



INCLUSION Project

Deliverable D2.2

Final report on new ideas and concepts for
Public Transport innovations in prioritized
areas

Version: 1.0

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This project has received funding from
the European Union's Horizon 2020
research and innovation programme
under grant agreement No. 770115

Document Control Page

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|------------------------------|---|--------------------------|--|
| Title | Final report on new ideas and concepts for PT innovations in prioritized areas | | |
| Editor | Lidia Sala, Álvaro García (MOSAIC) | | |
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| Nature | R | | |
| Dissemination Level | PU | | |
| Version number | 1.0 | | |
| Planned Delivery Date | 31 st January 2020 | | |
| Version date | 26 th February 2020 | | |
| Abstract | <p>Deliverable D2.2 – Final Report on new ideas and concepts for public transport innovations in prioritized areas – presents the results and outcomes of work package WP2 – Social Innovation, enabling ICTs and data intelligence.</p> <p>A first part of this deliverable summarises the main outcomes of T2.1. The second part of the deliverable describes the results of Task T2.2 Developing ideas and concepts for public transport innovations in prioritized areas, focusing on the concepts selected by the partners involved in the task, and a review of the ICT-enabled social innovation ideas and concepts which have been further developed aiming to improve Pilot Lab activities. The third part of this deliverable describes the methodology used for Task 2.3 – Validation and assessment of new concepts and tools-and reports the main conclusions of WP2 focusing on implications for the transferability of these concepts.</p> | | |
| Version | Date | Modified by | Comments |
| 0.1 | 20/11/2019 | MOSAIC | Structure to be approved by T23 partners |
| 0.2 | 19/12/2019 | MOSAIC | New structure and content definition of each section |
| 0.3 | 16/01/2020 | MOSAIC, SOFTECO | First draft of D2.2 – Section 2 and 3 |
| 0.4 | 24/01/2020 | MOSAIC | Second draft of D2.2 – Section 1 and 4 |
| 0.5 | 31/01/2020 | MOSAIC, SOFTECO, UNIABDN | Third draft of D2.2 |

| | | | |
|-----|------------|--------------------------|----------------------------------|
| 0.6 | 04/02/2020 | MOSAIC, SOFTECO, UNIABDN | Document ready for Peer Review |
| 0.7 | 10/02/2020 | MEMEX, UNIABDN | Peer reviewed version |
| 0.8 | 20/02/2020 | RUPPRECHT | Peer reviewed version |
| 0.9 | 24/02/2020 | MOSAIC | Final version for quality review |
| 1.0 | 26/02/2020 | SOFTECO | Quality Review. Final version. |

Executive summary

This document presents the final report on new ideas and concepts for public transport (PT) innovations in prioritized areas, and constitutes the final deliverable in WP2 – *Social innovation, enabling ICTs and data intelligence*. It summarises the results and outcomes of the work package activities, including Task 2.1 – *Review of current experiences* (M3-M10), Task 2.2 – *Developing ideas and concepts for PT innovations in prioritized areas* (M7-M28), and Task 2.3 – *Validation and assessment of new concepts and tools* (M14-M28).

A brief description of the main outcomes from Task 2.1 is provided in **Section 1** of the current deliverable.

Section 2 includes the description of the selected concepts and the description of the ideas for application within the context of each Pilot Lab (PL). This section describes (i) the methodology on how the ICT-enabled social innovation concepts were selected and developed; (ii) the new concepts identified in Task 2.2 through consultation with the PLs; (iii) the ideas for application within the context of each PL and the concepts that were selected for further investigation.

Section 3 focuses on the validation of the concepts that were selected for further investigation in Task 2.2. First, the methodology selected to carry out this exercise is defined. Second, the outcomes and findings of each validation process (dissemination event, survey responses from technical experts and local experts from each PL, workshops with the INCLUSION Stakeholder Forum members and feedback from the LinkedIn discussions) are explained. **Annex 1** at the end of this document includes the six surveys designed for this validation task.

Finally, **Section 4** includes a final discussion about the validation process of each selected concept and conclusions about the implications for the transferability of the concepts to different prioritised areas and vulnerable user groups.

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1 Introduction

1.1 The INCLUSION Project

INCLUSION is a 3-year European project that aims to address a number of challenges related to the accessibility of public transport in prioritised areas. In a fast-changing transport environment, where individuals' mobility requirements have become more complex and the role of new types of mobility services is increasing, public transport continues to be a key requirement for people with specific mobility needs. In settings ranging from deprived urban neighbourhoods to remote rural areas across Europe, an efficient and inclusive public transport system can provide greater access to jobs and educational and social opportunities.

The project is investigating the current conditions across a representative set of European prioritised areas as well as how novel transport solutions involving social innovation and Information and communications technology (ICT) tools can raise the level of accessibility and inclusiveness.

INCLUSION bases its investigation on a large set of case studies involving different forms of geographical areas and transport contexts, demographic categories, population groups and mobility solutions. The case studies provide concrete experiences from various good practice initiatives within Europe and beyond, involving both the public and private transport sectors and a variety of regulatory and business frameworks, as well as supporting technologies, organisational and operational conditions.

Complementary to this research, a number of innovative solutions are being tried out and validated through real-life experiments in the INCLUSION Pilot Labs. These include target areas in **Belgium, Germany, Hungary, Italy, Spain** and the **UK**, providing direct access to a variety of transport environments, socio-economic contexts, cultural and geographical conditions.

1.2 Who this report is for and how to use it

This is a final report on new ICT-enabled social innovation ideas and concepts for public transport innovations in prioritised areas and aims to define (i) the final specification for the selected concepts, ideas and proposal for novel ICT enabled social innovation in transport and mobility (Task 2.1, 2.2) and (ii) the validation of these concepts and the implications for the transferability of the concepts to different environments (Task 2.3).

The target audience for this report are any organisations, authorities and operators that aim to improving mobility situation for certain social groups in different prioritised areas by including some **ICT-enabled social innovation concepts** and by taking into account the eight general principles of inclusive mobility initiatives.

Section 1 describes the objectives and the main outputs of of WP2 research.

Section 2 explains in detail the process and methodology of selection and refinements of all candidate ICT-enabled social innovation concepts and ideas.

Section 3 of this document summarises the outputs of these validation steps through a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis. This validation analysis has taken into account WP3 outcomes by using the eight general principles of inclusive mobility initiatives that have been identified after a systematic analysis of all 50+ INCLUSION case studies. These principles have been taken into account to analyse the degree to which the selected concepts meet (or not) the needs of target vulnerable groups, that are directly tangible and immediately felt by both users and transport providers. For more details, please see [4].

Section 4 of the document lists the final conclusions of this study by highlighting the implications for the transferability of the concepts to different environments analysis and taking into account different prioritised areas, vulnerable user groups, transport provisions, etc.

1.3 Objectives of WP2 research

The INCLUSION Deliverable D2.1 'First report on new ideas and concepts for PT innovations in prioritized areas' introduces the overall scope of research of Work Package 2 and introduces the concept of ICT-Enabled Social Innovation in relation to the project objectives. For a detailed introduction about the objectives of WP2 research it is recommended to refer to this document.

In brief, Work Package aimed at developing ideas and providing opportunities for social and service innovations that respond to the needs identified for user groups and prioritised areas in Work Package 1. The main scope of the research is the application and development of ICT-enabled social innovations to improve the quality and take-up of collective mobility services, ease the promotion of new social policies, share successful initiatives and understand how to make better use of the innovation to achieve the main objectives of the project.

The research and analysis initially conducted on a number of existing experiences and projects (Project Task T2.1) has confirmed that the impact of many social innovation processes can be enhanced or sustained by ICT the domain of inclusive mobility and transport is no exception. Many social innovation transformations have originated from the use of social media platforms or other technologies. It is then simple to perceive the links between ICT and social innovation and their great potentials. This combination is the focus for the research in innovative solutions within Work Package 2 of the INCLUSION project.

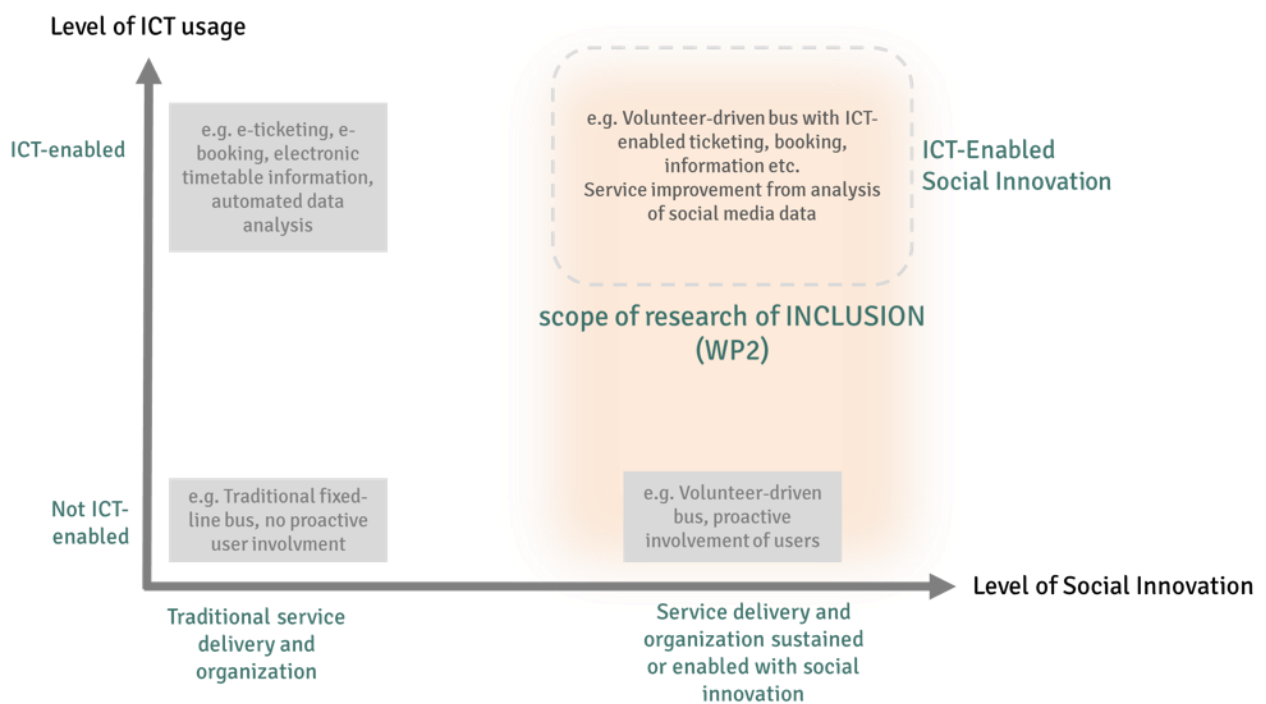


Figure 1 – Scope of research of WP2

Overall, the research of WP2 aims at demonstrating that ICT-enabled social innovation can facilitate/contribute to enabling the modernisation and inclusiveness of the transport system. by:

- improving new collective mobility services
- creating new mechanisms for mobility service delivery
- sustaining organisational reengineering and partnerships¹ in the mobility service delivery,

This can happen through a simplification of processes, an easier take-up of services and improved quality of the information and new service features.

To this end, Work Package 2 conducted the following activities:

- Analysis and review of existing experiences on ICT-enabled social innovation focusing on transport and mobility (Task 2.1).
- Investigation and development of new ideas and concepts with a potential to lower transport accessibility and inclusivity barriers for target vulnerable population groups and user segments (Task 2.2).
- Assessment and validation of the new concepts and innovations with a co-participative approach (Task 2.3).

¹ occurring across multiple levels of governments and between government and service delivery providers

1.3.1 Main outcomes of T2.1

The activities of Task 2.1 have been conducted in the first 10 months of the Project and the outcomes have been fully reported in D2.1 - *First report on new ideas and concepts for PT innovations in prioritized areas* [3].

Task 2.1 aimed at reviewing existing ICT-enabled Social Innovation experiences which are relevant for the objectives of the project, applicable to the background defined in Work Package 1 and transferable to cities and regions across Europe.

Specifically, the activities have been conducted by:

- Searching and analysing existing experiences with a focus on ICT applied to social innovation
- Extracting and generalising the findings from an ICT-oriented perspective, and
- Complementing the review by assessing socio-economic aspects (social acceptance, business models).

The outcomes of Task 2.1 served also as input to task Task 2.2 (*Developing ideas and concepts for PT innovations in prioritized areas*) because the new ideas and concepts defined in this task take into account some of the concepts and the implications identified for their implementation. This includes for example the potential disadvantages, such as the risk of digital exclusion.

The review has been conducted with a classification methodology defined from a multi-year study on ICT-enabled social innovation² (IESI) carried out by the Joint Research Centre of the European Commission (JRC). This has been adopted as the main reference for both Task 2.1 and Task 2.2, while keeping in mind the need for re-usability, exchange, usefulness and comprehension of the outcomes. The JRC study is recognised as one of the most significant at the European level in the domain of ICT-enabled social innovation.

A total of 15 experiences have been reviewed and are documented in D2.1, ANNEX 1.

1.3.2 Main outcomes of Task 2.2

Task 2.2, investigates and develops new IESI ideas and concepts with a potential to improve the accessibility and inclusivity of collective transport services.

The identification and development of new ideas considers the following elements:

- The conclusions and identified priorities from WP1, in particular taking into consideration the different gaps, challenges and general needs in the current transportation landscape

² Misuraca, G., Kucsera, C., Lipparini, F., Voigt, C., & Radescu, R. (2015). *ICT-Enabled Social Innovation to support the Implementation of the Social Investment Package - Mapping and Analysis of ICT-enabled Social Innovation initiatives promoting social investment in integrated approaches to the provision of social services: IESI Knowledge ap 2015*; EUR 27838 EN; <https://doi.org/10.2791/743181>

Misuraca, G, Pasi, G., & Urzi Brancati, C. (2017). *ICT-Enabled Social Innovation: Evidence & Prospective*, EUR 28814 EN. Publications Office of the European Union, Luxembourg. <https://doi.org/10.2760/494727>

identified and highlighted during the work package activity and documented in deliverables D1.2 and D1.3.

- The findings of Task T2.1 in the analysis of existing experiences on ICT-enabled social innovation, in particular considering possible improvements and extensions of some of the reviewed existing experiences.
- Possible evolution of existing case studies (WP3, documented in deliverable D3.1), considering areas where ICT instruments could provide definite improvements in terms of transport accessibility and inclusivity.
- Contributions and suggestions from partners involved in the six Innovation Pilot Labs, including identification of problems, past experiences, envisaged improvements, etc.) (WP4).
- Exploitation of partners' know-how of evolution and trends in the ICT and technology landscape, leading to the identification of possible novel solutions potentially

The new ideas and concepts are intended to be applicable to various aspects, sub-domains and dimensions of the inclusive transport like:

- transport organisation;
- innovative aspects on service provisioning;
- new ways to engage the end users (e.g. survey and engagement tools);
- supporting ICTs (e.g. use of App and social media as a dual channel);
- communication tools to enhance awareness and quality of the information

furthermore:

- the ideas can be developed at **both stakeholder and expert** level;
- the **scale of implementation** of the initiatives and concepts can be very different: national, sub-national, regional, local or multi-national, etc.

For more details on the methodological approach for the definition of new ideas and concepts, see Deliverable D2.1 "First report on new ideas and concepts for PT innovations in prioritized areas", INCLUSION project deliverable.

In the last stages of the Task T2.2 activities, the different concepts have been selected and analysed according to their attributes and suitability for the user and social groups concerned. All relevant initiatives have been subjected to a refinement process according to the mentioned criterion, and the more suitable solutions have been explained in more depth according to their applicability in the different pilot sites. This process of selection and refinement of the concepts led to the definition of the group of concepts to be validated in Task 2.3. This process and its outcome is described in section 2.

1.3.3 Main outcomes of T2.3

After the definition of ideas and selection of the ICT-Enabled Social Innovation concepts to be further analysed based on Pilot Lab (PL) interests (output from Task 2.2), Task 2.3 has been focused on validating these new Innovation ideas and concepts identified in Task 2.2.

Task 2.3 started in month 14, when the PLs indicated their interest in the different selected concepts. Based on these preferences, the assessment and validation of these potential innovations have been designed to follow a co-participative approach with the involvement of different tools and platforms as well as different partners and stakeholders.

The first step to validate these concepts was during the mid-term dissemination event (Groningen, 18th June 2019). During this event, a poster session was organised where a WP2 open-discussion session was conducted to share impressions about the selected concepts with the involved stakeholders.

The second step for this validation was the creation of one online survey per PL to gather more insights about the application of the concepts most relevant to their prioritised area environment and vulnerable user target groups, as well as to analyse the barriers to success and the transferability of the concepts to other vulnerable user groups, and their potential scalability. These surveys were distributed to technical and local experts proposed by each PL.

As a third step, a dedicated WP2 session was conducted with the INCLUSION Stakeholders' Forum experts to validate the viability of the potential innovations to be applied in each Pilot ecosystem. This analysis was related to the transferability of the concepts to different environments (areas, transport provision, etc.) and different vulnerable target groups.

The final step to finalise this multi-level concept validation, was the validation through LinkedIn discussions, which were organised for selected LinkedIn groups.

2 ICT-enabled social innovation: selected concepts

2.1 Task T2.2 – Methodology

Work Package 2 started with the analysis of several existing experiences in ICT-Enabled Social Innovation (IESI) in Task 2.1, while Task 2.2 defined concepts and ideas able to sustain, support or enable the INCLUSION mobility solutions. The activity has been concluded in the second period of the project and culminated with the production of 16 new ideas and concepts. The final catalogue is included as Annex in this report.

To enable a sound validation process, a restricted number of concepts have been identified from the catalogue by selecting primarily the concepts relevant for the activities in the INCLUSION Pilot Labs. The process was not merely a selection but also a refinement and adaptation of the concepts themselves due to the Pilot Labs' specific needs. This section explains how this process of selection and refinement led to the definition of the concepts subject to validation in Task 2.3.

2.1.1 Selection of concepts - Purpose and criteria

The **first criterion** for the selection is the pertinence and suitability between the IESI concepts and the activities of the INCLUSION Pilot Labs. Several of the concepts defined in Task 2.2 are not implemented in the INCLUSION Pilot Labs nor will they likely be in the future. The others, which have a strong relevance with the specific PLs' activities, revealed themselves to be useful and were consequently employed in two main ways:

- They are implemented within the measures being demonstrated at Pilot Sites in WP4 within the INCLUSION project.
- They have concrete potential for future application as enhancements or complementary features of the implemented measures but are not yet implemented.

The first criterion is the most important and significant, as it reveals directly and significantly the relevance to the matter at hand. The comparison between a theoretical concept and its application to a real environment provides concrete information about implementation viability, and therefore a sound validation.

A **second criterion of selection** is to give priority to the concepts which are implemented in more than one pilot site. This criterion allows the investigation of one concept among different scenarios in terms of:

- Scope of application (i.e. different purposes or ways of applying the same concept)
- Geography (i.e. different area types)
- Socio-Demographic conditions (i.e. different user groups or categories)
- Policy (i.e. different legislative conditions under which the concept is applied)

Overall, then, the second criterion is useful in order to provide a diversity of validation conditions through a more complete critical analysis.

The **third criterion** of selection is to consider, from a general point of view, the concept in relation to applicability, suitability and soundness. While all concepts and ideas identified in T2.2 are theoretically relevant for the project, some of them are more suited for application only in specific situations. On the other hand, for other concepts it could also happen that their applicability covers more than what was found in T2.2, according to areas, user groups and needs identified in WP1. In addition, there are concepts defined in a general way (an example is the gamification concept) that require a stricter definition to better fit the scope of the project. This specification is also part of the process of selection and definition.

The above criteria may not necessarily ensure that the concepts eventually selected for validation guarantee the widest and most complete coverage for all inclusive mobility needs. However, this selection has been conducted to demonstrate that IESI can be a valid support for the development of inclusive transport options and to identify and validate some of the most promising solutions.

2.1.2 Three-steps selection process

The process of selection and refinement of the concepts made use of questionnaires and continuous exchange of information with the pilot sites. It's possible to identify three main steps of selection and refinement which led to the final list of concepts to be validated.

The first step of selection, supported by questionnaires, occurred in February/March 2019 and generated a first set of candidate concepts emerging from the actual needs of Pilot Sites. In this first step of selection, the main criteria considered among the above mentioned is the pertinence and suitability between the IESI concepts and the activities of the Pilot Sites.

The results of the first step of selection have been discussed in a dedicated workshop during the Consortium Meeting held in Florence, on 5-6 March 2019. The partners, in working groups, discussed actual needs, limitations, and opportunities related to the IESI concepts and identified how these could be customized for the specific needs of their pilot site environments. This co-design workshop allowed exchange of experiences and opinions on potential effectiveness of the IESI concepts. Furthermore, it showed how these could be applied to support or enable the piloting measures being demonstrated at the pilot sites, not only in the project timeframe, but also in a long-term perspective. After the discussion, subsequent further refinements of the concepts applied in the Pilot Sites occurred. This can be identified as the **second step** of the process of selection.

The final selection for validation (**third step**) has been operated by the Task 2.3 partners, based on the actual implementation and relevance of the concepts. The partners have especially given priority to concepts known by experts and to interesting possibilities which could stimulate the discussion. The methodological approach for the process of selection and refinement of the concepts is depicted in the following Figure.

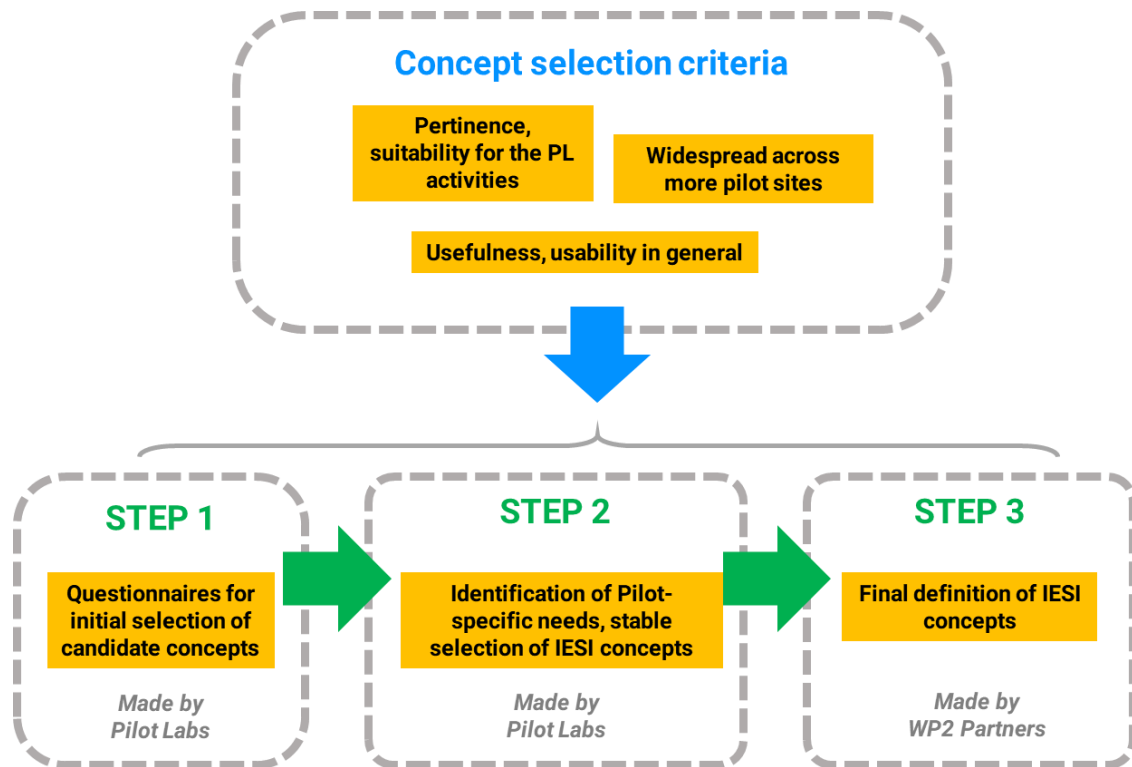


Figure 2 – Process of selection of IESI concepts

The next sections present the actions and outcomes of this process. Section 2.2 describes the outcomes of the first two stages while section 2.3 focuses on the final selection and describes in more detail the concepts selected for validation.

2.2 Concepts identified through consultation with Pilot Labs

2.2.1 Candidate concepts and ideas

The candidate concepts and ideas defined in task T2.2 have been documented in Deliverable D2.1 which was released in Month 14. In the following months, some additional IESI concepts and ideas have been defined. Annex 1 at the end of this document, contains the final catalogue of the innovative concepts defined in Task T2.2. The concepts are summarised in the following Table.

Table 1: IESI Concepts identified in Task T2.2

| Concept name | Description | Addressed actors | Purpose and issues |
|--|--|---|---|
| Gamification | Consists of an application of game elements to non-game contexts, in order to generate behavioural impacts on target users and change their habits/attitudes into more sustainable ones through the introduction of incentives and prizes. | Public Transport/Mobility Providers and Authorities, City Authorities, citizens, third party commercial entities. | Aims to support a more sustainable mode of transport usage targeted to identify user groups. This concept needs a technological device to provide "real-time", "added-value", and "customized service to the users; with "always-on" accessibility and availability of many data, shared from different applications. |
| Aggregating transport demand through social media | A group of citizens could share a trip in their private car with other passengers who have a common destination. | Citizens themselves providing self-organised transport solutions (based on a ridesharing scheme) to answer mobility needs, which cannot effectively be met by any other alternative mobility solutions. | Enlargement of the available mobility options, improvement of the quality of the mobility offer and its cost-effectiveness. It is required a networking system, which could be realised through phone contacts, or more easily thanks to social media. |
| Social Networks as Car-Pooling platform | A formal carpooling system on a social media platform. People attending an event are able to add information about "how they are going to the event", and whether they are 'going and driving,' or 'going but not driving'. Personal information and preferences are used to match drivers and riders. | The main actors in social network events ride sharing are principally the attendees of the events featured but could also involve the organisations involved in staging/hosting the event. | It helps the inclusivity of people living in an area with poor public transport to access events. The technology required is a smartphone, an internet connection and a social network account. |
| Improving data accuracy | Improve data accuracy and data quality coming from the social networks (and other sources) by direct or indirect interactions with the end-users to better understand users' preferences and needs; identify gaps and opportunities of transport services. | The main actors are potential attendees, other organisations related to the event, on-demand bus service providers and technology providers. | The service provider will be able to offer a better service quality adapted to user needs. This system needs digital platforms where people can participate in discussions, competitions, raffles, surveys, as well as a subscription to the relative social platform. |
| Dynamic pricing | Dynamic pricing algorithms allow service providers to stay up-to-date on competitors' prices, mobility offer and demand trends, as well as other influencing factors and automatically incorporate those variables into the pricing algorithm. | The main actors are users of the service, on-demand bus service providers, transport operators and technology providers. The prioritised areas are typically those with low public transport offering. | On-demand mobility services offers more reliable and convenient personalised transportation to satisfy specific user needs, influencing potential users to choose the most suitable trip. Costs are minimal for organisations; the only requirement is to have |

| Concept name | Description | Addressed actors | Purpose and issues |
|--|---|--|---|
| | | | information available of different factors needed for the correct applicability of the DP algorithm. |
| Block-chain Enabled Service Interoperability | This provides a viable method of coordination of parties, such as public and private operators or commuters, which continuously create, exploit, and share data. Decentralization, transparency, security, immutability, collaboration, responsibility and coding are the main features. | The main actors affected by the introduction of this kind of technology are potentially the providers of any kind of mobility service, including public authorities and private operators. | Thanks to this technology, the stakeholders are more likely to co-create/collaborate with each other. In this sense, a more reliable and effective MaaS system is generated. The main enabling factors are the open nature of the technology and the availability of different open source block-chain platforms. |
| Voice-based Conventional User Interfaces | This represents an opportunity to provide users with the experience of having at any time a personal assistant at their disposal, without incurring the costs and scalability issues involved in the setup and maintenance of a call centre of human operators providing assistance to users. | Conversational Interface assistant technology would address the needs of some categories identified as relevant for INCLUSION, such as elderly and visually- or motor-impaired people. | Voice assistant technologies increase the inclusiveness of people with cognitive issue, reduced motor skills, and vision losses, improving their experience and service accessibility. The implementation is due to the availability of commercial cloud-based Artificial Intelligence solutions for voice recognition and language interpretation. |
| Automated Image and Video Analysis for secure access to transport | Automated video stream analysis is used to detect potentially dangerous situations, such as potential crimes or other accidents, analysing scenes, activities, and movements, and alerting human operators only when needed. This has potentially huge implications for public safety. | Safety of vulnerable users (accessing enclosed and secluded areas, or sparsely frequented zones or facilities). | Aims to increase users' perception of safety, especially in isolated service stations. Deep Learning and Artificial Intelligence are the technological elements, with limits related to their capabilities and data privacy statements. |
| Positive Incentives | Scoring mechanisms associated with mobility behaviours that allow travellers to obtain real awards. Users earn 'credits' thanks to the behaviours that are incentivised, which can eventually be exchanged for awards. Different operators could provide the awards. | Public Transport/Mobility Providers and Authorities, City Authorities, citizens, third party commercial entities | Its aim is to foster and promote a shift in users' mobility habits, such as reducing driving or using alternative modes of transport. It can require automated tools to detect the behaviour, or any system able to record pro-active user actions. |
| Aggregation and analysis of users' | Establishment of a common interface to collect user trip requests or social media data formulated through | Entrepreneurs, authorities, traffic operators, public transport organisations. | The data would provide a detailed knowledge of user demand and needs, in order to improve the transport offering. To this end, it is necessary to create a |

| Concept name | Description | Addressed actors | Purpose and issues |
|---|--|---|--|
| demand on mobility apps | different platforms. Data would then come not from a single platform but potentially from many platforms. | | standardised interface able to establish a universal language to mediate across the different data protocols and existing formats adopted by the apps. |
| Inclusive transport agency | Creation of local virtual agencies acting as a social network for the provision of support and advice on transport in rural areas. | Support through offering advice on available: public transport (bus, trains); connections; fares; on-demand transport; ride-hailing services (if available); and other modes of transport. | It is addressed to a small-scale community, aiming to increase their inclusivity with a more customised service and support through a chat/request mobile app or direct human interaction. |
| PING if you care | Users provide real-time information and status about a service. This would be a type of crowd-sourcing mechanism through which volunteers can report problems encountered on transport services. | For people who require a service to access public transport, it is extremely important to have real-time information about the status of these services. | The purpose is to provide a more seamless and maintenance responsive service. It needs a device with active connectivity, such as Bluetooth, and a GPS technology. |
| Support ambassadors | Type of support asked and “matched” virtually through wireless digital signals between individuals’ smartphones. Then, people who need support for their transport access will know if someone is available to help. | Possible target could be elderly persons who would like to sit down in a bus but do not want to leave their luggage out of arm’s length, or a person with a pram that would like to get up a flight of stairs, or a visually impaired person. | In this way, people with disabilities are encouraged to use public transport. For such a system to work it would be necessary for a relatively large number of support providers to sign up. |
| On my way app | These contacts children who live at a walking distance from school, letting them reach their destination grouped and guided by some parents or older pupils. | The main recipients are parents who cannot take their children to the local school (within walking distance). | This concept would support a more sustainable way to reach a destination - walking rather than using the car. It needs an app-based system facilitating the process of aggregation and time management. |
| Two-way escalator prioritisation | Escalators that change their direction according to who gets to escalator or to a waiting button first. | Places with escalators used in both directions. | These solutions could help people with reduced mobility – who rely on escalators – to have more control over their own mobility. Technological elements could be sensors and a system of queue management. |
| Crowdsourcing tools | The idea behind this concept is that the level of “knowledge” produced by a community is deeper than that from a single group or by individual experts. The rationale is that the engagement of a larger group of | The involved actors are the Public Transport Operator or Authority, and other stakeholders. | The crowdsourcing initiatives enable a stronger involvement of customers and potential users who become relevant actors. The citizens feel in touch with the Operators (stakeholder) and think that their |

| Concept name | Description | Addressed actors | Purpose and issues |
|--------------|--|------------------|--|
| | <p>the target audience produces a “mass” effect which is able to include/collect various “expectations”, “considerations” and “needs” coming from different “users” or “stakeholder” groups even when they are not aligned or partially conflicting.</p> | | <p>opinion is truly considered. Technological elements are important in order to implement data collection techniques to facilitate data analysis procedures and to support the management of the whole crowdsourcing process.</p> |

2.2.2 Step 1 - Matching the concepts with the planned measures

In order to investigate the concept implementation attraction and interest level, questionnaires, structured with forms, have been proposed to the pilot sites. It has been used one form for each IESI concept, containing a short description of the concept itself and the following questions:

- *Do you think that the technological and social innovation elements of this concept could be applied (also in the future) to enhance, sustain or promote the measures and actions planned or under implementation in your pilot site? If you think this concept should be applied, how could this be done?*
- *If yes, do you have any plan to adopt this measure or at least part of the above described concepts in your pilot?*
- *Can you imagine any additional ICT and Social Innovation element, which isn't part of the above concept but is related, that can be applied in your pilot?*

The answers to the questionnaires are the preliminary indicators of how IESI elements are expected to be present in the implemented pilot measures and to what extent there are plans for future implementation or extensions.

The following tables report the general characteristics of the concepts which have been identified for implementation in the pilot sites in the first step of the selection process. The concepts are those really interesting for the Pilot Sites, based on the responses of the questionnaires.

Table 2: Preliminary potential application of the gamification concept

| | Gamification |
|--------------------------------|--|
| INCLUSION PL interested | Flanders |
| Concept | Application of game elements to non-game contexts in order to generate behavioural impacts of target users and change their habits/attitudes through the introduction of incentives and prizes. |
| Aim | To foster a more sustainable way to move among the citizens, in order to increase the use of a green modes (collective transport, cycling, walking) instead of the use of private car. |
| Technology | ICT is a key tool to provide "real-time", "added-value" and "customised" services to users; APP and "cloud" technologies enable the "always-on" accessibility to service provision (i.e. journey planning, real-time information, payment, etc.); Sharing data among different applications; E-ticketing system. |
| Target users and areas | Public Transport/Mobility Providers and Authorities, City Authorities, citizens, third party commercial entities; Youngsters - but it can be well understood and appreciated by all users. |

| | |
|---------------------|---|
| Social Innovation | It will build new relationships between organizations and its stakeholders. The latter will be more interested in understand what citizens could prefer, and therefore, their relation will change. Public value allocation and/or re-allocation as it fosters behavioural attitudes (decrease the use of private car). |
| Service improvement | It can contribute to attracting more customers towards PT and sustainable mobility modes. Support promotional campaign of PT or sustainable modes. |

Table 3: Preliminary potential application of the demand analysis through social media concept

| | Aggregating transport demand through social media |
|-------------------------|--|
| Inclusion PL interested | Barcelona and Rhein Sieg |
| Concept | “The ridesharing services” could be managed among a defined group of people with similar mobility needs (in terms of time and destinations). This will aggregate a “driver” who offers a shared ride, with a “passenger” who needs a ride, everything under a cooperative approach. |
| Aim | Citizens provide self-organised transport solutions to fulfil mobility needs, which cannot effectively be met, by any other alternative mobility solutions. |
| Technology | Social media services and their pervasive use in daily life by most of the people (irrespective of age) present a well-performing technological tool to exploit the networking functionality in a simple way. |
| Target users and areas | Areas within the concept are likely to be applied in remote rural and isolated areas (i.e. mountains, hilly, etc.) and peripheral areas of cities. In terms of target users, the concept can be horizontally applied even if it is more appropriate for young families with children. |
| Social Innovation | Need-driven/outcome-oriented production; open process of co-creation/collaborative innovation; fundamental change in the relationships between stakeholders, public value allocation and/or re-allocation. |
| Service improvement | Identify/aggregate/manage groups of people sharing common needs/interests in areas where Public Transport services are not financially sustainable due to low-demand or in areas served only in restricted time coverage. |
| Enabling factors | Aggregation of mobility demand and management of related operational issues. The people involved need to be networked and to “schedule” the ridesharing services; this means contacting each other to plan who will offer the “shared trip” each time (depending also on car availability), who will be the passengers and to manage irregular/uncertain conditions. |

Table 4: Preliminary potential application of the offer-demand matching using social media concept

| | Using social media to match volunteers with persons requiring travel assistance |
|---------------------------|---|
| Inclusion PL interested | Cairngorms |
| Concept | Use of social media to establish a connection between people needing travel assistance and volunteers having sufficient expertise to provide information, physical assistance support or even a lift. This is a basic instance of the 'social network as a carpooling platform' concept where the social network is able to support carpooling services in an automated way. |
| Aim | To informally exchange information and possibly arrange lifts with other travellers through social media. |
| Technology | The concept requires a smartphone, an internet connection and a social network account. If the system uses advanced carpooling features, once a group agrees to a carpool, the driver would additionally receive a suggested route and the system would provide notifications to the passenger(s). |
| Target users and areas | Young people, tourists, parents with young children, volunteer car services, etc. In most advanced versions, users can be grouped together and associations with events may be established (e.g. in the case of the 'social network as a carpooling platform' concept, the main actors in Facebook events ride-sharing are principally the attendees of the events featured, but could also include organisations involved in staging/hosting the event). |
| Social Innovation | The usage of a social media platform enables immediate access to a (large) pool of users with similar interests and requirements. It also removes the need for cumbersome multi-App sign-up and usage. Users of Facebook Events, for example, will be encouraged to offer a ride to friends or request a lift if they have no way of travelling there themselves. |
| Service improvement | Improved access and quality of information and support is likely due to the very high numbers on the social media platform |
| Enabling factors | The platform should be able to match requests and responses to bring together users and actors with similar interests/purpose |
| Scalability/Replicability | This proposed solution, if deployed by social media providers, would be immediately ready for use at any location and in any EU country. |

Table 5: Preliminary potential application of the dynamic pricing concept

| | Dynamic Pricing |
|-------------------------|---|
| Inclusion PL interested | Flanders and Barcelona |
| Concept | Dynamic Pricing (DP) algorithms allow service providers to stay up-to-date on competitors' prices, mobility offer and demand trends, as well as other influencing factors and, automatically, incorporate those variables into their pricing algorithm. |
| Aim | To define the proper prices by demand forecasting, trends and their value with regard to a potential user. This method of DP aims to set the right price, for the right customer, at the right time. |
| Technology | DP algorithms are designed to help the pricing strategy adjust itself, based on different factors (Real-Time issues, predictive science, occupancy, accessibility, distance, time of the trip, time of purchase, competitors' prices, seasonality and trends). |
| Social Innovation | This knowledge contributes to motive and incentivize potential users to choose certain options (e.g. specific on-demand bus route instead of taking own car). DP applied to on-demand mobility services also has other benefits, such as generating positive effects for traffic and reducing pollution |
| Service improvement | To improve these on-demand mobility services by influencing potential users to choose the most suitable trip. Service providers will be able to calculate in real time the marginal logistical complexity of on-demand mobility services in relation to the rest of the network and, consequently, influence and incentivise accordingly, potential users' behaviours to choose the most suitable services. |

Table 6: Preliminary potential application of the Crowd-sourced data collection concept

| | Crowdsourced Data Collection |
|-------------------------|--|
| Inclusion PL interested | Budapest, Florence and Rhein Sieg |
| Concept | Crowdsourced data collection is a method to collect data in real-time, being able to obtain more information from observations, which is not possible in traditional collection way. In fact, the level of "knowledge" produced by a community is deeper than that from a single group or by individual experts. The engagement of a larger section of the target audience produces a "mass" effect, which is able to include/collect various "expectations", "considerations" and "needs" coming from different "users" or "stakeholder" groups, even when they are not aligned or are partially conflicting. |

| | |
|----------------------------|---|
| Aim | The crowdsourcing initiatives enable a stronger involvement of customers and potential users who become relevant actors. The citizens feel in touch with the Operators (stakeholder) and think that their opinion is truly considered. |
| Technology | Interfaces (for information presentation and proposals/feedback collection); tools for the collection of the proposals/feedback; long-range communication network (WiFi, 3G,4G, 5G); Repository for the collection/analysis of the proposals/feedback; analytics module for reporting the results; configuration module. |
| Social Innovation | Stronger involvement of customers and potential users which become relevant even more than in the past. |
| Service improvement | 1) improvement of service planning and operation in order to better cope with user and citizens requirements; 2) launch of new service schemes/solutions; 3) improvement of service quality, for example, in accessibility; 4) enhancement of customer-oriented strategies and definition of targeted/customised services for specific users groups. |
| Enabling factors | 1) a well-designed and targeted dissemination activity to engage the participants and to reach high participation level; 2) use of incentives to foster participation; 3) involvement of supporting stakeholders contributing to dissemination; 4) the presence of a moderator/administrator in order to stimulate the on-line interactions, check the contents and validate their publication. |

2.2.3 Step 2 - Co-design of specific concepts and further selection

More specifications of the IESI concepts potentially applicable in the pilot sites were investigated using a co-design approach during INCLUSION's Florence Workshop, held in March 2019. Further considerations and brainstorming emerged on future usage, opportunities and potential issues related to the concepts. Moreover, the different working groups, represented by two pilot sites each, focused mainly on the concepts of interest for them.

The outcomes of the co-design working groups can be summarised as follows.

Discussion group involving Florence Metropolitan Area and Barcelona Metropolitan Region

- Need to maximise results of data collection through ICT-Enabled Social Innovation.
- The user-needs information gathering, usually performed through online questionnaires and data collection from surveys/questionnaires, can benefit from automatic collection of some pieces of information (i.e. QR code on ticketing machine).
- The gamification concept could also be applied to improve the data collection via questionnaires. Concrete feedback should be provided to the users to maximise effectiveness.
- To capture user requirements in an effective way, an introductory explanation is needed. ICT tools to automatically collect data can be helpful.

- Digital barriers exist for some vulnerable groups using digital platforms. An improvement could be to give incentives to youngsters who help elderly persons to use the platform.

Discussion group involving Cairngorms National Park and Flanders Region.

- Tourists should be encouraged to use public transport services through the usage of MaaS App.
- Social networks can support a form of transport sharing between local people and visitors/tourists.
- Rewards and incentives through local business groups can also encourage people to use e-bikes or join the transport sharing ecosystem.
- Incentives and/or gamification can be an effective way to encourage people to travel outside peak times.
- Providing payment information to vulnerable groups and removing barriers of transport poverty is a feasible option.

Discussion group involving Rhein-Sieg and Budapest

- Both sites have a focus on crowdsourced data collection.
- Integrating a questionnaire into the mobile app from partner VRS can help users provide feedback
- It's important to leverage local networks of user/stakeholder groups to gather and disseminate information.
- Scraping of social media is another way of identifying transport problems.
- Gamification, incentives and voting on certain problems/ideas is a valid option.

The discussion held in the Florence Workshop provided a starting point for further analysis, conducted in the following months, and which led to more specific potential application scenarios as follows:

Table 7: Application scenarios of concepts in step 2 of selection process

| Concept | Short description of envisaged application scenario | Potential application in INCLUSION |
|--|---|---|
| GAMIFICATION | Application of game elements to non-game contexts in order to generate behavioural impacts in target users and change their habits/attitudes through the introduction of incentives and prizes. | <ul style="list-style-type: none"> • Rhein-Sieg: to attract more cyclists • Cairngorms National Park: Cairngorm Connected MaaS system • Flanders region: attract more volunteer car drivers • Barcelona Metropolitan Region: attract more potential CanetRock attendees to BusUp services |
| AGGREGATING TRANSPORT DEMAND THROUGH SOCIAL MEDIA | Technological tool to manage the networking functionality in a simple way through social media, allowing citizens to provide self-organised transport solutions to answer mobility needs that can't be effectively fulfilled by any other alternative mobility solutions. | <ul style="list-style-type: none"> • Barcelona Metropolitan Region: To identify interest in attending to CanetRock festival using BusUp services (potential demand) |
| SOCIAL NETWORK AS CAR-POOLING PLATFORM | Social Network page to informally arrange lifts with friends through social media. The immediate users have access to a (large) pool of users with similar interests and requirements. It also removes the need for cumbersome multi-app sign-up and usage. Users of Facebook Events will be encouraged to offer a ride to friends or request a lift if they have no way of getting there themselves. | <ul style="list-style-type: none"> • Rhein-Sieg: Daily parent and child 'events' • Cairngorms National Park: For tourist events and volunteer driver 'events' • Barcelona: To attend music festivals |
| INCREASE DATA ACCURACY | Methodology to improve data accuracy and data quality stemming from social networks (and other sources) by increasing the number of touch points (direct or indirect interactions) with the end-users. Aimed at better understanding | <ul style="list-style-type: none"> • Florence Metropolitan Area • Cairngorms National Park • Flanders region • Barcelona Metropolitan Region • Budapest |

user preferences and needs, identifying gaps and opportunities of transport services.

DYNAMIC PRICING

Dynamic Pricing (DP) algorithms to allow service providers to define the proper prices by demand forecasting, trends and their value with regard to a potential user. DP aims to set the right price, for the right customer, at the right time, by staying up-to-date on competitors' prices, mobility offers and demand trends, as well as other influencing factors, and automatically incorporating those variables into the pricing algorithm.

- Cairngorms National Park: Cairngorm Connected MaaS system
- Flanders region: attract more volunteer car drivers to the Less Mobile Services/MobiTwinApp
- Barcelona Metropolitan Region: attract more potential CanetRock attendees to BusUp services

CROWDSOURCING TOOLS

The crowdsourcing initiative consists of: 1) a dissemination/promotion campaign to engage the target audience (the participants); 2) a process for the collection of the "contribution/input" given by the participants (i.e. feedback/comments); 3) a management procedure for the crowdsourcing process; 4) tools/procedures for the analysis of the contribution/input provided, their assessment and the drawing of conclusions (extraction of findings).

- Florence Metropolitan Area: As new functionalities of ATAF2.0 APP
- Budapest

2.3 Step 3 - Specification of ideas and concepts selected for public transport (PT) innovations in prioritised areas

The final selection of concepts operated by the Task 2.3 partners is based on relevance and actual usage or concrete interest for the IESI concept. The declarations of interest that emerged during the second step of selection remain valid but, in several cases, no further investigation nor any specification of a 'customised deployment' of such concepts have been carried out by the Pilot Sites. Therefore, some concept vs. site combinations were revealed as not being suitable for a validation, due to the absence of information from the field. Valid combinations are, instead, those where a specification of the concept has been produced, leading to implementation and usage of the concept itself.

Based on the final selection of Task 2.3 partners, the concepts for validation are identified and described in the next sections. In each of the following sections, a focus will be placed on the Pilot Sites pointing out the potential application of the concepts, and the related solution with their technical and social features.

2.3.1 Flanders

Table 8: Concepts and related solutions in Flanders Pilot Lab

| |
|--|
| <p><u>Implementation of Gamification</u></p> <p>The Flanders Pilot Lab is developing the MobiTwin App to allow volunteer drivers to offer their availability and permit mobility impaired passengers to request a lift up until the time of travel. This is improving a service which, until now, required 48 hours' notice to arrange a trip. The potential of introducing gamification elements to the MobiTwin App is being explored; whereby, volunteer drivers collect points, and potentially receive rewards, according to the service they offer/provide. The intention is to maintain interest and enthusiasm in the service and to attract more volunteer drivers</p> |
| <p><u>Implementation of Dynamic pricing</u></p> <p>Dynamic Pricing in Flanders is a measure applied to attract more volunteer car drivers to the Less Mobile Services/MobiTwin App.</p> <p>Taxistop has a Less Mobile Stations (LMS) service where it provides door to door transport for less mobile elderly people in Flanders. Members can call the station to book a trip at least two days in advance. Since Taxistop wants to provide more innovative solutions for sustainable and inclusive mobility, they are organising the roll-out of the Mobitwin App in Flanders. The Mobitwin App will offer a digital version of the Less Mobile Stations service, which matches trip requests for door-to-door transport (in real-time) for older persons and those with mobility impairments with trip offers from volunteer drivers. This provides more convenience for volunteer drivers and</p> |

a more responsive service for passengers. Taxistop is setting up pilot projects at some 'Minder Mobielen Centrales' where both driver and member are using the App

Deliver enhanced MobiTwin App to older, disabled and mobility impaired users

| | |
|---------------------------|---|
| <p>Technology element</p> | <p>The MobiTwin App will be developed to allow volunteers to declare when and where they are available and prepared to offer trips. It will also enable volunteers to respond to passengers' trip demands by agreeing to provide a specific requested trip. Gamification could be introduced to the App by creating a rewards system for volunteers based on their provided trips characteristics, such as the number of times they have offered their services. More rewards/points could be offered for certain trips (e.g. trips for health appointments which are more costly to society if they are missed) and/or for offering services when there are maximum peak demands (passenger requests) or when other volunteers' availability is the most limited. This is a form of dynamic pricing of rewards</p> |
| <p>Social Innovation</p> | <p>The App facilitates volunteers provision of the supply side of the transport service at times that are more suitable for them and rewards them for doing so at the times and for the purposes most needed by society</p> |

2.3.2 Barcelona

Table 9: Concepts and related solutions in Barcelona PL

| |
|--|
| <p style="text-align: center;"><u>Implementation of dynamic analysis through social media</u></p> <p>For the case of Barcelona, information mining from Twitter has been used in order to identify and quantify the potential demand to attend a large music festival, which then forms the basis for designing a pre-bookable bus service at a much earlier time than when the festival is already underway. Two strands of Social Media analysis are applied to determine demand:</p> <p>1) Identifying the Twitter accounts which are most relevant for the event. For this study, Mosaic developed and used their own algorithm.</p> |
|--|

2) Analysing the non-structured data aiming to detect Twitter activity related to the event in different geographic areas. For this, the data analytics tool Moriarty, developed by ITAInnova, is used.

It is expected that the use of these tools combined with other predictive algorithms (demographic distribution analysis, transport connectivity, historic attendees' data etc.) is able to identify particular sets of interested individuals. For instance, a specific section of the population that uses social media, declaring their preferences and aims, allows the mobility service companies to offer tailored services to these target groups through that social platform. In this way, people attending the Canet Rock festival will be served by a new transport system, characterised by new on-demand bus stops and routes, which have been established according to the demand identified through social media data analytics.

Implementation of dynamic pricing

The data on demand identified through social media data analytics, is key information to design a pricing strategy and dynamically adjust ticket values. Efficient pricing strategies can then be defined to attract more potential CanetRock attendees to BusUp services.

Introduce new on-demand services to meet identified mobility needs

| | |
|--------------------|--|
| Technology element | Considers the demand analysis through social media to establish new bus routes and provide a safer, cheaper and more comfortable way for teenagers and young adults living outside the city to travel to a music festival held overnight on the peri-urban fringe of Barcelona (Canet de Mar). Dynamic pricing modules could influence and incentivise potential users to buy their transport tickets well in advance. |
| Social Innovation | The solution applies information mining from Social Networks to identify the demand from potential users who want to attend the festival. This analysis enables planners to aggregate the mobility demand from different geographic areas which are poorly served by existing PT service provision and use this to propose the most suitable demand-responsive tailored bus routes and bus stop locations for the unserved demand. |

2.3.3 Budapest

Table 10: Concepts and related solutions in Budapest PL

Implementation of crowd-sourced Data Collection

In the Budapest Pilot Lab, the objective is to use Crowdsourced Data Collection to improve the PT experience for users with additional specific needs (blind and visually impaired, disabled, travellers with luggage or baby buggies, tourists).

An online public platform has been created to allow travellers to share their travel experiences and highlight specific issues/problems they face on the PT system. This will help BKK understand the needs, barriers and problems of the target group of travellers with reduced mobility and ability to use the PT system.

| Awareness Raising Campaign Measure | |
|------------------------------------|---|
| Technology element | The jarokelo.hu web page and App allow vulnerable travellers on public transport services to report problems and issues they experience on their journey. These are then shared with the relevant authorities and users are notified of the response. |
| Social Innovation | Crowdsourced information is collected, aggregated and shared with authorities to act on. There is transparency for the entire community in issues reported and actions by authorities in response. |

2.3.4 Florence

Table 11: Concepts and related solutions in Florence PL

| <u>Implementation of crowdsourced Data Collection</u> | |
|---|--|
| <p>For the case of Florence, the action involves the use of a mobile app to crowdsource information in order to improve PT services in a rural area and in a deprived urban area with a large presence of people with migrant backgrounds and refugees.</p> <p>Specifically, the introduction of new functionalities on an existing App ATAF 2.0 for getting users' feedback in i) the small Municipality of Campi Bisenzio for people with migrant background and ii) the rural area of S.Piero for rural commuters will offer functionalities to collect crowdsourced user feedback on the operated service. This information will be used by PT operators and transport planning authorities to improve service provision, thanks to a better understanding of user needs.</p> | |
| Introduction of new functionalities on existing App ATAF 2.0 for getting users' feedback | |
| Technology element | ATAF2.0 App enhanced to allow user reporting of incidents and issues while travelling. |
| Social Innovation | Crowdsourced information is collected and shared with authorities/providers. |

2.3.5 Rhein-Sieg

Table 12: Concepts and related solutions in Rhein-Sieg PL

| <u>Implementation of Crowdsourced Data Collection</u> | |
|---|--|
| <p>Crowdsourced data collection is a concept suitable to capture specific user needs and report issues for the 'forgotten paths' measure: this is a measure involving the creation of new, better and safer cycle paths by identifying desired cross-connections and implementing designated cycle paths where this can be easily achieved. This includes shortened connections between, for example, schools and leisure facilities with public transport stops. Following this, the routes will be included in the "Mobil-in-Hennef" map, marked, and communicated in the new Hennef Im Siegbogen development area. Secondary schools as well as the tourist office of the City of Hennef will be informed comprehensively and precisely about the results and the "newly discovered routes".</p> | |
| <u>Implementation of dynamic pricing</u> | |
| <p>The concept is associated with the 'Forgotten Paths' measure. The objective is to use Demand Analysis through Social Media to gain a better knowledge of the demand for cycle routes and help ensure new cycle paths or renewed 'forgotten' paths are located where they are most needed.</p> | |
| Development of App for cycling with relevant information on cycle route, where take shared bike and where storage facilities are | |
| Technology element | <p>Apps such as the Bike Citizens' Cycling App (https://www.bikecitizens.net/de/app/) provide detailed information on all cycling infrastructure and cycle friendly routes. It will inform citizens about the new bike share supply and storage facilities as well as cycle routes using the resurrected 'forgotten paths'. The App also encourages users to cycle more by offering a platform to introduce a gamification rewards programme through 'Bike Benefits' (https://www.bikecitizens.net/de/bike-benefit/)</p> |
| Social Innovation | <p>Crowdsourced information on cycle use (GPS tracks) is collected, aggregated and shared with city planners through the Bike Citizens' Analytics tool for the analysis, potential estimation, and evaluation of cycling data. Individual crowdsourced data on dangerous traffic situations, unsafe infrastructure, cycle security issues etc. can be shared by individual cyclists directly with city authorities through the 'PING if you care!' function. The PING button is a wireless pressure switch that can be attached to a bicycle or clothing. Whenever a cyclist encounters a dangerous traffic situation or a bottleneck, the button can be pressed. Via Bluetooth, the button's data are sent to the Bike Citizens' App. Once the cyclist has reached their destination, the various PINGs are displayed on the route overview as marked points and can be edited by the cyclist and the issue described/categorised and notified to the appropriate body to be addressed.</p> |

2.3.6 Cairngorms National Park

Table 13: Concepts and related solutions in Cairngorms National Park PL

| | |
|--|---|
| <u>Implementation of “Using Social Media to match volunteers with persons requiring assistance with travel”</u> | |
| <p>The main aim of the CNP Pilot Lab is to improve accessibility to public transport for older persons, young adults, teenagers and tourists in CNP. In order to achieve this objective, e-bikes and car clubs are the main measures to be implemented in INCLUSION, supported by a set of volunteers aimed at clarifying and explaining how these new services work. The Cairngorms Pilot Lab is exploring the use of Social Media platforms to pool together people with travel needs (tourists, local old and young people who lack transport or lack the knowledge/confidence to use available transport), matched with people who have capability and knowledge (local volunteers with experience). The desire to improve accessibility is not limited to the tourists’ side; therefore, a greater access for new local new activities and services is also provided for residents.</p> | |
| Develop MaaS type solutions for tourists | |
| Technology element | Considers the gamification features which could entice tourists to use a MaaS product and travel by public or shared transport services. |
| Social Innovation | There is a rewards system that could encourage tourists to visit outside high season (e.g. discounts from partner organisations/tourist attractions/cafes and restaurants), use public transport to get to CNP, and then use MaaS mobility services at off-peak times once in CNP (e.g. free or reduced cost car share or e-bike hire options). |

The following diagram summarises the approach followed in task T2.1 and T2.2 and visualise the initial concepts identified and then the selection of the final concepts.

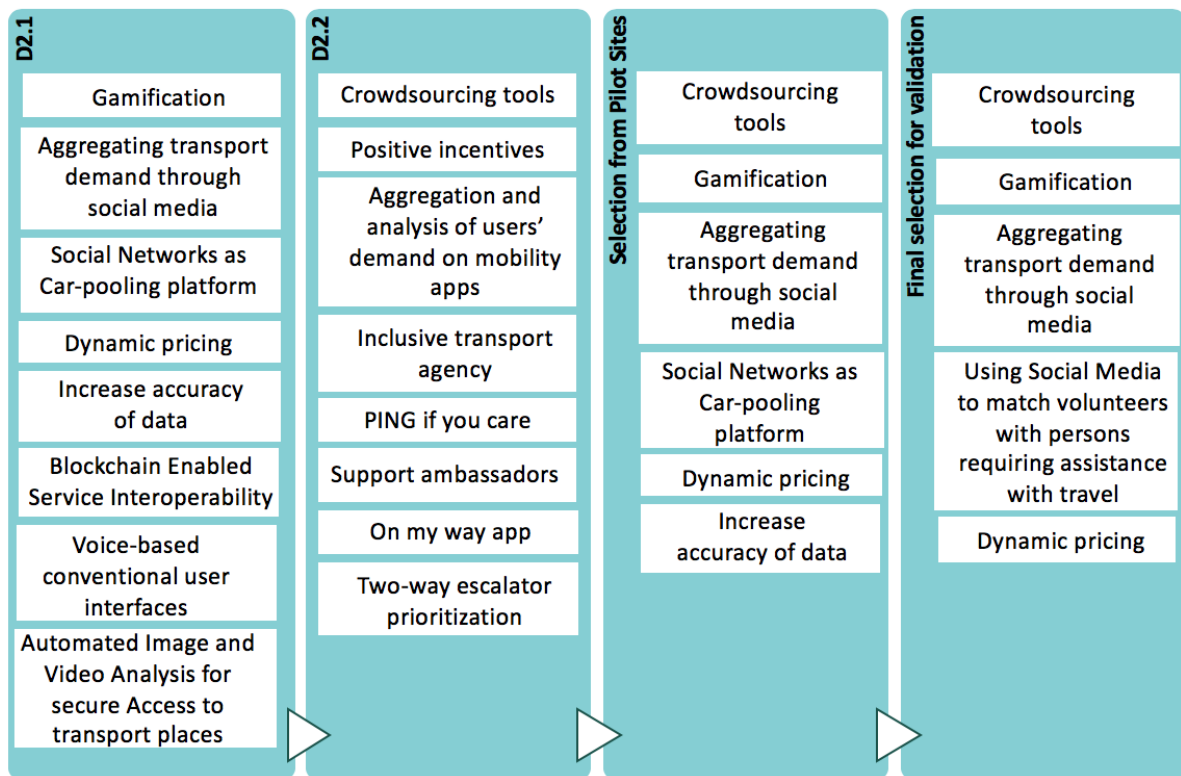


Figure 3: Summary of the selection process

3 Concepts Validation

3.1 Task T2.3 – Methodology

3.1.1 Validation process

Figure 4 summarizes the methodology that has been followed within Task T2.3 – Validation and assessment of new concepts and tools.

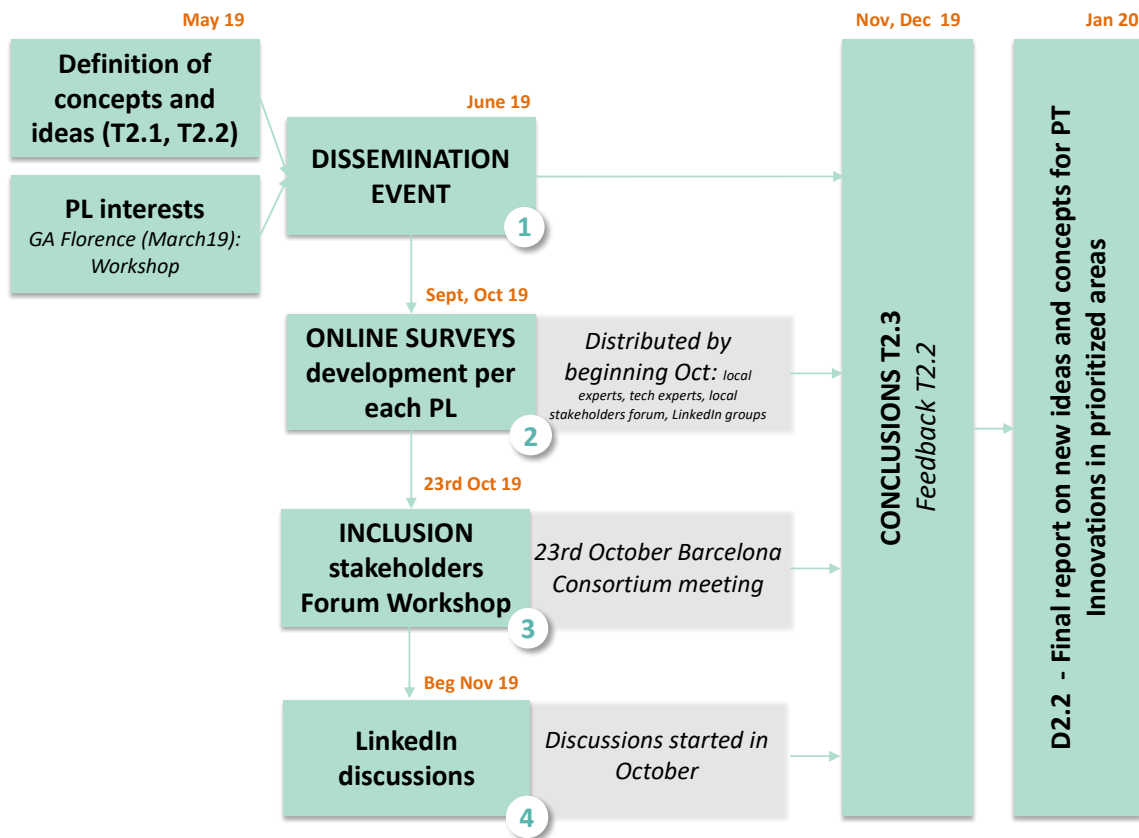


Figure 4: Task 2.3 methodology

After the definition of ideas and selection of the concepts to be further analysed based on Pilot Lab interests explained in section 2 (Task 2.1, Task 2.2), the assessment and validation of these potential innovations have been designed to follow a co-participative approach with the involvement of different tools and platforms as well as different partners and stakeholders. The methodology followed for this validation, within Task 2.3, is based on a four-step approach where the final concepts have been discussed in (i) the INCLUSION mid-term dissemination event, (ii) the online surveys designed for each PL, (iii) the INCLUSION stakeholders' workshop, and finally, (iv) the discussions on social media platforms.

Step 1: mid-term INCLUSION dissemination event

During the INCLUSION Mid-term dissemination event (Groningen, 18th June 2019) there was a poster session where a WP2 open-discussion session was conducted to share impressions about the selected concepts (crowdsourced data collection, demand analysis through social media, gamification, offer-demand matching using social media and dynamic pricing) with the involved stakeholders.

The structure of this poster (Annex 2) includes the identification of four different themes to present the elements that each PL was interested in: Transport Organisation, Service Provisioning, Understanding User Needs, and User Engagement. (Table 14).

Table 14: Concept Opportunities per each PL

| PILOT LAB | TRANSPORT ORGANISATION | SERVICE PROVISIONING | UNDERSTANDING USERS' NEEDS | USER ENGAGEMENT |
|---|---|---|---|--|
| RHEIN-SIEG (DE) | Crowdsourced cycle data informs city authorities on where new or improved infrastructure is needed | | ICT Platform to capture vulnerable user needs through crowdsourced information | Introduce gamification rewards to attract more cyclist |
| FLORENCE METROPOLITAN AREA (IT) | | | ICT Platform to capture vulnerable user needs through crowdsourced information (ATAFAPP) | |
| CAIRNGORMS NATIONAL PARK (UK) | Social Networks as car-pooling/mobility buddy platform | | | Introduce gamification and dynamic pricing to the Cairngorm Connected MaaS system feasibility study |
| FLANDERS REGION (BE) | Introduce dynamic pricing rewards to attract more volunteer car drivers at times of highest demand or to service most socially valuable trips | Person Centred Funding (PCF) mobility budget for migrant job seekers to pay for transport services using MaaS App | | Introduce gamification to attract more volunteer car drivers to the Less Mobile Services/MobiTwinApp |
| BARCELONA METROPOLITAN REGION (ES) | Aggregation transport demand through social media | | ICT Platform to capture vulnerable user needs through crowdsourced information | Introduce gamification and dynamic pricing rewards to attract more potential BusUp users |
| BUDAPEST (HU) | | | ICT Platform to capture vulnerable user needs through a crowdsourced information campaign | |

Based on the concepts that were chosen with potential to be implemented in each PL, the related opportunities of this implementation were identified (Table 15):

Table 15: Concept Opportunities per Pilot Lab

| PILOT LABS | GAMIFICATION | DEMAND ANALYSIS THROUGH SOCIAL MEDIA | DYNAMIC PRICING | CROWDSOURCING TOOLS |
|------------|------------------------------------|--|---|--|
| Rhein Sieg | Attract more cyclist | Identify daily parent and child 'events' | Attract more cyclists | |
| Florence | | | | As new functionalities of ATAF APP |
| Cairngorms | Connection to MaaS systems | For tourist and volunteer driver 'events' | Connection to MaaS systems | |
| Flanders | Attract more volunteer car drivers | | Attract more volunteer car drivers | |
| Barcelona | Attract more potential BusUp users | Identify potential interest to attend to CanetRock | Attract potential BusUp users to buy their tickets in advance | |
| Budapest | | | | Campaign to understand the needs of people |

Finally, a figure indicating the potential time horizon illustrating feasibility to implement these concepts in the six pilot labs was included in the poster. This analysis has been done by WP2 INCLUSION partners and discussed with the INCLUSION Pilot Labs.

Some of these concepts are being demonstrated within the timeframe of the project by the pilot labs within the WP4 demonstrations. This is the case of the Barcelona PL, where the concept of demand analysis through social media concept has been demonstrated to identify potential demand to attend to the music festival. In the case of Budapest PL, the crowdsourcing tools have been used during the demonstration phase to capture vulnerable users' needs. In the case of the Florence PL, the crowdsourcing tools have also been used to capture vulnerable users' needs information.

However, the other concepts that have been identified by the Pilot Labs, have potential for future applications within their PL environments. Figure 5 shows the horizon time illustrating the feasibility to implement concepts in the different Pilot Labs.

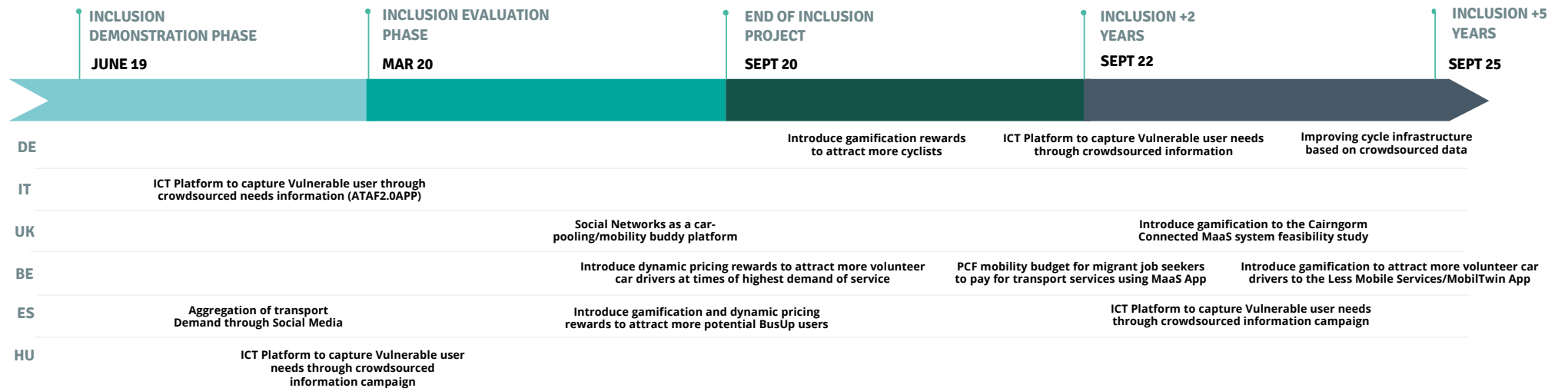


Figure 5: Horizon time illustrating feasibility to implement concepts in different Pilot Labs

Step 2: Online Surveys distributed to technical and local experts from each PL

One online survey for each PL (Florence, Rhein-Sieg, Cairngorms, Flanders, Barcelona and Budapest) has been designed to validate key aspects of the application of each concept to each prioritised area, as well as to analyse the barriers to success and the scalability potential of each concept. Annex 3 shows the raw data collected from each survey.

These surveys have been distributed to 80 different technological and local experts identified by all the INCLUSION consortium and Stakeholder Forum members. Within these 80 experts, there were:

- Service providers: Nektria, Masabi, Govamooz, Kyyti, Push., Lyftshare, Bike Citizens and Ridereport.
- Research Institutes and Universities: University of New South Wales, The University of Sydney, University of Leeds, University of Central Florida, National Chiao Tung University, Newcastle University, University of Glasgow, Heidelberg University, Technical University of Denmark And University of Zilina.
- PT operators and local authorities: SRM – Reti E Mobilità, Horarios Do Funchal, San Francisco Municipal Transportation Agency, Transport New South Wales, Hitrans, Highland Council, National Health Service, Police Scotland, Fire Scotland, Skills Development Scotland, Highlands And Islands Enterprise, Cairngorms National Park Authority, Moray Council, Scottish Council For Development And Industry, Rhein Sieg Kreis, Hennef Council, Tiemme Spa and Ataf.
- Non-profit organisations: Valueyou, Reward Volunteers, Mysociety, Taxistop, Ocmw Oudenaarde, Jarokelo and Klímapanasz.
- All the 14 Stakeholders Forum members

In each survey, different aspects were validated:

- For the crowdsourced data collection concept (Budapest, Florence and Rhein-Sieg), the ambition was to better understand the potential of this concept and analyse the target vulnerable users, associated costs and effectiveness, and the possibility to have a malicious use of the App.
- For the demand analysis through social media applied to the Barcelona PL, the aim was to better understand the target vulnerable groups, best platforms to be analysed, potential issues of quantity and quality of data and suitability and effectiveness of delivering bus services based on this analysis. For the Rhein Sieg PL, the aim was to better understand and improve the cycling infrastructure. In this case, the vulnerable target groups were further analysed, along with the different platforms and the quantity and quality of data.
- In the case of the gamification concept (Flanders), the ambition was to analyse the suitability of this concept applied to the volunteer drivers through the *MobiTwin* App. Also, the potential strategies for rewards were analysed.

- For the offer-demand matching using social media (Cairngorms), the online survey was focused on the potential platforms, target vulnerable users and other key issues such as safety and suitability.

Transferability and scalability issues of each concept have been analysed in all online surveys. To validate the dynamic pricing concept, some questions were included in the Barcelona and Flanders online surveys to have further insights about the rewards potential.

Table 16: Summary of Pilot Lab online surveys

| | PL | Key aspects to be validated |
|--|----------------------|--|
| Crowdsourced data collection | Budapest Florence | Better understanding of the crowdsourced data apps potential: Vulnerable target groups, malicious use of the App, associated costs and effectiveness. |
| | Rhein-Sieg | Barriers to success and scalability |
| Demand analysis through social media | Barcelona | Better understanding of the potential for establishing demand through social media potential: Target groups, platform, quantity and quality of data, geolocation, risks of using data for this purpose |
| | | Delivering bus services based on demands from Social Media: Suitability, effectiveness |
| | | Transferability and scalability |
| | Rhein Sieg | Improving cycling infrastructure based on demand analysis from social media: Target groups, platform, quantity and quality of data, geolocation, risks of using data for this purpose |
| | | Transferability and scalability |
| Gamification | Flanders | Gamification applied to volunteer drivers through MobiTwin App potential: Suitability |
| | | Reward potential |
| | | Transferability and scalability |
| Offer-demand matching using social media | Cairngorms | Matching offer/demand via social media: Platform, Target users, Safety, Suitability |
| | | Matchmaking actions validation |
| | | Transferability and scalability |

| | | |
|-----------------|-----------|--|
| Dynamic pricing | Barcelona | Delivering bus services based on demand from Social Media: Suitability, effectiveness, price sensitivities |
| | | Transferability and scalability |
| | Flanders | Rewards potential |
| | | Transferability and scalability |

The results of this step have been included in the in-depth SWOT analysis of each concept validated applied to the INCLUSION Pilot Labs (section 3.2, 3.3, 3.4, 3.5).

- **Step 3: INCLUSION stakeholders' forum Workshop**

On the 23rd of October 2019, INCLUSION organised a Stakeholders' Forum workshop. During this day, a WP2 dedicated session was conducted to validate the potential innovations developed in Task 2.2. The participants of this working session were divided into three different groups. Each group has at least two Stakeholders' experts, one pilot responsible partner, three other INCLUSION partners and one moderator. Two different pilots were addressed in each group (see Table 17).

Table 17: Stakeholders forum workshop participants

| | Group 1 | | Group 2 | | Group 3 | |
|--------------|------------------------------|----------|--------------------------------------|------------------------------|-----------------|--|
| PLs | Budapest | Florence | Barcelona | Rhein Sieg | Flanders | Cairngorms |
| WP2 concepts | Crowdsourced data collection | | Demand analysis through social media | | Gamification | Offer-demand matching using social media |
| | | | Dynamic pricing | Crowdsourced data collection | Dynamic pricing | |
| SF experts | Diogo Martins | | Martin Schiefelbusch | | Rob van de Bijl | |
| | Jacquie Bridgman | | Yariv Hauer | | Marine Cornelis | |

This session was focused on identifying the Strengths, Weaknesses, Opportunities and Risks of each concept applied to target Pilot Lab. Another key point to be validated was the technology suitability, taking into account different vulnerable users. This analysis was related to the transferability of the concept to different environments (areas, transport provision, etc.) and different vulnerable target groups (see Annex 4).

The results of this step are included in the SWOT analysis of each concept validated applied to the INCLUSION Pilot Labs (section 3.2, 3.3, 3.4, 3.5).

Step 4: SOCIAL NETWORKS discussions

To finalise the multi-level concepts validation, different LinkedIn groups were selected as potential groups to discuss the selected concepts. Table 18 shows the final list of concepts selected:

Table 18: Selected LinkedIn groups

| DEMAND ANALYSIS THROUGH SOCIAL MEDIA | CROWD-SOURCED DATA COLLECTION | GAMIFICATION AND DYNAMIC PRINCING | OFFER-DEMAND MATCHING USING SOCIAL MEDIA |
|---|---|---|--|
| <u>H2020-INCLUSION</u> | <u>H2020-INCLUSION</u> | <u>H2020-INCLUSION</u> | <u>H2020-INCLUSION</u> |
| <u>The Next Mobility: Automotive & Transportation Industry Innovation</u> | <u>PUBLIC TRANSIT</u> | <u>ITNAmerica</u> | <u>SIMRA-H2020</u> |
| <u>Intelligent Mobility</u> | <u>Linking Transportation Professionals</u> | <u>Sharing Economy, Collaborative Network, Social Commerce, Cooperative Economics, Mesh, Peer</u> | |
| <u>Social Media & Data Professional</u> | | <u>Gamification Network</u> | |
| <u>Social Media Basics</u> | | | |
| <u>Social Media Data - Social Data, Big Data, Data Analytics, Sentiment Analysis.</u> | | | |
| <u>Mobility4EU</u> | | | |
| <u>TRACE Project</u> | | | |

However, not all the LinkedIn groups were able to be reached as in some of them there is low recent activity. Thus, LinkedIn discussions were able to be organised in six different LinkedIn groups, as shown in Table 19.

Table 19: LinkedIn groups' discussions

| LINKEDIN GROUPS NAME | RELATED CONCEPT | IMPACT (MEMBERS) |
|--|---|------------------|
| H2020-INCLUSION | All | 84 |
| PUBLIC TRANSIT | Crowd-Sourced Data Collection | 42,788 |
| Sharing Economy, Collaborative Network, Social Commerce, Cooperative Economics, Mesh, Peer | Gamification applied to Volunteer Drivers and Dynamic Pricing | 3,328 |

| | | |
|---|--------------------------------------|--------|
| Intelligent Mobility | Demand Analysis through Social Media | 6,409 |
| The Next Mobility: Automotive & Transportation Industry | Demand Analysis through Social Media | 21,247 |
| Social Media Data – Social Data, Big Data, Data Analytics, Sentiment Analysis | Demand Analysis through Social Media | 729 |

Within these LinkedIn groups different more depth questions were posted:

DEMAND ANALYSIS THROUGH SOCIAL MEDIA

- o Which are the limitations, barriers and risks of using Social Media for travel demand analysis?
- o To what extent do you agree that sufficient information on travel demands can be extracted from social media data for some specific purposes such as designing new bus routes?

CROWDSOURCED DATA COLLECTION

- o Do you think this crowd-sourced information highlighting issues experienced by vulnerable user groups can provide useful data to inform improvements which result in a more inclusive service?
- o Which are the limitations, barriers and risks (e.g. technological or cultural) in using crowd-sourced data collection for the improvement of the quality of transport services for vulnerable users?

GAMIFICATION APPLIED TO VOLUNTEER DRIVERS

- o Do you think volunteers will be responsive to, or influenced by, gamification points or rewards?
- o Is it sensible to incentivise some types of trips ahead of others (e.g. trips for health appointments ahead of social trips)?

OFFER-DEMAND MATCHING USING SOCIAL MEDIA






- o Is it necessary that this type of solution be regulated and managed by a responsible body? E.g. Local authority or community organisation
- o Do you think that volunteer vetting and volunteer training is required? Is this necessary for all volunteers engaging with all user groups (e.g. tourists, local old persons, young persons)?




The results of this step are included in the SWOT analysis of each concept validated applied to the INCLUSION Pilot Labs (section 3.2, 3.3, 3.4, 3.5).

3.1.2 Link with WP3 – Inclusive mobility practices: identification and critical assessment

The systematic analysis of the 51 case studies conducted in WP3 revealed eight main patterns that emerged across multiple cases [3]. These represent underlying principles, which explain the success of various inclusive transport initiatives that meet the needs of target vulnerable user groups. If these principles are not met, they lead to transport poverty for the affected group(s), that are directly tangible and immediately felt by both users and transport providers. These eight principles should be considered systematically to ensure that an inclusive mobility project does not only work technically and financially, but also does justice to the various needs of the target groups. [1, 2]

Table 20: Eight general principles of inclusive mobility initiatives

| Principle | | Description |
|------------|---|--|
| ACCESSIBLE |  | The transport network, stations, vehicles and information are barrier-free (physically, sensorially and linguistically). This also includes ticket machines, apps for smartphone accessibility features, simple user-centric access to digital devices, acoustic and visual announcements at stations and aboard vehicles. |
| AFFORDABLE |  | Transport services are affordable for all users, in particular vulnerable users, relative to their income and proportional to their other overall cost of living. An inclusive society will have to cover related costs and subsidies, and avoid imposing a major cost factor on any particular user group(s). |
| CONVENIENT |  | The time and/or effort required for vulnerable users to reach a transport service (e.g. first and last mile) are minimised so that these users can benefit from the service in their everyday lives. Distance to the nearest service, reliability and adequate information provision about the service (e.g. timetables, route planning) contribute to its convenience. |
| EFFICIENT |  | Once vulnerable users are aboard a vehicle, the time and/or effort required to use the service (e.g. longer journey times, changing vehicles multiple times) are minimised so that these users can benefit from the service in their everyday lives. The main factors contributing to efficiency are vehicle routes, network coverage and intermodal connectivity. |
| EMPOWERING |  | Mobility solutions that build vulnerable users' capacities to get around confidently in their everyday lives. This idea can manifest in a training course or a scheme of "travel buddies" for certain social groups so that they are enabled to use certain transport options without requiring help by other people. Also technology can play a role here if it creates new degrees of freedom. |

| | | |
|------------------|--|--|
| EMPATHETIC |  | Empathy-building initiatives foster awareness and build capacities (e.g. through training) among the transport provider and general public for vulnerable users' needs and increase their readiness to help. Sometimes, mobility options would be more accessible if there were some kind of "helping hand" (literally or metaphorically) to support vulnerable users. |
| GENDER EQUITABLE |  | Gender equitable mobility services enable all users, regardless of gender identity or orientation, to have access to transport services that meet their daily needs. This does not require providing equal services for all, but rather providing services that are equivalent but different, recognising that not all groups have the same mobility needs. Measures that improve and facilitate intermodality, accessibility and safety are primary considerations for gender equity. |
| SAFE |  | Mobility services that increase the perceived and actual safety of all vulnerable users by preventing accidents, theft, violence and harassment. Related interventions include hard measures (e.g. lighting, spatial layout, station and vehicle design, signage, emergency buttons, etc.) as well as soft measures such as human surveillance, communication, staff training and public awareness campaigns. |

ICT-Enabled Social Innovation concepts based on PL interests have been validated through different WP2 actions: a dissemination event; on-line surveys; Stakeholders' Forum Workshops; and Social Networks-based discussions. In the next Section, each concepts is linked with WP3 related principles and evaluated following this structure:

- SWOT Analysis of the concept
- SWOT features found in the previous step applied to each PL
- Key features to be further discussed linked with

3.2 Crowdsourced data collection

BUDAPEST

Crowdsourced data collection to enhance PT services for travellers with additional specific needs by using a platform that will allow vulnerable groups to report problems and issues they experience relating to any aspect of their PT journey: problems and barriers that make PT usage impossible for the vulnerable target groups, problems and barriers that make PT usage difficult for the these groups and good examples that make PT usage easier for these groups.

FLORENCE

Crowdsourced data collection to enhance PT services for travellers in rural areas and for those with additional specific need. This App crowdsources information and feedback from passengers in San

Piero a Sieve (rural area) and Campi Bisenzio (peripheral area with migrant background and refugees). Moreover, this App allows the passengers to assess and rate the quality of PT service and provide information on their needs and problems they may experience while using PT service. This information is collected, aggregated where relevant and analysed by the PT operator in order to find strategies to improve the service.

RHEIN SIEG

Crowdsourced data collection to ensure that children and young people have greater mobility independence and allow cyclists to report problems and issues they experience relating to any aspect of their cycle journey, or to offer compliments where things are doing well. The crowdsourced information is collected, aggregated where relevant and shared with authorities to act on.

3.2.1 SWOT analysis for crowdsourced data collection concept

Table 21: SWOT – Crowdsourced data collection

| SWOT | PRINCIPLES | FINDINGS |
|------------|--|--|
| STRENGTHS | EFFICIENCY | The information received through Crowdsourced Data Collection platforms/Apps can help to highlight to Public Transport Operators and Public Transport Authorities where service improvements are needed. PT operators can improve their services and thus user experience is improved. |
| | ACCESSIBLE, EMPOWERING, GENDER EQUITABLE | Crowdsourced Data Collection tools can help users, especially those who are vulnerable, feel more included in society. |
| | | Solutions of this kind can be useful in identifying user transport habits, preferences and needs. |
| | CONVENIENCE | Such Apps are 'mobile', which enable users to contribute from anywhere on the travel network. |
| WEAKNESSES | EMPATHY | Sometimes, the input received is from people who "think out loud", which could mask the input from the overall crowd, and, consequently, the input that is actually necessary is not taken into account. |
| | | Especially with regard to people with disabilities, it is crucial to understand their behaviour in the first place. With this respect, Crowdsourced Data should complement and not substitute other classic practices for |

| | | |
|---------------|---------------------------|---|
| | | understanding user needs. In other words, ICT should always be merged with 'speaking with the people'. |
| | ACCESSIBLE | In rural areas, there is often a lack of fast broadband connection and access to the Internet. |
| OPPORTUNITIES | ACCESSIBLE/ AFFORDABLE | The widespread use of Crowdsourced Data Collection platforms can be achieved more easily thanks to the use of incentives (of different nature). |
| | EMPATHETIC | People often provide feedback only when they have needs. Therefore, elements of gamification could be a good incentive for collecting more data/feedback. |
| | ACCESSIBLE, EFFICIENT | In areas where real-time information is not provided from the transport operator, these Apps can improve the accessibility of the service by enabling real-time crowdsourced information. |
| THREATS | SAFETY | Using such Apps in rural areas, where users can detect in real time potential disruptions or problems and share them with the general public could lead to a feeling of unsafety (e.g. if a user notifies that they are on a bus, at the same time the user is informing others that their house may be unoccupied). |
| | ACCESSIBLE, EMPATHETIC | This tool may not be accessible to "digitally excluded" people. For instance, the use of technology decreases with increasing age, which makes older people less likely to be involved in Crowdsourcing Data Collection Apps. Furthermore, users from other target groups may decide not to use this technology at all. |
| | ACCESSIBLE | Needs from vulnerable user groups such as elderly, visually impaired or disabled should be studied in detail and ensure the accessibility of these groups to the Apps/platforms. |
| | AFFORDABLE | People with disabilities who have low economic power may not own a smartphone or may not have internet access included in a mobile package. |
| | EMPOWERING | The sample collected from these platforms may not represent all users, especially those who are vulnerable. |

STRENGTHS AND OPPORTUNITIES



Crowdsourced Data Collection can enable vulnerable users to be listened to by authorities and offers the opportunity to have a more **accessible** transport experience if the reported issues and feedback are taken into account. Since vulnerable users have this platform to make their voice heard, this improves their feeling of **empowerment** and provides an **empathy**-building initiative on the transport services. In addition, women and LGBTQ+ users can meet their daily needs in an improved manner, and report safety issues or other barriers to their ability to fully access the transport system and to ensure the service is **gender equitable**.

A further strength of this concept is the **convenience** of being able to report issues in real time and in every location. Consequently, the transport service is offered in a more **efficient** way and with a structure that allows a continuous improvement to the service.

There are several opportunities arising from this concept. The addition of incentives for giving feedback can make the service more **affordable** and improve the accessibility to transport services. Also, encouraging the use of such platforms increases the general public's readiness to help and, hence, is an opportunity to raise **empathy** among society.

WEAKNESSES AND THREATS



The potential Weakness of Crowdsourced Data Collection platforms lie in **empathy**. Vulnerable users considered for this approach have specific needs that may be difficult to understand without getting into detail. Therefore, it may happen that some users report issues and feedback that does not imply a potential improvement for the vulnerable users and, therefore, it does not add value to the service. Moreover, what could potentially happen is that the platform collects information that is not useful and altogether becomes a significant barrier for the scalability of this solution.

Empathy is a crucial factor of this solution for another reason. To create solutions focusing on data collected from this platform, must not obviate the different vulnerable user needs by speaking with them and understanding these needs from a personal or subjective point of view.

The Threats of this solution need to be considered in detail and some are related to the weaknesses. As mentioned above, giving personal information in real time can lead to a feeling of **unsafety**. Also, there may be some issues related to **accessibility** and **empathy** if this solution is not studied from the "digitally excluded" users' point of view. Therefore, special design considerations need to be taken into account to create a simple enough platform for such users, as well as finding other ways to deliver solutions in case any vulnerable user group may decide not to use this technology. Besides, if it is not ensured that data from all different types of vulnerable user groups is considered, such users can feel a lack of **empowerment**.

Another threat to this solution comes from vulnerable user groups that have low economic power and, therefore, it is not **affordable** for them to own a smartphone or to have Internet in their mobile phone plans. Furthermore, users that live in rural areas may not have a fast broadband connection and access to the Internet (lack of **accessibility**).

3.2.2 Crowdsourced data collection SWOT analysis applied to INCLUSION Pilot Labs

Crowdsourced Data Collection concept to enhance PT services for travellers with additional specific needs (BUDAPEST PL)

The use of the public crowdsourcing webpage and the mobile App platform creates a new social connection between the target groups and the public transport authority for the Budapest area (BKK), who will gain a better understanding of the requirements and problems of people with additional needs. Therefore, this concept clearly anticipates an improvement in the current PT services, since it eases in a significant way for the users to report problems and issues and give feedback about their PT experiences, and consequently improves **empowerment** and makes the PT services more **accessible** and **convenient**.

As mentioned above, such a solution should not be considered without merging it with traditional procedures, such as approaching vulnerable users and enabling them to feel included in society. In order to ensure that vulnerable users feel that their transport experience is being taken into account in an **empathetic** manner, there are particular features that need to be studied in detail to ensure the users' specific needs are considered and thus their experience using these services is comfortable. The following considerations for users with additional needs should be considered.

Table 22: Considerations for blind and visually impaired users

| Blind and visually impaired users |
|--|
| The accessibility features from mobile phones and the App should be exploited to obtain the full advantage of such features. |
| Screen reader and speech recognition attributes should be built into the App to make it usable for blind and visually impaired users. |
| It should be easy for users to input the location where they want to report the issue. Therefore, the ability to record in real time the GPS position where the difficulty exists would be useful for this. An element to expedite this could be to add a quick action speech command or button that records automatically the GPS location. |
| GPS technology guides users to navigate within 10 metres of their destination. If a person is blind or has very limited vision, 10 metres from a bus stop can often mean missing the bus entirely. In order to avoid this, clues can be contributed by users that describe permanent landmarks near the bus stop (e.g. a tree, hydrant, post-box etc.). These crowdsourced clues can guide the user very close to the bus stop. This approach has been implemented in the BlindWays App (https://www.perkins.org/access/inclusive-design/blindways). |
| In addition to the measure above, Bluetooth beacons can be installed and connected to the App so that it can alert users getting to bus stops with 1-2 metres of accuracy (more accuracy than GPS). |

Table 23: Considerations for users with disabilities

| Users with disabilities |
|---|
| Add a filter by different accessibility needs to the App/platform. This way, users can report and detect issues that affect them in a more significant way. |
| By adding the above filter, users can contact other users with similar additional needs to improve the feelings of empowerment and empathy . |

Table 24: Considerations for travellers with luggage or baby buggies

| Travellers with luggage or baby buggies |
|--|
| The App should be easy to understand, with no special features that can make using the App complicated. |
| The design should be simple and with a quick submission flow that allows users to report issues in an easy manner. |

Table 25: Considerations for tourists and foreign residents

| For users with disabilities |
|--|
| The App should be available in several languages, including English. Symbols and images instead of text should be used wherever possible to minimise language barriers as well as to minimise barriers for vulnerable users with cognitive disabilities. |
| Volunteers to advise tourists and foreign residents by means of the App. |

Crowdsourced Data Collection to enhance PT services for travellers in rural areas and for those with additional specific needs (FLORENCE PL)

In a similar manner to Budapest, besides making PT services more **accessible** and **convenient**, this platform seeks to improve the feeling of **empowerment** and **empathy** of vulnerable users towards the transport experience. Hence, vulnerable users evaluated in this Pilot Lab have the following particularities that should be taken into account.

Table 26: Considerations for people with migrant background and refugees

| Migrant background and refugees |
|---|
| In order to make the App available for people from different countries, it is important to include several languages. |
| The platform should give easy and understandable information, as well as maps and other visual material, when possible. |
| Promote an appropriate dissemination of the App to make it reachable to all vulnerable users. |

Table 27: Considerations for rural travellers

| Rural travellers |
|---|
| The App should include real-time information and the ability to share it in an easy process, since rural areas rarely have information in real time. |
| Rural areas usually have more critical multimodal connections than cities, so this platform should improve the information regarding multimodality and ensure accuracy on travel times. |

Crowdsourced Data Collection from cyclists reporting problems and issues they experienced (Rhein-Sieg)

Crowdsourced Data Collection platforms for improving cycling paths would make cycling more **accessible, safer and more convenient**. Cyclists also can appreciate this measure as an **empowering** and **empathetic** factor from the Public, Municipal and Transport Authorities. Using this technology for cyclists brings the necessity of particular considerations for the potential users of the platform.

Table 28: Considerations for cyclists

| Cyclists |
|--|
| The App should be easy to use with an attractive design and the ability to interact with other cyclists (e.g. match users who are interested in the same cycling routes) |
| In order for the users to feel they are doing something positive and significant for the cycling infrastructure, the App should be well supported by the authorities. |

3.2.3 Key concepts to be further discussed linked with the crowdsourced data collection concept

Quality and quantity of data

Crowdsourced Data Collection Apps works in a better manner when a considerable number of users are engaged with the service. Therefore, it is reasonable to consider what are the potential

outcomes when the number of users is very low. Within the validation process of this concept, it has been specified that these Apps are still useful even when the number of users is very low. In fact, these services usually start with a low number of users, but they can still provide useful information to Public Transport Authorities and Public Transport Operators for improving PT services and infrastructure. Moreover, it is easier to promote the App when a successful service improvement has been carried out in response to crowdsourced feedback, and this information is shared with other users.

In order to attract more users and generate more feedback, the following strategies can be considered:

- Promoting the App through associations of users with additional needs (e.g. publicising on buildings and vehicles around the main travel routes of users with additional needs).
- Promoting the App through already existing and widely used journey planning/travel information Apps.
- Promoting the App in situ with PT employees making the service known.
- Presenting the progress and actions already achieved in relation to collected feedback to date.
- Linking the usage of the App with gamification/rewards.
- Collaborate with the person who flagged up the problem to find solutions.

Malicious use of the App

The information recorded in the App could result in its malicious use. As mentioned above, the use of these platforms can lead to a feeling of unsafety if, for example, (mainly in rural areas) the user is letting others know that they are travelling and their house may be unoccupied.

The malicious use of the App should be detected and stopped to ensure the **safety** of the users. The following action can help towards achieving this goal:

- Add automatic ICT features, such as blocking multiple replies within a certain timeframe.
- Allowing use of the features only after the user is registered and logged in. Requiring National ID or Passport information would improve the security. For this matter, users would need reassurance and evidence that the App is secure.
- Peer classification by creating an algorithm that classifies users according to type of usage of the App (e.g. it can detect users that report useless information recurrently).

Costs associated with the App

The most significant costs associated with the operation of such Apps are the staff requirements for monitoring and assessing the data collected through the App and the promotional campaign to inform users of the App. Other significant costs are: technical support requirements; data servers and communication costs; and ICT tools and software.

3.3 Demand analysis through social media

BARCELONA

The concept has been applied to establish new bus routes and have a safer, cheaper and more comfortable way for teenagers and young adults living outside the city to travel to a music festival held overnight on the peri-urban fringe of Barcelona (Canet de Mar). The solution applies information mining from Social Networks to identify the demand from potential users who want to attend the festival. This analysis enables planners to aggregate the mobility demand from different geographic areas which are poorly served by existing PT service provision and use this to propose the most suitable demand responsive tailored bus routes and bus-stops locations for the unserved demand.

RHEIN SIEG

For the Rhein Sieg PL, Social Media data could be potentially used to gain knowledge of where young people want to cycle to and from, and to better understand where demand for cycle routes exists but is currently not well understood or catered for and could help ensure new cycle paths or renewed 'forgotten' paths could be established in the most appropriate places.

3.3.1 SWOT analysis for demand analysis through social media concept

Table 29: SWOT – Demand analysis through social media

| SWOT | PRINCIPLES | FINDINGS |
|------------|------------------------|--|
| STRENGTHS | ACCESSIBLE | By analysing social media data, it is possible to identify new potential demand for specific purposes. |
| | CONVENIENT | Most of the data coming from Social Networks are Real Time interactions. |
| | EFFICIENT, ACCESSIBLE | This concept is able to identify inefficiencies and problems of the network in Real Time (e.g. a non-suitable bus route, accessibility problems, etc.). |
| WEAKNESSES | EMPATHETHIC | May not give such rich data as talking to people. |
| | CONVENIENT, EMPOWERING | Social Media can explain what is happening in the city but not with enough level of detail needed for some specific purposes such as identifying new cycle paths or renewed 'forgotten' cycle paths. |
| | ACCESSIBLE | Exclusion of vulnerable users whom are not digitally connected; whereby, analysing social network data they are unable to be reached. |

| | | |
|---------------|---------------------------|---|
| OPPORTUNITIES | EMPATHETIC | Complement social media data with other data sources and use this information as an input for further discussions in focus groups. |
| | EMPOWERING, CONVENIENT | The social media sources are all target-oriented and they gather information on different types of user and activities. Depending on the requirements and the target group to be reached, different platforms are more adequate to be analysed. |
| | | The identification of potential demand through social networks can be focused on reaching different specific targets or vulnerable groups. |
| THREATS | EMPATHETIC | Risk of not considering all vulnerable user groups in the data sample analysed and hence having a low-quality data (biased sample). |
| | EMPOWERING | A significant risk is that what people say they will do on social media is not always what they actually do in reality. This could lead to an unreliable data set. |
| | SAFETY | Data Privacy issue when analysing personal data. |
| | ACCESSIBLE | Low amount of Social Media data containing geolocation. |

STRENGTHS AND OPPORTUNITIES



All social media sources are target-oriented, and they gather different types of user and activities. By analysing these data, it is possible to identify new potential demands located in remote areas where PT is not **accessible**.

Also, the real-time interactions available in social networks enable the collection of data with more frequency thereby enabling: (i) identification of specific problems, network insights (**empathy**) and; (ii) improvement of mobility services **efficiency** to be more **convenient** for the users.

WEAKNESSES AND THREATS



Demand Analysis through Social Media concept could have a potential weakness on the **empathy** principle. It is not the same qualitative data as that gathered through social networks when talking to people, so it might be that some users' insights are not able to be reached. Moreover, this concept is not convenient as, depending on the purpose of the analysis, in some cases this technology is unable to reach the level of details needed; whereby ,the user could not gain **empowerment**.

There are also some Threats identified, such as the lack of **empathy** when building the data set (maybe caused by not making sure that all vulnerable user groups are not represented in the data sample). Also, there are some **safety** issues such as data privacy when analysing personal data. Finally, if this concept is identifying demand analysis through social media to improve PT, in the cases when the geolocation data could not be obtained, this concept is not helping to identify remote places without PT **accessibility**. Also, as it is a digital ICT concept, it could happen that some users would be excluded, and they could not be reached.

3.3.2 Demand Analysis through Social Media SWOT analysis applied to INCLUSION Pilot Labs

Establishing new routes based on Demand Analysis through Social Media (Barcelona)

The target problem was a limited PT accessibility to travel to the music festival (since the event takes place during night-time and PT is infrequent and not flexible) and, in addition, 64% of the attendees are under 24 years old and 69% of attendees are female. Thanks to the demand analysis through social media, the focus was to provide a **safer**, cheaper, more comfortable, more **accessible** and more **convenient** way for teenagers and young adults living outside the city to travel to a major music festival by identifying geographical areas with potential uncovered demand.

This analysis enables planners to aggregate the mobility demand (event attendees) from different geographic areas which are poorly served by existing PT service provision and use this to propose the most suitable demand responsive tailored bus routes (BusUp services) and bus-stop locations for the unserved demand.

Compared to the previous annual event, thanks to the implementation of Demand Analysis through Social Media, the numbers of buses used increased by 32%, the number of stops reached increased by 36% and the number of direct routes increased by 200%. For this analysis, social media data has been complemented with other data sources, such as demographic and transport connectivity analysis to deal with the data quality/quantity issue.

In the case of BusUp services, the new bus routes need to obtain 70% occupancy to confirm its operation. If this is not achieved, the route is cancelled two weeks before the festival. Some actions have been identified to help ensure these routes run: (i) offer discounted bus fare to passengers who 'refer a friend'; (ii) promote the bus service through the festival website and social media accounts; (iii) promote the bus service through schools and colleges; (iv) offer last-minute discounts to fill empty seats (v) inform festival-goers of the new bus service at the time when they buy their festival ticket; and (vi) offer discounted bus fares to group bookings. A further action, which is being explored, to enhance the early booking to the BusUp services (and hence generate confirmed routes by reaching the 70% of capacity threshold as early as possible) is to introduce a form of dynamic pricing to the bus ticket cost.

- **Dynamic Pricing to complement the Demand Analysis through Social Media in Barcelona**

Dynamic pricing algorithms would: (i) influence and incentivise potential users to choose certain options (e.g. specific on-demand bus route instead of taking their own car); (ii) generate positive

effects for traffic (e.g. by reducing congestion) and reduce pollution and; (iii) help design the pricing strategy to incentivise users to buy well in advance their transport tickets (lower prices for advanced bookings) and avoid last-minute purchase.

To better understand price sensitivities of target users from social media, multiple criteria have to be analysed (**empathy, affordability**): (i) the festival key actions timing (e.g. tickets available, line-up decision, etc.); (ii) ratio between incomes and public transport price factors; (iii) user fluxes between the engagement moment, so, when the users decides they want to attend the festival, to the moment when they actually purchase the ticket, etc.

Demand analysis through social media to ensure that children and young people have greater mobility independence (Rhein-Sieg)

Rhein-Sieg Pilot Lab aims to use Demand Analysis through Social Media to gain a better knowledge of the demand for cycle routes and assist in discovering the new cycle paths or renewed 'forgotten' paths that are most needed.

The main risks of using Social Media for cycle travel demand analysis is the quality of data. This issue refers to the level of detail that can be extracted from social media analysis, precisely enough to define paths. One of the opportunities for this issue is that the conclusions from social media analysis give authorities first indications of potential cycle paths as input for further discussion in focus groups (**empathy, empowerment**).

Another risk for Demand Analysis through Social Media concept applied to this PL, is the biased sample that can be extracted from the network, as the digitally excluded user groups (e.g. elderly, people with low income that don't have access to internet, etc.) that will not be directly taken into account. If the input from other data sources is taken into account and complements these initial findings, these vulnerable groups might be included and analysed (**empathy**).

3.3.3 Key concepts to be further discussed linked with the demand analysis through social media concept

Improve quality and quantity of data

Open data or other data sources such as demographic data, wi-fi, etc. can be used to complement the data analysis based on social media data. Also, if other data sources (e.g. transport connectivity data, demographic data, level of incomes, etc.) complement the initial study, the demand that is not active in social networks will be taken (indirectly) into account. All of these actions will help better targeting of the community that should be approached and improve the data quality of each analysis. The use of AI to compile information and cross-check with other data sources will also help to improve **data quality**.

By engaging with key influencers to encourage discussion about the topic and analyse the reactions, users will be more motivated, more active on social networks a **greater volume of data** will be generated for analysis. Another action can be to create groups and events in social media platforms and contribute to increase the volume of data in the network.

Another key issue is the **amount of data containing geolocation**. To be useful for planning and to enhance such routes, information on user locations has to be quite precise. Hence, geo-referencing has to be very accurate. When this information is not freely provided by potential users, data analytics can partly infer the geolocation of users but, also, these analyses can be more accurate if other data sources are used such as GPS positioning from mobile providers, Bluetooth data, Wi-Fi data, etc.

3.4 Gamification for door-to-door volunteer transport service

FLANDERS

MobiTwin app provides ability for both passengers to request trips and volunteer drivers to offer availability right up to the travel. The introduction of Gamification elements to improve the MobiTwin App would encourage more volunteers to maintain interest and enthusiasm in the service through an incentive system, whereby volunteer drivers gain points for their travel offers by taking into account parameters like travel hour available, distance driven, etc. The points are suitable to create a ranking in a virtual game and to get virtual or real awards.

3.4.1 SWOT Analysis for the Gamification for volunteers' concept applied to door-to-door transport services

Table 30: SWOT –Gamification for volunteers

| SWOT | PRINCIPLES | FINDINGS |
|-----------|------------|---|
| STRENGTHS | ACCESSIBLE | The use of volunteers and the concept of adding gamification to door-to-door transport services will encourage more volunteer drivers and will potentially motivate/influence the times of day and types of trips for which volunteers make themselves available. |
| | CONVENIENT | The use of volunteers in this service allows provision of a door-to-door service for elderly people. |
| | EFFICIENCY | Adding gamification to this service allows the system to work more efficiently, since volunteers are more encouraged to offer the service in a way that better meets the needs of the users in terms of both timings and locations. |
| | AFFORDABLE | The use of volunteers makes the service more affordable for elderly users and the addition of gamification rewards can potentially make it more affordable/attractive for the volunteers. |

| | | |
|---------------------------|---|--|
| WEAKNESSES | ACCESSIBLE, CONVENIENT | There may not be volunteers available at the time a user wants to make a trip. Gamification incentives can help overcome this issue but may not be sufficient in all cases. |
| | | Vehicles may not be adapted to suit all the vulnerable user needs. |
| | EMPATHETIC | The nature of the trips and the target users' needs must be understood by the volunteer drivers. Training could be a useful option for the drivers to understand these complexities. |
| OPPORTUNITIES | ACCESSIBLE | Giving incentives only for critical scenarios is an opportunity to make the service more accessible during these (e.g. peak hours, rural or remote areas, night-time, bad weather conditions etc.). |
| | EMPOWERING | To encourage local people and create the feeling of empowerment among elderly users, the creation of local ambassadors might encourage them to be active on the system. |
| | | The scope of volunteer-based services could be extended to services provided by young persons for other young persons. |
| EMPOWERING, ACCESSIBLE | Local volunteers can help elderly users with their local knowledge and, hence, make more accessible their transport experience and increase their feeling of empowerment. | |
| THREATS | CONVENIENT, EFFICIENT | The number of volunteers is limited; therefore, there exists the possibility that a trip cannot be assigned to a vulnerable user at a time when it is needed. |
| | CONVENIENT | Volunteers may not be motivated by the gamification rewards/incentives. Motivation of the different types of volunteers needs to be understood to design adequate rewards. To attract young volunteers often requires financial or extrinsic rewards. |
| | AFFORDABLE | The provider may have financial issues when offering rewards, as it may require partnerships with local businesses or sponsorship to be established and maintained, which can be difficult to sustain if the service, and hence demand for rewards, grows. |

| | | |
|--|--------|---|
| | SAFETY | Elderly users may feel unsafe when travelling in a car of a complete stranger or a non-licensed driver. They might prefer to call a taxi. |
|--|--------|---|

STRENGTHS AND OPPORTUNITIES



The use of volunteers with Gamification features is a way to increase **accessibility** for door-to-door services, which are **convenient** for elderly users. Also, adding gamification can make the system work more **efficiently**, since volunteers are expected to be available more often by adding this feature. The service also becomes more **affordable** for both volunteers and elderly users.

An opportunity to raise **accessibility** to the service is to give incentives only for critical scenarios such as peak hours, rural or remote areas, and night-time or bad weather conditions. Elderly users would feel more **empowered** in society if young and local volunteers are engaged in this service. Locals' knowledge can help these users in the whole trip and give them advice if necessary.

WEAKNESSES AND THREATS



Main weaknesses on the **accessibility** of this solution are created by the possible **inconvenience** of offering such a service. For example, there may not be available drivers at the time when the service is needed, or users may face a long waiting time. Gamification incentives can help overcome this issue but may not be sufficient in all cases. Also, the vehicles may not be adapted to the elderly person that has asked for the service. This last point leads to the idea that elderly users' needs must be completely understood by the volunteers and that training is necessary in order to **empathise** with the users who require the service.

An important threat to the success of this service is having an insufficient fleet to meet the demand, which makes the service **inconvenient** and **inefficient**. Adding gamification can help to reduce this threat by attracting more volunteers (motivated by the incentives on offer). Also, for some vulnerable users, it is crucial to build trust with the volunteer drivers; otherwise, users may feel **unsafe** being a passenger in a stranger's car which would not have an authorised license (such as would be the case for a licensed taxi-cab) and would prefer to pay for other services that may be costly. The use of gamification schemes can help building trust between volunteers and users by adding a ranking system for both of them that accounts for their experience. A review system may also help to improve this gamification scheme.

3.4.2 Gamification for volunteers SWOT analysis applied to door-to-door transport services within INCLUSION Pilot Labs

Applying Gamification to the MobiTwin App (Flanders)

There are many considerations regarding gamification that need to be taken into account when applying it to volunteer drivers. The gamification system can be to collect points earned from each trip and with the ability to purchase prizes with these points (the prizes must be various and valuable). Another way to give incentives would be to benefit from cultural activities to strengthen social cohesion and increase participation in these activities. Other possible rewards could be discounts on food stores, bookstores, cinema etc.

- Dynamic incentives on the use of volunteers to provide door-to-door transport services

In addition to gamification, a form of dynamic pricing (or rather dynamic incentives) could be introduced to the gamification; whereby, increased rewards are offered to volunteers making themselves available at times of day when demand is greatest, or for agreeing to offer their services for trips which are of greatest social value (e.g. hospital appointments).

Dynamic incentives can attract and retain more volunteers. However, it is crucial to not create competitiveness between volunteers. Also, the volunteers should not believe that this service works like a real job in which they get incentives in cash and that depend on their performance.

3.4.3 Key concepts to be further discussed linked with the gamification concept applied to door-to-door transport services

Gamification and rewards for volunteers to substitute real jobs

For the reasons mentioned above, the use of gamifications and dynamic incentives on volunteering door-to-door transport services can lead to a misuse of this service. Volunteer drivers who have low economic power might think of using this service to make a living and this might cause the loss of paid and contracted jobs. Therefore, points and rewards must be very well balanced and the way this service is used should be evaluated in detail to avoid this kind of behaviour.

3.5 Offer-demand matching using social media

CAIRNGORMS NATIONAL PARK

Cairngorms PL is evaluating the concept of using of social media platforms to pool together people with travel needs and uncertainty matched to people with capability and knowledge. This can take the form of:

- Tourists arriving to the Cairngorms National Park who have a specific interest (golf, skiing, whisky) but lack the knowledge on how to access these activities matched with locals who share the same interest and possess the knowledge and possibly possess the transport capability to access the activity.

- Local vulnerable older persons who lack transport and lack the capability or knowledge on how to use public transport services matched with local volunteers who can act as travel buddies to assist in the use of public transport or can offer lifts.
- Local vulnerable young persons who lack transport and lack the knowledge on how to use the new non-conventional public transport services matched with local peers who can share experience of using services.

3.5.1 SWOT analysis for offer-demand matching using social media concept

Table 31: SWOT – Offer-demand matching using social media

| SWOT | PRINCIPLES | FINDINGS |
|---------------|------------------------|---|
| STRENGTHS | EMPOWERING | To share knowledge and potentially to share/offer lifts to the activities that tourists wish to access. |
| | ACCESSIBLE, AFFORDABLE | To make the transport network more accessible for vulnerable users. |
| | EMPOWERING | Locals help locals. |
| WEAKNESSES | EMPATHETIC, CONVENIENT | How to reach tourists (very short time visit) and encourage them to use this platform. |
| | ACCESSIBLE | Technical barrier of mobile and digital connectivity within some areas (e.g. Cairngorms National Park) |
| | CONVENIENT | Locals helping tourists for free is not easy to sell because others earn from the tourists. |
| OPPORTUNITIES | EMPOWERING, EMPATHETIC | This idea is applied to different groups of vulnerable users (e.g. local vulnerable young persons, local vulnerable older persons, tourists arriving with some language barriers, etc.). In some cases, it could be useful to develop training programmes to empower these individuals. |
| | EMPOWERING, CONVENIENT | The social media sources are all target-oriented and they gather different types of user and activities. Depending on the requirements and the target group to be reached, different platforms are more adequate to be used. |
| THREATS | SAFETY, GENDER EQUITY | Lack of trust when matching strangers. |
| | | Data Privacy issue when using or sharing personal data. |
| | ACCESSIBLE | Low number of active users in the platform due to the target users' acceptance. |

| | | |
|--|------------------------|---|
| | | Exclusion of vulnerable users that are not digitally connected and those that are not capable of using the technology; thereby, using social networks to match offer and demand means such users cannot be reached. |
| | EMPATHETIC | Language barriers when matching strangers from different nationalities. |
| | ACCESSIBLE, EMPOWERING | Locals with capabilities accept to share knowledge and to volunteer. |
| | EMPOWERING | Lack of partnership engagement (e.g. social media account managers, local authorities, transport providers, etc.) |

STRENGTHS AND OPPORTUNITIES



This concept allows locals with capabilities to share knowledge with others (locals or tourists) with specific travel needs. In some cases, training programmes can be developed for specific vulnerable users, as this might incentivise and motivate these groups to use the platforms (**empowering**).

The aim of this concept is to make the transport network more **accessible** for different vulnerable users by matching those with needs to those with capability (**affordable, empathy**) through social media platforms. The social media sources are all targeted-oriented and, depending on the requirements and the target group to be reached, different platforms are more adequate to use than are others (**convenient**).

WEAKNESSES AND THREATS



Depending on the target user, it could be difficult to motivate and encourage them to use this platform. One example is the case of tourists who are visiting the area for only a very short time, meaning that they will be reachable only during their trip (**convenient**). Also, depending on the area, there could be a technical barrier due to a lack of mobile and digital connectivity (in remote and some rural areas); therefore, for these cases, this tool will not be **accessible**.

There is a privacy issue when using or sharing personal data that could be a barrier for some users (lack of trust). Moreover, when matching those with needs to those with capability, two (or more) different strangers are matched and, in some cases, **safety** issues can emerge with vulnerable groups such as women, LGBTQ+, etc. (**gender equity**).

As a digitally based solution, the exclusion of vulnerable users that are not digitally connected is a threat. In this case, one solution could be to design marketing and training campaigns for all local vulnerable users explaining how this tool works (**accessible**).

The language barrier when connecting two strangers with different languages could result in a lack of **empowerment** and **empathy** between each other.

A final issue could be a lack of partnership and volunteer engagement; both of which are critical for scalability of this concept. The integration of the gamification concept might improve the engagement and motivate users to volunteer.

3.5.2 Offer-demand matching using social media swot analysis applied to inclusion Pilot Labs

Using social media platforms for matching those with need to those with capability (Cairngorms National Park)

After the validation of the concept, the form that seems more suitable for this concept is to match local young persons with other local young persons, as they are easier to reach by social media platforms. Also, when older persons are matched to local volunteers, in some cases, training programmes explaining how to use this platform should be developed (**empowering and empathetic**). The case of locals helping tourists would need to be further discussed as in this case, the activity could interfere with other business interests of local mobility services that want to earn money from tourists.

Some of the social media platforms that seem the most appropriate for bringing together the target users with need and those with capabilities are: Facebook (Older persons, Young persons or Tourists); Websites with embedded chat (mainly for Tourists and older persons); or Twitter (mainly for tourists).

These social media accounts should be managed for different organisations depending, in each case, upon the target users that need to be reached. In the case of tourists, some options are the 'Visit Cairngorm' organisation, or the local authorities in the area. In the case of youngsters, an account made and managed by the users themselves could also be a good option.

In the case of the Cairngorms pilot, the role of the local authority and/or HITRANS Regional Transport Partnership in facilitating the solution should be to recruit, check (for security reasons) and train volunteer participants.

3.5.3 Key concepts to be further discussed linked with the offer-demand matching using social media concept

Volunteer encouragement

One way to encourage volunteers for this purpose would be to create a local transport organisation for each region and set-up a website to announce the national travel planner with links to the page. Within this page, a rating system with incentives might encourage volunteers to use this system. Also, in the case of youngsters, the creation of local ambassadors might encourage them to be active on the system (empowering).

There are some restrictions on type or value of incentives, payments or gifts for volunteers. These incentives should be low and primarily offered as a reward, (e.g. participating in an annual local event where the best participants receive a gift and are thanked for their offer). Local awareness with the activity might be a way to increase participation in the activity.

One potential risk for this concept is around safety of users and the duty of care. Who is liable/responsible if a match arranged through the platform between a volunteer and a user results in a problem for one of the individuals? This is an issue for many vulnerable groups. For instance, women (especially tourists) may not feel safe travelling in a stranger's car; this could also happen the other way around, with a volunteer woman who may not feel safe in allowing a complete stranger in her car (gender equitable). There should be some guarantees/logos/follow-me-in-real-time options to minimise this risk. Also, there would need to be a clear complaints procedure for all parties.

Once the match is made, an informal offering of lifts by locals with capabilities could be encouraged or promoted but only through local potential users and should be established by following formal schemes ([https:// liftshare.com/uk/community/hitravel](https://liftshare.com/uk/community/hitravel)) or community transport run by voluntary car schemes.

4 Conclusions

4.1 Implications for the transferability of the concepts in different environments

The transferability analysis has been carried out by considering different vulnerable user groups such as older people, children, youths, women and care givers, people with disabilities, people with migrant background, job seekers, people in rural areas, those without a driver's license and people with a low income. Moreover, this transferability analysis has been focused on four prioritised areas and contexts: rural/remote, peri-urban, low-income and urban areas; all of them have a distinct set of mobility challenges and opportunities (Table 32). Across these area types, different users tend to be affected by the unique local context conditions that contribute to insufficient, inaccessible or non-existent collective mobility services [4].

Table 32: Area types characteristics

| AREA TYPE | MOST PRESSING MOBILITY CHALLENGES | TOP MOBILITY AIMS |
|------------------|--|---|
| RURAL/REMOTE | Inaccessible neighbourhood, social isolation, insufficient PT service, high costs of mobility services, lack of car ownership by vulnerable users, service withdrawal (bus service and other services, e.g. post office, doctors, shops, etc.), dependence on neighbouring town centres, not encouraged for cycling and walking and insufficient information provision. | EFFICIENCY, AFFORDABILITY, ACCESSIBLE, CONVENIENCE |
| PERI-URBAN | Insufficient and discontinued PT services, social isolation, development and infrastructure does not encourage walking and cycling, first-last mile challenges. | ACCESSIBILITY, CONVENIENCE |
| LOW-INCOME AREAS | Low car ownership, tend to only be able to afford older vehicles that require more maintenance and fuel, lack of resources to pay for PT tickets, bikes, perceived or actual safety concerns, tend to underprioritized for public investment due to low tax base, less organised and connected to make their voices heard in the political arena, employment opportunities low/decreasing (businesses and industry closing down) | AFFORDABILITY, CONVENIENCE, GENDER EQUALITY |
| URBAN AREAS | Inaccessible transport options (infrastructure or equipment, barriers), high costs, social isolation, insufficient information provision, perceived or actual safety concerns, lack of trust between resident, lack of social cohesion | ACCESSIBILITY, SAFETY, GENDER EQUITY |

4.1.1 Crowdsourced Data Collection

The engagement of a larger part of the target audience produces a “mass” effect which is able to include/collect various expectations and needs coming from different users or stakeholder groups even when they are not aligned. This section, identifies the different drivers/benefits and barriers/limitations of the transferability of the crowdsourced data collection.

DRIVERS and BENEFITS

After the validation analysis, the drivers and benefits for the transferability of Crowdsourced Data collection have been identified:

- Crowdsourced Data Collection Apps are a potentially useful tool regardless of the type of user, since it allows everyone to report issues/problems on PT usage.
- Another driver for the transferability of this concept is that because such areas are more disconnected and lack real-time information, the implementation of this technology can help with providing this information to the interested users.
- Potential safety issues experienced by women could be easily reported through this App.

BARRIERS and LIMITATIONS

This solution is transferable in most cases, but there are some barriers under certain circumstances, as shown in Figure 6 . The following user groups have special considerations that should be taken into account for the transferability of the concept:

- **Elderly users** can feel digitally excluded if they are not able to use the technology. Organising workshops to explain them how to use this service could make them feel more empowered.
- **Disabled users** require several accessibility features for the App to be convenient for them. For physically disabled, the App should have a simple design and the ability to add real-time location for the reported issues. For blind or visually impaired, speech recognition and screen reader should be implemented.
- For **low-income users**, owning a smartphone or paying for a mobile Internet plan may be unaffordable, so these users should be taken into account from a different approach.
- In the case of **migrants**, there are language barriers that should be overcome by making the App available in different languages and using images/icons instead or as well as text wherever possible.

From the prioritised areas point of view, it is evident that rural or low-income areas with no internet connectivity are unable to use this service at all, which restricts transferability for these cases.

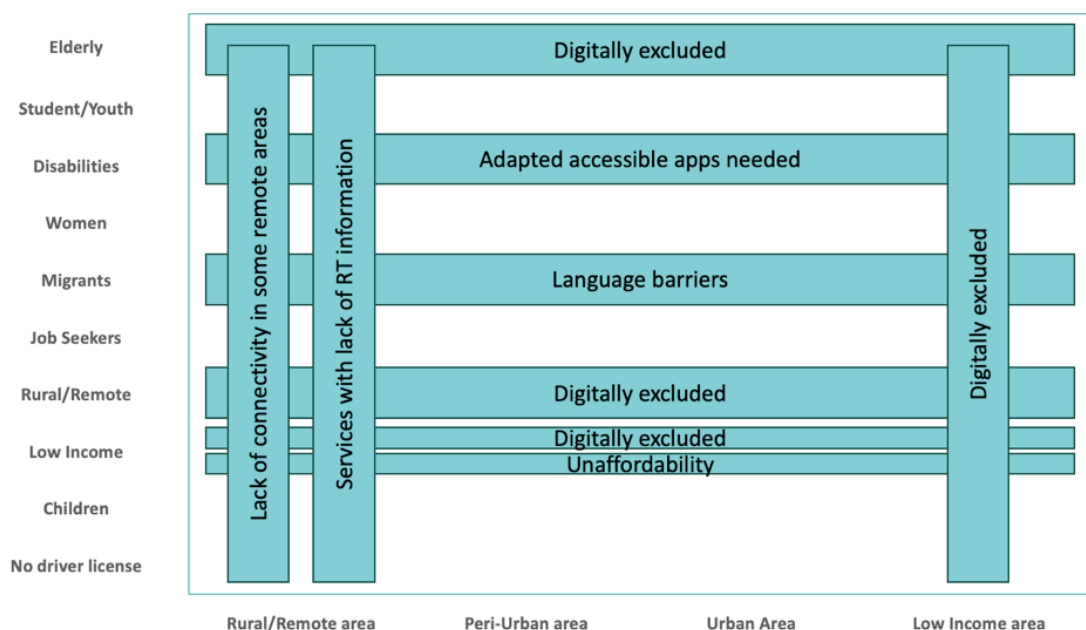


Figure 6: Barriers for the transferability of Crowdsourced Data Collection

4.1.2 Demand analysis through social media

Demand Analysis through Social Media is a concept that can be applied to many transport services. In the case of Barcelona, the concept has been applied to analyse the demand for a music festival, but it could be transferred to analyse demand for other vulnerable users and other areas that need different transport services. The drivers/barriers and barriers/limitations of this concept have been evaluated in this section.

DRIVERS and BENEFITS

The drivers and benefits for this concept are the following:

- A key criteria or driver is that uncertain but large latent demands can be identified through Social Media data analysis. This data removes the uncertainty and establishes the level of latent demand allowing better design of transport solutions that meet the demand.
- In some cases, there is a lack of existing suitable transport service or infrastructure in the location or at the time when the demand exists

BARRIERS and LIMITATIONS

Regarding type of users, the following barriers should be considered:

- Elderly users may not be active on Social Media networks and hence this user category could be masked by other user categories that are more active on social media. Therefore, transport authorities/providers should be careful when analysing the demand, especially if the service offered is addressed to elderly users. Likewise, other vulnerable user categories that are not active on social media might not be included in this analysis.
- Rural/remote areas users may not trust Social Media to the extent of showing interest towards a specific transport service. These users may not consider Social Media a channel to share their insights about transport preferences or needs.
- Low income users may not be using Social Media if owning a smartphone and paying for a mobile Internet plan is unaffordable.
- There may be privacy issues when analysing data from child users.

As for particularities for prioritised areas, it can be inferred that rural/remote areas usually have a significantly lower amount of data compared to urban areas, where most of the information comes from. Therefore, data obtained from these areas should be studied separately and in detail, and always merging it with other sources that complement it and add some human factor.

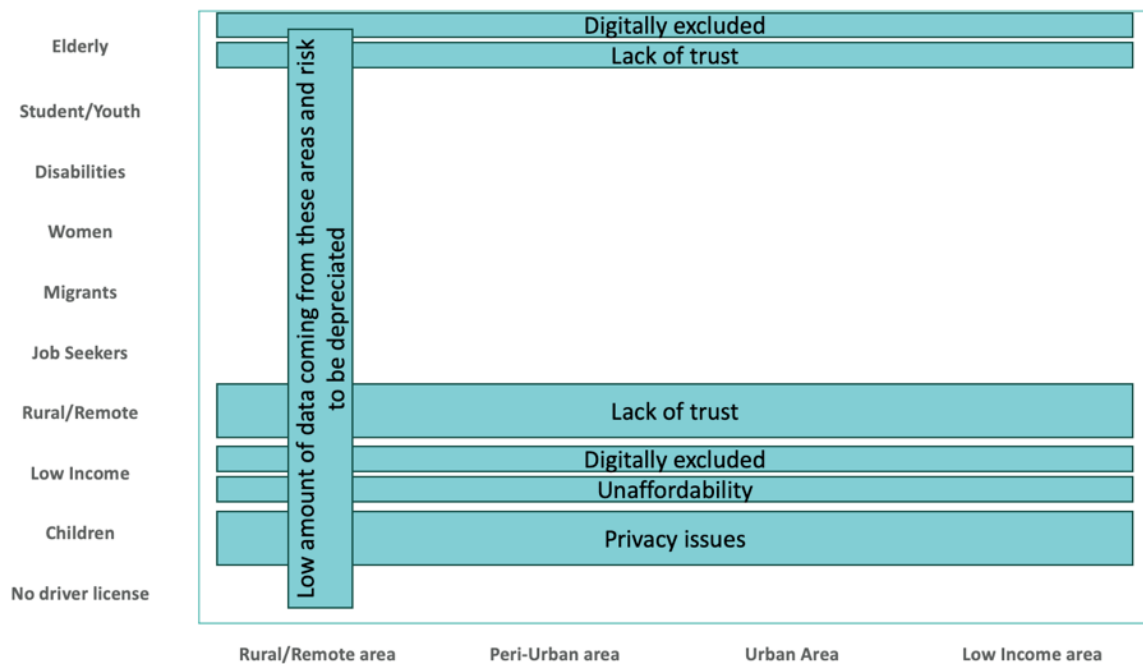


Figure 7: Barriers for the transferability of Demand Analysis through Social Media

4.1.3 Gamification for volunteers

Gamification for volunteers offering door-to-door transport services is a concept that could be transferable to any particular scenario in which this service is practical and helpful. The drivers/benefits and barriers/limitations for this concept have been evaluated in this section.

DRIVERS and BENEFITS

- Elderly users can feel hesitant to use this service due to the lack of trust and knowledge that they could feel towards it. Besides, the possible digital exclusion of these users could make them feel less empowered. Adding gamification, for example with a ratings and review system, could help building trust and improve the user experience.
- Disabled users have specific and different needs that may require adapted vehicles to offer transport services. Moreover, the specific needs of these users should be fully understood in order to grant an empathetic service. Gamification elements related with vehicle adaptations could establish a way for the users to know the vehicle adaptations and letting know their necessities.
- Users with migrant background could feel very integrated by using such service. However, the service could cause the opposite effect if they did not know about the existence of the service. Besides, potential language barriers should be taken into account. Gamification features when recommending the App would increase the acquisition of users from these backgrounds and hence their inclusivity in transport services.
- Rural/remote areas users may not trust such services if the driver is unknown. Therefore, a system should be enabled to make them trust this service by including gamification elements such as rating and review systems.

BARRIERS and LIMITATIONS

Concretely, rural areas often lack quality service and such service could be very advantageous for specific trips. The barriers found for this concept are shown in Figure 8.

- Gamification elements could be too complicated to use for elderly users, who could lose trust in the service (e.g. if they do not understand how to use the review and rating systems).
- In the case of people with disabilities, if the gamification elements do not consider the accessibility features related with their needs, the service might be felt as non-empathetic.
- Regarding vulnerable users with migrant background it is essential to design the Gamification elements in the App considering features that overcome the language barriers.

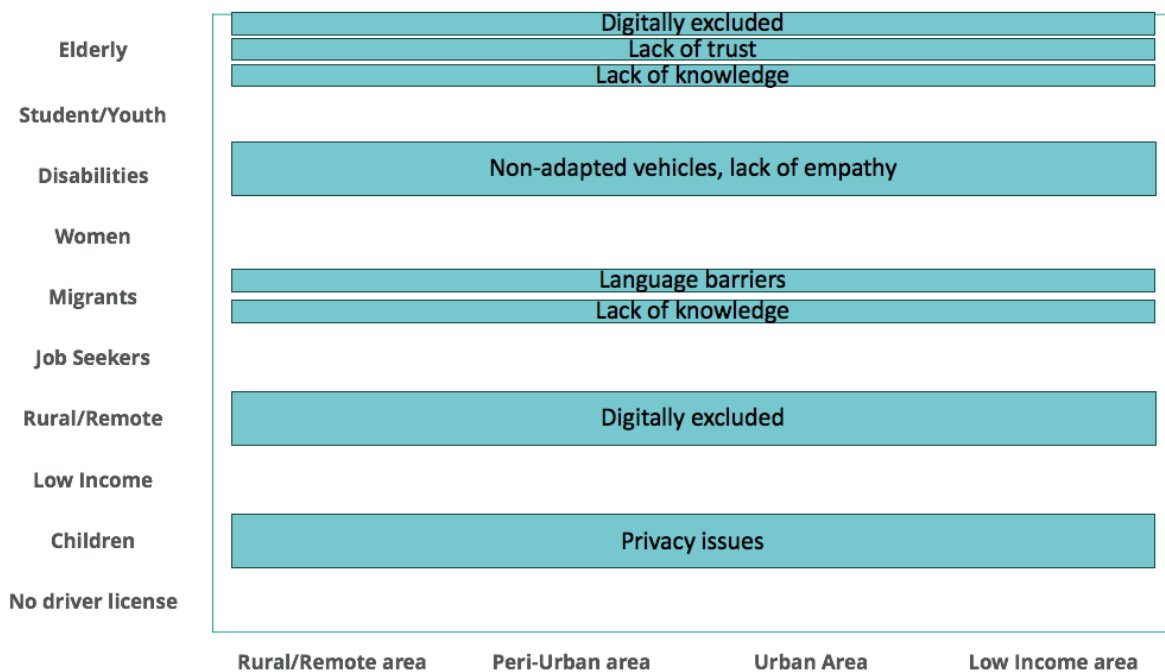


Figure 8: Barriers for the transferability of Gamification for volunteers

4.1.4 Offer-demand matching using social media

Offer-demand Matching using Social Media is a concept potentially transferable to all types of users. The main factor for the transferability of this concept is mainly the possible needs of the users to travel to a certain place, but also the possible capabilities of the compatible user that would accompany the other user. The drivers/benefits and barriers/limitations of this concept have been examined in this section.

DRIVERS and BENEFITS

After carrying out the validation of the concept, the following drivers have been identified:

- Potential visitors to a particular place may not know the area and the available activities. This lack of knowledge is a driver to apply this concept in order to match these visitors to

locals that know the area and have similar interests. These potential visitors can be tourists or elderly locals that do not know the area well.

- The application of this concept can assign travel buddies³ to elderly users interested in visiting a place. In this manner, these users can feel more empowered at the moment of traveling.

BARRIERS and LIMITATIONS

The main barriers for the transferability of this concept are:

- Tourists only have a short period of time to be reached. Therefore, the platform should work very efficiently to match these users to travel buddies. Besides, other possible barriers for tourists are the lack of trust and knowledge of the service.
- Elderly users may feel digitally excluded (lack of empathy). Besides, they may not trust this system to find travel buddies.
- For the case of disabled users, as mentioned in the previous concept, the vehicle must be adapted to the needs of the user, which creates a potential barrier. Moreover, the volunteers should be adequately trained to understand the needs of different users.
- A significant potential barrier is the management of the service. An organisation should take care of this matter and vet the suitability and trustworthiness of the volunteers.
- Safety issues may happen when matching vulnerable users with non-professional volunteers.
- Depending on the area, there may not be enough volunteers available to meet the demand.

³ A local volunteer who visits and gives help and support to a vulnerable traveler that is interested on visiting a place.

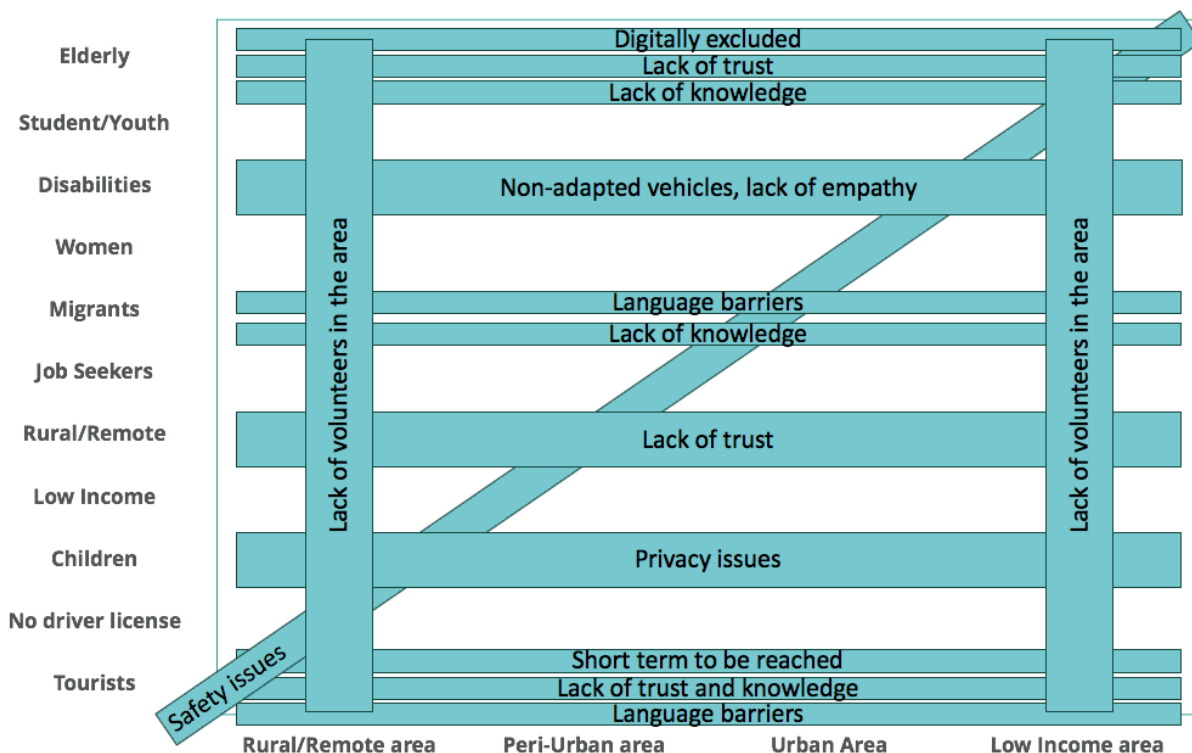


Figure 9: Barriers for the transferability of Offer-demand Matching using Social Media

4.2 Inputs for the business modelling work in WP6

The assessment of the ICT enabled Social Innovation concepts described in this deliverable presents some useful inputs for deriving the business concepts and developing the business modelling work to be conducted in WP6. The implications for WP6 from the four main concepts explored above are as follows:

Crowdsourced data collection

Travel information apps and services are typically developed by the private sector and revenues are generated through commissions on bookings made through the App, subscription payments from end users to access the App functions and features, advertising, or through license payments from public sector authorities to make the App available to all citizens. Crowdsourcing features add value to these information Apps, especially for the transport authorities and providers, as they provide a means for vulnerable users to directly communicate to authorities and operators the problems they encounter when travelling and/or to highlight some issues in transport service offer.

There are significant costs incurred by transport authorities or providers to improve infrastructure or adjust service provision that addresses the needs of vulnerable users and removes problems experienced by vulnerable users when travelling. The information from crowdsourcing apps helps to identify the priorities for allocating limited budgets to make improvements as well as identifying the quick and cheap fixes.

To deliver the above in an effective manner requires engagement between the private sector to enhance their travel information apps to capture user's needs, and to share these with public sector transport authorities to commit to invest time and budget to make necessary improvements. This suggests that a public-private partnership approach provides the best funding model to delivering these services in an effective manner. This will be investigated further in WP6.

Demand analysis through social media

Demand analysis through social media can be used to identify where there is sufficient demand for commercial bus operations. The design of these services can be tailored to the predicted demand. In some cases, this provides a purely private-sector initiated solution where sufficient profit is generated from the bus operation to pay for the data analysis work. This is the case in the Barcelona pilot lab application where the private sector technology developers/data analysts are contracted by the private sector bus operator to identify the stop locations and routes where predicted demand is sufficient to make bus operation profitable.

The application explored by the Rhein Sieg pilot lab would require a different business approach where the public sector transport authority would contract the private sector technology developer/data analysts to identify the locations where safe cycle infrastructure/routes is most needed for school pupils. This would require some form of public sector payment to the private sector technology company to undertake the required data analysis work.

Gamification for volunteers

Gamification for volunteers provides the potential to add value volunteer car services which provide a low-cost mobility solution in mainly rural and peri-urban areas where alternative transport options are scarce. The attraction and retention of volunteers is a main challenge for these services. Introducing an element of gamification to reward volunteers has the potential to attract more and different kinds of volunteers (younger persons motivated by rewards rather than intrinsic self-fulfilment) as well as helping to acknowledge contributions of existing volunteers through providing rewards as a thank-you. For many volunteers the rewards do not need to be financial or have any tangible value. However, for other volunteers they are motivated by financial reward or may need an extra incentive to consider providing increased or trips different to their norm. e.g. a volunteer who takes elderly people to a lunch club, may need extra incentive to take a disabled person to a health appointment.

From a business perspective there are a number of considerations which need to be taken into account. Firstly, if tangible rewards are introduced through gamification, these need to be sustainable. This requires either additional charges to users of the services, additional funding from public sector transport authorities, sponsorship or donations of rewards from local businesses or partnerships with other sector providers (e.g. health sector partners) who may benefit. A second consideration for volunteers who use their own private car is related with the legislation restrictions for the amount and types of financial reward they can receive without violating the rules of their personal insurance. The third consideration relates to whether volunteers using private vehicles are suitable providers of services for vulnerable users with complex needs, or if they are reliable enough for providing necessary trips. The business modelling work in WP6 will explore the types of

trip and user that volunteer car services are suited to and where gamification can enhance the service to these persons. It should also consider if there is a need to professionalise volunteer provision for certain trip purposes and for certain vulnerable user groups, through use of paid drivers using accessible vehicles and who are trained in the needs of complex vulnerable users.

Offer-demand Matching using Social Media

Using social media platforms to match users demanding or needing transport assistance, transport information or transport provision with volunteers who can provide a service or offer to help has the potential to deliver an informal low-cost solution where other formal assistance, information or transport services do not exist. This is especially relevant to rural areas. However, while this may be workable with little intervention from public sector bodies for some specific users and domains, it is likely to require oversight and management for most applications, which introduces additional costs. The vulnerabilities of the particular users also dictate whether specific training of volunteers is required and the extent to which volunteers are required to be vetted prior to engaging with users. All of this starts to add to the cost and human resources requirements to deliver the solution. It raises questions about who is suitable and has the capability to oversee such a solution and who provides and funds the training required.

Different levels of service are likely to require different business approaches. Where volunteers simply share information via social media, this would require minimal intervention from a gatekeeper or moderator to ensure information was appropriate. Perhaps some basic initial vetting of “volunteers” would be necessary. Where volunteers offer assistance to travel by acting as an escort or buddy then more stringent vetting would be required and volunteer training would likely be necessary for assisting certain vulnerable users. Where volunteers are offering a lift-sharing transport service then vetting would be required and possibly training for certain vulnerable user groups. The business modelling work in WP6 will explore in more depth what level of service is suitable and to which vulnerable users for offer-demand matching using Social Media.

5 ANNEX 1 – Detailed definition of new ideas and concepts

This annex includes:

- The ICT-Enabled Social Innovation ideas and concepts defined in Task T2.2 after the submission of Deliverable D2.1 which contain the first version of the catalogue.
- As a reference, the ICT-Enabled Social Innovation ideas and concepts already described in D2.1 which are still relevant for the validation conducted in Task T2.3.

The complete list of concepts is the following (in **bold** the new concepts defined after submitting D2.1 and described in this annex (see sect. 2.2.1)).

- Crowdsourcing tools
- Gamification
- Aggregating transport demand through social media
- Social Networks as Car-Pooling platform
- Dynamic pricing (**redefined in D2.2**)
- Increase accuracy of data
- Blockchain Enabled Service Interoperability
- Voice-based Conventional User Interfaces
- Automated Image and Video Analysis for secure access to transport places
- **Positive Incentives**
- **Aggregation and analysis of users' demand on mobility apps**
- Inclusive transport agency
- PING if you care
- Support ambassadors
- On my way app
- Two-way escalator prioritization

The selected concepts for validation (described in this annex) are the following (see sect. 2.2 and 2.3)

- Crowdsourcing tools
- Gamification
- Aggregating transport demand through social media
- Using Social Media to match volunteers with persons requiring assistance with travel (derived from: Social Networks as Car-Pooling platform)
- Dynamic pricing (applied in relation to Gamification and aggregating transport demand through social media)

5.1 Concepts selected for validation

5.1.1 Gamification

Description

Recently the concept of gamification has received attention as a promising pylon for creativity and innovation. Gamification can be described as the application of game elements to non-game contexts in order to generate a behavioral impacts on target users and change their habits/attitude through the introduction of incentives and prizes. The gamification can be applied to a wide range of everyday actions in order to make “virtuous” (from the collective point of view) behavior more attractive also from the perspective of personal benefits: the aim of the gamification is to facilitate the adoption of these habits as a part of common-day behavior even in the medium and long-term period when the incentives scheme will be removed. These game elements leverage people’s love

for competition and reward and use it to encourage certain actions which can contribute to foster collective well-being.

In the last years gamification has been experienced also in the mobility sector: in this case the aim is to increase the use of sustainable modes (collective transport, cycling, walking) instead of the use of private car or, alternatively, to foster proper traveling behaviors (in particular for driving) among the citizens. Currently gamification has been recognized to be a powerful tool for motivating change in citizens' behavior towards Public Transport and attracting more PT customers at limited costs.

An example of gamification is the web-based "Eco-Driving advice" service that supports eco-driving using CARWINGS which was launched by Nissan in January 2007. This service calculates average fuel consumption based on vehicle information sent to CARWINGS from the customer's car and displays monthly fuel efficiency rankings on their website. Through this service the users can enjoy seeing how well they do as eco-drivers while being encouraged to pursue fuel-efficient habits.

A second example is represented by the competitions managed at city or organization level (i.e. university, private companies) to foster use of public transport and sustainable transport modes to reach work, education or leisure location.

A third example is the accumulation of "virtual" points which can be carried out by users based on different use case scenarios: the use of public transport, collective or shared services, sustainable transport modes, the use of public transport services in specific time period (i.e. "low demand" hours), the use of specific payment modalities or specific tickets, the participation to surveys for the evaluation of services already operated or the assessment of new ideas/solutions to be implemented, the provision of data (i.e. trip diary) which can contribute to improve mobility policies and planning. The points can be then used to take advantage of discount or reward initiatives which can involve the public transport/mobility sector (i.e. discount on tickets prices) itself or external sectors (i.e. shops, café, etc.).

Technological elements

The adoption of gamification approaches and schemes to Public Transport and mobility is deeply pushed by the pervasive role of the ICT as key tool to provide "real-time", "added-value" and "customized" services to the users. This was accompanied by the growing use of APP and "cloud" technologies enabling the "always-on" accessibility to provided services (i.e. journey planning, real-time info, payment, etc.), from one side, and the sharing of data among different applications, from the other. The application of this kind of technologies is fundamental to enable the range of possible use cases described in the previous sections. The operation of the e-ticketing system can also support gamification schemes related to the payment of mobility/public transport services.

Due to the deep penetration of APP use in the daily life, any risk of digital exclusion is envisaged. Even the approach to gamification is closer to the preferences of youngsters (i.e. e-games, etc.), it can be well understood and appreciated by all targets as demonstrated by the wide range of applications.

Elements of Social innovation

Gamification supports:

- 1) Fundamental change in the relationships between stakeholders as it introduces incentives or promoting modalities which can overcome the “traditional” relationship established between Public Transport providers and customers/potential users
- 2) Public value allocation and/or re-allocation as it aims to foster behaviour/attitudes which contribute to decrease the use of private car and then to improvement the environmental sustainability of travelling habits.

Envisaged Service improvement

Gamification does not impact on the service quality or on the way they are offered or accessed or on the related costs. It can contribute to attract more customers towards public transport and sustainable mobility modes making the services available for a wider range of users. Secondly it improves the take-up of services allowing the implementation of targeted or personalized promotional campaigns.

Addressed actors, needs and prioritized areas

Gamification addresses the following actors: Public Transport/Mobility Providers and Authorities, City Authorities, citizens, third party commercial entities (i.e. shopkeepers, tourist services, etc.).

Relating to the prioritized areas and target groups identified at the beginning of INCLUSION project, gamification does not address any specifically but it can be implemented to support promotional campaign of public transport and sustainable mode use targeted to identified users groups (for example: use of smart cards released to a certain user profile or through the identification of some personal data during the registration phase)

Enabling factors.

In case of rewarding of points accumulated with the game, the Public Transport/Mobility Providers and Authorities need to establish commercial agreement with the commercial entities which provide gifts or discount in change of the accumulated points. All the stakeholder (public transport and commercial entities) can gain a “win-win” condition increasing their visibility towards the citizens and attracting more customers.

Scalability and replicability

The wide range of gamification applications and schemes demonstrates the replicability of the experiences. The need to engage external (to PT sector) actors is not a barrier as the reward or discount initiatives can be restricted to the public transport services (i.e. free tickets, discounted price for subscription, etc.). Anyway the engagement of commercial entities (external to public transport) can be a key factor in attracting new customers and can allow the Public Transport/Mobility Providers to find new funding channels i.e. sponsorship.

Links

- INTERREG Motivate project – the platform: <https://www.motivate.imet.gr/>
- H2020 Empower project: <http://empowerproject.eu/>
- Onyx Beacon: <https://www.onyxbeacon.com/gamification-in-public-transportation-passengers-win-points-in-ecological-competition-based-on-kilometers-of-travel-measured-by-onyx-beacons/>

5.1.2 Aggregating transport demand through social media

Description

In the prioritized areas where Public Transport services (conventional and “Demand Responsive Services” as well) are not financially sustainable due to low-demand or in the areas served only in restricted time coverage (i.e. only in the peak hours) due to a large flexibility of the demand itself, groups of citizens (who are deeply affected by the poor level of services provided) could share the trip on their private car with other passengers who have a common destinations. In particular “the ridesharing services” could be managed among a defined group of people with similar needs mobility (in terms of time and destinations) thus allowing them to offer (as a driver) the shared trip one time and to travel (as passenger) another time under a cooperative approach.

This concept can be extended from the group of citizens which participates to the initiative to their family. For example, an application of the concept could be the following: families living in peripheral/isolated areas with lack of the public transport services organize ridesharing services to bring the children to schools in the nearest town; similar applications could be to bring the children to leisure activities (i.e. sports, hobbies, etc.) when public transport services don't cope with flexible demand during the day. Other example could be workers sharing the trips to work and to reach a common interchange point (i.e. bus stop, park&ride area etc.).

The implementation of the concept requires the aggregation of the mobility demand and the management of related operational issues. The involved people need to be networked and to “schedule” the ridesharing services; this means to contact each other to plan who will offer the “shared trip” each time (depending also on car availability), who will be the passengers and to manage irregular conditions (i.e. change in the “planned services” due to unavailability of resources (drivers/cars), change of timetable, passengers planned to share the trip giving up).

Technological elements

The “networking” relationships among the participants which are required to implement the described concept can be realized in the different ways spanning from “simple” phone contacts to face-to-face daily meetings. The social media and their pervasive use in the daily life by all the people (regardless their age) represent a well-performing technological tool to manage the networking functionality in a simple way. Social media are widely used to aggregate/manage “groups” of people sharing common needs/interests (i.e. moms with children going to the same school): they allow to share information, to be updated on the groups initiatives and meetings, to fix appointment, etc.

Elements of Social innovation

The described concept covers all the identified elements of the social innovation, at certain level:

- Need-driven / outcome-oriented production: the aggregation of the mobility demand and the management of the ridesharing services provide targeted services for answering to the mobility need of the involved participants
- Open process of co-creation/collaborative innovation: the ridesharing services are operated under a collaborative approach where all the participants can provide their own contribution
- Fundamental change in the relationships between stakeholders: the concept drastically change the relationship between providers and users of the public transport services as the user become sometime also transport provider
- Public value allocation and/or re-allocation: the ridesharing services can familiarize the participants to share the trip then to use more public transport, the same trip is shared by various passengers then the aggregation of the mobility demand generates positive effects for traffic congestion and pollution

Addressed actors, needs and prioritized areas

The actors are represented by the citizens themselves providing self-organized transport solutions (based on ridesharing scheme) to answer to mobility needs which cannot be effectively complied by any other alternative mobility solutions (despite the use of private car). In terms of prioritized areas the concept is likely to be applied in remote rural and isolated areas (i.e. mountains, hilly, etc.) and peripheral areas of cities. In terms of target groups, the concept can be horizontally applied event it is well suitable for young families with children.

The ridesharing service can be a replacement of conventional public transport services but in some conditions also an integration related to spatial and time coverage. Even indirectly, the concept can contribute to the enlargement of the available mobility options, the improvement of the quality of the whole mobility offer and its cost-effectiveness as any other alternative mobility solutions should be financially sustainable in certain context of the prioritized areas

The following aspects of open innovation are introduced through the concept implementation:

- sharing: as the trip is shared by more passengers
- cooperation: for the aggregation of the mobility demand, each component of the group can offer a ride one time and to be passenger another time
- plurality of participants: all the people in the group can join the initiative
- self-organisation: as the group provide a transport service with their own resources and based on the internal organization of the group itself

- decentralization: the provided services can be organized to integrate the public transport offer than their operation can be see also as a “decentralization” of the public transport services provision guaranteed through a social innovation approach.

Enabling factors.

The enabling factor is the self-organization approach of the involved group of citizens and the willingness to cooperate in order to answer to the needs of the group itself: i.e. to provide solutions to the changes required to the “scheduled service”. A coordinating role is required in order to manage the communication flow on social media and act as “moderator”: good attitude in reducing conflicting situation is required. A person involved in the group must be named in charge of this role. Social media as technological supporting tool are not mandatory but they can facilitate the management of the group, enable timely circulation of information and track the communication flow.

Scalability and replicability

The concept is quite flexible to be adapted to different context, target groups and mobility needs. Any significant limits in the replicability of the concept is identified.

Links

- [1] CIVITAS Destinations Project – Elba Sharing Agency: <http://civitas.eu/measure/shared-elba-mobility-agency>
- [2] RideAustin – No-profit rideshare via app which allows riders and drivers to pair directly through the RideAustin: <http://www.rideaustin.com/>

5.1.3 Social network as car-pooling platform

Description

There is a growing tendency for social media users to informally arrange lifts with friends through social media. This is due to a lack of existence, lack of awareness, lack of convenience or lack of trust in using formal carpool service providers. These barriers would be mitigated to a large extent if carpooling could be integrated within the social media platforms that the majority of the population use on a daily basis.

Facebook's Events pages currently allow users to select whether they are attending, not attending, or are interested in attending an event. Facebook have plans to incorporate a new ride-sharing feature that will allow individuals who have indicated that they are going to an event to also add whether they are 'going and driving,' or 'going but not driving.'

The car-pooling function comes into effect when users have selected the 'going and driving' option, allowing them to also add how many passengers they are willing to take, what time they will be leaving, and whether they just want to open up their ride to friends or the entire list of attendees.

Facebook will use personal information from a user's Facebook profile and preferences to pair drivers up with riders, based on common interests. After agreeing to a match, drivers and riders receive navigation information to guide them to the pick-up spots and event venue.

Because of the very high market penetration of Facebook, this makes far more people aware of carpooling possibilities. The Events pages bring together people with similar interest going to the same location at the same time. The platform will offer a very easy and convenient way to connect these people and engage with one another on Facebook.

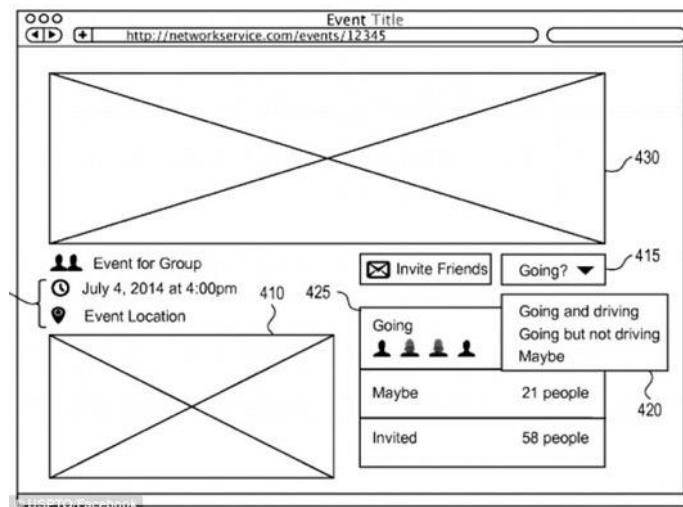


Figure 10 - An exemplary user interface illustrating an event and options for users to indicate intentions to attend and drive to an event or attend and not drive to the event

Source: (Richardson, Petrescu, & Finch, 2016)

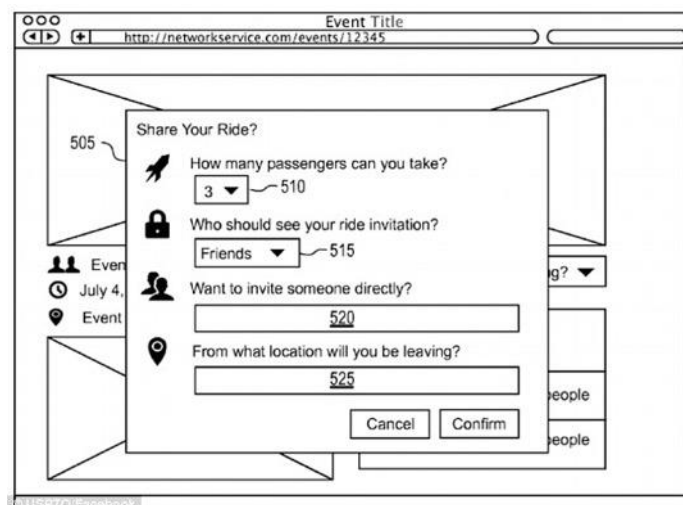


Figure 11 - An exemplary user interface illustrating determined matches for ridesharing

Source: (Richardson, Petrescu, & Finch, 2016)

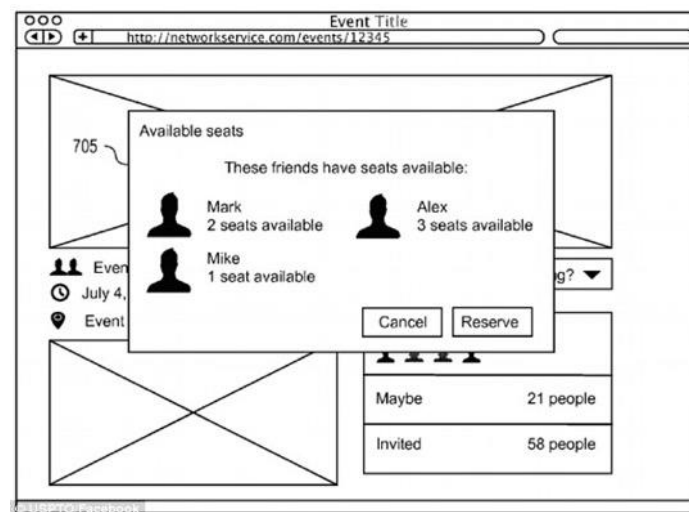


Figure 12 - An exemplary user interface illustrating a form to receive ridesharing information

Source: (Richardson, Petrescu, & Finch, 2016)

Technological elements

The technology required is a smart phone, an internet connection and a Facebook account. Facebook is by far the most widely used social media service across Europe with approx. 80% of the social media market share when accessed using mobile devices (<http://gs.statcounter.com/social-media-stats/mobile/europe>).

Once a group agrees to a carpool, the driver would additionally get a suggested route and the system would 'provide notifications to the passenger(s), e.g. of estimated pick-up time, of when the driver departs, when the driver picks up another passenger, when the driver is approaching, etc.

The development of the carpooling feature within Facebook Events is still in the development phase and so is currently not available for use.

Elements of Social innovation

Extending Facebook events as a ride-sharing/carpooling platform offers a fundamental change in the relationships between stakeholders, by removing the need to search for transport solutions from external car-pool providers. Instead the carpool platform is internal to the face-book page the user is accessing and as a result benefits from immediate access to a (large) pool of users with similar interests and requirements. It also removes the need for cumbersome multi-App sign-up and usage.

By providing a platform for shared rides, offered by private car owners, there is public value creation. Users of Facebook Events will be encouraged to offer a ride to friends, or request a lift if they have no way of getting there themselves.

The proposed feature could also let event attendees organise taking public transport together. For example, users who indicate they are 'Going but not driving' would be presented with an option to co-ordinate travel with one or more other attendees who are 'Going but not driving'. So the tool

can indicate other users who may wish to share a taxi to reduce costs or travel together on public transport for safety reasons (e.g. females returning from an event late at night).

Envisaged Service improvement

Improved access, awareness and take-up of carpooling is very likely due to the very high numbers of Facebook users. Promoting carpooling to specific events or for specific purposes through this medium has the potential to transform the coverage and level of use of carpooling providing a very cost effective transport solution where good quality public transport is lacking.

The suggested service also has the possibility to allow users to co-ordinate travel with one or more other non-driving attendees. If two users indicate that they plan to attend an event and travel to the event via a train line, bus line, taxi, the tool may suggest the users get on same train.

The aspects of open innovation which would be introduced include sharing, cooperation, plurality of participants, self-organisation and decentralization.

Addressed actors, needs and prioritized areas

The main actors in Facebook events ride-sharing are principally the attendees of the events featured, but could also involve the organisations involved in staging/hosting the event.

These events could be one-off music or sporting events, regular tourist site 'events', or could potentially even be 'everyday events' to which people need access. This opens up the potential of such a platform to a wide range of target users across different prioritized areas, for instance:

1. young people from rural or suburban areas with poor public transport accessing music or sporting events in cities;
2. tourists accessing rural attractions with poor public transport access -the event organisers could even use the platform to publicise and generate passengers for a shared car or minibus pick-up service operating between local hotels.
3. parents with young children accessing nursery or play group activities where the playgroup/nursery has created a daily event around their session. This would allow parents to find other parents attending the session who may be able to share a ride or travel together in a taxi. Users could even create their own events for group members such as "Lunch at Café Bistro".
4. Volunteer car services could create an 'event' based on the period of time they are volunteering their time – the event could be "10th Sept 2018, 08.00–14.00 hrs accessing the local hospital" and the volunteer selects 'Going and driving'. Any person who then has a hospital appointment without their own transport could request to a lift. Eligibility criteria could be added by volunteer drivers, e.g. pick-ups only from designated area and/or age or disability restrictions could be stipulated.

Enabling factors.

The Facebook platform and its Events pages bringing together users and actors with similar interest/purpose is the main enabler.

There are no specific barriers to deployment of this proposed feature. Costs are minimal for organizations who are hosting events – the only requirement is that they create and maintain a suitable events page. This is a very straightforward task.

Regulatory frameworks do not pose any barriers as long as no organization or individual is making profit from providing a transport service through the tools use. So, event organizers offering a shared car or minibus service would need to do so on a free basis. Individuals offering lifts (carpool drivers or volunteer drivers) can only receive payment to cover their costs (e.g. fuel and wear/tear). The Facebook Events ridesharing feature does not organize payments between users – this would be done face-to-face.

Scalability and replicability

This proposed solution, if deployed by Facebook, would be immediately ready for use at any location and in any EU country. Applications with target users where Facebook membership is more limited, such as with older persons, could involve a third party to represent and communicate with these users. For example, a care worker or an older persons charity could act as the Facebook member on behalf of the older people they represent.

Across the EU, 63% of internet users aged between 16-74 used social networks in 2016 with approximately 80% of these actively using Facebook. In total over 40% of 16-74 year olds in Europe are Facebook users. Among younger people aged 16 to 24 years, approximately 70% of the population are Facebook users. For 65 to 74 year olds, the proportion of Facebook users drops to below 25%. For over 75 year olds, only 44% are internet users and around 40% of these have a Facebook account (i.e. around 17% of population are Facebook users).

Links

<https://www.theverge.com/2016/10/7/13192918/facebook-events-app-ios-android>

<https://www.digitaltrends.com/social-media/facebook-ride-sharing-patent/>

<https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20170713-1>

<https://www.telegraph.co.uk/news/2017/06/14/rise-social-seniors-number-over-75s-facebook-doubles/>

5.1.4 Dynamic pricing (DP)

Description

Detailed description of the idea, its purpose, organization, accompanied with graphs, pictures and schemas if needed.

On-demand mobility services offers more reliable and convenient personalised transportation to satisfy specific user needs. However, the determination of the proper prices still remains a complex task that requires the possibility to foresee demands, trends and their value with regard to a potential user. Dynamic pricing (DP) can improve these on-demand mobility services by influencing potential users to choose the most suitable trip.

How? Dynamic pricing algorithms allow service providers to stay up-to-date on competitors' prices, mobility offer and demand trends, as well as other influencing factors (see Figure 13), and automatically, incorporate those variables into the pricing algorithm. Service providers will be able to calculate in real time the marginal logistical complexity of on-demand mobility services in relation to the rest of the network and consequently, influence and incentivise accordingly, potential users' behaviours to choose the most suitable services.

At the same time, dynamic pricing module can significantly improve economic and environmental sustainability by influencing users' decisions and encouraging them to choose the most suitable trip. Dynamic pricing algorithms also benefit service providers by gaining more users' knowledge through data collection of end-users' preferences and needs.

Technological elements

Big Data and Machine Learning are enabling companies in more industries than ever before to charge smart prices for their services that are able to be adjusted automatically based on market conditions.

Dynamic Pricing algorithm is designed to help pricing strategy adjust itself based on different factors. This method of DP aims to set the right price, for the right customer, at the right time.

One of the most important factors modelling DP is the level of potential users' knowledge. Some other factors are the following ones:



Figure 13: Examples of Dynamic pricing factors to be included in the algorithm

Elements of Social innovation

Multidimensionality of dynamic pricing algorithms is able to influence users' behaviour based on users' knowledge (preferences, needs, habits, etc.) and other key factors (Figure 13). This knowledge contributes to influence and incentivise potential users to choose certain options (e.g. specific on-demand bus route instead of taking their own car).

Envisaged Service improvement

By influencing users' behaviour to choose these new on-demand mobility services instead of taking their own car, as well as aggregating mobility demand with same destinations, generate positive effects for traffic congestion and pollution.

Within the Barcelona Pilot Lab, this concept will enable to offer smart prices, based on different factors and taking into account users' preferences and needs, aiming to influence and incentivise them to choose on-demand bus services to go to the event instead of taking another non-sustainable option. The perception of the price unfairness causes potential users' dissatisfaction, this concept will guarantee the optimal price, for the right consumer and in the right time.

Moreover, revenue management for on-demand bus service providers will be optimised thanks to this concept. It will be easier to plan resources needed as service providers will be able to influence and incentivise potential users to buy tickets with more anticipation.

Consequently, operational management for transport operators will be optimised as they will also be able to plan in advance and offer more competitive prices.

The prioritised areas are vulnerable areas with different problems of public transport accessibility, such as deprived areas or "isolated" areas with bad public transport connectivity or low offer of transport services (and low frequency).

Addressed actors, needs and prioritized areas

The main actors are users of the service, on-demand bus service provider, transport operators and technology provider.

The prioritised areas are the ones with no (low) public transport accessibility (either because are located in isolated geographical or because there is not public transport during night time) to go to the event.

Enabling factors.

The service provider platform where users can buy their on-line mobility services tickets.

There are no specific barriers to deploy this technology package. Costs are minimal for organizations the only requirement is to have information available of different factors needed for the correct applicability of the DP algorithm.

Scalability and replicability

This concept is flexible to be adapted to different on-line platforms and take into account different factors, depending on the availability of data in each case.

Links

- <https://www.omniaretail.com/dynamic-pricing>
- <https://www.uber.com/en-ZA/drive/resources/dynamic-pricing/>
- Talluri, K., & van Ryzin G. (2004). Revenue Management Under a General Discrete Choice Model of Consumer Behavior. *Management Science*. 50 15-33.

5.1.5 Crowdsourcing tools

Description

Detailed description of the idea, its purpose, organization, accompanied with graphs, pictures and schemas if needed.

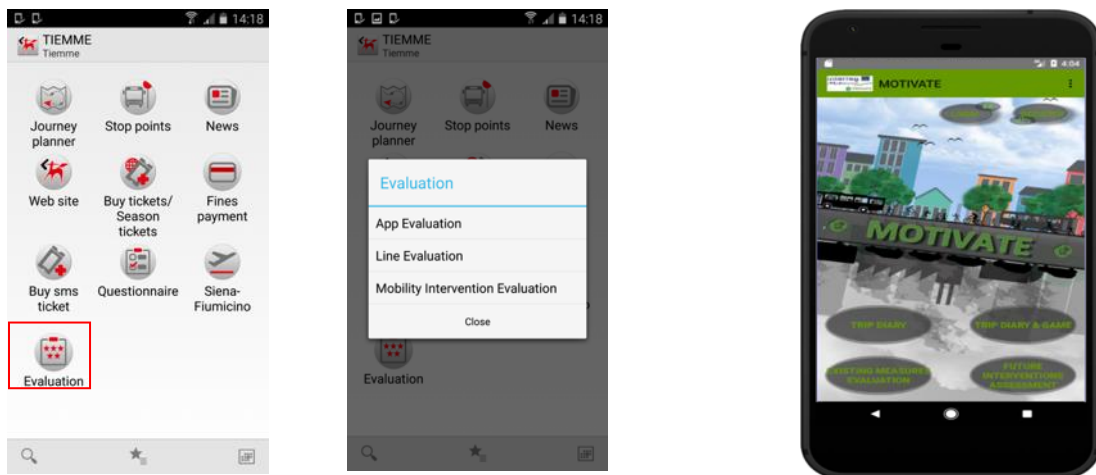
Crowdsourcing concepts have been widely applied in different industrial and commercial domains: the idea behind this concept is that the level of “knowledge” produced by a community is deeper than the one guaranteed by a single group or even by experts on their own. Higher is the number of target audience which can be reached, more relevant and useful is the result which can be achieved (this means the knowledge which can be generated by the crowdsourcing). The rationale is that the engagement of a larger part of the target audience produces a “mass” effect which is able to include/collect various “expectations”, “considerations” and “needs” coming from different “users” or “stakeholder” groups even when they are not aligned or even worse, partially conflicting. The idea is similar to the implementation of “focus groups” but the crowdsourcing multiplies the engagement up to a “mass” effect, pushing also on the adoption of co-participative approach: the target audience needs to feel itself not just an actor whose opinion has been asked for but more than this a “co-designer” contributing effectively to the definition of the final result, on one side, and as a beneficiary of the implementation of this result, on the other side.

Recently the crowdsourcing idea has been applied also in the Public Transport “system”, probably with some delay compared to other commercial or public services: Public Transport stakeholder have been most used to talk to each other without opening their mind to expertise and approaches coming from other sectors.

In Public Transport the crowdsourcing is applied to: 1) carry out customer satisfaction analysis about the level of satisfaction related to the services already provided, 2) collect requirements for new services, 3) collect new ideas/suggestions for the improvement of the services quality and the customization of services to specific needs, 4) evaluate the level of the acceptance of future scenarios and proposed solutions.

A crowdsourcing initiative consists of: (i) a dissemination/promotion campaign to engage the target audience (the participants), (ii) a process for the collection of the “contribution/input” given by the participants (i.e. feedbacks/comments), (iii) a management procedure of the crowdsourcing

process, (iv) tools/procedures for the analysis of the contribution/input provided, their assessment and the draw of conclusions (extract of findings).



(a)

(b)



(c)



(d)

Figure 14 - Examples of crowdsourcing initiative

Examples of crowdsourcing initiative (a) Tiemme Mobile APP for questionnaires collection; (b) MOTIVATE APP for the submission of trip diaries, (c) Twitter feed managed by Chicago Transit Authority, (d) Crowdsourcing through Facebook page by Zurich Public Transport Authority

Technological elements

(About 50 words) Summary of the main technological elements with the identification of any aspect related to acceptance or envisaged risk of digital exclusion.

Technological elements can widely contribute to the implementation of a crowdsourcing initiative. Their role is to implement data collection techniques, to facilitate data analysis procedures and to support the management of the whole crowdsourcing process. The development of distributed platform and the growth of web-mobile applications have been elements pushing the implementation of the architecture supporting crowdsourcing initiative.

Social media (such as Facebook or Twitter) can be used to implement crowdsourcing initiatives as the social media approach is well suitable to cope with the requirements to reach the participants, to collect info (ideas, evaluation level, comments/feedbacks) from them and to allow the cooperative “discussion” (i.e. cycle made of proposal/suggestion, comments and following refinement of the first proposal/suggestion, new comments and then going on with the iterations).

The technological architecture supporting the management of the crowdsourcing process is described in the following:

- Interfaces for info presentation and proposals/feedbacks collection: this allows the interactions with the participants of the crowdsourcing initiative (i.e. APP, webportal, social media)
- Tools for the collection of the proposals/feedbacks: they are implemented on the interfaces described above (i.e. on-line questionnaires and forms, registration of GPS location, data fields to be filled in by the crowdsourcing participant, registration of selection/notifications made on the interfaces, etc.)
- Long-range communication network (i.e. WiFi, 3G/4G/5G, etc.)
- Repository for the collection/analysis of the proposals/feedbacks: in the case of adoption of social media a “data mining” module for analysing the proposals/comments provided (i.e. mentions, etc.) can be used to feed the repository
- Analytics module for reporting the results of the crowdsourcing and for supporting the assessment process of final conclusions
- Configuration module: it is managed by an administration profile and it allows the configuration and modification of the questionnaires/forms, the publication of contents (i.e. proposals to be commented by the participants) and the management of comments/feedbacks (validation for publication required for avoiding abuse or violations).

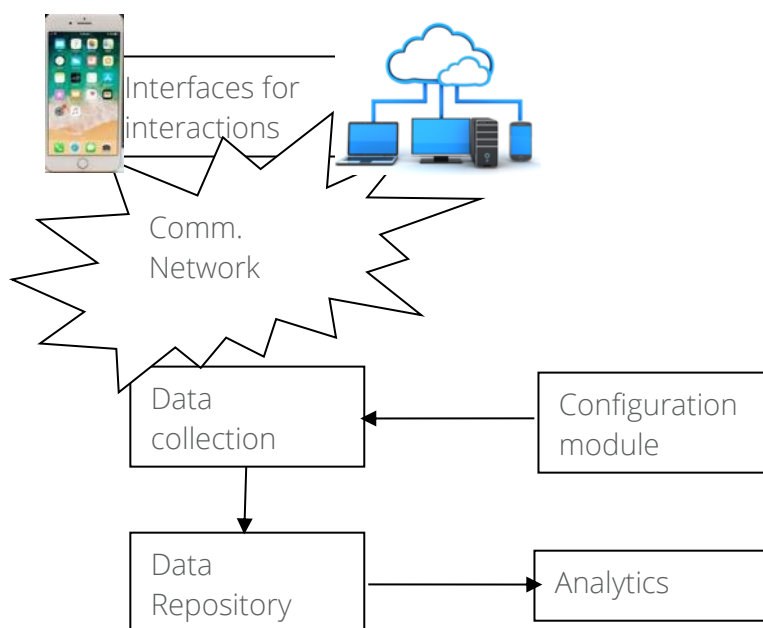


Figure 15 - Functional architecture for supporting crowdsourcing participants

Elements of Social innovation

The crowdsourcing initiatives applied to Public Transport enable a stronger involvement of customers and potential users which become a relevant actor even more than in the past. The citizens feel themselves really in touch with the Operators (stakeholder) and think that their opinion is duly considered. The services already operated and new services are improved/launched as result of a wide cooperative process.

Envisaged Service improvement

The service improvement which can be achieved through the crowdsourcing are: 1) improvement of service planning and operation in order to better cope with the users and citizens requirements, 2) launch of new service schemes/solutions, 3) improvement of service quality in terms of accessibility, etc., 4) enhancement of customer-oriented strategies and definition of targeted/customized services for specific users groups.

All these results can be achieved through a process which is: 1) more pervasive compared to focus groups, 2) really able to engage the wider audience, 3) low-cost to be managed compared to traditional data collection such as questionnaires, public consultation, etc.

Addressed actors, needs and prioritized areas

The involved actors are: the Public Transport Operator or Authority promoting and managing the crowdsourcing initiative, the participants, other stakeholder which can be engaged as multiplier (i.e. association of disabled/impaired, association of citizens, association of the families with children at the same school, students, etc.). These stakeholder are between the Public Transport Operator or Authority and the crowdsourcing participants and they can be involved at the beginning in order to facilitate the engagement of their associates/contacts.

With regard to the addressed target, the crowdsourcing can be applied in any prioritized area and without limitations in terms of participants and related needs.

Enabling factors.

Enabling factors to manage a crowdsourcing initiative are the following ones: 1) a well-design and targeted dissemination activity to engage the participants and to reach high participation level, 2) the use of incentives to foster the participation, 3) the involvement of supporting stakeholder contributing to the dissemination, 4) the presence of a moderator/administrator in order to stimulate the on-line interactions, check the contents and validate their publication.

Scalability and replicability

Being a general concept, the crowdsourcing can be easily adapted to different contexts and purposes and then it can be highly replicable.

INCLUSION Pilot site(s) where it is planned to apply the idea

Florence site as new functionalities of ATAF2.0 APP.

Links

- [1] INTERREG Motivate project – the platform: <https://www.motivate.imet.gr/> Tiemme site: <http://www.tiemespa.it/index.php/Dialoga-con-noi/Progetto-MOTIVATE>
- [2] H2020 CIPTEC project: www.ciptec.eu
- [3] Nash, S. «Crowdsourcing: it’s arrived, are you on board?», Presentation to the joint meeting between CIPTEC and EMTA associates, Budapest, May 2016.

5.2 New concepts, not selected for validation

5.2.1 Positive incentives

Description

Scoring mechanisms associated to mobility behaviours can be applied to allow travellers obtain real awards, either materially (e.g. a bus ticket or discounts) or in the form of benefits or facilities (e.g. free access to a service which normally has to be paid). It is then possible to distinguish between Gamification, already described as a specific IESI concept, and “positive incentives” where, instead of being part of a gaming schema, the user earns ‘credits’ thanks to the behaviours that are incentivized and can eventually exchange the credits with awards. The awards can be provided by different subjects (authorities, cities, PT companies etc.) according to various business models.

The overall objective is to foster and promote a change of the users’ mobility habits in terms of driving reduction or use of alternative modes of transport. This can be achieved either with restrictive actions (e.g. bans on access, or payment for access and use of parking) or through initiatives based on incentives. The latter approach is currently under investigation in many projects and countries and it is likely that a mix between prices, financial and social incentives could represent an effective measure to make the driver reducing of a significant percentage the mileage in urban environment or to shift to other modes.

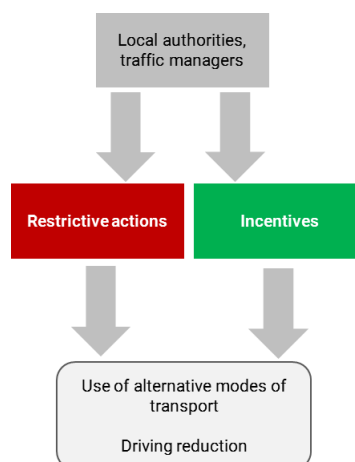


Figure 16 – Two different approaches to foster mobility behavioural change

In INCLUSION, positive incentives can be used to promote actions and behavioural schemas, elicit a change in habits, help people taking decisions etc. There may be actions or measures established for the creation of inclusive mobility which can make use of positive incentives.

Technological elements

The behaviour detection can be automated (but not necessarily) and this can be achieved through technological tools like mobile apps detecting the mode of transport and position of the user. In other cases the behaviour can be detected by sensors or through other technological elements. In other situations, the user pro-actively can make actions (e.g. booking a ride or offering a lift to a mobility-impaired traveller) which can be recorded.

Some of the behaviour-recognition operations of course may have relevant privacy implications issues especially when the position and tracking are involved.

Elements of Social innovation

Incentives can promote a co-participative approach in relation to activities, design, processes, decisions: if the achievement of a goal requires cooperation and participation, incentives can promote the participation and involvement.

Envisaged Service improvement

Its aim is to foster and promote the users' mobility habits shift. Going into a driving reduction or use of alternative modes of transport. It needs mobile apps detecting the mode of transport and position of the user, sensors to detect the behavior, or any system able to record pro-active user actions.

Addressed actors, needs and prioritized areas

Public Transport/Mobility Providers and Authorities, City Authorities, citizens, third party commercial entities

Enabling factors.

Normative issues may affect the operation of detection of the user behavior. For example, privacy issues may arise if data like user position has to be collected. Other enabling factors are related to the availability of awards both on the organizational and economical point of view. Award providers may, in fact, fulfill normative and management obligations and should find ways to financially sustain the provision of prices.

Scalability and replicability

The concept can be applied in a small or large scale (for example in a small community or in a large city). If the process is fully automated, then it is required to adapt the technological infrastructure to the number of users involved. The complexity of rules or behaviors to be assessed to trigger the incentive assignment can also influence the scalability and replicability.

Links

MOVEUS FP7 Project: <http://www.moveus-project.eu/>

5.2.2 Aggregation and analysis of users' demand on mobility apps

Description

The basic idea is to capture and analyse the requests, queries and interactions users have with traffic and transport systems (e.g. book a ride, make a trip request, ask for a timetable etc.) not only coming from a single source (like in the case of data coming from social media described as a separate concept) but by aggregating data from different system providers and/or sources. This will help entrepreneurs, authorities, traffic operators, public transport organizations etc, to even better know the demand, tailor the offering, understand the needs and take decisions.

The ambition is to use meta data describing the aggregated information from different providers and to find the common ones (for example the description of a trip request/response or the requested timetable at a bus stop). This forms a standardized data and service interface or set of Application Programming Interfaces (APIs) using a common, 'universal' language, understandable by external parties.

Usually, the front-end systems used by travellers (for example mobile apps) formulate a request to a central server to get the requested information. The common interface can transform the requests -originally formulated in different formats- into a universally understandable request to allow storing the request data (made anonymous and open) in a central datawarehouse. Eventually, the collected information on users' demand can be analysed by the mobility and transport organizations for the purposes and objectives of improving the quality of data and service and to plan new transport offerings. The concept of standardization of spatial infrastructures in general and mobility systems, has been investigated and studied by many initiatives and projects and a relevant amount of specification and studies are available to date.

The application in INCLUSION would be to understand better the needs of travellers living in rural or deprived areas and with special needs. A key technological point is to deal with anonymous information and to apply smart algorithms to classify the users and needs. It is assumed, in fact, that personal information although facilitating the identification of user categories and needs would not be available at least in a large amount.

Technological elements

Data standardization specs and systems, geo-spatial data processing, behavioural data detection. The front end systems, used by the travellers would remain untouched. The concept could be implemented either in a distributed way (data connectors running at each system provider, connected to the system end points) or centralized (data connectors running in separate servers, hosted for example by organizations in charge of data analysis).

Elements of Social innovation

The elements of Social innovation are mainly related to the aggregation of mobility demand and the possibility to organize ride sharing transport solutions. This is discussed for the concept 'Aggregating transport demand through social media' – see section 5.1.2.

Envisaged Service improvement

Improving the quality of information for the public, improving service and management of new transport offerings including ride sharing.

Better understanding of the needs of travellers living in rural or deprived areas and with special needs.

Addressed actors, needs and prioritized areas

The addressed actors, needs and prioritized areas are comparable to those described for the concept 'aggregating transport demand through social media' – see section 5.1.2.

Enabling factors.

The implementation of this concept may very ambitious if not impossible, in many situations as it would be necessary to reach an agreement between the information suppliers to exchange data. A super party (an administration) may act and indicate the normative rules to be followed. The unified API available from Transport For London⁴ is a good example of how the unified data access can take place by external application developers.

Scalability and replicability

A processing system implemented according to this concept would requires an increased use of networking and computational resources depending on the number of inter-connected system.

5.2.3 Community-driven inclusive transport agency

Description

Creation of virtual agencies providing support and advice on transport in rural areas. The idea is that people experiencing mobility impairment and not prone to use digital devices could ask information on available transport options for their mobility requirement (e.g. to make a trip) in a simplified way (i.e. by means of a SMS or through a phone call). The request is forwarded to a community of expert users ('contributors') who can eventually answer and provide the information through the same channel. Users have a 'reliability' score to avoid low quality of responses. The reputation can be rewarded (gamification).

Contributors takes advantage of existing ICT systems for information provision (timetables, open data, booking systems) to retrieve the necessary information. When the information is not available through ICT systems in place, the experts can search manually the information. If available in the urban area, on-demand transport could even be booked again through the community.

⁴ <https://tfl.gov.uk/info-for/open-data-users/>

The contributors act as volunteers (no reward except for the gamification tools) and can specify their status (“free” or “busy”) to receive requests. It may be required from them just a few minutes of their free time to contribute if there would be enough participants.

The natural applicative context would be the provision of support to impaired mobility people in rural areas, given the manageability of such communities in a small scale dimension. The provision of support is achieved with advice on available:

- Public transport (bus, trains)
- Connections
- Fares
- On-demand transport
- Ride-hailing services (if available in that area)
- Other modes of transport

Technological elements

The interface for the user is a human reachable by phone call, when required which is especially useful for people who are not familiar with mobile apps or computer interfaces. A chat/request form through a mobile app or web site can be also available. It is necessary to implement the technological system that assign SMS and Phone calls to free users. This is largely supported by todays' commercial systems.

Elements of Social innovation

Increased public value. Community-driven support.

Envisaged Service improvement

Provision of support to impaired mobility people in rural areas, given the manageability of such communities in a small-scale dimension. The provision of support is achieved with advice on available:

- Public transport (bus, trains)
- Connections
- Fares
- On-demand transport
- Ride-hailing services (if available in that area)
- Other modes of transport

Addressed actors, needs and prioritized areas

Impaired mobility people in general, especially digitally impaired people.

Enabling factors.

The concept requires economic resources to run the technological infrastructure able to manage the requests, assign the role of responder to one of the free volunteers and manage the response back to the user.

Contributors would be ensured by the community (gamification and incentives should be ensured).

The financial sustainability overall can be provided through investments from the public transport companies, local authorities and/or through small fees for the system.

Scalability and replicability

Suitable for small communities and rural areas where the needs for information options may be higher, it can be applied at regional level with an adequate increase of technological resources.

5.2.4 PING if you care

Description

For people who require escalators and lifts to access public transport it is extremely important to have real-time information about the status of these infrastructures. For public transport operators it is difficult to constantly check this status through in-person controls. In a number of cases, they have therefore initiated some sort of crowd-sourcing mechanism through which volunteers can report broken escalators, lifts etc. While this is working reasonably well in some cases (e.g. Berlin) it still requires a non-negligible effort to actually call a certain number or to launch a specific smartphone app. Although such actions take only very little time, experience shows that hasty travellers often decide against them – especially in a public transport context where it is often important to catch the next train, tram or bus within minutes or even seconds.

A similar situation for the crowd sourced reporting of cycling hazards (potholes, fallen branches etc.) has been successfully addressed with “PING if you care” (<https://pingifyoucare.eu>). This concept revolves around a small device, roughly the size of a bicycle bell, which volunteers can mount onto their bike’s handlebar. The device is connected via Bluetooth to the cyclist’s smartphone and can be pressed at any moment at any location that requires – in the cyclist’s view – certain attention, maintenance or repair. The GPS-enabled smartphone documents a time- and place-stamp whenever the PING button is pushed. At the end of each journey, or at the end of a day or even a week, the volunteer cyclists can – optionally – add qualitative comments to every spot within a digital map on their home computer.

The same principle could be utilised to report problems with public transport infrastructure. A group of regular public transport users could be equipped with analogous devices to record related problems simply by pressing a button without having to call a number and even without having to get out their smartphone. The device could even be designed in a way that makes it pleasant to wear inside a jacket pocket, around a necklace, inside the pen-pocket of a jacket etc.; or it could be integrated in the range of functions of as smartwatch.

Technological elements

All technological components of such a system already exist. They include small devices which communicate via Bluetooth with a nearby smartphone, which records – upon such a prompt from the external device – a time and location “stamp”. Each unique time-space identifier can afterwards be complemented with qualitative information by the user. Eventually, all details can be conveyed

digitally to a public transport operator or any entity in charge of construction, maintenance and repair of public transport infrastructure.

Elements of Social innovation

The system would rely on crowdsourcing principles, that is, it would rely on the ability and willingness of volunteers to observe and report problems or suggestions for improvements. From a technological perspective it would be easy to open this possibility to everyone; in practical terms, however, it might make more sense to use a selected group of volunteers; and to possibly even provide them some training so that their reports are reasonably comparable in terms of categorisation, severity and urgency.

Envisaged Service improvement

Users who are dependent on well-functioning support infrastructures (e.g. escalators, lifts, induction loops, audio announcements, etc.) would benefit from:

- Faster and more systematic detection of malfunctioning support infrastructures
- Faster and more systematic repair of malfunctioning support infrastructures
- Structured procedure for the collection of new improvement ideas

Addressed actors, needs and prioritized areas

The main beneficiaries would be people whose mobility depends to some extent on well-functioning support infrastructure, typically persons with some kind of physical impairment. The provider of such a reporting system would typically be a city or a public transport operator. The actual "reporters" could be any member of the public; most realistically a selected group of volunteers.

Enabling factors.

Strong commitment of a city administration and / or public transport operator would facilitate the initiation of such a service. Also an established community / network of volunteers would be beneficial for the uptake and wide usage of such a system.

Scalability and replicability

Such a system has no limits in terms of replicability and scalability. On the contrary: it could be implemented in any city of any size in any location.

Links

Ping if you care (inspirational system): <https://pingifyoucare.eu>

5.2.5 Support ambassadors

Description

The travel experience for some people would be much more convenient if they knew that someone is available to help, for example with accessing a bus, with reading a time table or with storing

luggage on a bus. It is a significant hurdle, however, to ask strangers for such help – even if they were truly willing to provide assistance but chose not to offer it proactively in order to avoid being perceived as patronizing. Sometimes the need for support is not visually obvious and therefore potential support providers might have no clue that someone near them would benefit from their assistance.

It could help in such situations if support seekers and support providers could be “matched” non-verbally. This could be implemented through wireless digital signals between people’s smartphones. Concretely, support seekers could activate a specific support demand on their smartphone in a specific situation at a specific bus stop. An example could be the signal “In need of support to access bus 738.” Another person waiting at the same bus stop could activate the signal “Willing to provide support to access any bus.” As soon as these two people are within Bluetooth range, their phones could vibrate and indicate the presence of a peer. They could find each other either through a portrait photograph or through a special acoustic signal.

The same principle could be applied in a variety of situations such as:

- An older person would like to sit down in a bus but does not want to leave his or her luggage out of arm’s length. A volunteer could then look after the piece of luggage.
- A person with a pram would like to get up a flight of stairs and would benefit from someone to help with carrying the pram and from someone else to handhold a second child.
- A visually impaired person would like to find out where coach 17 is likely to stop at the train platform. Someone nearby could be alerted to this need and provide support.

Technological elements

The availability of a smartphone would be the only technological prerequisite for such a support ambassador system to work. The majority of people nowadays are carrying a smartphone with them most times of the day; in other words, the hardware precondition can be considered to be met. The software component would yet have to be programmed but seems simple enough as it relies on the quasi ubiquitous Bluetooth standard.

Elements of Social innovation

The system would facilitate the direct, supportive encounter of one human being with another. The provision of support among strangers could theoretically be considered a social innovation – although it should rather be understood as ancient social virtue. The social innovation component therefore revolves around the technological mediation between two persons.

Envisaged Service improvement

Anyone who is in need of or would benefit from any support that can be provided by a nearby human being could enjoy the related service improvements. These range from help with heavy goods, travel with children, physical impairments or a broad range of other situations.

Addressed actors, needs and prioritized areas

Anyone in any location and in any situation could become the beneficiary of such a support ambassador system. And almost anyone could become a support ambassador; even people with bodily impairments could still perform certain support tasks such as keeping an eye on children.

Enabling factors.

For such a system to work it would be necessary for a relatively large number of support providers to sign up. This, in turn, requires significant marketing efforts (which is possible) and/or the combination with incentives such as free rides or other perks that could be offered by public transport operators, by public authorities or sponsoring companies. Of course it could also be a good idea to make the participation in such a scheme mandatory for public transport staff, municipal employees etc.

Scalability and replicability

Such a system has no limits in terms of replicability and scalability. On the contrary: it could be implemented in any city of any size in any location; even in rural areas.

Links

n/a

5.2.6 “On my way” app

Description

Too many children are driven to school every day by their parents. In certain areas, more than half of all children who are brought to school in their parents' cars have less than 800 metres between their home and their school. In a good number of neighbourhoods, so called “walking buses” are organised by parents or older school children to facilitate the walk to school together in a group of children. This means that children only have to walk a very short distance, say, 100 metres, to a previously agreed meeting point at a fixed time. From this meeting point, they then walk together the remaining distance to the school. Larger groups of around 10+ children are typically called “walking bus” whereas smaller groups tend to operate under the label “walking taxi”. Regardless of the size of the group, this requires a certain degree of coordination among the parents, which – apparently – can be too much to ask. In addition, it can be frustrating for children and parents to wait at the meeting point for delayed children – especially when it is cold or wet. An app-based system could facilitate this process. Participating children (or their parents) would signal their departure from home through the press of a button on a smartphone. This signal can be distributed among other children (or their parents) to indicate the time when it makes sense to leave their house. The same system could be used with older children who cycle to school. The system could even detect the departure automatically if GPS positioning is active. That way, participating children could all emerge from their homes at exactly the right point in time to join the travelling group.

Technological elements

The only technological requirement of the “On my way” is the availability of a smartphone app; ideally with GPS and mobile data activated. Most people nowadays are in possession of such a device; if not children, then at least their parents. For the core idea of the “On my way” to work, it would be sufficient to send a digital signal (“I [or: my child] is leaving home now”) at the appropriate time. This could even be done within the domestic Wifi range. While such signals can currently be conveyed with existing messenger apps, a more sophisticated application would allow all participants to enter their geo-location so that the app can calculate likely travel times and alert everyone along the route at individually tailored heads-up times. Such a system would yet have to be programmed.

Elements of Social innovation

The idea of a walking bus or walking taxi is the social innovation component of the “On my way” app. This concept has been developed a long time ago and is as such no longer innovative. The improved convenience that such an app would provide would simply facilitate the routinisation of such a daily social practice.

Envisaged Service improvement

- Children would be enabled to commute to school safely together with their peers
- Parents would be relieved of the duty to accompany their children to school every day without compromising the children’s safety.

Addressed actors, needs and prioritized areas

The “On my way” app would have to be programmed by an IT company – or by a group of IT-savvy volunteers; ideally as an open source solution so that further improvements can be made and so that the app can be provided free of charge. The main users would be parents of school children – esp. primary school children – possibly even children themselves (depending on the range of functionalities). The most important communicators and multipliers for such a system to reach a critical mass of users are the schools themselves.

Enabling factors.

What would enable the development and utilisation of a system like the “On my way” app is the existence of someone (company or volunteers) who can programme the required software / app. Data privacy issues would have to be taken very seriously in this process. Another crucial success factor would be the commitment of schools (esp. headmasters) and the willingness of parents to give such a system a try.

Scalability and replicability

A system like the “On my way” app requires a certain critical mass and density of users, which might make it difficult to work in rural areas. In (peri-)urban areas, however, the system would be eminently applicable and scalable. The transferability potential seems very high as long as group of committed individuals (parents / teachers) exists as key initiators.

Links

https://en.wikipedia.org/wiki/Walking_bus

5.2.7 Two-way escalator prioritisation

Description

At many public transport stops (especially subways and railway stations), there is one bi-directional escalator which provides access to a platform, usually next to a staircase. Typically, the direction that the escalator moves depends on who gets to the escalator first; they're triggered simply by someone stepping or rolling onto the platform in front of the stairs, and they usually continue running in that direction for a couple of minutes afterwards, even if no one is on the escalator.

This often leads to a situation where many (often able-bodied) people continue to use the escalator to go in one direction, while someone on the other end of the escalator who needs to go in the opposite direction (e.g. someone who is physically disabled, an elderly person, a person with a stroller or young child, etc.) has to wait for an indefinite amount of time, with the risk of missing their train or bus.

A simple solution for this would be to have a button on either end of the escalator which can act as a queuing mechanism for the direction of travel. In a sense, it's the same as an elevator call button. Since people on opposite ends of an escalator often do not see each other (and therefore do not know if someone is waiting on the other end to go in the opposite direction), an optional add-on could be a sign which lights up at one end of the escalator indicating when someone on the opposite end has pressed the call button. This could further help to prevent able-bodied people from continuing to use the escalator, as they would be aware that they would prolong the waiting time of the person waiting at the other end.

This technological solution could help people with reduced mobility – who rely on escalators – to have more control over their own mobility, in contrast to the current situation, where the escalators are often dominated by able-bodied people who could take the stairs but simply do not want to.

Technological elements

For this solution to work safely and efficiently, two technological elements would need to be put in place: 1) a button placed at the top and the bottom of the escalator that enables people to request their direction of travel (similar to how an elevator call button works), and 2) a sensor on the escalator that can detect when no one is still standing on the escalator, to avoid a situation where the escalator suddenly starts going in the opposite direction while they're still on it intending to go in the opposite direction.

As described above, an optional third technological element could be a sign which lights up at one end of the escalator indicating when someone on the opposite end has pressed the call button. This would be most useful on escalators where users cannot see if someone is waiting at the opposite end of the escalator.

Elements of Social innovation

Technically speaking, this solution does not have a strong social innovation element, although it could be said that it enables the technological mediation between two (or more) persons.

Envisaged Service improvement

- Vulnerable users with reduced mobility (e.g. physically disabled, elderly, people with a stroller or young child) are guaranteed to be able to use the escalator without an unnecessarily long waiting time.
- These vulnerable users would be less at risk of missing their train or bus due to unencumbered users making non-essential use of the escalator.

Addressed actors, needs and prioritized areas

The main users of the two-way escalator prioritisation would be vulnerable users with reduced mobility (e.g. physically disabled, elderly, people with a stroller, guardians with young children, etc.). The retrofitting or replacement (as needed) of existing escalators would typically fall within the remit of the public transport authority or the local authority. This solution could be implemented anywhere that escalators are needed but it is only feasible (either spatially, technically or financially) to install one bi-directional escalator rather than two escalators that operate in opposite directions.

Enabling factors.

Two main factors would enable the implementation of the two-way escalator prioritisation solution: 1) the available technology (and technicians) to install the escalator call buttons, sensors and light-up signs, and 2) available funding for the public transport authority or local authority to retrofit or replace escalators with this technology.

Scalability and replicability

This solution is applicable to any bi-directional escalator and can be adjusted to comply with local or national safety codes regarding escalator operation.

Links

n/a

6 ANNEX 2 – Poster INCLUSION Mid-Term Dissemination Event

TOWARDS MORE ACCESSIBLE AND INCLUSIVE MOBILITY SOLUTIONS FOR EUROPEAN PRIORITIZED AREAS

WP2 – Social Innovation, enabling ICT and data intelligence

ICT-enabled social innovation plays a crucial role to modernize the inclusive transport sector by improving new services and developing sustainable, more accessible and inclusive solutions; creating new mechanisms for service delivery and finally, sustaining organisational resiliency and partnerships in the service delivery.

Within the INCLUSION project, WP2 aims to explore new ideas and concepts for innovative mobility solutions in prioritized areas and analyse how ICT-enabled social innovation can help meet the needs and requirements of vulnerable users.

This work involves reviewing and analysing existing experiences, developing or adapting new ideas, and assessing and validating these new concepts and innovations in the INCLUSION Pilot Labs through a co-participative approach.

| PILOT LAB | TRANSPORT DEMAND ANALYSIS | SERVICE PROVIDERS | UNDERSTANDING USER NEEDS | USERS ENGAGEMENT |
|------------------------------------|---|--|---|--|
| BRNO AREA (DE) | Conceptual application of new city authorities where design focused infrastructure is needed. | | ICT Platform to capture vulnerable user needs through crowdsourced information. | Introduce gamification rewards to attract more cyclists. |
| FLORENCE METROPOLITAN AREA (IT) | | | ICT Platform to capture vulnerable user needs through crowdsourced information (GAMAPP). | |
| CHERRIBINS NATIONAL AREA (BE) | Social Networks as car-pooling network by buddy system. | | | Introduce gamification and dynamic pricing by the Car-pooling Connected Road system based on study. |
| FLANDERS REGION (BE) | Introduce dynamic pricing rewards to attract more volunteer car drivers at times of highest demand or to serve as most accessible routes from | Person Owned Car-pooling (POC) model by budget for not grant job seekers to pay for transport services using MaaS App. | | Introduce gamification to attract more volunteer car drivers to the Car-pooling Connected Road system. |
| BARCELONA METROPOLITAN REGION (ES) | Aggregation of transport demand through social media. | | ICT Platform to capture vulnerable user needs through crowdsourced information. | Introduce gamification and dynamic pricing to attract more potential taxi users. |
| BUDAPEST (HU) | | | ICT Platform to capture vulnerable user needs through crowdsourced information on campaign. | |

New Concepts and Tools

GAMIFICATION

Application of game elements to non-game contexts in order to generate behavioural impacts on target users and change their habits/attitude through the introduction of incentives and prizes.

| DE | BE | ES | HU |
|-----------------------|-----------------------------------|------------------------------------|-----------------------------------|
| Attract more cyclists | Campaign connected to MaaS system | Attract more volunteer car drivers | Attract more potential taxi users |

DEMAND ANALYSIS THROUGH SOCIAL MEDIA

Technological tool to manage the networking functionality in a simple way through social media allowing from one side, citizens themselves providing self-organised transport solutions to answer to mobility needs or, from the other side, transport service providers to aggregate transport demand through social networks.

| DE | BE | ES |
|----------------------------------|---|---|
| Identify parents and child users | For family and volunteer of car-pooling | Identify potential interested to attend Car-pooling |

DYNAMIC PRICING

Algorithms to allow service providers define prices based on demand forecasting, trends and their value with regard to the potential user; setting the right price, for the right customer, at the right time. This can be used to generate more revenue for the provider or to influence service supply to better respond to specific demands.

| DE | BE | ES | HU |
|-----------------------|--------------------------------------|------------------------------------|--|
| Attract more cyclists | Car-pooling connected to MaaS system | Attract more volunteer car drivers | Attract potential taxi users to buy their tickets in advance |

CROWDSOURCING TOOLS

The crowdsourcing initiative consist on:

- Dissemination/promotion campaign to engage the target audience
- Collection and sharing of the "contribution/input" given by the participants (i.e. feedbacks/real-time status)
- Management procedures of the crowdsourcing process
- Tools/procedures for the analysis of the crowdsourced data, assessment and conclusions

| IT | HU |
|------------------------------------|--|
| As a new functionality of MaaS APP | Campaign to understand the needs of people |

TIME HORIZON ILLUSTRATING FEASIBILITY TO IMPLEMENT CONCEPTS IN DIFFERENT PILOT LABS

Partner responsible: MOSAIC FACTOR, Email: info@mosaicfactor.com | Supporting partners: UNIABON, Email: s.d.wright@abdn.ac.uk; SOFTEDO, Email: michela.mastroratti@softedo.it | www.h2020-inclusion.eu

INCLUSION partners

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 770115

7 ANNEX 3 – Pilot Lab on-line surveys

7.1 Flanders on-line survey

Developing ideas and concepts for Public Transport innovations in prioritised areas

INCLUSION (<http://www.h2020-inclusion.eu/>) aims to address a number of challenges related to the accessibility of public transport in remote urban and rural areas. In a fast-changing transport environment, where individuals' mobility requirements have become more complex and the role of new forms of transport solutions is increasing, public transport continues to be a key requirement for people with specific needs. In some deprived urban neighbourhoods or remote rural areas across Europe, an efficient and inclusive public transport means greater access to jobs, educational and social opportunities.

*Obligatorio

Applying GAMIFICATION to the MobiTwin App for the Flanders Pilot Lab



INTRODUCTION

In Flanders, INCLUSION project partner Taxistop manages the Less Mobile Stations service, which reduces the barriers of participating in social life for less mobile elderly people by providing door-to-door transport using volunteer drivers. This service operates in 226 municipalities across the region, providing a service to 38,010 members using 2,846 volunteer drivers. Although a very popular service, two main problems exist: 1) attracting and retaining sufficient numbers of volunteer drivers to meet the demand; and 2) the long notice period required to book a trip. At present, users are required to book trips at least 2 days in advance of travel and, similarly, volunteer drivers are required to offer their availability at least 2 days in advance. The resulting services are not very responsive to user demands and, more significantly, rules out volunteers who may only know of their availability to offer their services on the day or night before. To overcome these problems, Taxistop have developed the MobiTwin App which provides the ability for both passengers to request trips and volunteer drivers to offer availability right up to the time of travel.

It is thought that introducing gamification elements to the MobiTwin App could encourage more volunteers to maintain interest and enthusiasm in the service. Gamification could introduce an incentive system, whereby volunteer drivers gain points for their travel offers by taking into account parameters like travel hour available, distances driven etc. The points are suitable to create a ranking in a virtual game and to get virtual or real awards. Furthermore, a form of dynamic pricing (or rather dynamic incentives) could be introduced to the gamification whereby increased rewards are offered to volunteers making themselves available at times of day when demand is greatest, or for agreeing to offer their services for trips which are of greatest social value (e.g. hospital appointments). Note that volunteer drivers are currently reimbursed for their fuel costs and vehicle wear and tear costs and this would remain - gamification is intended to provide additional incentives on top of this.

This survey aims to gain expert feedback on the potential of the GAMIFICATION concept applied to volunteer drivers.

Please, answer the following questions divided in three sections (GAMIFICATION, REWARDS AND SCALABILITY UNLOCKERS), it will not take more than 10 minutes.

CONSENT

Consent statement for participation in the research project Developing ideas and concepts for Public Transport innovations in prioritised areas.

Please read the statements below and tick the final box to confirm you have read and understood the statements and upon doing so agree to participate in the project.

I confirm that the project Developing ideas and concepts for Public Transport innovations in prioritised areas has been explained to me. I have had the opportunity to ask questions about the project and have had these answered satisfactorily.

I consent to the material I contribute being used to generate insights for the research project.

I understand that my participation in this research is voluntary and that I may withdraw from the research at any time.

I consent to allow the fully anonymised data to be used for future publications and other scholarly means of disseminating the findings from the research project.

I understand that the information/data acquired will be securely stored by researchers, but that appropriately anonymised data may in future be made available to others for research purposes. I understand that the University and project partners may publish appropriately anonymised data in its research repository for verification purposes and to make it accessible to researchers and other research users.

For more information refer to the participant form.
<https://drive.google.com/open?id=1a7yC0JF208aSNbVOCuQj0wJhBskFx-0n>

1. *

Selecciona todos los que correspondan.

I confirm that I have read and understood the above statements (check the box).

2. Name

3. Company Name

4. Position

GAMIFICATION

In this section we would like to better understand the potential of Gamification applied to volunteer drivers through the MobiTwin App.

5. Could suitable gamification features attract more volunteer drivers?

Marca solo un óvalo.

- Yes
 No
 Maybe

6. Could suitable gamification features help retain volunteer drivers?

Marca solo un óvalo.

- Yes
 No
 Maybe

7. Could suitable gamification features attract different types of volunteer drivers? (e.g. younger volunteers providing transport for other young people to festivals/concerts)

Marca solo un óvalo.

- Yes
 No
 Maybe

8. What forms of gamification would work best with volunteer drivers? Does this change according to type/age of volunteer?

REWARDS

In this section we would like to better understand the different possibilities of rewards' strategies

9. Which of the following sentences do you most agree with?

Marca solo un óvalo.

- Volunteers in general will be responsive to and motivated by tangible rewards
 Volunteers in general have an altruistic nature likely to make them more accepting of intangible rewards
 Volunteers are unlikely to be receptive to any form of reward

10. Do you see an opportunity for gamification to better match supply with demand by offering increased rewards to volunteers making themselves available at times of day when demand is greatest?

Marca solo un óvalo.

- Yes
- No

11. Do you know of any examples where the above has been demonstrated?

12. Do you see an opportunity for gamification to better address societal needs by offering increased rewards to volunteers offering their services for trips which are of greatest social value (e.g. hospital appointments)?

Marca solo un óvalo.

- Yes
- No

13. Do you know of any examples where gamification has been applied to better balance supply with demand?

14. What kind of rewards can local authorities offer to volunteer drivers who provide transport access to essential services (thereby reducing the need for local authority bus subsidies and payments for taxis)?

15. What kind of rewards can companies offer through sponsorship of gamification Apps/platforms? How can this be managed?

16. Do you know any rules/restrictions around the types of rewards which can be offered to volunteer drivers?

17. Do you think there could be any undesirable side effects of introducing gamification and rewards to volunteer services? Please give details.

18. Which of the following approaches do you feel is most suitable for this pilot?

Marca solo un óvalo.

- Small incentives/rewards per trip
- Fewer but larger rewards for drivers offering/providing most trips per month
- Points per trip leading to 'volunteer of the week' award but no tangible reward
- Gamification and rewards would provide no benefits

SCALABILITY UNLOCKERS

In this section we would like to better understand the barriers of delivering and scaling these solutions in terms of: solution being transferable to different kinds of users, number of users, different environments, financial sustainability, etc.

19. Would introducing gamification and rewards to the volunteer driver service be likely to expand the services available to vulnerable users

20. Please rate the following barriers to the success of this concept in terms of their importance?

Marca solo un óvalo por fila.

| | 1 (Unimportant) | 2 | 3 | 4 | 5 (Very important) |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| General public's (volunteer driver) acceptance | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Financial constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Legal constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Political constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Environmental constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Lack of partnership engagement (e.g. Less Mobile Service providers) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Technical constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

21. Can you provide more details on any of the barriers listed in the previous question? Or if you can think of any other significant barriers please describe these.

22. Which are the limitations of this solution? e.g. are there any technological, operational or cultural barriers to the scalability of this solution?

23. Do you have any other general comments on this solution?

24. Do you know of any other similar applications of gamification applied to volunteers? Please give details.

7.2 Barcelona on-line survey

Developing ideas and concepts for Public Transport innovations in prioritised areas

INCLUSION (<http://www.h2020-inclusion.eu/>) aims to address a number of challenges related to the accessibility of public transport in remote urban and rural areas. In a fast-changing transport environment, where individuals' mobility requirements have become more complex and the role of new forms of transport solutions is increasing, public transport continues to be a key requirement for people with specific needs. In some deprived urban neighbourhoods or remote rural areas across Europe, an efficient and inclusive public transport means greater access to jobs, educational and social opportunities.

*Obligatorio

Establishing new bus routes based on DEMAND ANALYSIS THROUGH SOCIAL MEDIA: a concept trialled in the Barcelona Pilot Lab



INTRODUCTION

The focus of this pilot initiative is to provide a safer, cheaper and more comfortable way for teenagers and young adults living outside the city to travel to a major music festival (Canet Rock) held overnight on the peri-urban fringe of Barcelona in Canet de Mar. The solution applies information mining from Social Networks (Twitter) to identify the demand from potential users who want to attend the festival. This analysis enables planners to aggregate the mobility demand (event attendees) from different geographic areas which are poorly served by existing PT service provision and use this to propose the most suitable demand responsive tailored bus routes and bus-stops locations for the unserved demand.

This survey aims to gain expert feedback on the DEMAND ANALYSIS THROUGH SOCIAL MEDIA concept.

Please, answer the following questions divided in three sections (SOCIAL MEDIA DATA, PRICING AND SCALABILITY UNLOCKERS), it will not take more than 10 minutes.

CONSENT

Consent statement for participation in the research project Developing ideas and concepts for Public Transport innovations in prioritised areas.

Please read the statements below and tick the final box to confirm you have read and understood the statements and upon doing so agree to participate in the project.

I confirm that the project Developing ideas and concepts for Public Transport innovations in prioritised areas has been explained to me. I have had the opportunity to ask questions about the project and have had these answered satisfactorily.

I consent to the material I contribute being used to generate insights for the research project.

I understand that my participation in this research is voluntary and that I may withdraw from the research at any time.

I consent to allow the fully anonymised data to be used for future publications and other scholarly means of disseminating the findings from the research project.

I understand that the information/data acquired will be securely stored by researchers, but that appropriately anonymised data may in future be made available to others for research purposes. I understand that the University and project partners may publish appropriately anonymised data in its research repository for verification purposes and to make it accessible to researchers and other research users.

For more information refer to the participant form.

<https://drive.google.com/open?id=1a7yCDJE208aSNbVOCuORQwJhBskFx-on>

1. *

Selecciona todos los que correspondan.

I confirm that I have read and understood the above statements (check the box).

2. Name

3. Company Name

4. Position

**SOCIAL
MEDIA DATA**

In this section we would like to better understand the potential of establishing demand through Social Media Data

5. To what extent do you agree that sufficient information on travel demands can be extracted from social media data in order to design new bus routes?

Marca solo un óvalo.

1 2 3 4 5

Strong disagree Strong agree

6. Which target groups of the population do you think are suited to be included in social media demand analysis?

Selecciona todos los que correspondan.

- Teenagers
- Young adults
- Families with young children
- 'Active' old people
- 'Frail' old people
- Migrants
- Tourists
- Disabled/mobility impaired
- Job seekers

Otro: _____

7. Which is the best Social Media platform to be analysed for extracting demand data? Does it vary by target group?

8. Do you have any suggestions on how the quality and quantity of demand data extracted from social media can be increased?

9. Do you have any suggestions on how to maximise the amount of Social Media data containing geolocation?

10. What are the risks of using Social Media for travel demand analysis?

Delivering bus services based on demands from Social Media

In this section we would like to better understand the key factors in delivering attractive transport services based on the estimated demand from Social Media. The Barcelona Pilot Lab has identified a large scale music festival as a suitable case where extracting travel demands from Social Media can help improve public transport services. The key characteristics for this were uncertainty of where demands will originate combined with large proportion of festival attendees being active on Social Media.

11. How would you rate the suitability of using Social Media data to design bus routes in this case?

Marca solo un óvalo.

| | 1 | 2 | 3 | 4 | 5 | |
|-----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| Very unsuitable | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Very suitable |

12. Do you have knowledge of any other application areas where extracting demands from Social Media can enhance PT service provision? Please give details.

13. The new bus routes need to obtain 70% occupancy to confirm its operation. If this is not achieved the route is cancelled two weeks before the festival. Please rate the effectiveness of the following actions/attributes in ensuring the routes run.

Marca solo un óvalo por fila.

| | 1 (Not at all effective) | 2 | 3 | 4 | 5 (Very effective) |
|--|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Inform festival goers of the new bus service at the time when they buy their festival ticket | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Provide 'early bird' discounts for the bus service when booked well in advance | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Promote the bus service through the festival web-site and social media accounts | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Promote the bus service through schools and colleges | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Offer discounted bus fares to groups booking (e.g. 6 or more friends booking together) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Offer discounted bus fare to passengers who 'refer a friend' | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Offer 'last-minute' discounts to fill empty seats | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Run all routes but increase fare if occupancy below 70% | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Rely on word of mouth for promotion | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

14. Are there any other actions you can suggest to increase bookings to the new bus service?

15. How can we better understand the price sensitivities of target users from social media?

16. Do you think that the introduction of dynamic pricing (e.g. lower prices for advanced booking) is a sensible way to get early confirmation that a route will run?

Marca solo un óvalo.

- Yes
 No

SCALABILITY UNLOCKERS

In this section we would like to better understand which are the scalability unlockers for this solution

17. Please rate the following barriers to the success of this concept in terms of their importance?

Marca solo un óvalo por fila.

| | 1 (Not at all important) | 2 | 3 | 4 | 5 (Very important) |
|--|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| General public's acceptance of 'on-demand' bus services | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Financial constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Legal/privacy constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Political constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Environmental constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Lack of partnership engagement (e.g. festival organiser) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Social Media data quality (e.g. data not homogeneous data in different Social Media platforms; missing geolocation data) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Social Media data quantity (e.g. small % of target group active on Social Media) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

18. Can you provide more details on any of the barriers listed in the previous question? Or if you can think of any other significant barriers please describe these.

19. Is the solution scalable in terms of numbers of users? Are there any technical, operational or cultural barriers for the scalability of this solution?

20. Is the solution transferable to other types transport demands? Do you think there are other application areas where extracting demands from Social Media can enhance PT service provision? Please give details.

21. Do you have any other general comments on this solution?

22. Do you know of any other similar applications of demand analysis through social media? Please give details.

7.3 Budapest on-line survey

CrDeveloping ideas and concepts for Public Transport innovations in prioritised areas

INCLUSION (<http://www.h2020-inclusion.eu/>) aims to address a number of challenges related to the accessibility of public transport in deprived urban and remote rural areas. In a fast-changing transport environment, where individuals' mobility requirements have become more complex and the role of new forms of transport solutions is increasing, public transport continues to be a key requirement for people with specific needs. In some deprived urban neighbourhoods or remote rural areas across Europe, an efficient and inclusive public transport means greater access to jobs, educational and social opportunities.

*Obligatorio

CROWD SOURCED DATA COLLECTION to enhance PT services for travellers with additional specific needs: the Budapest Pilot Lab



INTRODUCTION

This pilot action involves crowdsourcing information from groups of travellers with additional specific needs: blind and visually impaired, disabled, travellers with luggage or baby buggies, tourists, and foreigners staying in Budapest long-term. The jarkelo.hu webpage, which currently allows citizens to report everyday urban problems (i.e. uncollected rubbish, broken paving, pot holes, missing street bin and signs etc.), is being developed to allow these groups of travellers to report problems and issues they experience relating to any aspect of their PT journey. There are three types of information collected:

- Problems and barriers that make PT usage impossible for the vulnerable target groups.
- Problems and barriers that make PT usage difficult for the vulnerable target groups.
- Good examples that make PT usage easier for the vulnerable target groups.

The crowdsourced information is collected, aggregated where relevant, and shared with authorities to act on. This information is also made visible to fellow travellers with common needs in order that they can benefit and learn from other's experiences.

With the use of the public crowdsourcing webpage and mobile App platform, a new social connection will evolve between the target groups and the public transport authority for the Budapest area (BKK) who will gain a better understanding of the requirements and problems of the people with additional needs.

This survey aims to gain expert feedback on the potential of the CROWD SOURCED DATA COLLECTION concept to enhance PT services for travellers with additional specific needs.

Please, answer the following questions divided in two sections (CROWD SOURCED DATA APPS and BARRIERS to SUCCESS), it will not take more than 10 minutes.

CONSENT

Consent statement for participation in the research project Developing ideas and concepts for Public Transport innovations in prioritised areas.

Please read the statements below and tick the final box to confirm you have read and understood the statements and upon doing so agree to participate in the project.

I confirm that the project Developing ideas and concepts for Public Transport innovations in prioritised areas has been explained to me. I have had the opportunity to ask questions about the project and have had these answered satisfactorily.

I consent to the material I contribute being used to generate insights for the research project.

I understand that my participation in this research is voluntary and that I may withdraw from the research at any time.

I consent to allow the fully anonymised data to be used for future publications and other scholarly means of disseminating the findings from the research project.

I understand that the information/data acquired will be securely stored by researchers, but that appropriately anonymised data may in future be made available to others for research purposes. I understand that the University and project partners may publish appropriately anonymised data in its research repository for verification purposes and to make it accessible to researchers and other research users.

For more information refer to the participant form.
<https://drive.google.com/open?id=1a7yCDJE208aSNbVOCuOrOwJhBskFx-on>

1. *

Selecciona todos los que correspondan.

I confirm that I have read and understood the above statements (check the box).

2. Name

3. Company Name

4. Position

CROWD SOURCED DATA APPS

In this section we would like to better understand the potential of Crowd Sourced Data Apps

5. Do you think that crowdsourced data collection platforms/Apps offer the opportunity for improved integration of vulnerable travellers into mainstream public transport users?

Marca solo un óvalo.

- Yes
 No
 Maybe

6. Please indicate the extent to which you agree with the following statements: Crowdsourced data collection...

Marca solo un óvalo por fila.

| | 1 (Strongly Disagree) | 2 | 3 | 4 | 5 (Strongly Agree) |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| ...can highlight to authorities where service improvements are needed | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...can identify what solutions are needed | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...is not detailed enough to understand issues experienced by users with additional specific needs | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...is most beneficial for sharing information between fellow travellers with similar specific needs | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...Apps are too difficult to use for blind and visually impaired passengers | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...Apps are too difficult to use for disabled passengers | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...Apps are too difficult to use for travellers with luggage or baby buggies | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...Apps are too difficult to use for tourists | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...Apps are too difficult to use for foreigners staying in Budapest long-term | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

What particular features and design considerations do you feel are important in a crowdsourcing app for the following users with additional specific needs?

7. Blind and visually impaired

8. Disabled

9. Travellers with luggage or baby buggies

10. Tourists

11. Foreign residents

12. Do crowdsourcing apps still provide useful and usable information when number of users is very low?

Marca solo un óvalo.

Yes

No

13. How would you rate the effectiveness of the following strategies or features in attracting more users or generating more feedback?

Marca solo un óvalo por fila.

| | 1 - (Not at all effective) | 2 | 3 | 4 | 5 - (Very effective) |
|--|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| by promoting the App through associations of users with additional needs | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| by linking the usage of the App with gamification / rewards | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| by presenting the progress and actions already achieved in relation to collected feedback to date | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| by promoting the App through already existing and widely used journey planning/travel information Apps | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

14. Are there any other strategies or features which you think are effective in attracting more users or generating more feedback?

15. How do you rate the following methods for detecting and stopping malicious use of the App?

Marca solo un óvalo por fila.

| | 1 - (Not at all effective) | 2 | 3 | 4 | 5 - (Very effective) |
|--|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| With automatic ICT features (i.e. by blocking multiple replies within a certain timeframe) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| By allowing using the features only once the user is registered and logged in | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| By conveying a clear message on the ethical implications of a malicious use | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

16. Are there any other methods for detecting and stopping malicious use of the App?

17. Please rate the significance of the following types of costs associated with the operations of such Apps.

Marca solo un óvalo por fila.

| | 1- (Less significant) | 2 | 3 | 4 | 5 - (More significant) |
|--|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| Staff requirements for monitoring and assessing the data collected through the crowdsourcing App | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Staff requirements for technical support | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ICT tools and software for processing the data collected | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Data servers and communication costs | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Promotional campaign to let users know about the apps | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

18. Are there any other main types of costs associated with the operation of such Apps?

BARRIERS to SUCCESS

In this section we would like to better understand the barriers of delivering and scaling these solutions in terms of: solution being transferable to different kinds of users, number of users, different environments, financial sustainability, etc.

19. Please rate the following barriers to the success of this concept in terms of their importance?

Marca solo un óvalo por fila.

| | 1 (Unimportant) | 2 | 3 | 4 | 5 (Very important) |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Target User Capabilities (e.g. ownership and competence with smart phones) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Target User awareness and willingness to use | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Suitable design of the technology | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Organisation constraints (e.g. to monitor and maintain the App) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Partnership engagement (Authority/PT provider willingness to act on information) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Financial constraints (e.g. to act on information obtained) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Legal constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Political constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

20. Can you provide more details on any of the barriers listed in the previous question? Or if you can think of any other significant barriers please describe these.

21. Which are the limitations of this solution? e.g. are there any technological, operational or cultural barrier for the scalability of this solution?

22. How can the potential and effectiveness of the solution be improved?

23. Do you have any other general comments on this solution?

24. Do you know of any other similar crowdsourcing Apps tailored to users with additional needs?

7.4 Florence on-line survey

Developing ideas and concepts for Public Transport innovations in prioritised areas

INCLUSION (<http://www.h2020-inclusion.eu/>) aims to address a number of challenges related to the accessibility of public transport in deprived urban and remote rural areas. In a fast-changing transport environment, where individuals' mobility requirements have become more complex and the role of new forms of transport solutions is increasing, public transport continues to be a key requirement for people with specific needs. In some deprived urban neighbourhoods or remote rural areas across Europe, an efficient and inclusive public transport means greater access to jobs, educational and social opportunities.

*Obligatorio

CROWD SOURCED DATA COLLECTION to enhance PT services for travellers in rural areas and for those with additional specific needs: the Florence Pilot Lab



INTRODUCTION

This pilot action involves using a mobile App to crowdsource information and feedback from passengers. The measures are implemented in two pilot areas: i) San Piero a Sieve, a rural area with a population density between 50 and 100 inhabitants/Km2 for a total of around 4.300 inhabitants, and ii) Campi Bisenzio, a peripheral area located north-west of Florence characterised by large presence of people with migrant background and refugees. The ATAF 2.0 travel information and journey planning app, is being enhanced with a new functionality to allow passengers to assess and rate the quality of PT service and provide information on their needs and problems they may experience while using the PT service. The crowdsourced information is collected, aggregated where relevant, and analysed by the PT operator in order to find possible strategies to improve the service.

With the use of this functionality, a new social connection will evolve between the target groups (mainly migrants, low-income people and commuters) and the public transport operator of Florence Metropolitan area (Busitalia/ATAF) who will gain a better understanding of the requirements and problems of users and of the main issues target groups may experience while using the PT service.

This survey aims to gain expert feedback on the potential of the CROWD SOURCED DATA COLLECTION concept to provide the operator with relevant information to enhance PT services. Please, answer the following questions divided in two sections (CROWD SOURCED DATA APPS and BARRIERS to SUCCESS), it will not take more than 10 minutes.

CONSENT

Consent statement for participation in the research project Developing ideas and concepts for Public Transport innovations in prioritised areas.

Please read the statements below and tick the final box to confirm you have read and understood the statements and upon doing so agree to participate in the project.

I confirm that the project Developing ideas and concepts for Public Transport innovations in prioritised areas has been explained to me. I have had the opportunity to ask questions about the project and have had these answered satisfactorily.

I consent to the material I contribute being used to generate insights for the research project.

I understand that my participation in this research is voluntary and that I may withdraw from the research at any time.

I consent to allow the fully anonymised data to be used for future publications and other scholarly means of disseminating the findings from the research project.

I understand that the information/data acquired will be securely stored by researchers, but that appropriately anonymised data may in future be made available to others for research purposes. I understand that the University and project partners may publish appropriately anonymised data in its research repository for verification purposes and to make it accessible to researchers and other research users.

For more information refer to the participant form.

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1. *

Selecciona todos los que correspondan.

I confirm that I have read and understood the above statements (check the box).

2. Name

3. Company Name

4. Position

CROWD SOURCED
DATA APPS

In this section we would like to better understand the potential of Crowd Sourced Data Apps

5. Do you think that crowdsourced data collection platforms/Apps offer the opportunity for improved integration of vulnerable travellers into mainstream public transport users?

Marca solo un óvalo.

- Yes
- No
- Maybe

6. Please indicate the extent to which you agree with the following statements:
Crowdsourced data collection....

Marca solo un óvalo por fila.

| | 1 (Strongly Disagree) | 2 | 3 | 4 | 5 (Strongly Agree) |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| ...can highlight to PT operators/authorities where service improvements are needed | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...can identify what solutions are needed | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...is not detailed enough to understand issues experienced by users with additional specific needs | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...is most beneficial for sharing information between fellow travellers with similar specific needs | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...Apps are too difficult to use for migrant travellers | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...Apps are useful in rural areas where real-time information is lacking | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

What particular features and design considerations do you feel are important in a crowdsourcing app for the following users?

7. People with migrant background and refugees

8. Rural travellers

9. Do crowdsourcing apps still provide useful and usable information when number of users is very low?

Marca solo un óvalo.

- Yes
- No

10. How would you rate the effectiveness of the following strategies or features in attracting more users or generating more feedback?

Marca solo un óvalo por fila.

| | 1 - (Not at all effective) | 2 | 3 | Column 4 | 5 - (Very effective) |
|--|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| by promoting the App through associations of users with additional needs | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| by linking the usage of the App with gamification / rewards | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| by presenting the progress and actions already achieved in relation to collected feedback to date | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| by promoting the App through already existing and widely used journey planning/travel information Apps | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

11. Are there any other strategies or features which you think are effective in attracting more users or generating more feedback?

12. How do you rate the following methods for detecting and stopping malicious use of the App?

Marca solo un óvalo por fila.

| | 1 - (Not at all effective) | 2 | 3 | 4 | 5 - (Very effective) |
|--|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| With automatic ICT features (i.e. by blocking multiple replies within a certain timeframe) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| By allowing using the features only once the user is registered and logged in | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| By conveying a clear message on the ethical implications of a malicious use | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

13. Are there any other methods for detecting and stopping malicious use of the App?

14. Please rate the significance of the following types of costs associated with the operations of such Apps.

Marca solo un óvalo por fila.

| | 1- (Less significant) | 2 | 3 | 4 | 5 - (More significant) |
|--|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| Staff requirements for monitoring and assessing the data collected through the crowdsourcing App | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Staff requirements for technical support | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ICT tools and software for processing the data collected | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Data servers and communication costs | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Promotional campaign to let users know about the apps | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

15. Are there any other main types of costs associated with the operation of such Apps?

BARRIERS to SUCCESS

In this section we would like to better understand the barriers of delivering and scaling these solutions in terms of: solution being transferable to different kinds of users, number of users, different environments, financial sustainability, etc.

16. Please rate the following barriers to the success of this concept in terms of their importance?

Marca solo un óvalo por fila.

| | 1 (Unimportant) | 2 | 3 | 4 | 5 (Very important) |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Target User Digital skills (e.g. ownership and competence with smart phones) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Target User awareness and willingness to use | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Suitable design of the technology | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Infrastructure constraints (e.g. communications network) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Organisation constraints (e.g. to monitor and maintain the App) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Partnership engagement (Authority/PT provider willingness to act on information) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Financial constraints (e.g. to act on information obtained) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Legal constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Political constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

17. Can you provide more details on any of the barriers listed in the previous question? Or if you can think of any other significant barriers please describe these.

18. Which are the limitations of this solution? e.g. are there any technological, operational or cultural barriers for the scalability of this solution?

19. How can the potential and effectiveness of the solution be improved?

20. Do you have any other general comments on this solution?

21. Do you know of any other similar crowdsourcing Apps tailored to users with additional needs?

Este contenido no ha sido creado ni aprobado por Google.

Google Formularios

7.5 Rhein Sieg on-line survey

Developing ideas and concepts for Public Transport innovations in prioritised areas

INCLUSION (<http://www.h2020-inclusion.eu/>) aims to address a number of challenges related to the accessibility of public transport in deprived urban and remote rural areas. In a fast-changing transport environment, where individuals' mobility requirements have become more complex and the role of new forms of transport solutions is increasing, public transport continues to be a key requirement for people with specific needs. In some deprived urban neighbourhoods or remote rural areas across Europe, an efficient and inclusive public transport means greater access to jobs, educational and social opportunities.

*Obligatorio

DEMAND ANALYSIS THROUGH SOCIAL MEDIA and CROWD SOURCED DATA COLLECTION to ensure that children and young people have greater mobility independence: the Rhein Sieg Pilot Lab



INTRODUCTION

The aim of this pilot is to ensure that children and young people have greater mobility independence by being able to cover more of their daily trips themselves by public transport and/or bicycle, and that adults will be able to replace trips made by car with trips made by public transport or bicycle, in particular also pick up and drop off trips.

Improving the cycling infrastructure is crucial in achieving the aims of the pilot. Central to this is delivering the 'forgotten paths' measure to the public. This measure involves making improvements to existing off-road paths and minor changes to road infrastructure in order to establish safe and attractive cycle routes, and then promoting (reminding) local residents of the existence of these.

One of the challenges at present is knowing where best to establish these 'forgotten' paths. A second challenge is knowing what types of changes and improvements are most needed by cyclists. Two technological solutions deploying social innovation concepts have been identified as potentially offering tools to help transport planners address these challenges.

1) Demand analysis through social media applied to gain a better knowledge of where young people want to cycle to and from. This will help understand where demand for cycle routes exists but is currently not well understood or catered for and could help ensure new cycle paths or renewed 'forgotten' paths could be established in the most appropriate places.

2) Use of a mobile App to crowdsource data from cyclists reporting problems and issues they experience relating to any aspect of their cycle journey, or to offer compliments where things are done well. This could be location of pot holes in the road, dangerous junctions for cyclists, lack of cycle parking, poor lighting, poor cycle signage, best routes for fellow cyclists, etc. The crowdsourced information is collected, aggregated where relevant, and shared with authorities to act on. This has the potential to help improve the changes and features to include in the renewed 'forgotten' paths. This information could also be made visible to fellow cyclists in order that they can benefit and learn from other's experiences.

This survey aims to gain expert feedback on the potential of the DEMAND ANALYSIS THROUGH SOCIAL MEDIA and the CROWD SOURCED DATA COLLECTION concepts to ensure that cycle network improvements are those that provide most benefit to cyclists and are introduced at the places most demanded by children and young people.

Please, answer the following questions divided in two sections (SOCIAL MEDIA DATA and CROWD SOURCED DATA APPS), it will not take more than 10 minutes.

CONSENT

Consent statement for participation in the research project Developing ideas and concepts for Public Transport innovations in prioritised areas.

Please read the statements below and tick the final box to confirm you have read and understood the statements and upon doing so agree to participate in the project.

I confirm that the project Developing ideas and concepts for Public Transport innovations in prioritised areas has been explained to me. I have had the opportunity to ask questions about the project and have had these answered satisfactorily.

I consent to the material I contribute being used to generate insights for the research project.

I understand that my participation in this research is voluntary and that I may withdraw from the research at any time.

I consent to allow the fully anonymised data to be used for future publications and other scholarly means of disseminating the findings from the research project.

I understand that the information/data acquired will be securely stored by researchers, but that appropriately anonymised data may in future be made available to others for research purposes. I understand that the University and project partners may publish appropriately anonymised data in its research repository for verification purposes and to make it accessible to researchers and other research users.

For more information refer to the participant form.

<https://drive.google.com/open?id=1a7yCDJE208aSNbVOCuOrOwJhBskFx-on>

1. *

Selecciona todos los que correspondan.

I confirm that I have read and understood the above statements (check the box).

2. Name

3. Company Name

4. Position

Improving cycling infrastructure based on demands analysis from Social Media

The Rhein Sieg Pilot Lab wants to better understand where demand for cycle routes exists but is currently not well understood within Hennef. In this section we would like to better understand the key factors in estimating cycling demand of young people from Social Media

5. How would you rate the suitability of helping ensure new cycle paths or renewed 'forgotten' paths could be established in the most appropriate places through Social Media demand analysis?

Marca solo un óvalo.

1 2 3 4 5

Very unsuitable Very suitable

6. To what extent do you agree that sufficient information on travel demands can be extracted from social media data in order to improve cycling infrastructures?

Marca solo un óvalo.

1 2 3 4 5

Strong disagree Strong agree

7. Which target groups of the population do you think are suited to be included in social media demand analysis?

Marca solo un óvalo.

- Teenagers
- Young adults
- Families with young children
- 'Active' old people
- 'Frail' old people
- Migrants
- Tourists
- Disabled/mobility impaired
- Job seekers
- Otro: _____

8. Which is the best Social Media platform to be analysed for extracting demand data? Does it vary by target group or by country?

9. Do you have any suggestions on how the quality and quantity of demand data extracted from social media can be increased?

10. Do you have any suggestions on how to maximise the amount of Social Media data containing geolocation?

11. What are the risks of using Social Media for cycle travel demand analysis?

12. Please rate the following barriers to the success of this concept in terms of their importance?

Marca solo un óvalo por fila.

| | 1 - (Not at all important) | 2 | 3 | 4 | 5 - (Very important) |
|--|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Target group (teenagers/young adults) acceptance of cycling | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Social Media data quality (e.g. data not homogeneous data in different Social Media platforms; missing geolocation data) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Social Media data quantity (e.g. small % of target group active on Social Media) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Financial constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Legal/privacy constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Political constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Lack of partnership engagement (e.g. Local authority acting on feedback) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Environmental considerations | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

13. Can you provide more details on any of the barriers listed in the previous question? Or if you can think of any other significant barriers please describe these.

14. Is the solution scalable in terms of numbers of users? Are there any technical, operational or cultural barriers for the scalability of this solution?

15. Is the solution transferable to other types of transport demands? Do you think there are other application areas where extracting demands from Social Media can enhance transport provision? Please give details.

16. Do you have any other general comments on this solution?

17. Do you know of any other similar applications of demand analysis through social media? Please give details.

CROWD SOURCED DATA APPS

In this section we would like to better understand the potential of Crowd Sourced Data Apps

18. Do you think that crowdsourced data collection platforms/Apps offer the opportunity for improved understanding of young persons travel requirements?

Marca solo un óvalo.

- Yes
 No

19. Please indicate the extent to which you agree with the following statements: Crowdsourced data collection....

Marca solo un óvalo por fila.

| | 1 (Strongly Disagree) | 2 | 3 | 4 | 5 (Strongly Agree) |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| ...can highlight to authorities where infrastructure improvements are needed | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...can identify what solutions are needed | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...is not detailed enough to understand issues experienced by users with additional specific needs | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...is most beneficial for sharing information between fellow travellers with similar specific needs | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...Apps are too difficult to use for teenagers/young people | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...Apps will not provide reliable information from teenagers/young people | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

What particular features and design considerations do you feel are important in a crowdsourcing app for the following users?

20. Teenagers

21. Young adults

22. Cyclists

23. Do crowdsourcing apps still provide useful and usable information when number of users is very low?

Marca solo un óvalo.

- Yes
 No

24. How would you rate the effectiveness of the following strategies or features in attracting more users or generating more feedback?

Marca solo un óvalo por fila.

| | 1 - (Not at all effective) | 2 | 3 | 4 | 5 - (Very effective) |
|--|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| by promoting the App through cycling associations | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| by promoting the App through schools and colleges | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| by promoting the App through social media | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| by linking the usage of the App with gamification / rewards | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| by presenting the progress and actions already achieved in relation to collected feedback to date | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| by promoting the App through already existing and widely used journey planning/travel information Apps | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

25. Are there any other strategies or features which you think are effective in attracting more users or generating more feedback?

26. How do you rate the following methods for detecting and stopping malicious use of the App?

Marca solo un óvalo por fila.

| | 1 - (Not at all effective) | 2 | 3 | 4 | 5 - (Very effective) |
|--|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| With automatic ICT features (i.e. by blocking multiple replies within a certain timeframe) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| By allowing using the features only once the user is registered and logged in | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| By conveying a clear message on the ethical implications of malicious use | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

27. Are there any other methods for detecting and stopping malicious use of the App?

28. Please rate the significance of the following types of costs associated with the operations of such Apps.

Marca solo un óvalo por fila.

| | 1- (Less significant) | 2 | 3 | 4 | 5 - (Most significant) |
|--|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| Staff requirements for monitoring and assessing the data collected through the crowdsourcing App | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Staff requirements for technical support | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ICT tools and software for processing the data collected | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Data servers and communication costs | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Promotional campaign to let users know about the apps | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

29. Are there any other main types of costs associated with the operation of such Apps?

30. Please rate the following barriers to the success of the CROWDSOURCING mobile APP concept in terms of their importance?

Marca solo un óvalo por fila.

| | 1 (Unimportant) | 2 | 3 | 4 | 5 (Very important) |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Target User Capabilities (e.g. ownership and competence with smart phones) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Target User awareness and willingness to use | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Suitable design of the technology | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Infrastructure constraints (e.g. communications network) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Organisation constraints (e.g. to monitor and maintain the App) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Partnership engagement (e.g. Authority willingness to act on information) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Financial constraints (e.g. to act on information obtained) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Legal constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Political constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

31. Can you provide more details on any of the barriers listed in the previous question? Or if you can think of any other significant barriers please describe these.

32. Is the solution scalable in terms of numbers of users? e.g. are there any technological, operational or cultural obstacles to the scalability of this solution?

33. How can the potential and effectiveness of the solution be improved?

34. Do you have any other general comments on this solution?

35. Do you know of any other similar crowdsourcing Apps tailored to cyclists?

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7.6 Cairngorms National Park on-line survey

Developing ideas and concepts for Public Transport innovations in prioritised areas

INCLUSION (<http://www.h2020-inclusion.eu/>) aims to address a number of challenges related to the accessibility of public transport in deprived urban and remote rural areas. In a fast-changing transport environment, where individuals' mobility requirements have become more complex and the role of new forms of transport solutions is increasing, public transport continues to be a key requirement for people with specific needs. In some deprived urban neighbourhoods or remote rural areas across Europe, an efficient and inclusive public transport means greater access to jobs, educational and social opportunities.

*Obligatorio

SOCIAL MEDIA PLATFORMS FOR MATCHING THOSE WITH NEEDS TO THOSE WITH CAPABILITY: the Cairngorms Pilot Lab



INTRODUCTION

Cairngorms National Park (CNP) is one of the most remote areas in Scotland, but also one of the most popular tourism destinations within the Scottish Highlands. Although the local resident base is around 20,000, the area experiences more than one and a half million visitors per year for summer hiking and winter skiing. The underlying public transport infrastructure is fragile and includes fixed route bus and rail (both privately operated), some open access Demand Responsive Transport (operated by Community Transport and local authorities) and taxis.

This pilot will be focused on improving accessibility to public transport both for residents (especially older persons, young adults, teenagers) and tourists to and within the protected rural landscape of the Cairngorms National Park, with a particular focus on infrastructure that fosters connections for communities to and within the area and delivers inclusive growth. Planned initiatives in the area include introduction of demand responsive bus, e-bike share scheme, car share scheme and enhanced liftshare opportunities. A key challenge is that tourists are unaware of the travel options available to them and residents lack the confidence or knowledge on how to use non conventional public transport services (especially older and young persons).

To address this challenge, the INCLUSION project is researching the concept of using of social media platforms to pool together people with travel needs and uncertainty MATCHED to people with capability and knowledge. This can take the form of:

- Tourists arriving to the Cairngorms National Park who have a specific interest (golf, skiing, whisky) but lack the knowledge on how to access these activities MATCHED with locals who share the same interest and possess the knowledge and possibly possess the transport capability to access the activity.
- Local vulnerable older persons who lack transport and lack the capability or knowledge on how to use public transport services MATCHED with local volunteers who can act as travel buddies to assist in the use of public transport or can offer lifts.
- Local vulnerable young persons who lack transport and lack the knowledge on how to use the new non-conventional public transport services MATCHED with local peers who can share experience of using services.

The above research ideas raise questions on how to effectively and safely deliver such a concept to the different target user groups, including vetting of participants.

This survey aims to gain expert feedback on the potential of using SOCIAL MEDIA PLATFORMS FOR MATCHING THOSE WITH NEED TO THOSE WITH CAPABILITY.

Please, answer the following questions divided in three sections (MATCHING OFFER/DEMAND via SOCIAL MEDIA, DELIVERING THE SOLUTIONS, AND SCALABILITY UNLOCKERS), it will not take more than 10 minutes.

CONSENT

Consent statement for participation in the research project Developing ideas and concepts for Public Transport innovations in prioritised areas.

Please read the statements below and tick the final box to confirm you have read and understood the statements and upon doing so agree to participate in the project.

I confirm that the project Developing ideas and concepts for Public Transport innovations in prioritised areas has been explained to me. I have had the opportunity to ask questions about the project and have had these answered satisfactorily.

I consent to the material I contribute being used to generate insights for the research project.

I understand that my participation in this research is voluntary and that I may withdraw from the research at any time.

I consent to allow the fully anonymised data to be used for future publications and other scholarly means of disseminating the findings from the research project.

I understand that the information/data acquired will be securely stored by researchers, but that appropriately anonymised data may in future be made available to others for research purposes. I understand that the University and project partners may publish appropriately anonymised data in its research repository for verification purposes and to make it accessible to researchers and other research users.

For more information refer to the participant form.

<https://drive.google.com/open?id=1a7yCDJE208aSNbVOCuOrOwJhBskFx-on>

1. *

Selecciona todos los que correspondan.

I confirm that I have read and understood the above statements (check the box).

2. Name

3. Company Name

4. Position

MATCHING OFFER/DEMAND via SOCIAL MEDIA

In this section we would like to better understand the potential of social media platforms to reach target users with needs and to match them to locals with capability.

5. To what extent do you think Social Media offers an appropriate means for bringing together the target users with need and those with capability?

Marca solo un óvalo por fila.

| | 1 (Not at all appropriate) | 2 | 3 | 4 | 5 - (Very appropriate) |
|--|----------------------------|-----------------------|-----------------------|-----------------------|------------------------|
| Tourists matched to local enthusiasts / advocates | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Local young persons matched to other local young persons | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Older persons matched to local volunteers | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

6. Which social media platforms do you consider to be the most suitable for this purpose for the different target groups

Selecciona todos los que correspondan.

| | Tourists | Young persons | Old persons |
|---|--------------------------|--------------------------|--------------------------|
| Facebook | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Twitter | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Web-site with embedded chat (e.g. widget for WhatsApp chat) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| None are suitable | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

7. If you selected 'other' in the previous question please give more details here.

8. Which social media account types do you consider to be the most suitable for this purpose?

Selecciona todos los que correspondan.

| | Tourists | Young persons | Older persons |
|--|--------------------------|--------------------------|--------------------------|
| Account managed by Local Authority / HITRANS RTP | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Accounts managed by transport service providers in the area | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Account managed by VisitCairngorm | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Accounts managed by main employers in the area | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Accounts managed by main attractions in the area | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Dedicated account created for this 'matching' purpose managed by the local authority / HITRANS RTP | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| I don't think it is a good idea | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

9. If you selected 'other' in the previous question please give more details here.

10. Do you have any suggestions on how we can encourage local volunteers/locals with knowledge to engage through the chosen social media platforms/accounts?

11. Are there any concerns or issues around safety of users and duty of care? e.g. who is liable/responsible if a MATCH arranged through the platform results in a problem for one or other of the users?

DELIVERING THE SOLUTIONS

For all the solutions proposed, social media provides a platform for bringing together persons with needs and persons with capability. It is then left to the individuals to decide how they then interact. Which of the following additional actions should be encouraged following the matchmaking?

12. Once a match is made, do you think that informal offering of lifts by locals with capability should be encouraged or promoted?

Selecciona todos los que correspondan.

| | Yes | No | Only through established formal schemes (e.g. https://liftshare.com/uk/community/hitravel or community transport run voluntary car schemes) |
|-------------------------------------|--------------------------|--------------------------|---|
| For tourists (of any age) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| For young persons (local residents) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| For older persons (local residents) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

13. Once a match is made, do you think that informal offering of assistance to use public transport (e.g. travel buddy) by locals/volunteers should be encouraged or promoted?

Selecciona todos los que correspondan.

| | Yes | No | Only through established formal schemes (e.g. volunteers need to be vetted and trained) |
|-------------------------------------|--------------------------|--------------------------|---|
| For tourists (of any age) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| For young persons (local residents) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| For older persons (local residents) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

14. What role do you think the local authority and/or HITRANS RTP should play in facilitating the above solutions? (e.g. should they be involved in vetting of volunteer participants?)

15. What level of vetting do you consider to be appropriate for local volunteers offering lifts or assistance to the target users.

Marca solo un óvalo.

- No vetting necessary
- Local authority or HITRANS RTP non-regulated work vetting assessment
- Formal vetting according to PVG guidelines for regulated work (<https://www.mygov.scot/pvg-scheme/the-pvg-scheme/>)
- Other

16. If you selected 'other' in the previous question please give more details here.

SCALABILITY UNLOCKERS

In this section we would like to better understand the barriers to delivering and scaling these solutions in terms of: solution being transferable to different kinds of users, number of users, different environments, financial sustainability, etc.

17. Please rate the following barriers to the success of this concept in terms of their importance?

Marca solo un óvalo por fila.

| | 1 (Unimportant) | 2 | 3 | 4 | 5 (Very important) |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Awareness of matching platform by target users with need | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Target users acceptance | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Awareness of matching platform by locals with capability | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Locals with capability acceptance to share knowledge / volunteer | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Financial constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Legal constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Political constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Lack of partnership engagement (e.g. social media account managers, local authority, transport providers) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Technical constraints | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Safety of users | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

18. Can you provide more details on any of the barriers listed in the previous question? Or if you can think of any other significant barriers please describe these.

19. Thinking about ways to encourage locals with capability to participate on the social media matching sites, which of the following would be suitable?

Selecciona todos los que correspondan.

| | For matching with tourists | For matching with young persons | For matching with older persons |
|--|----------------------------|---------------------------------|---------------------------------|
| Incentives / rewards offered for 'top' participants on matching site (e.g. free/discounted use of services or facilities provided by local authority) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Incentives / rewards offered for 'top' participants on matching site (e.g. free/discounted use of services or facilities provided by local businesses) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Informal direct payments or gifts between those with need to those with capability | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Formal reimbursements for services delivered (paid by local authority) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Formal reimbursements for services delivered (paid by commercial sponsorship) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No incentive or financial payment is suitable | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

20. If you selected 'other' in the previous question please give more details here.

21. Are there restrictions on types or value of incentives, payments or gifts which locals with capability can receive? Please provide details.(e.g. payments/reimbursements for lifts need to be within HMRC mileage payment allowance in order that insurance is not invalidated www.hmrc.gov.uk/rates/travel.htm).

22. Which are the limitations of this solution? e.g. are there any technological, operational or cultural barriers to the scalability of this solution?

23. Do you have any other general comments on this solution?

24. Do you know of any similar solutions using social media to match persons with transport needs to those with transport knowledge/capability?

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8 ANNEX 4 - Stakeholders Forum Workshop

This session was focused on identifying the Strengths, Weaknesses, Opportunities and Risks of each concept applied to their potential Pilot Lab. Another key point to be validated was the technology suitability, taking into account different vulnerable users. This analysis was related to the transferability of the concept to different environments (areas, transport provision, etc.) and different vulnerable target groups

Group 1 – Crowdsourced Data collection

This group was focused on Budapest and Florence pilots and the potential to improve these demonstrations by using Crowdsourced data collection concept.

Table 33: Crowdsourced Data collection concept validation

| | |
|---------------|---|
| CONCEPT | Crowdsourced data collection |
| STRENGTHS | Based on the information received through the crowdsourced data collection platforms/Apps, the PT operators or authorities can improve their services. So, this tool can help to highlight the PTO/PTA where the service improvements are needed. |
| | The crowdsourcing tools can help users feel included. |
| | Through the crowdsourced data collection platforms/Apps, it is possible to get a lot of information. |
| | Crowdsourcing data collection via App is 'mobile', users can bring their contribution everywhere. |
| WEAKNESSESS | Data analysis can be useful to detect users' habits of people which are usually ignored. |
| | Sometimes, the input received is from people who "think out loud" and not from the overall crowd. |
| OPPORTUNITIES | Especially people with disabilities it is important to understand, first of all, who they are. With this respect, crowdsourcing should complement and not substitute other 'classic' practices for understanding user needs. In other words, ICT should always be merged with 'speaking with people'. |
| | An example of "integration" could be a specific functionality that asks users: "What could be a potential improvement of the service?". And then, the user suggests adjusting or change the bus route. |

| | |
|---------|--|
| | It is good to spend efforts to make people use crowdsourcing and convince people that it is worth to use it. |
| | The widespread use of crowdsourcing by users can be achieved more easily thanks to the use of incentives (of different nature and entity). |
| | People often provide feedback only when they have needs. With this respect, elements of <u>gamification</u> could be a good incentive for getting other kind of data/feedback. |
| THREATS | People who have more difficulties in using technologies could be excluded, therefore while you are convinced to be listening of vulnerable users such people with disabilities or elderly, on the contrary you are listening all the others. |
| | Risk of using crowdsourcing in rural areas as the use of this functionalities where users can detect in real-time potential disruption or problems in the service and share them with the general public could lead to a feeling of unsafety (if I am on a bus, my house is empty), thus people could decide to not use the crowdsourcing tools. |
| | It is not easy to understand who those people are who provide information. What about the “digital excluded” people? It is out of doubts that the use of technology decreases with the increase of age (starting people over 50). Other users may decide to not use crowdsourcing technology at all. |
| | Especially with elderly, visually impaired people or people with disability, it is important to take care of the accessibility of the platforms. |
| | It could be argued that the sample that is collected with crowdsourcing is not the ‘right’ sample (in the sense that it doesn't represent all users, especially the most vulnerable). |
| | In the rural areas, there is also the issue of lack of fasting broadband connection and access to the internet, that limit the potential of crowdsourcing. |

- Technology suitability taking into account different vulnerable users:

Suitability of technology for different vulnerable users: Technology is less suitable and usable for people with disabilities and elderly. It may be that also the income is another relevant factor (money to purchase a smartphone). On this respect, it is important to force national governments to give the technology to people with disabilities, cause the technology is becoming an essential enabler for life.

Group 2 – Demand analysis through social media

This group was focused on Barcelona and Rhein Sieg pilots and the potential to improve these demonstrations by using the demand analysis through social media concept. Also, Dynamic pricing and Crowd source data collection concepts have been taken into account as second priority for these Pilot Labs.

Table 34: Demand analysis through social media concept validation

| | |
|---------------|--|
| CONCEPT | Demand analysis through social media for forgotten paths |
| STRENGTHS | Gives first indication of paths as input for further discussions in focus groups (gather data). |
| WEAKNESSES | May not give as rich of data as talking to people. |
| | Not “high resolution” enough |
| OPPORTUNITIES | Crowdsourcing data through social media |
| | Feedback through social media |
| | Buying data from Strara App |
| | Elephant paths: Forgotten paths to LA, not residents |
| | Ask people to post photos of areas that needs improvement |
| | Identify some specific paths thanks to specific target groups and promote them through social media and other sources to let the other target groups discover them. |
| | Complement social media data with WiFi or Bluetooth data. |
| | Social media can explain what is happening in the city (general) but not granularity enough to define paths. |
| THREATS | Accurate geolocation. |
| | Misinterpretation of data (delay in when people post in social media) not everyone who says they'll do something will. |
| | Difficult source to identify a precise route/forgotten path. Maybe social media is the tool to create groups to motivate and incentivise people to find these forgotten paths and encourage them to share it through social media. |
| | Other data such as GPS, WiFi, Bluetooth is more precise data for these kind of purposes (Crowdsourced data collection). |

- Technology suitability taking into account different vulnerable users:

If we want to use social media to discover these forgotten paths, we need the input from other data sources. If not, this technology will not be suitable or difficult for some vulnerable groups such as elderly.

Once different paths will be identified, social media can be a tool to promote them but also, to organise educational workshops to share the findings.

Table 35: Demand analysis through social media to design new on-demand bus routes concept validation

| | |
|---------------|---|
| CONCEPT | Demand analysis through social media for on-demand bus routes. |
| STRENGTHS | Complementary data. |
| | Identify inefficiency on route. |
| WEAKNESSES | Not useful for all the users (can't be the only source to design bus routes). |
| OPPORTUNITIES | Induction (indication of routes) then supply with other data sources. |
| | Social networks data is complementary but the only one in RT. |
| | Use of social media to get concrete answers from people. |
| | Complement with other tracking data (F2F discussions). |
| THREATS | Data Privacy. |
| | Limited access to data from different social networks e.g. Facebook. |
| | Limited application to certain user groups. |
| | Limitation depending on the cultures and/or geography. |

- Technology suitability taking into account different vulnerable users:

Digital literacy across cultures determines if it's suitable for e.g. elderly (in Finland they use social media, in Germany not so much).

Not suitable for elderly.

Group 3 – Gamification for Volunteers

This group was focused on Flanders and Cairngorms pilots and the potential to improve these demonstrations by using Gamification and Dynamic Pricing in the first one, and the Offer-demand matching using social media concept in the second one.

Table 36: Gamification

| | |
|---------------|--|
| CONCEPT | Use of volunteers and adding gamification to the MobiTwin App |
| STRENGTHS | The use of volunteers and the concept of adding gamification to the MobiTwin App will encourage more volunteer drivers and will potentially motivate/influence the times of day and types of trips volunteers make themselves available for. |
| | Providing a door-to-door service. |
| | Offering cooperation between the private sector and public authorities. |
| WEAKNESSES | Need for training of drivers to understand and cater for the complex needs of members. → It might depend on the nature of the trips being offered and the passengers' needs. |
| OPPORTUNITIES | Communication with stakeholders is very important – e.g. LMS employees and volunteer drivers. It is important that this is not lost through automation. |
| | Other similar rewards/incentives schemes suggested included the incentives offered to people to redistribute veh's to areas of highest demand for free floating car clubs and micro mobility services. |
| | Rewards and appreciation of volunteers are very important. Fewer but larger rewards would be most suitable. Also, if rewards were only made to volunteers with most time available, then it could demotivate others. |
| | To focus on future volunteer service in different markets; e.g. younger volunteers for social and leisure trips. |
| THREATS | To offer trainings on how to use the App. |
| | Why would anyone volunteer when they could be an Uber driver? Is a volunteer driver service suitable for getting people to health appointments? Can volunteers be expected to provide a service for those with a medical condition? Or should volunteer services be used for social, leisure, shopping purposes where availability of volunteer driver at a certain time or day or even day of week is less critical. |

| | |
|--|--|
| | Losing trust between driver and passenger if passengers could not choose or request their regular driver. |
| | Risk that members who use a volunteer service have an emotional attachment to certain volunteer drivers (trust has been built) and automating the process could jeopardise this. |
| | Fear amongst LMS providers of losing social contact with their members |
| | Language barriers |

Table 37: Offer-demand matching using social media concept

| | |
|---------------|--|
| CONCEPT | Offer-demand matching using social media concept in the context of tourists matching with local ambassadors with knowledge and expertise in the tourists' interests. |
| STRENGTHS | To share knowledge and then potentially to share/offer lifts to the activities that tourists wish to access. |
| WEAKNESSES | Why wouldn't tourists simply rent a car? |
| | What is 'vulnerable' about wealthy tourists? |
| OPPORTUNITIES | Idea applied to different groups of vulnerable users (e.g. as a travel buddy matching service for elderly persons) |
| THREATS | Ensuring that the most appropriate social media platform is used for different user groups |
| | How is the idea vetted to reduce security risks? What training is required for volunteers and who is responsible for providing this? |

9 References

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10 INCLUSION consortium



For further information

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 770115