inclusion

INCLUSION Project

Deliverable 5.6

Evaluation of findings and transferability potential at European level

Author(s): Steve Wright (UNIABDN); Caitlin D Cottrill (UNIABDN); Sarah Brooke (UNIABDN)

Document Control Page

Title	Evaluation of findings and transferability potential at European level
Editor	UNIABDN
Contributors	UNIABDN, RUPPRECHT, MEMEX, SOFT, POLIS, EMTA
Nature	R
Dissemination Level	PU
Version Number	1.0
Planned Delivery Date	M33
Version Date	9th September 2020
Brief Description	D5.6 provides a synthesis of the impact and process evaluation of all the INCLUSION Pilot Lab measures delivered in WP4. A summary of the findings for each individual measure is presented including transferability considerations and lessons learned. This is followed by a wider cross-site assessment of drivers, barriers and risks to identify common factors which contribute to successful outcomes as well as those which present barriers and challenges to be aware of. Risks relating to lack of or unsuitable user engagement are highlighted, and guidance given for the most suitable type of engagement with different target users at both the inception/design and trial/delivery stage. Finally, the main conclusions for transferability are presented. These results, together with WP3 / Task 3.4 outcomes, will provide fundamental inputs for the development of policy recommendations in D6.2.

Version	Date	Modified by	Comments
0.1	30th July 2020	UNIABDN	First draft prepared by UNIABDN
0.2	20th August 2020	RUPPRECHT, MEMEX, SOFT	Version shared with T5.5 analysis partners for review and inputs
0.3	1st September 2020	SOFT, EMTA	Version shared with peer reviewers Algowatt and EMTA.
0.4	9th Sept 2020	POLIS	Version for glossy brochure formatting
0.5	9th Sept 2020	UNIABDN	Final version for quality review
1.0	10th Sept 2020	SOFT	Quality review, final version for submission

Contents

1 Executive Summary

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 (Information and Communication Technology)-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 have been developed and implemented through real-life experiments in the project Pilot Lab (PL) sites in Belgium, Germany, Hungary, Italy, Spain, and the UK.

The evaluation of these real-life experiments 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.

- Deliverable 5.3 *Process Evaluation Results* presents evaluation of the processes of preparation, implementation and operation of measures, including the roles of information, communication and participation. It explains the mechanisms, barriers, drivers, actors and context conditions surrounding the design and implementation of each intervention and their influence on the measured impact. It also establishes if there are factors external to INCLUSION, that have had an influence on the measured impacts, or if there are any unexpected consequences / impacts generated by the INCLUSION interventions.

- Deliverable, *D5.5 Full evaluation: The test results*, presents results of the impact evaluation comparing changes in directly observed data relating to a set of identified key performance indicators for each measure and supplemented by additional feedback provided by key stakeholders in the measure delivery.

This deliverable integrates and summarises the results from both the impact and process evaluation. The main findings and lessons learned are presented for each Pilot Lab measure, highlighting what worked well and what challenges were encountered that needed to be overcome. Transferability considerations for each of the measures are identified highlighting important factors of success/failure for different types of solution.

This is followed by a wider cross-site assessment of drivers, barriers and risks to identify common factors which contribute to successful outcomes as well as those which present barriers and challenges to be aware of. Risks relating to lack of, or unsuitable, user engagement are highlighted, and guidance given for the most suitable type of engagement with different target users at both the design and delivery stage. Finally, the main conclusions for transferability are presented.
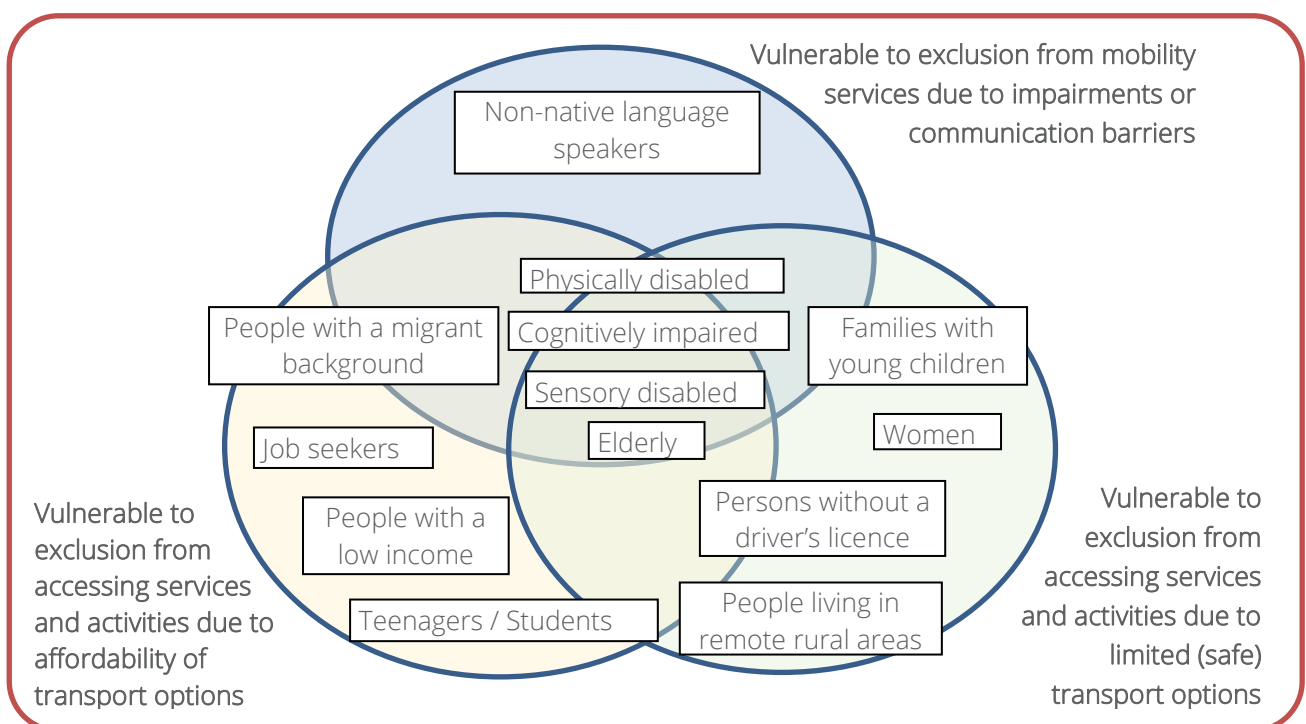
2 Introduction to Target Users in INCLUSION

INCLUSION has defined 13 user groups that are vulnerable to exclusion. These are illustrated in the Venn Diagram below. Some user groups are vulnerable because they have limitations on what they can do due to physical impairments, cognitive impairments or communication/language barriers; this results in being excluded from the use of mobility services unless adaptations are made, or assistance and information being provided to better cater for their needs. Other user groups may be classed as vulnerable due to a lack of available (and safe) transport options or poor transport service provision resulting in their being excluded from accessing employment, key services or from participation in social and cultural activities. Those without access to a car, especially young people, in rural areas and women can often belong in this category. Finally, other groups may be classed as vulnerable due to a lack of affordable transport options resulting in their being excluded from accessing employment, key services or from participation in social and cultural activity. People with a low income, those with a migrant background, and teenagers / students often find themselves excluded in this way.

Each user group has varying needs in terms of accessibility, affordability, convenience, efficiency, empowerment, empathy, gender equity and safety. To sufficiently address these needs, it is important to be aware that many users are associated with more than one of the 13 user categories, and therefore 1) have multiple needs, and 2) are consequently more seriously affected than if only challenged by one category of need. For example, an elderly migrant woman tends to face greater challenges than someone who solely identifies as an elderly user or as a migrant. People with disabilities and impairments, including the elderly, often cannot drive and may have a low income and so can be vulnerable to exclusion in all three dimensions of the Venn diagram.

For more detailed analysis of user needs see Chapter 4 of INCLUSION Deliverable D3.4 – *Typology and description of underlying principles and generalisable lessons*, available at http://www.h2020-inclusion.eu/resources/publications/.

Source: Created by the author

3 Introduction to the Pilot Lab areas

Within INCLUSION a number of innovative solutions have been developed and implemented through demonstration of real-life measures in the project's Pilot Labs (PLs). The target PL areas, in Belgium, Germany, Hungary, Italy, Spain, and the UK, provided direct access to a variety of different transport environments, socio-economic contexts, and cultural and geographical conditions. Detailed descriptions of the pilot lab sites and the measures implemented are provided in INCLUSION Deliverables D4.2 – D4.7 available at: http://www.h2020-inclusion.eu/resources/publications/

Site	Target area	Target users
Flanders Region, Belgium	Urban, suburban and rural area	Older persons and people with mobility issues; migrant jobseekers
Rhein Sieg Region, Germany	Part rural; part peri-urban	Families with young children and teenagers
Budapest, Hungary	Urban area	Disabled, blind and visually impaired citizens, people with luggage / buggies, tourists and non-native language speakers
Florence, Italy	Peri-urban and rural areas	Low income, migrants, rural commuters
Barcelona, Spain	Peri-urban area	Young persons and women travelling for leisure purposes
Cairngorm National Park, UK	Rural, tourist area	Elderly people, persons of reduced mobility, local residents who suffer from fuel poverty, young people, tourists

The measures introduced and evaluated at each of the Pilot Lab sites are summarised in this Section. The main findings are presented along with key lessons learned and considerations that are relevant for transfer of the measure elsewhere. In addition, a short discussion is given on the implications for each measure and potential opportunities that the measure may present in the aftermath of the Covid-19 pandemic.

In addition to the measure specific results and lessons presented in this Section, there are a number of key indicators which broadly apply across measures and which address the common INCLUSION project objective to: *"Ensure accessible, inclusive and equitable conditions for all and especially vulnerable user categories"*. Appendix A presents the impact achieved for the different Pilot Lab measures relating to the project level KPIs.

More comprehensive impact evaluation for each measure is contained in INCLUSION Deliverable D5.5 – *Full evaluation: The test results*, available at: http://www.h2020-inclusion.eu/resources/publications/.

3.1 BUDAPEST Pilot Lab – Crowdsourcing data platform

Context / Intro: Budapest has a population of 1.75 million inhabitants and an extensive public transport system which includes 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 was extended in 2019 and comprises 36 lines. 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.

Objective: to contribute to improvements in public transport usability for people with reduced mobility.

This was achieved by better understanding the needs of people with reduced mobility by capturing public transport user feedback through a crowdsourcing online platform and acting on the information received.

Target users: blind and visually impaired, disabled, travellers with luggage or baby buggies, tourists, and non-native language speakers.

Contact: Andor HÁZNAGY (BKK Centre for Budapest Transport)
AndorGellert.Haznagy@bkk.hu
Other info: https://jarokelo.hu/

JÁRÓKELŐ ONLINE CROWDSOURCING PLATFORM

Area Type	Urban
Main Actors	BKK – Public Sector transport authority and operator in the city of Budapest
	Járókelő – Community/not-for-profit NGO developing the technology
Delivery	Public-Community-Partnership

The existing Járókelő online crowdsourcing platform which already allowed the public to feedback on public services in the city, was enhanced to offer a public transport specific sub-page.

This was accompanied by a marketing and promotion campaign called 'without barriers', promoted jointly by BKK (the transport authority in the city of Budapest) and Járókelő NGO, to inform the public and encourage them to submit feedback or 'announcements' about issues encountered or improvements needed regarding use of public transport.

The demonstration showed that almost half (44%) of the reported issues can be quick and relatively cheap to solve or respond to.

Reported incidents and passenger feedback increased from 5 per month using previous methods (e-mail, phone) to 14 per month via the crowdsourcing platform during the 'without barriers' campaign.

The types of problems that could be solved included improvements to information at stops, introduction of tactile paving on platforms and in stations, fixing lighting issues highlighted by visually impaired users, plans to introduce braille signs at PT vehicles stop signs, adjusting handrails on staircases, improving audio information at stations, and professional responses to requests to provide barrier-free access to PT stops and to the street from stations, and improved descriptions of how to use discount cards / student IDs.

There was a 24% increase in target group (blind and visually impaired, disabled and those with buggies or luggage) users who are satisfied or very satisfied with their experience of PT.

The contract between BKK and Jarokelo NGO will be extended and the crowdsourced public transport data platform will continue after the end of the INCLUSION demonstration campaign.

Source: https://jarokelo.hu/
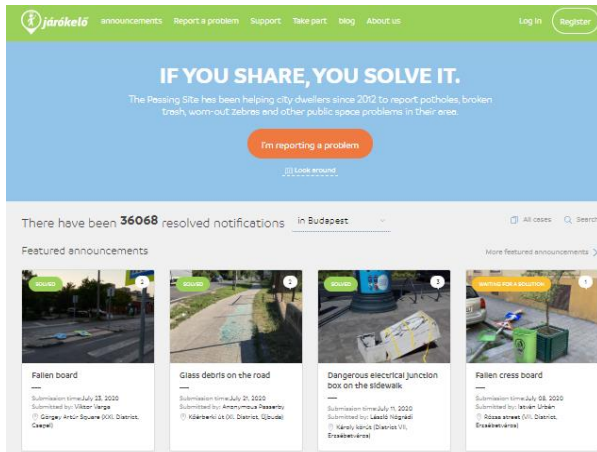
Transferability and lessons learned

People with reduced mobility were *empowered* by this measure in the sense that they were given a legitimate and public space to express unmet needs and make their voices heard and quickly responded to.

Providing responses to all 'announcements' is important to build trust between the target users and transport provider and create a feeling that the provider is empathetic to the user's needs.

Not all reported issues can be solved, especially physical barriers; however, the information builds a database of user's needs for consideration in the future longer-term planning of infrastructure and fleet upgrades and is also shared with other city organisations and stakeholders responsible for road maintenance, street access and signage around stops and stations.

Having good support from organisations that represent the target groups is crucial in marketing and making the users they represent aware of, and able to understand how to use the platform. Communication of the benefits of the platform, sharing success stories of issues that have been solved and showing that the platform works, is crucial to engaging these users.

Covid-19: There are many opportunities that a crowdsourced information platform can offer. Passengers can report on instances where safety and hygiene protocols are not being adhered to. Passengers can also share information on crowding levels on PT services and platforms to inform other passengers, but also to notify BKK where more capacity is required, or where gating is necessary to restrict numbers on platforms.

inclusion

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

3.2 BUDAPEST Pilot Lab – Staff awareness training

Context / Intro: The Budapest pilot lab within the INCLUSION project focussed on improving access to the 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).

Objective: to contribute to improvements in public transport usability for people with reduced mobility.

This was achieved through training the public transport staff to better understand the needs and capabilities of vulnerable users in order to provide appropriate assistance and behaviour towards those users while travelling and at stops and stations.

Target users: blind and visually impaired, disabled, travellers with luggage or baby buggies, tourists, and non-native language speakers.

Contact: Andor HÁZNAGY (BKK Centre for Budapest Transport)
AndorGellert.Haznagy@bkk.hu
Other info: http://www.bkk.hu/

STAFF AWARENESS TRAINING

Area Type	Urban
Main Actors	BKK – Public Sector transport operator in the city of Budapest
	Associations representing vulnerable users - Community/not-for-profit
Delivery	Public Sector

A new training programme for metro, tram and bus staff, ticket inspectors, and customer service employees has been developed and piloted in order to contribute to more competent staff behaviour and therefore a more inclusive environment.

The staff awareness training measure involved four phases: 1) a workshop held with representatives and associations of the target groups to better understand their respective and varied mobility needs, 2) a reflection process and needs assessment that led to the production of a training guide, 3) conducting the training with staff in participation with volunteers (i.e. people with reduced mobility from disability associations that assisted to demonstrate their needs and teach the staff how to enable them), 4) evaluation of the impacts on the staff and volunteers.

Outcomes from the training include:

- BKK strengthened its relationships with stakeholders and its customer relations with passengers

- BKK employees better understand the habits and needs of the passengers and feel more confident in recognising and supporting those vulnerable users who may benefit from extra assistance. Staff competency in recognising and assisting vulnerable users increased by just under 20%.

- More of the vulnerable target users feel confident to use public transport and there have been around 20% more vulnerable users in the target groups satisfied or very satisfied with public transport services.

In the future, the training is to be rolled out to employees from other PT service providers (operating the bus services) working across the city.

Source: BKK Budapesti Közlekedési Központ

Transferability and lessons learned

▪ The effect of the staff awareness training on vulnerable users is that it is empowering, empathetic, gender equitable, and safe. Better staff awareness and improved attitudes towards vulnerable users helps remove confidence barriers that prevent vulnerable users from utilising conventional PT services. Better trained staff can also lead to improved safety and feelings of security while travelling, which is of particular relevance to women and elderly passengers.

▪ Staff who are in contact with vulnerable users have better ability to recognise them, have a good understanding of their additional needs, and have knowledge of how to best deliver service to them. This includes greater recognition that less visible disabilities such as autism, dementia or anxiety can present significant barriers to travel.

▪ Staff awareness training further helps to ensure staff members know the appropriate actions to take when serving a vulnerable user, such as drivers giving extra time for boarding, including securing wheelchairs / sitting and alighting for vulnerable passengers in wheelchairs or assisting users with mobility difficulties.

Covid-19: There are many new rules and regulations around safe use of public transport which passengers are expected to follow, and staff are expected to communicate and enforce. The need for staff training has never been more important to ensure that all PT users can travel safely, but due to the heightened needs of vulnerable users, communicating the new rules in an empathetic manner is essential. Future staff training for vulnerable users provides the opportunity to incorporate Covid-19 related guidance and responses suitable for different vulnerable user groups.

Source: BKK Budapesti Közlekedési Központ

3.3 BARCELONA Pilot Lab

Context / Intro: As part of the SUMP process, cities are being tasked with developing Mobility Management Plans (MMP) which bring together a package of measures tailored to the needs of a location that generates significant travel demand. For tourist sites and non-regular large-scale events, producing these MMPs is difficult as demand is continuously changing and the challenge in providing tailored public transport or other mobility services is that the location of the transport demand is not known in advance. A potential method for addressing this lack of information on demand to attend non-regular large-scale events is through analysis of social media data on 'conversations' relating to the event/tourist site. This case study investigates the reliability of utilising this generally unstructured data to plan more efficient travel options.

Objective: To improve access to social and cultural events for groups vulnerable to exclusion (particularly young adults/teenagers and women) due to a lack of available and safe transport options.

This was achieved through two initiatives:

1) extracting demand data for a large music and cultural event (Canet Rock) from mining social network (Twitter) content, and

2) utilising the resulting information to feed into the design of commercially viable bus routes from peri-urban and rural areas of Barcelona region to the event held overnight on the peri-urban fringe of Barcelona, in Canet de Mar.

Target users: The target groups for the case study were those vulnerable to exclusion from the event due to a lack of transport options, particularly young persons and women living in peri-urban and rural areas.

Contact: Eva Romagosa, Co-founder & Chief Innovation Officer, BusUp eva@busup.com

Other info: https://canetrock.busup.com/home

GENERATING DEMAND RESPONSIVE COLLECTIVE BUS ROUTES FROM SOCIAL NETWORK DATA ANALYSIS

Area Type	Peri-Urban + Rural
Main Actors	BusUp – Private Sector bus operator
	MOSAIC – Private sector technology company
Delivery	Private Sector (commercial)

The majority of the existing BusUp routes serving the festival (developed through traditional demand estimation based on population and previous attendance) are serving more densely populated urban areas.

Demand estimation from Twitter data resulted in identifying peri-urban and more rural areas with lower population but where there is relatively high demand to attend the event. This is a notable finding for the INCLUSION project where the objective is to improve access to the event for vulnerable users and from peri-urban and more rural areas.

- Ultimately 11 new BusUp routes from peri-urban and rural areas were established and delivered as a result of the Twitter data analysis. These attracted enough bookings to make the services commercially viable, providing improved access to around 450 new users (a 37% increase on the previous year).

- BusUp service was very popular with female festival goers (in total, 84% of BusUp users were female compared to 49% of non BusUp users) and younger festival goers (78% of BusUp users were under 24 compared to 67% of non BusUp users). Interestingly while 42% of BusUp users were under 18, only 10% of non BusUp users were under 18, suggesting that the BusUp service is enhancing opportunities and empowering young people and women to attend the event.

- Of the 13.9% of BusUp users stating they couldn't have attended without BusUp, 58% of these were under 18 again illustrating the heightened benefits for this group.

- 60% of those using BusUp who had attended previous Canet Rock festivals, had previously travelled by car and changed to BusUp. A further 37% previously used train. However,

inclusion

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

satisfaction with train use is rated much worse than for BusUp especially amongst female and younger travellers.

The social media data analysis approach will be refined, and improved marketing and communication established through the event organiser is planned for the next Canet Rock festival in June 2021.

Source: https://canetrock.busup.com/home

Transferability and lessons learned

The additional knowledge gained from Social Media (Twitter) data has enabled planners to identify locations in less densely populated areas where there is still sufficient demand to deliver commercially viable collective bus services to large scale events.

Practitioners should be aware that the transferability of this approach to other scenarios needs to be considered carefully. Three characteristics of this example were important factors in contributing to its successful application:

1. Gaps in knowledge of demand: one-off or irregular large-scale travel demand generators such as events where attendees are changing/not known in advance
2. Social Media active target groups
3. Shortage of suitable existing transport options for the target groups

Several aspects of the model used to mine twitter data could be further developed in future replications to improve the quality of data that is mined, as well as to increase the quantity and variability of the different datasets regarding tickets, demographic data, transport connectivity, etc. The dictionaries that were used for data scraping would greatly benefit from A.I. assistance.

There is a variable amount of uncertainty regarding the transparency, accessibility, and availability of personal data from social media platforms. In general, more localised festivals and events generate less activity online than international ones. There is a risk that not enough data can be mined from too few tweets. Additionally, the topic of data privacy continues to be explored and debated. Already there is a slowly growing trend to deny social media apps geolocation trackability.

In events which sell out early, such as Canet Rock, it is essential to channel market communications through the event organiser. For next editions of the event this aspect will continue to be key.

Covid-19: It is unclear at this stage how overall festival attendance and uptake of BusUp services to travel to the festival will be affected come July 2021. Communication and liaison with the event organiser will be necessary to ensure safe travel can be offered while remaining commercially viable.

Source: https://canetrock.busup.com/home

3.4 Cairngorms National Park (CNP) Pilot Lab

Context / Intro: Cairngorms National Park (CNP), located in the Scottish Highlands, is one of the most remote and rural regions in the UK. Although the local resident base is around 20,000, the area experiences more than one and a half million visitors per year for summer hiking and winter skiing. The rural nature and low resident population of the CNP area means that the demand from individuals for transport services is not sufficient for commercially viable operation from private sector providers.

To increase transport options in the area for both tourists and local residents an e-bike share scheme has been established at three hubs: in Aviemore and Grantown-on-Spey within CNP, as well as in Fort William to the South West of CNP. Through an innovative public private partnership between HITRANS, the regional transport authority, and existing local bike shops in these towns an affordable delivery mechanism is being tested.

Objective: The main aim of the e-bike share service is to promote active travel and increase active travel options in CNP. A long-term goal is for residents to cycle more and to purchase their own e-bike as a result of experiencing use through the e-bike share scheme.

Target users: The target groups are (active) elderly people, persons of reduced mobility, young adults and teenagers, local residents who suffer from fuel poverty due to high rural fuel costs, and tourists.

Contact: Jayne Golding, HITRANS **Projects and Policy Officer** jayne.golding@hitrans.org.uk

Other info: http://cairngorms.co.uk/

PUBLIC PRIVATE PARTNERSHIPS (PPP) TO DELIVER SHARED E-BIKES IN RURAL SCOTLAND

Area Type	Rural
Main Actors	HITRANS – Public Sector regional transport authority
	Local Bike shops - Private sector (commercial)
Delivery	Public-Private Partnership

For the public sector to set up and manage an e-bike sharing service in a rural area would require on-going day to day operational input and additional premises or infrastructure to establish hubs for hosting the service, needing significant additional budgets and staffing, both of which are very limited in rural areas. The solution that was delivered for CNP was to establish a public-private-partnership with existing local bike shops in the main towns of the CNP area. Through this partnership the public-sector partner (HITRANS in the CNP case) provided the financial support to purchase the e-bikes and then partnered with local bike shops that own suitable premises and employ office/admin/maintenance staff who can host and operate the service.

While there remains the requirement for some public-sector funding, the overall cost of delivering the service is significantly reduced compared to the cost of the public sector providing the service on its own. The private sector bike shop subsumes the operating cost of the bike hire within their existing premises and staff costs and only receive public sector payments to cover bike/vehicle maintenance costs. Their motivation is to increase the number of people cycling, who may then go on to purchase their own bike from the shop. The users of the hire service may also purchase cycle accessories from the shop.

The e-bike share service has empowered:
- more able old persons to enjoy active travel for health and leisure purposes (15% of resident users were over 65 and 20% were 56-65 years old);
- Over 65% of residents had never used an e-bike before, but all respondents stated they would use e-bikes again. Four resident e-bike users have purchased an e-bike since hiring;

- persons with certain mobility impairments or health conditions to aid recovery/maintain fitness; and
- younger persons and those suffering from transport poverty to access work by providing an affordable travel option that fosters independence.

The partnership arrangement will continue beyond the INCLUSION project end. All bike shops are keen to explore expansion and new customer segments.

Source: Mikes Bikes Shop, Aviemore

Transferability and lessons learned

- Public-private partnership with local bike shops provides a successful and cost-effective mechanism for delivering e-bike sharing schemes in rural areas.

- Public sector financing to purchase the e-bikes provides the leverage to ensure vulnerable users and locals can benefit from the scheme.

- Using local bike shops to host the service reduces operating costs, provides in-house maintenance, and increases promotion and engagement within the local community.

- Importantly, bike shops act as the local champion, continually promoting e-bikes within the community and establishing partnerships with local health service providers and local businesses (another advantage over a stand-alone on-street hire service). Bike shops engaged directly with local businesses and health sector providers to receive referrals for e-bike use related to target groups. E.g. Doctors' surgeries refer patients recovering from hip surgery or those with respiratory issues. The e-bikes provide an aid to recovery / treatment. Employers refer job seekers or workers who have difficulties accessing work (this could be due to distance to travel and timing of shifts).

- Generating revenue from tourist use provides an opportunity to cross-subsidise discounted local hires but there may be conflicting demand between tourists and residents for e-bike hire during summer/tourist high season. Setting aside a small number of e-bikes for local only use is being considered. The optimum number of e-bikes and the balance between tourist and local use to create a financially sustainable model of delivery has still to be established.

- Short term hires are good for tourist, leisure and health/fitness related trips. Longer term hire of several weeks are better for accessing work and can help young people or unemployed access job or training opportunities for the duration of a course or until they can afford to purchase their own form of transport.

Covid-19: Because the e-bikes are a shared public resource they have been made available to key workers in the area (police, health service, supermarket staff) to get to and from work during the lockdown. This is especially important while public transport services have been reduced or curtailed.

In the recovery from Covid-19, the e-bike share service, in terms of health protection, offers a much safer form of transport than collective travel options and will be an increasingly valuable part of rural mobility and a key transport supply option within Mobility as a Service solutions.

3.5 FLORENCE – Campi Bisenzio Pilot Lab

Context / Intro: Campi Bisenzio municipality is a peripheral zone 13km North-West of Florence city centre with many tenements inhabited by migrants and also social care centres. Migrants and modest income groups represent a large segment of public transport service users. The main bus route serving the area (line number 30/35) was structured based on historical data without any particular attention given to the changing and specific needs of the fast growing migrant user segment. A new tram line was opened on 23rd February 2019 connecting the edge of the area with Florence city centre. This pilot study involved redesign of the routes to connect with the tram line and better respond to the demands of the migrant population. This was combined with provision of information, including provision of on-board information monitors and a mobility app tailored to the needs of migrant users. In addition to this, crowdsourced user feedback by migrants on the operated service can be collected through the app.

Objective: The main objective was to improve access to public transport in the area close to line 30/35 for migrants and provide a better direct connection from the bus to the recently opened tram line.

Target users: Migrants and low-income people

Contact: Erika Ferretti, Busitalia
e.ferretti@fsbusitalia.it

Other info: http://www.fsbusitalia.it/

IMPROVING BUS SERVICES FOR MIGRANTS IN DEPRIVED CAMPI BISENZIO AREA IN NORTHERN FLORENCE

Area Type	Peri-Urban
Main Actors	AFAF – Public Sector metropolitan transport authority of Florence
	Busitalia – Private Sector (public funded) bus operator
Delivery	Public Sector

This involved the redesign of the route of bus line 30/35 including addition of two new bus stops and a new timetable to provide a better direct connection from the bus to the recently opened tram line. Additionally, the information provided to passengers was tailored to better meet migrant needs and capabilities through additional on-bus information panels and simplified journey planning app information.

- The redesign of the line 30 bus service to connect to the new tramline has resulted in a significant increase in passenger numbers, including a significant increase in migrant users (+84% increase).

- Almost half of migrant trips in the morning peak now involve some form of connection (35% to tram and 18% to other bus services) at the new bus stops. Before the redesign, the walking distance from the nearest bus stop to tramway bus stop was 700m (approximately a 9-minute walk). Following the redesign, the walking distance from the nearest bus stop to tramway bus stop is 270 m (3-minute walk) in one direction and 150m (2-minute walk) in the other.

- Overall satisfaction with the public transport service amongst line 30/35 users has increased with 18% more passengers stating they are satisfied or very satisfied with the new service. It is likely that about 10% of this increase can be attributed to the enhanced information provision.

Co-design workshops and focus groups involving all stakeholders involved in the solution were viewed as an essential component of the success of this measure. The participation of users' association can facilitate the contact with the target users and produce a "multiplying effect" for promotion and communication to more target users. Cultural considerations should also be taken into account during any participatory process with people with a migrant background. Safety was revealed as an overarching issue both at the bus stop and onboard. People with a migrant background tend to feel marginalised by their fellow passengers and also by the drivers. Properly catering for the needs of migrant users, captured in co-design sessions, takes time and adds cost to the development, but it is necessary.

inclusion

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

Busitalia/AFAT aims to further develop this process based on focus group and co-design in other suburban and peri-urban areas close to Florence, in order to improve the accessibility and inclusivity of other lines in areas where low-income and vulnerable people live

Source: Busitalia

Transferability and lessons learned

The re-design of line 30 was possible to implement once the local and regional authorities gave their approval. These decision-making bodies were mainly convinced due to this measure's alignment with their goal to increase ridership, thereby increasing fare revenue. It is therefore likely that similar measures implemented in other rural and deprived urban areas that benefit vulnerable user groups could boost their chances of receiving funding and approval from local and regional authorities by promoting their business case (i.e. better service attracts more riders and therefore increased fare revenue).

Information communicated to migrants needs to be kept simple by using icons and images and avoiding lengthy text wherever possible. Understanding where they are in the city and what ticketing options and rules apply were identified as the most useful information to assist them in using the bus service.

Information provided through cartoon videos displayed on the on-board panels were found particularly effective: the information was clear, and the message correctly understood. The use of this tool could be further enhanced to convey more information on the desired behaviour to have on board the bus (e.g. leave the seat to persons with reduced mobility (elderly, persons with disabilities or pregnant women) or speak with low voices, get in the bus at the front door and alight at the central/rear door, etc.).

The testing procedure of the demo version of the ATAF app with the direct involvement of a group of

target users representatives rather than just the involvement of the design and contracting people, proved to be a successful step in the process of the app restyling and overall improvement.

Source: Busitalia

The newly implemented functionality of the feedback survey through the new ATAF app was appreciated by migrants as it gives them the possibility to anonymously express their opinions on the bus service, thus increasing their feeling of integration and motivation to use the bus service.

The new ATAF app functionality to collect crowdsourced users' feedback on the operated service offers a low cost means of helping identify possible gaps in the service provision or other specific users' requirements that need to be further explored.

Covid-19: In the recovery from Covid-19, opportunities for the new ATAF travel information app relate to sharing information with passengers on the crowding levels of PT services, information about next service arrival times if a vehicle is crowded, and alternative travel options such as bike hire. Through the in-app passenger feedback functionality, passengers can report instances where safety and hygiene protocols are not being adhered to and notify providers and authorities where more capacity is required.

3.6 FLORENCE – **San Piero a Sieve** Pilot Lab

Context / Intro: San Piero a Sieve is a rural area located in the centre of the Mugello area on the northern boundaries of the metropolitan conurbation and 30km from the Florence city centre.

The measure involved redesigning the bus routes around the railway station in San Piero a Sieve to improve interchanges for intermodal journeys into the city of Florence and, related to this, improving the quality of information made available to public transport users especially relating to connected journeys.

Objective: The main objectives were to improve the connectivity between different bus lines and the intramodality between bus and rail services, and to improve the quality of the user information on the bus and rail services in the rural area of S. Piero to rural commuters.

Target users: The vulnerable to exclusion users in this area are rural commuters, especially young adults and those on low income.

Contact: Erika Ferretti, Busitalia
e.ferretti@fsbusitalia.it

Other info: http://www.fsbusitalia.it/
http://www.ataf.net/

IMPROVING BUS SERVICES FOR RURAL DWELLERS IN THE MUGELLO AREA TO THE WEST OF FLORENCE
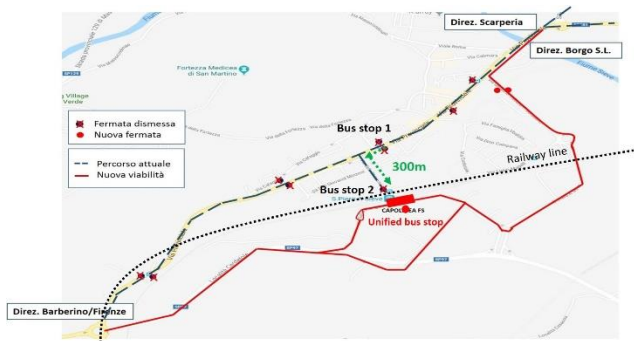
Area Type	Rural
Main Actors	AFAF – Public Sector metropolitan transport authority of Florence
	Busitalia – Private Sector (public funded) bus operator
Delivery	Public Sector

The redesign of the bus lines 320/303 involved changing the paths of the bus routes around the railway station and moving 2 bus stops to provide direct access to the railway station. After the re-organisation all bus lines were unified to stop at a consolidated interchange hub giving all bus lines direct access to the main entrance of the railway station and significantly reducing the walk distance required to make a connection. Not only did this improve the interconnection between bus and train, it also made bus to bus connections much easier. This included installation of a smart pole at the interchange hub from which people can get the real transit time and other relevant PT information. Additional to this, the ATAF journey planning app was enhanced through incorporation of train timetable information in the app and improved identification of multimodal journey options. Functionality was also added to capture user feedback through the app in the form of an in-app feedback form/survey.

- The redesign of bus lines 302/303 to establish a unified connection hub enabling better interchange between buses and with the train service resulted in an almost 8% increase in bus trips.

- The proportion of passengers on line 302/303 making connected journeys increased from 11% to 20%.

- The number of passengers stating they were satisfied or very satisfied with the PT services in general in the area increased by over 15%.

- The satisfaction with quality of information increased substantially with the launch of the new ATAF app which provided improved intermodal information and real time train information. The number of passengers stating they were satisfied or very satisfied with the quality of information increased by 75% from 47% to 84%.

While this measure improved the "physical" integration between the bus and rail services, further efforts will be made to also improve the "virtual" integration. Busitalia aims to continue in this direction by identifying the real-time datasets needing to be aggregated / integrated for the provision of dynamic multi-operator information at bus stops and info channels (especially the ATAF app).

www.inclusion.eu

inclusion

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

Source: Busitalia

crowded, and alternative travel options such as bike hire. Through the in-app passenger feedback functionality, passengers can report instances where safety and hygiene protocols are not being adhered to and notify providers and authorities where more capacity is required.

Transferability and lessons learned

This pilot showed that the integration of different services is an essential factor, especially for those rural areas crossed by an important railway line. The possibility of shifting from bus to rail in a short time encourages use of public transport services and gives those without cars further possibilities of joining social activities. The solution of ensuring good connections among services is transferrable to rural areas where the last-mile part of the trip is covered by the conventional bus or active modes and the longer part is covered by the train.

The re-organisation of the bus routes and the transport hub in San Piero a Sieve aimed to improve the service provision for rural commuters. Further efforts could be made to understand whether there are additional transport or mobility needs that some other vulnerable users (such as elderly or people with reduced mobility) in San Piero a Sieve still have. The possibility of integrating a shared mobility service based on community-based transport service bus (or car) could be investigated and piloted. This would allow a better last-mile connection between the rail station and the dispersed dwellings and may be more suitable in some rural areas with large elderly populations.

The new ATAF app functionality to collect crowdsourced user feedback on the operated service offers a low cost means of helping identify possible gaps in the service provision or other specific users' requirements. This could inform aspects of more flexible service design.

Covid-19: In the recovery from Covid-19, opportunities for the new ATAF travel information app relate to sharing information with passengers on the crowding levels of PT services, information about next service arrival times if a vehicle is

![inclusion logo]

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

3.7 FLANDERS – MobiTwin app

Context / Intro: The Flanders pilot lab is led by Taxistop, a non-profit organisation focused on promoting and delivering mobility solutions that respond to people's needs and offer them alternative solutions to save time and money. They operate across Belgium, with much of their activity centred on the Flanders region. The Flanders area of Belgium provides a mixture of urban, peri-urban and rural geographies. A number of issues are currently affecting transport accessibility in the area for vulnerable groups of the population, such as infrequent public transport and a lack of door-to-door services.

Taxistop is the founder of the Less Mobile Stations (LMS) service where it provides door-to-door transport, provided by 2900 volunteer drivers, for 31,000 less mobile elderly people in Flanders. The members can call the station to book a trip at least two days in advance of travel. Within INCLUSION, Taxistop developed the MobiTwin app to offer a digital version of the LMS service which matches trip requests for door-to-door transport (in real-time) for older persons and those with mobility impairments with trip offers from volunteer drivers.

Objective: The main objectives were to:

1) introduce a new technology (real-time MobiTwin app) to elderly and disabled target groups to make leisure and social activities more accessible, provide a service that is more responsive to user needs and to provide for urgent trips;
2) make the workload more bearable for the employees of the Less Mobile Stations who are currently matching requested trips by calling volunteers (with the MobiTwin app, the matching happens automatically);
3) expand the LMS to more people with mobility issues (such as young people, or people in poverty) and increase the pool of volunteer drivers.

Target users: Older persons and those with mobility impairments who are vulnerable to exclusion from social activities due to a lack of transport.

Contact: Esen Köse, Projects autonomous, connected & inclusive mobility
esen.kose@taxistop.be

Other info: www.taxistop.be

MobiTwin app

Area Type	Urban; Peri-Urban; Rural
Main Actors	Taxistop – Community/not-for-profit mobility company
	Less Mobile Stations (LMS) – Public sector municipalities coordinating local volunteer car service
Delivery	Public-Community Partnership

Taxistop delivered the app at two LMS services (Ghent and Oudenaarde) where both driver and members had access to the app. Ghent has 189 members and 28 volunteer drivers, while Oudenaarde has 160 members and 22 volunteer drivers. Although the new MobiTwin app was developed and available for use during the demonstration phase, there were no actual successful uses of the app.

An in-depth investigation was conducted to understand what went wrong in the implementation and what lessons can be learned both for the MobiTwin app going forward and for more general application of technology solutions to certain vulnerable users.

- the LMS members do not need an instant booking capability – only 7% stated that they had any need for transport within the hour;
- LMS members will not use an app – only 13% stated that they would use new technology to organise their trips.

The main conclusion is that the solution needs to fit the abilities and speed of life of the target group. Ultimately the MobiTwin app was applied to solve a problem that wasn't experienced by the target user group and did so by introducing a technology that wasn't useable by the target user group. The focus for future enhancements should be around the benefits that the app can deliver to the volunteer drivers and LMS staff. Co-creation with these stakeholders to meet their needs and requirements is key.

inclusion

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

- Taxistop was very dependent on the LMS staff since they have direct contact with, and a very good insight into the needs and wishes of, volunteers and members. However, there was a lack of trust in technology from LMS staff. This stifled the uptake of the app by volunteers and members.
- The employees of the LMS have hesitated to introduce the app to their volunteers and members because it could decrease the contact with the users of the service which remains important for both social and practical purposes.
- Often there is a negotiation process between the passenger and LMS employees in order to find a match to drivers. This is more difficult to replicate in the MobiTwin app.
- Many of the target group within the demonstration were not digitally connected. The vast majority of the elderly target users are not sufficiently tech savvy to adopt this type of app.
- LMS providers need to retain their role as human intermediaries coordinating between elderly members seeking trips and volunteer drivers offering trips.

Source: Taxistop

Transferability and lessons learned

Ensuring the privacy of volunteer drivers is important. Several volunteers shared their concern on their privacy with the app. Currently, all the communication prior to the trip happens through the LMS employees. This gives volunteers a certain amount of privacy and distance in the face of members who get too attached to a driver. When a request occurs through the app, members and drivers have to share some information (such as a phone number), in case of emergency. This

can then result in unwelcome contact from the member at other times.

This target group often experiences situations that are considered 'normal' or 'easy-going', as complex or scary. This is why more in-depth insights on the mobility needs are necessary. One-on-one interviews are often the most suitable way to collect data from less mobile and elderly people. Creating a dialogue as early as possible can build up trust relationships with all stakeholders.

Co-creation can be a helpful tool to present new technologies to vulnerable target groups. By involving all stakeholders from the first step of creating new solutions and including them as a part of the creation, a stronger feeling of belonging and owning something can be created. This lesson sits perfectly with the principle of empowerment: involve the users and encourage them to come up with solutions in the process rather than creating solutions for them.

Opportunities for the app are likely to exist where there is a younger and more technology ready target group and for trips where instant response to requests is important. A critical mass of both drivers and users is required for the technology/matching to be effective. This will never be reached with the LMS members' target group but could be attainable with younger cohort of volunteers/passengers.

Covid-19: As the target group of elderly members are the most at risk from the virus there is reluctance and reservations from both volunteers and members to come into contact and share vehicles. This will remain even as official restrictions are relaxed; however, the greater need for home delivery of food and medicines to members' homes provides opportunities for repurposing of volunteers to provide this service. Although this is not currently supported by the MobiTwin app, it is a feature to consider in the future.

inclusion

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

3.8 FLANDERS – Olympus app for migrant jobseekers

Context / Intro: The Olympus Mobility app is an already existing Mobility as a Service (MaaS) app that is provided by employers to be used by their employees. The app covers the whole of the Flanders region and integrates all public transport options and bike sharing in one app. For the INCLUSION project, Taxistop worked with the Olympus app developers to simplify the interface and introduce some new functionalities/ features to allow its use by low income and migrant job seekers. The workplaces suited to migrant workers are often located in rural areas while many job seeking migrants live in the more urban areas. The PT journeys can be relatively long and expensive. A specific feature introduced was a personal mobility budget of €30, provided automatically through the app to approved migrant job seekers.

Objective: The main objective for the measure was to improve access to job opportunities for migrants through increased awareness and use of mobility solutions by (un)employed migrants (with low incomes).

Target users: Migrants vulnerable to exclusion from job opportunities due to lack of knowledge about, and ability to afford, transport.

Contact: Esen Köse, Projects autonomous, connected & inclusive mobility
esen.kose@taxistop.be

Other info: www.taxistop.be

OLYMPUS APP FOR MIGRANT JOBSEEKERS

Area Type	Urban; Peri-Urban; Rural
Main Actors	Taxistop – Community/not-for-profit mobility company
	STEP partnership- Public sector funded not-for-profit NGO's supporting migrant job seekers
	Olympus – Private sector technology developer
Delivery	Public-Private-Community Partnership

Training on the use of the app and the benefits it provides was conducted with 45 members of staff from organisations that support migrant jobseekers. Unfortunately, prior to the app launch a restructuring of the support organisations resulted in staff changes. Finding alternative support organisations and retraining new recruits delayed and limited the engagement between migrants and the Olympus app. This resulted in a much smaller cohort of 5 employees actively promoting the Olympus app from two organisations.

In total there were 20 downloads and 14 users of the app. Despite the low level of use of the app during the demonstration, there was still valuable feedback gained and many important lessons learned.

- Migrant users need extra one-to-one support, training and encouragement to become confident to use the technology. This is time consuming and labour intensive.

- Establishing and maintaining good relationships with the organisations that support vulnerable groups is essential when delivering a new technology measure.

- Where 'local champions' within the support organisations emerge, who are enthusiastic about the technology, uptake by the migrant target users was evident and the app was beneficial.

- While the €30 personal mobility budget added value in removing immediate cost barriers to migrants accessing job opportunities, it does not provide a long-term solution to making transport more affordable for migrant users. Through the demonstration, it became apparent that the VDAB (public employment service of Flanders) also had some discounts on public transport for jobseekers that were not included in the app. This barrier was turned into an opportunity by the Olympus Mobility app provider who collaborated with VDAB to include these discounts in the app.

- Although the app increased knowledge on how to get to job opportunities, other barriers in accessing opportunities, such as language and work experience, were more insurmountable.

Source: Taxistop

Transferability and lessons learned

The importance of one-on-one, in-depth conversations was highlighted. This can provide richer insights in the role transport plays in the lives of job-seeking migrants and other mobility needs. One-on-one interviews can also guarantee a feeling of safety when the users know that there is a human being behind the technology they can rely on.

Extra effort should be put into involving the target group as being a part of something bigger. This target group often feels left out of how things are decided for them instead of with them in society. Giving them a chance to participate in a co-design process can give them a voice and the feeling of being heard. This will most likely result in more dedication to get to know new technologies and also the willingness to use them.

New technology should also be made available without the need to own a smartphone. Although a large proportion of the target group owns a smartphone, often they don't have access to mobile data or the app is not compatible with their device. Furthermore, the process of accessing the technology must be kept as simple as possible. Interviews with migrant job seekers revealed that although some found the usability of the app acceptable, they encountered difficulties in downloading it and the process to login presented a barrier to use for some.

It should not be forgotten that a solution can be defined in several ways for this target group, which is not necessarily a new technology. Technology should be seen as something extra for support in addition to human interaction and not as a full replacement of it.

Source: https://www.its.be/member/Olympus

Covid-19: Covid-19 has also meant that fewer jobs are available, fewer jobseekers are travelling and fewer public transport services are available to use. The main difficulty being that the personal support required by migrants to locate potential opportunities has been unavailable during the Covid-19 lockdown.

In a general sense, the inclusion of bike-sharing services within the Olympus app gives migrant users information on safe modes of travel that they may be able to utilise if distances and locations are compatible. This may be potentially beneficial in some circumstances in the recovery from Covid-19 if sharing confined PT services is discouraged.

3.9 RHEIN SIEG – Improved access to public transport

Source: VRS GmbH

Context / Intro: The Rhein-Sieg district in Germany is a partly rural and partly peri-urban district 30km to the South-East of Cologne and 15km to the East of Bonn. It is an attractive region for families with young children because the real estate prices are lower than in Cologne or Bonn. The current public transport network provides connections to Cologne and Bonn via regional trains. The routes of the bus-lines within Rhein Sieg are not specific to the needs of young families but instead are designed to provide connections to reach the cities of Cologne or Bonn (largely for commuters). Therefore, the PT options for multi-purpose trips often taken by families with young children in the (peri) rural area are currently very limited.
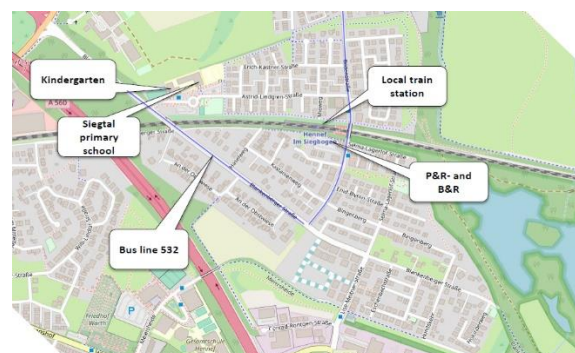
Focusing on one new housing estate (Hennef Im Siegbogen), in-depth surveys received from almost half of the 567 households identified a number of measures for better meeting the needs of the target groups

Objective: The main objective was to improve access to public transport in Hennef Im Siegbogen and attract new users to the bus.

Target users: Families with young children and teenagers

Contact: Bernd Knieling, Kommunikation Verkehrsverbund Rhein-Sieg GmbH
bernd.knieling@vrsinfo.de

Other info: http://www.vrsinfo.de

IMPROVED ACCESS TO PUBLIC TRANSPORT

Area Type	Peri-Urban
Main Actors	VRS – Public Sector regional public transport authority
	Rhein-Sieg-Kreis – Public Sector district municipality
Delivery	Public Sector

Improving access to public transport was addressed by increasing the service frequency on the bus serving Hennef Im Siegbogen (line 532) between 4pm and 7pm from 1 service per hour to 2 services per hour. In parallel to this, single bus fares were reduced by 20%.

Main impacts based on before and after surveys with around 40% of the residents of Hennef Im Siegbogen:

- There has been notable increase in regular accompanied trips by bus, especially to primary school (16% increase).

- The proportion accompanying their children by car to primary school decreased from 35% to 21%.

- The proportion of accompanied children using the bus at least once a week has increased from 19% to 22% for all respondents. For those stating they used the increased frequency measure, the proportion of accompanied children using the bus at least once a week increases to 33%; suggesting the measure is a significant factor in this increase.

- There has been notable increase in unaccompanied children travelling by bus at least once a week (40% increase).

- There has been a marked decrease in the percentage of respondents who said they never used PT (from 16% to 11%) and an increase in infrequent PT users (from 8% to 16%).

While it is difficult to be certain that these changes have been a result of the INCLUSION measures, the data is based on a large sample and the reported level of use of the measures gives credence to them being a plausible contributor to the improvements reported.

- There was a 25% increase in satisfaction with the general mobility offer amongst those who used the increased bus frequency measure and a 23% increase in satisfaction amongst those who used the reduced bus fare measure.

The additional costs arising from the enhanced travel offer on bus line 532 are covered by the responsible public sector body, the Rhein-Sieg-Kreis, and are not limited in time. This ensures that the offer can be maintained in the future.
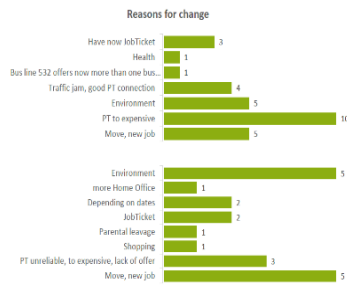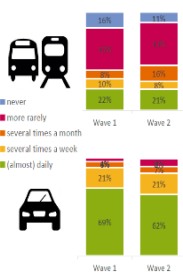
Source: VRS GmbH

Transferability and lessons learned

Key to the success of the measures has been establishing a comprehensive understanding of the needs of the target users prior to designing the interventions. The 'before' survey, with a response rate of 44% of the population, identified the shortcomings in the existing mobility offer for the target groups.

Based on the VRS experience, it generally takes around 12 to 24 months to establish a new or extended offer in PT, partly depending on the scope of the communication measures. The time frame of the INCLUSION project did not allow for this length of demonstration period before evaluation and so the results may be underestimating the longer-term impact of the measures. Better promotion of the measures and a longer demonstration period would be likely to improve the awareness of the measures, which was relatively low at 23% for increased frequency and 16% for reduced single fare. The awareness-to-use ratio is high in both measures (70% and 80% respectively) suggesting the marketing may have reached those most likely to use the measure.

Both measures will continue to be implemented after the INCLUSION project ends and once Covid-19 restrictions allow. The longer-term operation will provide more robust understanding of the full potential and impacts provided by these measures.

Covid-19: On relaxation from Covid-19 it is very likely that use of bus services will be perceived to create an augmented health risk and therefore will be avoided where possible. As the measures introduced were aimed at encouraging more bus use by infrequent bus users, for mainly non-essential trip purposes, it is probable that these trips will be avoided or only made by using a different, safer mode.

Nevertheless, the more frequent a time schedule the more bus capacity is created hence these bus services can be less crowded for those that have no alternative but to use them.

3.10 RHEIN SIEG – Promoting cycle use

Source: VRS GmbH

Context / Intro: In depth surveys with 40% of the 567 households within the Hennef Im Siegbogen housing estate identified a lack of information, at least among some users, about the existing offers for cycling in the peri-urban area of Hennef, both with regard to the existence of individual routes and offers and the quality or condition of the respective offer. In order to counteract this deficit, a physical mobility map was developed in which all relevant mobility offers are bundled both cartographically and with further explanations and links. Cycle facilities and routes, including 'forgotten paths' for cycling featured prominently in this map. In addition to this, a small scale trial of an e-bike rental service was introduced.

Objective: The main objective was to improve usage of bikes (and e-bikes) in Hennef Im Siegbogen.

Target users: Families with young children and teenagers

Contact: Bernd Knieling, Kommunikation Verkehrsverbund Rhein-Sieg GmbH
bernd.knieling@vrsinfo.de

Other info: http://www.vrsinfo.de

PROMOTING CYCLE USE

Area Type	Peri-Urban
Main Actors	VRS – Public Sector regional public transport authority
	Tourist information office – Public Sector
Delivery	Public Sector

The Mobil-in-Hennef map was distributed to all households in the area.
- Overall, there has been an increase in cycling trips of approximately 5%.
- Parents accompanying children by bike has increased for trips to primary school, sports activities and visiting friends.
- There was a 13% increase in satisfaction with the general mobility offer amongst those who used the Mobil-in-Hennef map.
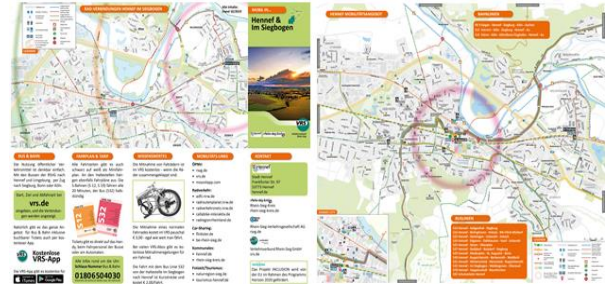
For the e-bike rental, two e-bikes (pedelecs) were rented from a local bicycle wholesaler for the period from June to October 2019. These could then be reserved by telephone or in person for one or up to four weeks through a simple booking process. The costs for the users amounted to €5 per week per bicycle. The delivery and return of the e-bikes to users was carried out via the tourist information office of the city of Hennef. All households in Hennef Im Siegbogen received a printed flyer with information promoting the e-bike hire measure.

Data relating to 82 e-bike trips showed e-bikes have been effective at replacing car trips for those using them - over half the trips by e-bike were previously made by car and a quarter were previously made by regular bike. 13% were new trips for leisure purposes.

These findings are based on a small number of users and trips and so should be viewed as an indication of the potential of the e-bike service rather than irrefutable evidence. A much larger sample of users will be required to substantiate the findings presented through this small-scale demonstration.

Transferability and lessons learned

Key to the success of the measures has been establishing a comprehensive understanding of the needs of the target users prior to designing the interventions.

The mobility map of Hennef provides a low-cost solution to increase awareness of sustainable and safe ways of travelling in Hennef.

The e-bike hire measure reduced operational costs by utilising the local tourist office to host the service. This was possible since the small scale and weekly hire placed limited additional demands on existing tourist office staff. For the short-term trial leasing rather than purchasing the e-bikes was the

most economic decision with maintenance included in the lease arrangement.

Trends show there is growing awareness and interest in e-bikes in the Hennef area, suggesting potential for expanding the scale of this measure. However, longer term delivery of an e-bike hire service at a larger scale would require a review of the leasing and hosting arrangement.

The potential of e-bikes as an essential means of transport for everyday journeys (and not as sports equipment) is far from exhausted. In this context, the combination of bicycle/e-bike and PT also offers great potential if access barriers such as use, borrowing, and general availability are as low as possible.

Covid-19: Public e-bikes offer a safe alternative to local bus for many citizens once the Covid-19 restrictions are relaxed. However, far higher availability of e-bikes would be required for this to be realised.

4 Cross-Site Assessment

In the previous sections describing the results obtained for each measure, consideration is given to transferability of and lessons learned from those specific measures. This section takes a broader view on transferability by presenting results from cross-site assessment to highlight factors that provide common drivers or barriers to the successful delivery of particular types of measure.

This analysis is built on assessment of the influence of the following set of 12 factors relevant to the successful planning, design, delivery or uptake of a measure[1].

- **Political / strategic**: e.g. political and/or strategic motives, extent of sustainable development agenda or vision, impacts of a local election, conflict between key (policy) stakeholders due to diverging beliefs in directions of solution

- **Institutional:** e.g. Impeding administrative structures, procedures and routines, impeding laws, rules, regulations and their application, hierarchical structure of organizations and programmes

- **Problem related:** e.g. Complexity of the problem(s) to be solved, lack of shared sense of urgency among key stakeholders

- **Involvement, communication:** e.g. extent of involvement or awareness of key (policy) stakeholders, types of consultation, involvement or awareness of citizens or users

- **Positional:** e.g. is measure part of wider city programme

- **Planning:** e.g. technical planning, establishing user requirements, insufficient economic planning and market analysis to determine requirements for measure implementation

- **Organizational:** e.g. importance of partnership arrangements, importance of leadership and know-how of key persons responsible for the measures

- **Financial:** e.g. dependency on public funds and subsidies, other sources of funding

- **Technological:** e.g. technological issues or advantages from technology

- **Cultural:** e.g. cultural circumstances and life-style patterns

- **Social-Demographic barriers:** e.g. ability, willingness, personal feelings of target users.

- **Readiness level:** e.g. How advanced is the city with regards to capability and readiness for introducing the measure; for instance, if introducing a bikeshare measure does the city have good cycling infrastructure.

In the analysis each measure was assessed against the set of 12 factors by synthesizing the findings from both the impact and process evaluation as well as information from the implementation experiences. This provided identification of the factors that result in positive impacts (drivers) and the factors that present as main barriers that hindered or prevented successful delivery or uptake/use. Risks to be aware of associated with each factor were also identified and actions to mitigate these risks were described.

From this analysis a number of common traits for particular types of solution have been identified relating to key success factors and barriers for transferability.

The following table presents the main generalisable findings from this assessment, looking firstly at the overarching patterns and lessons learned associated with 5 key characteristics related to the solution. Section 4.1 then presents findings associated with the type of solutions combined with the actors involved in delivering the solution. Finally, Section 4.2 considers the forms of engagement required with different types of vulnerable users at both the design and delivery stages in order to mitigate the risk of unsuitable solutions and low uptake by the target users.

---

[1] These factors are recommended for use in transferability analysis within EC-funded projects (*reference:* CIVITAS WIKI: Applied Framework for Evaluation in CIVITAS PLUS II (2013). Online at https://civitas.eu/content/evaluation-civitas-evaluation-framework-plus-ii)

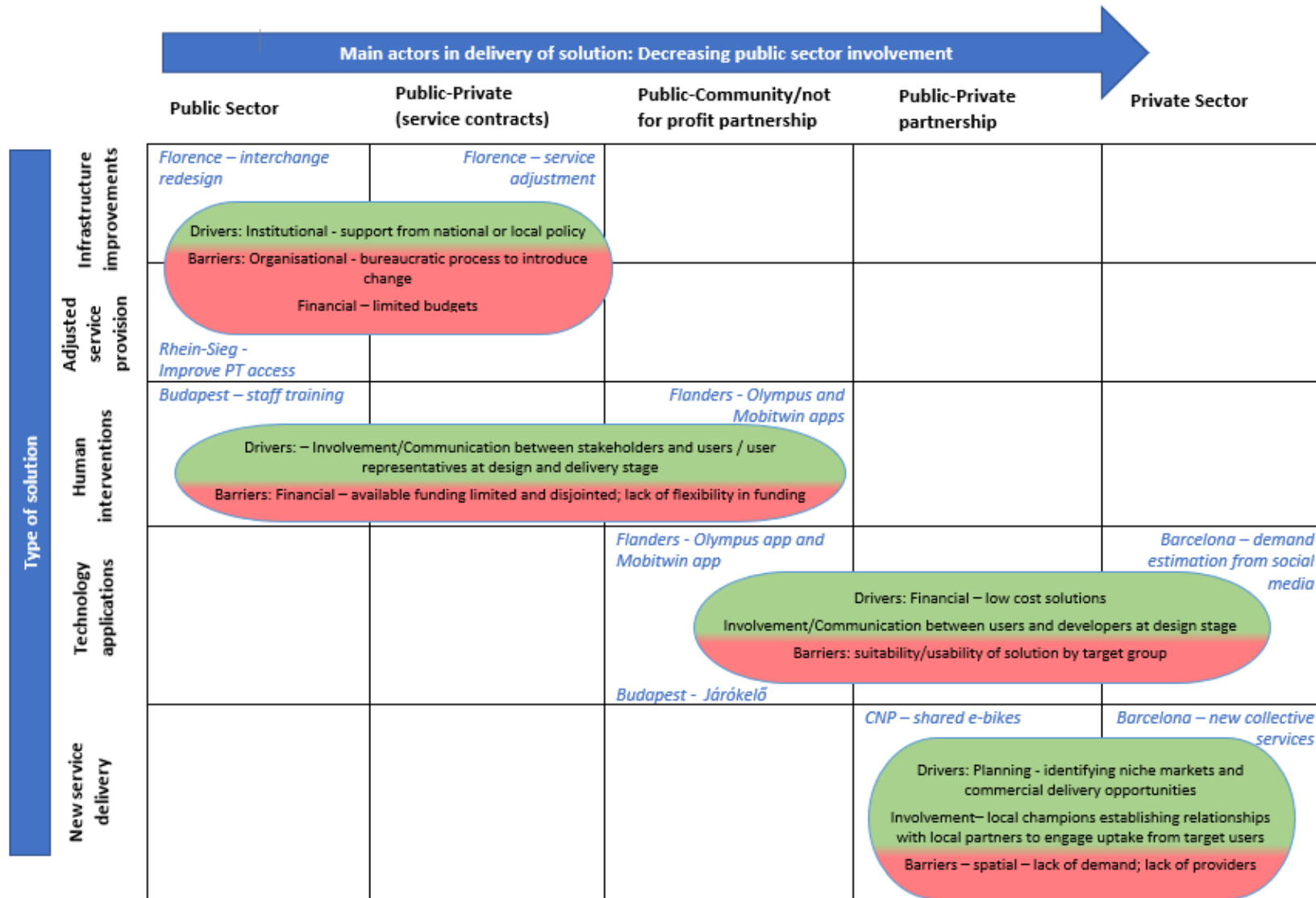| Institutional Context	Role of ICT usage	Stakeholder engagement Cooperation among actors	Communication and marketing	Trust building and active facilitation Understanding needs of target groups
• **Institutional:** Institutional contexts are the functioning environments in which measures were developed and carried out. • **Readiness level:** It is necessary to get involved with institutions that influence activities or funding as early as possible, even prior to the planning phase, ensuring that institutions (particularly public and regulatory institutions) have enough time to deal with bureaucratic protocols. • **Positional:** There is the need to have better alignment of national-level priorities and processes for local-level measures in rural areas to receive funding for measures that support those priorities. • **Strategic:** The national level can be more supportive of local initiatives, not only in terms of funding, but with labour, marketing, authorization and legitimising activities. • **Planning:** Identify structures that could exclude target groups from involvement in a measure. Future planners should reflect on their (and partnering) institutional norms and corporate cultures during planning phases to pre-empt institutional delays, sidestep uncooperative partners, and avoid "minds from changing". • **Organizational:** Overlook the structure that the coordinators sit in, or of trusted partners where existing relations are established, since they are both well-known and familiar. Corporate and individual identities can have much influence on PL activities, either positively when seen as a "innovative agents of change" or negatively when seen as a "disruptive rule-breakers".	• **Social demographic barrier:** To find the best ICT solutions to meet the needs of the target group, it is important to start from the needs and skills of the people who are part of the targeted vulnerable user group. • **Involvement:** Vulnerable users should be involved in co-designing the tool from the start, as the experience from the INCLUSION PLs shows that it can be significantly more challenging to, for example, retrofit an app to benefit a target group that was not taken into account in any way in the original design of the app. • **Planning:** If the target group tends to be technologically proficient, then it could be helpful to start with a personal consultation with a select group of people, working on building a personal relationship and co-designing a solution together with them. • **Problem related and technological:** Keep in mind the compatibility of apps with different smartphone operating systems. Minimise the data consumption of apps, as many of the vulnerable users have limited mobile data. Keep in mind that if your target group is a disability group, online platforms need to be accessible-friendly to them too. When using ICT to mine data from social media, the topic of data privacy continues to be explored and debated.	• **Political/strategic:** In cases where the success of a measure relied *entirely* on a local champion because resources were scare (i.e. lack of manpower and suitable regulatory contexts, or inaccessibility to stakeholders) individuals were overburdened with workload and quality of measures were limited. • **Planning:** Understanding of user needs *before* a measure is implemented is essential. • **Organisational:** Co-learning and co-creative processes with stakeholders is time-consuming; however, ensuring smooth and fruitful co-operative engagement has led to immeasurable usefulness and direct benefit of measure outcomes and outputs for the target users involved. Additionally, partnering with vulnerable-user-group associations, and using their networks to establish contact with other local ambassadors can also help to build trusting relationships with the target users directly. • **Involvement:** Facilitating a space to listen, guide, but also learn from users has been a definitive driver of INCLUSIONs measures. Encouraging stakeholder contributions and cooperation among actors requires recognising and making each person involved feel that they are part of wider change. • **Problem related and social demographic barrier:** Participants may be keen to give their feedback, but in a low-effort format. Written surveys may require too much time, or incentives, and could be replaced or complemented with, informal in-person interviews directly after engaging with the measure. • **Readiness level:** When it comes to introducing disruptive innovations, it was broadly found that city administrators did not always have the power they would have needed to implement a novel offer that required them to change their existing operations. It is advised that timing in one's approach is critical: the earlier the better.	• **Involvement, communication:** Targeted micro-level communication may be more successful than a general en-masse call, as it is personal and speaks directly to the potentially interested individuals. • **Financial:** Incentives work well to attract participants for focus groups and completing surveys, from vulnerable user groups during a planning phase to the general public after implementing a new offer. • **Organizational:** volunteers should also be involved in the co-creative process from the beginning, as they are key stakeholders in delivering this solution. • **Planning:** Direct communication with target users and marketing opportunities initiated during planning phases tend to have a great impact in terms of reach than broad-scale marketing later during implementation phases of a measure.	• **Cultural:** Building up a trust-based relationship with vulnerable users is a key driver for reaching often hard-to-reach groups for participatory processes. Building trust and confidence in one's self is also a key learning component for increasing capabilities to better deal with travel needs of vulnerable users such as people with reduced mobility. • **Organizational:** Make use of user associations that represent the vulnerable user groups, as well as local ambassadors from your target group(s). These actors can also act as mediators during focus groups. • **Involvement:** Involve the vulnerable users from the beginning, before a solution has already been designed. This encourages a co-creative process and ultimately a higher uptake of the mobility solution. • **Planning:** Maintain dialogue with the target groups throughout the design and implementation phases and ask for their knowledge and expertise instead of trying to sell them a solution they did not ask for and do not know much about. • **Communication:** Establish personal one-on-one relationships to build trust among stakeholders and the target users. • **Readiness level:** Allocate enough time to build trust relationships with stakeholders and users, especially when developing a solution that requires them to take up a new technology. • **Cultural:** Thoroughly understand the language proficiencies and preferences of people with a migrant background. This includes whether they prefer their native language, simplified local language or English, as well as their reading and writing proficiency in the local language. • **Technological:** create a solution that suits elderly people's speed of life; the mobility world is changing at a certain speed, but the world of elderly people is changing more slowly. It is key to focus on providing solutions that empower elderly people to have control over their mobility, while providing solutions that are familiar and within their comfort zone.

4.1 ACTORS and TYPES OF SOLUTION

Regarding the actors involved in the delivery of the measures, the factors that present as the main drivers and barriers are largely related to the types of service/solution being introduced. The drivers and barriers have been identified through a cross site assessment of the drivers, barriers and risks associated with a range of factors in each of the INCLUSION pilot lab measures. The figure below highlights the main types of drivers and barriers for different types of solution having different types of actor involvement in the delivery mechanism. It also illustrates the INCLUSION PL measures associated with the different solution type/actor combinations.

- For solutions that involve infrastructure improvements the main actors are public sector authorities responsible for the infrastructure (e.g. interchange hubs, stop locations, stop/station access); the main drivers relate to institutional support through local authorities delivering national or local policy; the main barriers relate to the cost of such changes and the limited financial budgets to implement improvements.

- For adjustments in existing conventional PT services operated by private sector providers under public sector service contracts, the main driver is again institutional support; the main barriers relate to organisational issues and in particular the bureaucratic process to introduce changes to contracts.

- Where human interventions form a significant part of the solution these tend to be delivered by the public sector or through partnership, often with community organisations using volunteers or through not-for-profit organisations that directly work with or support target users. The main drivers are the involvement and communication between the target users and these support organisations both at the design and delivery stages ensuring solutions are suited to the users' needs and capabilities. Financial barriers relate to limited and disjointed funding to support these initiatives and also a lack of flexibility and clarity in the rules around funding not-for-profit organisations and initiatives using community volunteers.

- Technology solutions that are specifically designed with attention to the needs of vulnerable user groups are typically developed by private sector technology companies. While there are some circumstances where these can be delivered on a fully commercial basis through user charges/subscriptions, in general, public private partnerships offer the best means of delivering these. Within the partnership, the public-sector shares data on services and user requirements and the private sector developers build and deliver the services to users for a fee paid by the public sector. It is also possible for not-for profit NGO's to provide the technology development rather than a private sector organisation. The main driver is the relatively low on-going operational costs; however, for successful solutions there needs to be strong involvement and communication between users and developers at the design stage. The main barrier relates to the suitability of the solution limiting uptake by the target group – hence the need for co-design in the planning and development stages.

Where new mobility services are to be delivered these are very often initiated and delivered by the private sector. The main drivers at the planning stage include identifying niche markets and commercial opportunities for service delivery. If a service cannot support full commercial viability, then there may be a case for a public private partnership arrangement whereby the public sector provides some of the funding to establish the service, which is then delivered and operated by the private sector partner. In such an arrangement, the overall cost of delivering the service is significantly reduced compared to the cost of the public sector providing the service on its own. Another key driver is private sector organisations establishing relationships with local partners to engage uptake from target users. This is motivated by a strong need to make a profit, or at least cover costs, and is often lacking in public sector operated services. The main barrier to success is a lack of demand in the area served. A barrier to implementation may be a lack of private sector providers located in the area.

Main actors in delivery of solution: Decreasing public sector involvement →

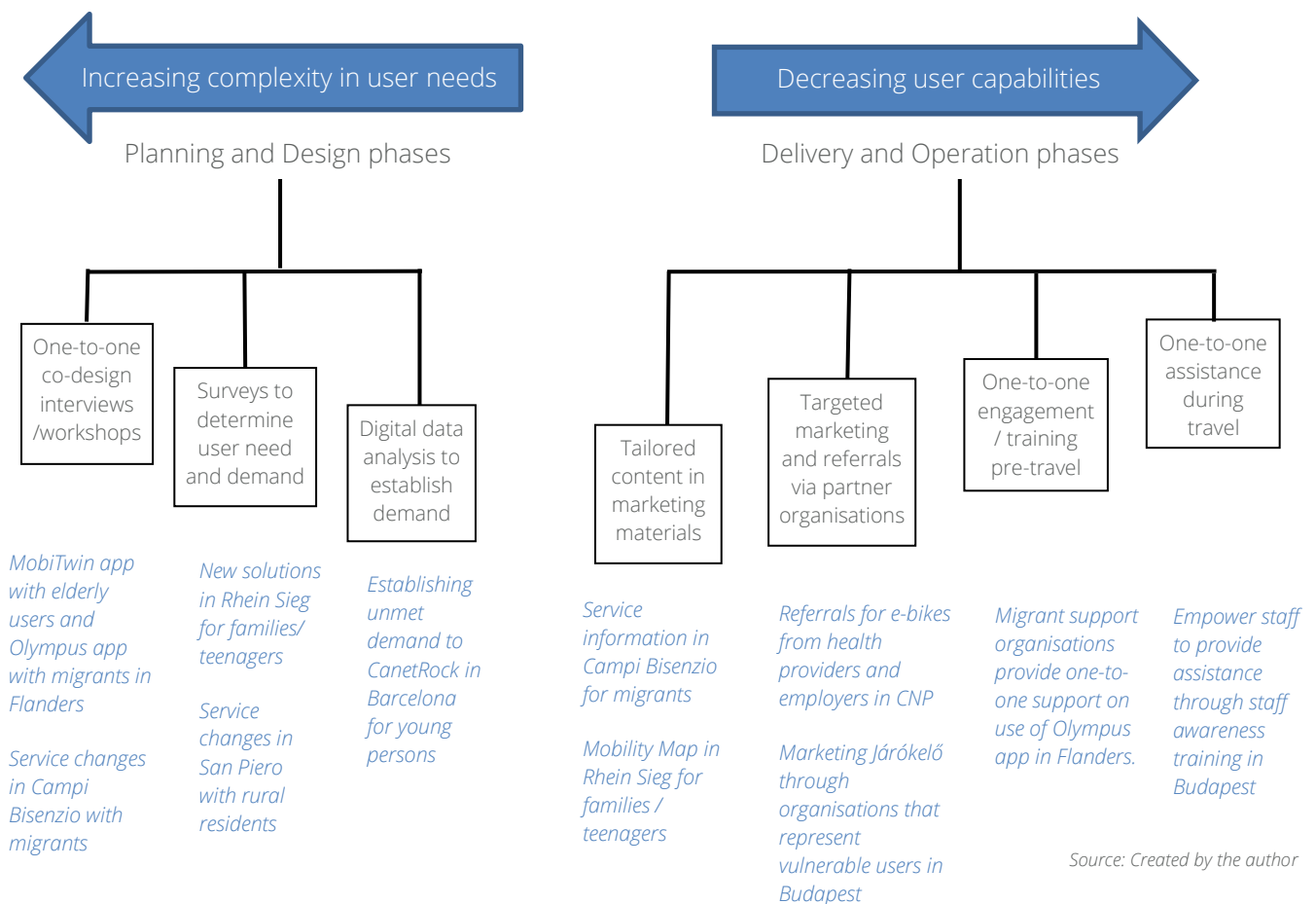| Type of solution	Public Sector	Public-Private (service contracts)	Public-Community/not for profit partnership	Public-Private partnership	Private Sector
Infrastructure improvements / Adjusted service provision	Florence – interchange redesign	Florence – service adjustment			
	Drivers: Institutional - support from national or local policy **Barriers: Organisational - bureaucratic process to introduce change** **Financial – limited budgets**				
	Rhein-Sieg - Improve PT access				
Human interventions	Budapest – staff training		Flanders - Olympus and Mobitwin apps		
	Drivers: – Involvement/Communication between stakeholders and users / user representatives at design and delivery stage **Barriers: Financial – available funding limited and disjointed; lack of flexibility in funding**				
Technology applications			Flanders - Olympus app and Mobitwin app		Barcelona – demand estimation from social media
				Drivers: Financial – low cost solutions **Involvement/Communication between users and developers at design stage** **Barriers: suitability/usability of solution by target group**	
			Budapest - Járókelő		
New service delivery				CNP – shared e-bikes	Barcelona – new collective services
				Drivers: Planning - identifying niche markets and commercial delivery opportunities **Involvement– local champions establishing relationships with local partners to engage uptake from target users** **Barriers – spatial – lack of demand; lack of providers**	

Source: Created by the author

4.2 USER ENGAGEMENT

From the user perspective, understanding vulnerable user needs and establishing user demand during the planning and design phases is essential for successful solutions. From the cross-case assessment of drivers, barriers and risks it is evident that the manner in which this can be undertaken varies according to the complexity of user needs. For users that have a range of complex needs it is essential to hold one-to-one interviews to fully comprehend the issues they faced and to involve them in the design process to ensure that solutions which are developed meet these needs and are useable. Where users have more straightforward needs, but where the current transport provision does not cater for these, then surveys can be a suitable means to determine what changes or new services are necessary to provide for them. In cases where a particular group is vulnerable to exclusion from a particular event or activity simply because of a lack of service provision, then analysis of digital data can be sufficient to identify where demand exists and is currently unmet.

When it comes to the delivery and operation of solutions, barriers to uptake and use increase with decreasing user capability to use the solution/service. If there are few barriers to understanding how to use a service, then providing tailored content in marketing and communication media may be sufficient for vulnerable users to become aware of and understand how to use a new or adapted solution/service. If solutions are developed for particular vulnerable target users benefit, then targeted marketing and referrals from partner organisations (e.g. local organisations supporting vulnerable users or who can identify and recommend suitable vulnerable users) can be a more effective means of reaching and engaging those users. If the capability of the vulnerable users to use the new or adapted solution/service is limited or requires further explanation, then one-to-one training with the vulnerable users prior to travel/use is recommended. Finally, vulnerable users with least capability to use services/solutions will need one-to-one assistance both prior to and during travel until confidence and familiarity is built up.

Source: Created by the author

inclusion

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

5 Conclusions for Transferability

The most successful measures are those where extensive demand analysis or user requirements work was undertaken and where co-design formed a key element of the process.

- It is essential to provide platforms or settings where vulnerable users' voices can be heard and quickly responded to.

- Properly catering for the needs of vulnerable users, captured in co-design sessions, takes time and adds cost to the development, but it is necessary.

- Co-design needs to include all stakeholders involved in the solution and not just the end users. This is especially important where technology may need to be used by representatives on behalf of end users (e.g. friends, family, community groups).

- Properly understanding the needs, wishes and capabilities of the target users avoids developing / delivering solutions that are not compatible with users' way and pace of life.

Building partnerships and providing one-to-one support are essential for increasing user awareness, confidence and capability, leading to greater uptake.

- Certain vulnerable user groups encounter social-demographic barriers to use of new solutions; e.g. elderly persons using technology solutions, migrants understanding information solutions, older persons lacking confidence to cycle. One-to-one support is essential to help vulnerable users overcome such barriers and to build trust.

- To maximise uptake and use by target vulnerable users, partnerships are necessary with local businesses and organisations who work with vulnerable users and can direct or refer suitable vulnerable users to the new mobility service.

- Local champions are essential, especially for solutions where extra support and building partnerships in the community are required (Bike shop owners, Migrant support workers).

ICT solutions can play an important role if the needs and skills of vulnerable people are fully comprehended.

- The use of ICT in mobility solutions that are targeted towards elderly users may be one step ahead of their needs and skills at present. For such groups, it could be more helpful to develop an ICT solution that is used to support the back-end operations of a mobility solution.

- ICT should not entirely replace the human element of delivering mobility solutions. This is especially critical for solutions that benefit socially excluded vulnerable user groups, as one of the main aims is to reduce social isolation. ICT should be there to streamline and supplement the human touch, thereby making it more convenient for the target group in question.

- Where ICT tools are developed for use by vulnerable users, they should be involved in co-designing the tool from the start. Not only does this ensure users' specific needs are accommodated in the solution, it also builds familiarity and trust in the technology.

The public sector has a role to play through financing, monitoring, assuring quality and safety.

- Public-Private Partnerships (or Public-Community Partnerships) often provide the best means of delivering solutions, where public sector funding initiates new services which can then be operated at a lower cost by private or not for profit organisations. The private sector or community organisation also increases promotion and engagement within the local community.

- The public sector funding provides the leverage to ensure vulnerable user needs are catered for and they can benefit from the schemes whilst safety and security of users (and their personal data) is enforced.

INCLUSION consortium

For further information

www.h2020-inclusion.eu

 @H2020_INCLUSION
#H2020INCLUSION

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

![inclusion logo]

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

APPENDIX A

There are a number of key indicators which broadly apply across measures and which address the common INCLUSION project objective to: *"Ensure accessible, inclusive and equitable conditions for all and especially vulnerable user categories"*. The following tables summarise the quantitative results from the impact evaluation of the pilot lab measures against the project level targets.

Project KPI: Change in no. of uses / trips by target groups

Indicator	Target	Site/measure	Target Users	Impact
Change in no. of uses / trips by target groups	25% increase in number of trips made using PT (conventional or alternative PT) services by vulnerable users	RHEIN SIEG: More frequent bus service	Families with young children	400% increase in number of trips using bus to primary school by children accompanied by parents
		BARCELONA: Demand responsive collective bus service	Young adults, teenagers, women	37% increase in BusUp ticket sales
		FLORENCE: Campi Bisenzio	Migrants	84% increase in bus trips by migrants on line 30
		FLORENCE: San Piero	People living in rural areas	7.7% increase in bus trips
	25% increase in number of trips involving transport connections to the PT network by target users at pilot lab sites (for measures where connected journeys are a desired outcome by users)	FLORENCE: Campi Bisenzio	Migrants	35% of migrant bus trips involved connection from bus to tram during morning peak. A further 18% made bus to bus connections
		FLORENCE: San Piero	People living in rural areas	82% increase in passengers who make a connection to other PT services
		CAIRNGORM NATIONAL PARK: e-bike share scheme	Tourists	27% of tourist users of e-bike scheme accessed CNP by train. This compares to the average of only 3% of tourists using PT to access CNP

Project KPI: Change in no. of users from target groups

Indicator	Target	Site/measure	Target Users	Impact
Change in no. of users from target groups	____	BUDAPEST Staff training + crowdsourced data platform	Physically disabled; Sensory disabled; Those with buggies	3.8% increase in vulnerable users using PT at least once per week
		RHEIN SIEG: More frequent bus service	Families with young children	16% increase in children accompanied by parents using bus at least once a week for regular trips. 40% increase in proportion of unaccompanied children using bus at least once a week 80% (net) of rare PT users increasing their bus use.
		RHEIN SIEG: Promoting cycle use	Families with young children	increase in children accompanied by parents cycling to activities: +57% to primary school +0% to secondary school +21% to sports activities +33% to social activities
		BARCELONA: Demand responsive collective bus service	Young adults, teenagers, women	BusUp users 70% more likely to be female than average festival attendees BusUp users 16% more likely to be aged under 24 than average festival attendees BusUp users 4 times more likely to be aged under 18 than average festival attendees
		CAIRNGORM NATIONAL PARK: e-bike share scheme	People living in rural areas; Elderly	65% of rural residents using e-bike had never used e-bike before. 15% of resident users were over 65 and 20% were 56-65 years old

Project KPI: Increase in access to services and activities

Indicator	Target	Site/measure	Target Users	Impact
Increase in access to services and activities (e.g. PT network / Social and Leisure activities / Work locations)	Increase type of transport services available to the public at pilot site	RHEIN SIEG: More frequent bus service	Families with young children	More frequent (+lower fare) bus service accessing school, kindergarten
		RHEIN SIEG: Promoting cycle use	Families with young children	58% of trips by hired e-bike replace car trips 41% of e-bike trips were to access work 33% to access leisure 20% to access shopping 6% of hired e-bike trips involved parents accompanying children – all of these trips were previously undertaken by car
		BARCELONA: Demand responsive collective bus service	Young adults, teenagers, women	46% increase in number of BusUp services accessing Canet Rock festival 13.9% of BusUp users couldn't have attended without BusUp 60% of BusUp users attending for the second time came by car in 2018
		CAIRNGORM NATIONAL PARK: e-bike share scheme	People living in rural areas; Elderly; Young persons without access to car	Shared e-bike service provided at 3 locations. For residents, leisure and health were the most commonly stated reason for use, with 17% using e-bike to access work.
		FLORENCE: Campi Bisenzio	Migrants	Improved bus to tram intermodal connections – approx. 500m reduction in walking interchange for trips accessing city centre employment and services

Project KPI: Change in satisfaction

Indicator	Target	Site/measure	Target Users	Impact
Change in satisfaction with general mobility provision and access to services and activities (e.g. PT network / Social and Leisure activities / Work locations)	40% increase in satisfaction with access to key services / opportunities for vulnerable users (at pilot site)	RHEIN SIEG: More frequent bus service	Families with young children	7.8% increase of people who are very satisfied or satisfied by mobility offers in Hennef Im Siegbogen
		BARCELONA: Demand responsive collective bus service	Young adults, teenagers, women	64% more women satisfied with BusUp compared to using train to access the event 31% more under 24's satisfied with BusUp compared to using train to access the event
		FLORENCE: Campi Bisenzio	Migrants	78% increase in passengers satisfied or very satisfied with PT offer.
		FLORENCE: San Piero	People living in rural areas	15.7% increase in passengers satisfied or very satisfied with PT offer
		BUDAPEST	Physically disabled; Sensory disabled; Those with buggies	24% increase in target group users who are satisfied or very satisfied
			Non-native language speakers	6.6% increase in tourists + foreigners who live in Budapest long term who are satisfied or very satisfied
Change in satisfaction with services and/or information on services (amongst those who used or experienced the new solutions)		RHEIN SIEG: More frequent bus service	Families with young children (survey with wider population)	38.5% increase of people who are very satisfied or satisfied with the general mobility offer amongst those who used the increased bus frequency measure
		RHEIN SIEG: Reduced bus fare		35.4% increase of people who are very satisfied or satisfied with the general mobility offer amongst those who used the lower bus fare
		RHEIN SIEG: Promoting cycle use		20% increase of people who are very satisfied or satisfied with the general mobility offer amongst those who used the Mobility map measure
		FLORENCE: San Piero	People living in rural areas	75% increase in passengers satisfied or very satisfied with quality of information provision
		FLORENCE: San Piero	People living in rural areas	111% increase in passengers making a connection who are 'very satisfied' with ease of making connection