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Transnational review of matching needs and
services for a comprehensive planning

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TABLE OF CONTENTS

1. Introduction	4
2. Pilot areas characteristics.....	5
3. Transport network	8
4. Mobility needs identified and addressed.....	12
4.1. Bologna.....	12
4.2. Gdynia.....	13
4.3. Prague.....	14
4.4. Murska Sobota	15
4.5. Budapest.....	16
4.6. East Tyrol.....	17
4.7. Transnational analysis of mobility needs.....	19
5. Pilot actions	24
6. A transnational strategy	26
7. References.....	28



1. Introduction

Remote regions in central Europe share the same risks and issues related to being at the periphery of main transport networks. Inadequate and under-used services, excessive costs, lack of last-mile services and proper intermodality, poor communication and information to users and car commuting are the challenges that many central European regions face.

The SMACKER project addresses those disparities to promote public transport and mobility services that are demand-responsive and that connect local and regional systems to main corridors and transport nodes.

Within SMACKER mobility issues related to peripheral and rural areas, and main barriers are assessed and addressed by providing solutions that draw on the best international know-how. SMACKER promotes demand-responsive transport services to connect local and regional systems to main transport corridors and nodes: soft measures (e.g. behaviour change campaigns) and hard measures (e.g. mobility service pilots) are used to identify and promote eco-friendly solutions for public transport in rural and peripheral areas to achieve more liveable and sustainable environments, better integration of the population to main corridors and better feeding services. SMACKER helps local communities to re-design their transport services according to user needs, through a coordinated co-design process between local/regional partners and stakeholders; SMACKERS also encourages the use of new transport services through motivating and incentivizing campaigns. The direct beneficiaries of the actions are residents, commuters and tourists.

Participation reflects the overall integration of citizens and groups in planning processes and policy decision-making and consequently the share of power. In particular, transport planning and transport relevant measures are often the subject of controversial discussions within the urban community. The concept of Sustainable Urban Mobility Planning has established the principle that the public should be included from the very beginning of the transport planning process and not only when the plans are largely completed and only minor amendments can be carried out. For that reason, public authorities need to open-up debate on this highly specialised and complex subject area and make participation a part of the planning process. In order to ensure participation throughout the process, development of an engagement strategy would be necessary.

In this deliverable, the results of the individual regional reports on matching needs and services for a comprehensive planning are assessed through a cross-analysis, to deliver analysis useful for training and planning at transnational level.

This deliverable is also the SMACKER Output O.T1.5 “1 Transnational Strategy for planning demand responsive/sustainable services in rural an urban-peripheral areas”.

Chapter 2 introduces the different pilot areas within the SMACKER project.

Chapter 3 compares the different networks of the pilot areas.

Chapter 4 summarizes the mobility needs in the different pilot areas and analysis the transnational aspects of these.

Chapter 5 compares the different pilot actions of the pilot areas and analysis the transnational aspects of these.

Chapter 6 derives a transnational dimension of the SMACKER actions and drafts a strategy on that.



2. Pilot areas characteristics

The pilot regions in the SMACKER project can be categorized into two groups (see Table 1 and Figure 1).

The pilot regions of Bologna, East Tyrol and Murska Sobota share similar spatial characteristics, as they are characterized by a predominantly rural character with rather dispersed settlements and a low population density. They also have similar characteristics in terms of transport options in the area, i.e. scarce accessibility of touristic sites by Public Transport (PT), and their focus on tourists as a target group of passengers. Murska Sobota focuses on commuters as well and Bologna focuses onto residents as well.

In contrast, the pilot regions Gdynia, Prague and Budapest have a rather dense, suburban character, with a higher density than the pilot regions mentioned above, but not as dense as in the city centres they are linked to. Pilot actions of Gdynia, Prague and Budapest are therefore more focused on commuters and residents with their pilot action.

All pilot regions have in common, is the level of public transportation that does not meet the mobility needs and is therefore insufficient and/or ineffective. Moreover, in all pilot regions the dominant mean of transport are private cars.

Table 1: Characteristics of pilot regions

Pilot area	Bologna	Gdynia	Prague	Murska Sobota	Budapest	East Tyrol
Pilot area [km ²]	816	25,53	70	209	36 ¹	2.020
Inhabitants [number; year]	55.488 (2018)	12.563 (2019)	36. 000 (2020)	25.540 (2020)	56.200 (2020)	48.753 (2018)
Population density [inhabitants/ km ²]	68	492	1.403	119,83	153 ¹	24,13
Population dynamics	Stagnant	Growth	Strong growth	Decreasing	Stagnant ¹	Decreasing
Topography	Mountainous of the metropolitan city of Bologna	Varied topography and landscape, a lot of agricultural land and greenareas	Rolling plains with valleys in the eastern part towards and along the river	Flat	One side flat, the other slightly hilly ¹	Mountainous
Spatial characteristic	<ul style="list-style-type: none"> ▪ Predominantly rural, wide scarcely populated ▪ Disperse settlements 	<ul style="list-style-type: none"> ▪ Suburban ▪ Largest district ▪ Chwarzno : single-family houses and blocks of flats 	<ul style="list-style-type: none"> ▪ Suburban ▪ Disperse settlements of various sizes ▪ Metropolitan area 	<ul style="list-style-type: none"> ▪ Predominantly rural ▪ Disperse settlements 	<ul style="list-style-type: none"> ▪ Suburban ▪ Low-density of population 	<ul style="list-style-type: none"> ▪ Disperse settlement ▪ Low % of permanent settlement area

¹ Stated numbers for Budapest refer to the zones covered by DRT line in July 2020



SMACKER

Pilot area	Bologna	Gdynia	Prague	Murska Sobota	Budapest	East Tyrol
	<ul style="list-style-type: none"> 12 small municipalities touristic profile (thermal sources, health spa, ski area etc) 	<ul style="list-style-type: none"> Wiczlino is an old village with a large area, but also extensive building - which is an area with a relatively small population 				
SMACKER-specific characteristics	<ul style="list-style-type: none"> Tourism > scarce accessibility of touristic sites by PT No PT service during off-peak hours 	<ul style="list-style-type: none"> Traffic safety Road congestion 	<ul style="list-style-type: none"> Regular commuters to/from city centre Environmental pollution 	<ul style="list-style-type: none"> Agriculture Tourism Commuters to/from neighbouring municipalities 	<ul style="list-style-type: none"> DRT bus line implemented Fixed bus line of low utilization 	<ul style="list-style-type: none"> No PT service during off-peak hours Tourism > scarce accessibility of touristic sites by PT Tourists interested in sustainable mobility Elderly resident asking for PT
Goals	<ul style="list-style-type: none"> Encourage last mile mobility between villages & touristic sites and among villages themselves 	<ul style="list-style-type: none"> Improve connectivity to city centre 	<ul style="list-style-type: none"> Offer improved sustainable mobility services/ level of service 	<ul style="list-style-type: none"> Offer sustainable and multimodal mobility for events/ touristic sites Improve user experience (Web-application) 	<ul style="list-style-type: none"> Transport passenger from lower density peripheral areas by DRT to core PT network of Budapest Improve user experience (Web- 	<ul style="list-style-type: none"> Offer sustainable mobility for tourists and residents Provide information about regional mobility offers Establishment of e-car-sharing



Pilot area	Bologna	Gdynia	Prague	Murska Sobota	Budapest	East Tyrol
					application)	
Level of public transport	<ul style="list-style-type: none"> Poor Mobility requests mostly uncovered 	<ul style="list-style-type: none"> Not sufficient 	<ul style="list-style-type: none"> Not adequate to rapid development 	<ul style="list-style-type: none"> Not sufficient Mobility needs covered unsatisfactory 	<ul style="list-style-type: none"> Not effective /comfortable DRT for users 	<ul style="list-style-type: none"> Not sufficient Mobility requests mostly uncovered
Dominant mean of transport	Private cars	Private cars	Private cars	Private cars	Private car & PT	Private cars

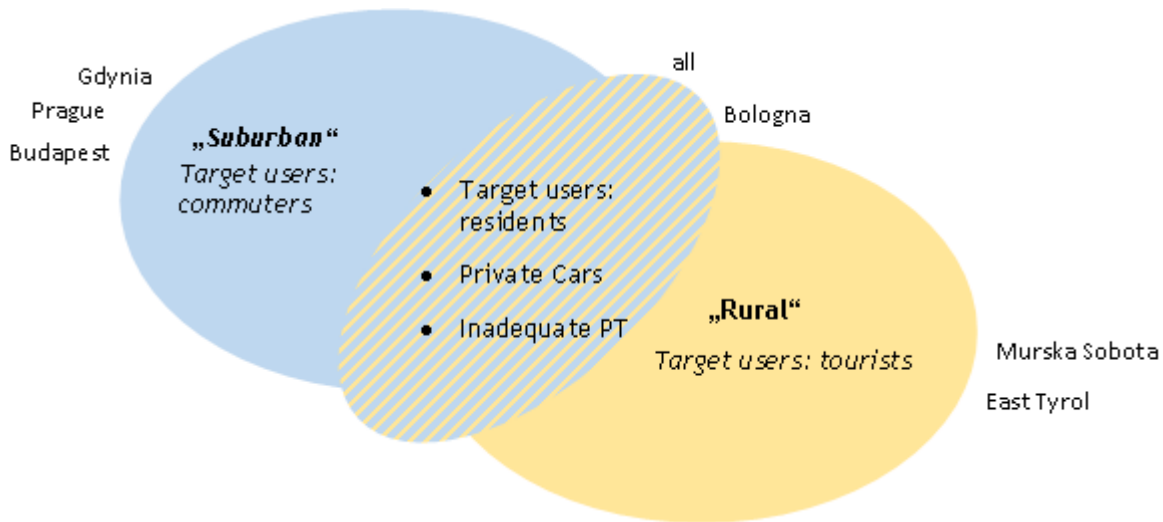


Figure 1: Types of pilot regions



3. Transport network

A common feature in all pilot regions but Gdynia is availability of a comprehensive to appropriate road network (Table 2). Only Budapest pilot area has a comprehensive rail network, Bologna and Murska Sobota pilot area an appropriate one, Prague and East Tyrol pilot areas an incomplete one and Gdynia pilot area does not have rail network.

Light rail/tram is not available in most pilot regions, with exception of Budapest, which can be traced back to the rural focus of the SMACKER project and trams are usually provided in rather densely populated environments.

This is summarized in the table below.

Table 2: Overview of availability of transport infrastructure networks in all pilot regions

AVAILABILITY OF TRANSPORT INFRASTRUCTURE					
TRANSPORT INFRASTRUCTURE	COMPREHENSIVE	APPROPRIATE	INCOMPLETE/LIMITED	NOT APPLICABLE	
Existing network	Roads	Murska Sobota	Bologna	Gdynia	
		Budapest	Prague		
		East Tyrol			
	Rail	Budapest	Bologna	Prague	Gdynia
			Murska Sobota	East Tyrol	
	Light rail/tram	Budapest			Bologna
					Gdynia
					Prague
					Murska Sobota
	Cycling paths				East Tyrol
			Bologna	Gdynia	
			Budapest	Prague	
				Murska Sobota	
				East Tyrol	
	Pavements		Murska Sobota	Bologna	
		Budapest	Gdynia		
			Prague		
			East Tyrol		

Gdynia pilot is focused on the existing network for it is rather incomplete (road, cycling path and pavements). Roads networks are the most comprehensive/ appropriate networks within the SMACKER pilot regions. Railway, cycling paths and pavements networks come in a second position, rather appropriate to incomplete. It can be concluded that the availability of transport network does not correlate with the „suburban“ or „rural“ character of the pilot regions, determined above.



Table 3: Overview of the quality of transport infrastructure in all pilot regions

Condition of infrastructure	TRANSPORT INFRASTRUCTURE ²	GOOD	ADEQUATE	POOR	NOT APPLICABLE
	Condition of infrastructure	Roads	Murska Sobota	Bologna	
East Tyrol			Gdynia		
			Prague		
Rail			Budapest		
		Bologna	Prague		Gdynia
		East Tyrol	Murska Sobota		
Light rail/tram			Budapest		
					Bologna
					Gdynia
					Prague
Cycling paths					Murska Sobota
		Gdynia	Murska Sobota	Prague	East Tyrol
			Budapest		Bologna
Pavements			East Tyrol		
			Bologna	Prague	
			Gdynia		
			Murska Sobota		
			Budapest		
		East Tyrol			

The condition of the transport infrastructure is overall adequate (Table 3), with the exception of Prague pilot area, where cycling paths and pavements are in poor condition. Gdynia stands out, as it is the only pilot region which provides good condition of cycling paths, although the network is incomplete (Table 2). As „rural“-typed pilot regions Bologna and East Tyrol (Figure 1) are the only pilot regions that provide rail in good condition.

² Legend: Good - infrastructure in optimal condition, no intervention needed; Adequate - infrastructure in average condition, interventions/maintenance needed; Poor - infrastructure in bad conditions, interventions needed.



Table 4: Overview of the density of transport stops in all pilot regions

DENSITY OF PUBLIC TRANSPORT INFRASTRUCTURE						
	TRANSPORT INFRASTRUCTURE	GOOD	ADEQUATE	POOR	NOT APPLICABLE	
Density of transport stops / stations	Bus	Gdynia	Bologna			
		Prague	Murska Sobota			
		Budapest	East Tyrol			
	Rail			Bologna	East Tyrol	Gdynia
				Prague		
				Murska Sobota		
				Budapest		
	Light rail/tram	Budapest				Bologna
						Gdynia
						Prague
						Murska Sobota
						East Tyrol

The density of bus and rail stops is adequate to appropriate in all SMACKER regions. Pilot regions classified as „rural“ (Figure 1) offer less dense networks of bus stops. The rather suburban pilot regions do provide good density of transport stops. Where rail stations are available the density is good, except for East Tyrol, which might be traced by to the special spatial characteristic of alpine topography that puts restrictions on the supply with rail stations.

Table 5: Overview of the availability of mobility services in all pilot regions

AVAILABILITY OF MOBILITY SERVICES						
	MOBILITY SERVICES	AVAILABLE	PLANNED	UNDER CONSIDERATION	NOT APPLICABLE	
Existing or planned mobility services	Bus	Bologna		Gdynia		
		Prague				
		Murska Sobota				
		Budapest				
	Rail	Bologna				Gdynia
		Prague				
		Murska Sobota				
		Budapest	Budapest			
	Light rail/tram	Budapest	Prague			Bologna
						Gdynia
						Murska Sobota
	Car sharing	Gdynia				Bologna
		Prague				
		Murska Sobota				
		Budapest				
	Bike sharing	Gdynia			Prague	Bologna
		Murska Sobota				
		Budapest				
	Park and ride	Bologna			Gdynia	
		Budapest	Prague		Murska Sobota	
e-scooter sharing	Gdynia			Prague	Bologna	
	Budapest			Murska Sobota		



The mobility services „bus“ and „rail“ are available in all pilot regions but Gdynia, where bus service implementation is under consideration (see Table 5). „Light rail/Tram“ is not available in almost all pilot regions, except in „suburban“ regions like Budapest and Prague. „Car sharing“ is available in almost all pilot regions except Bologna, which correlates with good road network and road infrastructure. „Park and Ride“ is available in some pilot regions, while in others it is under consideration with possibility of implementation on the short or midterm. The same applies to “e-scooter” sharing: the „suburban“ pilot regions like Gdynia and Budapest already offer this service, as it is a rather urban phenomenon at this time.

Conclusions regarding the transport network

Some overall conclusions can be drafted about the transport networks in the SMACKER pilot regions. Good to adequate road network (except for Gdynia) correlates with good to adequate condition of the roads and a good to adequate density of bus stops. Overall, the pilot regions offer mobility services focussed on road infrastructure. Rail services are available as well. The network and the conditions of the network for cycling and walking show some potential to be improved in all pilot regions as well as the density of rail stops.



4. Mobility needs identified and addressed

4.1. Bologna

In Bologna pilot area following mobility needs and issues were identified [5]:

- a) The intermodality bus+train in the Bologna Apennine area must be improved, exploiting train services offered on the rail lines (TEN-T corridors) Bologna-Pistoia and Bologna-Firenze.
- b) The night public transport service should be improved, particularly in summertime.
- c) The DRT booking procedure should be facilitated, allowing to implement it both by an app and a call centre.
- d) Accessibility to DRT services for elderly people (mainly in terms of improved accessibility to new technologies).
- e) Improvement of the DRT services communication to final users through tourist points and dedicated campaigns.
- f) Improve the accessibility by public transport to trekking, hiking and mountain biking pathways.
- g) DRT service should give the possibility of carrying bikes and mountain bikes on the bus.
- h) Improve the tourist accessibility of the pilot area relying on an improved DRT service.

Identified mobility needs were matched with pilot activities and are shown in Table 6 below. SMACKER activities address needs related to DRT improvements, as well as needs related to promotion and accessibility. As project activities cannot address all needs of pilot area some of them remain out of SMACKER intervention (such as night DRT services).

Table 6: Correlation between identified mobility needs and Bologna pilot area [5]

Mobility needs (as identified in pilot region)	SMACKER pilot action's interventions in relation to specific mobility need.	Correlation of pilot with identified needs (low / medium / high)
a) Intermodality promotion	The pilot foreseen an integration of the DRT bus services with the trains serving the Bologna Apennines area (Grizzana, San Benedetto Val di Sambro, Riola, Marzabotto and Porretta Terme train stations).	High
b) Night DRT services	/	Low
c) Facilitation DRT booking services	The pilot foresees the launch of a dedicated app for the DRT service booking, a telephone booking service and the possibility to book bus trips with shorter advance.	High
d) Elderly accessibility	The telephone booking service via the traditional call-centre foreseen in the pilot is thought for elderly people with low technological skills.	High
e) Communication improvements	The pilot foresees the launch of a dedicated app allowing a better communication of the existing DRT services both for residents and tourists.	High
f) DRT accessibility improvement	The pilot foresees an increase of the number of stops and of the road network covered by the improved DRT service. Moreover, the pilot	High



Mobility needs (as identified in pilot region)	SMACKER pilot action's interventions in relation to specific mobility need.	Correlation of pilot with identified needs (low / medium / high)
	foresees specific measures aimed to improve the quality of public transport service during off-peak hours.	
g) Bikes carrying service in buses	Some of the transport means used in the SMACKER pilot allow the possibility of carrying bikes and mountain bikes in tow. The bike transport services should be booked via the call center.	Medium
h) Tourists accessibility	The pilot foresees specific measures aimed to better fit the needs of tourists considering both summer (hiking) and winter (skiing) specific needs.	High

The SMACKER activities foreseen tackle several users' needs identified while some remain out of the project scope (night DRT services, bicycle transport on DRT).

4.2. Gdynia

In Gdynia pilot area following mobility needs and issues were identified [6]:

- a) Over the past three years, respondents have increasingly used their own cars, while reducing the frequency of using public and alternative transport.
- b) Insufficient parking space due to high use of cars resulting in congested streets (the biggest challenge for the district).
- c) Only the youngest (up to the age of 20) and the oldest group of people have limited access to private cars, and the youngest most often use public transport.
- d) The majority of primary school children go to school by car with their parents.
- e) Car-sharing is a marginal phenomenon that has no impact on the transport situation of the district.
- f) DRT is the most attractive among the additional services that respondents would like to have, included in the monthly public transport ticket in Gdynia

Identified mobility needs were matched with pilot activities and are shown in Table below. SMACKER activities address needs related to promotion of public transport, access to information and increase of PT attractiveness. Needs identified in relation to parking and congestion will be mainly addressed through nudging activities.

Table 7: Correlation between identified mobility needs and Gdynia pilot area [6]

Mobility needs (as identified in pilot region)	SMACKER pilot action's interventions in relation to specific mobility need.	Correlation of pilot with identified needs (low / medium / high)
a) Promotion of transport use	Increase of the quality of the public space around bus stops and small architecture infrastructures to make it more attractive. Purchase of e-link timetables at bus stops.	Low



Mobility needs (as identified in pilot region)	SMACKER pilot action's interventions in relation to specific mobility need.	Correlation of pilot with identified needs (low / medium / high)
b) Increase the attractiveness of public transport and bus stops	Greenery of the space around public stops, new benches and new fish-shapes seats imitating those in the city centre of Gdynia.	High
c) Provide updated information on public transport frequency/communication improvements	Purchase of e-link timetables/passengers information display at bus stops.	High
d) Avoid/reduce illegal parking	The fish-shapes seats have both a decorative function and help reducing illegal parking.	Medium
e) Avoid/reduce road congestion	By making the PT more attractive and accessible in terms of offers/information provided, more users will switch from the use of private cars to the use of PT.	Low
f) Improve the environmental condition of bus stops	Plants and bushes will be planted in order to green the space around bus stops.	Medium

SMACKER activities will raise awareness of sustainable mobility options as an alternative to the private car. An awareness-raising campaign promoting public transport will be organised in the framework of various public events that attract many participants. Public transport trials and welcome packs will increase the likelihood that people will switch to public transport and come in contact with the pilot action.

4.3. Prague

In Prague-Suchdol pilot area following mobility needs and issues were identified [7]:

- a) Mobility needs of users, especially from suburban area, have been increasing over the past years.
- b) Most commuters from Central Bohemia region travel to Prague by car.
- c) Current users of public transport are very satisfied with the quality of its services.
- d) Car transport is still more competitive than public transport in the suburban area and Prague outskirts because of insufficient supply of PT and mobility services.
- e) Main motivators for changing habits (from car to public transport) are shorter intervals on the outskirts of Prague and in the suburban area, faster direct connections with less stops, cheaper fares, more P+R locations, better availability of PT stops near homes, workplaces and schools.

Mobility needs of Prague-Suchdol pilot area are growing due to development of suburban areas and residents' need to commute to/from work/school. As cars are still very competitive to public transport in terms of speed, reliability and price, a significant share of commuters opts for car as preferred mobility choice. The identified mobility needs were matched with pilot activities and are shown in Table below.



Table 8: Correlation between identified mobility needs and Prague pilot area [7]

Mobility needs (as identified in pilot region)	SMACKER pilot action's interventions in relation to specific mobility need.	Correlation of pilot with identified needs (low / medium / high)
a) Mobility needs of users, especially from suburban area, have been increasing over the past years	Planned feasibility study for new multimodal terminal with additional mobility services will provide basis for development of services in line with identified needs.	High
b) Most commuters from Central Bohemia region travel to Prague by car	With new tramline and multimodal terminal commuters will be able to travel to Prague by public transport and not by car.	Medium
c) Current users of public transport are very satisfied with the quality of its services	With additional tramline and multimodal terminal, the current users will have better access to public transport and it is expected that high levels of satisfaction will remain.	Medium
d) Car transport is still more competitive than public transport in the suburban area and Prague outskirts because of insufficient supply of PT and mobility services	With new tramline, multimodal terminal as well as additional mobility services cars will lose existing competitive advantage over public transport. Supply of PT and mobility services in suburban area will be significantly increased.	High
e) Main motivators for changing habits (from car to public transport) are shorter intervals on the outskirts of Prague and in the suburban area, faster direct connections with less stops, cheaper fares, more P+R locations, better availability of PT stops near homes, workplaces and schools	New tramline with multimodal terminal will enable faster travel times to Prague City. Additional mobility services planned within the pilot will provide better solutions for first/last mile problem and increase accessibility of public transport in suburban area of Prague-Suchdol.	High

The feasibility study for flexible transport and nudging activities are at the core of the pilot and all activities are aligned with mobility needs identified.

4.4. Murska Sobota

In Murska Sobota pilot area following mobility needs and issues were identified [8]:

- a) Limited availability and accessibility of PPT, especially in rural areas.
- b) Inflexible PPT, mostly unavailable in the evening and on the weekends.
- c) Insufficient promotion of PPT and sustainable mobility for daily commuting.
- d) Lack of information on mobility options throughout the region for tourists.
- e) Poor PT connections between tourist attractions, spa and wellness resorts, and urban centres in the region.
- f) Lack of an integral and comprehensive approach to sustainable mobility infrastructure planning in the region, especially the cycling routes.

Personal vehicles (cars) are dominant mode of transport for mobility between urban and rural areas in region. This is also true for visitors to the region (tourists); a minor share of tourists uses bicycles for mobility



(recreational and sightseeing reasons) while use of public transport by tourists is rather rare. Main users of public transport in the region are children (pupils) and elderly. The identified mobility needs were matched with pilot activities and are shown in Table below.

Table 9: Correlation between identified mobility needs and Murska Sobota pilot area [8]

Mobility needs (as identified in pilot region)	SMACKER pilot action's interventions in relation to specific mobility need.	Correlation of pilot with identified needs (low / medium / high)
a) Limited availability and accessibility of PPT, especially in rural areas	Pilot to be partially implemented on rural areas currently not serviced by PT.	Medium
b) Inflexible PPT, mostly unavailable in the evening and on the weekends	Within pilot, demand responsive service operating in the evenings and on weekends to be deployed.	High
c) Insufficient promotion of PPT and sustainable mobility for daily commuting	The pilot action is not aimed at commuters.	Low
d) Lack of information on mobility options throughout the region for tourists	The app deployed within the pilot provides tourist with mobility options including bike sharing, public transport alongside tested DRT service.	High
e) Poor PT connections between tourist attractions, spa and wellness resorts, and urban centres in the region	The pilot implements mobility service connecting wellness resort, urban centre and recreational/event area.	High
f) Lack of an integral and comprehensive approach to sustainable mobility infrastructure planning in the region, especially the cycling routes	The pilot does not deal with mobility infrastructure.	Low

The foreseen pilot responds to the specific need for travelling to/from events happening on weekends and/or evenings and is focused on two user types - residents and tourists. It will connect nearby spa resort with touristic centre Expano via urban centre. Mobility needs are also addressed through nudging activities aimed at residents and tourists towards using sustainable mobility options. Regardless some nudging activities are aimed specifically at commuters and at tourists, which corresponds to the poor access to information on public transport identified within these two user groups. SMACKER activities are targeting needs for more flexible PT and filling the gap on information accessibility on mobility options throughout the region for tourists.

4.5. Budapest

The city of Budapest, as the capital of Hungary, is connected with a comprehensive and dense road network and railway lines connecting the region and linking it to other regions of Hungary and to neighbouring countries. All typical urban transport modes are available in the city. Demand responsive public transport is operated in Budapest's peripheral districts that with more suburban character.

In several Budapest's peripheral districts, DRT bus line system was extended to connect suburbs with the nearest suburban railway line or fixed bus line. Mobility needs and issues presented below relevant for these suburban areas served by DRT [9]:



- a) If users are asked about their satisfaction related to the DRT lines and services, the lowest rate is given to the service request methods. This points out that the largest potential is in developing a new notification system.
- b) Drivers talked about the experience that there are potential passengers who do not indicate their travel demand in the timetable period of DRT because they find the way too complicated and they think it is easier to wait for the bus that will run by another demand. They are checking the departure of the bus on the online schedule surface or just physically: they look out of the window if the bus “came up” to the bus stops.
- c) The willingness to use a new web-based application for notifying the travel demand is higher among the young people (under 30) and lower among the elders.
- d) The need for facilitating the service request methods are obvious and users are open to try or use continuously the new interface.

Expressed needs relate mainly to DRT booking service that should be simplified and replaced with an IT system to be more effective and user-friendly. This was expressed by users as well as by operators. SMACKER activities in Budapest are focused on this particular issue and answer to the mobility needs identified. The identified mobility needs were matched with pilot activities and are shown in Table below.

Table 10: Correlation between identified mobility needs and Budapest pilot area [9]

Mobility needs (as identified in pilot region)	SMACKER pilot action’s interventions in relation to specific mobility need.	Correlation of pilot with identified needs (low / medium / high)
a) Service request method for a DRT ride is poor	Is foreseen in the new online system	High
b) Possibility to check the departure of the bus	After the IT development, it will be available in FUTÁR application.	High
c) The willingness to use a new web-based application for notifying the travel demand is higher among the young people (under 30) and lower among the elders	There will remain a telephone-based booking system for the elderly	Medium
d) Need for facilitating the service request methods are obvious	Is foreseen in the new online system	High

Besides implementation of IT system for DRT booking, SMACKER activities also comprise nudging activities focused on promotion of public transport and access to information. Main focus of all nudging activities is to deliver the information on DRT (service information, booking, travel information etc.) to different target groups in relation to the online service request opportunity. SMACKER activities in Budapest pilot area are well aligned with identified needs.

4.6. East Tyrol

In East Tyrol pilot area following mobility needs and issues were identified [10]:

- a) Tourists are generally interested in using existing mobility services at origin and at destination and willing to use them. Tourists ask for public transport / DRT service information (online on webpages and as well as printed hard copy brochures). It proves that dissemination of information and advertisement is essential for existing offers to attract people using sustainable mobility offers.



- b) Tourists mainly ask for hiking taxis, ski buses and public buses. These mobility offers are most important during vacation time. It is also required to improve the service offer and close gaps of travel chains, especially to touristic hot spots. Thus, e-car sharing also plays an important role in providing DRT services for tourists.
- c) Environmental-affine people and elderly people mainly ask for mobility services at destination. Especially these target groups are potential DRT and public transport users and can be sensitized to use sustainable mobility offers for arrival and to combine e-car sharing and public transport / DRT during vacation.
- d) Tourists are interested in booking mobility packages in combination with the accommodation (e.g. airport/railway station shuttle or luggage transport included). Touristic operators do not offer such mobility packages. Sustainable mobility at destination and at origin is a booking criterion for tourists. This is a necessary nudge to offer mobility packages.
- e) Tourists are willing to pay extra for sustainable mobility offers during vacation. Sustainable mobility offers have a high value for tourists.
- f) Tourists increasingly travel by e-car and ask for charging stations at accommodation and touristic hot spots. The demand requires an expansion of charging stations at touristic infrastructure.
- g) Climate protection in general is a booking criterion, in particular offering sustainable mobility or regional products in tourism.

Identified mobility needs were matched with pilot activities and are shown in Table below. SMACKER activities address needs related to promotion of public transport, access to information and attractiveness of e-mobility (visibility, access to information, charging infrastructure).

Table 11: Correlation between identified mobility needs and East Tyrol pilot area [10]

Mobility needs (as identified in pilot region)	SMACKER pilot action's interventions in relation to specific mobility need.	Correlation of pilot with identified needs (low / medium / high)
a) Dissemination of information and advertisement	To be considered in the mobility information brochure to be developed.	High
b) Tourists mainly ask for hiking taxis, ski buses and public buses	To be considered in the mobility information brochure to be developed.	High
c) Combine e-car sharing and public transport / DRT during vacation	Establishment and implementation of new e-car sharing locations in municipalities. Ideally to provide tourists an access to the e-car sharing system. So, both services, the e-car sharing and public transport can be combined to overcome gaps in their travel chain and link the last mile.	Medium
d) Booking mobility packages in combination with the accommodation	/	Low
e) Expansion of charging stations at touristic infrastructure	Establishment and implementation of new e-car sharing locations in municipalities is foreseen.	High
f) E-car sharing location is within walking distance	Establishment and implementation of new e-car sharing locations in municipalities is foreseen.	High
g) To make the e-car sharing system visible and transparent for users and do tailored marketing measures	Nudging strategy is foreseen to satisfy these user needs.	High



SMACKER activities in East Tyrol are aligned with identified mobility needs and accompanied with nudging actions. Majority of them are of general nature (promotion of sustainable transport, increasing visibility of public transport) with some actions that target specifically at commuters and at tourists. This corresponds to the poor access to information on public transport identified within these two user groups. Two of the mobility needs, packages for tourists and the mobility as a service concept, remain outside of SMACKER scope.

4.7. Transnational analysis of mobility needs

SMACKER regions are quite diverse in their characteristics and so are their mobility needs. Before going forward, it should be noted out that needs identified within SMACKER are in some regions specific to DRT (Budapest) while in other regions needs were identified across much broader spectrum (not only DRT related needs but also needs with regard to cycling routes, congestion, parking etc). Thus, the needs discussed below represent merely part of mobility needs and problems in each region.

The needs identified in SMACKER reports D.T1.2.18 to 23 “Review for matching needs and services for a comprehensive planning” were reviewed and paraphrased into actions to be taken as response to the identified need. This resulted in four distinct types of needs and related actions, needs not related to any of the four categories were classified under “Miscellaneous”:

- **Improving access to mobility information:** actions addressing needs and problems related to inadequate/poor/difficult access to information on public transport and sustainable mobility options.
- **Promotion:** actions addressing needs and problems related to better or more intense promotion of public transport and sustainable mobility options.
- **Improvement of Public Transport (PT) services and/or infrastructures:** actions addressing needs and problems related to deficiencies in existing public transport services and investments into upgrade or construction of infrastructure important for public transport services.
- **DRT interventions:** actions addressing needs and problems related to DRT services already in operation.
- **Miscellaneous:** actions addressing various needs and problems that do not fit into any category above.

In Table 12 below, actions in relation to mobility needs in SMACKER regions are shown.



Table 12: Actions Mobility needs in SMACKER regions

TYPE OF ACTION	BOLOGNA	GDYNIA	PRAGUE	MURSKA SOBOTA	BUDAPEST	EAST TYROL
Improving access to mobility information	- Improvement of the DRT services communication to final users.	- Provision of updated information on public transport frequency alongside communication improvements.	/	- Improve access to information on mobility options throughout the region for tourists.	- Improve access to real-time information on departure/arrival of buses	- Improve access to information for tourists on hiking taxis, ski buses and public buses.
Promotion	- More intense promotion of existing intermodal services (train + bus).	- Promotion of public transport to reduce mobility by cars.	/	- Improve/intensify promotion of PPT and sustainable mobility for daily commuting.	/	- Intensify dissemination of mobility related information for tourists, keep it updated. - Tailored marketing measures for promotion of sustainable mobility at the destination (important selection criterion for tourists).
Improvement of PT services and/or infrastructure	- PT service (buses) to allow transportation of bicycles.	- Increase the attractiveness of public transport and bus stops. - Improve the environmental condition of bus stops.	- Increase supply of PT services to meet increasing mobility needs. - Construction of new public transport infrastructure (tramline, terminal) to meet	- Increase availability and accessibility of PT, especially in rural areas - Improve PT in the evening and on the weekends and introduce some level of flexibility.	/	- Invest in expansion of e-charging network, especially near attractions. - Accommodation providers should consider instalment of e-charging infrastructure



TYPE OF ACTION	BOLOGNA	GDYNIA	PRAGUE	MURSKA SOBOTA	BUDAPEST	EAST TYROL
			<p>increasing mobility needs.</p> <ul style="list-style-type: none"> - Increase supply of public transport services to stimulate shift from cars to public transport. - Improvements in public transport (shorter intervals, faster direct connections, fare diversification, denser PT stop network). 	<ul style="list-style-type: none"> - Improve PT connections between tourist attractions, spa and wellness resorts, and urban centres in the region. 		<p>at/near accommodation facilities.</p>
DRT interventions	<ul style="list-style-type: none"> - Night public (DRT) transport service needs improvement (frequency) particularly in summertime and during holidays and weekends. - Facilitation of DRT booking services via app and call centre. - DRT to enable accessibility to trekking, hiking and mountain biking tracks. 	/	/	/	<ul style="list-style-type: none"> - Upgrade DRT booking method (bookings via app), existing (phone call) method is unreliable and work-intensive. - DRT booking method via app to be easy to use also for elderly, phone bookings to remain as elderly are unwilling to change to new booking form. 	/



TYPE OF ACTION	BOLOGNA	GDYNIA	PRAGUE	MURSKA SOBOTA	BUDAPEST	EAST TYROL
	- DRT to be deployed for enabling access to peripheral, outlying tourist attractions.					
Miscellaneous	- Access to transport services should be simple and easy to use for all age groups (elderly).	- Measures to reduce parking needs and related problems of illegal parking. - Measures to reduce road congestion.	- Preserve high satisfaction of public transport users.	- Lack of an integral and comprehensive approach to sustainable mobility infrastructure planning in the region, especially the cycling routes.	/	- Offer combination of e-car sharing and public transport / DRT. - Support development of mobility packages to be offered in combination with the accommodation.



As shown in Table 12, needs vary significantly across regions however several common issues can be identified in particular as regards the first three types of actions:

1. Access to mobility information -

Access to information on public transport and sustainable mobility options is insufficient. Whether if discussing changes in schedule or real time information, users (including potential users) expect to have information easily accessible. The information has to be accurate, up to date and provided through variety of accessible channels.

2. Promotion of public transport and sustainable mobility options

Existing public transport services and sustainable mobility options need to be constantly promoted and made more visible. Two distinct needs were identified - promotion of public transport for residents and promotion for tourists. Mobility promotion for tourists should already be included in the promotion of tourist destination while promotion for residents should be specific and take into account regional and cultural particularities.

3. Improvement of PT services and/or infrastructure

Actions related to improvements in public transport range from construction of new infrastructure (terminal, tramline), to upgrade of existing infrastructure (bus stops), establishment of new services, increasing frequency of existing services to combining public transport with e-car sharing. As the needs of users (including potential users) are constantly evolving, public transport planning has to keep up with these needs. Appropriate policies and planning are essential to ensure funding for investments into public transport.

Not surprisingly needs related to DRT were identified only in regions where DRT is already in operation. These needs mostly refer to booking services and deployment of additional services and/or connections. When it comes to other needs (classified under “Miscellaneous”), the set is quite diversified - from access to public transport and information for the elderly, measures for reducing parking needs and road congestion, an integral and comprehensive approach to sustainable transport infrastructure planning, combining e-car sharing with public transport, to information packages for tourists. Some of the identified needs are addressed in SMACKER pilot actions as depicted in following chapter.



5. Pilot actions

Each of the six pilot actions has its own peculiarity given by the specific territorial context, however it is possible to find some common aspects among them all. Some pilots, for example, focus on feasibility studies and foresee a DRT offer in the future, given specific conditions and once the mobility needs of the people living in the pilot area are assessed. Some may concentrate on technological tools with the aim of improving a booking system or the availability of real-time mobility information and time schedules, and some others may rather concentrate on communication campaigns whose final aim is a raise of people's awareness and a change of behaviour. These last targets, however, unite all pilots (Table 13).

A quick overview of the pilot actions would help in defining the differences and the common aspects among them.

The pilot action of Bologna foresees an integration of the DRT bus service with the trains serving the Apennines area, as well as the launch of a dedicated app for the DRT service booking. Altogether, this pilot action offers an efficient DRT service, improves the connectivity as the number of stops will also be increased, and deals with technology for the booking service through the app.

Differently, the pilot action of Gdynia does not yet offer a DRT system as there is first a different job to be done in the area, starting from the promotion of the public transport. In fact, in Gdynia's pilot area the mobility habits are still very much car-oriented and as such, a change of behaviour must be stimulated in this sense, so that DRT may be a future option to work on. Different measures will be activated for increasing the attractiveness of bus stops as well as for preventing illegal parking on pavements and bicycle paths, and communication/participation activities will be organized with the aim of discussing sustainable mobility option and therefore stimulate a change of behaviour.

Also, Prague does not yet offer a DRT service but the pilot action aims to develop a feasibility study for organizing flexible transport in relation to a new multimodal terminal. New mobility services will be designed, and the study will serve as an input for the master plan of the City of Prague.

Technology is once again the focus of a pilot action in Murska Sobota, which develops an efficient app-oriented service enabling DRT. This app will give all due information on mobility options, schedules and DRT offer.

Also, in Budapest, a new web-based application will be developed with the aim of improving the booking request process and give an updated schedule of bus departures.

Lastly, the region of East Tyrol aims to boost communication through the creation of a brochure with information about mobility and targets also to implement new e-car sharing locations for improving the connectivity and overcoming the gaps in the travel chain.

All pilot actions go in the direction of increasing the people's awareness about sustainable mobility options, and depending on the current situation of each location, they may either promote the use of public transport with the target of offering a DRT service, or they concretely implement DRT services through technological application that will make the booking service quicker and easier. The improvement of communication and the change of people's behaviour are at the basis of all pilots, whereas the differences among them are mostly connected to the peculiarities of the locations and their specific mobility needs.



Table 13: Elements of the pilot actions of the different pilot regions of the SMACKER project

Results	Bologna	Gdynia	Prague	Murska Sobota	Budapest	East Tyrol
Offering DRT	x	x		x	x	x
Feasibility study about DRT		x	x			
Improving connectivity	x	x			x	
Efficient DRT	x	x				x
Additional measures		x				x
Booking/ Operating Technology - APP	x			x	x	
Communication / Behaviour change campaign	x		x		x	x
Communication / Participation	x	x	x	x		x



6. A transnational strategy

In order to develop this SMACKER Output O.T1.5 , i.e. the transnational strategy for planning demand responsive/sustainable services in rural and peripheral areas, both the analysis of local users' needs and expectations (A.T1.2), and the good practices already existing at the European level, either past or ongoing (A.T1.1), were considered.

Although the pilot actions may differ from one another since they apply to different contexts, they have common aspects and purposes that help defining the transnational strategy for the improvement of DRT. The following topics should all be taken into consideration when training about and planning DRT at transnational level.

■ Improving/extending Public Transport offer and mobility services

- Establishment of minimum standards for PT in rural areas (in terms of attractiveness of bus stop and availability of real-time information and updated time schedules).
- Establishment of a regional mobility organisation (consultant, agency, etc.) coordinating mobility services, measures and projects (including DRT/PT-projects).
- Analysis of the local context and assessment of the mobility needs before planning new mobility solutions.
- Establishment and/or improvement of DRT solutions together with a sound technological basis (dedicated app, innovative booking system).
- Specific needs of vulnerable groups (elderly, impaired, young) need to be always considered.

■ Improving the booking system of mobility services

- Consider the MaaS-Approach:
 - integration of different mobility services into one (cycling, public transport, sharing),
 - ideally comprehensive payment for different transport modes.
 - different mobility services in just one app/system.
 - use technological standards, which offer connectivity to include other mobility services (e.g. DRT-system from neighbour region).
- Consider a booking system in line with users' expectations, e.g. online for younger users and by phone for the elderly.

■ Improving information/awareness

- Involve the residents of the local context, discuss their mobility needs and plan new mobility offers together.
- Maintain a Local Mobility Forum (LMF).
- Develop attractive graphics to put in public spaces to stimulate the use of public transport and raise awareness on DRT (if possible, even though a dedicated communication campaign).



- Increase the attractiveness of bus stops in rural areas (for instance through small architecture and greenery projects).
- Differentiate between mobility needs of tourists and residents:
 - Include schools/education for long-lasting effects,
 - Offer different language options for tourists.

Finally, it is noted that each **SMACKER** pilot can benefit at local level of the analysis done and the strategy drafted below, as it is possible to learn from the solutions adopted by the other regions / partners.



7. References

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