ensuring a full territorial coverage. However, apart from their level of update, they are referred to commuters' mobility and, therefore, a remarkable portion of the demand and mobility needs are not covered.

In this purpose, it is to ascertain a changing[16] and heterogenous framework at cross-border and international level, where different typologies of data are collected. As far as mobility demand is concerned, the gathered data are specifically related to commuting behaviours of the population. However. these data are not always included in the dataset and, in case, the information of cross-border trips is collected with a broader level of detail.

In this purpose, it is worth mentioning that the UNECE document[17] proposing general criteria to be implemented at international level, while recognising as "core topic" the commuting characteristic given by the location of place of work, it specifies that where it "is outside the country it is generally only necessary to code it to the country concerned". Furthermore, it also classifies as "not core" (thus implying that could be gathered or not depending on the specific Country) the following topics:

- Location of school, college or university
- Mode of transport to work (or to place of education)
- Distance travelled to work (or to place of education) and time taken

However, apart from their specific level of update and completeness, it is also to recall that census data, being referred only to the specific aspect of commuters' mobility, are lacking information

[16] For instance, in Italy the recent years has seen the shift the traditional survey, encompassing the distribution of questionnaires to the whole population of the Country each 10 years (with last survey carried out 2011) to a "permanent" census campaign, carried out on yearly bases (starting from 2018) on a limited sample of inhabitants and integrating the collected data with others from administrative sources [https://www.istat.it/en/permanent-censuses/population-and-housing].

[17] See "Conference of European Statisticians Recommendations for the 2020 Censuses of Population and Housing" https://unece.org/DAM/stats/publications/2015/ECECES41_EN.pdf

about other relevant typologies of trips including occasional ones for different purposes (e.g. business, shopping, visits, tourism etc.), which obviously correspond to a relevant part of the overall transport demand. In order to widening the coverage to all these different aspects, a remarkable and innovative opportunity to be further analysed, is nowadays given by the usage of mobile phones cells data. In this purpose, it is to report the experience made in recent years by Friuli Venezia Giulia Region administration (see the related Infobox 07), which also allowed producing a report specifically addressing the cross-border mobility patterns (Friuli Venezia Giulia Autonomous Region, 2020).

IN-DEPTH INFORMATION BOX 07 – Transport demand data and flows from mobile phones cells data

In the recent years Friuli Venezia Giulia has tested the analysis of transport flows on the basis of mobile phone users location data. In fact, this is a promising and accessible source for obtaining data on transport demand and presence of users on a certain area allowing for a comprehensive coverage of the different areas and time periods. In the first experience made, data were aggregated on a municipal basis (with the exception of the municipality of Udine, which was subdivided in 11 zones), gathered in two phases between March 2016 and May 2017, for a total of 15 months Within this period, statistics were elaborated with refence to different and users categories and time slots. With reference to users categories, the overall data has been segmented on the basis of nationality, thus distinguishing between Italian (who were also further subdivided into residents and visitors) and foreign passengers. The resulting database allowed to estimate the number of people located in a certain zone within a given time slot. A second output also allowed to understand the number of users travelling between each couple of zones (i.e. the data making up an Origin/Destination matrix), which is especially useful for transport planning activity. A third output was testing the tracing of the origins and journeys patterns of group of users (“platoons”) to and from 4 specific territorial spots.

Obviously, the tested approach can be further replicated and extended as to further understand the demand of transport services also within cross-border areas. In this regard, a subsequent analysis, carried out in the period 2019-2020 resulted in a thorough analysis of cross-border mobility. In particular, embracing a period before and after the spread of the COVID pandemic it has allowed to register the effects of such extra-ordinary contingent emergency (see for further details at https://www.regione.fvg.it/rafvg/cms/RAFVG/GEN/statistica/FOGLIA58/).

Moreover, the willingness to proceed further has been further confirmed and new analyses are currently ongoing with reference to a 1-year period starting from October 2021.

5.1. Analysing of transport demand commuting in the IT-SI cross-border area

Focusing on transport demand for commuting, the present paragraph is providing a brief overview of key outcomes of the analyses carried out separately on the two different datasets made available by the official statistics institutes at national level (ISTAT and SURS). Having regard also to the level of detail of a wide-area analysis, this overview is made with reference to trips carried-out between different municipalities.

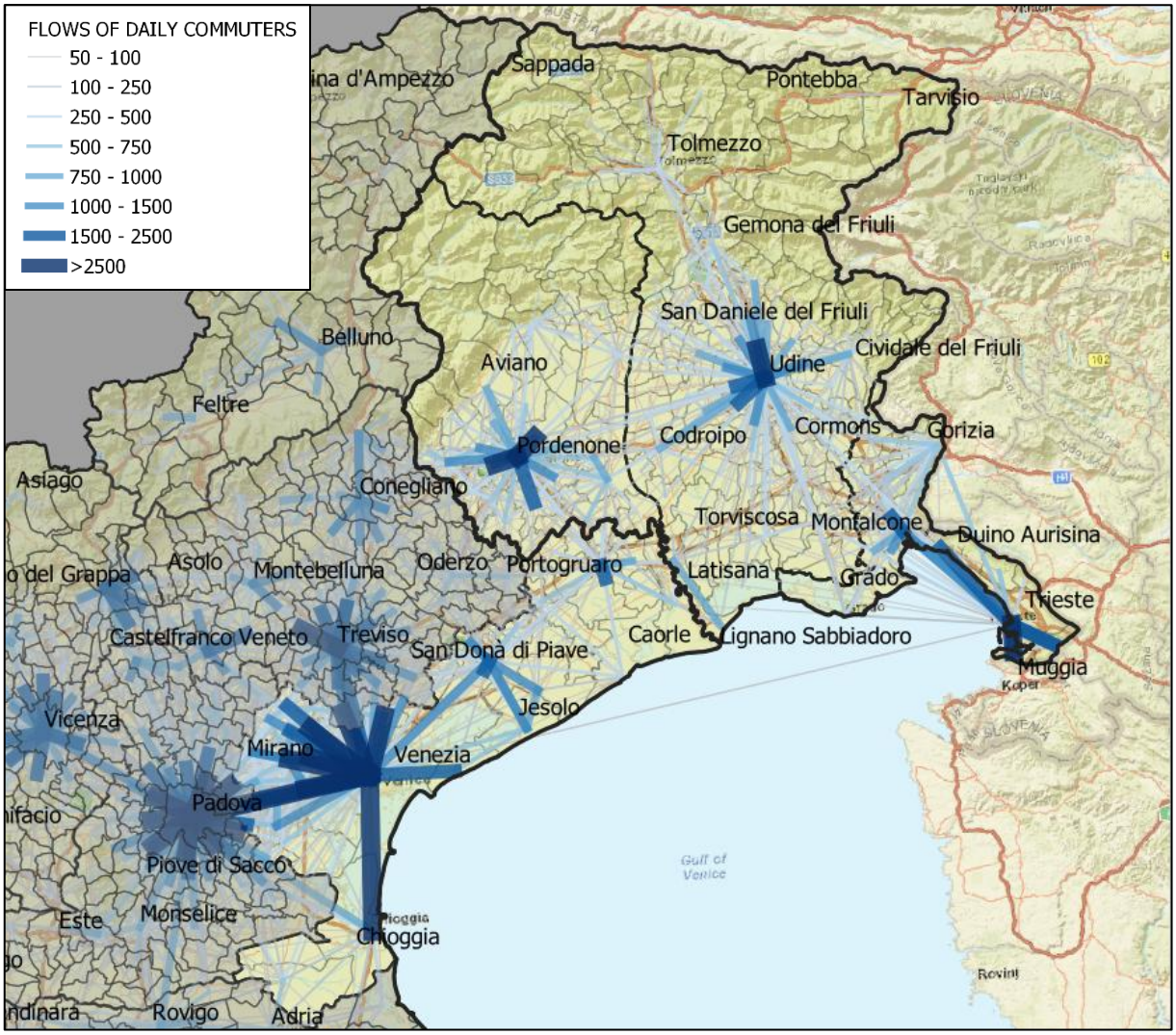


Figure 26 – Desire lines of related to transport demand for commuting between Italian municipalities in the morning peak of demand. Source: elaborations on ISTAT 2011 census data.

To this end, a thematic map representation through "desire lines" as shown Figure 26 is representing the number of daily commuters (in the morning peak-hour phase of a working date)

between the couple of municipalities showing higher values on the basis of the 2011 Italian Census.

The provide representation shows remarkable flows between the main centres and related hinterland. In particular, high values are registered in the Venice area. It is worth noting that these demand relationships are closely intertwined with those belonging to the neighbouring provinces of Padova and Treviso (including, their main centres). Moreover, quite detached from this central area of Veneto region, characterised by high urbanisation, in the Eastern part some more detached and distinct basin are centred on the second level polarities of San Donà di Piave and Portogruaro (also served by the Venice-Trieste railway line). Moving further eastward, the key basin is of strong Origin/Destination demand is linking Trieste and other municipalities in the coastal area from Monfalcone to Muggia. Other distinct and remarkable polarities are represented by the main centres of the former provinces of FVG region centre (esp. Udine and Pordenone).

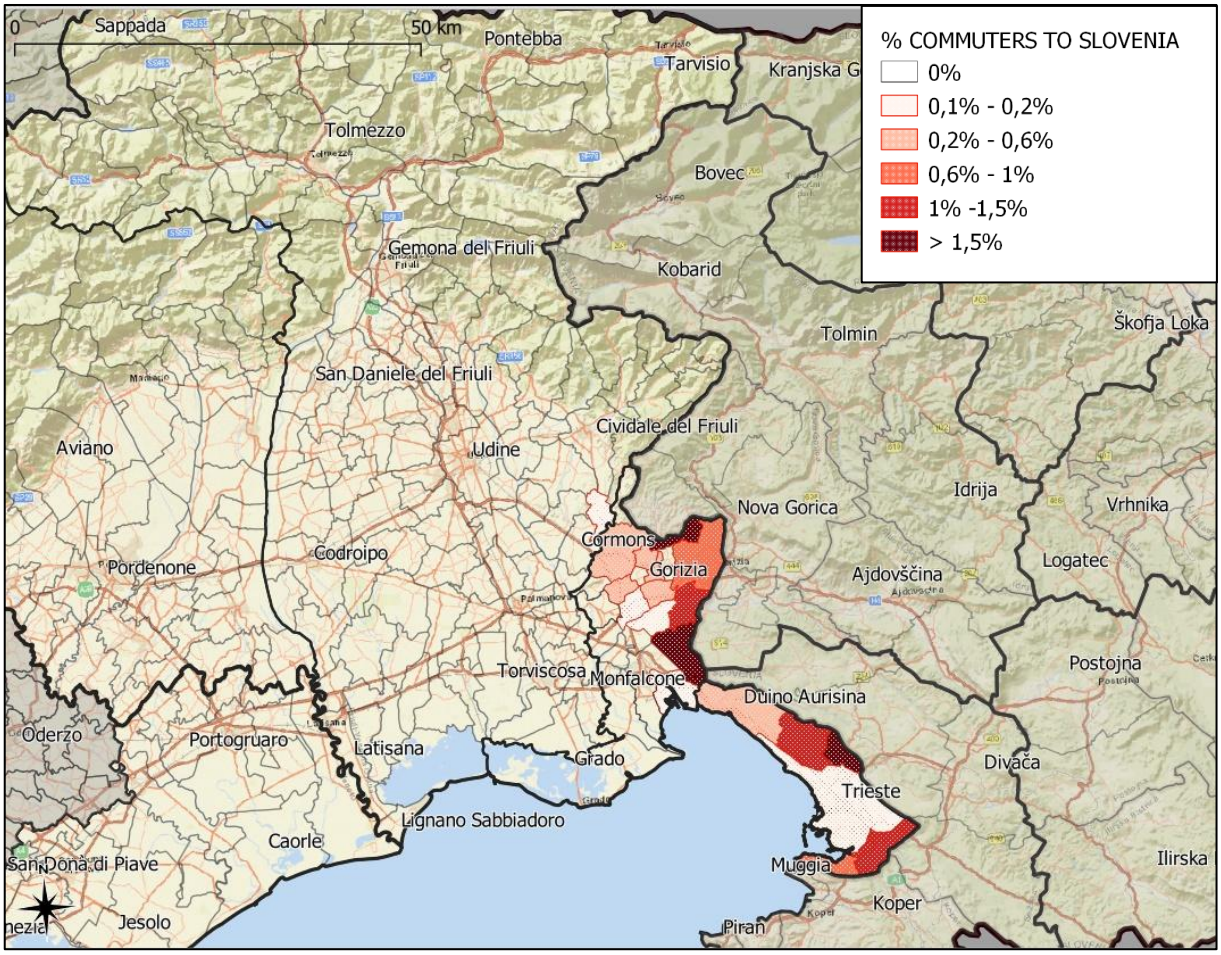


Figure 27 – Percentage of cross-border commuting from Slovenian to IT municipalities. Source: elaborations on ISTAT 2011 census data.

Unfortunately, in case of commuting to a beyond the national border, only the Country of destination is coded. Therefore, being not possible a representation of the specific Origin/Destination relations, for this specific purpose an aggregated representation of the overall percentage of commuters that have a destination in Slovenia is provided (see Figure 27). This representation allows to ascertain very limited values of cross-border commuting, with relatively significant percentages only in the NUTS3 area of Trieste and (partly) the one of Gorizia. It must be noted that the relevant absolute values of Trieste (if compared with those of other municipalities) in terms of percentages with respect to the overall commuting correspond with a very low value (less than 0,2%).

The analyses of more recent data about commuting made available on yearly basis in the SURS website (SiStat database) are shown in Figure 28.

In this representation is evident the key role played by the capital city, with Origin-Destination relations not only with its immediate hinterland and NUTS3 region (Central Slovenia Statistical Region) but also with more distant centres in the IT-SI Programme Area. In this purpose, it is to mention Kranj, Skofja Loka, Postojna, Koper as well as, to a less extent Jesenice and Nova Gorica. Moreover, Ljubljana has strong relations with relevant Central in Eastern Slovenia (esp. Maribor, Celje and Novo Mesto).

Closer to the IT-SI border, it is to mention relevant second-level basin around the polarity of Nova Gorica as well as between the key centres of the coast (Koper and Piran).

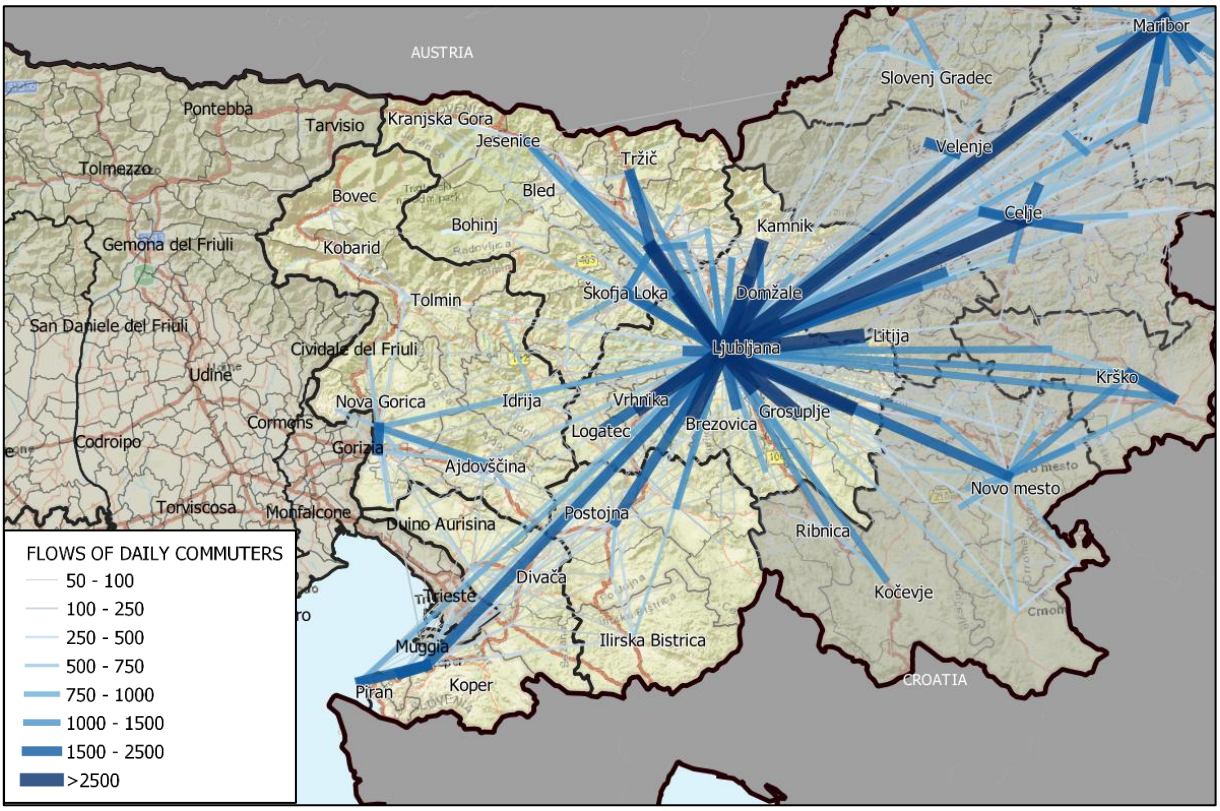


Figure 28 – Desire lines of related to commuters' transport demand between Slovenian municipalities. Source: Elaborations on SURS data (SiStat database).

5.2. SYNOPSIS

On the basis of the overall analysis of the transport demand in the IT-SI area and related information sources provided in the present chapter some key recommendation can be outlined in the following box with particular reference to data availability.

RECOMMENDATION BOX 04 – Remarks on the data availability on the mobility and transport demand affecting the IT-SI Cross-Border area (multimodal) transport system

Transport demand represents the key side of the transport system expressing highlighting the mobility needs to be met. Unfortunately, it proves particularly difficult to have reliable and complete data on this purpose. In fact, available statistics are usually lacking and/or limited to particular areas or components of the overall mobility. Traditionally, national population census data is representing a key reference ensuring a full territorial coverage. However, in this purpose, it is to ascertain a changing and heterogenous framework, at cross-border and

international level, where different typologies of data are collected. As far as mobility demand is concerned, the gathered data are specifically related to commuting behaviours of the population. However. these data are not always included in the dataset, and, in case, the information of cross-border trips is collected with a broader level of detail. However, apart from their specific level of update and completeness, it is also to recall that census data, being referred only to the specific aspect of commuters' mobility, are lacking information about other relevant typologies of trips including occasional ones for different purposes (e.g. business, shopping, visits, tourism etc.), which obviously correspond to a relevant part of the overall transport demand. In order to widening the coverage to all these different aspects, a remarkable and innovative opportunity to be further analysed, is nowadays given by the usage of mobile phones cells data.

6. TRAFFIC FLOWS IN THE MULTIMODAL NETWORK

The transport demand, while performing the trips for reaching the destination, is making use of the transport network (transport supply) by choosing specific paths. Obviously, the traffic flows registered at a specific link (over a certain time interval) results from summing up the contributions related to each path including that specific link. Therefore, according to the transport modelling framework traffic flows are the outcomes of the interaction mechanism between transport demand and supply, which are simulated through specific algorithms made available through a transport modelling and simulation specialised software. The implementation of such process is called traffic assignment. Though a comprehensive modelling is beyond the scope of the present project, the test performed with particular reference to the area of the Metropolitan City of Venice (see IN-DEPTH INFORMATION BOX) allows to showcase the typical outcomes of a traffic assignment simulation.

The resulting simulated flows are re-constructing the actual flows, which typically (or traditionally, i.e. without the big data resulting from GPS monitoring of, at least, a sample of the overall vehicles traveling in the transport network) are measured in a limited numbers of locations (or sections). The actual measures collected at the monitoring sections allow to check the validity of the simulation (which, conversely, allow to obtain an estimation of traffic flows for all the links of the modelled network).

Furthermore, through specialised algorithms it also provides useful elements for checking and improving the transport modelling activity and, in particular, for upgrading and updating O/D matrices, which are typically quite difficult to be obtained (especially with a certain degree of reliability and accuracy).

Apart from modelling-related aspects traffic data are relevant information for assessing, first of all, the level of usage of a specific transport infrastructure. In this purpose, they are compared with the capacity (see chapter 4), in particular, in order to assess the available residual capacity (i.e. the remaining room for increases of flows. In this purpose, the percentage of already “consumed” capacity is represented by the level of saturation, given by the ratio between actual flow and the capacity.

Furthermore, the level of traffic is relevant per-se given the fact that is associated with relevant externalities and impact of the traffic (e.g. gas and noise emissions, accidents, etc.).

In the following paragraphs the topic of traffic flows is addressed distinguishing between road and rail network. In this purpose, it is also to emphasise the relevant significance of a key distinction between the two cases. In fact, differently from the road network, the flows on the rail network are mainly (e.g. apart from contingent situations) determined by an a-priori scheduling (i.e. the time plans). Hence, in relative terms (and provided that the related data are made available) its

quantification (in terms of number of vehicles travelling) is affected by less degree of uncertainties.

6.1. TRAFFIC FLOWS IN THE ROAD NETWORK

The remarkable theme of traffic flows in the road network has been deepened in CROSSMOBY and tested through addressing separately the following different aspects:

- Survey of the actual traffic flows by realizing a network of monitoring sections (see IN-DEPTH INFORMATION BOX 08);
- The simulation of traffic flows tested through the Metropolitan City of Venice Road transport model assignment (see IN-DEPTH INFORMATION BOX 09);
- The evaluation of the perception of the existing through collecting answer to a specific question within a questionnaire distributed to the bordering municipality on the Italian side (see IN-DEPTH INFORMATION BOX 10).

With reference to the actual assessment of traffic conditions along the main East-West corridor, the following Figure 29 provides an assessment of the total number of vehicles per day as well as of the intensity of the lane use. As a brief and general remark, relevant level of traffic, leading to high level of usage in large portion of the motorway axis, especially in the area close to Ljubljana as well as between Venice and Trieste.

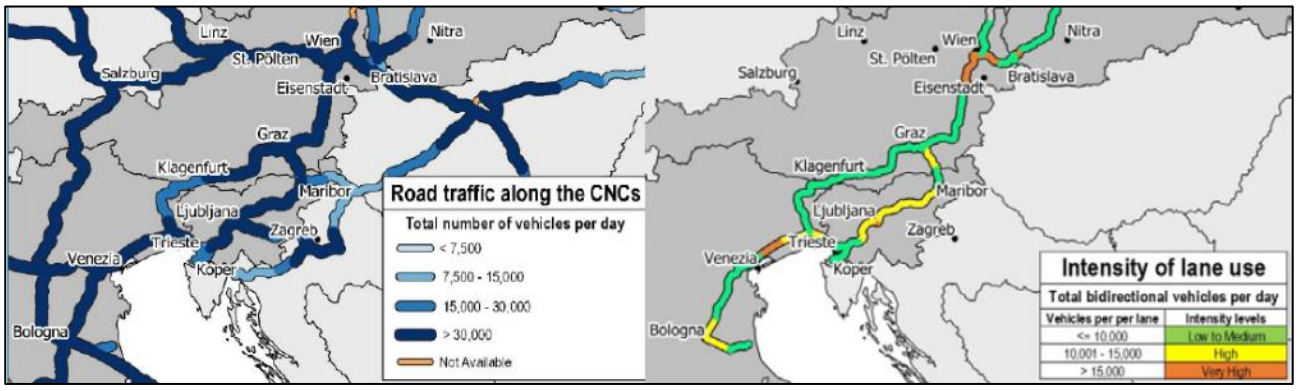
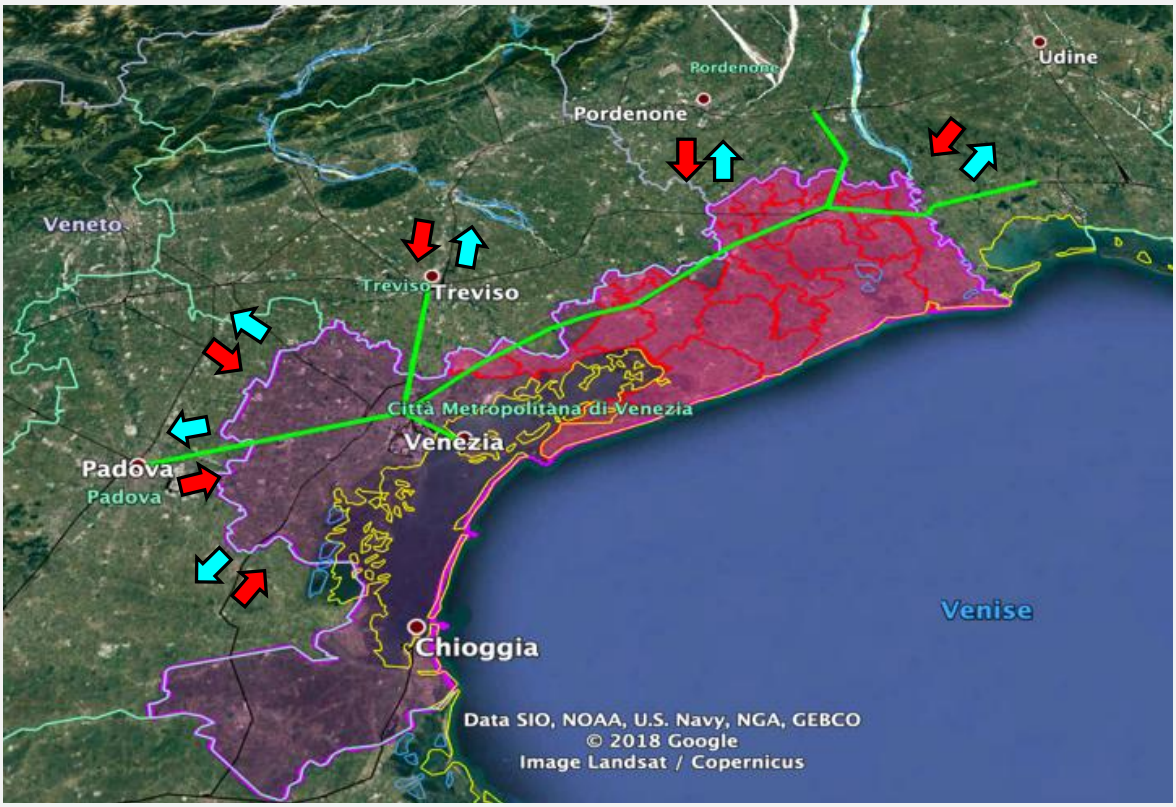


Figure 29 – Road traffic flows and intensity of lane use along the Baltic-Adriatic Corridor. Source: BAC 4th Workplan (2020)

The representation of traffic flows in the road network will be further deepened in the 3rd release of the document.

IN-DEPTH INFORMATION BOX 08 - <u>Traffic monitoring pilot by PP3 - Veneto Strade</u>

Within the CROSSMOBY project, Veneto Strade S.p.A. is developing a pilot action with the main aim of realizing an innovative road traffic monitoring network to be installed along the main road axis converging towards the territory of the former province of Venice (i.e. the Metropolitan City of Venice).



Overview of the area to be covered by the new monitoring network to be developed.

More in particular, such network will enable a double monitoring approach involving both mobile and fixed devices along the main roads serving the area. In fact, one of the first steps is represented by the acquisition of 5 mobile monitoring devices that will allow to assess and adjust the allocation of the following 10 fixed monitoring points. Moreover, the mobile ones will be available to collect specific traffic data during particular events or occasions, as to foster the knowledge on traffic behaviours in particular conditions.

As a first effort, Veneto Strade realized a dedicated study and survey in order to define the positioning of such devices, as well as to better frame the available monitoring devices: in this purpose it was possible to finetune the most suitable technology to be adopted for the monitoring

network to be installed by taking in due consideration the potential locations.

	MARCA - MODELLO	TECNOLOGIA	DATI RILEVATI							TIPOLOGIA DI TRASFERIMENTO DATI
			Velocità	Conteggio	Lungh.	Stato traffico.	Orario	On line	Classificazione veicoli	
FIX DEVICES	COMARK – US6003	ULTRASUONI		X		X	X		3	Uscita seriale
	COMARK – USM9001	RADAR+ ULTRASUONI	X	X	X	X	X		8+1	Linea dati RS 485
	COMARK – USMI9601	TRIPLA TECNOLOGIA	X	X	X	X	X	X	8+1	Linea dati RS 485
	ASIM by xtralis - TT290 Series	TRIPLA TECNOLOGIA	X	X	X	X	X	X	8+1	Linea dati RS 485
	LA SEMAFORICA – TDC3	TRIPLA TECNOLOGIA	X	X	X	X	X	X	8+1	Linea dati RS 485
	COMARK – LSR2001T	LASER SCANNER	X	x	X	X	X		20	Ethernet
	VELOCAR		X	X		X	XX	X	7	
	COMARK MULTILANE	DOPPIO RADAR	X	X	X	X	X	X	5	
	AUTOVELOX 106	LASER	X	X			X	X		
MOBILE DEVICES	STS - EASYDATA	RADAR	X	X	X		X			Palm
	TT TECH – VIACOUNT II	RADAR	X	X	X	X	X			Palmare porta seriale
	LA SEMAFORICA – D2 SENS (2 corsie)	RADAR	X	X	X	X	X	X	5+1	Ethernet-USB
	LA SEMAFORICA – D4 SENS (4 corsie)	RADAR	X	X	X	X	X	X	5+1	Ethernet-USB
	LA SEMAFORICA – IR TEC (1 corsia)	RAGGI INFRAROSSI	X	X	X		X	x	8+1	
	SI MANAGEMENT – SR4	RADAR	X	X	X		X	X	4	Bluetooth
	COMARK - MD01	RADAR	X	X	X	X	X	X	5	Linea dati RS 232 ed RS 485

Overview of the carried-out survey on the monitoring devices

On the basis of the outcomes of the preliminary analyses, PP3 - Veneto Strade has installed the 10 fixed traffic monitoring stations in the location shown in the following figure (see red symbols) along the main roads managed by Veneto Strade. These devices, based on a laser scanner technology, are capable of counting as well as classifying vehicles with high precision and resolution and capable of distinguishing more than 20 vehicle classes. Moreover, Veneto Strade also bought and tested 7 mobile devices to be used for temporary surveys.

Overall, they have been already used in three different monitoring campaigns (lasting 10 days each) in May and June 2021, and in February 2022.

IN-DEPTH INFORMATION BOX 09 - Metropolitan City of Venice Road Transport Model Assignment (by PP02 - UNIVE)

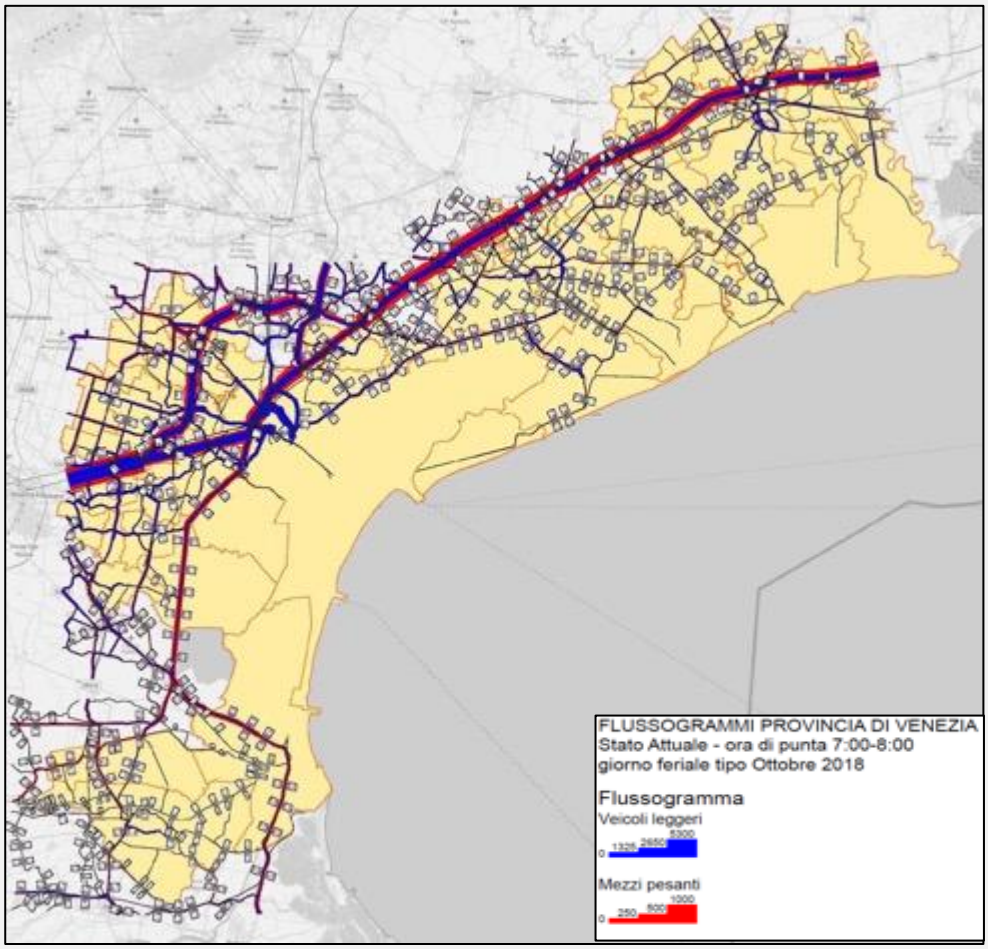
In the following figures the representation of the key outcomes of a traffic assignment, carried out through a specialised transport simulation software, with reference to the area of the Metropolitan City of Venice is provided.

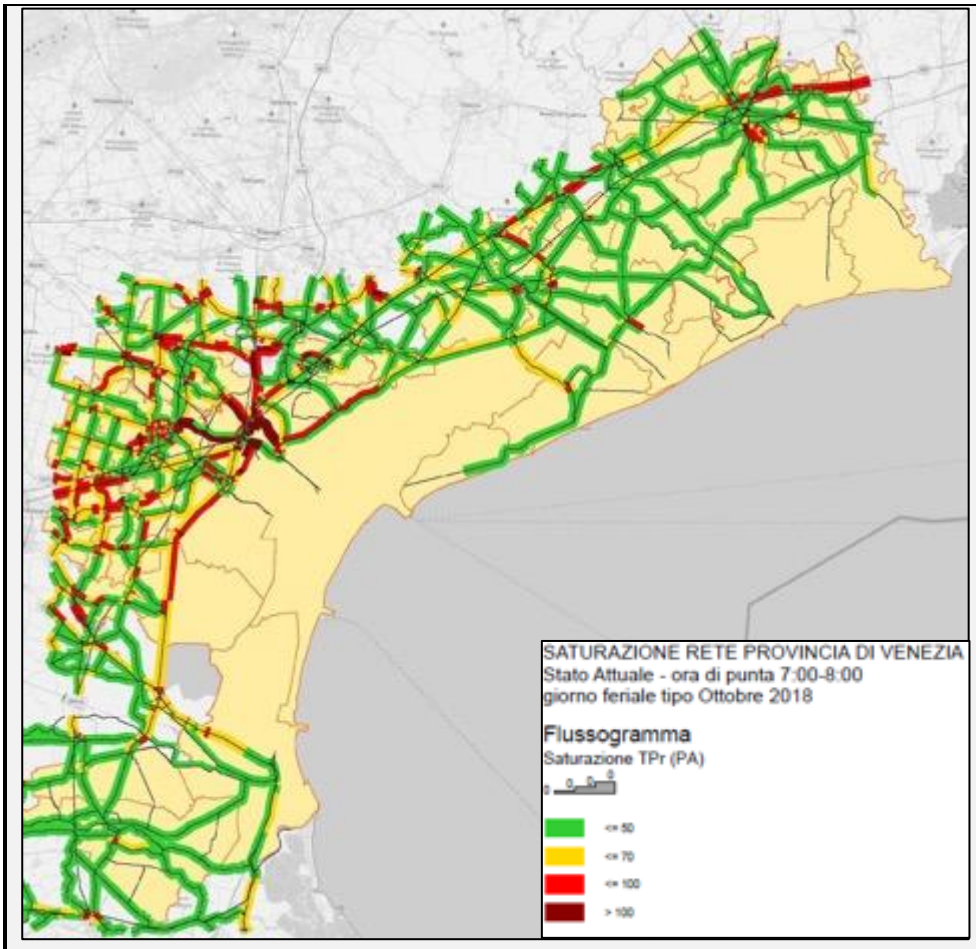
In particular, the first image provides a thematic representation of the number of light and heavy vehicle (respectively in blue and colour) passing through each link of the network during the morning peak-hour period in the month of October (07.00-08.00 am).

The second image, instead, provides a thematic representation of the corresponding level of saturation of each link (ranging from less than 0.5, in green colour, to more than 1, in brown).

As a general comment, it is to highlight the relevant flows along the motorway axis in East-West

direction as well as in the links heading to the Mestre centre (including, from South, the SS 309 “Romea”, characterised by remarkable share of heavy vehicles).





IN-DEPTH INFORMATION BOX 10 - <u>Perception of traffic in the cross-border municipalities on the Italian side</u> (by PP2 - UNIVE)

- **Mapping and analyzing the State of the Art: targeted objectives and survey design**

Within the research analysis implemented by Cà Foscari University of Venice - Department of Management (PP2) in the framework of WP3.2 of the CROSSMOBY project – already presented in the INFORMATION BOX 03 - an additional questionnaire focused on Cross-border mobility and transport issues to a specific and representative sample of respondents within the whole statistical population: all the 25 municipalities located on Italian side (FVG Region) of the border with Slovenian Republic.

The additional survey focused on cross border mobility it has been also produced an excellent level of respondents with **16 additional questionnaires** completed and received out of 25 municipalities, equal to **64%** territorial coverage.

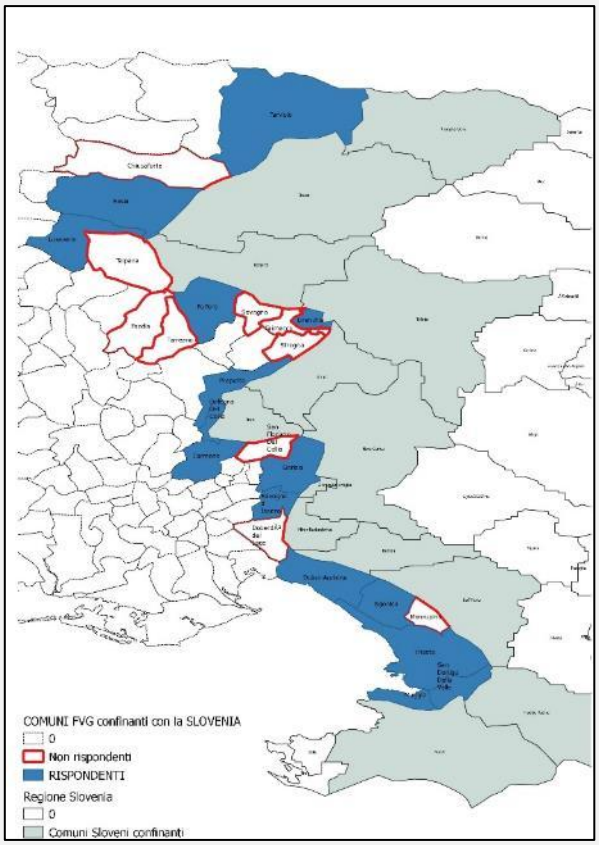


Fig. 1 (Dec 4, 2020)

Among other things, they have allowed to ascertain the perception of the road traffic level with specific reference to both freight and commuters flows.

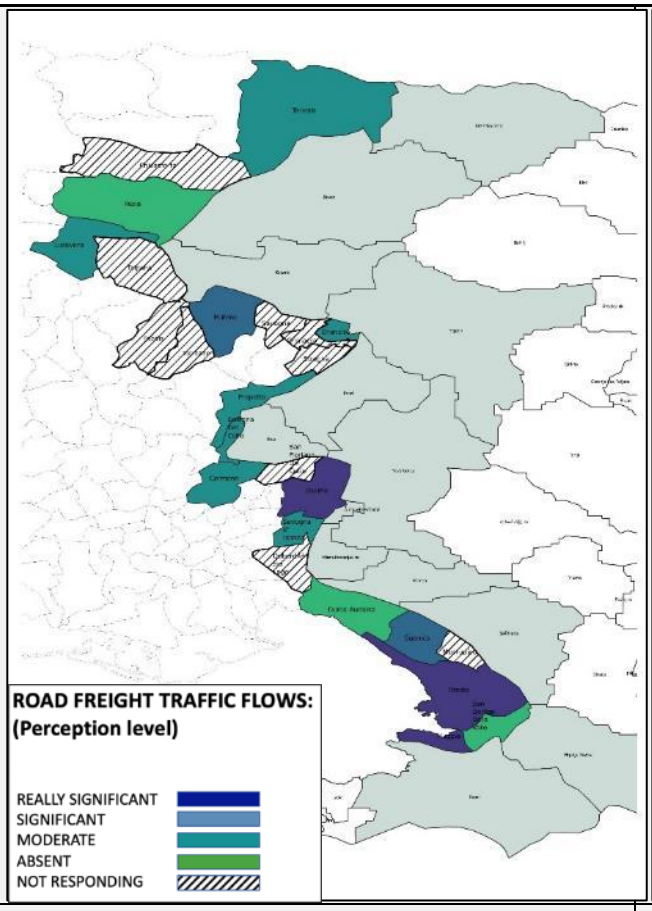


Fig. 2 (Dec 4, 2020)

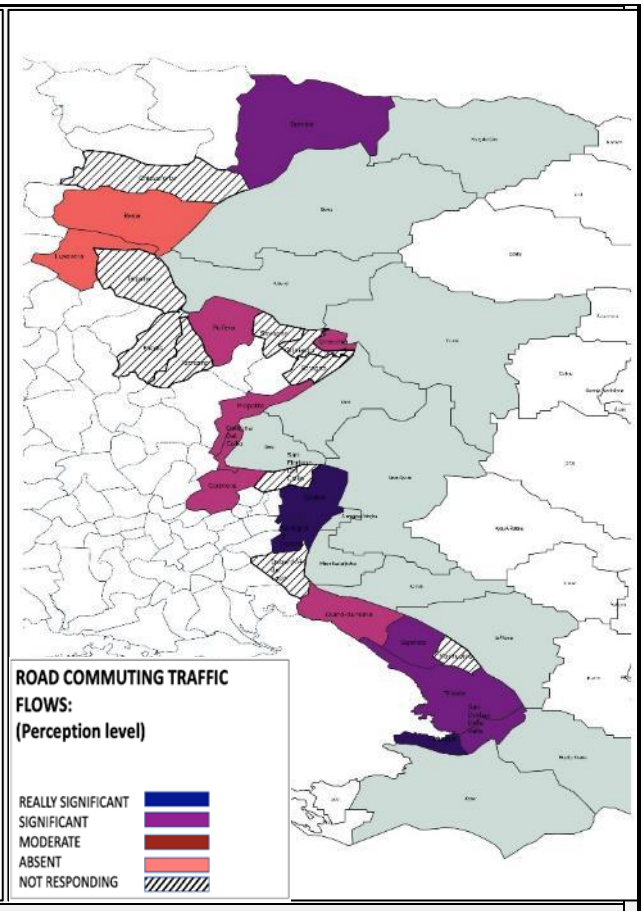


Fig. 3 (Dec 4, 2020)

6.2. TRAFFIC FLOWS IN THE RAIL NETWORK

Traffic flows in the rail network are made available through the information on the timetables, which (once systematised and established the correspondence with the elements of a network graph) allows to represent the number of trains travelling through a certain links over a certain period of time (e.g. a working day).

A thematic representation of the number of daily passenger trains in the different links on an average working day is provide in the following This figure is representing the situation in the reference year 2020 out of the contingent changes due to measures taken for tackling the COVID-19 pandemic (e.g. temporary cancelling of cross-border services).

The representation highlights higher flows in the Italian side, especially in the different lines converging to the Venice node. Remarkable values are also registered in East-West direction along the two routes linking Venice respectively with Udine and Trieste. Higher number of passenger trains are registered in the Monfalcone-Trieste section, where the two lines (the one passing from Udine and Gorizia and the southern linking Venice and Trieste more directly) merge together.

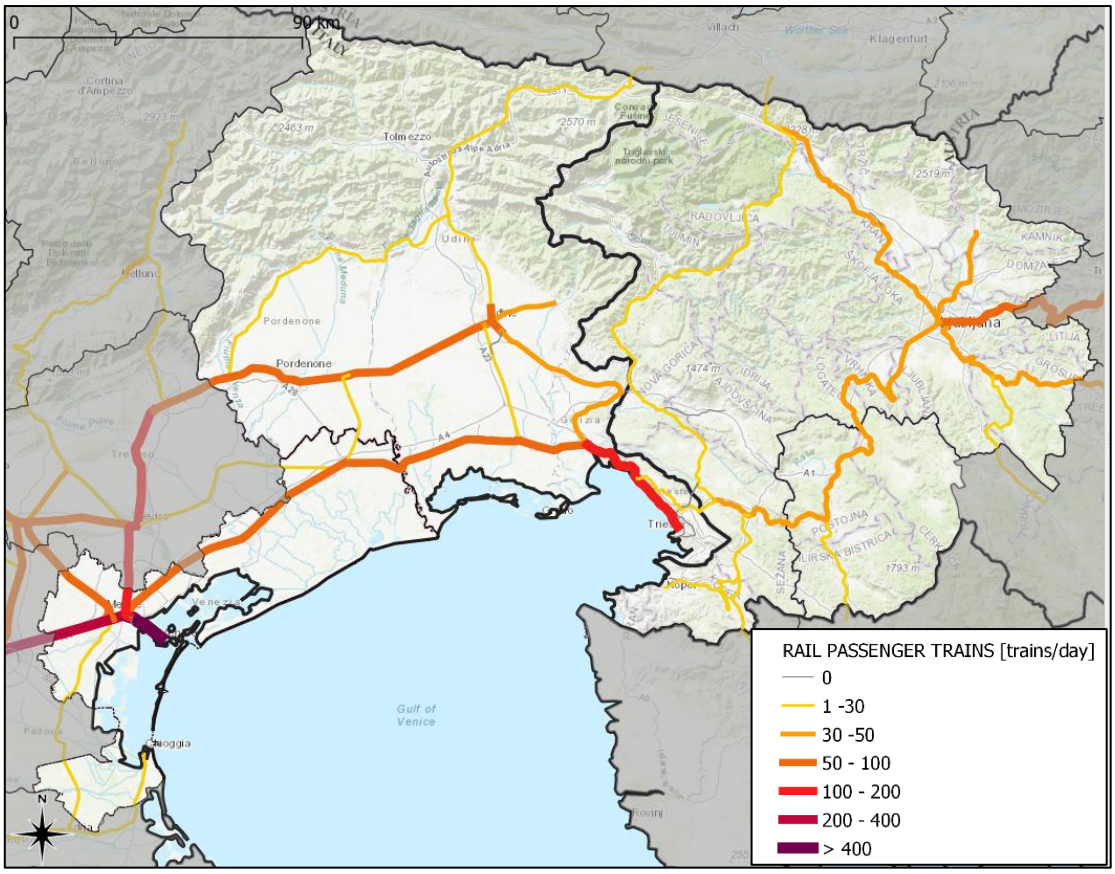


Figure 30 – Railway network passenger trains flows the IT-SI Programme area.

These high value in the Trieste coastal contrast with the gap at cross-border level which the CROSSMOBY rail service linking Trieste/Udine and Ljubljana has contributed to positively addressed but also with low number of trains on the Slovenian lines linking or close to the border.

Relatively higher values, instead, can be seen in the lines converging to the capital city of Ljubljana.

In particular, remarkable values can be seen along the line linking to Zidani Most and then, to Celje and Maribor or, alternatively, to Sevnica and eventually Zagreb.

In any case, it is report limited numbers in all the operational cross-border connections (i.e. extending the analyses to the connections with Croatia and Austria).

In fact, it is to recall and highlight that since the rail network is also used by freight trains, the corresponding figures are also needed in order to evaluate the level of saturation and, consequently, the possibility to introduce new services (either passengers or rail ones).

Moreover, it is to recall that in order to provide an indication on the actual passenger flows, counting the number of passengers of trains services and/or boarding/alighting at stations are usually performed. This information can complement the previous information on the supplied number of trains by providing figures on mobility demand that is actually making use of those services.

6.3. SYNOPSIS

On the basis of the analysis of the traffic data in the IT-SI area and related information sources some key recommendation can be outlined in the following box with particular reference to data availability.

RECOMMENDATION BOX 05 – Remarks on the data availability on traffic data related to the IT-SI Cross-Border area
In general terms, traffic data collection is unevenly carried out in the different part of the IT-SI area. Moreover, in general the integration in shared dataset at cross-border level is missing and therefore, calling for future improvements. Furthermore, a certain heterogeneity in this purpose is also due to the differences between the typology of traffic. For instance, in the case of railway transport, while data related to passenger trains can be obtained (at least from the timetables) the information related to freight ones is generally not available. In this regard, it is to highlight that given the fact that typology of services shares the same infrastructure, in order to assess that the available capacity for developing further services both data are requested as well. Hence, a great margin of improvement can be ascertained in this specific regard.

7. ACCESSIBILITY

Accessibility represents a key aspect for representing the territorial needs to be addressed by mobility planning. In fact, the EU guidelines have emphasised the central role of accessibility, representing one of the primary objectives to be addressed by the innovative approach brought-in by SUMPs.

In this purpose, a particular deal has been paid to such since the early stages of the CROSSMOBY project implementation, starting from the methodological deepening on the concept itself of accessibility carried-out by PP02 – UNIVE (see IN-DEPTH INFORMATION BOX 11).

In particular, it encompassed elaborating on an innovative proposal for multi-dimensional accessibility. Moreover, accessibility analyses were carried-out with reference to particularly relevant contexts for the CROSSMOBY project: the stops of the pilot rail service between Trieste and Ljubljana (see IN-DEPTH INFORMATION BOX 11).

IN-DEPTH INFORMATION BOX 11 - MULTI-DIMENSIONAL ACCESSIBILITY (by PP02 - UNIVE)

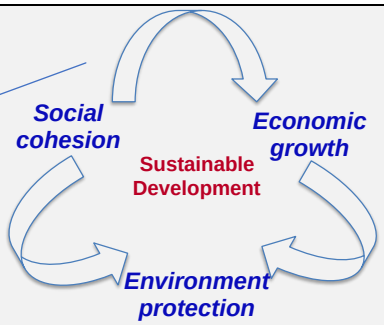
- *Accessibility and transport planning: a. methodological perspective**

This PP2 research working paper presents the analytical work implemented for the definition of an accessibility indicator in the context of interregional transport planning and programming. Despite the fact that the concept of accessibility is very widespread and popular in the field of sustainable mobility studies, its application by the bodies in charge of managing mobility systems is rather limited. Among the main reasons that hinder a systematic dissemination of accessibility indicators are the inherent complexity of the concept of accessibility, which presents a wide variety of interpretations, and the consequent difficulty in quantifying it. In addition, the surveys required for the indicators presented in the literature often require very articulate and in-depth survey systems. For these reasons, as part of the analyses aimed at developing the CROSSMOBY project (Interreg 2014-2020 V-A Italy-Slovenia Programme), the PP2 Research team presented a methodological proposal aimed at integrating the analysis of accessibility into transport planning and programming. The working paper presents the basic considerations, the construction of the index and dataset, as well as the experimental application of this indicator to the Trieste - Ljubljana route.

***Working-Paper**: http://virgo.unive.it/wpideas/storage/2019nr03.pdf (Italian version)

Making transport ***accessible*** without any discrimination:

- Comfortable
- Affordable
- Safe
- Socially inclusive
- ….

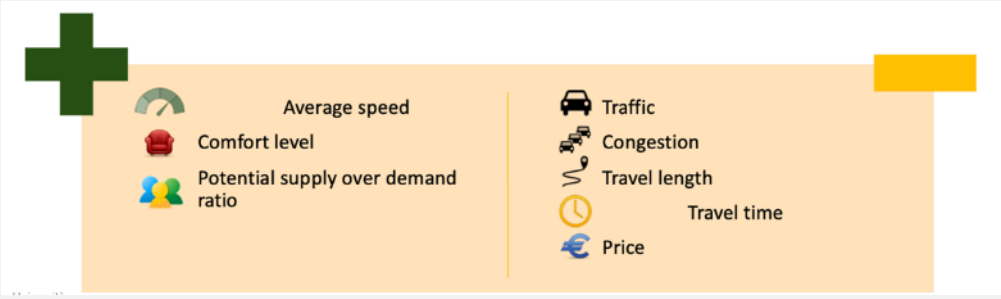


Accessibility:

The distribution of quality transit access in a region (…) to mitigate instances of either disparate impact or disparate treatment. *(Welch & Mishra, 2013, 29)*

- *An on-desk accessibility analysis: identifying and testing analytical methodology to assess the accessibility impact of the new railway Venezia – Trieste – Ljubljana*

PP2 Research Team identified an Accessibility Index suitable for measuring Accessibility in different environments. A set of different variables has been analysed and evaluated whether they increase or decrease the total Accessibility level.



By using the specified variables, we derived the following Accessibility Index:

$$A_{ij}(t,s) = \frac{\mu_1 AV_{ij} \times CL \times \sum_{j=1}^{n} \mu_{2,j} \frac{O_j}{D_j} e^{-\beta c_{ij}}}{\mu_3 TVC \times \mu_4 \frac{V}{C} \times \mu_5 T_{ij} \times \mu_6 L_{ij}}$$

A_{ij} = Total Accessibility

AV_{ij} = average speed

CL = comfort level

O_i/D_j = potential supply over demand ratio

β = cost elasticity parameter

c_{ij} = travel cost

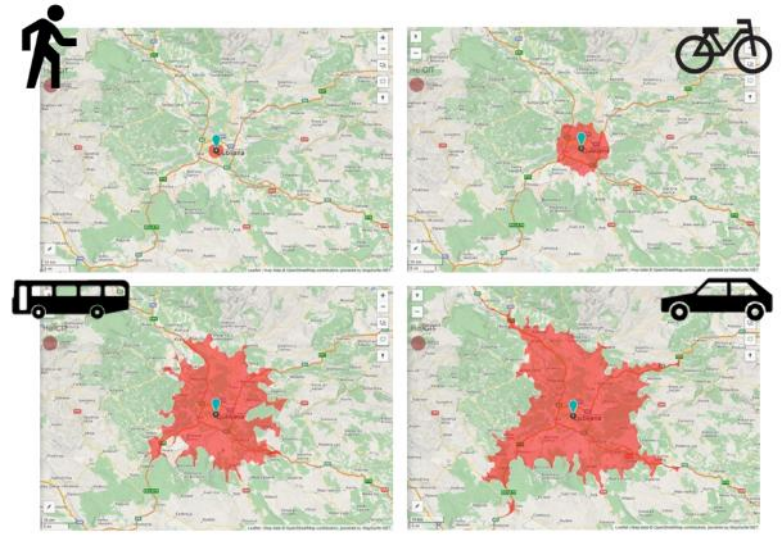
TVC = traffic volume count

V/C = congestion level

T_{ij} = travel time

L_{ij} = travel length

Applying the Accessibility Index, it has been possible. to evaluate the point-to-point Accessibility for the rail line Trieste - Ljubljana by using different transport systems. The Accessibility Index is versatile and allows to measure both point-to-point Accessibility and area Accessibility. As example: In order to evaluate the potential of the destination, we calculated **Ljubljana's area Accessibility** for different transport modes. The starting point of the isochrone is at the central train station. (**Ig 1**)



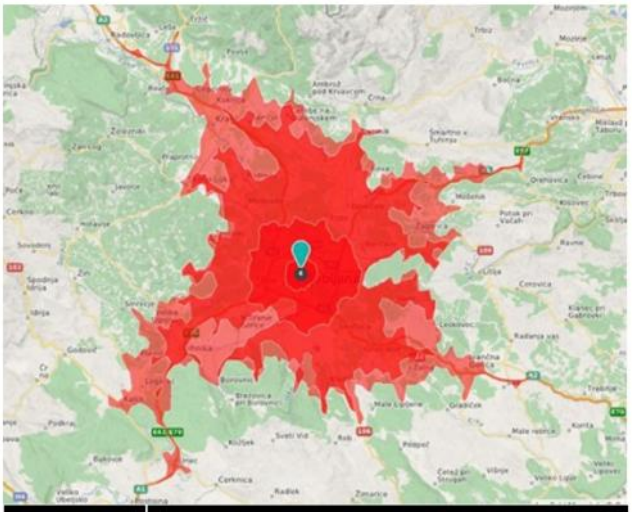
Infographic 1

At the same time, it has been calculated the **area Accessibility of Trieste** for different transport modes, too. The starting point of the isochrone is always at the central train station. The objective was to evaluate how far you can go within a 30-minutes time span starting from the train stations considered, comparing the results obtained for the two cities. (**Ig2**).

Infographic 2

The comparison between Ljubljana and Trieste is straightforward. Within the same time, it is possible to cover a larger territory starting from Ljubljana than from Trieste. This result because of a series of main factors influencing positively the accessibility, as example (**Ig3**):

- *Public transport system more developed;*
- *Much more cycling routes;*
- *Less traffic and congestion;*
- *Well-connected train station in a central position*
- *…*



	Ljubljana	
β	0.2	0.6
A_L		

	Trieste	
β	0.2	0.6
A_T		

Infographic 3

Finally, benefits and limits of this kind of analysis could be summarized as follows.

Benefits:

- *quantification of a crucial sustainability indicator*
- *ex-ante and ex-post measure for policies effectiveness*

Limits:

- *partial understanding of the accessibility concept*
- *need to be integrated with qualitative analysis of infrastructures and site characteristics*

- *An On-field analysis: the accessibility of the railway stations along Ljubljana-Trieste railway*

line

The aim of this on field research, concerning the evaluation of accessibility of the several halfway train stations between the two hubs of Ljubljana and Trieste, is to apply the same concept of accessibility to the railway station conceived not just as a basic transport infrastructure but as a strategic real-life place/area of the urban environment and a multimodal mobility node (not just for main metropolitan railway hubs but also – and probably even more - for small municipalities) able to enhance and improve fundamental factors. As city livability, social inclusion and interactions, connections, cultural exchanges, etc. So, taking into considerations a wide range of indicators the results of the on-filed survey can be displayed and summarized in the following infographics as the one represented in the following Infographic (along with other examples provided in Appendix 2)

Infographic 4

Making reference, instead, only to travel times, a first assessment of accessibility can be carried out just by an isochrone map representation (i.e. a thematic map that shows the areas reachable from a certain point within different time thresholds). For instance, the following Figure 31

showcases an example of isochrone maps based on bus transit travel times on the basis of the public transport data made available in GTFS format.

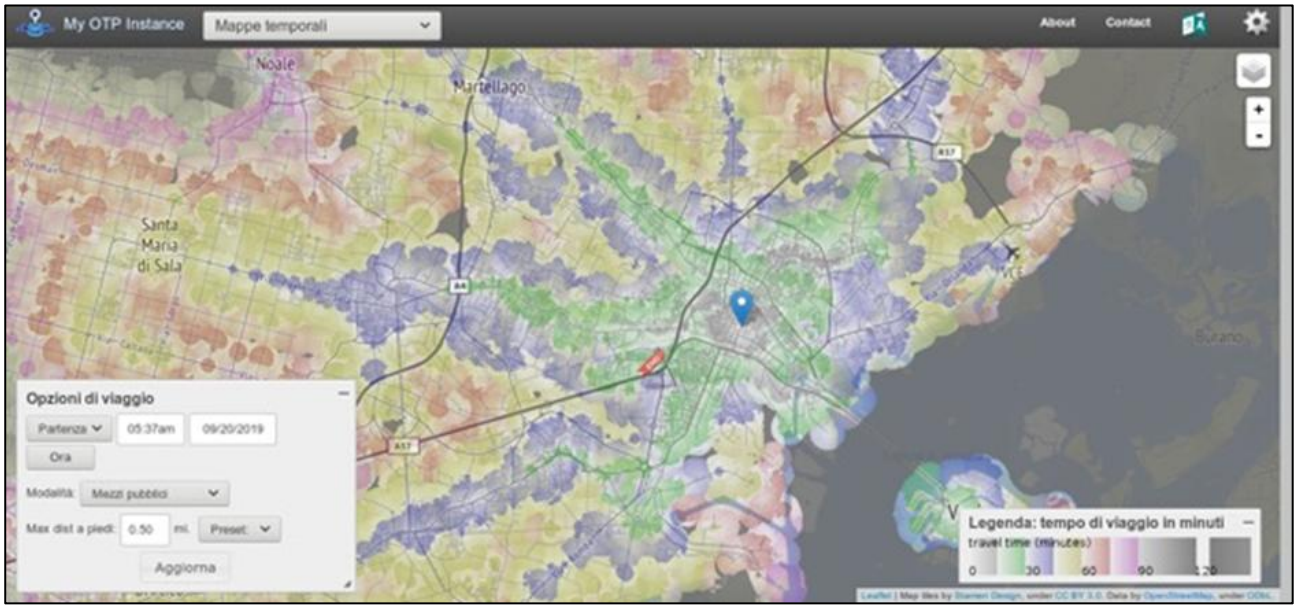


Figure 31 – Example of isochrone map representation.

Moreover, PP04-UIRS have elaborated on further and more deepened analyses according to the approach of developing methodologies exploiting open-source software (see IN-DEPTH INFORMATION BOX 02). In this regard, PP04 has tested an analysis on the possibility to carry out a trip from a node to other destinations with a return in the same day (withing convenient thresholds), thus showcasing the possibility related to the usage of GTFS and OpenStreetMap data.

In particular, these analyses have been made with reference to two main scenarios:

1. with cross border connections (CROSSMOBY pilot train and Gorizia – Nova Gorica international urban bus);
2. without cross border connections (CROSSMOBY pilot train and Gorizia – Nova Gorica international urban bus).

An example of the application of the methodology with particular reference to the case of Trieste is shown in the following figures. For instance, this allow to ascertain that provided new cross-border service is widening the Trieste catchment area with reference to destinations in the main centres served by the CROSSMOBY train as well as to further areas that can be eventually reached through interchanges.

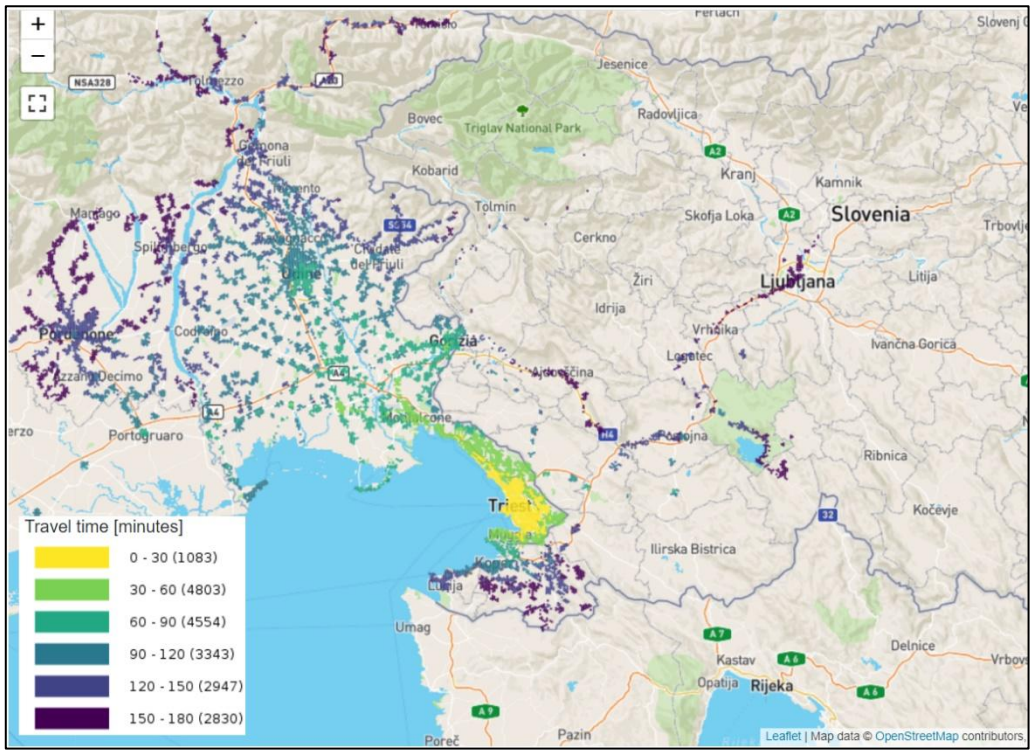


Figure 32 – Accessibility assessment analyses referred to the city of Trieste - scenario with CB services.

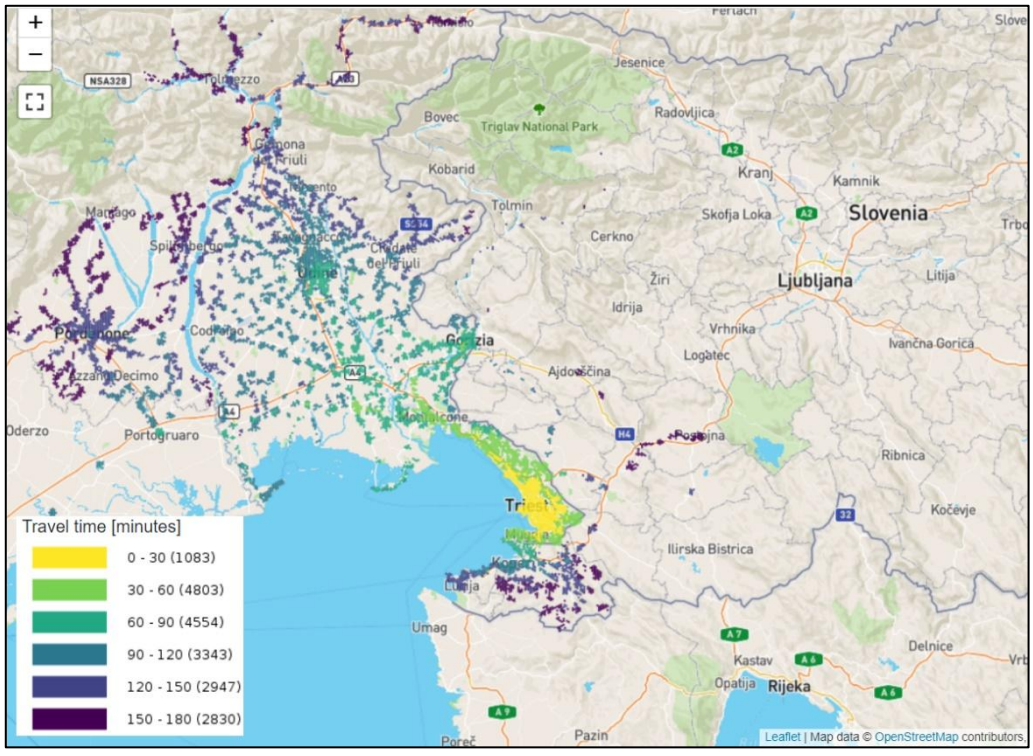


Figure 33 – Accessibility assessment analyses of the city of Trieste - scenario without CB services.

8. CONCLUSIONS

Through the present deliverable, a detailed overview of the strategic framework of the multimodal transport system of the Italy-Slovenia Programme Area has been provided.

The cross-border framework is inherently characterised by a relevant deal of complexity, with different typologies of stakeholders to be involved in the development of sustainable transport solutions backing an actual cross-border integration. For this purpose, it is to recall how related challenges affects different context encompassing both the local level and long-distance corridors and ranging to the urban dimension and remote rural context. Hence, in order to appropriately address this framework, a multilevel governance approach must be fostered and pursued.

Furthermore, such decision process is to be supported by thorough technical assessment and forecasts based on well-grounded elements. Hence, data availability and integration, being a key driver of this process, must be further enhanced and developed. In this regard, while the already achieved data and related analyses allow supporting the decision-making process, the ascertained lack of data also provides a remarkable message to be conveyed in terms of cognitive gaps to be filled, thus fostering enhanced data collection and sharing at cross-border level in a future perspective. For this purpose, remarks are being reported with reference to specific themes through “Recommendation boxes” reported at the end of the paragraphs of the present document.

As a general remark, it is to underline the relevant margin of improvements with reference to both data collection and integration. With particular reference to the transport supply side, relevant opportunities are associated with the availability of Open Data and the spread of shared formats (esp. GTFS concerning the Public Transport dataset). Concerning the demand side, it is to ascertain relevant criticalities in data availability. Nonetheless, a remarkable and innovative opportunity to be further analysed, is nowadays given by the usage of mobile phones cells data.