

# INCLUSION Project

## Deliverable 5.1

### Impact Evaluation Plan

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## Statement on Research Ethics

The project team will adhere to the principles of ethical research practice; namely, to conduct the research fairly and ethically, in the spirit of openness and with the highest standards of integrity. At all times we seek to adopt best practice in terms of research governance and other legislative requirements and endeavour to minimise any impact or potential impact on the environment from our research activities.

Where the project involves the collection of primary data through the use of interviews and focus groups, The University of Aberdeen's Ethics Committee will be involved in approving research materials, methods of recording, and data storage. In the event that focus groups and/or interviews are electronically recorded (whether in audio only or audio and visual format), we will ensure that we are fully compliant with all procedures regarding electronic data collection, sharing, and storage. We can confirm that this is compliant with the Government Social Research Code. The University of Aberdeen Research Ethics Framework can be accessed at:

[http://www.abdn.ac.uk/staffnet/documents/policy-zone-research-and-knowledge-exchange/Res Gov Handbook - June 2015.pdf](http://www.abdn.ac.uk/staffnet/documents/policy-zone-research-and-knowledge-exchange/Res_Gov_Handbook_-_June_2015.pdf)

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# 1 Executive Summary

As set forth in the project proposal, the INCLUSION (Towards more accessible and iNCLUSive mObility solutions for EuropeaN prioritised areas) project aims to “...understand, assess and evaluate the accessibility and inclusiveness of transport solutions in European prioritised areas, to identify gaps and unmet needs, propose and experiment with a range of innovative and transferable solutions, including ICT-enabled elements, ensuring accessible, inclusive and equitable conditions for all and especially vulnerable user categories.” As part of this remit a number of innovative solutions will be developed and implemented through real-life experiments in the project pilot sites (in Belgium, Germany, Hungary, Italy, Spain, and the UK) within Work Package 4. Work Package 5 will undertake a quantitative assessment of the impacts and a qualitative process evaluation of the innovative transport solutions implemented in the INCLUSION pilot sites. This Deliverable D5.1 presents the ‘Impact Evaluation Plan’ to be followed by the local evaluation managers at the Pilot Lab sites in order to assess the impact of the implemented solutions in a coordinated and consistent manner. A sister document, Deliverable D5.2 provides the ‘Process Evaluation Plan’ providing guidance on the requirements and methodology to be followed to enable assessment of the processes of preparation, implementation and operation of measures, including the roles of information, communication and participation of actors and stakeholders.

Section 2 provides a brief introduction to the INCLUSION project followed by an overview of the overall INCLUSION evaluation approach (Section 3) including the evaluation objectives, a description of work and tasks and reporting requirements. Section 4 introduces the six Pilot Lab (PL) sites in the project: Flanders region Pilot Lab (Belgium); Rhein-Sieg region Pilot Lab (Germany); Budapest Pilot Lab (Hungary); Florence metropolitan area Pilot Lab (Italy); Barcelona peri-urban area Pilot Lab (Spain) and Cairngorms National Park Pilot Lab (UK). Section 5 then describes a clear, methodical approach for quantifying the impacts of the INCLUSION measures/interventions introduced at each site. This takes the form of a set of impact evaluation framework tables and corresponding guidance that helps PL partners to clearly define the objectives for each measure and to identify suitable corresponding indicators that allow measurement of the outputs and evaluation of the outcomes. The impact evaluation framework is intended to identify the data necessary to measure the scale of the impact resulting from the INCLUSION project interventions. It also highlights how and from where already existing data can be obtained, and indicates where additional new data needs to be collected. Section 6 of this deliverable focuses on the methods, sources and timings of data collection. It highlights different types of data and the methods by which these types of data can be collected, considers the timings and frequency of data collection and highlights where coordinated survey design for multiple measures may be appropriate. Data privacy and ethical considerations are also highlighted. Section 7 details the tasks/activities and timings for the main impact evaluation tasks including the Deliverables to be output from these activities.

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## 2 Introduction to the INCLUSION project

In a continuously changing transport environment, where individuals' mobility requirements become more complex and the role of new forms of transport solutions is growing, public transport (PT) and other collective transport solutions fill an important role in providing for people's needs and in adding value to society. Recent studies from the UK Department of Transport<sup>1</sup> show how PT plays a vital role in most transport areas, particularly in the most deprived urban neighbourhoods or remote rural areas. Where local bus services are reduced, passengers are often unable to make alternative transport arrangements. For 1 in 5 bus journeys, a practical alternative does not exist. For people living in the area, this may mean not taking a job, not taking advantage of educational opportunities, not taking care of health needs or not seeing friends and family.

The main objective of the INCLUSION project is to understand, assess and evaluate the accessibility and inclusiveness of transport solutions in European prioritised areas<sup>1</sup>, to identify gaps and unmet needs, propose and experiment with a range of innovative and transferable solutions (including ICT-enabled elements), to ensure accessible, inclusive and equitable conditions for all and especially vulnerable user categories. The project will address this objective through a series of Work Packages (WP) as illustrated in Figure 1. WP1 involves investigating the current conditions across a representative set of European prioritised areas, understanding the relevant needs of various vulnerable user and social groups, while WP2 is assessing how novel transport solutions involving social innovation and ICT tools can help raise the level of accessibility, inclusiveness and equity of mobility in the reference areas and for the concerned users. WP3 is developing 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 will provide concrete experiences from various European sites and pilot initiatives involving both public and private transport providers and a variety of regulatory and business frameworks, as well as supporting technologies, organisational and operational conditions.

Complementary to this research, within WP4, a number of innovative solutions will be developed and implemented through real-life measures/interventions in the pilot sites, directly involved in the project through the participating organisations. The target pilot areas, in Belgium, Germany, Hungary, Italy, Spain, and the UK, provide direct access to a variety of different transport environments, socio-economic contexts, cultural and geographical conditions. WP5 will undertake a quantitative assessment of the impacts and a qualitative process evaluation of the innovative transport solutions implemented in the INCLUSION pilot sites. WP6 will frame the lessons learnt and derive transferable solutions as regards technological, social and organisational innovation and their combination into effective, efficient and affordable mobility solutions with viable socio-business models (i.e. models not only economically, but also socially, acceptable and sustainable).

The research and achievements obtained through case studies investigation and innovation experiments will be significantly enhanced and validated via external collaborations established in

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<sup>1</sup> Within the INCLUSION project, 'Prioritised areas' are those that have individual or composite characteristics (spatial, demographic, and socio-economic) that may contribute to limiting mobility and/or accessibility options.

WP7 through a Stakeholders' Forum, set up at the onset of project activities and comprising transport operators, local authorities, users' associations, and advocacy groups, from different EU member states.

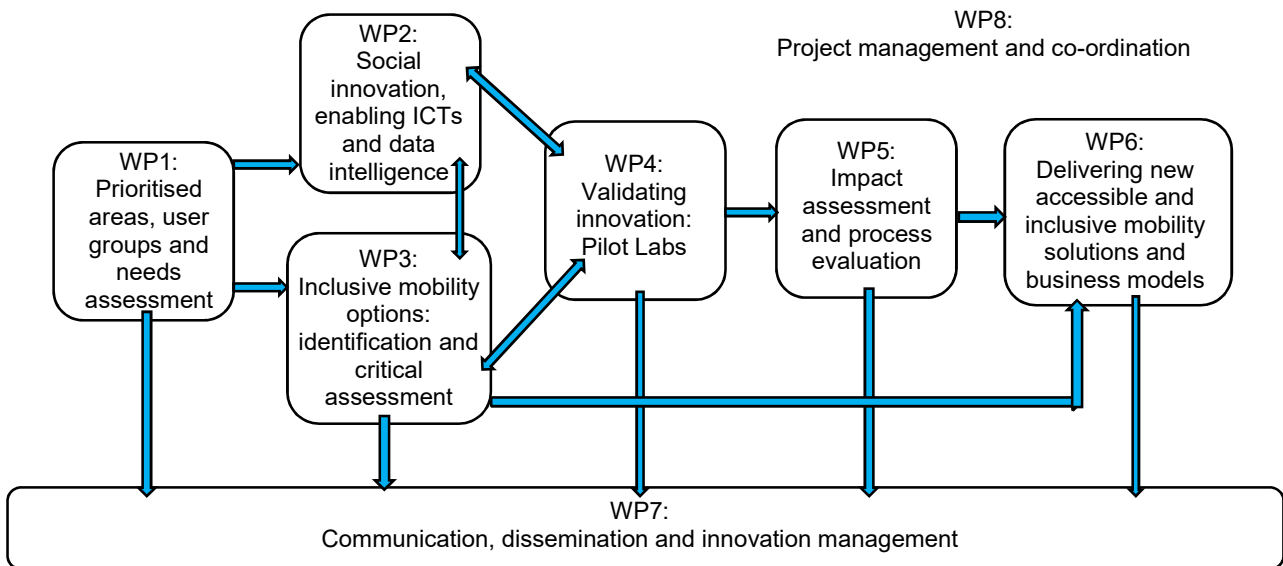


Figure 1: WP interrelations



## 3 Approach to INCLUSION Evaluation

### 3.1 Objectives

This Work Package defines a common evaluation methodology to assess the results and achievements of the INCLUSION Pilot Labs (PLs), co-ordinates the collection of data and information of the measures in the different PLs and performs a quantitative assessment of the impacts of the different innovations implemented in the PLs and a qualitative evaluation of the processes related to their implementation.

More specifically, WP5 is aimed at:

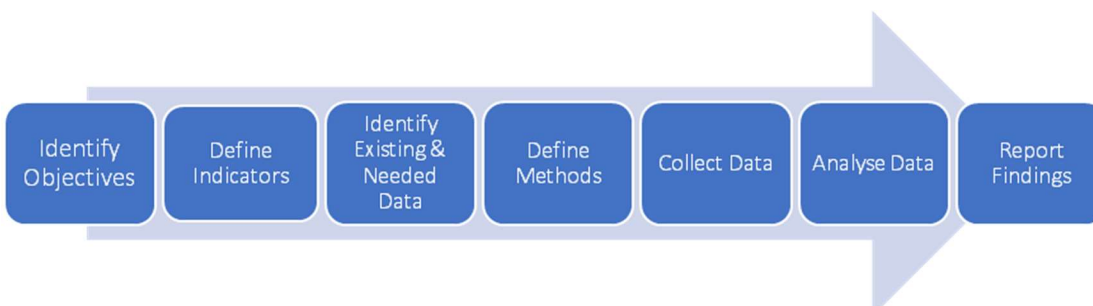
- Co-ordinating a common procedure based on existing best practice to collect and manage data across the PLs, analyse the data and achieve unambiguous and comparable results.
- Providing an independent assessment of such outcomes both at a local level and across the different PLs.
- Assessing the transferability at the European level of the innovations tested and validated in the PLs.

### 3.2 Description of work and tasks

The Evaluation procedure adopted in the project is two-pronged, since it includes the assessment of both results and outcomes (*Impact Evaluation*) and that of the process of planning and implementation (*Process Evaluation*) of the measures within the PLs. The integrated interpretation of results from both assessments will provide the necessary understanding of the effectiveness of the INCLUSION measures.

#### **Impact Evaluation**

The aim of impact evaluation is to provide a clear, methodical approach for quantifying (through quantitative and qualitative analytical methods) the direct and indirect impacts of individual measures (introduced in the PL areas in WP4). For this to be possible, it is critical that measurable impact objectives be clearly defined. Figure 2 describes an approach to impact evaluation that can be applied for each measure.



**Figure 2: Approach to Impact Evaluation**

Findings resulting from the impact evaluation of individual measures will combine with the findings of the process evaluation thereby leading to well-informed conclusions. These findings will be used to determine the potential for transferability and policy impacts on a wider EU scale.

### Process Evaluation

Process evaluation involves the evaluation of the processes of preparation, implementation and operation of measures, including the roles of information, communication and participation. It aims to understand the mechanisms, barriers, drivers, actors and context conditions surrounding the design and implementation of each intervention and their influence on the measured impact. It will also establish if there are factors external to INCLUSION, which have had an influence on the measured impacts, or if there are any unexpected consequences/impacts generated by the INCLUSION interventions. This requires continuous engagement and consultation with key stakeholders at both pilot site level and measure/intervention level. The D5.2 'Process Evaluation Plan' provides guidance on establishing the key stakeholders along with advice on the timings and engagement methods (e.g. online surveys, semi-structured interviews, interactive drawing exercises, focus groups) to elicit the necessary process evaluation information. Findings from the process evaluation activity will be key to identifying the potential transferability of measures beyond a specific PL where a particular measure is implemented, as well as providing insight for further policy initiatives.

The main partners involved in the evaluation activities are illustrated in Figure 3. University of Aberdeen (UNIABDN) lead the Work Package and are also the leaders of the impact evaluation tasks. Rupprecht are in charge of the process evaluation. Each of the six PLs has a designated local evaluation coordinator, as identified in Figure 3, who is responsible for local data collection, survey design and delivery, stakeholder engagement, interviews and hosting focus groups. The local coordinators will be assisted in designing and developing survey and interview materials to support these activities by the following support partners: UNIABDN will support HITRANS in the Cairngorm PL; BUSUP will support MOSAIC in the Barcelona PL; MEMEX will support BUSIT in the Florence PL; Rupprecht will support VRS in the Rhein-Sieg PL. Two sites, Flanders and Budapest, do not have a designated support partner but will be offered support where needed from UNIABDN and RUPPRECHT.

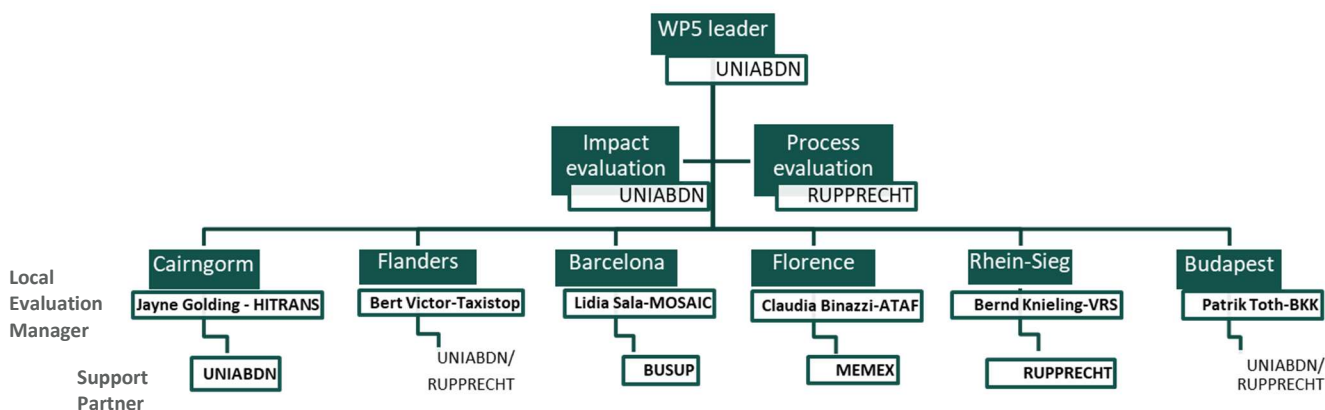


Figure 3: Roles of project partners in the evaluation

The main tasks within the evaluation Work Package (WP5) are described below and their timings are summarised in Figure 4.

- **Task 5.1: Impact evaluation plan (M10-M14)** (*Task Leader: UNIABDN, Partners: MEM*)

The objective of Task 5.1 is to assess the main technical, social, environmental, and economic impacts of what is being tested in the PLs. To achieve this, a dedicated common methodology will be developed, providing a set of goals and criteria common to all PLs as well as specific objectives of relevance for each PL. The framework of the methodology will be based on previous similar successful assessment procedures (namely from CIVITAS SATELLITE, CIVITAS CAPITAL and the World Business Council for Sustainable Development WBCSD sustainable urban mobility indicator set), and customised to meet the specific INCLUSION cases.

The work in this task will be supported by the INCLUSION Evaluation Group (IEG), chaired by the WP Leader and comprising the Local Evaluation Manager at each PL and with strategic advice provided by members of the Stakeholder Forum.

*Participants & Role in the task:*

UNIABDN will co-ordinate and contribute to the draft and edition of the Impact Evaluation Plan; MEM will ensure linkage with the PL activity in WP4.

*Outcomes:*

Task T5.1 will produce D5.1 Impact Evaluation Plan (Month 14) describing the methodology adopted to evaluate impacts, including practical guidelines for the data evaluation process.

- **Task 5.2: Process evaluation and execution (M10-M30)** (*Task Leader: RUPPRECHT, Partners: MEM, VRS, BUSIT, TAXISTOP, HITRANS, BUSUP, BKK*)

The first step within Task 5.2 will be the definition of a detailed methodology (based on the experience acquired from various CIVITAS projects) to develop an in-depth understanding of the entire PL process (from planning to implementation; including specific operational tasks and the role of communication, information and participation). The purpose is to capture and analyse 'the stories behind the figures' in order to understand the mechanisms, barriers, drivers, actors and contextual conditions that explain the factual results as determined in Task 5.4. The process evaluation will also deliver crucial inputs for the transferability assessment (Task 5.5.) and for recommendations for practitioners and policy makers (Task 5.5).

*Participants & Role in the task:*

RUPPRECHT will co-ordinate the creation of the Process Evaluation Plan and its execution. Selected other partners will contribute to all task activities, in particular those who act as support partner for specific PLs and who possess specific language skills.

*Outcomes:*

Task 5.2 will result in two deliverables: D5.2, the Process Evaluation Plan (Month 13) describing the methodology to collect relevant data to evaluate the process, including specific data collection templates) and D5.3, the overall Process Evaluation Results (Month 30), which will, already during their development, have fed into Task 5.5.

- **Task 5.3: Full impact evaluation, the reference results (M19-M24)** (*Task Leader: UNIABDN, Partners: MEM, RUPPRECHT, MOSAIC, VRS, BUSIT, TAXISTOP, HITRANS, BUSUP, BKK*)

Based on the INCLUSION Impact Evaluation Plan (D5.1), each PL will develop their own Local Impact Evaluation Plan which will detail the Measures to be implemented, their associated impacts and the indicators to be used to measure the impacts. This will be completed by April 2019. This forms the template from which a description of the 'before INCLUSION' phase for the PLs involved in demonstration tests will be reported and assessed. This will include common and specific Key Performance Indicators' (KPIs) baseline values. If possible and consistent with the local context, availability and resources, KPI baseline values and background trends will be used also to model/simulate 'Business-as-Usual' scenarios, so as to have a more comprehensive *ex ante* comparison.

*Participants & Role in the task:*

UNIABDN will lead the task and will analyse and report the baseline results. MEM, RUPPRECHT and MOSAIC will assist UNIABDN in the activities. VRS, BUSIT, TAXISTOP, HITRANS, BUSUP, BKK will develop their Local Impact Evaluation Plans and contribute to the collection and supply of baseline data in each PL.

*Outcomes:*

The outcomes of Task 5.3 will be reported in D5.4 Full Evaluation, the reference scenarios (Month 24), illustrating the assessed baseline situation of the INCLUSION PLs, including, where possible, the 'Business-as-Usual' scenarios.

- **Task 5.4: Full impact evaluation, the test results, (M23-M30)** (*Task Leader: UNIABDN, Partners: SOFT, MEM, RUPPRECHT, MOSAIC, VRS, BUSIT, TAXISTOP, HITRANS, BUSUP, BKK*)

A description of the 'during INCLUSION' phase for the PLs involved in delivering Measures, including KPIs operational values and quantitative assessment of the 'after' data values. Analysis of the 'after' data compared with baseline data will be conducted for each measure/intervention as well as for each PL site as a whole. This will include assessment of KPI's against target values. A cost-effectiveness assessment will also be conducted to enable cross-case analysis and to provide input to the business model work of WP6.

*Participants & Role in the task:*

UNIABDN will lead the task and will analyse and report the 'after' versus baseline results. SOFT will contribute to the evaluation and development of the cost-effectiveness and cross-case

analysis with a horizontal view across the different experiences in the PLs. MEM, RUPPRECHT, MOSAIC will contribute to the evaluation of test results against 'Business-as-Usual' scenarios. VRS, BUSIT, TAXISTOP, HITRANS, BUSUP, BKK will contribute to the collection and supply of 'after' data for their PL.

*Outcomes:*

Task 5.4 will contribute to D5.5 Full Evaluation, the test results (Month 30), describing the results from the 'before-after' comparison of the INCLUSION PLs both at local and cross-site.

- **Task 5.5: Impact and process evaluation of findings and assessment of transferability at European level, (M27-M32)** (Task Leader: UNIABDN, Partners: SOFT, MEM, RUPPRECHT, EMTA, POLIS)

Results and achievements from the previous tasks will be summarised, critically reviewed and synthesised in the form of key findings, in order to place the PL experiences in the context of their transferability potential to support a wider exploitation of the tested measures across Europe. More specifically, proven methodologies already successfully applied in other EC-funded projects (like CIVITAS WIKI) will be adapted to the INCLUSION requirements and used to assess the possibility of transferring the INCLUSION experiences across Europe.

*Participants & Role in the task:*

UNIABDN will lead the task, closely liaising with RUPPRECHT; SOFT and MEM will provide support and will contribute to the evaluation and assessment of findings as leading partners of WP2 (social, technological and organisational innovation) and WP4 (PLs experiments). EMTA and POLIS will leverage their network dimension and advise on transferability aspects.

*Outcomes:*

Task 5.5 results will be reported in D5.6 - Evaluation of findings and transferability potential at European level (Month 32), which synthesises the key findings from all the INCLUSION PLs and provides references for transferability of assessed innovations at European level. These results, together with WP3 / Task 3.4 outcomes, will provide fundamental inputs for the development of policy recommendations in WP6 (Task 6.3).

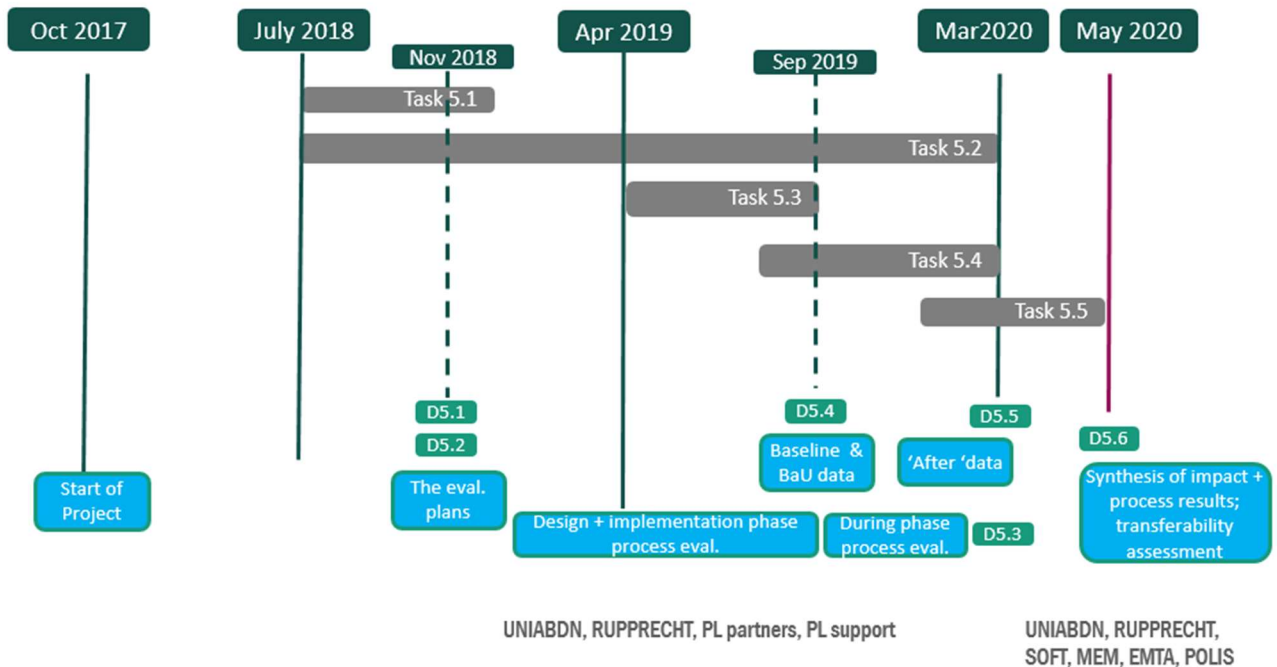


Figure 4: Timings of the main tasks within the evaluation

### 3.3 Reporting requirements

A list of Deliverables for WP5 is shown in Table 1, followed by the relevant Milestones (Table 2).

Table 1: WP5 Deliverables

No.	Deliverable name	Delivery date	Lead
D5.1	Impact Evaluation Plan	M14	UNIABDN
D5.2	Process Evaluation Plan	M14	RUPPRECHT
D5.3	Process Evaluation Results	M30	RUPPRECHT
D5.4	Full Evaluation, the reference scenarios	M24	UNIABDN
D5.5	Full Evaluation, the test results	M30	UNIABDN
D5.6	Evaluation of findings and transferability potential at European level	M32	UNIABDN

**Table 2: WP5 Milestones**

No.	Milestone name	Delivery date	Lead	Means of verification
MS5.1	Completion of project level impact and process evaluation plans	M14	UNIABDN	Deliverable D5.1 and D5.2 submitted
MS5.2	Interim process evaluation results compiled	M24	UNIABDN	Intermediate version of Deliverable D5.3 internally reviewed by WP5 participants
MS5.3	Transferability potential established	M32	UNIABDN	Deliverable D5.6 submitted

## 4 Introduction to the Pilot Sites in the project

Table 3 provides an overview of the main characteristics of the Pilot Labs planned in INCLUSION. More detail follows under the heading of each specific PL.

*Table 3: Overview of INCLUSION Pilot Labs*

Site	Target area	Target users	Mobility offer and services	Main gaps and need for improvement
Flanders Region, Belgium	Urban, suburban and rural area	Older persons and people with mobility issues; migrant jobseekers	High-capacity public transport, car-pooling, car-sharing, Less Mobile Services, local taxi	Door-to-door, cost-efficiency, limited user groups, time-consuming, reaching a critical mass
Rhein Sieg Region, Germany	Part rural; part peri-urban	Families with young children and teenagers	Bus routes and on-demand bus systems	Limitations on public transport options for the multi-purpose trips
Budapest, Hungary	Metropolitan area	Disabled, blind and visually impaired citizens, people with luggage / buggies, tourists and non-native language speakers	Integrated network	Re-educate wider public and staff of public transport
Florence, Italy	Urban, Peri-urban and peripheral areas	Young persons, low income, migrants, commuters	Traditional bus routes	Lack of detailed statistics about the habits and usage level of the PT services by the migrants (on target lines). Better information to end-users
Barcelona, Spain	Peri-urban area	Young and leisure travellers	Typical of metropolitan area with limited services from and between peri-urban areas.	New services between peri-urban areas and large (music) events
Cairngorm National Park, UK	Rural, tourist area	Elderly people, persons of reduced mobility, local residents who suffer from fuel poverty, young people, tourists	Fixed route bus and rail, some open access DRT and taxis	Better integration of existing services and transport options according to the different needs, first and last mile services.



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## 4.1 Flanders region Pilot Lab (Belgium)

Taxistop is a non-profit organisation with a mission of 'doing more with less'. It creates solutions for people for sharing, mainly for transport. In this sector, Taxistop delivers several shared mobility services, such as, carpooling, car-sharing, and on-demand transport for elderly. Besides these services, Taxistop is also involved in projects to create political awareness of shared mobility, awareness campaigns, and social innovation. In areas where public transport is not able to organise reliable transport at economically affordable prices, Taxistop will offer solutions based on existing services already offered: carpooling, car-sharing, and on-demand transport for elderly people (Less Mobile Services) using volunteer drivers.

Currently, Taxistop offers on-demand transport services for 35,000 elderly persons in Flanders through their Less Mobile Services provision. In 80% of the Flemish municipalities there is a partnership between the municipality and Taxistop to organise this service. Taxistop offers training, insurance and software, whilst the municipalities conduct the recruitment and acceptance of members and volunteers, and the local dispatching. The journeys are offered using 2,500 voluntary drivers in their private cars. Around 400,000 rides are served per year.

In terms of gaps and need for improvement, a number of issues are currently affecting transport accessibility in the area. Currently public transport does not offer any door-to-door solution (cost-efficiency is a main issue here). There are also gaps with the Less Mobile Service - the service is restricted to people with mobility problems caused by physical problems, and time-consuming administration is needed for drivers and local dispatching. The carpooling service suffers limitations as well - it is difficult to reach a critical mass and new ways to put rides in carpool databases should be developed.

The INCLUSION objectives for providing more accessible and equitable travel solutions in the Flanders rural areas will focus on:

- 1) Increasing the efficiency of the Less Mobile Services provision by rolling out a mobile web application for the drivers, which should make it possible to organise rides without the intervention of the local municipality;
- 2) Enlarging the target group. Currently this service is mainly dedicated to elderly people (with reduced mobility) with an income lower than twice the minimum wage. Taxistop hopes to expand the system to more people with mobility issues (like young people, or people in poverty);
- 3) Offering a total solution to migrants seeking jobs in the PLs – adapting an existing combined Mobility as a Service (MaaS) type offer to provide more accessible travel options for migrants seeking jobs. This will involve provision of a fixed budget to be used on transport services available through the MaaS platform including carpooling, car-sharing, high capacity public transport and on-demand transport.

## 4.2 Rhein-Sieg region Pilot Lab (Germany)

Verkehrsverbund Rhein-Sieg (VRS), located in the southwest of North Rhine-Westphalia in Germany, provides its services in the region of Rhein-Sieg. The PL is in the Rhine-Sieg district (RSK). This district is partly rural, and partly peri-urban. It is an attractive region for families with young children because the real estate prices are lower than in Cologne or Bonn, and (most parts of) the RSK are well connected by train or car to Cologne and Bonn, where many RSK residents work. In general, the population of the Rhein-Sieg-Kreis will increase around 5.7% until 2040.

VRS will focus its PL on expanding its services to families with young children. This population segment in the region, and especially in the new housing estate, does not have sufficient access to public transport for their daily trips, especially for multipurpose trip chains (e.g. taking children to/picking up children from kindergarten, shopping for daily needs, commuting to their jobs). Consequently, most people use their own cars (for example, 87% of inhabitants older than 10 years use the car 2-7 times a week, while public transport is used by only 24% at a rate of 2-7 times a week).

The current transport provides mid-sized cities connections via regional trains with Cologne and Bonn. Rural areas are connected via bus lines and demand responsive bus systems (TaxiBus, AnrufSammelTaxi) to mid-sized cities. The routes of the bus-lines and demand bus systems are not specific to the needs of young families but instead are designed to reach the centre of a city. The whole area is part of the VRS, which means it offers a unique tariff system and a – more or less – harmonised timetable. The demand bus supplements or replaces scheduled PT services, particularly in the areas where passenger demand varies greatly.

The main gaps and need for improvement focus around the issue that the PT network is currently designed to meet the needs of commuters and students and is concentrated within and around the city centre (or to the main train station) in a more or less direct way. Therefore, the PT options for multi-purpose trips often taken by families with young children in the (peri) rural area are currently very limited.

The aim of the PL is to identify the needs of these families (via a survey) in one selected new housing estate and to offer an interesting and resilient public transport service. The main goal, therefore, is to identify to respond to the needs of families with young children and teenagers: improving the integration of different means of mobility with public transport and extending the concepts for the implementation of similar measures in other regions of the Verkehrsverbund Rhein-Sieg.

## 4.3 Budapest Pilot Lab (Hungary)

Budapest is the capital city of Hungary, an important hub of Central-Eastern Europe, and the ninth largest metropolitan area of the European Union. It has a population of 1.75 million inhabitants and an extensive public transport system. The targeted area is part of the track-bound service (metro and tram) of Budapest. Budapest has a 39 km long metro network on four lines and one of the greatest tram networks in Europe. Tram 6 is the busiest tram line in the world with more than 400,000 passengers daily. The tram network has been extended in 2016. Providing equality of access for

transport services is a key priority; however, the metro and tram network in Budapest is currently not accessible for everyone.

Despite the recent improvements in the infrastructure in terms of accessibility, the environment is still not inclusive. There are four metro lines in Budapest. Line 2 is partly accessible ; line 4 is fully accessible; while stations on lines 1 and 3 do not have step-free access. Tram service is partly accessible . All stations on line 4-6 are step-free and a reconstruction programme in 2016 provided several additional fully accessible stations on the tram network.

The main gaps and need for improvements focus around the needs of the approximately 10-15% of all public transport users who are somehow reduced in their mobility (disabled, visually impaired, passengers with luggage, temporarily disabled people, or even people who do not speak the country's language); thus it is vital to involve all people. The general comprehension about accessibility is that it is an additional expenditure that is solely for disabled people. It is vital to re-educate the wider public with campaigns and retrain staff to change attitudes, from believing a passenger with a disability as a problem to creating an inclusive, equitable environment which stimulates everyone to help passengers with reduced mobility and creates a more effective system.

Therefore, the main target group is not only the staff of public transport operator but also the wider public. The focus of the INCLUSION PL in Budapest will initially be on launching campaigns for the wider public and staff to create a stimulus environment for social inclusion (based upon assisting individuals with reduced mobility at stops and stations). Recent improvements in the accessibility of the built infrastructure are yet to be matched with similar improvements in social inclusion. Furthermore, encouraging co-operation among all stakeholders of persons needing assistance is also an important aim.

#### 4.4 Florence metropolitan area Pilot Lab (Italy)

The Italian PL will be conducted in two distinct areas within the metropolitan region of Florence - the economic, cultural and social capital of Tuscany Region.

In the first area, the pilot activities will be carried out in relation to two urban Bus Routes (nos. 30 and 35) which serve an area from the central railway station to the north of Florence. This area is a peripheral zone of Florence with a lot of tenements inhabited by migrants and also social care centres. Therefore, migrants and modest income groups represent a large segment of public transport service users. The number 30-35 service is based on a conventional fixed public transport routes. Although migrants are the largest number of users, the service is structured based on historical data without any particular attention given to this user segment. Currently no detailed statistics about the transported passengers, their habits and usage level of these public transport services are available.

The second target area is located in San Piero a Sieve, in the centre of Mugello area, on the northern boundaries of the metropolitan conurbation. The vulnerable users in this area are young persons and those on low income.

In both pilot lab areas the main gaps and need for improvement focus around: a better understanding of the specific needs and levels of use of the services by the identified vulnerable user groups; the

need for an effective promotional campaign focussed on these target groups; provision of on-board information monitors and smart pole information at bus stops providing information tailored to vulnerable users needs; development of interactive information services (provided for example within the existing ATAF2.0 mobile app) to include additional needs of vulnerable users; better integration between bus routes and the train and tram network.

## 4.5 Barcelona peri-urban area Pilot Lab (Spain)

The target area comprises the peri-urban region of the Barcelona Metropolitan Area consisting of:

- 1) First Zone: comprising of other municipalities (outside Barcelona) in an official union of adjacent cities and municipalities called the Àrea Metropolitana de Barcelona (AMB) (also Greater Barcelona) with a population of 3,220,071 in an area of 636 km<sup>2</sup> (density 5,0630 hab/km<sup>2</sup>).
- 2) Second Zone: considered as an urban and metropolitan adjacent area. It forms a belt of cities: Vilanova i la Geltrú, Vilafranca del Penedès, Martorell, Terrassa, Sabadell, Granollers, Mataró and their respective areas of influence. The Generalitat projects the interconnection by means of the Orbital Railway Line.
- 3) Third Zone: considered a territory of consolidated expansion. In this area, the expanse is of a radial type, spreading across fluvial corridors or depressions, as in the case of Manresa, Igualada and Vic, or continuing to the coast, as in the case of Blanes and El Vendrell.

The addressed population and target groups in Barcelona PL include occasional groups of travellers – particularly young people – that can form spontaneously among like-minded people sharing common interests, for instance, travelling to common destinations such as concerts, football games, theme parks, nature excursions, and so on.

The current transport situation prioritises public transport infrastructure investment in urban centres, which are more densely populated and amenable to public transportation with frequent, regular stops. There is a mounting demand for transport services to, from and around peri-urban areas. Public transport authorities generally provide radial routes linking peripheries and the metropolitan centres. However, radial routes do not always meet the needs of citizens in outlying areas, since they are inflexible and often infrequent; thereby forcing people to use cars. In the INCLUSION target area, public transport is essentially limited or non-existent so the car is perceived as being the only option, despite private car use being more expensive and less sustainable.

The main gaps and need for improvement are identified as follows. Currently, there is no convenient transport offer from the peri-urban areas to social events (concerts, football games, theme parks) which results in significant accessibility issues (particularly relevant for young people). Currently there is no historical information on such demand, how it is structured, and how it can be served by flexibly adapted services; the only very limited information having been obtained through (outdated) surveys. Accessibility issues are also present due to a lack of real-time information; all information is static or has a very high cost (Google) and is not classified according to the mobility operator needs.

The focus of the Barcelona PL will be on applying ICT methods and tools to investigate the target groups' transport demand through information mining from Social Networks and on organising transport services that adapt dynamically over time to meet the identified mobility needs and demand and improve transport accessibility. The goal is to enhance BUSUP technology to provide innovative services that meet the needs of users traveling to events such as music festivals and sports events located in city peripheries or neighbouring towns. To this end, MOSAIC will use data analytics tools developed in a Research and Innovation Centre (ITAInnova) that will focus on:

1. Information scraping services: Artificial Intelligence used for searching through Social Networks for historical data of user preferences, organised by user segment;
2. Pseudo-real time services: services checking the social networks on a daily basis to discover some common mobility interests of a target group, also based on Predictive algorithms.

It is expected the use of these tools combined with predictive algorithms can detect a particular interest of a specific group of the population, allowing the companies providing mobility services to offer tailored services to these target groups through the social networks which they utilise.

Overall, the Barcelona PL aims to: Enhance specific data analytics tools; Propose and test smart mobility solutions (to include new routes for BUSUP services) in the whole per-urban region of the BMA to specific user groups of leisure travellers to specific events; Design and test a digital and social media communication strategy able to reach the identified target users and introduce them to the alternative smart mobility solutions. The PL will assess the level of acceptance and satisfaction of the proposed smart mobility solution in a targeted area, by its targeted users, in terms of social inclusion, environmental sustainability and quality of life, etc.

#### 4.6 Cairngorms National Park Pilot Lab (UK)

Cairngorms National Park (CNP) (<http://cairngorms.co.uk/>) is one of the most popular tourism destinations within the Scottish Highlands, the most remote region in Scotland, and comprises an area of 4528 sq km. 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. Traffic volumes in the area peak during school holidays and seasonal activities, such as skiing; make small unclassified roads (traditionally used for cycling and walking routes) busy and dangerous. The traffic has a constant level of HGVs due to the whisky industry and through connectivity to other parts of Scotland. 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. There are plans for shared taxi / car sharing services. From a governance perspective the area is interesting, since there are 5 local authorities and 3 regional transport partnerships (RTPs).

Tourism is vital to the CNP. It accounts for 30% of the economy (GVA) and 43% of employment. Visitors flock to the area to appreciate the outstanding landscapes, wildlife and huge range of activities. In the 2014/15 Cairngorm Visitor Survey, results reveal that Transport, and Phone and Wi-Fi are the lowest rated facilities in the Park; with 17% of visitors expressing Transport facilities as either 'poor' or 'very poor', and 28% stating Phone and Wi-Fi as 'poor' or 'very poor'. Also, only 3% of visitors used public transport as a way of getting about – 1% travelling to the area, and 2% travelling within the area. Tourists therefore form a key target user group in the area.

A number of other vulnerable groups have been identified, namely: older persons/persons of reduced mobility; local residents who suffer from fuel poverty due to high rural fuel costs; and young people who face the challenge of not having access to their own mobility solution and thus rely on lifts from friends and relatives. Traditional timetables for transport services will often provide links from settlement to main settlement but these services do not deviate from main routes and rarely offer the full door-to-door mobility solution that can empower communities and enable people to continue to live in the same place from cradle to grave. Low car ownership levels are evident in the elderly population which, allied with sparse settlement patterns, makes it challenging to serve people well in mobility terms. In the absence of public transport options, young people are reliant on parental lift giving which can place a pressure on the young persons and their guardians. The lack of travel options risks a loss of this key segment of society to the area, as they may choose to move from the area to have access to a wider range of options (e.g. retail, leisure, cultural or employment) that they could still access from the CNP area if travel options were provided within the area.

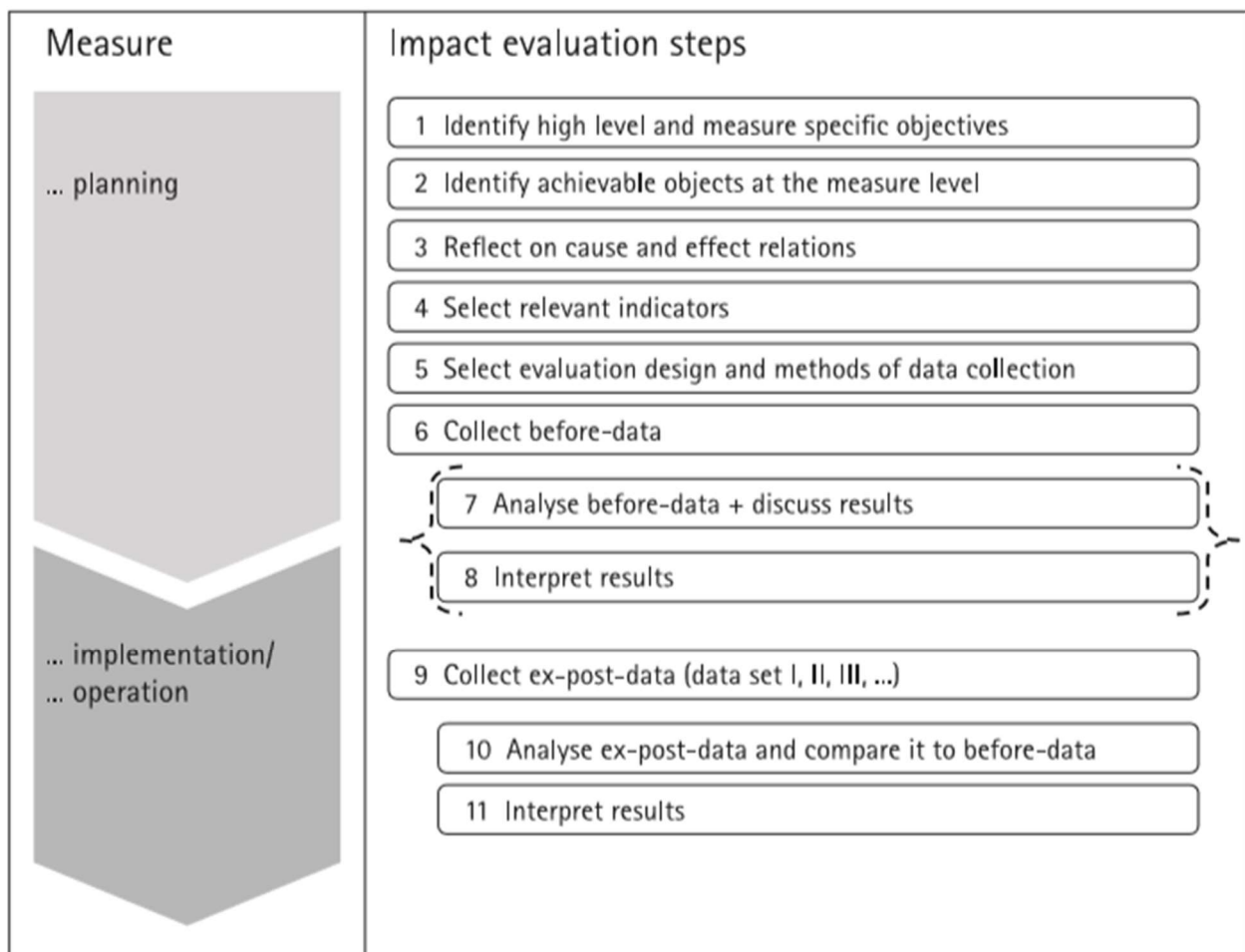
Enhanced mobility has been identified as a means of promoting economic development, better customer service and a better visitor experience and sustaining local populations. The development of a suite of mobility services which could be managed as a set of mobility as a service (MaaS) measures can help develop tailored solutions that address a wide range of needs across demographics and geographies within the CNP. The ability to offer connected mobility will assist the current statistic of 90% of visitors utilising the car to move around compared to 3% by public transport and 7% by cycling.

The focus of the PL has identified a set of potential innovative measures to explore; the final selection will be influenced by the outcomes of INCLUSION WPs 1, 2, and 3. These could include:

- 1) Governance issues related to mobility management which could enable the exploration of new business concepts such as the reallocation of public transport subsidies to support innovative inclusive mobility options.
- 2) Development and implementation of a traveller information strategy for vulnerable groups. This would build on an on-going initiative to develop a MaaS solution for CNP which is supported by the Scottish MaaS Cluster. The only evidence for traveller information needs that is currently available is segmented and largely based on visitors. There is little to no information available on elderly and young people and INCLUSION provides the opportunity to develop an information strategy focused on elderly and young people, once their mobility requirements have been confirmed
- 3) Development of a central application programming interface to capture multiple information sources that can be presented as open data. Data will be analysed and validated, i.e. train, bus etc. and made available to all via a 'one stop solution'.
- 4) Integrated ticketing between rail and bus. Alternative solutions will be evaluated focussing on the accessibility and barriers to the Park with the possibility of providing one ticket for accessing transport but also leisure activities
- 5) Lift sharing scheme and/or car club and/or e-bikes. This would involve an examination of both the transport infrastructure requirements and the cultural shift required to allow the implementation of shared mobility solutions. One option is to establish e-bikes / car club / lift share along the lines of 'hubs' in the Park. This would mean people can connect to (fixed route) transport or initiate a journey.

## 5 Impact Evaluation for the INCLUSION pilot sites

The aim of impact evaluation is to provide a clear, methodical approach for quantifying the direct and indirect impacts of the measures/interventions being introduced to the PL areas within WP4. Figure 5 expands on the summarised steps of impact evaluation outlined in Figure 2, and illustrates the ideal steps of impact evaluation. Steps 1 to 5 in Figure 5 form the ‘impact evaluation framework’ as described in Section 5.1 (Step 1) and Section 5.2 (Steps 2-4). Steps 5 and 6 relate to the collection of data and are addressed in Section 6 of this Deliverable.



**Figure 5: Steps of Impact Evaluation**

Source: Dzeikan et al. (2013) *Evaluation matters - A practitioners' guide to sound evaluation for urban mobility measures*

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The evaluation will be conducted at two different levels: 1) PL site-level; and 2) Individual measure/intervention level.

- Section 5.1 describes, for each PL, the overall site level objectives and the performance indicators identified to measure the extent to which the objective has been achieved (the desired overall outcomes).
- Section 5.2 then presents the framework for conducting impact evaluation on each individual measure/intervention to be introduced at the PL sites. Currently PLs do not know exactly what set of measures/interventions will be introduced at their site – this is expected to be confirmed by Month 17 (Feb 2019). Therefore, the framework is developed as a template for PL partners to follow, providing detailed, step-by-step, guidance to the PLs in order to enable them to quickly establish the content (objectives, performance indicators for both outcomes and outputs, target values for those indicators and data sources / collection methods) necessary for the impact evaluation.

The impact evaluation framework is intended to identify the data necessary to measure the scale of the impact resulting from the INCLUSION project interventions. It also highlights how and from where already existing data can be obtained, and indicates where additional new data needs to be collected. Section 6 of this Deliverable focuses on the methods, sources and timings of data collection.

The process evaluation, detailed in a separate deliverable (D5.2 'Process Evaluation Plan'), supports the impact evaluation findings by 'telling the stories behind the figures'. The integrated interpretation of results from both impact and process evaluation assessments will provide the necessary understanding of the effectiveness, and transferability, of the INCLUSION measures.

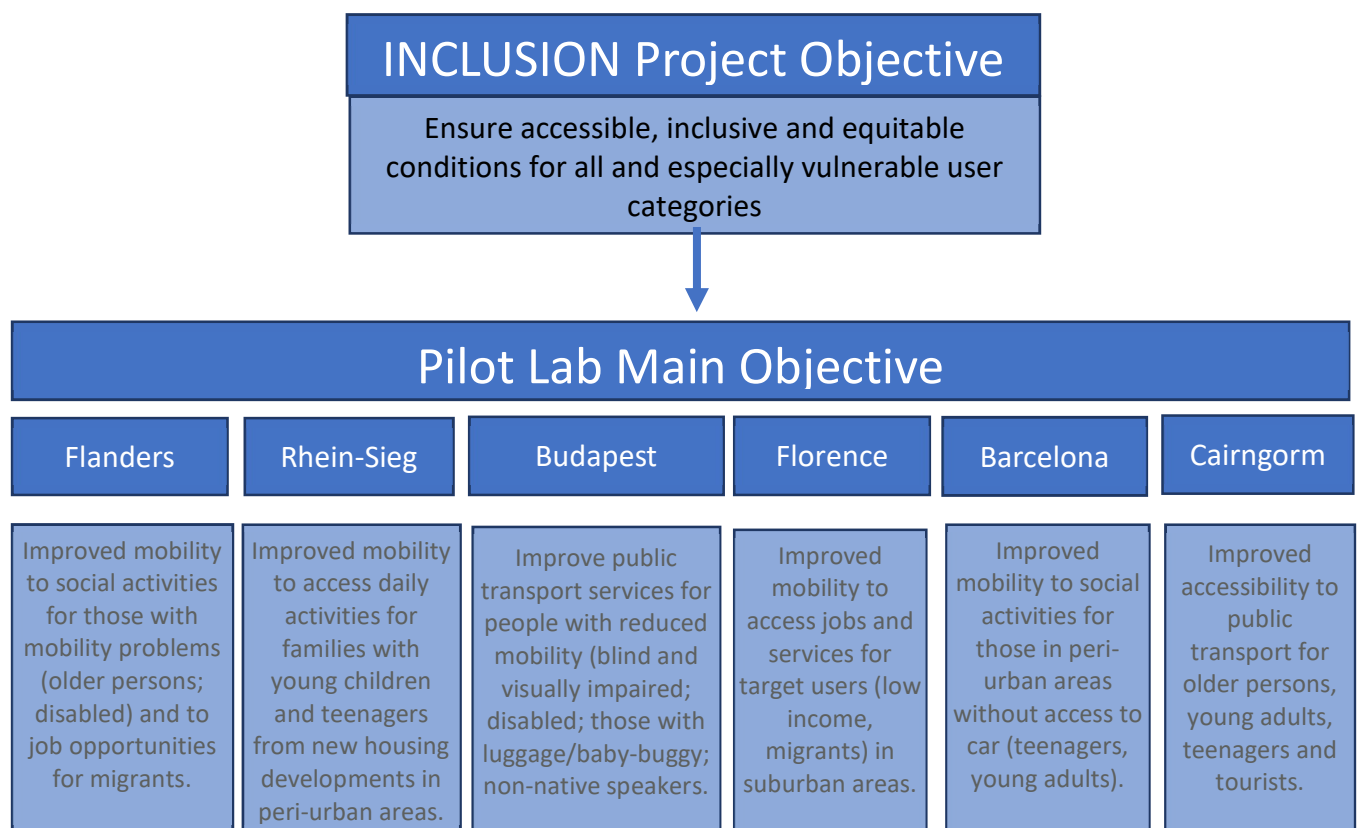


## 5.1 Pilot Lab site-level evaluation framework

At the site level PLs share the common INCLUSION project objective to **"Ensure accessible, inclusive and equitable conditions for all and especially vulnerable user categories"** even though each PL has its own differing sets of objectives related to the specific measures or interventions they plan to introduce.

This project objective provides the basis from which each individual PL site will build its own overall site level objective(s). These site level objectives are tailored according to the vulnerable users identified for each site and the trip purposes those vulnerable users have most need to make and/or most difficulty to make.

Figure 6 provides an overview of the PL main objective for each site. These have been established through surveys and consultation with the PL partners. As can be seen, the tailored pilot site objectives are consistent with the INCLUSION project objective but applied to a specific environment.

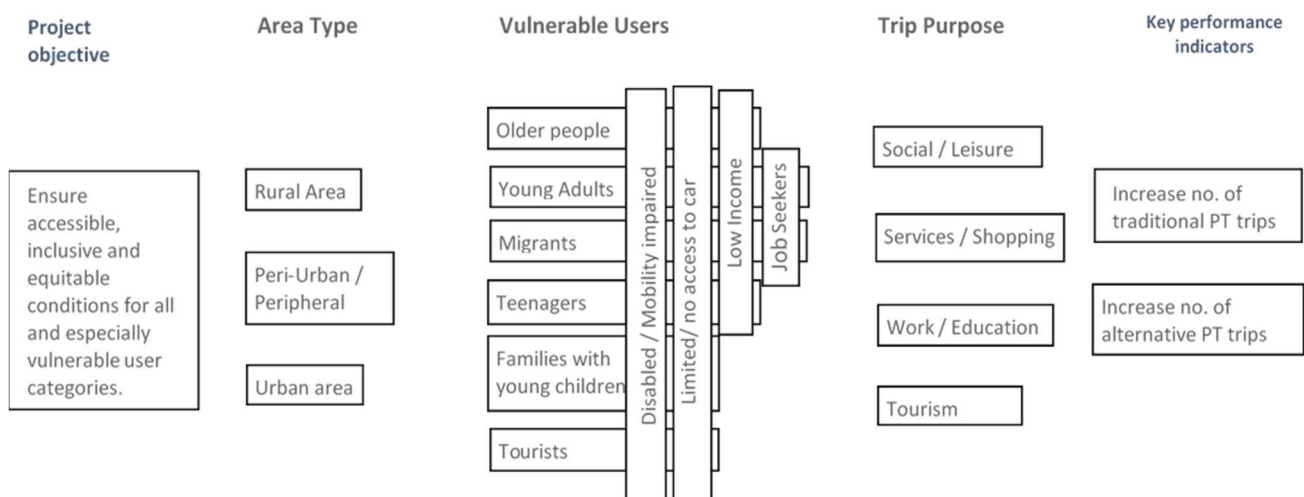


**Figure 6: Overview of pilot lab main site level objectives**

The impact evaluation of the PL objectives presented in Figure 6 requires the identification of outcomes and key performance indicators that provide a quantified measure of those outcomes. Across the PLs, the main outcome is to improve mobility for those without access to private car, through better access to public transport or alternative mobility services. Although the application environments are different across the sites, a pair of common key performance indicators (KPIs), which enable measurement of the extent to which this outcome will be achieved, have been identified as:

1. Increase in number of trips using traditional PT<sup>2</sup> services (applicable at all sites)
2. Increase in number of trips using alternative PT services<sup>3</sup> (applicable at some sites)

Figure 7 provides an overview of the different area types across the PLs, the combined set of vulnerable user groups (and their characteristics) targeted across the PL sites, and the range of different trip purposes considered for those user groups. Table 4 presents the focus for each PL (relating to specific area type, vulnerable user groups and trip purposes) towards achieving the pilot-lab level objectives identified in Figure 6. It also specifies KPIs provided by the PL site partners during initial consultations and review during the WP5 impact evaluation workshop held in Aviemore, Scotland on 11<sup>th</sup> October 2018. The targets for these KPIs are still to be confirmed following completion of the requirements and needs surveys and baseline assessments for each target group.



**Figure 7: Overview of the range of area types, target users and trip purposes across pilot lab sites**

<sup>2</sup> Traditional PT encompasses any scheduled fixed route public transport service (e.g. bus, train, tram, metro etc.)

<sup>3</sup> Alternative PT services encompass new mobility services including e-bikes/shared bike, car share, liftshare/carpool, DRT, shared taxi, volunteer car services

**Table 4: Focus for each pilot lab site with overall outcome KPI targets by user group trip purpose**

Pilot Site	Area Type	Vulnerable Users	Trip Purpose	KPIs related to objective outcome	
Cairngorm	Rural Area	Older people	Social / Leisure Services/Shopping	% change in traditional PT trips	% change in alternative PT trips
		Young Adults + Teenagers	Social / Leisure Services/Shopping Work / Education	% change in traditional PT trips	% change in alternative PT trips
		Tourists	Tourism	% change in traditional PT trips	% change in alternative PT trips
Flanders	Rural Area	Older people	Social / Leisure	N/A	% change in alternative PT trips
		Disabled / Mobility impaired	Social / Leisure		
		Migrants	Work / Education	% change in traditional PT trips	% change in alternative PT trips
Florence	Urban / Peri-Urban / Peripheral	Young adults and teenagers	Services/Shopping	% change in traditional PT trips	N/A
		Commuters	Work / Education	% change in traditional PT trips	N/A
		Migrants	Work / Education Services/Shopping	% change in traditional PT trips	N/A
		Other low income citizens	Work / Education Services/Shopping	% change in traditional PT trips	N/A
Barcelona	Peri-Urban / Peripheral	Young Adults	Social / Leisure	% change in traditional PT trips	% change in alternative PT trips
		Teenagers	Social / Leisure	% change in traditional PT trips	% change in alternative PT trips
Rhein-Sieg	Peri-Urban (New housing development)	Families with young children	Social / Leisure Work / Education Services/Shopping	% change in traditional PT trips	% change in alternative PT trips
		Teenagers	Social / Leisure Work / Education	% change in traditional PT trips	% change in alternative PT trips

Budapest	Urban Area	Blind and visually impaired	Social / Leisure Work / Education Services/Shopping	% change in traditional PT trips	N/A
		Disabled	Social / Leisure Work / Education Services/Shopping	% change in traditional PT trips	N/A
		Passengers with luggage or baby buggy	Social / Leisure Work / Education Services/Shopping	% change in satisfaction of traditional PT trips	N/A
		Tourists	Tourism	% change in satisfaction of traditional PT trips	N/A
		Foreigners staying in Budapest long-term	Social / Leisure Work / Education Services/Shopping	% change in satisfaction of traditional PT trips	N/A

Much of the data related to the PL-level KPIs will be available from the operators of the public transport (PT) services. For instance, for traditional public transport the number of trips made by older persons and disabled/mobility impaired persons may be obtained from operator ticket data where older persons and disabled/mobility impaired users typically have different fares or special passes that allow distinction between these travellers and others. Similarly, teenagers also usually have different ticket types and so should be differentiable using ticket data. Tourists, migrants, young adults and other low income citizens are more difficult to distinguish and differentiate using only ticket data. There may be some ticket types specifically for tourists – although these are unlikely to be used by all tourists for PT trips. In cases where traditional PT trips are booked in advance using an App it will sometimes be possible to identify the user group (this will be the case for migrants in the Flanders PL). For alternative PT services it will be easier to differentiate between different user groups as all these services require some form of pre-registration before use, which requires users to provide age, mobility/disability status, and/or home address. This is unlikely to be sufficient to identify migrants or other low income users, but will allow distinction between all other groups. Identifying trip purpose from operator ticket and booking data is more difficult. Section 6.1 explores in more detail the potential sources and methods of data collection.

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## 5.2 Individual measure/intervention level evaluation framework

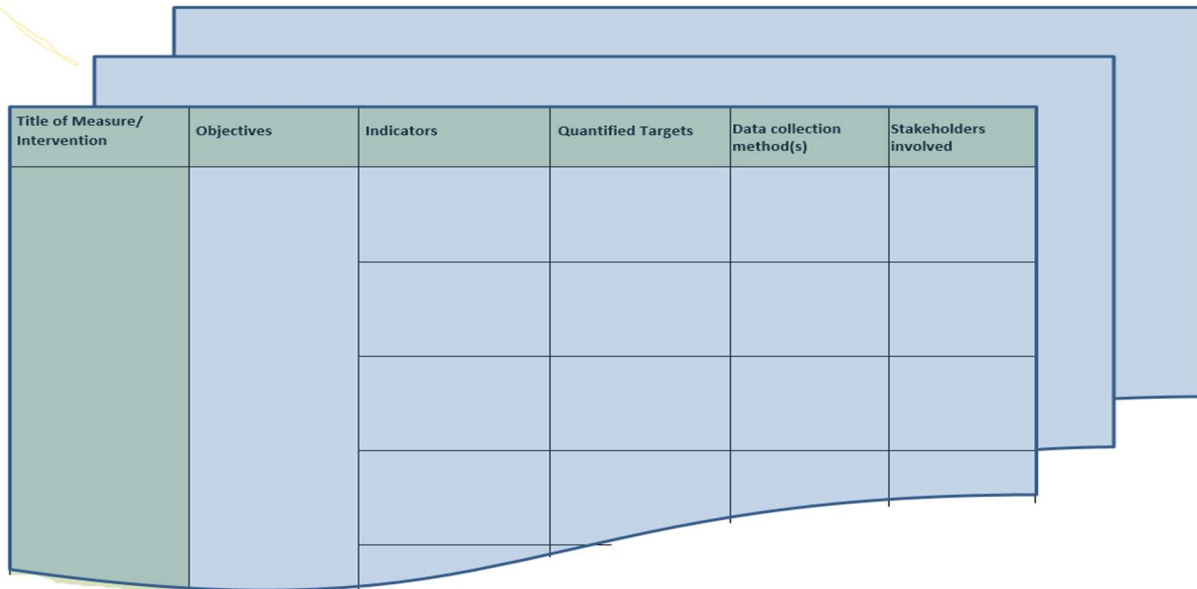
To achieve the above described pilot-site level objectives and target outcomes a number of measures or interventions will be implemented at each site. The combined impacts of introducing the measures contribute to the overall target outcomes at the pilot site level.

At this stage of the project, the set of measures/interventions to be introduced at each PL site is still to be confirmed. Sites are currently conducting user needs surveys and consolidating feasibility analysis in order to understand the types of interventions, including their specific design (i.e. location of services, timing of services, and other operational details), required by their target users.

As a result, this section describes the impact evaluation framework for PL partners to follow, once they have confirmed their specific measures/interventions, in order to collect the data necessary to conduct a meaningful evaluation of each measure/intervention. This framework helps PL partners to clearly define the objectives for each measure and to identify suitable corresponding indicators that allow measurement of the outputs and evaluation of the outcomes.

The framework consists of a set of tables for each measure/intervention that is to be introduced. A separate table is required for each objective associated with the measure/intervention. Illustration of the table template is provided in Figure 8. The framework consists, for each measure, of:

- 1) the objective or a number of objectives associated with their introduction
- 2) related performance indicators (KPIs) associated with outcomes
- 3) the target values related to each outcome performance indicator
- 4) related performance indicators (KPIs) associated with outputs
- 5) the target values related to each output performance indicator
- 6) the intended method of data collection
- 7) the stakeholders involved in the data collection/provision



Title of Measure/ Intervention	Objectives	Indicators	Quantified Targets	Data collection method(s)	Stakeholders involved

Figure 8: Illustration of the impact evaluation framework table template

## 5.2.1 Definitions

### Objectives

The measure/intervention **objective** should describe an outcome, meaning the effect or change that the measure is supposed to cause for the target group. Well-formulated, genuine outcome objectives are therefore of great importance if the impact assessment is to have any significance. Objectives relating to outputs can be useful for assessing the extent to which a measure has been delivered to plan.

It is important to note the distinction between **outputs** and **outcomes**.

- Outputs are the items or activities produced as a result of implementing the measure/intervention. Outputs are considered complete on delivery of the measure and are typically tangible and more easily measured objectively.
- Outcomes are related to the changes in behaviour caused by the intervention, or the knowledge transferred. Outcomes become apparent after some interval following measure delivery. Outcomes are often more difficult to measure, and are often measured subjectively by approximation through surveys with samples of the population.

### Indicators

An **indicator** is a quantitative variable that provides a simple and reliable means to measure achievement, to reflect the changes connected to an intervention. Indicators must closely relate to the objectives of the intervention/measure and thereby allow for statements about the degree to which the objectives have been achieved. Four basic requirements have to be taken into account when defining indicators: 1) They should be SMART (see below). 2) They must clearly reflect the

performance or impact of your measure. 3) They must match the objectives. 4) They are capable of reliable assessment using the data collection and measurement methods chosen.

### Quantified Targets

The quantified targets are the planned or estimated value (or change in value) of the performance indicator after implementation or after a defined period of operation. Target values related to output indicators will typically be defined by specifications in the measure plan, tender document or delivery contract. Target values related to outcome indicators will be expected or desired changes in value of the outcome indicator as a result of a period of operation of the measure/intervention. This is usually indicated by a % change in value of the indicator between the 'before' and 'after' situation.

#### 5.2.2 Guidelines

When completing the framework tables, the PL must adhere to a few basic rules:

- All measures/interventions should have at least one objective and each objective should have at least one related performance indicator, although in many cases each objective will have multiple performance indicators.
- Each measure must have a minimum of one outcome performance indicator.
- It is not mandatory for a measure to have output performance indicators, although these are useful to assess whether delivery and technical performance targets have been met.

In order to evaluate the effects of an urban transport measure it has to be clear, which objectives should be addressed by the chosen measure and how these objectives relate to the higher overall pilot site level objective (detailed in Section 5.1). Clear measure specific objectives, from which the performance indicators can be derived, help to show the results of the measure and to determine whether the results mean a success or a failure of the measure.

As application of measures/interventions in INCLUSION are specific to particular vulnerable target groups and in specific prioritised areas, general established indicator sets for assessing transport projects are not very useful. As noted above, indicators must closely relate to the objectives of the measure and thereby allow for statements about the degree to which the objectives have been achieved.

To give an example, Table 5 provides a completed framework table for a single objective for a hypothetical measure. It is recommended to the PLs that the SMART approach (Doran, 1981) is used in order to set and formulate clear measure objectives and associated indicators/targets, within the duration of the project that allow for an assessment of the measure's success after its implementation. SMART stands for **S**pecific, **M**easurable, **A**chievable, **R**elevant and **T**ime-related.

- **Specific** - Do the objectives spell out exactly what is to be achieved and are therefore well-defined and understandable? This should specify clearly what is to be achieved, by whom and where. In the example in Table 5 the 'what' is improved access to public transport; the

'whom' is Target Group A; the 'where' is area X. Do the data collection methods and targeted groups match with the specific target users/groups identified in the indicators?

- **Measurable** – Does the target make it possible to measure the success or failure of the measure? What is the evidence for success? There can be multiple targets relating to the objective (usually one or two for each indicator). Sometimes these are specified as absolute values and sometimes as % change in a value. Often targets associated with outputs are specified as absolute values (e.g. Target associated with output indicator 3 in Table 5) and are usually straightforward to measure at the time of delivery. In most cases, to be meaningful, targets associated with outcomes are specified as a % change compared to the 'before' situation. In these cases it is necessary to measure the value of the indicator before implementation of the measure/intervention and also to measure this at some time after the measure/intervention has been operating/active. The need for 'before' measurements often means conducting surveys with a sample of the population prior to the launch of a measure/implementation. Timings and budgets for this need to be borne in mind.
- **Achievable** – Are the set objectives and targets achievable? A measure that introduces 2 new bus services across an entire city is unlikely to result in a 10% increase in PT trips in the city. However, if the objective and target are framed to include the target group and the area of the city where the new services are delivered, then perhaps a 10% increase amongst that group within that area is achievable. PLs need to ensure the objective and targets, at the measure/intervention, level are tailored to the groups and areas that the measure /intervention aims to address. Are the indicators sufficient to achieve the stated objective? For instance in Table 5 the outcome indicator 1 is not sufficient by itself to adequately describe if the objective has been achieved – this is because a 10% increase in bus trips by target group A in area X may be due to a large number of extra trips by a small number of target users rather than a more general increase in access to the bus service for target group X. Hence the need for the outcome indicator 2 which provides data on the proportion of those in target group A using the bus.
- **Relevant** – In a practical sense, is it really possible to achieve the objective with the available resources? Does the objective fit to the overall pilot-site / project objectives detailed in Section 5.1? Assess whether the measure level objective would benefit from rephrasing to better align it with the higher level pilot-site overall objective. Remember each of the individual measures/interventions are steps towards the overall objectives (see Figure 6).
- **Timely** – Within which time frame can the objective be achieved? Is it feasible to meet the targets within the time limit constraints of the project? Is there sufficient time between launch/delivery of the measure/intervention and the 'after' data collection to achieve the target results?

Following the above SMART advice to help define the objectives, indicators and targets will allow evaluation of any impact or effect by identifying the data required 'before' (baseline) and 'after' implementation (ex-post). This enables comparison of both situations and conclusions to be drawn. The central question to answer is: What was the situation before the measure was implemented and what changes can be attributed to the measure? For further examples and guidance on SMART the reader is referred to <https://www.mindtools.com/pages/article/smart-goals.htm> and <https://www.smartsheet.com/blog/essential-guide-writing-smart-goals>.



### 5.2.3 Impact evaluation framework tables example

**Table 5: Measure level impact evaluation template (hypothetical example)**

Title of Measure/ Intervention	Objectives	Indicators	Quantified Targets	Data collection method(s)	Stakeholders involved
e.g. Redesign of bus routes and schedules in area X	e.g. Improve access to public transport in area X for target group A	Outcome indicator 1 e.g. Change in no. of trips by bus in area X for target group A	e.g. 10% increase in bus trips by target group A in area X	e.g. primary data collection through 'before' and 'after' surveys with target group A in area X  e.g. secondary data collection from bus operator ticket data	Persons in Target Group A  Bus operators
		Outcome indicator 2 Proportion of target group A using bus at least once a week	e.g. 20% increase in target group A using bus in area X at least once a week	e.g. primary data collection through 'before' and 'after' surveys with target group A in area X	Persons in Target Group A
		Outcome indicator 3 Satisfaction with bus services by Target Group A in area X	80% of bus users in Target Group A 'satisfied' or 'very satisfied'  50% increase in Target Group A 'satisfied' or 'very satisfied' with bus services in area X	e.g. on bus passenger surveys with bus users from Target Group A in area X (5 point Likert scale)  e.g. primary data collection through 'before' and 'after' surveys with target group A in area X	Persons in Target Group A  Bus operators (to allow the surveys on the bus)
		Output indicator 1 Reduce average walking distance to nearest bus stop in area X	25% more people within 600m of nearest bus stop in area X	GIS mapping tools	Local Authority Planning Dept.
		Output indicator 2 Increased frequency of bus service during off-peak times in area X	50% increase in numbers of services in evenings and weekends in area X	Bus timetables	Bus operators
		Output indicator 3 New bus routes in area A connecting with train station	2 new routes delivered with 4 buses per hour in peak and 2 buses per hour off-peak	Bus timetables	Bus operators

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#### 5.2.4 Timings for Pilot Sites to complete impact evaluation framework tables

By the end of M14 (Nov 2018) PL sites will be provided with a set of empty framework tables (one table to be completed for each objective associated with each measure/intervention). The tables should be completed following the SMART guidance. The table structure can be adjusted by the PL partners to suit the measure being delivered – rows can be added or removed (or simply left blank) where necessary. However, the basic rules presented in section 5.2.2. need to be adhered to (at least one objective per measure and each measure must have at least one **outcome** performance indicator). This will provide the initial set of measure/intervention level impact evaluation tables. It is necessary that these initial tables defining objectives, indicators and targets are kept under review as the project progresses. As pilot sites obtain a more concrete picture of exactly what measures they will introduce, it is important that the objectives and performance indicators remain appropriate. If necessary, they should be altered to ensure the evaluation remains meaningful. For instance, it may be that the targets should be amended upon completion of the user needs assessments. It may even be that this reveals additional objectives as being important to the user – in such cases these should be added and suitable indicators and targets defined. The initial engagement with stakeholders to collect baseline data may identify that certain data cannot be provided and so indicators and associated targets may need to be altered. Early process evaluation activity may result in adjustments to the objectives or indicators. Of course, any changes to initially identified objectives, indicators or targets need to be justified and recorded via the process evaluation. The set of tables with defined objectives, indicators and targets for each measure will be considered final prior to the delivery of the measures. Any changes after this time would need to be due to exceptional circumstances.

PL sites will be required to complete a set of impact evaluation tables for one measure/intervention of their choice by the end of M15 (Dec 2018). These will be reviewed by UNIABDN and feedback provided to the PL partners on improvements and edits required by end of M16 (Jan 2019). The PL sites will then produce the initial impact evaluation tables for their other measures/interventions by the end of M17 (Feb 2019).

These initial tables and are likely to be subject to minor change as PLs complete user requirements assessments and conduct initial consultations with relevant stakeholders involved in the design, delivery and data provision. The final set of measure/intervention level impact evaluation tables will be due in M19 (April 2019) for all measures/interventions.

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### 5.3 Defining Business-As-Usual scenarios

In addition to assessing outputs and outcomes against objectives within the project timescales, the impact evaluation also needs to consider the impact of the measure/intervention compared to a hypothetical 'business-as-usual' scenario, in which the measure/intervention was not implemented. For large scale infrastructure projects with impacts realised over many years this aspect of evaluation is important. Within the INCLUSION project, where small scale measures are being evaluated over a short time period of 6 months to a year, the change to the current situation is likely to be negligible for most measures within such short timescales. Therefore, for most measures/interventions it will be sufficient to compare the 'after' INCLUSION results with the baseline 'before' situation to establish short-term impacts. However, in some circumstances where significant changes may actually be expected within the project evaluation timescales then the 'business-as-usual' scenario needs to be defined. For example, if prior to the end of the project, there is expected to be a rapid influx of migrants to a PL area (and migrants are one of the target groups), or if a new hospital is expected to open within a PL area (and older persons are one of the target groups). Both these scenarios would generate significant additional transport demands from the target group within the study area resulting in changes to the current baseline conditions. Defining the 'business-as-usual' reference case for a particular measure would be needed in such circumstances in order that the cause of changes in data captured through the impact evaluation can be understood and appropriately attributed to the measure/intervention.

Over the longer term underlying trends in the PL areas (e.g. aging population) may be likely to influence the longer term impacts and benefits of the measures introduced. To forecast longer term impacts needs an understanding of the trends and future changes expected to affect the target group population in the PL area. This future forecasting can highlight where positive impacts from introducing the INCLUSION measures/interventions can be expected to magnify over time, alleviating or mitigating greater problems and issues that would arise under a 'business-as-usual' future. The future forecasting of impacts is especially of interest to policy makers and for strategic planners who make investment decisions. This longer term forecasting should only be done at the PL level, considering the overall objectives and KPIs as defined in Section 5.1. It need not be done for each measure/intervention individually.

Establishing 'business-as-usual' scenarios in the short term (up until the project end) and over the longer term (e.g. next 5-10 years) requires professional judgement from relevant experts/stakeholders. This exercise will be informed by outputs from the process evaluation activity and supplemented by existing trend data relating to the target users in the pilot areas (e.g. from census data and other established repeat surveys).

The Business-as-Usual scenarios need to be defined and relevant data that depicts these collected by the PL partners by M22 (end July 2019).

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## 6 Data collection

The impact evaluation framework described in Section 5.2 (see example of Table 5) establishes the indicator data that is required in order to evaluate the impact of the measure/intervention introduced. The sources for the data are also to be identified in the impact evaluation framework tables. This Section provides more insight and guidance on the potential data sources and considerations related to availability, sufficiency, specificity and affordability, which should act as an aid to the PL partners when identifying suitable data sources.

There are two different kinds of data that can be used for impact evaluation: Firstly, data that is already available and secondly, new data needed to be collected by the PL. Collection of new data is called primary data collection since the data is collected by the PL partners themselves (or their subcontractor). If data is already being collected or has been collected by someone else, and is used for the impact evaluation, it is called secondary data. It is always advisable to look initially for available secondary data, because it could save considerable time and money. The next section describes in more detail the different types of secondary data and methods for primary data collection.

### 6.1 Sources of impact assessment data

The data relating to the KPI's at the pilot level refer to; 1) increases in traditional PT trips by specific user categories for particular trip purposes and 2) increases in alternative PT trips by specific user categories for particular trip purposes.

For the measure/intervention level, the data required is not yet known as the set of measures/interventions at each PL site is still to be confirmed. What is known is that the measures/interventions in the INCLUSION project are being delivered with specific target user groups in mind and often for specific trip purposes. As a result the primary data (new data) collection process will need to be focussed on these target users / trip purposes, and where secondary data (existing data) is available it will only be useful if the identified target group and possibly also trip purpose data can be extracted.

Bearing this in mind, the data at both PL level and individual measure level will potentially come from a variety of sources. These include:

- 1) Existing operator data (traditional PT services) – traditional PT operators record information on who uses their services through ticketing data and use of smart cards. This will be able to distinguish between trips by certain target user groups. For example, trips where concessionary passes have been used by older persons and/or disabled persons. Ticket data may also provide information on the number of trips by teenagers or young adults if discount fares or young person passes are utilised. Some special tickets are designed for use by tourists although not all tourists will utilise these. Ticket data by itself cannot identify trips by low income persons or by migrants. Operator data is unlikely to be able to accurately

distinguish between trip purposes, although ticketing data which shows boarding and alighting at specific places may give a good indication of trip purpose (e.g. bus stops beside hospitals, town centres, leisure centres, tourist sites etc.). However, where these locations are close together it is not possible to attribute a trip to a specific purpose from ticket data alone.

- 2) Existing operator data (alternative PT services) – alternative PT services all require some form of pre-booking which often requires users to share information on their age. As a result, all trips are recorded and there is knowledge of all age related user categories. Some of these services are specifically designed for particular trip purposes and so it may be straightforward to also distinguish between trip purpose. Intermediary booking Apps such as MaaS Apps also provide a rich source of information on user category, trip characteristics (e.g. modes used and whether single mode or intermodal trips) and possibly trip purpose. New services implemented as a PL measure should consider whether primary data can be collected as part of its operation.
- 3) Additional operator data - Where it is not possible to derive user category or trip purpose from operator data then additional data collection will be needed; e.g. for alternative PT services where pre-booking is required users could be asked to confirm the purpose of their trip at the time of booking.
- 4) Existing survey data – some data relating to target groups and trip purposes may be collected on an infrequent basis through national government census surveys or more routinely by local authorities or employers (e.g. annual household surveys, travel to work surveys, workplace travel plan surveys, public transport passenger surveys, local authority mobility surveys). While these sources can provide useful background information on the pre-INCLUSION status and trends, their frequency of collection and aggregate nature means they are unlikely to be focussed sufficiently on the areas or user groups impacted by the INCLUSION measures. It will be important to assess their suitability before considering them as a valid data source for the impact evaluation. They may be useful for establishing underlying trends.
- 5) Additional 'before' survey data - in cases where there is limited existing data available (from service operators or surveys) to detail the pre-INCLUSION conditions (e.g. where completely new services are to be introduced), then it will be necessary to conduct additional 'before' surveys with the target user group(s). These surveys can also be used to raise awareness of the impending new services amongst the target user group.
- 6) Additional 'after' user survey data - Where operator data is not sufficient to derive user category and trip purpose, then surveys with users will be needed to establish estimates of the proportions of service trips by target user groups for particular purposes. These surveys can be used to also gain knowledge on the users travel behaviour prior to the INCLUSION service/intervention and also to gain feedback on how they found out about the service and their satisfaction with the service.
- 7) Additional 'after' non-user survey data – In addition to conducting after surveys with users of the INCLUSION services/measures, it is likely that further 'after surveys with non-users will be required to understand their reasons for not using / not considering use of the INCLUSION service / measures. It may be due to lack of awareness, lack or acceptance, or lack of ability.

Fully understanding this is important for service improvement and to better understand potential future impacts.

- 8) Accessibility mapping and GIS software tools – average distances to PT stops and average scheduled travel times can be obtained from these software tools. Local authorities usually maintain their own versions of these although there are now some open source tools available for application where suitable open source data sets exist. Before and after data related to changes in PT service routes and schedules can be compared to capture output indicators.

Other data commonly used in measure evaluation can include

- 9) Automated data collection from sensors – sensor data can provide traffic counts, cycle counts, emissions at specific locations. Where many sensors are distributed across a wide area these can provide a good indication of changing conditions over time. For INCLUSION it is unlikely that sensor data will be useful, mainly because it does not distinguish between different users. There may be instances where it can be used to provide some additional background data.
- 10) Use of mobile phone tracking Apps to collect data – recent developments in analysis of mobile phone GPS data allows mode of travel to be derived from GPS traces. This can provide a rich source of information on travel habits by revealing where, when and how someone is travelling. For measures where number of trips using a specific mode or where number of intermodal journeys are outcome indicators, this may be a useful data collection tool. However, these types of Apps may not be suitable for use by all vulnerable target user groups in INCLUSION. Where the target group are tourists or young persons then there may be a good argument for considering such an approach. Getting a sufficiently large number of the target group to use the App then becomes the challenge.

## 6.2 Considerations for Primary data collection

Where it has been established that primary data collection is required in the form of 'before' and 'after' surveys, these should be conducted with a sample of the target user group. Careful thought needs to be given to who exactly forms the target user group and how they can be reached and encouraged to complete a survey.

For instance if an objective is to improve PT services for disabled persons in area X, it is not sufficient to only sample disabled users of PT services in area X 'before' and 'after' the related measure is introduced. Although the impact of the measure on existing PT users in area X is certainly important, it is also important to find out if the introduction of the measure has any impact on disabled persons in area X who do not currently use PT services.

While it is straight-forward to identify and reach users of PT services in area X through surveys conducted on the vehicle or at the PT stop, it may be more difficult to identify which passengers have a disability. Surveys could be conducted with all passengers, but with questions to establish if the respondent has any disability. Including all passengers in the survey has the benefit that questions

related to attitudes towards and awareness of disabled passengers and their needs could be elicited from the wider travelling public where necessary. An alternative could be to approach all passengers with an introductory question relating to whether they have a disability, and to then only continue to survey those who identify they do. This has the advantage that it will take less time to complete surveys with a pre-determined sample of disabled persons, but attitudes from the wider public are missed. Either way, conducting on-board or PT stop surveys can take a long time to secure sufficient responses from the required target users, and as mentioned they don't capture opinions of target users who don't use the service.

If disabled passengers need to register to receive a special pass to get reduced fares or free travel, then it may be possible to use this data to identify who the disabled group are in area X. Surveys could then be sent to these persons. This would be a quicker and much cheaper way to reach a larger number of respondents in the target group. However, response rates for postal surveys are much lower than for face-to-face surveys (either on-board PT services or at PT stops). Telephone interviews may be an alternative to postal survey and tend to provide better response rates than postal surveys but require more resources, but less than face-to-face surveys.

There may be many disabled persons in area X who do not have a special PT pass and who currently do not use any form of PT service. How are these people reached? If there is no way of finding addresses of disabled persons (in order to send a postal survey), then engaging with organisations who represent the target users is a sensible approach. For disabled persons this may be associations who provide activities and services for disabled clients. Getting access to their clients to conduct the surveys or even getting them to help deliver the surveys to their clients is a good approach. If using this type of approach then it may be important that the clients are target users that have a connection to the area in which the measure is being implemented. This needs to be considered and its importance assessed on a case-by-case basis.

While the above example relates to disabled target users, the same approach, considerations and difficulties apply for most target groups. Getting a mix of users and non-users (of the measure/intervention being introduced) is important for both the 'before' and 'after' stages of the evaluation. Of course, where a completely new service is to be introduced then there may not be any users for the 'before' stage and so surveys with a suitable sized sample of the target group population is adequate 'before' implementation.

Wherever possible, obtaining 'before' and 'after' survey responses from as many of the same individuals as possible is advantageous. This allows direct comparison of the impact of the measure/intervention on individuals. This is especially important if sample sizes are small. This should be borne in mind when designing how and selecting who to approach in the 'before' survey.

To increase survey response rates and encourage better quality survey completions it is good practice to offer an incentive for completing the survey. This is up to PLs to decide for themselves based on available budgets. A good approach is to include all completed responses in a prize draw, possibly with a prize related to the measure/intervention and tailored to the target group.

For surveys (and other data collection activities) it is important to consider if a single survey can be used for a target user group to capture data relevant to more than one measure. For instance, if there are multiple measures being implemented for older persons in area X, can the survey contain

the necessary questions related to the KPIs for each of the measures targeting older persons? This coordinated approach to survey design is recommended wherever the data collection is specific to the target group. On the other hand, if a survey for users of a particular service is being delivered to all users of the service and is not delivered to only the target group then questions need to be measure specific rather than target group specific.

### 6.3 Cost effectiveness data

Cost effectiveness is a useful output from the impact evaluation. It considers the impacts and the costs – “how much will it cost to achieve X amount of impact” or “how much impact can I expect to achieve with X amount of cost/funding”. It considers a specific key indicator linked to a particular objective. It is particularly useful for policy and decision makers.

In addition to the impact related data outlined above, there will also be the need to collect data on costs of design/delivery and costs and revenues of operation of the measures/interventions. This data will need to be acquired from the commissioners and operators of the measures/interventions.

- Costs of design/delivery include staff costs in set-up and implementation plus capital costs for equipment or infrastructure. It may also include marketing costs for promoting the launch of a service.
- The on-going operating costs include staff time, equipment/vehicle maintenance, fuel / data charges. In many cases most of these costs are provided by tender prices if a service is contracted to a private sector provider.
- Operating revenues include fares or charges generated from passengers/users through their use of the service.

As many measures/interventions are not dedicated for the exclusive use of the INCLUSION target users, and also some INCLUSION measures are add-ons or refinements to services which are already established, the interpretation of cost data will need careful consideration in order that cost effectiveness calculations attribute costs to impacts in a reasonable manner.

### 6.4 Data Privacy Considerations

The detailed data to be collected and processed as described above will need to be treated in accordance with all relevant data privacy regulations and practices, particularly with respect to the General Data Protection Regulation (GDPR, EU2016/679) and in alignment with the INCLUSION Data Management Plan (included a part of D9.1, submitted 23 May 2018). Much of the data to be collected as part of the impact evaluation activities may be considered personal data, defined under the GDPR as “any information relating to an identified or identifiable natural person (‘data subject’); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier



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or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person<sup>4</sup>.” The GDPR sets out seven key principles that should be considered in the treatment of such data:

- Lawfulness, fairness and transparency
- Purpose limitation
- Data minimisation
- Accuracy
- Storage limitation
- Integrity and confidentiality (security)
- Accountability

These principles should be considered when collecting or processing collected data that could potentially identify persons on whom data are collected (either primary or secondary data as described above), either in relation to a particular activity, or when data sets are combined. Considerations related to data privacy should also reflect broader ethical research requirements as outlined in Statement on Research Ethics above.

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<sup>4</sup> Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) Official Journal of the European Union, Vol. L119 (4 May 2016), pp. 1-88

## 7 Summary of the Impact Evaluation process

Figure 9 details the tasks/activities and timings for the main impact evaluation tasks. Highlighted at the bottom of the figure are the Deliverables to be output from these activities.

Within Task 4.1 each PL site is required to produce a Local Pilot Action Plan (LPAP) for defining (and then reporting) the actions required in the design, implementation and operation of the PLs and defining the related time plan. This is due at the end of month 14 (Nov 2018) and will contain the final indication of the measures / interventions being introduced at each PL site.

Following this, the sites should begin preparation of their initial impact evaluation framework tables for each measure/intervention (following the guidance provided in Section 5.2). The approach and timings for this are detailed in Section 5.2.4.

Based on the information contained in the initial impact evaluation framework tables PL partners should start obtaining the baseline ('before' INCLUSION) data which is available from existing sources. By month 18 (end March 2019) all PLs should have obtained all the baseline data which is available from existing sources and have a clear picture on what new data needs to be collected at their site for each measure.

By the end of month 19 the finalised set of measure-level impact evaluation tables should be produced.

Also by the end of month 19 (April 2019) 'before' surveys, interviews, travel diaries and other methods should be designed and delivery plans established to enable the collection of new data which is required to complete the description of the baseline ('before' INCLUSION) situation. The PLs will be reminded to coordinate data collection across multiple measures where appropriate (see section 6.2).

By the end of month 20 (May 2019) all surveys/interviews etc. should have been conducted and the full set of baseline data should be collected for each measure.

Measure operation should commence after this time (i.e. June 2018 onwards). If measures are expected to commence ahead of this schedule then the above timings need to be brought forward. This may also have implications for any 'before' data collection which is coordinated across multiple measures.

To allow sufficient operating time for impacts to be generated a minimum of 6 months is required between start of measure operation and 'after' data collection. As a result **all measures need to commence operation by July 2019** if subsequent delays to the evaluation analysis Deliverables D5.5 (due M30 Mar 2020) and D5.6 (due M32 May 2020) are to be avoided.

Table 6 provides a checklist of things to take into account when completing the impact evaluation framework tables.

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Data required to establish estimated trends for 'business-as-usual' scenarios (i.e. what you expect to happen without INCLUSION interventions) needs to be obtained by end of month 21 (July 2019). This data is likely to be available from secondary sources supported by the measure specific baseline data and the qualitative process evaluation engagement with key stakeholders (see D5.2 Process evaluation plan).

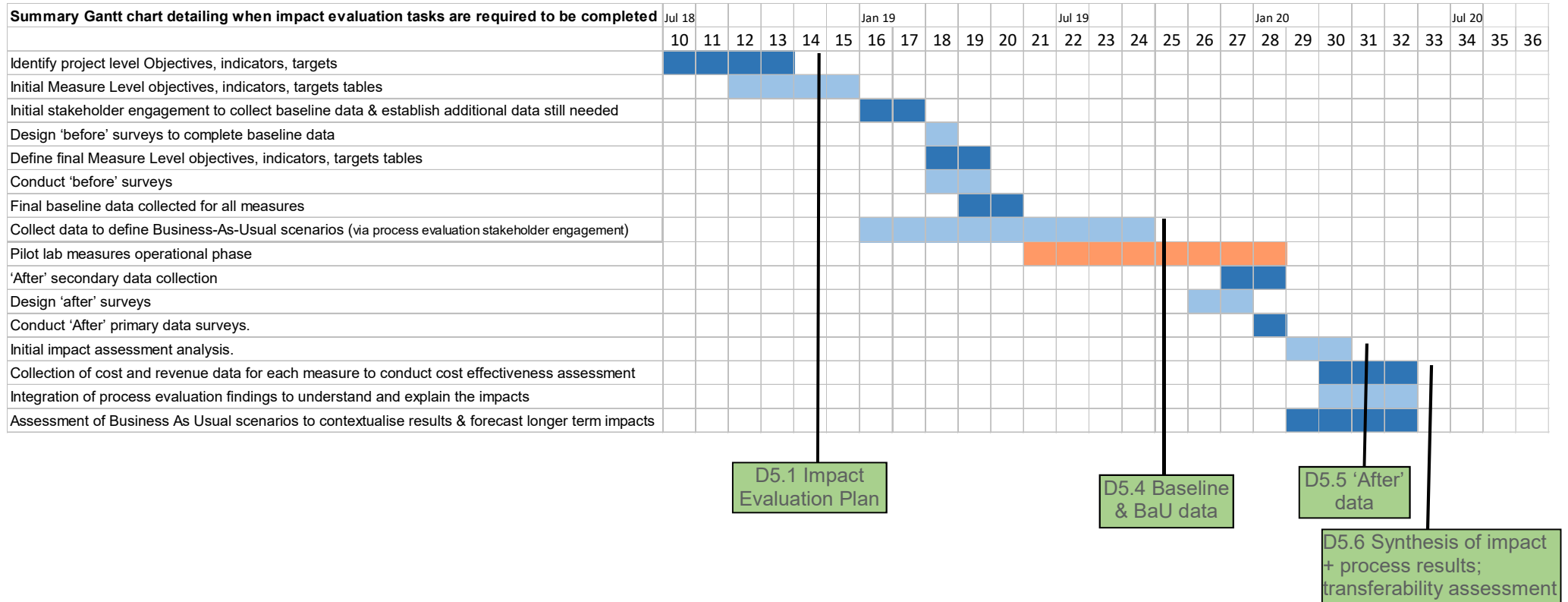


Figure 9: Impact evaluation activities

**Table 6: Checklist for completing the impact evaluation framework tables**

To be applied to the impact evaluation framework tables for each measure/intervention	
<p>1. Are the objectives suitable? Are they actually objectives? Are they described clearly enough to relate to a specific target group and trip purpose (where required)?</p> <p>Refer to the definitions in Section 5.2.1 and guidelines in Section 5.2.2.</p>	<input type="checkbox"/>
<p>2. Have you identified the main <b>outcome</b> performance indicators that provide a measure of the extent to which the objective is achieved? Remember, outcomes are related to the changes in behaviour caused by the intervention, or relate to the knowledge transferred.</p> <p>Do they directly relate to the objective? Are they sufficient to fully address the objective, or are there additional performance indicators that would make the evaluation more robust? E.g. make sure that you have indicators relating to the wider target group and not only to persons in the target group who are users of the service implemented. Are the outcome performance indicators SMART?</p>	<input type="checkbox"/>
<p>3. Is there a minimum of one <b>outcome</b> performance indicator for each measure?</p>	<input type="checkbox"/>
<p>4. Have you identified important <b>output</b> performance indicators associated with the measure? Remember, outputs are items or activities produced as a result of implementing the measure/intervention.</p>	<input type="checkbox"/>
<p>5. Are the targets sensible and appropriate?</p> <p>Think carefully about the units of measurement for the KPIs and their targets. Remember targets for <b>outcome</b> indicators should usually be specified as % change between 'before' and 'after' implementing the measure.</p>	<input type="checkbox"/>
<p>6. Can the data for each indicator be obtained?</p> <p>Think carefully about how this will be done and which stakeholders will be involved? Remember you will need to collect data from both users of implemented services and non-users within the target group. Refer to Section 6.</p>	<input type="checkbox"/>

<p>a. Can the data be obtained from existing sources? Will operators share data with you?</p> <p>b. If not, can existing data collection methods/tools be adapted to capture necessary data?</p> <p>c. If not, are completely new surveys or other primary data collection methods required in order to capture the required data? Remember, these will need to be delivered both 'before' and 'after' implementation of the measure/intervention.</p>	<p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>
<p>7. Do you have sufficient budget and resources for additional surveys with users and non-users, both 'before' and 'after' measure implementation?</p> <p>Is there the possibility coordinate the design of data collection surveys which combine questions related to multiple measures that affect a particular target group?</p> <p>Are there any novel data collection approaches which you can consider? E.g. Mobile phone tracking via mobility App; participatory approaches to data collection.</p>	<p><input type="checkbox"/></p>
<p>8. Do a final data check:</p> <p>Is the data adequate to provide a meaningful evaluation of the impacts from introducing the measure?</p> <p>Is the data relevant to the objectives (at measure level? and at overall pilot lab level?).</p> <p>Is the data suitable (in terms of timing, location, and target groups)?</p> <p>Is the data sufficient (to capture current conditions and background changes/trends)?</p> <p>Do you have sufficient budget and/or staff resources to collect the new 'before' data prior to the measures becoming operational? (i.e. by end May 2019 at the latest!)</p>	<p><input type="checkbox"/></p>

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