Deliverable D8.5.3
Final report on cooperation with other Projects

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Abstract: The deliverable describes the actions and outcomes in Year 3 of Project Task 8.5 aiming at promoting networking, knowledge exchange and coordination activities among MoveUs and other relevant projects running under FP7 in the same timeframe.
### HISTORY

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<th>Full Form</th>
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<tbody>
<tr>
<td>API</td>
<td>Application Programming Interface</td>
</tr>
<tr>
<td>DRT</td>
<td>Demand Responsive Transport</td>
</tr>
<tr>
<td>EC</td>
<td>European Commission</td>
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<td>EIP-SCC</td>
<td>European Innovation Partnership on Smart Cities and Communities</td>
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<tr>
<td>EV</td>
<td>Electric Vehicle</td>
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<tr>
<td>FCD</td>
<td>Floating Car Data</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
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<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
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<tr>
<td>IoT</td>
<td>Internet of Things</td>
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<tr>
<td>IT</td>
<td>Information Technology</td>
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<td>ITS</td>
<td>Intelligent Transport Systems</td>
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<tr>
<td>LL</td>
<td>Living Lab</td>
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<tr>
<td>OEM</td>
<td>Original equipment manufacturer</td>
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<tr>
<td>OS</td>
<td>Operating System</td>
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<tr>
<td>T&amp;IA</td>
<td>Tracking and Itinerary Adjustment</td>
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<tr>
<td>VTBC</td>
<td>Voluntary Travel Behaviour Changes</td>
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The cooperation among the European research initiatives is always regarded as a crucial and extremely valuable activity. The results obtained at different levels always give the great opportunity to set more advanced starting points and allow to “raise the bar” in terms of objectives and innovation for new projects.

In that respect, a well-known activity usually carried out at the beginning of each project like in MoveUs, is the so-called analysis of the status of the art in the domains of interest. Nevertheless, a cooperation with other projects running in the same period and carried out in a more continuative way, can give punctual, specific added value and greatly improves the knowledge of the respective consortia in many different ways. That’s what can be concluded from the experience gained in MoveUs after three years of collaboration with projects having strong similarities in terms of background, activities, fields of interest and organizational aspects.

Thanks to a growing mutual knowledge and improved analysis of the common issues, the projects involved in the cooperation have constantly refined their investigations by conducting interesting discussions and comparisons around the respective solutions, findings and innovative results. Dedicated collaboration meetings have been held over the project lifetime and revealed to be the most effective instrument for improving the cooperation. Thanks to an accurate previous selection of shared topics of interest, each representative could explain in detail the most critical aspects and raise the relevant questions and elements of discussion. It can be said that the outcomes obtained in the cooperation with such organizational schema, greatly improved the experiences and enlarged the perspectives by giving, at the end a better awareness of the potential weakness and strengths of present and future decisions and actions.

The present report, together with those of the first two years, gives an insight of the outcomes of the collaboration in the third year, which can be assumed to be the most interesting and productive period for the cooperation. For this reason, the report provides also indications that can be useful for future activities of this type.
1 Introduction

1.1 About MoveUs

The main goal of MoveUs Project is to design, implement, pilot, evaluate, disseminate and exploit a number of novel ICT tools for smart mobility in the context of smart cities, directly addressing real users’ needs while promoting a habit-change in their daily lives. This goal is pursued with a number of actions and objectives including:

- The integration of scattered and heterogeneous mobility data
- The provision of green, multimodal, personalized, sustainable, safe and private, reliable and extensible services
- Structuring real business cases

Typical users, providers and stakeholders of MoveUs are:

- Citizens and Tourists
- Public and private transit organizations
- Transport/fleet operators
- Cities authorities
- Local business
- Energy operators
- ICT solutions providers
- Non-profit organizations

The main service domains addressed are:

- Travel recommendations
- In-advance traffic information
- Incident warning
- Eco-routing and carbon footprint metering
- Incentives-based methods and criteria for energy saving
- Crowd-sourced information provision

The tools and instruments developed to support the services are:

- A cloud-based mobility management platform
- An API toolkit
- Smart mobility applications for smartphones and control centres
- Energy efficient assessment tools to measure users’ energy efficiency gains

The results of MoveUs are validated in three pilot cities: Madrid, Genoa and Tampere. Each city addressed key aspects and solutions during the development and validation phase.

Madrid provides quick, personalized and “at hand” mobility information to facilitate the user to take the most efficient mobility decisions, foster the use of greener
transport modes: public bus, public bike, bike-hiring, walking modes and promote efficiency in the use of private cars and public bus system. Another important objective is to integrate the user (pedestrians, travellers, drivers, etc.) into the cooperative mobility architecture as a new source of information.

For Genoa the objectives are considered within the more general development as a Smart City with the foreseen reduction of 23% of CO2 emissions by 2020. An interactive process between the planning, development and testing of services in the field of smart mobility and energy efficiency will be established with the support of feedback mechanisms and services. Key tools and methods will be: a) the Multimodal journey planner with feedback from users, b) the integration of crowd-sourced data into the Genoa traffic supervisor and c) the fulfilment of personal mobility needs in an urban environment.

Tampere aims at increasing the share of walking, cycling and public transport by developing for example cycling paths, public transport routes and bicycle parking spaces (Tampere City Strategy 2025). Looking at MoveUs the objectives are to increase the share of sustainable mobility by a) opening traffic data, both real time and static in standard modes, b) providing mobility information in an integrated and easy-to-use way using mobile devices, c) setting up services that will integrate cycling, public transport and car route information with real-time traffic and weather data and d) provide energy and carbon footprint metering for the different transportation modes.

1.2 Scope of the document

Considering the objectives and activities summarized above, a key activity for MoveUs, is the exchange of information and cooperation with other relevant projects running under FP7 in the same timeframe including projects selected under the FP7-SMARTCITIES-2013 call as well as other projects under CIP ICT-PSP and Transport program. The present report describes the networking, knowledge exchange and coordination activities among MoveUs and these projects for the third year of project activities.

The aim of T8.5 is to identify relevant common issues and understand possible commonalities in terms of approaches, lines of investigation and solutions adopted in the different projects which:

(a) May facilitate synergies among MoveUs activities (WP2-WP7) and other projects’ developments,

(b) May further support MoveUs exploitation, sustainability and business model development (WP10) and

(c) Can be eventually generalised into cross-project or program level inputs for the Commission.

In Year 3 the main cooperation activities have been:
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- The second cooperation workshop with other RTD projects part-funded under FP7 and addressing Smart Cities themes of common interest and prominent within the H2020 work plan in Trento on October 14th, 2015.
- The Genoa Smart Week event in Genoa from May 23rd to 28th, 2016.
- The 1st MOVESMART Workshop in Bilbao on October 15th, 2015.
- The special “Smart Multimodal Journey Planners and Traveller Information Services for Urban Mobility”, held in the context of the 11th ITS European Congress that took place in Glasgow on 7th of June 2016.

The present deliverable reports on the outcomes of the workshops, introduces the projects that participated and outlines the themes of common interest as well as the conclusions.
2 Overall approach

In the period considered for this reporting (year 3) the main activities performed in Task 8.3 were:

1. Continue monitoring the initiatives of interest on personal mobility solutions, integration of public and private modes and promotion of cleaner means of transport.
2. Establish contacts with the initiatives selected in the monitoring phase.
3. Concrete participation in a number of cooperation activities and workshops.

During the reporting period, the above phases ran in parallel.

2.1 Monitoring and cooperation background and criteria

The reference background context for the cooperation activities is defined in details in the first year and remains valid for the whole project period. It consists of a scenario where transport and traffic management systems, administrations, and providers operate together at different stages of a service chain to capture, store and process relevant and heterogeneous of data on mobility to provide Multimodal smart travel services.

![Service chain of the background scenario](image)

Key relevant stages have already been identified and are summarized here:
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a) **Content provision** where data owned by local (origin) transport and mobility organizations and authorities are made available through locally-available interfaces,

b) **Content integration** with local contents retrieved, integrated and processed to generate enhanced information suitable for the purposes of the target system,

c) **Value added Service Generation** with the development of value added services

d) **Service delivery**

MoveUs operates according to the above context with the MoveUs *cloud-based platform* acting as content integrator and the *city-services* as key provisioning components on top of the platform.

During Year 3, specifically, there was a special focus on the validation of the whole system. Therefore, besides the architectural aspects, the cooperation also focuses on the organizational and operational issues of the Living Lab activities.

### 2.2 Methodology and topics of interest

The cooperation was achieved in two main directions: one investigative with a number of projects sharing the same background and the second one very concrete with other projects and initiatives.

The key selected projects for the cooperation remain those operating in the same background scenario, where commonalities can be found in terms of **Aspects of interest** and **scope of activities**.

The following schema is a reminder of the methodology already adopted in previous periods where the aspects of interest (General Objectives, Technical solutions, Methodological approach, Innovative elements) are identified for a number of scopes and in relation to the same reference background scenario previously introduced.
The *aspects of interests* initially identified are reviewed and updated in the third year especially in relation to the activities done. The following list summarizes the *identified topics of interests for year three*.

- **Concepts and options for system and service architectures:**
  - Use of cloud and ICT transformative technologies (technical/architectural)
  - Itinerary and Track adjustment
- **Innovative concepts:**
  - Incentives (Organizational, technical)
- **Energy Consumption awareness**
  - Voluntary behaviour change (organizational)
- **Users involvement:**
  - Living labs organization (organizational, legal)

Special emphasis on the cooperation is put on the user recruitment and itinerary and track adjustment. In MoveUs, like for other projects these aspects are of great importance. In MoveUs, in particular, the application of incentives is a key element for both aspects: it is the potential trigger for a transport behaviour change and has strong implications with the detection of the mode of transport and other aspects of the user trips.

### 2.3 Organization of the report

The report is structured in two main parts dealing with the activities done in year two:
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- The first (section 3) describes the monitoring of European initiatives
- The second (section 4) describes the concrete cooperation activities held in the period.
3 Monitoring of European Initiatives

Like for the previous periods, during the Monitoring Phase, the European projects and initiatives running in the same timeframe of MoveUs were analysed. The list of selected candidates has been already identified in year 2 and included:

- StreetLife [7]
- MOVESMART [1]
- MyWay [2]
- PETRA [3]
- Simpli-city [4]
- Co-Cities [6]
- Superhub [7]
- Team project [8]

The main activities of the workshops and physical events have been:

- Review of project results
- Email contacts to prepare the cooperation workshops and to invite the project representatives to them.

3.1 The EIP-SCC program

The European Innovation Partnership on Smart Cities and Communities [EIP-SCC] [5] brings together cities, industry and citizens to improve urban life through more sustainable integrated solutions including applied innovation, better planning, a more participatory approach, higher energy efficiency, better transport solutions and intelligent use of Information and Communication Technologies (ICT).


Many of these areas are also of interest or directly linked with the main objectives of MoveUs, including:

- Urban Mobility
- Business Models
- Policy & Regulation
- Energy Efficiency & Low Carbon Solutions
- Open data

The collaboration with the European Innovation Partnership on Smart Cities and Communities is important in order to maintain a link with the cities, stakeholders and service provider and evolve to adapt in the different contexts analysed by the different action clusters of the partnership.
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MoveUs has established a link with EIP-SCC during the Genoa Smart Week event. More details can be found in section 4.2.
4 Cooperation activities

The following sections offer more details on the outcomes of the cooperation activities in year 3.

4.1 Second cooperation meeting in Trento

4.1.1 Preparation, themes of discussion

The Trento Collaboration Meeting that was held on the 14th of October 2015 is the follow-up workshop of the MyWay collaboration meeting that took place in Berlin in May 2015. Therefore, the topics of discussion have been selected based on the outcomes of this workshop.

The main link between the two workshops has been found especially by looking at the break-out session on Pilot Implementation / User Engagement and Crowd Sourcing of mobility information. Here, the following issues emerged:

- The questionnaires prepared for collecting data during the validation have to be filled out as much as possible by avoiding bothering the user too much at the same time.
- The strategies for user recruitment are not always the same and sometimes may differ very much. The question arises about what can be done to establish common parameters for an effective recruitment.
- The Voluntary Behaviour Change is a key objective for the projects involved. Here some common criteria and approach can be identified and established although of course the objectives may be very different from a project to another. Examples of common approaches are gamification / statistics (how many CO2 saved over time, how many calories burned).

Starting from these points and considering the running activities of the interested projects, the cooperation workshop in Trento focused then on “Pilot Implementation”, with a special focus on:

1) User engagement and participation: is directly tied with the questions and open issues emerged during the Berlin cooperation workshop. Aspects of interest are: Solutions, success stories and lessons learnt for attracting, retain and continuously engaging end-users (citizens and mobility managers).

2) Tracking and itinerary adjustment, identified as key aspect for the pilot implementation and validation in trip planning scenarios. Here the aspects of interest are: Solutions for tracking, monitoring, and adapting travel itineraries taking into account real-time mobility information (e.g. transport delays/cancellation, traffic, parking availability) as well as other relevant information (e.g., weather, air pollution, special events) that might affect the journey.
4.1.2 Participants projects and agenda

At the Trento Collaboration Meeting three projects participated all out of the objective 6.6, FP7 Call 10 - Integrated personal mobility for smart cities: MyWay, MoveUs, Streetlife. The agenda of the workshop is in the following table.

<table>
<thead>
<tr>
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<th>Activity</th>
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<tr>
<td>10:00</td>
<td>Coffee/Welcome/Introduction</td>
</tr>
<tr>
<td>10:05</td>
<td>Agree on Agenda, Minutes writing, Introduction</td>
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<tr>
<td>10:05</td>
<td>Round Table of Participants/who is who</td>
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<tr>
<td>10:20</td>
<td>Session: User engagement and participation in mobility pilots for Smart Cities</td>
</tr>
<tr>
<td>10:20</td>
<td>Presentations:</td>
</tr>
<tr>
<td>12:15</td>
<td>2 introductory slides on key points of the session</td>
</tr>
<tr>
<td></td>
<td>Next: Around max. 5-6 slides per project on project objectives (1 slide), pilots &amp; objectives (done, planned to do) regarding the specific topic, crispy experience viewpoints regarding that topic, important issues per project presentation.</td>
</tr>
<tr>
<td></td>
<td>Per project not more than 10 minutes.</td>
</tr>
<tr>
<td></td>
<td>Note: don't show a full project presentation – only focus on the topic.</td>
</tr>
<tr>
<td></td>
<td>Discussion: on best practises in the pilots.</td>
</tr>
<tr>
<td></td>
<td>Goal of the session: Identify critical issues across the pilots, present lessons learned and as result: identify transferable solutions– jointly work out common paper until the end of the session.</td>
</tr>
<tr>
<td>12:00</td>
<td>Lunch Break</td>
</tr>
<tr>
<td>13:15</td>
<td>Session: Tracking and itinerary adjustment:</td>
</tr>
<tr>
<td>13:15</td>
<td>2 introductory slides on key points of the session</td>
</tr>
<tr>
<td>14:45</td>
<td>Around 5-6 slides per project on pilots objectives (what was done, what planned to do in pilots: as service, technically, regarding compliance with legal issues), name preeminent project viewpoints regarding Tracking and Itinerary adjustment and issues. Each project presentation not more than 10 minutes.</td>
</tr>
<tr>
<td></td>
<td>Note: don't give a full project presentation – focus on the topic of the session.</td>
</tr>
<tr>
<td></td>
<td>Discussion: how are the best practises in the pilots.</td>
</tr>
<tr>
<td></td>
<td>Goal of the session: Find out, critical issues in the pilots, transferable solutions, lessons learned – jointly work out a common paper until the end of the session.</td>
</tr>
<tr>
<td>14:45</td>
<td>Conclusion</td>
</tr>
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Table 1 – Agenda of the Trento workshop
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4.1.3 Outcomes of the workshop

The Collaboration Workshop has been held as an informal discussion as the participants concretely wanted to know what was done in the projects.

All projects involved in the workshop have approximately the same timeline but a different approach on sustainable mobility.

The outcomes are presented for the two sessions.

4.1.3.1 Session 1: User engagement and participation in mobility pilots for Smart Cities

The key questions formulated as basis for the presentation/discussion of the first session are:

- How the validation has been carried out in the pilots?
- Which is the technical background: models, enabling technologies?
- How is the involvement/role of the user: proactive, active, passive? What are the scenarios and use cases in the pilot Cities? What kind of data has been collected and what are the related functional capabilities?
- How about Privacy and data security?

Each projects’ representative presents the approach and outcomes of the validation activities conducted up to the date of the workshop.

MyWay

MyWay was in the end stage at the time of the workshop.

The pilot cities in MyWay are:

- Barcelona/Catalonia, focusing on urban and regional mobility, highly personalised multi-modal travel services: bus/metro/train, DRT schemes, bike sharing, EV scooter sharing (MOTIT).
- Berlin, focusing on intermodal travel services, real-life tests and scenario evaluation through simulation (future mobility); intermodal info services (bus/metro/train), car sharing, bike sharing
- Trikala (GR), mid-size town, focusing on regional seasonal peak mobility, elderly services, students’ mobility; regular Public Transport, private mobility, spontaneous social mobility (car pooling). Evaluation of scalability of services

The Living Lab has been conducted with two categories of pilot users:

- Users with high experience in mobility. They accessed early versions of the services developed in the project to give crucial feedbacks to increase quality of the solution
- Real users: Users from the street, have been involved from Phase 1 to take advantage of comments on quality of the solution and usability of the apps.
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The issues detected have been:

- Missing information on tech barriers (e.g. minimum version of the OS to use the Apps)
- Evaluation process perceived as complicated by users
- Drop-outs detected in real-users

The corrective actions applied have been:

- Increase the information in the registration process like the minimum version of the OS to use the Apps
- Number of questionnaire reduced, together with the number of questions for each questionnaire (removed questions perceived as similar)
- A very simple “Gamification” with incentives has been introduced

In MyWay the main lessons learnt are:

- User engagement needs more, shorter pilot iterations to stimulate a valuable feedback. It is not very useful nor feasible to keep the users active for a long time. So the recommended approach for the future would be to have shorter living lab sessions and involve the users from the very beginning by selecting them and pushing their participation.
- It can be useful to start with mock-ups in the process of service co-creation to avoid failing in pursuing the real needs. Here the human-centred design approach with an active participation of the users in the process of co-creation is crucial: with a small group of users, going through the entire development process from the beginning to the end the results could be more effective.

MoveUs

At the time of the workshop, MoveUs had to start the validation and consequently there are no outcomes of the same type of MyWay ones.

The pilot cities in MoveUs are: Madrid, Genoa and Tampere

The Living Lab approach has been followed as methodology for User Driven Innovation. A Living Lab is about experimentation and co-creation with real users in real life environments, where users, together with researchers, firms and public institutions look for new solutions and new products. But also Living Labs are about societal change, about promoting innovation in a societal basis, involving SMEs, entrepreneurs and public institutions that can together have immediate impact. In a LL, users/citizens become a community of active actors and not only passive receivers.

Key Objectives of the Living Lab activities are:

- Identify, through user workshops, key factors needed for developing technologies and methods enabling a better mobility experience through the MoveUs technologies.
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- Gather concrete specifications of services and functionalities that Living Labs require for a sustainable business development across the different city sectors and profiles (ages, disciplines, user types and technologies).
- Bring the user and usability approach into business and services development, and consequently into R&D on sustainable and collaborative mobility.
- Bring together the scientific community, as represented by the software developers and the end-user community so a common understanding is achieved.

The MoveUs living labs, leaded by Atos have been conducted in a structured way with a target 100 people engaged in each pilot and with actions and experiments similar between the pilots.

Workshops have been carried out since the early stages of the Living Labs (started well in advance compared to the final validation) with experts, mobility management bodies, energy efficiency experts etc. From the experience gained it is evident that the co-creation of services from the beginning is very important. A crucial aspect anyway is the different experience of the test users.

The representatives from Tampere municipality reported that in MoveUs they engaged experts from public transport, a group easy to acquire and address for using and testing the services developed during the project. More difficult was, instead, to engage the end-users through questionnaires, needed to collect feedbacks and answers. The need for a focus group of normal users requires also a different approach and a specific questionnaire because the format used for the experts is not applicable for normal users.

The work of a communication expert seems to be required to design effective questionnaires for “common” end-users since the language for experts is too complicated. Also other aspects like the invitation-letter of the questionnaire had to ask with clear words, what is the reason/benefit for people to participate.

Streetlife

At the time of the workshop, Streetlife finished the first round of piloting from the end-users.

The pilot cities in Streetlife are: Berlin, Rovereto and Tampere

Here are the main facts reported at this stage:

- The 2nd iteration has been scaled up both in terms of number of users (attraction, engagement) and in terms of duration of the experiments (retention)
- Active user participation plays a key role in several use cases like active crowd-sourcing, car-pooling, gamification and behavioral change
- Different kind of stakeholders are involved: citizens but also mobility managers and private companies
Different target users in the three cities are involved (bikers, tourists, commuters/colleagues, etc.)

The strategies for carrying out an effective user engagement have been studied and the main outcomes/ideas have been identified as follows:

- Incentive models for behavioral change
- Engagement through gamification in Berlin
- Gamification framework for Smart Cities

A “Design thinking workshop” was held to get inputs of which elements the users may appreciate more and be then effective for switching from the car to more sustainable modes of transport. The outcomes gave importance to incentives and gamification concepts for a mobile app e.g. free tickets, group rankings, easy planning.

The main values/hints found in relation to the assignment of incentives and application of gamification schemas are:

- Concrete information about impact of car driving on environment.
- Collecting points that can be spent in e.g. vouchers, free tickets, etc.
- Possibility of filtering the route by personal preferences like beautiful landscape, quiet, fast, secure, sightseeing, etc.
- An overview about personal performance e.g. km, CO2 reduction, calories should be available
- Competition with peer groups on the above performance parameter is possible
- With the competition virtual points for sustainable behavior can be gained

Figure 3 – Streetlife - aspects to be applied to induce a behavioural change
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This general approach produced different implementations in the three Streetlife pilot cities which have been introduced in the workshop.

Incentives and gamification

Incentives are a key topic of discussion for the workshop since it is possible to identify:

- “Incentives for user engagement”, offered to promote the participation
- “Incentives for changing the mobility behaviour”, aiming at promoting the modal shift for the users participating in the Living Labs.

MoveUs started a discussion on the incentives schemas by introducing the concept developed in MoveUs that is based on the following pillars:

- RULES (or MEASURES): stimulate the adoption of eco-mobility behaviours and, if met permit to gain INCENTIVES;
- INCENTIVES: for example, discounts on tickets and fares, on local taxation, on city services, free and/or extended access to Limited Traffic Zones, parking lots reserved for private cars and freight vehicles, discounted insurance; and also incentives which are not directly related to money—what we call “social incentives”;
- MEASUREMENT of the true mobility behaviours giving feedback to citizens: check if RULES are met in order to assign INCENTIVES;
- DISTRIBUTION of INCENTIVES to users: in order to allow users to spend INCENTIVES

During the discussion it is reported that a huge job has been done by MoveUs in the project on the definition and usage of incentives.

A validation activity, driven by incentives and complemented by gamification strategies, can train the people towards more sustainable choices, open new perspectives on alternative modes of transport not previously considered in the daily routine, strengthen the awareness of sustainable choices and eventually prologue the modal shift for a longer time after the validation.

The gamification together with the use of incentives can foster a “Social” attitude on the topic of sustainable modes of transport: initially the incentives should promote the change. In the meanwhile, the user can start using the “game” and be involved in a social group that keeps the motivation high.

Issues and answers to critical aspects

The discussion continued by working out a definition of “User Engagement”. “User Engagement” comprises:

- Identification of the needs (stakeholders/users)
- Recruitment
- Keeping the user in active participation
- Provision of feedback by means of dedicated tools
- Involvement in the active development process (service co-creation)
A number of questions/issues have been then identified:

- How to get real users?
- At which state of the development process is the best time to include users?
- How to get the users actively participating to avoid retirement?
- How to scale up to get the behavioural change the city is looking at?
- How to measure the engagement?
- How to get the users to respond to the questionnaires?
- How to measure, validate the experiment?
- How can we exploit the feedback?

Solutions/answers to these questions, formulated and discussed by the participants to the workshop:

- Effectiveness of the incentives: promote, define, offer effective incentives to trigger an initial interest and keep the user active.
- Pay the user (through a recruitment company) just with a small amount. For example, students may be happy to get a reward, even a small one.
- Gamification: a “gaming” platform for an attractive, social experience on the sustainable mobility can attract the users although it is observed that often the users are interested in games only for a short time.
- Offer an outstanding user experience is extremely important. (Here a further issue/question emerged: “why would people switch from their existing mobility services to ours?”)
- Create/promote other related initiatives. For example, Finland promotes Open APIs: third parties use them and this is an added value as they can extend their investment.
- It is needed to have an expert in communication to formulate effective messages to the users.
- Incorporate the questionnaire in the App.
- Offer a discussions group.
- Perform interviews instead of making questionnaires.

Overall, incentives and gaming and a combination of them, can be considered to tackle the critical task of user recruitment where it is often difficult to involve enough people and keep them active for the whole validation period.

The following figure resumes shortly the main requirements and expected benefits emerged in the discussion.
4.1.3.2 Session 2: Tracking & Itinerary adjustment

The topic of Tracking and Itinerary Adjustment (T&IA) is common to several smart mobility projects including Streetlife, MyWay and MoveUS. There are also some examples already in the market showing both the potentials of personalised value-added user services and the aspects related to the privacy.

Driving questions

The following aspects are highlighted to drive the subsequent discussion:

- T&IA may have different approaches, implementations and objectives; what are the respective views in the various projects?
- To what extent the T&IA solutions have been developed? How far the various projects have progressed with this?
- Considering that a few core enabling technologies are central to develop T&IA capabilities into new generation mobile services (mobile sensors, social media, big data / analytics technologies, IoT, Future Internet enablers, etc.) is it possible to identify common building blocks in T&IA solutions? Any reference architecture?

Use cases

Each project participant gave a brief overview of the notion of user tracking and itinerary adjustment according to the approach followed in the project. According to a few use cases considered in the projects.

Use case 1: Check if the user follows the suggested trip

A first case of itinerary validation is applied to check whether the user is following the planned (or suggested) trip so that -for instance- incentive-
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oriented schemes can be applied. This is the case of assignment of incentives for the execution of trips by using only certain mode of transport like in the MoveUs project. Here the itinerary validation requires the so-called ‘mode detection’: the identification that the traveller has actually used a specific mode (bus, car, bike, etc.) for the trip legs composing the journey. The current technologies offer something in this respect; for example the mobile devices have sensors and OS-specific services and APIs that provides estimated values of the current mode of transport. Further information can be retrieved and combined by these ones by retrieving the trajectory and other data from the user positions (GPS track).

Use case 2: Mobility behaviour understanding

Another use case of interest for transport authorities, local administrations, etc. is the detection of the mobility behaviour by understanding the mobility patterns from T&IA generated data. This value-added information requires high volumes of data (many users and many GPS tracks).

Use case 3: Facilitating Voluntary Travel Behaviour Changes (VTBC)

Facilitating VTBC is another interesting use case addressed in Streetlife (Berlin, Rovereto, and Tampere).

All use cases are based on users’ position-related data. Here it is important to distinguish between real-time/on-line use (relevant for the provision of online services like re-routing) and non-real-time/on-line use (relevant for analytics-related processing and application like transport assessment and planning).

Motivation and approach of the projects and further discussion

MyWay

The tracking functionalities in MyWay are designed and implemented to comply with the following projects indications:

- Take into account, adapting and refining the trip, contextual information
- Learn from the expectations and preferences of the traveller

MyWay implements the following components:

- Trip Composer:
  - Combines all the modes
  - External/existing planners
  - meta-planning level
- Trip Memory:
  - Learning
  - tracking experience
  - updating/adapting
- Trip Follower:
  - active trip monitor
  - real-time alerts - users can be proactive
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The components are developed to implement an active monitoring of the trip, following the objectives of the project.

STREETLIFE

Streetlife developed a concept for Travel Assistance based on control and adaptation of currently taken routes. Key points are:

- Route Definition: request mobility recommendations
- Route Control: match the actual route with relevant real time/crowd sourced data
- Route Adaption occurs if a disturbance is detected.

The route control is especially where the tracking is applied: the “Itinerary tracking & adjustment” use case foresees continuous GPS tracking & permanent uplink to the server of data on itineraries of pre-planned and on-going trips. Real-mode detection is executed and the users are informed about derivations and alternative routes available in an automatic way.

In Streetlife the data is interesting for the public authority, traffic management. And can be used for analysis and actions on behaviour change.

MoveUs

In MoveUs, the tracking functions are applied to the procedures of assignment of the Incentives. MoveUs defines the “rules” that promotes the use of sustainable transport modes. After this step, it has to be detected the measurement of the users’ behaviour in terms of mileage covered with a certain mode of transport during a trip. This measurement finally applies to the calculation and assignment of incentives.

For the objectives of MoveUs, the trip detector can be seen as a “black box” that generates a measurement useful for this calculation.
The requirement for the automatic assessment of rules associated to these incentives is the measurement of:

- Distance
- Time of execution
- Mode of transport

The measurements are carried out on each segment or leg that composes a trip. The segments are the sections of the trip separated by interchanges. At interchanges, users may wait and change mode of transport and the detection process must of course consider these situations.

In MoveUs the mode detection is achieved through a combination of:

- client-side operations and functions,
- platform-side operations and functions

The following slide has been presented to show the different approaches considered during the design, their advantages and disadvantages.
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**Data Sources available to “follow the trip”:**

<table>
<thead>
<tr>
<th></th>
<th>PROs</th>
<th>CONs</th>
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</thead>
<tbody>
<tr>
<td><strong>In-vehicle:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAN bus or ODB</td>
<td>Accurate measure</td>
<td>Difficult or no access</td>
</tr>
<tr>
<td><strong>User Device:</strong></td>
<td></td>
<td>Approximate measure</td>
</tr>
<tr>
<td>GPS Position, other sensors</td>
<td>Easy Access</td>
<td></td>
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</tbody>
</table>

**Computation of the trip following data:**

- **Client side**: No need to transfer mobility data
- **On the MoveUs platform**: Performance and privacy issues

**Data Sources available to “follow the trip”**: In-vehicle: CAN bus or ODB. User Device: GPS Position, other sensors.

**Figure 6 – Tracking in MoveUs – data sources and computation**

**Discussion**

The discussion and comparison of the different approaches and technological options is summarized as follows.

*User tracking techniques*

User tracking can be done at different levels and with several techniques: the user position can be detected at individual points and times (e.g. at the start and end of the trip) up to a (nearly) continuous tracking (e.g. the full itinerary).

This implies different levels of technical and organisational complexity that have an impact on the type of service implemented. Fine-grained GPS tracking provides a more reliable itinerary reconstruction, but it has a negative impact on battery consumption and thereby it may influence the overall usability. A tailored approach needs to be identified case by case related to the specific goals and use cases.

*Tracking and rewards*

Users are likely to accept to be tracked only if some ‘rewards’ are provided in exchange; i.e. value-added services like alert and information in case of travel disruption, dynamic re-planning of travel solution, use of incentive schemes (e.g. when using sustainable transport solution like vehicle sharing), etc.

*Type of data collected*

The applications developed in the projects have different data and information collected or generated by the mobile devices and combined together. This includes:

- position (time, speed, bearing, etc.) from mobile device’s location services (GPS, cell network),
- data from built-in OS-dependant mode-detection APIs,
- transport leg information.
Involvement/role of the user

The user may be involved in different ways for the activation/running of T&IA services:

- **passive role:** data is collected from users’ devices in a silent way without directly interacting (except for giving the consent on tracking)
- **Reactive role:** users are asked to interact on demand and on specific situations in the trip: for example, they may be asked to confirm the trip start/end, interchange change of mode of transport, rate the service, etc.
- **proactive role:** users provide information proactively; for instance, by providing information on traffic event of potential interest for other users like it happens in the MyWay app.

Data quality

The validation of the collected T&IA data is identified as a key aspect of the entire activity. The aspects of data quality includes: reliability, accuracy, granularity/coverage of information. It has been remarked that sometimes the need to have a large amount of data /samples obtained at high frequency can be in contrast with the reliability and overall quality of the service like in the case previously mentioned (fine grained tracking of user position vs. battery consumption). Again, a balanced approach is desirable based on the goals of the application/service.

Privacy and data security

About privacy and data security, the first requirement of course is the compliance with the national and EU regulations. Most solutions can use traditional privacy preservation mechanisms like user data anonymization although this technique can not be applied in personalized services (where the trajectory of a specific user has to be known).

It is very important that the applications and services stores any sensible information in a 'single place' in order to facilitate the implementation of privacy protection and data security measures. A privacy-by-design approach for applications and services was commonly advocated. MoveUs for example adopted this approach.

It is evident that an explicit consent has to be given by the user in order to proceed with the data collection. The privacy related aspects must be clearly stated and illustrated in the terms of Use of the service (App) and before using it. It has been observed anyway that despite the importance and public sensitivity of privacy related issues, it is quite common that people do not pay attention to what they are consenting to when accepting the relevant terms of use of a newly installed application.

Technical background

A common key technical element was the use of smartphones APIs for location detection (GPS, cell data) and mode detection (accelerometer, sensors).
Interaction with ITS services (i.e. for transport mode detection based on the GPS tracks) is an alternative/complementary approach which brings certainly an increased complexity but also a higher quality. MyWay interface local ITS services in the three Living Labs, including real-time data (e.g. bus departure times at stops in Barcelona) and trip planning (local trip planning service). MoveUs interacts with the centralized platform to calculate the mode of transport of the different legs of the journey and to provide the necessary incentives.

Streetlife presented an interesting use of serious games technologies, based on a gamification platform providing the city transport managers a set of tools to set up and operate serious gaming workflows; e.g. incentivising the use of bicycle in Berlin through on-line rewards, improvement of users public ‘sustainable travellers’ profiles and promotion of competition towards sustainable transport behaviour.

Resume of the discussion

The main points discussed in the session on T&IA are summarized in the following points:

Main purposes
- Itinerary validation
- Detection of Mobility Behaviour (e.g. from transport authority)

Technical implementation
- Implementation with different levels of service and complexity
  - Offline or Online,
  - With multiple or a limited number of collected tracks,
  - Combination of the GPS values with itinerary data,
  - Calculation made on the device only or with additional services local or centralized (e.g. for mode detection).

Technical background
- Identification of enabling technologies,
- Use of standards smartphones sensors,
- Use of supporting APIs.

Accuracy Validation
- It is needed to implement reliability/accuracy/quality assessment and adjustment

Involvement of the end-user
- Proactive, reactive (confirmations, by rating the travel experience, etc.) or passive (use of sensors).

User acceptance
- The reward can be with value added services, incentives.
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Privacy and data security

- Application of National regulations, clear and accessible terms of usage...

Issues

- Find the right balance on the extent to which services are on client side, server side
- Implications on data volumes, need to buffering the data, frequency of tracks collections and issue related the use of sensors, battery usage
- Accuracy of mode detection. This is a key aspect of validation of some services in the projects’ LLs (for example the assignment of the incentives in MoveUs)
4.2 The Genoa Smart Week

The Genoa Smart Week has been held in Genoa, from the 23rd to the 28th May 2016. It has been a week of initiatives, meetings and networking events that involved national and international players in a discussion on innovation for the development of a sustainable city.

The week was sponsored by the City of Genoa and the association Genoa Smart City, in collaboration with local and European partners. A number of foreign delegations and representatives of the European Commission joined the events.

On Friday 27th, two sessions were held with the participation of MoveUs

- In the morning, the session “Incentives for behavioural changes in mobility” was organized in collaboration with the Transports and Mobility Department of the Municipality of Genoa.
- In the afternoon, the session “Smart urban mobility & Cities of the Future: European Innovation Partnership (EIP) on Smart Cities and Communities” was organized in collaboration with DG MOVE – European Commission.

The first event was entirely conducted by the MoveUs consortium, represented by the Municipality of Genoa, Quaeryon and Softeco Sismat to discuss interactively with the participants about the incentive schema developed in the project. The audience and the open discussions made this session not only a dissemination event but also a concrete opportunity of cooperation.

The second event was a significant step towards a stricter cooperation with EIP on further developments and initiatives in order to maximize the impact of MoveUs, as planned in T10.1 Exploitation and Sustainability analysis. In this event, user’s take up of MoveUs services was evaluated concluding these initiatives are especially tied to the theme of incentives in European Cities as a way to promote sustainable transport choices and, more generally, savings in energy consumption.

The session “Incentives for behavioural changes in mobility”

During the morning session, the partners of the MoveUs consortium presented the project outcomes with a special focus on the incentive model and concepts.

The general needs and context are introduced by the Municipality of Genoa. The incentives schema developed in MoveUs is introduced and described by Quaeryon while the ICT services developed in MoveUs and of potential interest for a City are introduced and described by Softeco.
Focusing on the theme of the workshop, it has been discussed the role of the ICT services that acts as tools for the travellers that operates in the existing context of transport and mobility with functionalities of

- Information about the existing incentives,
- Automatic verification of the rules,
- Assignment and management of the incentives.
One of the main aspects of interest that emerged in the discussion was especially the possibility of applying the incentives to the use of bicycle as alternative mode of transport. The detection of the “bike mode” can be a key factor to promote the use of bicycle although it has been recognized that in the specific case of Genoa there are also other reasons that currently makes this choice not very attractive by most travellers.
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Session: “Smart urban mobility & Cities of the Future: European Innovation Partnership (EIP) on Smart Cities and Communities”

The afternoon session was held in the context of the event “Smart urban mobility & Cities of the Future: European Innovation Partnership (EIP) on Smart Cities and Communities”, organized in collaboration with DG MOVE – European Commission.

Here, several representatives of private and public organizations participated and provided presentations of innovative projects and ICT solutions including MoveUs, with a presentation prepared by the Municipality of Genoa, Quaeryon and Softeco Sismat again focusing on the innovative incentive model.

The following table contains the agenda of the workshop.

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>12:30 p.m.</td>
<td>Registration and networking with snacks</td>
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<tr>
<td>1:30 p.m.</td>
<td>Welcome</td>
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<td>European Partnership for Innovation of Cities and Smart Communities – Initiatives presentation for smart electric mobility and mobility services</td>
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<tr>
<td>2:00 p.m.</td>
<td>Break-out Session I</td>
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<td></td>
<td>Interactive discussion:</td>
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<td></td>
<td>Exchange on good practice and innovation solutions, opportunities for collaboration and contributing to:</td>
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<td></td>
<td>• Smart electro-mobility initiative</td>
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<td>• Mobility services initiative</td>
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<td></td>
<td>Innovative and Green Solutions for the distribution of goods in town</td>
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<td></td>
<td>From research projects to mobility products</td>
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<td></td>
<td>Interoperability and national and international roaming: the situation and the need for improvements</td>
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<td></td>
<td>MOVEUS Project</td>
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<td>3:00 – 3:30 p.m.</td>
<td>Coffee Break</td>
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<tr>
<td>3:30 – 4:45 p.m.</td>
<td>Input presentation: financing opportunities</td>
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<td>Scaling innovation: examples of how to cluster and finance projects</td>
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<table>
<thead>
<tr>
<th>Break-out Session II</th>
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<tr>
<td>(Table discussion a 2 x 25 minutes)</td>
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<tr>
<td>• What are opportunities?</td>
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<tr>
<td>• What are barriers in using</td>
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<tr>
<td>• Concrete actions</td>
</tr>
</tbody>
</table>

| 4:45 – 5:00 p.m. | Wrap up and next steps |

Table 2 – Agenda of the Smart urban mobility & Cities of the Future workshop

The most significant suggestions and impressions about MoveUs can be summarized as follows:

- It is desirable that the number of cities involved increases: MoveUs is an app common to Tampere, Genoa and Madrid. Other cities can participate simply linking their local mobility services.
- Finding financial resources for a European Demonstrator would be extremely desirable.
- It would be useful to make the EIP platform's members participate to the "game" defining combinations of Rules/Incentives and providing positive incentives
- It would be interesting to extend the engineering of the concept from Mobility to Urban waste and Less energy consumption at home (e.g. electricity, gas).

4.3 The 1st MOVESMART workshop

MoveUs participated in the 1st MOVESMART workshop that was held at University of Deusto, Bilbao on 15th October 2015. The theme was: Renewable mobility services in smart cities: Challenges, approaches and social aspects

The topics/research areas highlighted during the invitation to the workshop were:

- Renewable mobility in smart cities.
- Social networking in transportation
- Use of crowd-sourcing techniques for transport data collection
- Reliability in crowd sourcing systems
- Multimodal and time-dependent route planning
- Incentivised vehicle-sharing
- Mobility on demand (MoD)
- Energy efficiency in transportation
- Cloud-based mobility services

During the cooperation workshop, the MoveUs architectural concept, technical solution, high-level services and algorithms have been presented.
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The workshop was open to different topics addressed in MOVESMART Project and the rest of projects, but with special focus on: crowd-sourcing techniques, public transport planning and alternative modes as car-sharing and electric vehicles. The main outcomes of the discussion are presented in the following.

Crowd-sourcing techniques

Crowd sourcing data collection can be operated with direct user feedbacks and real-time data retrieval from drivers/travellers through smartphone apps and in-car GPS devices. In MoveUs this information is currently associated to the state of traffic and the overall quality of services, according to the working principles of Co-Cities (discussed during the cooperation activities in year 1). The provision of feedback is also associated to the provision of incentives.

The main issues identified in this field are tied to the reliability of the information source and the existing difficulty to get enough data. Here a key point is the user involvement and engagement.

Through the monitoring of the user's travel, enriched FCD constitutes a promising and valuable input for any analytical process and replacing classical techniques such as surveys, samples and interviews in decision support.

Public transport planning

Most of the projects are deploying promising multi-modal planners, following in general, a meta-planning approach that allow the integration of existing routing systems and a scalability in terms of: area of coverage, mode of transport and algorithm criteria. A common interest is expressed around energy consumption and environmental impact estimation algorithms.

Electric Vehicles

This topic is only partially addressed in MoveUs but it is one of the pillars of other projects. In any case, common underlying algorithms are currently deployed by MoveUs (e.g. travel times estimation, routing), that can be used to build domain specific modules as those related to electric vehicle.

4.4 11th ITS European Congress

A special session “Smart Multimodal Journey Planners and Traveller Information Services for Urban Mobility” was held in the context of the 11th ITS European Congress that took place in Glasgow on 7th of June 2016.

Organized by the Institute of Communication & Computer Systems (ICCS) on behalf of the TEAM [TEAM] European project, this session involved speakers and coordinators from different relevant projects: StreetLife [StreetLife], MoveSmart [MoveSmart], PETRA [PETRA], TEAM, MyWay [MyWay] and MoveUs.

During the cooperation workshop, the MoveUs technical architecture and details of multi-modal journey planner and other relevant algorithms were presented under the title “Data analytics to foster sustainable mobility habits”.

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The role of this session was to present current approaches and development of comprehensive multimodal journey planners in conjunction with smart traveller information services and discuss the way forward. During the session, the speakers and the attendees discussed actual examples and implementations which have been made in the last years in this field as well as possible challenges and issues that need to be studied. The next steps have been identified in order to address properly the growing needs of drivers and travellers for an improved mobility in urban environments.

The topics/research areas highlighted during the invitation to the workshop were:

- Cooperative systems
- Multimodal travel services
- User engagement and involvement

The main outcomes of the discussion are presented in the following.

Cooperative services

Connectivity enables a broad range of applications and services. Collaborative extends the Cooperative concept, including drivers on the loop with impact on traffic efficiency, co-modal mobility and safety in non-time critical scenarios where interaction is expected to be machine-to-machine. The TEAM Project was active on this last point from the perspective on OEMs, with opportunities to scout novel functions for mid-term. Some relevant vehicle services could be: collaborative adaptive cruise control, collaborative driving or smart intersection for intelligent priorities, among others.

Multi-modal travel services

According to the European Commission vision, “travel, already at the planning stage, should be a user-friendly experience. Multimodal scheduling, information, booking and payment systems and integrated ticketing via one website could greatly contribute to such perception. To link the first/last mile with long-distance travel should be ensured”. A roadmap for delivering EU-wide multimodal travel information, planning and ticketing services was released on June 2014.

The term “Mobility as a Service” stands for consuming and buying mobility services based on consumers’ needs instead of the means of transport. Some challenges are: the fragment of transport service marketplace and the irruption of private schemes (vehicle sharing, ride sharing, etc.). Through the “Mobility as a Service” systems, consumers can use mobility services provided by different operators by using just one platform and a single payment system. This platform should provide intermodal journey planner with combinations of different transport modes: private car, walking, car-sharing, car rental, underground, rail, bus, bike-sharing, taxi, a booking system, a single payment method and real-time information.

Some projects worked on multi-modal planning services: MoveUs, MyWay, Streetlife, OPTICities [10], MOBINET [11], MobilWallet [12], BonVoyage [13], MASAI [14], SHIFT2Rail [15], SocialCar [16], Extravel, European Travellers Clubs [17], TAP TSI [18], Smart Ticketing Alliance [19] and many other initiatives.
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Most of the projects agree that three main enablers are: multi-modal trip planning, user profiling (or patterns) and on-trip user support services:

- **Multi-modal planner algorithms.** MyWay and MoveUs follow a meta-planner or hierarchical approach, involving local/partial planners. PETRA address an uncertainty-aware planning, exploiting real-time predictive model for more robust, shorter trips.

- **User profiling and service personalization.** MyWay (preference engine module), Petra, TEAM and MoveUs are addressing this issue in similar way, by defining a complete user profile, based on personal data (age, vehicle, etc), user statistics (habits as transport mode preferences, LoI, usual trips) or explicit preferences (e.g. criteria for multi-modal trip selection). In MoveUs and PETRA, techniques as trajectory clustering with noise removal or map-matching are being applied, enabling even anticipate user’s movements.

- **On-trip services.** Different categories of services are currently available on-trip: real-time incidence notification and re-planning, navigation/routing, parking/ crossing assistance, mixed/augments reality and always, real-time info-mobility services.

MyWay project provides complementary services as resource booking, e-ticketing/payment, etc., completing the technologies for MaaS deployment.

**User engagement**

Some of the projects aim at changing the personal mobility patterns and habits, with special focus on carbon emission reduction (MoveUs, StreetLife). Here, the main challenge is the involvement and engagement of final users, as an information source and service consumer. Focus on end-user applications, StreetLife project has defined and implemented a Gamification Framework, by deploying a long-run experiment supported by a couple of apps. The concept is to gain “green leaves” points on the basis of the Km travelled with sustainable transport modes, badge collections and weekly personalized challenges with green leaves bonuses. Finally, weekly prizes and final grand prizes offered by sponsors can be gained. In MoveUs, gamification is supported by a full incentive scheme definition per city, where incentives can be gain based on sustainable habits, green transport mode using and user involvement in terms of crowdsourcing activity (e.g. incident notification, transport/service Quality of Service reporting).
5 Conclusions

In the second year MoveUs actively participated in cooperation activities starting with the “2nd Collaboration Workshop” held in Trento where key common topics of projects MoveUs, MyWay and Streetlife have been discussed and further investigated following the outcomes of the 1st cooperation workshop in Berlin (whose outcomes are described in deliverable D8.5.2 Second report on cooperation with other projects”).

These two key topics are: the recruitment of the user and the itinerary calculation and adjustment. The projects involved in the cooperation have similar objectives and timeline and the discussion on the topics could then take place on a comparable level from both the organizational and technical point of view. Commonalities and differences were discussed and the main issues identified with some proposals to tackle them. Giving this approach and outcomes, it has been shared the intention that initiatives in future projects or proposal preparation should be carried out in the light of this fruitful discussions.

From the perspective of MoveUs, a special emphasis has been put on the application of incentives both in the Trento workshop and in the Genoa Smart week.

The incentives can be applied for both enforcing the recruitment of the users and promote a behavioural change in mobility. Despite the different approaches and priorities, the outcomes of the different discussions in the workshops confirmed the potential of incentives and gamification (and combination of both) as ways to know and appreciate new modes of transport previously discarded in the daily routine.

A combination of incentives and serious gaming with a “social” component can be effective to involve the travellers in new mobility initiatives and innovative services as well as to stimulate them to keep using new transport modes and provide a valuable feedback on them. Incentives and gaming can be then considered to tackle the critical task of user recruitment where it is often difficult to involve enough people and keep them active for the whole validation period.

These topics have been also discussed in cooperative sessions held during the 1st MOVESMART workshop and the 11th ITS European Congress (special session on Smart Multimodal Journey Planners and Traveler Information Services for Urban Mobility) where MoveUs took part. The different approaches, that generally implies the use of a Multimodal Journey Planner system, showed how the common objective of addressing properly the growing needs of drivers and travellers for an improved mobility in urban environments, is pursued and how common elements like the application of incentives and gamification are now growing.

The whole cooperation task T8.3 has been successfully carried out during the entire project duration with the establishment of strong relationships especially between some selected projects whose similarities with MoveUs are stronger. This is the case of the projects Streetlife and MyWay where the cooperation between the respective consortiums has been very friendly and productive and will hopefully give stronger results in possible future cooperation activities.
D8.5.3 Final report on cooperation with other Projects

6 References

[7] Superhub project: http://www.superhub-project.eu
[8] Streetlife project: http://www.streetlife-project.eu
[16] SocialCar project: http://socialcar-project.eu/
[18] TAP TSI project: http://tap-tsi.uic.org/