D2.5 Intermediate report on innovation & business model development

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D2.5 Intermediate report on innovation & business model development

Work package 2, Deliverable D2.5

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Coordinator:	Andrew Morris, Prof – Prof. of Human Factors in Transport Safety Loughborough University Ashby Road, LE11 3TU Loughborough, United Kingdom
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Lead contractor for this deliverable:
George Yannis – NTUA

Report Author(s):	Roussou, I., Yannis, G. (NTUA), Greece

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Executive summary

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The LEVITATE Policy Support Tool (PST) is an open access, web-based system, which will provide future users with access to LEVITATE methodologies and results. It is intended that the LEVITATE Policy Support Tool (PST) will remain in operation for long term after the end of the project and it will gradually become a reference Information System. D2.5 Intermediate report on innovation & business model development provides **a report on the projects innovative aspects and the description of the business model**, in order to merge project results and knowledge with partner interests, market and regulatory needs to develop business models and manage IP to produce plans and agreements for post-project exploitation. The business model description is developed in the following sections:

- Presentation of the current state of the art of the LEVITATE PST. The LEVITATE methodology, scenarios and impact assessments will make a major advance on existing policy ressources by providing decision-makers with all of the project results in the form of an online Policy Support Tool, as currently there are no dynamic impact assessment tools dedicated to Connected and Automated Transport Systems (CATS)
- Vision for PST operation after the project. It is necessary to develop an operational framework to ensure the project facilities can be accessed and updated beyond the completion of LEVITATE. Future research activities will enrich the knowledge base developed in LEVITATE. In order to achieve a more global perspective, the PST will include studies from outside Europe, Furthermore, the knowledge base and innovative methodologies in the LEVITATE PST provide a basis for continuous expansion. To this end, LEVITATE intends to build up a sustainable network to exchange growing knowledge on newest methodologies.

- Funding the future operation of LEVITATE PST. Four operation scenarios are considered for the after the project operation of the LEVITATE PST depending on the available funding: Minimum Operation Scenario, Normal Operation Scenario, Growth Operation Scenario and Extended Growth Operation Scenario. In order to receive funding the LEVITATE consortium has already engaged in a wide range of exploitation and dissemination activities.
- Roadmap including all nesseccary steps in order to attract funders, such as demonstration workshops, dedicated visits, conference presentations and marketing strategy is developed.

The objective of this report is to outline the highest aspiration for the continuation of the operation of the LEVITATE PST after the end of the LEVITATE project and the respective period covered by the European Commission financing. As the PST is still under development the full business plan will be presented in Deliverable 2.8- Post-project Exploitation Plan.

1   Introduction

1.1   LEVITATE

Societal **Lev**el **I**mpacts of Connec**t**ed and **A**utoma**t**ed Vehicl**e**s (Levitate) is a European Commission supported Horizon 2020 project with the objective to prepare a new impact assessment framework to enable policymakers to manage the introduction of connected and automated transport systems, maximise the benefits and utilise the technologies to achieve societal objectives.

Specifically LEVIATE has four key objectives:
1. To incorporate the methods within a **new web-based policy support tool** to enable city and other authorities to forecast impacts of CATS on urban areas. The methods developed within Levitate will be available within a tool box allowing the impact of measures to be assessed individually. A Decision Support System will enable users to apply backcasting methods to identify the sequences of CATS measures that will result in their desired policy objectives.
2. To develop a range of **forecasting and backcasting** scenarios and baseline conditions relating to the deployment of one or more mobility technologies that will be used as the basis of impact assessments and forecasts. These will cover three primary use cases – automated urban shuttle, passenger cars and freight services.
3. To establish **a multi-disciplinary methodology** to assess the short, medium and long-term impacts of CATS on mobility, safety, environment, society and other impact areas. Several quantitative indicators will be identified for each impact type
4. To apply the methods and **forecast the impact of CATS** over the short, medium and long term for a range of use cases, operational design domains and environments and an **extensive range of mobility, environmental, safety, economic and societal indicators.** A series of case studies will be conducted to validate the methodologies and to demonstrate the system.

1.2   Work package 2 and Deliverable 2.5 within LEVITATE

The purpose of this WP is to create awareness about the possibility to estimate the impact of connected and automated transport with the tools developed within LEVITATE. Specific objectives are:
- To inform and involve local, regional and national transport authorities.
- To provide a framework and process for an effective peer-to-peer transfer of know-how and experience to selected stakeholder.
- To make the tools accessible through events, training and workshops for knowledge consolidation.
- To promote exploitation of the tools by authorities and private stakeholders.

The objective of the Deliverable D2.5 Intermediate report on innovation and business model development, is to describe the innovation management in order to develop the project business model. D2.5 specifies how to achieve LEVITATE's business objectives.

2 State of the art PST

2.1 The current LEVITATE PST

The aim of the LEVITATE project is to prepare a new impact assessment framework to enable policymakers to manage the introduction of CATS, maximize the benefits and utilize the technologies to achieve societal objectives. To this end the project will develop a Policy Support Tool, focusing on municipalities, regional authorities and national governments that wish to prepare for the increasing prevalence of connected and automated systems, need to understand the implications for mobility policies and wish to identify the most effective measures to achieve wider societal objectives. The LEVITATE PST will be an **open access, web-based system** that will provide future users with access to LEVITATE methodologies and results (Dragomanovits, Yanniset al., 2020). The detailed design will be informed by the specific needs of the key stakeholders and it will provide access to related bibliography, project results, documentation of tools and methods, excerpts from CATS policy recommendations, as well as a Decision Support System with forecasting and backcasting capabilities.

Currently, there are many policy papers on the introduction of CATS available at different levels that cannot be easily transferred to other regions and cities. The LEVITATE project will introduce an open access tool that is based on the forecasting and backcasting methodology and as a result will allow cities and regions for the first time to freely access guidelines and recommendations tailored to achieving their own targets. These guidelines and recommendations are based both on the analysis of worldwide city data and a stakeholder process involving experts from diverse regions and cities to foster a meaningful backcasting that can be applied to different scenarios described in deliverable 4.4 (Detailed list of forecast scenarios, applicable forecasting methodologies and necessary output variables). With this tool cities and regions have a quick way to get first recommendations for the introduction of CATS which will speed up the process of introduction of CAT in follower cities and regions. This in turn will spark the process of innovation on the side of detailed simulation of CATS introduction into different environments.

The toolkit can be advocated as a **global reference system** for Connected and Automated Transport Systems (CATS) impact assessment, to be used by decision makers, stakeholders and experts at all levels (city, regional, national, European, global). Based on the above concept, the LEVITATE Policy Support Tool will comprise two main modules (Figure 1): the Knowledge module (static component) and the Estimator module (dynamic component).
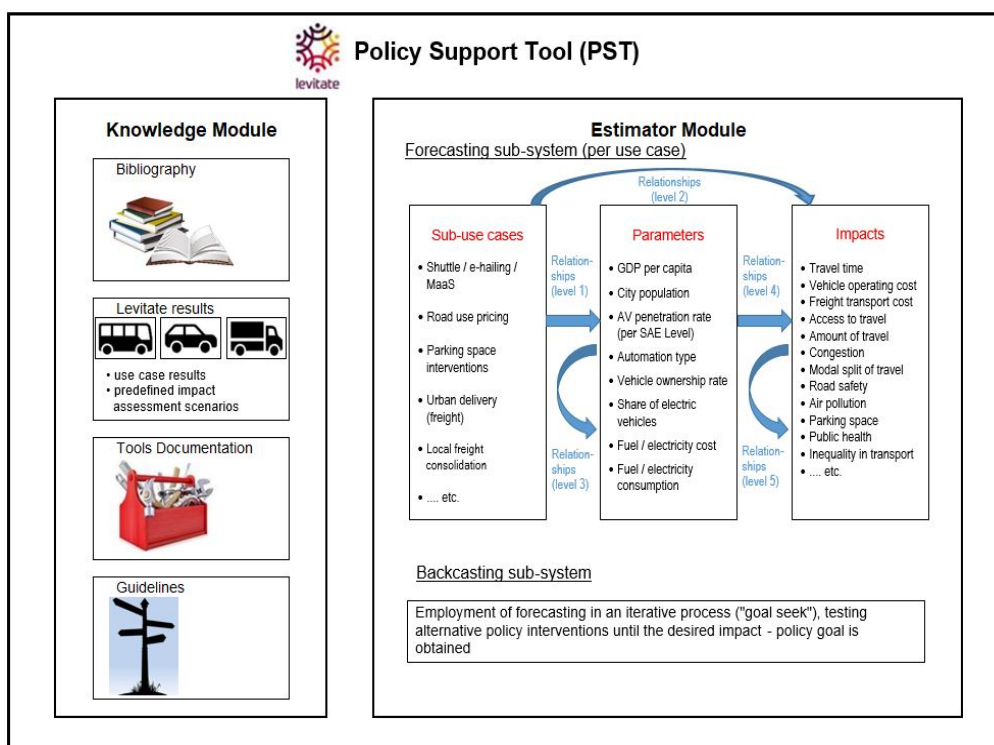
Figure 1: PST modules

The **Knowledge module** will consist of a static repository, searchable through a fully detailed, flexible and documented way. The user will be able to search by any parameter to adjust and customize the search according to preliminary results and to access all background information about any stage of the project. More precisely, the Knowledge module will include namely:
- the **bibliography** of all relevant literature concerning impact assessments of CATS,
- the project **results**, including the case studies on the participating cities (scenarios (developed in D4.4 " Detailed list of forecast scenarios, applicable forecasting methodologies and necessary output variables)and baseline conditions, results) and the predefined impact assessments,
- the documentation about the **toolbox of methods developed in LEVITATE** (defined in D3.2 "Methods for forecasting the impacts of connected and automated vehicles"), to enable cities to explore the expected impacts of CATS in the users circumstances (including underlying models, data and impact assessment methods),
- excerpts from **CATS policy recommendations**.

The **Estimator module** will provide estimates for different types of impacts (including cost-benefit ratios) of different policy interventions and allow comparative analyses. It will include two parts, the forecasting and the backcasting sub-system.

In the **forecasting sub-system**, the user will be able to select a CATS application or policy intervention (or group of interventions), define the required parameters (or accept pre-defined values) and the module will provide quantified and/or monetized output

(depending on the impact) on the expected impacts. The impact assessment results will also include:

- an assessment of uncertainty in the estimates (e.g. confidence intervals or qualitative assessment);
- references on the methodology applied for the impact assessment (i.e. how were the respective relationships estimated: literature review, questionnaire survey, simulation study, etc.).

Predefined values for each parameter not influenced by the intervention will be available; however some of the values will be open for the user to change if needed. Also, indications on the evolution of the estimated impacts over time - short (5 years), medium (10 years) and long term (25+ years) impacts - will be included.

In the **backcasting sub-system**, the user will be able to select a policy objective, i.e. a targeted impact, and the PST will provide relevant interventions that are expected to result in this impact. Similarly to the forecasting sub-system, predefined values for parameters will be available, with the option to be modified by the user.

2.1.1 Demonstration of the forecasting sub-system operation

The steps to be followed by the user to obtain an impact assessment for a specific policy intervention are as follows:

1. Selection of use case:
   The user is asked to select amongst urban shuttles transport, passenger vehicles and freight transport use case.
2. Definition of initial values:
   The user reviews default initial values for parameters and impact indicators and changes any initial value that is not appropriate for the specific urban environment under consideration. For the participating cities of Vienna and Manchester, a database of initial values will be available, which can be expanded for additional cities.
3. Definition of base scenario:
   The user chooses between four predefined scenarios regarding penetration rates of: autonomous vehicles (AVs), connected AVs and electro mobility. These scenarios are: "no automation", "pessimistic", "neutral" and "optimistic". Alternatively, he/ she will be allowed to define a custom scenario. The base scenario, without considering any interventions, will be used as the reference business-as-usual scenario for the impact assessments.
4. Selection of one or more policy interventions (sub-use cases):
   The user will be provided with a list of policy interventions (sub-use cases) and will be able to choose one for consideration by the PST forecasting estimator. Most policy interventions will be considered on a binary (yes/no) basis; some however require more details, e.g. when considering city tolls, the amount of money per entrance in the city center (static toll) or per Km inside the city center zone (dynamic toll).
5. Definition of implementation year:
   The user defines on which year the policy intervention(s) under consideration will be implemented.
6. Analysis for reference scenario:
   The PST forecasting estimator, provides an estimation for the values of all impact indicators and for every year of the analysis, using the relationships between

parameters, impacts and sub-use cases at various levels. No sub-use cases / policy interventions is considered in this analysis.

7. Analysis for scenario with policy intervention(s):
The PST forecasting estimator, will provide an estimation for the values of all impact indicators and for every year of the analysis, using the relationships between policy interventions, parameters and impacts. For the analysis the PST will take into consideration the intervention selected by the user cumulatively, from the defined implementation year onwards.

8. Impact estimation:
The difference between the reference estimations of step 6 and the intervention estimations of step 7 results in the estimated impact of the selected intervention(s).

9. Presentation of results:
Results in terms of forecast of the expected future in the reference scenario, the scenario with intervention(s) and the impact of the intervention(s) will be presented both quantitatively and graphically as presented in Figure 2.

Step 3:	Definition of base scenario	SCENARIO 3 - NEUTRAL		
Step 4:	Selection of policy intervention	Introduction of a static city toll for non-automated passenger cars		
	€ per entrance in city centre	0,80 €	(0€ - 10€)	
	Implementation year	2030	(2020 - 2045)	

RESULTS

Show graph for Impact no: [1]
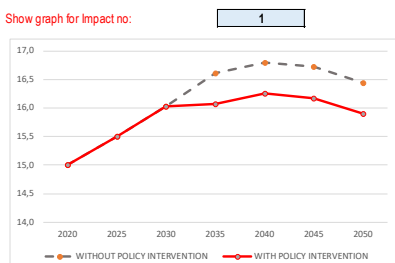
no.	Impact	Unit of Measurement	WITHOUT POLICY INTERVENTION							WITH POLICY INTERVENTION						
			2020	2025	2030	2035	2040	2045	2050	2020	2025	2030	2035	2040	2045	2050
Direct impacts																
1	Travel time	min	15,0	15,5	16,0	16,6	16,8	16,7	16,4	15,0	15,5	16,0	16,1	16,3	16,2	15,9
2	Travel comfort	-	5	5	5	6	6	6	6	5	5	5	6	6	6	6
3	Value of travel time	€	1,00	1,07	1,15	1,12	1,15	1,27	1,32	1,00	1,07	1,15	1,13	1,17	1,30	1,35
4	Vehicle operating cost	€/Km	0,250	0,251	0,253	0,258	0,260	0,283	0,286	0,250	0,251	0,253	0,253	0,255	0,278	0,282
5	Access to travel	-	5	5	5	5	6	6	7	5	5	5	5	6	6	7
Systemic impacts																
6	Amount of travel	Km	6.000	6.030	6.060	6.180	6.300	6.375	6.450	6.000	6.030	6.060	6.180	6.301	6.376	6.451
7	Road capacity	veh/hr.lane	1.500	1.504	1.508	1.523	1.556	1.594	1.641	1.500	1.504	1.508	1.523	1.556	1.595	1.641
8	Congestion	min	10,0	10,3	10,7	11,1	11,2	11,1	11,0	10,0	10,3	10,7	10,5	10,7	10,6	10,4
9	Modal split of travel 1	%	40,0%	40,4%	40,9%	41,0%	40,9%	40,9%	41,0%	40,0%	40,4%	40,9%	42,0%	41,9%	41,9%	42,0%
10	Modal split of travel 2	%	3,0%	3,0%	3,0%	2,9%	2,8%	2,8%	2,7%	3,0%	3,0%	3,0%	2,9%	2,8%	2,8%	2,7%
11	Vehicle ownership rate	veh	1,20	1,20	1,21	1,19	1,18	1,18	1,18	1,20	1,20	1,21	1,19	1,18	1,18	1,18
12	Shared mobility rate	%	4,0%	4,0%	4,3%	5,4%	8,3%	12,1%	15,4%	4,0%	4,0%	4,3%	5,4%	8,3%	12,1%	15,4%
13	Vehicle utilisation rate 1	%	8,0%	8,1%	8,6%	11,5%	18,6%	27,6%	35,8%	8,0%	8,1%	8,6%	11,3%	18,6%	27,6%	36,0%
14	Vehicle utilisation rate 2	%	35,0%	35,1%	35,2%	34,7%	32,7%	30,0%	26,4%	35,0%	35,1%	35,2%	34,7%	32,7%	30,0%	26,4%
Wider impacts																
15	Road safety	accidents/year	2.000	2.018	1.984	1.999	1.708	1.336	1.020	2.000	2.018	1.984	2.003	1.713	1.340	1.024
16	Air pollution	µg/m3	20,0	18,5	18,3	20,2	23,4	26,6	28,6	20,0	18,6	18,4	17,2	19,6	22,0	23,4
17	Noise pollution	%	5,0%	4,6%	4,6%	5,0%	5,9%	6,6%	7,1%	5,0%	4,6%	4,6%	4,4%	5,2%	6,0%	6,5%
18	Commuting distances	Km	20,0	20,2	20,3	20,8	21,2	21,5	21,8	20,0	20,2	20,3	20,8	21,2	21,5	21,8

Figure 2: PST results example

2.1.2 Backcasting estimator principles

As applied in policy analyses, the term backcasting usually refers to an analysis designed to answer the following question: What measures need to be taken in order to realize a specific (quantified) objective set for a specific year? The task of the analyst is then to estimate the contributions of various programmes or measures that can be made towards realizing the target. Thus putting together a package of actions policymakers can implement to ensure that the objective is realized. This perspective is clearly

relevant, for example, in the case of a city with policy objectives of preventing a growth in travel performed by fossil fuel vehicles, increasing walking and cycling, and, at the same time, reducing the number of traffic injuries. Realizing all objectives at the same time is clearly challenging and requires great ingenuity in the development of policy options or instruments.

For Levitate we develop a methodology which combines the generation of a feasible path leading to policy targets by backcasting with a detailed analysis of interventions with cutting edge forecasting tools. This guarantees the most efficient process that reaches the desired policy targets through the suggested interventions for policy makers. Cities can directly obtain a feasible path to reach their targets instead of search exhaustively for (levels of) measures leading to them. Through the combined methodology, cities can implement CATS without the unwanted and unforeseen consequences and rebound effects.

The operation of the backcasting estimator is visualized in Figure 3. More specifically, the user defines the desired policy vision described in terms of changes in the impacts (= combination of policy objectives). Then the PST will control which interventions lead to this expected impact by running the forecasting estimator for all interventions. If the impact lies within the targeted corridor towards the desirable policy vision, the solution is retained. Otherwise, a new set of baseline data and interventions is assumed and the analysis runs again.
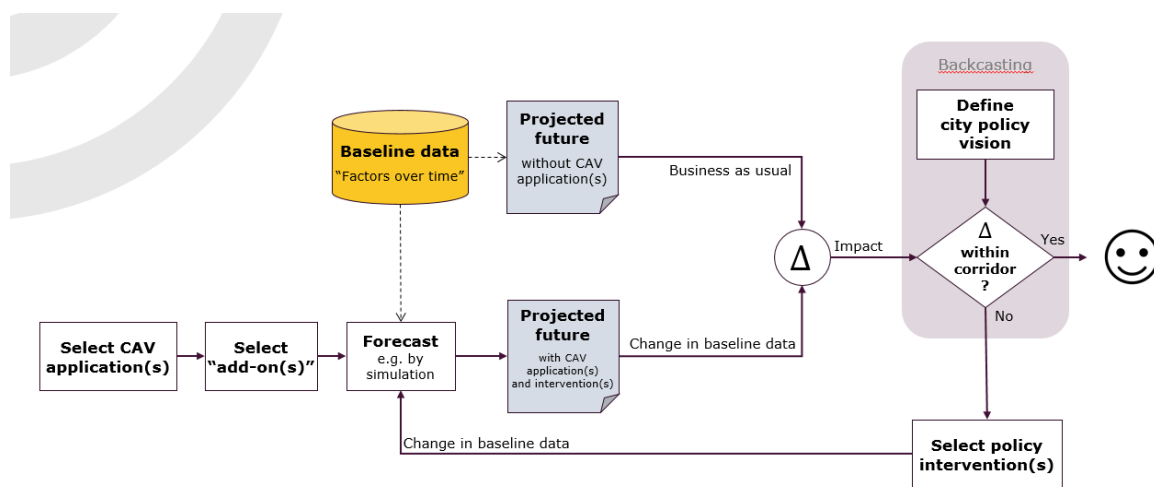

Figure 3: Backcasting estimator methodology

More details on the contents, the interface and the foreseen operation of the aforementioned modules are presented in WP8 deliverables. More specifically, D8.1 will present the integration of the results of WPs 4-7 into the PST. The development of the PST for the impact assessment of CATS will be detailed in D8.2. Finally, the applications of the PST on selected use cases and the developed policy recommendations will be the content of D8.3 and D8.4 respectively.

2.2 Added value of the PST

The structure and model of the LEVITATE PST was presented during the second stakeholders reference group (SRG) workshop held in Brussels on the 26th of November 2019 (presented on the levitate website: https://levitate-project.eu/2019/12/10/2nd-stakeholder-reference-group-workshop-takes-place-in-brussels/). Participants recognized the added value of the PST giving a very positive feedback concerning the usability of the PST structure. After the second SRG workshop, where stakeholders proposed their suggestions for improvement the PST will go above and beyond existing policy support systems by

- Providing an innovative impact assessment approach concerning CATS
- Demonstrating the combined effect of selected sub-use cases, parameters and impacts
- Comparison between scenarios
- Ensuring cooperation with city macroscopic transport models
- Rigorous selection criteria to prioritise the highest quality evidence
- Presentation of key information about each included study without the user requiring access to the original source
- Providing communication between projects
- Including a sensitivity analysis
- Providing cost benefit analysis for selected sub-use cases
- Providing guidelines for the introduction of CATS
- A user friendly and easy to use interface design
- Applying a rigorous quality assurance process to all content

As a consequence of the dedicated design approach it is the only CATS related, dynamic PST with the following features:

- Impact assessment results concerning automated urban transport, passenger cars and freight transport that will support the users to decision making
- Takes a holistic approach considering impact assessment for CATS
- Provides comprehensive and accessible information for users of various backgrounds

3 Future PST

This chapter outlines the best case scenario for the future PST, where the PST continues to provide an up-to-date and comprehensive overview of all relevant information on CATS introduction to support policy makers and other stakeholders worldwide. It concerns an expansion of both the contents and functionality of the current PST taking into account suggestions of stakeholders during the second SRG workshop.

3.1 Future contents

In order to achieve a more **global perspective**, the PST will include studies from outside Europe, provided by LEVITATE partners from Australia, China and the United-States of America. Furthermore, the knowledge base and innovative methodologies in the LEVITATE PST provide a basis for continuous expansion. To this end, LEVITATE intends to build up a **sustainable network** (consisting of stakeholders, researchers, infrastructure authorities) to exchange growing knowledge on newest methodologies. **Future research** activities will enrich the knowledge base developed in LEVITATE. Evidence collected in similar research activities in and beyond Europe will contribute to enhancing the knowledge module as well.

The PST could also be extended with additional information on the effectiveness of the introduction of automation related policies and interventions. Therefore, the LEVITATE partners will form synergies with different European and international **projects**. The integration of the PST into the overall impact assessment tools of other projects will contribute to further developing both modules of the PST, providing a range of impact studies of new and future mobility technologies. To this end, it is intended to exploit the LEVITATE PST, in the H2020 project SHOW, where all CATS parameters will be considered and analyzed based on data from field demonstrations and simulation experiments, including data referring to the interaction between CATS and other road users. The LEVITATE project also cooperates with the ARCADE project, a European Commission-funded Support Action aimed at building consensus across stakeholders from all sectors for a sound and harmonized deployment of Connected, Cooperative and Automated Driving (CAD) in Europe and beyond. These **research synergies** with other projects will support the continuation and development of the LEVITATE PST contents after the project end.

Furthermore the mobility behavior and needs of low- and middle income countries differ from high income countries. Some **customizing** in that respect will add value to the PST in order not to show irrelevant information, highlight important elements and add targeted information regarding the smooth integration of CATS. This could include automation related policy recommendations and interventions that have different impacts, costs and benefits for developing countries. Additionally, the contents of the knowledge module could be further customized to user needs and available information. Users could be allowed to **request additional information** from the back-end database for the studies that they are interested in.

Finally, with the introduction of CATS in different cities more societal impacts could be studied and added into the PST, in order to expand the range of useful information for

end-users. This additional information and analysis will help getting support from other policy areas or even attract extra funding. The respective SRG members – as priority users – will further provide input for **further detailed scenarios** that could be included into the PST, in order to expand its contents and as a result draw the attention of funders.

3.2   Future services

First of all, an important extension will be the **translation** of the PST in different languages to facilitate more user groups in e.g. Latin America, India, South East Asia, and other areas of the globe. Policy makers prior to selecting potential interventions, need to analyse the current situation and need to determine which CATS intervention are most relevant and effective for the specific situation. Although it is outside the scope of the PST to provide a tool to perform the problem analysis, the PST could be extended with information and links to other tools/resources to assist policy makers and other stakeholders in their analysis of current situation and problems. Policy makers, stakeholders and other PST users could identify potential sub-use cases to introduce in their cities and propose the addition of these sub-use cases into the PST.

Additionally, partners will make provision of further **consultancy** services and contract research to cities and municipalities on the strategic direction w.r.t. CATS topics around urban planning and transport which are beyond the scope of LEVITATE. The PST supports the user in introducing CATS and developing CATS policies, by offering an extensive impact assessment. Cities and regions will have a quick way to get first recommendations for the introduction of CATS, but in the future version PST and the LEVITATE partners could provide more guidance assisting users in implementing different CATS interventions, providing links to relevant organisations or websites, as well as propose countermeasures to tackle potential risk factors related to the introduction of CATS. The LEVITATE partners will also provide consultance for detailed and individual assessment including detailed simulation modelling (on street level up to city level).

Further development of the assessment tools and methodologies will take place in order to reach a higher **technical readiness** level so that they can be commercialised. It is expected that parts of the backcasting system will not be able to be implemented within public online tool due to the complexity of the approach and the uniqueness of each city and region. In-depth modelling, training sessions, and consultancy services can be provided on an individual basis that require **specific expertise** and additional effort beyond the scope of LEVITATE.

4   Business plan development

The objective of this Business plan is to explore the possibilities for the continuation of the operation of the LEVITATE PST after the end of the LEVITATE project and the respective period covered by the European commission financing (31 December 2021)

Four scenarios are considered for the after the project operation of the LEVITATE PST
- OS-0: Minimum Operation Scenario
- OS-1: Normal Operation Scenario
- OS-2: Growth Operation Scenario
- OS-3: Extended Growth Operation Scenario

4.1   OS–0 Minimum Operation Scenario

The minimum operation scenario concerns the minimum operation of the LEVITATE PST, without any external funding. **All costs are covered by the LEVITATE partners**. The minimum scenario concerns: the uninterrupted operation of the system without any contents update and a minimum number of call meetings (e.g. twice per year) organized by the LEVITATE partners.

4.2   OS–1 Normal Operation Scenario

The normal scenario concerns a normal operation of the LEVITATE PST, with some external funding. The normal operation costs are covered by **external funding**.
The normal scenario concerns:
- The uninterrupted operation of the system
- Updates of the interventions impact assessment and cost-benefit analyses, adding recent studies to the knowledge module
- The respective quality control
- One physical meeting per year and a number of call meetings (e.g. four per year)

The extent of the content updates depends on the size of the funding.

4.3   OS–2 Growth Operation scenario

The growth scenario concerns a **more intensive operation of the LEVITATE PST**, with **considerable external funding**. Similarly to the normal scenario, the growth operation costs are covered by the external funding.
The growth scenario concerns:
- The uninterrupted operation of the system
- Updates of interventions impact assessment, cost-benefit analysis adding more impacts and parameters.
- Possibility to receive, check and incorporate input submitted by other experts/organisations
- The respective quality control
- Two physical meetings per year and a number of call meetings (e.g. four per year)

The extent of the contents updates depends on the size of the funding.

4.4   OS–3 Extended Growth Operation Scenario

The extended growth scenario concerns in addition to the growth scenario the **incorporation of various data and knowledge parts**. Data could concern studies, field demostrations and project outcomes related to CATS impacts. Knowledge could concern state of the art CATS interventions documentation. In order to introduce all additional data and knowledge **considerable external funding** is necessary. The extent of the development of additional data and knowledge features depends on the size of the funding.

4.5   Funding the future operation of LEVITATE PST

Three Funding Scenaria are foreseen:

- **Funding scenario 0**, where no funding is available. The LEVITATE PST does not secure any funding and continues with minimum cost covered by the partners. This funding scenario corresponds to the Minimum Operation scenario.
- **Funding scenario 1**, where exclusive funding is offered. The LEVITATE PST is financed by only one organization, covering all the expenses and a common brand is developed.
- **Funding scenario 2**, where multiple funding is available. The LEVITATE PST is financed by several organizations, covering all expenses and the brand remains property of the LEVITATE partners.

To keep the tools and services running after the project's life-time, IT maintenance and ongoing data management will be necessary on the supplier side. The LEVITATE PST will serve as a **promotion tool** to attract potential customers to make use of the full LEVITATE offer. Potential funding entities are EU stakeholder and advisory groups, administration and authorities, in particular in charge with the implementation of CATS into cities and regions, EU member states. Suppliers of traffic modelling software are competitors and potential users at the same time. International consultants offer market reports, best practices, benchmarks, rankings and derived recommendations on CATS, which are a nice supplementary to the LEVITATE results. The combined stakeholder networks in LEVITATE will provide the basis for further **collaboration opportunities** to coordinate research activities and strategically aligning funding programs. The project findings will also be promoted through open access scientific journal publications (Accident Analysis and Prevention, Transportation Research Part C: Emerging Technologies, etc.) and presentations in conferences (TRA, TRB, ISHGD, ICTR, etc.). Levitate's partnership with ALICE through Polis will help promoting the freight and logistics segment of the PST. Furthermore, a **training fee** will be required for in-depth training on professional simulation modelling including backcasting for urban/transport/ traffic planners. An alternative business plan is to promote a model involving licensing on the complex simulation and impact assessment methodologies for consultants.

In order to receive funding the LEVITATE consortium has already engaged in a wide range of **exploitation and dissemination activities**, detailed in D2.4 Intermediate Exploitation Plan. The majority of these activities aimed at promoting the project objectives by means of presentations at related events and publications in conferences and journals, as well as on-line. Additionally, partners having close contacts with different ministries and cities, intend to promote the PST to them and advise them in

relation to CATS impacts. Furthermore, they can bring them in contact with LEVITATE partners in case they have questions or need advice on other aspects of the PST. All partners will promote, throughout their network, the tools individually (knowledge repository, back-casting and forecasting methods and impact assessments) and collectively (PST).

Aimsun is the only Levitate partner that has a **commercial purpose**. Aimsun develops and distributes the integrated transport modelling software Aimsun Next and the decision support system for real-time traffic management Aimsun Live. At present, Aimsun services 4,000 licences in 75 countries. Aimsun licensees include government agencies such as TfL, TfGM, Mairie de Paris and NYCDoT and USDoT; leading consultancies such as AECOM, Arup and Jacobs; and academic users and research partners such as the Universities of California, Berkeley, MIT and the EC – JRC. Following LEVITATE completion, further internal funds will be used to finalise **full commercial rollout** of associated software upgrades developed during the project, which will reach the market no later than 9 months after the end of the project. Finally, Aimsun will **demonstrate and validate** the PST solution through its promotion to a number of clients worldwide, both in the government and consultancy sectors.

The full business plan, including potential funding organisations, potential cooperations and budget distribution for the different operation scenarios will further evolve during the development of the PST and will be presented in deliverable 2.8 – Post-Project Exploitation Plan.

4.6   Organisation

The current PST is developed and **owned by the LEVITATE consortium**. As a start this group will act as developing organisation. This organisation is responsible for promoting the usage of the PST via each consortium members' network and presentations at (inter)national events. Moreover, to enable further development and operation of the best case scenario, additional funding is inevitable. Therefore, within the LEVITATE project, efforts are made to find funding. It is foreseen that multiple sources need to be found. At a later stage a legal entity needs to be formed, consisting of parties that will contribute to the extension and operation of the PST. It will have a leader, steering group and partners, similar to the LEVITATE consortium. The LEVITATE consortium will engage active participation in EU stakeholder and advisory groups, such as EC DG MOVE, DG Research, DG Climate/Environment, ERTRAC, etc. Additionaly, liaisons with ongoing H2020 projects such as ARCADE, SHOW and involvement in the European CCAM research and innovation partnership, will contribute to extend the exploitation of the LEVITATE results.

Further developments will most likely not involve all project partners and could have contributions from outside the consortium. Funding parties will have their own wishes with respect to availability of the PST. Therefore, **IPR** (intellectual property rights) **issues** need to be covered in the set-up of the organisation responsible for future operation and further development of the PST. In addition, the timeframe and schedule for the future enhancements will be agreed with the funding parties. The exact timeframe will depend on the financial resources available to support the future PST. It is anticipated that two physical meetings and multiple phone meetings will be held each year to co-ordinate work. It is planned that the PST itself will be updated on a regular basis. The number of times the PST is updated in a year is dependent on funding. In the best case scenario it is envisaged that the PST would be updated four times per year.

The organisation will be responsible for **future operation of the PST website**. It is possible that part of the future website could include a dedicated or restricted section for different user groups (e.g. through a subscription service). The PST is designed to be self-explaining and will contain short instruction videos as well as a quick guide for users. Further development of the PST will be along the lines used in LEVITATE, including **quality assurance procedures**. It might be possible for external people to add contents to the PST, yet this should be done following the methodology developed within LEVITATE and all additional contents will have to go through the quality assurance process described in the PST.

5 Roadmap

From the above business plan description, it is evident that input from WP8 as well as from the final consultation workshop is necessary in order to further develop and realize these plans. This initial exploitation plan is created early in the time plan in order to evolve along with the project and the development of the PST, as well as to provide useful information about the foreseen operation and funding scenarios.

The following time plan (Figure 4) is suggested for the PST business plan, which reflects to the timeplan of the LEVITATE project as a whole.

- Establish and follow a **tight time schedule**, starting wih the operation of a high quality PST (anticipated for M22 – September 2020)
- **Demonstration workshops** (from M22 – September 2020 to M34 – October 2021)
- Development of a comprehensive **marketing strategy** and a professional marketing package (M24 – November 2020) that includes:
  - o Explanation of the system
  - o Explanation of the system's value
  - o Address governance issues
  - o Highlight the added value for funding organizations
- **Dedicated visits** to potential funding organizations (from M25 – December 2020 to M34 – October 2021)
- **Post-Project** Exploitation and Business Plan (M36 – December 2021)

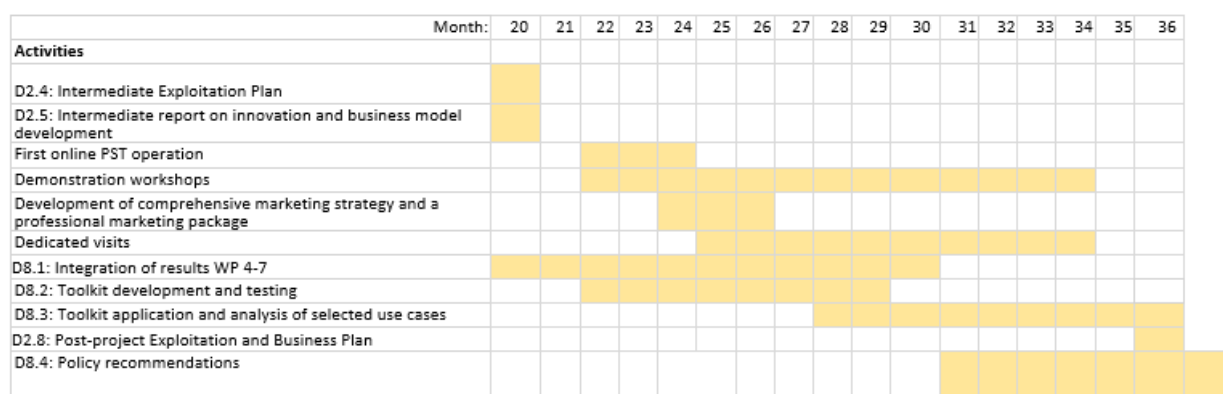This business plan roadmap will be further developed and enhanced along with the project's progress.

Figure 4: Activities Gantt chart

6   Conclusion

The LEVITATE PST has been developed within the Horizons 2020 LEVITATE project. It includes a holistic CATS impact assessment approach and has been funded by the European Commission, however the intellectual property is owned by the LEVITATE Consortium. As such the PST developed within the research project can have continued independent operation after the end of the research project. It is intended that the LEVITATE PST will remain in operation long after the end of the project and it will gradually become a reference information system, in which more and more municipalities, cities, experts and organisations contribute their studies with quantitative results, using the LEVITATE protocol.

The main objective of the Marketing Package is to explore the possibilities for the continuation of the operation of the LEVITATE PST after the end of the LEVITATE project and the respective period covered by the European Commission project financing. This information is presented in context of the best case scenario.

After the end of the LEVITATE project, there are different options for how the development of the PST can unfold, dependent on the degree of received funding. The optimal scenario is for extended growth of the PST. The extended growth scenario concerns a future version of LEVITATE PST operation, with considerable external funding. The growth operation costs are covered by the external funding.

The extent of the development of additional data and knowledge features depends on the size of the funding. It is envisaged that the future PST will be financed by several organisations, covering all the expenses while the brand remains property of the LEVITATE partners.

The partners in the consortium dispose all the background expertise and capacity to achieve the targeted exploitation plans as mentioned above and accelerate the path to the targeted stakeholders. The PST itself will be used as promotion tool as a quick assessment on the basis of a few but meaningful data. This PST demonstration is easily doable and will be presented in promotion activities by the partners. To guarantee a long-lasting exchange of knowledge, new findings on more innovative methodologies, new regulations, user needs, data etc. a network will be brought up to live. An Online Forum on the Website will foster the exchange of experiences among users.

The full business plan, including potential funding organisations, potential cooperations and budget distribution for the different operation scenarios will further evolve during the development of the PST and will be presented in deliverable 2.8 – Post-Project Exploitation Plan.

References

Dragomanovits, A., Yannis, G., et al. (2020, April 27-30). Developing a Policy Support Tool for Connected and Automated Transport Systems. Transport Research Arena 2020, Helsinki, Finland. (Conference canceled)