Interreg ADRION ADRIATIC-IONIAN SMILE

Università Iuav di Venezia

DELIVERABLE T1.2.2

TRANSNATIONAL ACTION PLAN FOR SUSTAINABLE MOBILITY SCENARIOS DESIGN

July 2019

Report prepared by Silvio Nocera, Federico Cavallaro and Francesco Bruzzone (Università IUAV di Venezia) in cooperation with all Project Partners

INDEX

SECTION 1: INTRODUCTION AND AIM OF THE REPORT

SMILE (FirSt and last Mile Inter-modal mobiLity in congested urban arEas of Adrion Region) project is focused on first and last mile of mobility in the Adrion Region, where it aims to achieve a real sustainable mobility. This represents an interesting challenge for these variegated urban areas that include costal, inland and bordering cities of different size. In fact, the municipalities involved in the project are capital, middle cities and little cities. Many problems affect them: transport network congestion and related waste time, transport accidents, air pollution and noise. The economic impacts are very large and effective solutions have not yet been found, due to the fact that there is also a problem related to the most appropriate institutional level to face it. For this reason, SMILE tackles the problem from a strategic point of view, involving some multilevel institutions that can be seen as knowledge providers. It involves 12 partners (11 project partners and 1 associated partner). The partnership has been built by involving institutions capable to have an inter-municipal coverage (Regional Agencies), local authorities with implementing capacity, supporting bodies providing consultancy, services and education in field of mobility, an academic-knowledge provider, a strategic planning body. So the Adriatic-Ionian Region municipalities and stakeholders, involved in the project, agreed to work together for the benefit of each country and the whole region. The point of view of the stakeholders and their knowledge of the territorial and transport problems represents a delicate part for the analysis of the current state of mobility. The acquisition of the opinions of the stakeholders and of the identified objectification data will consist of choosing the best strategies to face problems. The novelty and originality of SMILE resides in the elaboration of mobility scenarios and SUMP (Sustainable Urban Mobility Plan) scheme within a transnational context and in the mix of IT solutions that will be tested in order to the main transport issues, to promote intermodal solutions and to make more efficient traffic flows. The transnational approach is needed because it allows a comparison, exchange and share of experiences. In this sense should be conceived the elaboration of a transnational SUMP-Sustainable Urban Mobility Plan as common cognitive umbrella under which to elaborate local SUMPs mirroring local specific situations. In fact, in the first/last mile, integrated actions are needed to equilibrate modal shift and to promote a stronger inter-modality between different sustainable areas.

This report aims at describing how to design sustainable mobility scenarios, taking into account the variegated urban and rural areas involved, the different mobility scenarios depicted at local/regional level. This document will represent the main knowledge base for developing a transnational SUMP concept, implement IT solutions, prepare new policies for future sustainable mobility.

SECTION 2: PROJECT PARTNERS

SMILE project involves 12 project partners (of which one is associated) and 7 countries. More precisely, it involves:

- 5 regional agencies/bodies supporting local municipalities in developing transport/mobility policies & plans;
- 5 local authorities that have competences in mobility planning and road maintenance;
- 1 university that, in its role of WP T1 Coordinator, capitalises in SMILE its know-how and experience in supporting partners in designing its mobility scenarios;
- 1 educational/consultancy centre that provide consultancy and service on mobility to several towns;

Table 1 shows the partners involved in the project.

Table 1: Project partners overview

PARTNER N°	ABBREVIATION	NAME	COUNTRY
1	RRC KOPER	Regionalni razvojni center Koper	SLOVENIJA
2	SCV	Šolski center Velenje	SLOVENIJA
3	Ragusa Municipal Consortiom	Libero Consorzio Comunale di Ragusa (già Provincia Regionale di Ragusa)	ITALIA
4	IUAV	Università di venezia	ITALIA
5	ZADRA NOVA	Agencija za razvoj Zadarske županije	HRVATSKA
6	DURA	Razvojna agencija Grada Dubrovnika DURA	HRVATSKA
7	MoH	ΔΗΜΟΣ ΧΕΡΣΟΝΗΣΟΥ	ΕΛΛΑΔΑ (ELLADA)
8	RDA Banat	Regionalni centar za društveno-ekonomski razvoj – Banat doo	SERBIA
9	Tirana	Bashkia Tirane	ALBANIA
10	Agency “PREDA-PD"	Agencija za ekonomski razvoj grada Prijedora “PREDA-PD”	BOSNIA AND HERZEGOVINA
11	Gradiska	Opština Gradiška	BOSNIA AND HERZEGOVINA
12	ASSOCIATED	Ministero delle Infrastrutture e Trasporti	ITALIA

Moreover, also a strategic planning body (Strategic Planning Agency Rimini-IT, promoted by Municipality of Rimini, Province, Chamber of Commerce & other entities) is involved. This balanced mix of different organizations should produce expected qualitative results. It owns all the necessary competences to implement the activities planned by SMILE and hence to achieve expected outputs and results.

SECTION 3: TRANSNATIONAL ACTION PLAN FOR SUSTAINABLE MOBILITY SCENARIOS DESIGN: AN OVERVIEW

The following sections are the core of the deliverable T1.2.2. Starting from the scenario drawn by PPs (deliverable T1.2.1) and the information requested by WPT1 Leader - IUAV Università di Venezia in the initial phases of the WP, it presents the steps required to gather the adequate knowledge, base for developing a transnational SUMP concept (as developed in WPT2). The Transnational Action Plan indicates criteria for elaboration of transnational SUMP concept. Information included here are meant as guidelines: indeed, they cannot be considered exhaustive and can be integrated with the specificities of a given locality; nevertheless, they may represent a first initial source to collect information able to highlight the peculiarities of a given area. The transnational approach claimed in the title is declined in two ways: first, the adoption of such scheme at the transnational level allows a fruitful comparison, exchange and share of experiences between different contexts, under a common framework. Second, the focus on transnational mobility issues constitute an important content-related aspect. The entire process is based on the following steps, as summarized in Figure 1:

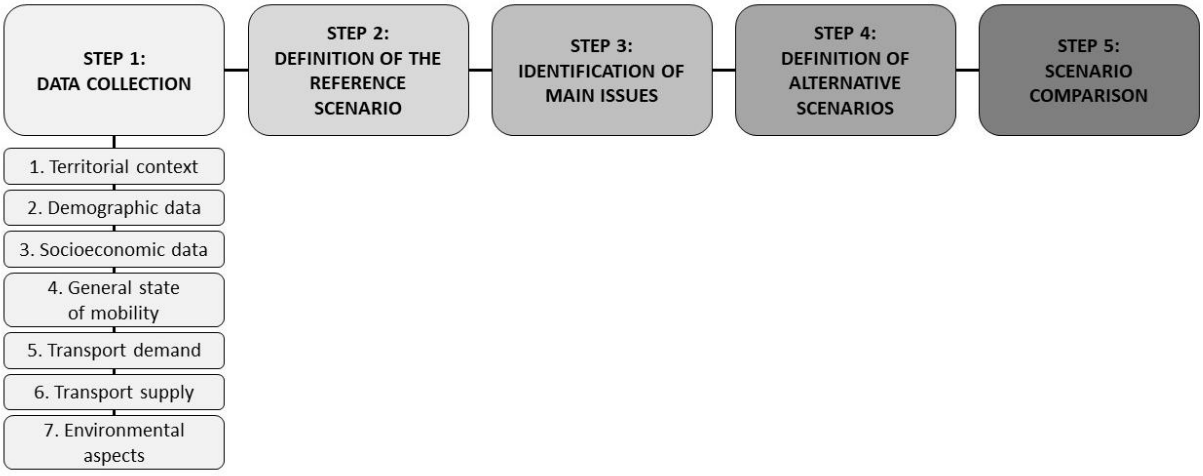

Figure 1: Development process of a transnational SUMP

SECTION 4: STEP 1, DATA COLLECTION

This step aims at collecting different types of information about the area object of analysis. It includes geographical, social, environmental, economic and transport-related issues, which, for the sake of simplicity, are divided into seven subchapters. This phase is essential, since an accurate data collection is the unavoidable first step in order to have a clear vision about the actions to undertake.

4.1 TERRITORIAL CONTEXT

The first set of information is related to the territorial context and the physical description of the area under examination. This may include (but it is not limited to) the following aspects:

a. Type of territory (including urban, rural, sea, hill, mountain) and their identification on a map.

b. Size of the city. By revising the classification provided by OECD (2012)[1], different sizes can be identified according to the number of inhabitants: XS (up to 50.000); S between 50.000 and 100.000; M between 100.000 and 250.000; L between 250.000 and 500.000; XL between 500.000 and 1.000.000; XXL between 1.000.000 and 5.000.000; (Global city of more than 5.000.000). The size of the destination in square km and main physical characteristics can increase the knowledge.

c. Type of settlement: the morphological characteristics of a city have relevant consequences in the development of a city and should be taken into account adequately. It can be a) Compact b) Polycentric c) Linear d) Clustered e) Dispersed. Similar to point a), also in this case a city can present more features according to the portion of territory under examination. The visualization through a map can simplify the inclusion of this information in the following phases of plan development.

d. Land use: each area of the municipality under evaluation is characterized by a mixite of uses, including the residential, retail, office, industrial, facility ones. In order to understand the zones that generate/attract highest flows, a clear picture should be presented.

e. Local Official districts: subdivision of the municipality into administrative divisions like county, prefecture, district, borough, parish, municipality, shire, village, etc. If there is not an official division, the area has to be divided into homogeneous zones according to the socioeconomic characteristics, according to administrative limits (like census sections, municipal borders), physical geographic separators placed on territory (like railways, rivers etc.), exclusiveness, etc.

f. Traffic Analysis Zones (TAZ): subdivision of the municipality into portions of territory with homogeneous characteristics according to activities, accessibility, transport infrastructures and transport service. If there is not an official division into TAZs, the area has to be divided into homogeneous zones according to the socioeconomic characteristics, according to administrative limits (like census sections, municipal borders), physical geographic separators placed on territory (like railways, rivers etc.), exclusiveness, etc.

g. Main attractors: include the most popular tourist attractions, the main public and private services, the most important economic activities, and their location on the map. They may be schools, industries, commercial centres, political centres, hospitals, business districts, etc.

h. Weather and environment: summarise all environmental and climate information of a city, including information about the average day and night temperatures per season, average mm of precipitation per season, average number of hours of sunshine per season.

[1] https://ec.europa.eu/regional_policy/sources/docgener/focus/2012_01_city.pdf

4.2 DEMOGRAPHIC DATA

The second set of information aims at providing an insight about the population living in the area. Data has to be preferably related to each TAZ, or, if not available, aggregated to a higher level. This may include (but it is not limited to) the following aspects, which should be collected on a 10-year time series and may also be represented in a map, to illustrate the differences between parts of the city:

a. **Permanent residents** and their age;
b. **Non-permanent residents**, including transfer student, transfer workers, etc.;
c. **Population Density** (inhabitants/km^2);
d. **Members per households** (n°);

4.3 SOCIOECONOMIC DATA

The third set of information describes the economic and social characteristics of the territory under evaluation, comparing them with the national and regional average. Information includes:

a. **The most developed economic sectors** of the area (aggregating them into primary, secondary and tertiary);
b. **The most developed activities** in the before-mentioned sectors (%);
c. **Employed** and operators for each economic sector or activity (minimum 10-year time series), including industry, public services, private services, tourism, education, agriculture. They should be expressed in absolute and % terms;
d. **Average income** and income divided by each sector presented above;
e. **Unemployment** (% of total population);
f. **Students**: overall number and divided according to the degree (junior high school, high school, university).

Further information can be also provided, according to the specific economic sectors that are considered relevant: for instance, if the tourist sector plays a central role in local economy, information about arrivals, main origins, overnight stays, average length of stay, tourist index (calculated as ratio between tourists and inhabitants), types of tourists and holiday (relax and wellness, walking and active holidays, family holidays, luxury beach holidays, cultural holidays, eno-gastronomic holidays, celebration holidays, etc.), main types of accommodation (hotels 3-5, hotels 1-2*, villas, apartments, second homes, hostels and camping) can be also provided.

4.4 GENERAL STATE OF MOBILITY

This set of information introduces the issues related to the mobility, presenting them at a general level. Data has to be preferably related to each TAZ, or, if not available, aggregated to a higher level. This may include (but it is not limited to) the following aspects:

a. Presence of a **Sustainable Urban Mobility Plan** (SUMP) or other Policy Document on Sustainable Mobility. Description and identification of its main objectives (this point is fundamental also in light of the following steps);

b. **Transport and logistics policies** implemented in the last 10 years and their results;

c. **Solutions** to promote sustainable mobility of **commuters**, such as commuter pass that provides unlimited regional transport travel, tax deduction, integration of mobility systems, development of apps and IT solutions;

d. **Solutions** to promote sustainable mobility of **tourists** such as commuter pass that provides unlimited regional transport travel, tax deduction, discounts to services and attractions, development of apps and IT solutions;

e. **Solutions** to promote sustainable **last-mile logistics,** such as usage of e-vehicles or cargo bikes, delivery consolidation, drop-off centres or lockers, IT solutions, and others;

f. Availability of sustainable **mobility information centres** for tourists and citizens in the area;

g. Characteristics of **transnational mobility**: existing connections and transport modes.

4.5 TRANSPORT DEMAND

Starting from the Traffic Analysis Zones and main attractors defined in 4.1, this set of actions analyses the current transport demand and traffic flows, both in aggregated and disaggregated terms. Also in this case, a 10-year time series should provide information about the trend and variations in last years.

a. Number of **residents**, **commuters** and **tourists** in the area;

b. Number of **passenger trips** and **freight trips** in the municipality (total, generated and attracted); if available, they should be disaggregated according to the different transport modes;

c. Number of **total trips** in the area, distinguishing a) between trips made by residents, commuters and tourists b) by reason of transport (study, work, leisure, other);

d. **Travel modes** for **passenger transport** (with % for each mode);

e. Travel modes for **commuters** (with % for each mode);

f. **Travel modes** for **tourists** (with % for each mode);

g. **Travel modes** for **freight transport** (with % for each mode);

h. **Average distance** covered by freight vehicles for **last-mile service** (km);

i. Amount of **freight movements** (tonne-km);

j. Number of **trips** for each economic sector or activity (as defined in 4.3);

k. Number of **cars** per 1.000 inhabitants;

l. Number of **licensed drivers**;

m. **Occupancy rate** of vehicles;

n. Number of **originated and attracted trips** per each zone;

o. **Trips distribution** (through an OD Matrix) among the TZAs or districts, if possible divided by different transport modes.

4.6 TRANSPORT SUPPLY

This section describes all main elements referred to the transport networks and services available in the area under evaluation. The analysis includes both passenger and freight transport.

a. Analysis of the **accessibility** of the destination: main connections by **train**, suburban bus and plane, including origin, destination, prices and travel times;

b. Analysis of the **local mobility:** characteristics of transport infrastructures in the municipality (presence and length, expressed in km), distinguishing between primary roads, secondary roads, urban roads, tramways, bicycle lanes;

c. Visualisation **of transport infrastructures** in a dedicated map, including also train stations, train tracks, airports, bus stations, parking, bike-sharing stations, pedestrian areas, ports, intermodal terminals, toll booths;

d. **Identification of transport modes** available in the municipality for **passengers**, including bus, tram, metro, train, taxi, private transport modes (motorcycle, car) and alternative transport modes (walking, bicycle) and other alternatives;

e. **Identification of** Intermodal Terminals (location, transport modes involved);

f. **Identification of transport modes** available in the area for **freight**, including light commercial vehicles, heavy duty vehicles, ship, airplane, train and other alternatives;

g. **Identification of possible synergies** between freight and passenger transportation (e.g. possibility of sharing infrastructures or road space);

h. **Vehicular fleet** of transit, distinguishing between systems (train, subway, tram, bus, cableway, boats, etc.) and Euro emission standards (Euro 0-6, alternative fuels);

i. Number of recharging stations for electric vehicles. including their location;

j. Description and visualisation of the **parking system**, including its structure (closed parking lot, outdoor parking lot, on-street), number of parking lots and fees;

k. Description and visualisation of the **Park-and-ride** supply: number, total area at disposal, maximum number of cars, parking fees, presence of shuttles or other means of transport, main connections;

l. **Soft mobility and sharing services** available, including car sharing, bike sharing. Number of companies, their location and prices. Campaigns and initiatives to encourage a low carbon mobility (bike to school; bike to work; events);

m. **Taxi service and rental cars available,** including number of vehicles;

n. List of other transport services available (Uber, Blabla car, Flixbus, On-call bus, etc.);

o. Equal opportunities for people with reduced mobility: platforms and vehicles accessible (% of the total);

p. Provision of a **focus on First and Last Mile passengers and goods mobility**: modal split, modes available, destinations and flows diagrams, etc.

Further information can be also provided, according to the specific sectors that are considered relevant: for example, specific tourist routes performed by train, ship, or by bus (performed by public companies) can be considered, as well as shuttle services connecting the most important parts of the city with terminal hubs.

4.7 ENVIRONMENTAL ASPECTS

This section tries to identify all main environmental-related characteristics of the territory under evaluation.

a. **Fuel** sold at local level (litres), distinguishing between diesel, LPG, gasoline, methane and electricity used for recharging electric vehicles (minimum 10-year time series);

b. Identification on a map or a GIS file of the zones with highest **concentration** of CO, NO_2, PM_x, O_3; provision of the numeric values referred to concentration (annual average and, if available, distinction between summer and winter periods). Users may include the following values as reference: CO concentration > 10 mg/m³, NO_2 concentration > 40 µg/m³, PM_{10} concentration > 40 µg/m³, O_3 concentration > 120 µg/m³;

c. Quantification of **traffic emissions** in differ zones of the municipality (minimum 10-year time series), distinguishing between CO, CO_2, PM_{10}, NO_2, O_3. If possible, provide a map of emissions;

d. **Noise emissions** in differ zones of the municipality, providing values referred to the day, the night and the average (L_{den}). A map or GIS file mapping the different zones should be also included;

e. Number of **accidents** occurred in the territory under evaluation, providing information about traffic-related injuries, fatalities, severe injuries, slight injuries. If possible, include such information in a map or in a GIS file with the localization and description of events (minimum 10-year time series);

f. Identification of the most **congested roads/zones** due to traffic flows (if possible, provide a map or a GIS file including quantitative values referred to the peak hours). Indication of the main reasons of congestion (infrastructural size, physical condition of infrastructure, private traffic, particular events, etc.);

g. Identification of **periods** when road congestion occurs, including the duration of events, length of the road tail and average waste time for each vehicle (if available, the capacity/flow ratio can be a valid indicator);

h. Calculation of the annual **transport costs** for the construction, maintenance and management of the transport infrastructures.

SECTION 5: STEP 2, DEFINITION OF THE REFERENCE SCENARIO

This step uses historical data collected in the previous phase to: a) define a clear picture of the current condition (by selecting those aspects that are considered relevant for the analysis); and b) project this condition in the future.

The aim is defining the so-called "**reference scenario**" of a given destination, which is the representation of how future would look like assuming the current condition as starting point and without relevant socio-economic and environmental changes. After having set an appropriate temporal horizon (in line with the objectives of the plan (as identified in 4.4.a) and the analysis that need to be carried out), current status is prolonged according to the trend of the last years. For this reason, data collected in the previous phase need to be available for a period that is sufficient for their extrapolation. Normally, historical data has to cover a broader temporal horizon compared to the forecasted period. Such forecasted period depends on the quality of data and their reliability.

SECTION 6: STEP 3, IDENTIFICATION OF MAIN ISSUES

On the basis of all information collected and elaborated in the previous phases, the reference scenario has to be compared to the mobility plans and the reference mobility policies, highlighting those characteristics that are already in line with the desired condition and those that differ from it. The process may be not linear: data collection is used as first input, but if missing information is found, further information can be collected and integrated into the general framework and reference scenario may be changed, as well.

The aim of this section is the identification of the **main issues** related to the mobility that are still not addressed and the evaluation of their consistency with the policy framework. According to the objective of this deliverable, particular emphasis should be given to the **transnational** issues, which require a stakeholder analysis not limited to the local scale. Here is the example of one issue that can typically be identified during this phase:

Issue: *sustainability of transnational commuting*

Indicator: percentage of commuters adopting the private vehicle to go to the working place

Status quo: 95% of commuters adopt his/her own vehicle to commute for working reasons

Stakeholders: main firms, public transport authorities, policy-makers municipalities origin/destination of the flows (…)

Timeframe: short-term / medium-term

At the end of this phase, all main aspects that constitute an issue for the context under evaluation are listed and prioritized. Such issues may refer to the current or to the future condition, according to the elaborations deriving from the reference scenario. For instance, transnational commuting may be not a problem today, but according to the growth registered in last 15 years, it could become a priority in 5

years). Subsequently, issues can be clustered according to their thematic nature, in order to understand which group(s) present globally the highest number of problems to be addressed.

SECTION 7: STEP 4, DEFINITION OF ALTERNATIVE SCENARIOS

The fourth phase of the process is the identification of those policy/measures/actions that are able to overcome the issues defined in the previous phase and to assess their impacts, related to the opportunity of introducing them. For this task, rather than presenting the single aspects in a separate way, the elaboration of alternative scenarios may be a valid solution. A **scenario** is not a forecast of the future condition, but a "representation of visions/images of the future and courses of development organised in a systematic and consistent way" (EC, 2008)[2]. A scenario can be named with a concept that identifies the main drivers characterising it. Readers interested in deepening the scenario theme may refer to Appendix 1, where a description of scenarios taken from the MED project Mobilitas is provided.

Practically, this activity aims at identifying and evaluating those technical and policy **solutions** that address the issues previously listed with the optimal performances in terms of technical, economic and financial results. Outcomes of the alternative scenarios are expressed in terms of **objectives**. Such objectives, in turn, need to be measured through adequate **indicator**(s), whose performance can be quantified in a clear and simple way, to allow the comparison between scenarios (see also next step). The definition of an ideal **timeframe** and the clear identification of **responsibilities** and **costs** are other integrative aspects that have to be highlighted. Finally, an important aspect that needs to be highlighted is the relationship between the actions identified and those highlighted in the mobility plans: this check is relevant to understand the relationship between the plan and the actions that are to be proposed. Indeed, some actions deriving from the analysis carried out so far may be similar to those actions included in the plan, some may be integrative and some other may be even in contrast. A clear vision of the relationship between existing framework is thus of the utmost importance, in order to avoid contradictions of similar initiatives and, ultimately, actions that produce negative effects on the consolidated scheme.

In the definition of the alternative scenarios, a **participatory approach** that includes those relevant stakeholders potentially involved in the implementation phase, as well as those end users that may take benefit from its introduction, can guarantee better results. For this reason, it is important to involve them from the beginning of the process, so that they feel integrative part of the elaboration. In most cases, this approach guarantees another important advantage: indeed, such stakeholders can provide useful integrative information able to define the current picture of the area under evaluation.

[2] EC, European Commission, 2008. Joint Research Centre, Institute for Environment and Sustainability, Backcasting approach for sustainable mobility. Office for official publications of the European Communities, Luxembourg.

SECTION 8: STEP 5, SCENARIO COMPARISON

The definition of the alternative scenarios has to be followed by the evaluation of their performances, in order to rank them and select the most appropriate one(s), according to the initial assumptions. To achieve objective and unbiased performance measures, criterions must hold the following properties (Nocera, 2010)[3]:

· **Suitability**: the performance measure should be actually influent;

· **Measurableness**: it should be possible and easy to measure the performance in an objective manner. Measurement results should be within an acceptable degree of accuracy and reliability;

·**Realism**: it should be possible to collect, generate or extract reliable data relating to the performance measure without excessive effort, cost or time;

· **Defensibility**: the performance measure should be clear and concise so that the manner of assessing and interpreting its levels can be communicated effectively within a circle of decision makers and to the general public. This is often possible when the performance measure is clear and simple in its definition and method of computation;

· **Universality**: every parameter considered should be generalizable and not refer to single cases only. It should be applicable to an individual mode or a combination of modes as well.

The evaluation should be made according to the three aspects highlighted above, namely the technical, financial and economic ones. To this aim, tools such as the Cost Benefit Analysis (CBA), the Multi Criteria Analysis (MCA) or the Cost Effectiveness Analysis (CEA) can be a valid methodological support. At the end of this process, a **ranking** of the different scenarios and their score for each of the criteria previously mentioned has to be provided, in order to express the reasons behind the choice in a clear way. If necessary, sensitivity analyses can be also performed, in order to understand risks associated with the implementation of each scenario and outcomes in case of variations compared to the prognosis. In this way, policy makers are aware of the potential deviations from the results of the scenario. This approach is particularly helpful, since it must always be kept in mind that scenario is not the representation of the future condition in a given context, but only one possible alternative condition. Furthermore, results deriving from this comparison could suggest the elaboration of other new scenarios, which imply the adoption of other measures. This iterative process is common when dealing with themes characterised by a high degree of uncertainty and reveal the empirical approach that policy makers have to follow in finding the most appropriate solution.

[3] Nocera S., 2010. Un approccio operativo per la valutazione della qualità nei servizi di trasporto pubblico/An operational approach for the quality evaluation in public transport services. Ingegneria Ferroviaria, 4/2010, pp. 363-383

CONCLUSIONS

This deliverable has defined the steps that need to be followed in order to define a **correct design of mobility scenarios**, with a focus on transnational issues. Five main steps have been identified, namely: data collection (including all main subcategories), definition of the reference scenario, identification of main issues, definition of alternative scenarios and their comparison. Obviously, the information included cannot be exhaustive for each context but should be declined and integrated according to the specificities of each territory under evaluation. Still, the main social, economic, environmental and mobility-related aspects have been included and can be used as reference for the provision of alternative scenarios.

As mentioned in each section, drawing mobility scenarios implies not only a technical know-how, but also other **managerial competencies**. They include, among the others, the identification of a correct timeframe, the attribution of responsibilities to the appropriate actors, the inclusion in the process of the relevant stakeholders and the forecast of an adequate budget for the development of the identified activities. In most cases, all data required to have a comprehensive vision cannot be available -mostly if referred to the transnational dimension: in this case, ad-hoc integrations of existing materials should be foreseen from the beginning.

Finally, a mention of the relationship between this deliverable and the **entire phase of planning and implementation** of the results has to be provided. Indeed, this is only the first step of a broader process that should bring to the definition of the most adequate transport measures to be adopted and monitored through the adoption a transnational SUMP. Referring to the project SMILE, this is the core of the next WP. Hence, this deliverable should be seen as a bridge between the technical analyses and the next operative phases.

APPENDIX 1: DEFINITION OF SCENARIOS, PROJECT MOBILITAS

A **scenario** is not a forecast of the future condition, but a "representation of visions/images of the future and courses of development organised in a systematic and consistent way" (EC, 2008). The aim is not to forecast the future, but rather to develop strategies to face the assumption that future is largely uncertain. A scenario is based on given hypotheses, which are crossed with the initial situation, thus leading to the future sequences of events that the hypotheses imply (Figure 1). In this sense, scenarios can be seen not as a static snapshot of future condition, but rather as logical consequences of events (Banister, 2004). It describes a possible future through the identification of selected significant events, main actors and their possible decisions.

Figure 1 Procedure for the scenario development

The development of scenarios and its consequential use can help to explore how the future might look like and select the better strategies to apply (Shell, 2004). **Decision makers can use this approach to face the most alarming, yet uncertain, aspects of the future**. There is no single answer to future events, for this reason many parallel scenarios are developed and each one is the fulfilment of different hypotheses, and all the scenarios measured those aspects of the future that are likely to persist. Unlike forecasting, scenarios do not demand consensus, because this approach does not create a unique definition of future, but defines different ideas and versions of the future at the same time. Figure 2 represents how the scenario method includes uncertainties, unlike *prognoses* and *utopias*. The scenarios are distinct from *prognoses* because they do not set out to predict the future, while they differ from *utopias* (dystopias) because their output is not a desired (or feared) future. While prognoses deal with near future and utopias are suitable with the distant future, scenarios work well in a mid-time horizon chosen in relation to the topic. For political and territorial processes, a period of 20 to 25 years might be suitable (ETUI, 2014).

Due to its flexibility, **the scenario method is largely used in the scientific world**. The project partners of MOBILITAS can successfully use this method to explore different ways to approach the future in relation to climate change in the pilot areas. However, it must consider the several sources of uncertainty as a main factor to be taken into account. Salling et al. (2007) distinguish ontological and epistemic uncertainties, which influence considerably the results. The former derives intrinsically from the model adopted and from the choices made by modellers and policy makers, while the latter are innate in humanity and are due to our lack of knowledge in specific values. For a deeper discussion about these issues, interested readers may refer to Nocera et al., 2015.

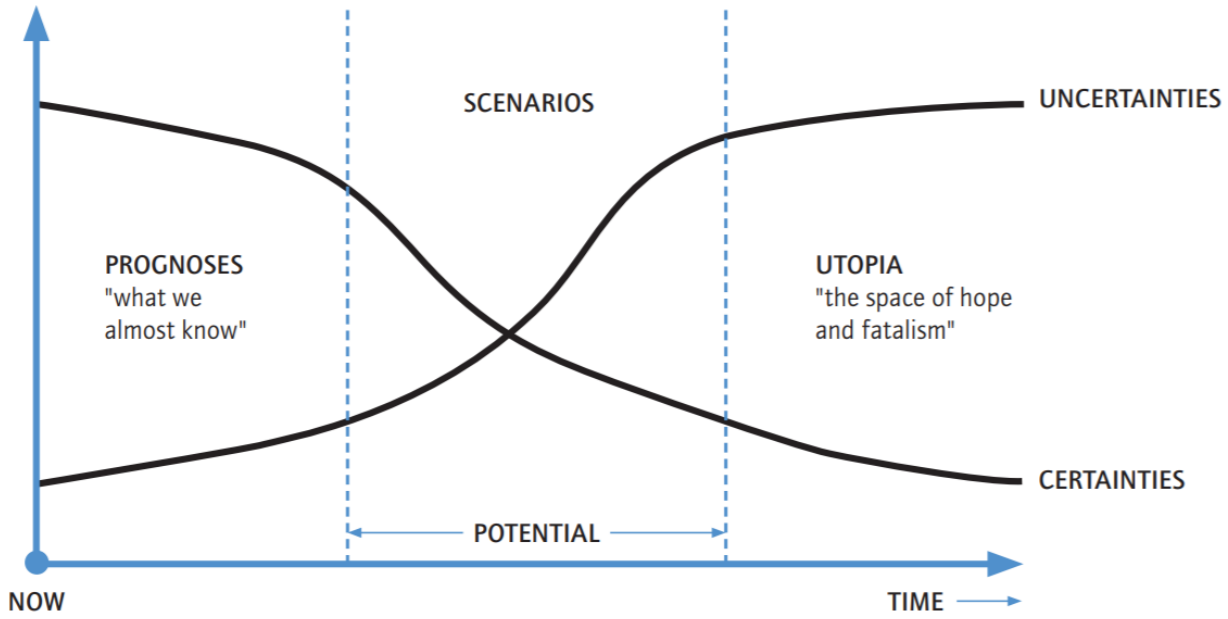

Figure 2 Scenarios relation with uncertainty and certainty. Source: ETUI, 2014

It is essential to build a comprehensive picture of the context of interest with the help and knowledge of other people. For this reason, scenario building is a collaborative process that aims to facilitate the sharing of ideas and knowledge between different stakeholders and it encourages the involvement of different perspectives and disciplines. The output of the *scenarios method* consists in a range of images, graphs, and written documents that make scenarios comprehensible. Furthermore, it produces tables and figures for the quantitative analysis to support future decisions. The main aspect of the scenario approach is the provision of a strategic tool that can be exploited by its users (policy makers, technicians, inhabitants, etc.) to explore currents events in a common language, but especially to make shared assumptions about future events and take successful decisions (Shell, 2004).