

## D1.2 FRAMEWORK FOR DEVELOPMENT AND IMPLEMENTATION OF STRATEGIES FOR HORIZONTAL UPSCALING

Version 0.6

### *Disclaimer*

This report is part of a project that has received funding by the European Union's Horizon 2020 research and innovation programme under grant agreement number 955332.

The content of this report reflects only the authors' view. The European Climate, Infrastructure and Environment Executive Agency (CINEA) is not responsible for any use that may be made of the information it contains.





Version history		
Version	Date	Summary of changes
01	13 SEPTEMBER 2022	First draft submitted to SCALE-UP community for validation
02	17 OCTOBER 2022	Final draft available for internal review
03	31 OCTOBER 2022	First draft including internal changes
04	24 NOVEMBER 2022	Final draft submitted to technical coordination
05	28 NOVEMBER 2022	Reviewed version after Technical Coordinator ETRA
06	29 NOVEMBER 2022	Reviewed version after Project Coordinator ANTWERP

## D1.2 – Framework for development and implementation of strategies for horizontal upscaling

<b>WP No.</b>	1	<b>WP Title</b>	STRATEGIES FOR VERTICAL AND HORIZONTAL UPSCALING
<b>Deliverable owner</b>	UPM		
<b>Author(s)</b>	María Beltrán Mari Luz Brownrigg-Gleeson Adriana Cortez Andrés Monzón María Eugenia López-Lambas		
<b>Reviewer(s)</b>	Evelyn De Wachter (TML)		



	Dirk Engels (TML) Danny Schipper (ECORYS)
<b>Due Date</b>	30.11.2022
<b>Delivery Date</b>	30.11.2022

## List of Acronyms

Acronym	Meaning
<b>A</b>	Antwerp
<b>ATR</b>	Antwerp Transport Region
<b>EC</b>	European Commission
<b>EV</b>	Electric Vehicle
<b>FUA</b>	Functional Urban Area
<b>FG</b>	Focus Group
<b>FGD</b>	Focus Group Discussion
<b>ICT</b>	Information and Communications Technology
<b>LEM</b>	Local Evaluation Managers
<b>M</b>	Madrid
<b>MaaS</b>	Mobility as a Service
<b>ML</b>	Measure Leader
<b>PT</b>	Public Transport
<b>T</b>	Turku
<b>TEN-T</b>	Trans-European Transport Network
<b>WP</b>	Work Package

## *Legal Disclaimer*

This project is co-funded under the European Framework Programme for Research and Innovation Horizon 2020 as part of the Societal Challenges call 2018 “Smart, Green and Integrated Transport”.

The content of this document reflects solely the views of its authors. The European Commission is not liable for any use that may be made of the information contained in this document.

The SCALE-UP consortium members shall have no liability for damages of any kind including, without limitation, direct, special, indirect, or consequential damages that may occur as a result of the use of this material.

This deliverable is a draft document subject to revision until formal approval by the European Commission.

© 2021-2025 by SCALE-UP Consortium

## Contents

<b>1. Introduction .....</b>	<b>10</b>
<b>1.1.Context and aim of this document .....</b>	<b>10</b>
<b>1.2.Inputs and methods.....</b>	<b>13</b>
1.2.1. Internal assessment .....	13
1.2.2. External assessment .....	14
1.2.3. AVOID-SHIFT-IMPROVE as a methodology.....	22
<b>2. Internal Assessment of Potential Barriers and Challenges.....</b>	<b>23</b>
<b>2.1.WP7 Evaluation Framework: Cities’ Baseline for Horizontal Integration.....</b>	<b>24</b>
<b>2.2.Knowledge Exchange Webinars (WP8) - Barriers and Challenges .....</b>	<b>26</b>
<b>2.3.Common and specific barriers and challenges among cities .....</b>	<b>29</b>
2.3.1. Common barriers .....	30
2.3.2. City specific barriers.....	30
2.3.3. Main findings summary .....	31
<b>3. External Vision for Efficient Implementation of SCALE-UP strategies.....</b>	<b>34</b>
<b>3.1.Key elements in the current mobility ecosystem .....</b>	<b>34</b>
3.1.1. Antwerp .....	34
3.1.2. Madrid.....	35
3.1.3. Turku .....	36
<b>3.2.Challenges, Barriers, and Drivers by Topic for Horizontal Integration .....</b>	<b>37</b>
3.2.1. Urban Policies Integration and Management.....	38
3.2.2. Economy/Financing/Business.....	38
3.2.3. Transport/Mobility.....	39
3.2.4. Innovation/ICT .....	39
3.2.5. Environment/Sustainability .....	40
3.2.6. Land Use/Urban Planning.....	40
3.2.7. Inclusive Society .....	41
3.2.8. Validation of the SCALE-UP themes .....	42



<b>3.3.External vision: common and city specific barriers, challenges and drivers (input for D1.5 -Guidelines and Recommendations)</b> .....	<b>42</b>
3.3.1. Most repeated barriers and drivers .....	42
3.3.2. Common ideas in the 3 FGD.....	43
3.3.3. City specific ideas.....	44
3.3.4. Synthesis of the FGDs for SCALE-UP .....	47
<b>4. Preliminary Conclusions for Horizontal Upscaling (to be updated – Deliverable 1.7)</b> .....	<b>48</b>
<b>4.1.Preliminary conclusions and suggestions</b> .....	<b>48</b>
<b>4.2.Preliminary recommendations</b> .....	<b>49</b>
<b>5. Bibliography</b> .....	<b>53</b>
<b>6. ANNEXES</b> .....	<b>54</b>
<b>6.1.Annex 1: Internal assessment</b> .....	<b>54</b>
6.1.1. Guidance Questions.....	54
6.1.2. Internal comments.....	55
<b>6.2.Annex 2 Guidance for Focus Group Discussions</b> .....	<b>59</b>
6.2.1. THE FOCUS GROUP METHODOLOGY .....	59
6.2.2. FOCUS GROUP PREPARATION .....	65
6.2.3. CONDUCTING THE FOCUS GROUP .....	75
6.2.4. REPORTING AND INTERPRETING.....	77
6.2.5. Bibliography.....	86
<b>6.3.Annex 3: FGD findings</b> .....	<b>87</b>



## List of Figures

Figure 1 WP1 Outline .....	11
Figure 2 FGD dynamic: multidisciplinary debate (multi-level & multi layered) .....	17
Figure 3 Horizontal layers of the mobility system .....	23
Figure 4 Tag cloud based on the comments made on Antwerp's introductory question.....	35
Figure 5 Tag cloud based on the comments made on Madrid's introductory question.....	36
Figure 6 Tag cloud based on the comments made on Turku's introductory question .....	36
Figure 7 Preliminary diagram for developing user-centric and data-driven strategies .....	50
Figure 8 FG Methodology logic in WP1 phase 1 (year 2022 and deliverables 1 and 2) .....	60
Figure 9 FG Methodology logic within WP1 framework and work planning .....	62
Figure 10 SCALE-UP outputs for each intervention field .....	64
Figure 11 Connection of SCALE-UP intervention fields with the FG dynamic and the findings expected with this methodology. ....	65
Figure 12 FGD dynamic: 5 open questions in order to generate a multidisciplinary debate, under a multi-functional and multi-layered lens.....	69

## List of Tables

Table 1 FGD Participants area of expertise for each node .....	16
Table 2 Classification for the number of participants discussing ideas .....	19
Table 3 FGD Topics and Subtopic .....	21
Table 4 Main findings from the ASI methodology by topic.....	51
Table 5 Internal barriers and challenges for horizontal integration, in (1) urban policies integration and management.....	55
Table 6 internal barriers and challenges for horizontal integration, in (2) economy-financing-business .....	56





Table 7 internal barriers and challenges for horizontal integration, in (4) ICT-innovation .....	57
Table 8 internal barriers and challenges for horizontal integration, in (4) ICT-innovation .....	58
Table 9 Table 1 FGD Core Questions.....	68
Table 10 ANTWERP'S Current Mobility Ecosystem (part 1 Focus Groups) .....	87
Table 11 MADRID'S Current Mobility Ecosystem (part 1 Focus Groups) .....	88
Table 12 TURKU'S Current Mobility Ecosystem (part 1 Focus Groups) .....	89
Table 13 left (vertical-horizontal), right (barriers, challenges, drivers, recommendations) .....	90
Table 14 comments organized by layers .....	90
Table 15 Set of tables showing percentages of participation on barriers & challenges for the 7 topics of discussion on each of the urban nodes.....	91
Table 16 Urban Policies integration and management .....	91
Table 17 Economy-financing-business .....	92
Table 18 Transport & Mobility .....	93
Table 19 ICT-Innovation .....	95
Table 20 Environment-sustainability-energy .....	96
Table 21 Land-use/urban planning .....	97
Table 22 Inclusive society .....	98
Table 23 Barriers most mentioned in the 3 FGs.....	99
Table 24 DRIVERS most mentioned in the 3 FGs.....	101
Table 25 Common ideas in all 3 FGD .....	102
Table 26 Antwerp's city specific barriers, challenges & drivers .....	103
Table 27 Madrid's city specific barriers, challenges & drivers .....	104
Table 28 Turku's city specific barriers, challenges & drivers .....	106



# 1. Introduction

## 1.1. Context and aim of this document

WP1 addresses the framework to develop, implement and validate strategies for vertical and horizontal integration in the SCALE-UP urban nodes, Antwerp, Madrid, Turku, and beyond. WP1's first deliverables, D1.1. and D1.2. (Development of the framework for effective strategies on the vertical and horizontal approach), are closely related and jointly aim to respond to SCALE-UP's main goal: to develop **user-centric** and **data-driven** strategies, to enhance the take-up of smart, clean, and inclusive mobility, through well-connected and multi-usage urban nodes, in a consistent and comprehensive manner.

Deliverable D1.1 focuses on the vertical strategies for integration: alignment and interrelations between cities, Functional Urban Area (FUA) and Trans-European Transport Network (TEN-T). Deliverable D1.2 focuses on finding ways of integrating the 3 horizontal layers that conform the mobility system: the physical, digital, and human layers. **This document D1.2 will analyse, and present findings related only to horizontal integration.**

SCALE-UP's goal is defined by five strategic objectives:

- Improve multi-level and multi-stakeholder governance enabling seamless multimodal transport across urban nodes.
- Develop inter-connected and multimodal nodes for passengers and freight as a backbone of a resilient mobility system, including network optimisations.
- Develop data-driven mobility strategies and tools to stimulate seamless multimodal transport of passengers and freight and optimise network capacity across the wider urban area.
- Provide access to inclusive, clean, and safe mobility solutions.
- Change travel behaviour focussing on clean, active, and healthy modes of transport.

These 5 strategic objectives relate to the five areas of intervention defined in SCALE-UP, in which the 3 urban areas excel and deliver valuable output by implementing 28 mobility measures scaled to the FUA and considering the TEN-T dimension:

- Governance
- Multimodality
- Data

- Clean, safe, inclusive
- Behaviour

Figure 1 presents the outline of WP1, throughout the duration of SCALE-UP as well as its interactions with other WPs (further detailed in the following pages of this section).

During the present work phase (phase 1), within WP1, **D1.1** and **D1.2** use both internal and external input to **develop framework strategies for vertical and horizontal integration**. Internal input comes from **WPs 2-6** as well as findings from **WP7**, external input is considered by carrying out Focus Group Discussions. **D1.2** focuses on the **diagnosis** of the urban nodes regarding horizontal integration in terms of planning, implementation and cooperation and challenges of integration. Both D1.1 and D1.2 will be updated in phase 2 (D1.3 and D1.4 due date M24). D1.4 will make use of feedback and input from the mid-workshop to define performance indicators related to horizontal integration, by involving all the stakeholders that are part of the project. Additionally, **D1.1 and D1.2 will serve as input for D1.5 “Guidelines and recommendations for other cities/ urban areas on the SCALE-UP strategies for vertical and horizontal upscaling”**. Finally, during phase 3, once measures have been implemented, deliverables D1.6, D1.7 and D1.10 will constitute effective strategies for both vertical and horizontal integration, and Guidelines and Recommendations. D1.3 and D1.4 will also be updated and validated in D1.8 and D1.9.

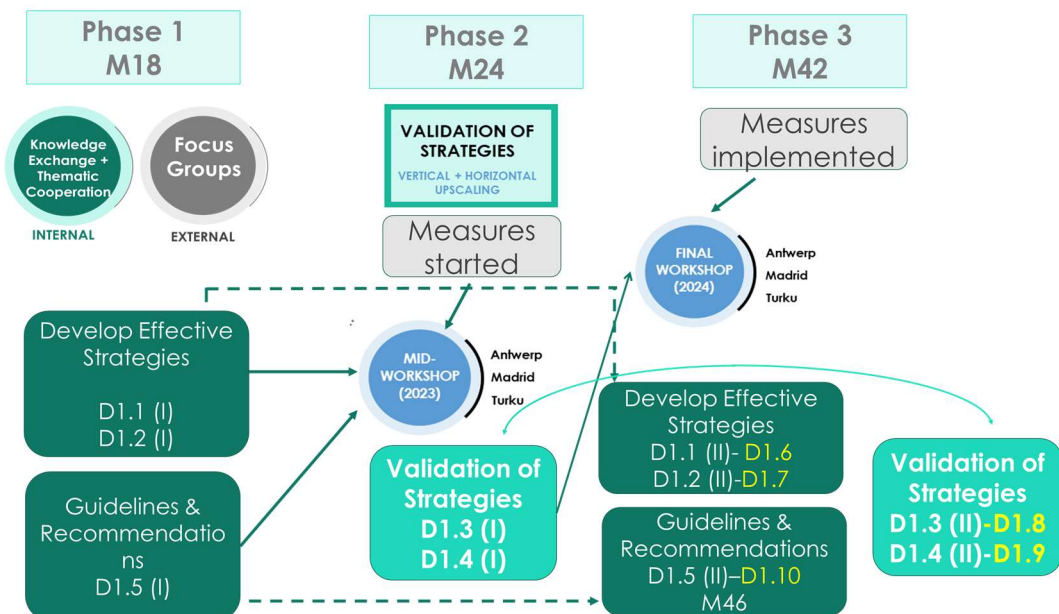


Figure 1 WP1 Outline



### WP1 and WP7 interactions

WP7, in charge of “Monitoring and Evaluation” develops and implements a layered evaluation approach encompassing 3 main focuses: evaluation of the SCALE-UP measures, evaluation of the FUA and evaluation of the strategies for integration. Part of the interaction with **WP1 is to discuss the crucial elements for effective vertical and horizontal integration, translated into indicators** of both possible concepts in SCALE-UP urban nodes and beyond.

WP7 intermediate findings will be an input for **the strategies for integration to be developed in WP1** (as well as for the thematic cooperation of WP2-6). Likewise, **the frameworks developed in WP1** defining vertical and horizontal integration, will be an input for WP7, in the process of evaluating the level of integration of the SCALE-UP urban nodes. Together, WP1 and WP7, will work on defining indicators that measure the level of integration.

### WP1 and WP8 + WP2-6 interactions

There is a direct interaction between WP1 and the implementation work packages WP2-6 as well as with WP8, in charge of the “Knowledge exchange and take-up” strategy among SCALE-UP. As previously mentioned, the 28 measures that the urban nodes implement are clustered around five intervention fields (Governance, Multimodal, Data, Clean-safe-and inclusive, and Behavioural Change), each corresponding to one WP (WP2-6). Within each Work Package, there is a thematic cooperation task leader, organizing regular **thematic cooperation meetings/bilateral meetings** (one per urban node, as part of tasks 2.1-6.1), to discuss barriers, challenges, and specific drivers for the implementation of the measures. As will be explained later, these meetings’ content, is an input for WP1, in the iterative process of defining vertical and horizontal strategies for integration. Later, this deliverable D1.2 (as well as D1.1) and the findings of WP1 will be an input also for WP2-6, in relation to any valuable undetected barriers or other recommendations that could help in the implementation of measures.

After the first round of these bilateral meetings, WP8 organised **thematic knowledge exchange webinars** around the five fields (planned at least once a year) to allow the urban nodes to exchange on the innovative solutions they are implementing, and find common challenges, barriers, drivers, and strategies for integration. There is a direct relation with WP1 Strategies for integration which gives guidance on the vertical (across governance levels and boundaries) and horizontal integration (across

the different mobility layers; physical-infrastructure and services, digital, and human). These are seen as an input also for WP1, as it will be explained later.

## External input

In addition, the external findings (derived from the Focus Group Discussions), will bring new challenges, possible recommendations, and ideas to the next webinars and workshops, to advance in this iterative process. The FGD procedure is fully described in Annex 2 Guidance for Focus Group Discussions.

## 1.2. Inputs and methods

The approach followed is divided in 3 main steps detailed in the sections 1.2.1, 1.2.2, 1.2.3. Both internal (1.2.1) and external (1.2.2) assessments allowed to carry out a **diagnosis** of the urban nodes, while Avoid-Shift-Improve (A-S-I) methodology (1.2.3) served to outline **preliminary recommendations**.

- **Internal assessment.** Based on 2 main inputs, on the one hand, Potential barriers and drivers identified by the Measure Leaders (ML) and Local Evaluation Managers (LEM) in D7.3 “Mobility baseline in the SCALE-UP FUAs” and D7.4 “Evaluation Plan 2” from WP7 “Evaluation and Monitoring”, and on the other hand, results from bilateral meetings (WP2-WP6) and knowledge exchange webinars (WP8).
- **External assessment.** Potential barriers, challenges, drivers, and recommendations resulting from 3 Focus Group Discussions (FGD) held with external experts on the 3 urban nodes.
- **AVOID-SHIFT-IMPROVE as a methodology.** The findings from both internal and external expertise allowed to identify the main barriers and drivers for the implementation of the measures and to propose recommendations for the integration of the mobility layers. To this end, the Avoid-Shift-Improve approach was followed to define preliminary guidelines for horizontal integration to develop user-centric and data-driven strategies and to enhance the take-up of smart, clean, and inclusive mobility.

### 1.2.1. Internal assessment

- **WP7 – Baseline and barriers/drivers for measures implementation**

WP7 “Evaluation and Monitoring”, has been working on an evaluation plan for measures implementation (see D7.4 “Evaluation Plan 2”). For this deliverable D1.2, we have extracted and summarized relevant findings from this document, such as

potential barriers and challenges identified by the Measure Leaders (ML) and Local Evaluation Managers (LEM). These are presented in tables, classified by urban node (Antwerp, Madrid, Turku) and layer (physical, digital, human), and will later be compared with the external findings from the FGs.

Another WP7 deliverable, D7.3 “Mobility baseline in the SCALE-UP FUAs”, has been used as an input for this deliverable D1.2. We have summarized the valuable information on each of the urban nodes’ baseline, in relation to horizontal integration.

- **WP2-WP6- Webinars and bilateral meetings reports**

The thematic cooperation (bilateral meetings) and knowledge exchange webinars (organized regularly along the whole duration of the project) of the intervention fields (WP2-WP6), exchange knowledge and build up capacity around each intervention field (Governance, Multimodal, Data, Clean-safe-and inclusive, and behavioural change) between the 3 SCALE-UP urban nodes, as part of tasks 2.1-6.1. Relevant stakeholders from the three urban nodes are meeting on a regular basis, ensuring a permanent cross-sharing of knowledge during the whole demonstration period.

Fifteen thematic bilateral meetings were considered in D1.2: one per urban node for each of the 5 intervention fields (WP2-6), from 2021-2022. Some of the meetings were organized by WP1 main partners: ECORYS as thematic cooperation task leader of WP2-Governance, and UPM as thematic cooperation task leader of WP4-Data, which facilitated notes used in this document. As for the other WPs, notes facilitated by each thematic cooperation task leader were used (ETRA-WP3 & WP5, EUROCITIES WP6). Additionally, five thematic knowledge exchange webinars were inputs for this D1.2 (one per intervention field/WP), for this, we used notes facilitated by the organizer, EUROCITIES. The detailed concept notes for all these meetings can be found in Annex 2, deliverable D8.1 (Lucian Zagan, Eurocities). The audio recordings can also be found on the SCALE-UP collaboration platform online.

For this WP1 deliverable (D1.2), we extracted - from all these internal meetings - relevant findings for horizontal integration, organized by urban node and layer (physical, digital, human). The main findings will be presented later in the document and compared with the external findings from the FGDs in the 3 urban nodes.

### 1.2.2. External assessment

Focus Group Discussion for the 3 cities (WP1)

To gain an **external perspective** and further knowledge on vertical and horizontal integration, a Focus Group Discussion (FGD) was held on each of the urban nodes,



with a group of local experts from outside the project. The main purpose was to discuss each node's mobility strategy and assess the various types of innovative mobility measures that SCALE-UP is deploying in the three nodes. The purpose of the FGD was to identify - with experts external to SCALE-UP project - new or different challenges and barriers (for vertical and horizontal integration), than those identified within the project through the already mentioned thematic cooperation and knowledge exchange webinars held regularly in each implementation work package and in the WP8 community of practice.

**Madrid FG:** Organized by UPM-TRANSyT team, the FGD was held on April 21<sup>st</sup> 2022, in the ETSI Caminos, Canales y Puertos of the UPM (Madrid, Spain). There were 6 external participants, 1 moderator, 2 facilitators and 2 researchers taking notes (internal from SCALE-UP, and all from UPM). The FGD was held in Spanish.

**Antwerp FG:** An event - with the same dynamic, questions and participants' profiles - was held in Antwerp on May 20<sup>th</sup>, 2022, organized, and moderated jointly by ECORYS and UPM. There were 1 moderator and 1 facilitator, 4 external participants and 2 researchers taking notes (from UPM and ECORYS), and observants from ECORYS, City of Antwerp and TML. This event was held in English in the Lindner Hotel (Antwerp, Belgium), right after 2022 SCALE-UP's General Assembly.

**Turku FG:** the last FGD, was held on June 2<sup>nd</sup>, 2022, in Turku, organized by UPM in collaboration with the City of Turku and Turku's University of Applied Science (TUAS). As in Antwerp, it was held in English. There were 1 moderator, 1 facilitator, 4 external participants and 2 researchers taking notes and the City of Turku and The Regional Council of Southwest Finland, as observants. The event took place at Turku's University of Applied Science (TUAS).

**This deliverable D1.2, focuses mainly on presenting findings from the FGs (external input) related to horizontal integration and upscaling.**

### *1.2.2.1 FGD Key Elements*

The dynamic or format of the 3 FGDs was a spontaneous conversation between all the participants, moderated by the UPM team (horizontal integration) who brought up questions and topics previously crafted and designed jointly with ECORYS (vertical integration). For more information see the Introduction in Section 6.2 Annex 2 Guidance for Focus Group Discussions. The participants of the 3 FGD's were urban experts from each urban node, who know the city and region well, and with different areas of expertise (see Table 1 for more information about the area of expertise of the participants), ranging from innovation, financing, governance, urban planning or

social agenda, who work at local, regional and national scope, both in the public and private sector. The FGDs were recorded, and the transcripts thoroughly analysed, under the focus group methodology standards.

All of the questions were open-ended, in order to generate a **multi-disciplinary debate** in these main areas: (1) urban policies integration and management, (2) economy-finance-business, (3) transport-mobility, (4) ICT-innovation, (5) environment-sustainability, (6) land use-urban planning, and (7) inclusive society. Participants were also selected based on those expertise criteria.

*Table 1 FGD Participants area of expertise for each node*

Urban Node	Participant	Area of expertise
<b>Antwerp</b>	P1	Urban policies integration and management (1), Transport-mobility (3)
	P2	Land use/Urban planning (6), Transport-mobility (3), ICT-innovation (4)
	P3	Transport-mobility (3), economy/financing/business (2), Urban policies integration and management (1),
	P4	Urban policies integration and management (1), Transport-mobility (3)
<b>Madrid</b>	P1	Transport-mobility (3), ICT-innovation (4)
	P2	Transport/mobility (3), economy/financing/business (2)
	P3	Land use/Urban planning (6)
	P4	Environment/sustainability (5)
	P5	Urban policies integration and management (1)
	P6	Economy/Financing/Business (2)
<b>Turku</b>	P1	ICT-innovation (4), Economy/Financing/Business (2), Urban policies integration and management (1)
	P2	Land use/Urban planning (6), Urban policies integration and management (1)
	P3	Environment/sustainability (5), inclusive-society (7), Urban policies integration and management (1)
	P4	Land use/Urban planning (6), Transport/mobility (3), Urban policies integration and management (1)



The discussion was moderated to maintain the two different lenses: **multi-level** (city-FUA-TEN-T) and **multi-layered** mobility reality (Physical, Digital, Human). See Figure 2 for key ideas. These are all variables under which responses were coded and filtered later in the process.

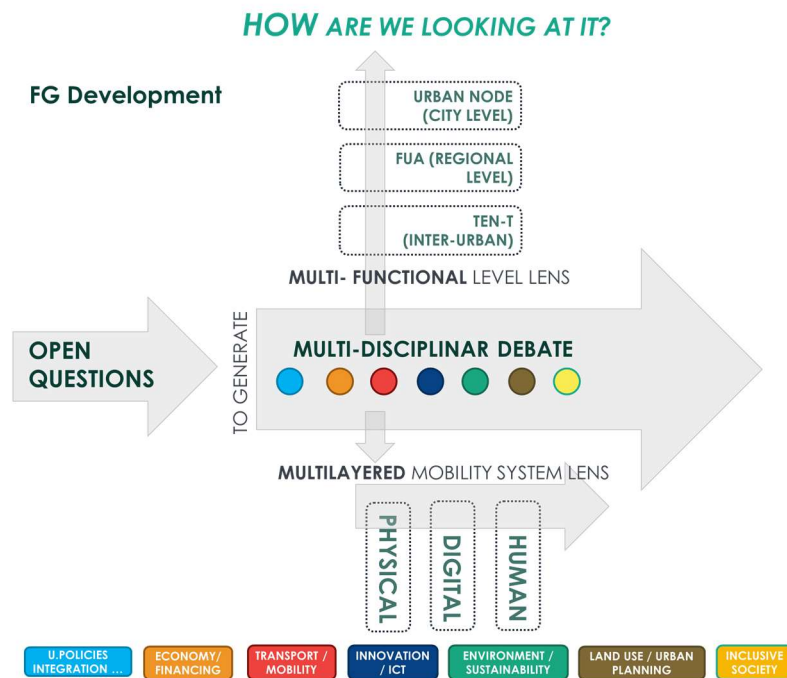


Figure 2 FGD dynamic: multidisciplinary debate (multi-level & multi layered)

### FGD analysis

A theme-based evaluation was carried out to analyse the results of the FGDs to obtain recurrent patterns across the 3 urban nodes sessions, as well as finding new aspects which have not been previously discussed in the knowledge exchange and bilateral meetings organized internally in SCALE-UP. The first stage of the analysis consisted of going through the transcriptions (automatically made by Microsoft Teams), while listening to the audio recording, and correct inaccuracies or small mistakes due to acronyms, pronunciation, etc., of all 3 sessions and then apply a coding technique, following the general procedures for qualitative research (see Annex 1 6.1). This coding was manually developed and initially guided by the results on previous projects related to SCALE-UP (Eccentric, Satellite, Vital Nodes...).

The coding has different levels:

- **(1) Type of integration:** vertical-horizontal
- **(2) Type of comment:** barrier, challenge, driver, recommendation

- **(3) Layers:** governance, physical, digital, human
- **(4) Horizontal layers:** physical, digital, human
- **(5) Topics for discussion:** urban policies integration & management, economy & financing, transport & mobility, innovation & ICT, environment & sustainability, inclusive society.

First, the comments were classified according to their relation to **(1)** vertical integration (V), horizontal integration (H) or both (V+H). Then, according to the type of comment, classifying them in: **(2)** barriers/problems (BARR), challenges (CHALL), drivers (DRIV) or recommendations (RECOM). For the simplicity of this delivery and its comprehensiveness, results on barriers and challenges are presented together, and drivers and recommendations are also grouped, when required. The next level of coding was on whether the ideas or arguments fell on the **(3)** physical (PHY), digital (DIG) or human (HUM) horizontal layers, or the vertical axis governance (GOV). This deliverable D1.2 focuses mainly on presenting findings on the former three (horizontal layers). Governance arguments are discussed in deliverable D1.1, which is related to vertical integration strategies. The last coding applied was related to 7 topics **(4)**: urban policies integration & management (POL), economy, financing & business (ECON), transport & mobility (MOB), innovation & ICT (ICT), environment & sustainability (SUST), Land use & urban planning (PLAN) and inclusive society (SOC).

This deliverable summarises the most relevant ideas that came up in the 3 FGs, classified according to the coding filters just explained, to simplify comparisons and make the information more comprehensive. As suggested by previous scientific literature [1,2,3], the qualitative results are supported by the quantitative data on the number of participants discussing certain themes (see Table 2). Consequently, “when an idea is discussed by less than 25%, we refer to it as ‘few’, for between 25% and 50%, ‘some’, for between 50% and 75%, we refer to it as ‘many’ and for more than 75% of the participants, ‘almost all’” [1]. In this type of quantitative data, we only count one time each idea discussed by each participant. In other words, if one participant insists 10 times on the same idea during the whole FGD, but nobody else agrees or brings it up, this only counts as 1, because it is the same person that mentioned it several times.

Table 2 Classification for the number of participants discussing ideas

TYPE	PARTICIPATION	%
FEW		<25%
SOME	✓	25%-50%
MANY	✓✓	50%-75%
ALMOST ALL	✓✓✓	>75%

### 1.2.2.2 Seven Topics for Discussion

On top of facilitating FGDs according to a multifunctional level (urban node-FUA-TEN-T) and a multi-layered mobility reality (Physical, Digital, Human), we tried to cover certain topics. These are the 7 topics brought up in the discussion, based on previous projects related to SCALE-UP (Eccentric, Satellite, Vital Nodes...<sup>1</sup>). These topics also have the aim to not leave out any of the aspects that come into play when in regard to mobility, and at the same time, offer a more common classification and allowed to select FGD participants according to their expertise in these fields.



#### 1. URBAN POLICIES INTEGRATION & MANAGEMENT

Under this topic the inter-administrative cooperation, coordination, and integration of the government, intertwining with civil society and the business fabric to manage public affairs are considered. The administration understood as an agent of configuration of social spaces where the rest of the actors interact to make decisions and a real debate is initiated with all the actors of the mobility ecosystem and with society as a whole.

---

<sup>1</sup> <https://civitas.eu/projects/eccentric>  
<https://ec.europa.eu/inea/en/horizon-2020/projects/h2020-transport/urban-mobility/civitas-satellite>  
<https://vitalnodes.eu/2020/05/23/new-civitas-vital-nodes-e-course-examines-integration-of-urban-nodes-into-ten-t-networks/>





## 2. ECONOMY / FINANCING / BUSINESS

Under the topic economy-financing-business we understand resources (time and money) needed to carry out a specific mobility measure or action. They can be public, private or through public-private agreements. This topic also includes anything business related, like start-ups or new business concepts.



## 3. TRANSPORT / MOBILITY

Mobility is understood as the set of movements, of people and goods, that occur in a physical environment (in the case of urban mobility, in the city and FUA). These trips are made in different types or transport systems: car, public transport, etc., and by foot and bicycle (active modes). New mobility services (NMS), including micro mobility and shared-mobility services, are also included in this topic.



## 4. INNOVATION / ICT

Under this topic we understand technological innovation which is based on the results of new technological developments, new combinations of existing technologies or the use of another acquired knowledge. The deployment of ICT mobility-related services can help address the challenge posed by urban transport.



## 5. ENVIRONMENT / SUSTAINABILITY

Under this topic we focus on the perspective of experts working to search for greener and cleaner mobility options to tackle the pollution caused by transport, especially in cities.



## 6. LAND USE / URBAN PLANNING

This topic is focused on decisions and actions related to land use and urban planning have an impact on the mobility model, and therefore on the environment and people's behaviour.



## 7. INCLUSIVE SOCIETY

Under this topic users' needs are taken into account, with special attention to those often disregarded because of age, gender or physical impairments



aligned with the “Leave no-one behind” Agenda 2030<sup>2</sup>. Citizenship awareness, communication and understanding are key elements considered for a transition towards a sustainable and safe mobility.

As part of the analysis on the content of the 3 FGs, we grouped the comments under common areas of discussion. This gave rise to a list of subtopics within each of the 7 topics (see Table 3).

Table 3 FGD Topics and Subtopic

<b>1</b>	<b>URBAN POLICIES INTEGRATION &amp; MANAGEMENT</b>	<b>2</b>	<b>ECONOMY-FINANCING-BUSINESS</b>
1.1	Law, policies, ordinances, plans	2.1	New business models & mindsets
1.2	Public administration & management	2.2	Economic incentives & UVARs
1.3	Political will & support	2.3	PPP & stakeholders
1.4	Regulation of data & NMS (ownership & privacy issues)	2.4	Commercialization of data services
		2.5	Power relations
<b>3</b>	<b>TRANSPORT-MOBILITY</b>	<b>4</b>	<b>ICT-INNOVATION</b>
3.1	Private vehicle	4.1	EV, e-bikes, e-scooters
3.2	Public transport	4.2	New apps
3.3	Active modes	4.3	Technology & information
3.4	Infrastructure, re-use, reallocation	4.4	MaaS & Integration of NMS
3.5	Accessibility & connectivity	4.5	Knowledge on data
3.6	Shared mobility	4.6	Collection & storage of data
3.7	Multimodality	4.7	Access & unification of data
3.8	Freight & logistics	4.8	Data-driven
		4.9	Data-management & use
		4.10	User-centred
<b>5</b>	<b>ENVIRONMENT-SUSTAINABILITY-ENERGY</b>	<b>7</b>	<b>INCLUSIVE SOCIETY</b>
5.1	Sustainable planning	7.1	Pattern of use & habits
5.2	Health	7.2	Communication
5.3	Resources & energy	7.3	Awareness
5.4	Air quality	7.4	Culture
		7.5	Training
<b>6</b>	<b>LAND USE/URBAN PLANNING</b>	7.6	Participation
6.1	Land use	7.7	Users' needs
6.2	Services & accessibility	7.8	Perceptions-emotions
6.3	Urban strategic planning	7.9	Methods of inquiry
6.4	Zone of influence		
6.5	Urban design & city structure		

<sup>2</sup> E. Samman et al., 'Leave no one behind' – five years into Agenda 2030. Guidelines for turning the concept into action, ODI, 2021.

### 1.2.3. AVOID-SHIFT-IMPROVE as a methodology

As a result of the diagnosis carried out, both preliminary strategies for integration and preliminary recommendations following the AVOID-SHIFT-IMPROVE methodology are established. In addition to evaluating integration of layers based on the diagnosis, the A-S-I methodology (first officially mentioned in 1994 in the report of the German parliament's Enquete Commission)<sup>3</sup> allows to make concrete recommendations to overcome the barriers and challenges detected and enhance the adoption of effective policy. This is further detailed in section 4.

---

<sup>3</sup> Bongardt, D., Stiller, L., Swart, A., & Wagner, A. (2019). Sustainable Urban Transport: Avoid-Shift-Improve (ASI). Transformative Urban Mobility Initiative.

## 2. Internal Assessment of Potential Barriers and Challenges

### SCALE-UP Horizontal Integration: 3-layer approach

The SCALE-UP concept relates to two dimensions necessary for upscaling. A vertical upscaling (Y axis) refers to integrating the mobility and transport strategies on multiple governance levels and beyond geographical boundaries (city, functional urban area (FUA), TEN-T) through collaboration and coordination with stakeholders (deliverable D1.1). The horizontal upscaling defined in the project (X axis) refers to the **integration** of the different layers that shape the mobility system: the **physical** or infrastructural layer, the **digital** layer, and the **human** layer referring to the central position of the end-user. To function as a data driven and user-centric urban node all three layers need to be addressed in a balanced way, as this is the main strategy to ensure integration. For example, behaviour or intention of use should be taken into account when planning new infrastructure to guarantee its use.

The scope of this Deliverable D1.2, horizontal **integration** (X axis in the SCALE-UP concept), is focused on the horizontal aspects of the multi-layered mobility system. SCALE-UP translates these layers into three levels (see Figure 3)– physical (infrastructure and services), digital, human - which are approached together acknowledging their interdependency. This 3-layer approach will deliver a clear overview of the context and conditions in which the measures are implemented and will serve to validate the policy strategies of the 3 urban nodes.

- The **physical layer** refers to both infrastructure and services necessary for mobility.
- The **digital layer**'s scope is data management, storage, etc. and ICT tools.
- The **human layer** encompasses users' perspective, attitudes and behaviour.



Figure 3 Horizontal layers of the mobility system



## 2.1. WP7 Evaluation Framework: Cities' Baseline for Horizontal Integration

### Relevant contextual elements – WP7

#### ANTWERP

The complex structure of the mobility landscape in Flanders and Belgium can represent an important barrier since creating mobility policy and initiating mobility projects often involve a lot of stakeholders, which reinforces the need for corporation and consultation. From an opposite perspective, this can be considered as a strength because it guarantees the involvement of multiple voices.

Regarding the **physical layer** there are a lot of governance levels having impact on mobility and multi modal hubs in the city & the FUA. It's complex for all relevant stakeholders to work together regarding the physical, digital & human layer, although a lot of work in Antwerp is done with a pragmatic approach.

Regarding the **digital layer, mobility related data** is often available on a city level, as the city of Antwerp has participated in different European projects managing and evaluating different mobility initiatives. However, at the Transport Region level, data is often not as well-collected because of different issues such as the unclear definition of competences.

When it comes to the **human layer**, concerning citizens' acceptance and behavioural change, there's a **constant ongoing discussion on mobility as well as on mobility policy** amongst the administration, amongst the citizens, and between the citizens and administration.

#### MADRID

The overall mobility structure of Madrid was analysed to foster Madrid 360 Strategy which is aligned with the five intervention fields and 3 horizontal layers of SCALE-UP.

With respect to the **physical layer**, there has been a reduction in vehicle ownership and a rise of 13% in public transport demand during the last 4 years highlighting the importance to study if the current infrastructure can take more users. Nevertheless, goods and freight distribution, lack of parking space, unclear planning and high emissions are some of the main issues that need to be solved.



Regarding the **digital layer**, **data** is collected by different stakeholders, in different formats and with different purposes. The public has access to a lot of data through different platforms owned by the city, the municipal company of transport and the Regional Transport Consortium platform among others. Even though the data is gathered, not all data is useful nor used to its full potential. Moreover, there is no good integration of data as evidenced by the fact of having 5 different platforms (3 at regional and 2 at city level). For achieving smart mobility, a strategic plan is needed to set a framework for data management (ownership, collection methodology, format, etc.).

Finally, with respect to the **human layer** and changing **citizens' behaviour** towards a more sustainable mobility, there are some problems that still need to be addressed. In the case of active mobility, bad connectivity and insufficient pedestrians' space in some areas are barriers to overcome to increase the share of people walking. Similarly, infrastructure problems such as unavailable and discontinuous cycling lanes cause cycling to be one of the less used modes. There is still a lot of work to be done to foster change in citizens' mobility decisions, for this it is important to raise their participation in different initiatives. Appropriate communication campaigns are also essential to raise awareness and achieve the long-term changes set as objectives.

## TURKU

Regarding the **physical layer**, the municipalities do not necessarily own the slots of land deriving in the problem of how the city is able to assign some of its functions on privately owned land. Moreover, to provide **clean, safe, and inclusive** mobility solutions for citizens, the development of business models is still needed.

When it comes to the **digital layer**, the challenge lies within the lack of a common owner of mobility-related data. The city of Turku does collect mobility data, but other FUA municipalities do not have data collection practices yet. For this reason, when there is data available it is dispersed, with different quality standards, and, furthermore, data ownership is sometimes not clear.

Regarding the **human layer**, concerning **citizens' behaviour**, no kind of incentives in the mobility context have been carried out. Hence the needed service design, identification and profiling of user segments are still in the very early stages.

## 2.2. Knowledge Exchange Webinars (WP8) - Barriers and Challenges

As explained in section 1.2.1 knowledge exchange webinars coordinated by WP8, in charge of the “Knowledge exchange and take-up” strategy in SCALE-UP were held in regard to the 5 fields of intervention and the bilateral meetings corresponding to WP2-WP6 that were priorly held per node. These webinars allowed urban nodes to exchange common barriers, challenges, drivers, and strategies for integration, and serve as input for this deliverable.

To ensure the maximum effectivity of the webinars, a series of guidance questions (see Annex 1) were outlined, that allow to establish the current situation as well as the main strategies, barriers, challenges. They were grouped under the following themes:

- Planning. Main issues regarding planning departments, instruments, and their relation to the 3 layers (physical, digital, and human) fall under this theme.
- Implementation. This theme collects measure related aspects, both measures in SCALE-UP as other supporting measures the nodes might be implementing.
- Cooperation/organisation. Under this theme the main scope is interaction between users, businesses, and decision makers.
- Challenges, barriers, and strategies. The last theme was focused on the identification of challenges, barriers and strategies.

The analysis of this information for each node is presented by layer to identify similarities and differences between the potential barriers, challenges and drivers identified from the internal perspective of the 3 nodes.

### **ANTWERP**

#### **Physical**

Only two types of potential barriers were identified for the implementation of the measures on the physical layer in Antwerp. The first and most emphasized one is **“involvement and communication”** related to the coordination of various visions and ideas of the different stakeholders involved in the deployment of the measure. Additionally, the need of raising awareness of the different measures is considered as key to ensure their success. The second type of potential barriers identified is **“technical”** as it is related to different technical aspects for the development and implementation of the measures.

**New technologies** and **political** aspects such as the ambition of Antwerp to reach climate neutrality by 2050 (governance agreement 2019-2024) are considered potential drivers that might ensure measures' success.

## Digital

From ML's perspective, **cooperation and willingness** between all stakeholders can represent a barrier for the correct implementation of digital measures. Moreover, **technical** issues like data availability, standardisation, and operability might cause the need of extra efforts and possible delays in measures deployment. Finally, **legal issues** concerning data management is also considered as a possible barrier due to the complications it implies.

On the other hand, European **regulation** and **financial support** play a fundamental role for the optimal implementation of digital measures and for ensuring their continuity after SCALE-UP.

## Human

Measure leaders consider that setting a common approach for reaching measures' objectives could be hard due to the **great variety of stakeholders** and **multidisciplinary teams** involved. The fact that all the stakeholders are not on the same page, could also cause conflicts when dealing with incentives. **Privacy regulation** (GDPR) is also considered as a potential barrier due to the difficulties related with managing data, especially citizens' data. Finally, the health crisis caused by COVID-19 has caused a negative impact on the organisation of events, delaying the implementation of the measures focused on them.

From the positive side, the **existing culture of monitoring events** is expected to act as a driver for measures that aim to change citizens' behaviour towards active and sustainable mobility.

## MADRID

### Physical

Several types of potential barriers were identified for the implementation of the different measures of the physical layer in Madrid. All of them can be grouped depending on if they are related to stakeholders, citizens, and infrastructure.

According to the MLs, **lack of space** and **poor infrastructure** are potential barriers for the implementation and adoption of the measures. **Cultural issues** are also two potential barriers: **citizens' opposition** to the implementation of different measures and **misuse** of the facilities deployed as part of the measure. **Involvement of all**

**parties** and **adequate communication** also need to be correctly addressed to raise public awareness.

Regarding potential drivers, most of them are related to **financial** aspects like **economic incentives** for users or **new public-private partnerships** derived from the implementation of the measure. Additionally, the fact that most of the measures are part of wider strategic plans at city, regional and national level makes their **objectives** to be **aligned** towards clean mobility.

## Digital

Two clear potential barriers were identified for the implementation of the digital measures. The first one has to do with **involvement and institutional issues**. The **inadequate communication** between the different stakeholders and the **slow reaction time** of public administration might delay measure's deployment. The second potential barrier deals with **technical** concerns for the integration of data ensuring certain levels of accuracy.

The **availability of real-time information** together with **new technologies** implemented for data acquisition could be considered potential drivers for the implementation of the measure.

## Human

**Insufficient communication** and **low citizen participation** cause lack of awareness of the different services. This could represent a barrier in the implementation of the measure but even more during its operation phase. Furthermore, **cultural issues** might be the principal barrier to overcome to achieve the expected change in behaviour.

## TURKU

### Physical

**Funding** and **lack of economical sustainability** are potential barriers identified in Turku for the implementation of the measures included on the physical layer, especially to make them go further than only short-term pilots. **Communication** needs to be properly addressed to raise **awareness** of citizens and to overcome **cultural difficulties** related to the **acceptance** of the measure. Additionally, **positional** barriers like the **unclear role of the city** in the roadmap might affect the scalability and operation of the different measures.

With respect to potential drivers for the implementation of the measures, MLs consider that the work started by the stakeholders in the CIVITAS ECCENTRIC project to improve **involvement** and **communication** would serve as good basis for further

**cooperation.** There are **cooperation structures** established between the region's municipalities and most of the **stakeholders work together** in several ongoing city's processes related to mobility. Finally, in 2020, Turku has signed a voluntary agreement to reduce emissions at construction which will play a fundamental role as driver for the implementation of the measures and to ensure proper functioning over time.

## Digital

Different potential barriers dealing with **involvement** were identified for the implementation of digital measures. Among these, contractual situation, lack of resources and lack of interest might hinder the use of new technologies for data acquisition and management. Other **data related** issues like **ownership, know-how** on utilizing and **data quality** might represent a challenge when dealing with multi-operator information.

The use of open-source code is seen as a **technological** driver to ensure scalability of the measures. Moreover, the inclusion of the measures into the [Service map](#) of the city, is expected to ensure a stable and constant exploitation of them after the project.

## Human

New **cooperation** models are needed to support nudging campaigns. Specific **planning** on how to come up with viable incentives to get the desired (long-term) impact is needed. **Identifying different users' groups** and defining **strategies to reach them** based on their needs are obvious barriers to be overcome for the correct implementation of the measures. Furthermore, specific **problem-related** barriers such as winter conditions may affect measure deployment.

MLs consider that **contextual** geopolitical situations and **previous work** done by the city of Turku in developing climate strategies might support the incentive campaigns included in the measures focused on changing behaviour. **Existing strategic policies** support the measures and extra **involvement** of other parties are expected for promoting the winter brand.

## 2.3. Common and specific barriers and challenges among cities

SCALE-UP internal bilateral meetings and thematic knowledge exchange webinars, organized during the project's first year, in WP2-6, brought into the discussion mostly barriers, detected by the different partners, collected in the following paragraphs.

They are classified by subtopic (number in brackets, i.e. 1.2, see Table 3 FGD Topics and Subtopic) and node (A for Antwerp, M for Madrid and T for Turku)

### 2.3.1. Common barriers:

- Lack of vision alignment or different visions, among the different administration levels (1.2)
- Unclear regulation of data management: Contractual, data anonymization, legal framework (1.4)
- Financial incentives: Organization, standardization, financing. (2.2)
- No synergies between stakeholders (2.5)
- Data collection (4.6): No unified approach for data collection (M), no set of rules for data sources + defining right codes, quality standards (T)
- Data integration (4.7): No systematic methodology to integrate data (A), nor for linking data from different service providers (T)
- Data sharing (4.9): What, why and how? (A), No systematic ways to reach agreements with companies.

### 2.3.2. City specific barriers:

The barriers presented below were only addressed in the node they are mentioned in. Moreover, this does not necessary imply that they cannot be barriers for the other nodes.

#### Antwerp

- No incentives to share data (2.1)
- Different visions among stakeholders (2.3)
- No clear difference between public data and business data (2.4)
- Misinformation (2.5)
- External issues delaying the implementation of the measures (4.1)
- No clear approach for linking bikes with MaaS (4.4).
- Not clear target groups (7.7)

#### Madrid

- Difference in competences & bureaucracy (1.2)
- Controversy for using public space for private usage (on-street charging points). (4.1)
- Inadequate data integration (4.4)
- How to ensure user engagement (challenge) (7.1)

- Finding appropriate communication channels (7.2)
- Low awareness (7.3)
- Dealing with coexistence of bicycles and pedestrians (7.4)
- Not enough citizens/business participation (7.6)
- Challenge: Motivate people on using services (7.7)

## **Turku**

- There is no separate competent authority in FUA level. (1.2)
- Financing to reach long-term sustainability (2.1)
- No systematic use of data for planning (4.8)
- How to create the shared understanding of mobility services for citizens and media (7.2)
- No clear understanding of what customers need (7.7)
- Challenge: Reaching customers (7.9)

### 2.3.3. Main findings summary:

Based on both common and city specific remarks, the following assessment of horizontal integration has been made by layer and its integration needed with the others, including practical examples and questions that need to be addressed in advance to ensure the success of any mobility measure based on the correct integration of the layers involved on it.

#### 2.3.3.1 *Physical layer*

The integration of the physical layer with the digital and human layer, in terms of services and infrastructure has been examined based on the mentioned remarks, resulting in the following points.

#### **Barriers:**

##### Physical-digital:

-In the case of the hubs, when the owner and operator are not the same, there is a risk of data not being shared because of conflict of interest.

For this it is needed to establish a clear data collection methodology for hubs, develop a framework for data collection and for its standardization.



#### Physical-human:

-When the owner of the hub venue is not the same as the company operating that same hub, the company cannot be forced to offer incentives for making it attractive to users.

-Combination of tickets sometimes is not easy if you have different companies

#### Physical-digital-human:

-Different services available- offer included in different APPs- too many APPs not friendly for people to use it

### 2.3.3.2 *Digital layer*

The main barriers for integration with the physical and human layer are described below:

#### **Barriers:**

#### Digital-physical:

-Data from different services could be used for planning purposes and for new mobility services, however it is not properly collected, nor correctly used for planning purposes.

#### Digital-human:

-If the plan is to foster sustainable mobility and to ease the use of PT through data/information, target groups should be identified in advance.

-Target group not identified. To achieve correct integration the following questions must be addressed: How data should be collected and presented to users? How to avoid information overload? How to use data to change citizens behaviour?

### 2.3.3.3 *Human layer*

Finally, integration between the human layer and the physical and digital ones are examined:

#### Human-physical:

-How to reach to customers and get the needed data about them?



Human-digital:

-What role can local authorities have in event management so that to have a say in promoting sustainable mobility solutions for events (regulatory role?, partnerships with event organisers?)

-How to create long-term impact with behavioural approaches?

-Lack of regulation to support incentives

Human-digital-physical:

-Lack of cooperation models

## 3. External Vision for Efficient Implementation of SCALE-UP strategies

The following sections present the main findings of the Focus Group Discussions conducted for each urban node following the methodology explained in 1.2.2.

### 3.1. Key elements in the current mobility ecosystem

#### 3.1.1. Antwerp

When asked about Antwerp's mobility ecosystem (see Annex 3: FGD findings), *almost all* participants agreed on certain statements: removing cars from the city centre is a challenge; there is a lack of consistency (plans, norms) in respect to cars; the fact that people get to choose, because cars are still allowed in the city, is seen as a problem.

Within the **transport-mobility** topic, private vehicle was the most debated. They also mentioned public transport and infrastructure, mainly in relation to vertical integration: TEN-T's corridor impact on the city, highways, and fast train connections. Other points mentioned on Antwerp's mobility ecosystem were related to the **land use & urban planning** topic, where East-West connections were seen as a weak point, due to geographical barriers. On the other hand, the focus on urban design was pointed out as a strong point.

These observations from Antwerp's FGD, are illustrated in a simple way in the tag cloud below (Tag cloud based on the comments made on Antwerp's introductory question (Figure 4)).



Figure 4 Tag cloud based on the comments made on Antwerp's introductory question

### 3.1.2. Madrid

Participants in the Madrid's FG, when responding to the short statement on mobility's ecosystem (Figure 5) mentioned mostly public transport (PT) as a strong point, due to its large supply, accessibility, and good quality, among others. Madrid's FG participants mainly focused on strong aspects of the mobility ecosystem, which were almost all on the **physical layer**, and related to the transport-mobility topic. Unlike Antwerp's case, Madrid FG participants did point out some strong points for horizontal integration among the **digital layer**, such as the fact that PT operators are well integrated, there is an ongoing effort to integrate NMS, even someone highlighted Madrid as an ongoing experimental platform for shared mobility start-ups. On the other hand, the main weak areas within the mobility system, were more related to the **human horizontal layer** and to governance and vertical integration. It is worth mentioning that *many* agreed that most problems are in the periphery, where it is more challenging to improve things and there is a higher rate of use of the car.



Figure 5 Tag cloud based on the comments made on Madrid's introductory question

### 3.1.3. Turku

In Turku's FG, the participants highlighted a more heterogeneous mix of strong and weak points, in relation to their mobility ecosystem, although most of them were within the physical layer. Some of the weak points mentioned were the great dependence on car due to lack of public transport alternatives and multimodality, especially in the periphery (transport-mobility topic), the difficulty to find cycling routes for new users, some ending in the middle of nowhere (planning topic), or local businesses opposing pedestrianizations (economic-financing topic). In terms of the strong points mentioned, we could highlight PT as reliable and available in the city centre, 90% of people living within 30min cycling distance from the city centre and the enhancement of active modes (pointing out their benefits, for health and economy, as well as the potential for infrastructure becoming friendlier for bicycles).



Figure 6 Tag cloud based on the comments made on Turku's introductory question

The tag cloud (Figure 6) represents graphically what was said and the importance given to each comment.

## 3.2. Challenges, Barriers, and Drivers by Topic for Horizontal Integration

This section explains the (external) findings on barriers & challenges, and drivers, for horizontal integration. The FG participants' ideas have been classified by topic and subtopic. (For full details please see tables in Annex 3- 6.3).

If we look at the overall comments (Table 13 left (vertical-horizontal), right (barriers, challenges, drivers, recommendations))

Most barriers and challenges pointed out in **Antwerp's** FGD, were related to the digital layer, whereas most drivers and recommendations were associated with the physical layer (see table 5, Annex 3). In terms of topics (Table 6, Annex 4), most of the barriers belong to **Innovation-ICT** (38%), and most drivers/recommendations fall into the **transport-mobility topic** (31%).

Most barriers/challenges discussed in **Madrid's** FGD belong to the digital layer (51%). Nevertheless, the most discussed topic was "**inclusive society**" (25%). In terms of drivers/recommendations, most comments relate to physical layer (39%), and the most prevalent topic was again "**inclusive society**" (26%).

For **Turku**, both barriers/challenges and drivers, pointed out issues more related to the physical layer (48% for the former and 42% for drivers) and directly related to the **transport & mobility** topic (35% and 28%).

The human layer was, both in Antwerp's and Madrid's case, the one with less comments. Whereas in Turku's FGD, 38% of barriers/challenges and drivers fell under the human layer.

For as the less commented topics, sustainability/environment, and urban planning/land use, were by far the least commented ones, in all 3 cities.

Table 16-Table 22 in Annex 3, show in detail the barriers/challenges and drivers/recommendations pointed out in all 3 FGD, organized by the 7 topics: urban policies integration & management (1), economy-financing-business (2), transport-mobility (3), innovation-ICT (4), environment/sustainability (5), land-use/urban planning (6) and inclusive society (7). The following points discuss the most relevant findings on each one separately.

### 3.2.1. Urban Policies Integration and Management

Within the first topic of “Urban Policies integration & management”, one of the subtopics that came up in the 3 FGDs was related to Law, policies, ordinances & plans (1.1). As barriers, the idea of contradictory parking measures came up (A), as well as having a too ambitious or unrealistic modal split as a target (A, T). Pricing measures were mentioned as a challenge (M), on top of slowness for developing plans (T). Legislating bottom to top was brought up as a driver (T).

Comments related to Political will (1.3) were all barriers, such as a poor political support to NMS (M, T). In terms of regulation of data & NMS (1.4), most of the comments are barriers, such as unresolved privacy issues (A), unclear regulation for data protection (M) and perceived uncertainty of data use ownership (M, T).

**Integration required:** *Regarding this topic, the main issues for integration are related to governance, which is directly addressed in D1.1. In short, there is no consensus on how mobility is understood and how mobility policy is created (bottom to top or top to bottom). However, integration with the digital and human layer, especially in relation to data management (digital-human) and privacy issues(digital-human)), needs to be addressed.*

### 3.2.2. Economy/Financing/Business

In the “Economy-Financing-Business” topic, there were several ideas common to all FGs. In the subtopic new business models & mind-sets (2.1), the lack of an operator or service provider figure (A, M) was pointed out as a barrier, and the market distortion on mobility services concept as a challenge (M). In respect to drivers, the rapidly changing market (M), the creation of a business for data input and release and bringing start-ups closer to the end user needs (T) were among the most discussed. Under the subtopic economic incentives & UVARs (2.2), only drivers came up: raising private vehicle cost (M) and PT incentives combined with LEZ (T). The subtopic Public-Private Partnerships (PPP) & stakeholders (2.3), emphasizes the barrier of poor PPP collaboration (M, T) and drivers, such as new PPPs including universities and small municipalities, data on P&R (A), or making PPP collaborations more attractive for private companies (M). Under the umbrella of commercialization of data services (2.4), the barriers focus on the lack of profit or business on data analysis (A) and of a business model for data provision (M) as well as taking processing and storage as free services for granted (M). As a driver, participants mentioned a marketing-oriented approach to data (M). If we talk about power relations (2.5), only barriers were

mentioned: excessive power of private companies as well as their non-mobility-oriented agenda (A,M) and high competition and lack of cooperation between competitors or partners (M).

**Integration required:** For this topic, all the barriers identified in FGD are related to the digital layer, while drivers are more transversal and are due to either attitudes and behaviour (human layer) or infrastructure needed (physical layer).

### 3.2.3. Transport/Mobility

The “Transport-mobility” topic is the most extensive topic discussed, both in number of ideas and in the variety of them. Private vehicle/car (3.1) was widely debated, with mainly barriers mentioned, such as lack of better alternatives to car (A), high rate of car ownership (M, T) and getting used to a car as a barrier for going back to PT (T). The main driver pointed out was regulating car ownership (T). The mentions related to public transport (PT) (3.2), include barriers such as travel time and cost (M,T), electric vehicles trying to replace PT (T) or regulated offers and fixed frequencies (M). The drivers mentioned: PT available in the city centre (M, T) and making PT as easiest choice (T). Under the active modes (3.3) subtopic, only one barrier is mentioned (difficulty to find cycling routes, T), and drivers, such as thinking of active modes as the cheapest solution (T). Comments on Infrastructure, re-use, reallocation (3.4), were mostly about changing the existing infrastructure. Main highlights on barriers: TEN-T connections (A), excess of car infrastructure (M) and the challenge of changing the existing system (T). Highlights on drivers include more biking spots in city centres (A) and transferring infrastructure from cars to bikes (A, M, T).

**Integration required:** Under this topic, the main barriers detected are linked to a correct integration between the physical layer and the human layer. For instance, to reduce car-dependency, it is necessary to offer appealing alternatives that may, not only, require changes in infrastructure or offered services, but also in human behaviour and attitudes.

### 3.2.4. Innovation/ICT

“Innovation/ICT” was discussed deeply in the 3 FGs. EV, e-bikes, e-scooters (4.1) were seen mainly as challenging in all nodes, and even as a possible threat to Public Transport (T), whereas New Apps (4.2) were considered as drivers (M, T). Technology (4.3) was thought of as both a challenge and a driver. It may not be the solution to every problem (T) but ICT is considered a powerful impulse (M). MaaS/Integration of NMS (4.4) is still not fully developed (A, M), and services such as ticketing, and NMS



are not integrated yet (M). However, unification of MaaS (M) is seen as a driver. Knowledge on data (4.5) still proves challenging, with lack of know-how with data among local authorities (M) and data reliability (M) considered as barriers. In Collection & storage of data (4.6) the lack of a single repository for data (M) is an important barrier while availability of data (A, T) is mentioned as a driver. Access and unification of data varied in between nodes, with some local authorities not having access to data (A) being considered a barrier and open data being regarded as a driver (T). A Data driven approach (4.8) proved to be a challenge for Public Transport (M) but a driver for businesses (A). Data management and use (4.9) was considered in all cases a barrier/challenge, with no efficient use of data (M). Regarding a user-centred (4.10) approach, it was not considered user friendly (M).

**Integration required:** *With respect to Innovation/ICT most barriers and drivers are related to the digital layer, however there are integration issues between this layer and both the physical layer and human layer. On the one hand, even if barriers regarding data know-how and management are overcome, physical infrastructure is also needed (for example charging plugs) and a positive attitude and willingness to adopt new technologies is also key.*

### 3.2.5. Environment/Sustainability

“Environment/Sustainability/Energy” was the least discussed topic. Regarding Sustainable Planning (5.1), urban design and sustainable planning focus (M) was perceived as a driver. Health (5.2) related drivers such as citizen science projects (A) and a health and comfort-oriented discourse were mentioned (M). However, regarding resources and energy (5.3) energy transition related to transport was seen as a challenge (M).

**Integration required:** *While Environment/sustainability was scarcely mentioned, integration between the physical layer and the human layer (appealing to people’s health and comfort) were highlighted and are necessary to achieve more environmentally friendly mobility habits.*

### 3.2.6. Land Use/Urban Planning

“Land Use/Urban Planning” was one of the least debated topics. Regarding land use (6.1), urban sprawl (A, T) was seen as a barrier along with a lack of land use- public space-P&R analysis (M). Some services and accessibility related drivers (6.2) such as easy accessibility to services in city centre were mentioned. Urban strategic planning (6.3) was considered outdated (A) or undeveloped (M). Urban design and city



structure were also discussed, with (lack of) planning to foster change behaviour being considered a barrier (T). Pedestrianization benefiting local businesses (T) and connecting green spaces (M) were mentioned as drivers.

**Integration required:** *When new developments are planned it is vital to foster mixed uses to reduce commuting and improve liveability. Besides all the deployment needed (related to the physical, the digital and the human layers) it is directly related to a correct integration with governance (vertical integration, addressed in D1.1)*

### 3.2.7. Inclusive Society

The last topic debated was “Inclusive Society”. Pattern of use/ Habits (7.1) was discussed, strong everyday habits (M) and being used to the car (T) were some of the main identified barriers. Children getting used to PT and active modes was considered a driver (T). As to communication (7.2), poor communication methods and strategies (M) were frequently mentioned as a barrier while properly communicating actions was a driver (M). Ignorance of MaaS among users (M) and lack of awareness (M) were highlighted as barriers regarding awareness (7.3) although NMS bringing awareness on data (A) was considered a driver. In relation to culture (7.4), the slow change of the mobility culture paradigm (M) alongside PT reputation and perception (M) were considered main barriers while children getting used to PT was considered (T) a driver. In training (7.5), only barriers were identified, such as lack of digital skills (M). In participation (7.6), an important barrier is the poor citizenship involvement (M). When it comes to users' needs (7.7), the most mentioned drivers were affecting the end user behaviour (T) and encouraging new business to discuss needs with potential users (T). Lack of empathy (M) and the car's emotional value (M) were identified as main perceptions-emotions (7.8) barriers while meeting people's expectations (M) is a main driver. In methods of inquiry (7.9), recurrent Travel Behaviour Surveys (3-4 years) (A) and identifying the non-customer (M) were highlighted as drivers.

**Integration required:** *For the last topic, most barriers and drivers are related to the human layer, although it is worth highlighting the potential of correctly integrating the digital layer and the human layer to bring a positive change in attitudes towards PT and NMS as well as alter mobility habits.*

### 3.2.8. Validation of the SCALE-UP themes

If we look at the main internal barriers extracted from WP2-6 webinars, related to horizontal integration, and we group them in the same 7 topics as the external findings from the FGD (see 6.1 Annex 1: Internal ), we can mention some interesting findings for the Project in general and WP2-6 in particular:

- From the 7 topics analysed in the FGD's, only 4 of them came up implicitly in the internal analysis: (1) Urban policies integration & management (table 1, annex 1); (2) economy-financing-business (table 2, annex 1); (4) innovation-ITC (table 3, annex 1) and (7) inclusive society (table 4, annex 1).
- Mobility-transport comes up explicitly, when talking about SCALE-UP mobility measures, maybe since in the project, it is a transversal issue.
- The remaining 2 topics, (5) environment & sustainability and land use & urban planning (6), are not part of the discussion.
- Most barriers and drivers need integration between layers to be overcome/pursued. However, some of them, belonging to specific topics (such as Innovation/ICT) have some aspects that are specific to one of the layers.

## 3.3. External vision: common and city specific barriers, challenges and drivers (input for D1.5 -Guidelines and Recommendations)

The information gathered in the FGDs shows an external point of view and is valuable input for **D.1.5 “Guidelines and recommendations for other cities/ urban areas on the SCALE-UP strategies for vertical and horizontal upscaling”** along with the internal findings both **on vertical (D1.1) and horizontal integration (D1.2)**.

### 3.3.1. Most repeated barriers and drivers

As explained previously (3.1.1), comments and arguments made by FGD participants were categorized depending on how frequently they came up in the discussion, shedding light on what themes or issues are more relevant at least from an external point of view. It is of interest therefore to see the most repeated barriers and drivers, that can be found in Table 23 and Table 24 in Annex 3.

The most repeated **barriers/challenges**, among many or almost all FGD participants for Madrid and Turku, were related to **“inclusive society”**, however, in the case of Antwerp, this topic was not so widely discussed. Frequently mentioned barriers were poor communication methods (7.2, M) and lack of awareness (7.3, M) along with the emotional value of the car (7.8, M), also in regard to saving time thanks to car use (7.8, T). Many barriers/challenges were also related to **“ICT-Innovation”** such as not fully developed MaaS (4.4, A) or no single repository for data integration and management (4.6, M), among many others, which comes to show that ICT-Innovation has room for improvement. Contradictory parking measures (1.1 A), poor PPP collaboration (2.2, M) and PT/multimodality not as available in metropolitan area (3.7, T) are also worth highlighting.

Although many barriers/challenges were related to **“ICT-Innovation”**, so are most of the **drivers/recommendations**, as well as to **“inclusive society”**. New ticketing methods (4.4, M) and unification of MaaS (4.4 M) and availability of data (4.6, A) came up frequently in the FGD. As for inclusive-society, changes in the pattern of use such as children getting used to PT/active modes (7.1, T), properly communicating actions (7.2, M) and NMS bringing awareness on data (7.3, A) were important drivers according to the FG participants. Urban design and sustainable planning focus (5.1, M) was highlighted, and to a lesser extent, the benefits of pedestrianization for local businesses (6.5, T) or modal split going in the right direction (3.4, A).

### 3.3.2. Common ideas in the 3 FGD

There were some common barriers and challenges that came up in more than one city’s FG (see Table 25 Annex 3). Within the topic of **“urban policies integration management”**, two main barriers came up in the 3 FGD: unrealistic or too optimistic modal split (1.1 law, policies, ordinances, plans) and unresolved privacy issues, not clear data protection and ownership & privacy issues (1.4 regulation of data & NMS). Common barriers and challenges brought up in **“economy-financing-business”**, were lack of service provider figure (2.1 new business models and mindsets), lack of or poor PPP collaboration (2.3 PPP & stakeholders), data analysis and provision business model (2.4 commercialization of data services) and the fact that private companies have excessive power and non-mobility-oriented agenda (2.5 power relations). The recurrent barriers mentioned related to the transversal topic of **“transport & mobility”** were car ownership/dependency (3.1), traveling time (3.2 public transport), making things easier for bikes (3.3 active modes), transfer/transform

infrastructure (3.4 infrastructure, re-use, reallocation), poor accessibility and lacking connectivity (3.5 accessibility & connectivity), poor multimodality (3.7 multimodality) –especially in metropolitan areas. If we look at the comments related to “**ICT-innovation**”, repeated barriers mentioned in different cities were NMS not fully developed or integrated (4.4 MaaS & NMS) and no single repository (4.6 collection & storage of data). Barriers mentioned in relation to “**environment-sustainability**”, were city specific. Within the topic of “**land-use and urban planning**”, only one recurrent barrier, sprawl (6.1 land use). And related to the last topic, “**inclusive society**”, the barrier that came up in more than one city was the lack of citizen’s engagement (7.6 participation).

There were fewer common drivers mentioned in more than one city. Making things easier for bikes, was mentioned as a driver by Antwerp and Turku (3.3, “**transport and mobility**” topic). Within “**ICT-innovation**” topic, the power of ICT in mobility was recurrently mentioned as driver (4.3 technology & information), hand in hand with the unification of MaaS (4.4 MaaS & NMS) and the existence and availability of data (4.6 collection & storage of data). The health debate and health-oriented discourse (5.2 health), within the “**environment-sustainability**” topic, was a common driver. In the last topic, “**inclusive society**”, finding out people’s perception, expectations, emotions, and opinions, was pointed out as driver in all three FG (7.8 perceptions-emotions), closely related to another repeated driver: using in-person surveys to gather users’ information (7.9 methods of inquiry).

### 3.3.3. City specific ideas

#### Antwerp

As shown in Table 15 of Annex 3, most barriers and challenges pointed out in Antwerp’s FGD, were related to the digital layer. In terms of topics, most of the **barriers** belong to **Innovation-ICT (38%)**, **transport-mobility (22%)** and **urban policies integration (19%)** (see Table 15 Set of tables showing percentages of participation on barriers & challenges for the 7 topics of discussion on each of the urban nodes

All these can be reflected on the city specific barriers and challenges that were pointed out in Antwerp’s FGD (Table 26 Annex 3).

Some of Antwerp’s main barriers are related to a lack of coordination, either in relation to urban policies, such as the lack of Transport Region parking policy (1.1) or the lack of coordination between operators and administrations regarding data

collection and its administration (2.5). Freight (3.8) was not discussed except in Antwerp, however just as a remark although it is one of the main issues for the city because of the port (not mentioned in the FG). The lack of data, either on everyday displacements (4.3) or real-time schedule info (4.3) is considered a big challenge as well as planning for people's needs (4.10). Land use and urban planning was pointed out as outdated (6.3). Very few remarks were made in regard to inclusive society, in comparison to the other urban nodes.

Most **drivers and recommendations** mentioned in Antwerp, are associated with the **physical layer** (see Table 14). For as the most discussed topics, when pointing out drivers/recommendations, **transport-mobility** came up on **31%** of conversation, then **Innovation-ICT (25%)** and **inclusive society (19%)** (see Table 15)). Worth highlighting are the following drivers and recommendations, pointed out only in Antwerp's case.

A decree on accessibility (1.1) is suggested, which could be of interest to other urban nodes. Antwerp is ahead of many cities when it comes to data, and they considered that making it mandatory to share data would be a driver and at the same time it could set an example to other cities. PPPs were also considered a driver, for example in the case of data from private companies being shared with universities or small municipalities for data analysis. Shared mobility was emphasized, recommending it to be included in parking norms (3.6) or as a driver as in the case of the region wide shared bike system (3.4) along with better biking infrastructure (3.4). Citizen science projects were mentioned as incentives (5.2). Citizen participation led by access to data as a specific driver is also worth noting.

## Madrid

As explained earlier, most barriers in Madrid's FGD belong to the digital layer (see Table 14). Nevertheless, the most discussed topics(see Table 15 Annex 3) were first "**inclusive society**" (25%), and then "**ICT-innovation**" (23%) and "**economy-financing-business**" (17%). Therefore, many city-specific barriers and challenges pointed out in Madrid (Table 27, Annex 3) fall upon these topics, differing from Antwerp's.

Some specific barriers mentioned in Madrid are the high competition between partners (2.5) and market distortion on the mobility service concept (2.1). Private EV contradictions (4.1) (do we want an increase in private vehicles even if they are EV?) are also worth noting. Sustainability related issues were discussed more than in the other urban nodes, emphasizing the challenge of the energy transition in the transport sector (5.3). The lack of consensus on the mobility zone of influence (6.4) was also remarked. As previously said, inclusive society was widely discussed, and



barriers such as strong mobility habits (7.1), ignorance of MaaS among users (7.3), unidentified cultural patterns (7.9) and the cars emotional value (7.8) among others came to light.

While most of the barriers were related to the digital layer, Madrid's **drivers** are related mainly to the **physical layer (39%)**. However, most drivers regard to **“inclusive society” (26%)**, **ICT (23%)** and **economy-financing-business (16%)**.

Of all the specific drivers pointed out, the following are of the upmost interest. Business creation for data input and release (2.1) is seen as a powerful driver along with making PPP collaborations attractive (2.3). A marketing-oriented approach to data (2.4) is also seen as positive. A Sustainable planning focus (5.1) is considered as a driver along with the city's polycentric morphology (6.5). In relation to “inclusive society”, the importance of awareness campaigns on good behaviour is identified as a driver while administrations properly communicating measures is recommended. Another powerful driver in Madrid is the good acceptance of NMS.

## Turku

Turku differs from Antwerp and Madrid. In Turku, barriers and drivers are linked to the **physical layer**, followed by the **human** (see Table 14), contrary to what happened in Antwerp and Madrid where both barriers and drivers were majorly related to the digital layer. The most discussed topics were **“mobility-transport (35%)”** followed by **“inclusive-society” (28%)** (Table 15 Annex 3

Some of the most relevant specific barriers to Turku are the following. There is a lack of political willingness to develop PT alternatives due to fear of the public (1.3). For those used to the car it is difficult to change back to PT (3.1). At the same time, piloting P&R has not yet detected a good place for implementation. In regard to planning, an identified barrier is cycling routes ending in the middle of nowhere (6.5) while a challenge is street infrastructure/planning that fosters a change of behaviour (6.5). Regarding society, the most remarkable barriers are lack of awareness and policies that do not resonate with individuals' life (7.3) as well as the comforts that car use offers in terms of time (7.1). Local businesses opposing to pedestrianization (7.8) was also brought up.

When it comes to drivers, as previously mentioned, most were related to the **physical layer (42%)** and under the **“mobility-transport” (28%)** and **“inclusive society” (24%)** topics.

Worth mentioning is the bottom to top policy making approach (1.1) as a driver, the suggestion of car ownership regulation (3.1) along with an emphasis on active



modes, with drivers as their cheapness (3.3), or the availability of cycling routes (3.3). A new platform to find all available charging stations regardless of company provider (4.8) is recommended. A powerful EU message for stronger citizen engagement (7.2) is considered a driver. Also related to society are other specific drivers such as citizens opinion – not happy with the current system (7.8), willingness of citizen's involvement in policies in the early stages (7.6) and children getting used to PT and active modes (7.1).

### 3.3.4. Synthesis of the FGDs for SCALE-UP

FGDs have allowed us to gain an external view on both vertical and horizontal integration from SCALE-UP. At the same time, it makes it possible to find both common issues and more specific ones as perceived by the participants of each FGD. When it comes to SCALE-UP layers it is worth highlighting how Antwerp and Madrid focused more on the digital one, while in Turku the scope was on the physical layer. Antwerp disregarded the human layer in comparison to Madrid and Turku, where it was referenced more frequently. In regard to the most discussed topics, it is of interest how aspects related to “Innovation-ICT” were discussed widely in Antwerp and Madrid, particularly in relation to barriers, while mentioned to a lesser extent in Turku. Different issues falling under “transport-mobility” were classified as drivers in both Antwerp and Turku, whereas for Madrid, drivers were more related to “inclusive-society”. It is also remarkable how little “sustainability” was discussed, although it can be considered underlying in most of the comments made by the FGD participants. The FGD have also enabled to discover potential drivers and recommendations as well as barriers that had not been brought up in the different SCALE-UP assessments.

## 4. Preliminary Conclusions for Horizontal Upscaling *(to be updated – Deliverable 1.7)*

### 4.1. Preliminary conclusions and suggestions

As explained in section 1.2, an initial diagnosis was carried out to understand the context for change in each urban node and at the same time analyse the level of integration among layers. To this end, it was concluded that prior to integration, the individual layers (physical, digital, human) require improvement.

Currently, all urban nodes present a similar level of integration among layers. Each of them presents both issues specific to their contexts and common concerns. Regarding common barriers, a poor coordination between mobility providers, a lack of unified approach to data, and little consideration of human behaviour among many more, result in bad integration between all 3 layers.

It is of utter importance to reach a balance among the layers, as supported both by different observations from SCALE-UP stakeholders and from the external experts. It has been observed that in most of the cases some of the interventions are not aligned with citizens' needs, highlighting the need to pay extra attention on the human layer.

The deployment of infrastructure and services to foster sustainable mobility will only be successful if awareness is brought on the negative externalities of our day-to-day mobility decisions and if there is willingness to change our behaviour towards sustainable decisions.

#### **Antwerp**

As a driver the correct integration between the **physical** and the **human** layer fosters the adoption of cycling when infrastructure and services (bike lanes and shared bicycle system) are improved.

The integration of **human, physical and digital** layers plays a fundamental role to ensure seamless journeys for commuters. Which is currently hindered due to the existing barriers for the implementation of MaaS such as the insufficient relationship between stakeholders (not all NMS included or willing to be part of) and municipalities not following a common approach. Additionally, data-related issues (i.e. availability of real-time data) also conditions the adoption of MaaS by citizens.



## Madrid

The good integration of the **human** and the **digital** layer can be seen in the good acceptance of new mobility services due to the existing digital penetration rates among the citizens (mainly in the city).

The high competition between stakeholders causes market distortion on mobility services (physical layer) jeopardizing its integration with the digital layer (limited data sharing) hampering the adoption of PT and user centric approaches.

## Turku

The low satisfaction of citizens with certain mobility services could be used as a driver to promote the integration of the **digital**, the **physical** and the **human** layers through the deployment of data driven businesses, encouraged to discuss needs with mobility providers and potential users.

Lack of citizens involvement (poor awareness raising and ineffective communication campaigns-human layer) limits the positive effect of the different interventions in infrastructures and services (physical layer).

## 4.2. Preliminary recommendations

The results of applying the proposed framework to SCALE-UP nodes highlight the need to carry out an **initial diagnosis** of the current state of mobility in the nodes. This diagnosis should be based on the **project's stakeholders'** views including the complementary perspective of **experts** in different fields. Guidance questions included in Annex 1 and semi structured interviews considering planning, implementation, and cooperation/organization issues are recommended as effective ways to gather stakeholders' views.

As a complementary input we suggest conducting Focus Groups Discussion inviting experts from the seven relevant fields of section 1.2.2.2 which are considered to cover all the needs of the three horizontal layers of the mobility system. A more detailed description of the key elements needed for the FGDs is presented in Annex 2 Guidance for Focus Group Discussions.

Both approaches serve to **identify the barriers and challenges** for the **implementation of mobility measures** and for the **integration of the layers** (physical, digital, human) to which the measure belongs. Additionally, the expertise of the stakeholders and invited experts allows them to draw **recommendations** based on previous experience in similar projects and on lessons learned as an added value.

The inputs obtained in the diagnosis can feed the **Avoid-Shift-Improve (ASI)** method that serves as guidelines to ensure the correct functioning of each layer and therefore ease the integration among them.

Figure 7 presents a preliminary diagram of the application of the ASI approach on different topics that cover the three layers. It worth mentioning that topics 5 “environment sustainability” and 6 “land use urban planning” have been merged due to similarities in the barriers and drivers detected.

### Problem definition

CORE OBJECTIVE *Enhance the take-up of Smart, clean and inclusive mobility*

METHODOLOGICAL FRAMEWORK *Vertical/Horizontal & layers*



Policy instruments	Regulatory	Economic	Transport	ICT	Environment & Planning	Social Agenda
<b>AVOID</b>	Red	Red	Red	Red	Red	Red
<b>SHIFT</b>	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
<b>IMPROVE</b>	Green	Green	Green	Green	Green	Green

OUTCOME *Develop user-centric and data-driven strategies*

Figure 7 Preliminary diagram for developing user-centric and data-driven strategies

The ASI approach follows an implicit hierarchy and is considered context sensitive. Its application is expected to serve to prioritize actions towards the integration focusing first on avoid, followed by shift, and improve measures to enhance the take-up of smart, clean, and inclusive mobility. In Figure 7, an example of how A-S-I methodology is applied is included, in regard to PT: one should avoid car use, shift car use to PT use, and improve the PT service.

We have selected from the internal and external discussions, the most discussed ideas (by some, many or almost all participants) as well as common ideas and issues raised in the urban nodes.

Table 4 Main findings from the ASI methodology by topic

	AVOID	SHIFT	IMPROVE
<b>REGULATORY</b>	<ul style="list-style-type: none"> <li>-Contradictory parking measures</li> <li>-Unclear regulation on data protection</li> <li>-Unclear regulation on ownership and privacy issues of sharing data</li> <li>-Complicated bureaucracy</li> </ul>	<ul style="list-style-type: none"> <li>- Perceived uncertainty on data use ownership to a more certain knowledge on data use ownership</li> <li>- From unrealistic/too optimistic modal splits to a more realistic one</li> <li>-To a bottom-top approach, affecting the end-user's behaviour</li> <li>-From the current understanding of mobility to an understanding of a transversal mobility concept (in theory and practice)</li> <li>-To an integrated vision between regional areas and cities</li> </ul>	<ul style="list-style-type: none"> <li>-The speed of developing plans</li> <li>-The number of resources made available to small municipalities for data related issues</li> <li>-Local authorities support to NMS</li> <li>-The speed of the Public Administration</li> <li>-Vision alignment at different administrative levels</li> </ul>
<b>ECONOMIC</b>	<ul style="list-style-type: none"> <li>-Market distortion on mobility services concept</li> <li>-Private companies' power and non-mobility-oriented agenda</li> <li>-Not having a business model for data provision and analysis</li> <li>-Misinformation</li> <li>-Lack of synergy between stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>- To start-up businesses approach that is closer to end user's needs</li> </ul>	<ul style="list-style-type: none"> <li>-PPP collaboration</li> <li>-Services by creating a service provider figure</li> <li>-Data management by business creatin for data input and release</li> <li>-Standardization of incentives and study who will assume the cost of incentives</li> </ul>
<b>TRANSPORT</b>	<ul style="list-style-type: none"> <li>-EV replacing Public Transport</li> </ul>	<ul style="list-style-type: none"> <li>-People's mindset, from being used to the car to getting used to PT</li> <li>-Car ownership/dependency</li> <li>-Existing infrastructure use, typically car use, to active modes</li> </ul>	<ul style="list-style-type: none"> <li>-Accessibility and connectivity</li> <li>-Multimodality</li> <li>-PT availability and multimodality in city centre and in metropolitan areas</li> </ul>



# SCALE-UP

User-Centric & Data Driven Solutions for Connected Urban Poles

<p><b>ICT</b></p>	<ul style="list-style-type: none"> <li>- Inefficient use of data</li> </ul>	<ul style="list-style-type: none"> <li>-To a PT centred approach</li> <li>-To more user-friendly interfaces</li> <li>-To an integrated strategy for data collection, provision and sharing services, as well as implementing a single repository for data integration and management</li> </ul>	<ul style="list-style-type: none"> <li>-MaaS development and unification</li> <li>-Integration of NMS</li> <li>-Integrated ticketing</li> <li>-Data availability and reliability</li> <li>-Know-how of ICT/data among local authorities</li> <li>-Unification of charging point providers in one app</li> <li>-Technology for charging stations</li> <li>-And create new platforms to find available charging stations</li> <li>-Promote data-driven businesses</li> <li>-The use of data for planning</li> </ul>
<p><b>ENVIRONMENT AND PLANNING</b></p>	<ul style="list-style-type: none"> <li>- Urban sprawl</li> </ul>	<ul style="list-style-type: none"> <li>-Urban design and planning's towards sustainability</li> <li>-Current PT discourse to a health and comfort one</li> <li>-Street infrastructure and planning to one that fosters a change in behaviour</li> </ul>	<ul style="list-style-type: none"> <li>-Planning with a Land use-public space-P&amp;R analysis</li> <li>-Update urban and environmental planning</li> <li>-The connection between green spaces to impact habits and health</li> <li>-The perception and understanding of pedestrianization as benefiting local businesses</li> </ul>
<p><b>SOCIAL AGENDA</b></p>	<ul style="list-style-type: none"> <li>-Poor communication methods and strategies</li> <li>-Lack of awareness from policy makers that ends in policies that don't resonate with individuals' everyday life</li> </ul>	<ul style="list-style-type: none"> <li>-Strong everyday habits</li> <li>-The attitude to PT by getting children used to it and to active modes</li> <li>-The emotional value of the car to PT and active modes</li> <li>-The importance time has in our lives to a conception of it that encourages the use of other modes</li> </ul>	<ul style="list-style-type: none"> <li>-Awareness</li> <li>-Speed of change of the mobility culture paradigm</li> <li>-PT perception and reputation</li> <li>-Education and training in respecting "shared facilities"</li> <li>-Citizen involvement</li> <li>-Digital skills and resources</li> <li>-Communication of actions, measures, and changes</li> <li>-Knowledge and gathering of people's perception, expectations, opinions</li> <li>-Knowledge by recurring travel behaviour surveys carried out in person</li> <li>-Identification of the non-customer/user of PT</li> </ul>



## 5. Bibliography

- [1] R. Cascajo, E. Lopez, F. Herrero, A. Monzon, User perception of transfers in multimodal urban trips: a qualitative study, *Int. J. Sustain. Transport.* (2019) 1–14, <https://doi.org/10.1080/15568318.2018.1476632>.
- [2] M. Sandelowski, Real qualitative researchers do not count. The use of numbers in qualitative research, *Res. Nurs. Health* 24 (3) (2001) 230–240, <https://doi.org/10.1002/nur.1025>.
- [3] J. Van Cauwenberg, J. Van Holle, V. Simons, B. Deforche, Environmental factors influencing older adults' walking for transportation: a study using walk-along interviews, *Int. J. Behav. Nutr. Phys. Activ.* 9 (1) (2012), <https://doi.org/10.1186/1479-5868-9-85>.
- [4] A. García-Martínez, [Modelización de la penalización del transbordo en el transporte público](#), in: Doctoral Thesis, ETSI Caminos, Canales Y Puertos, Universidad Politécnica de Madrid, 2018.
- [5] D. Li, X. Zhou, M. Wang, Analysing and visualizing the spatial interactions between tourists and locals: a Flickr study in ten US cities, *Cities* 74 (2018) 249–258, <https://doi.org/10.1016/j.cities.2017.12.012>.



## 6. ANNEXES

### 6.1. Annex 1: Internal assessment

#### 6.1.1. Guidance Questions

##### 1. PLANNING

- 1.1. Are there any important changes (since the grant agreement) in the scope and extension of the measure?
- 1.2. Who is in charge (main actors)? What planning department/organization?
- 1.3. Is it part of an already existing plan?
- 1.4. Is it related to other Measures outside Scale-Up?
- 1.5. What is the interrelation between the physical, digital, and human layers in this measure? Is there a weaker one? Which layer is more related with this measure? How does this measure address the different dimensions?
- 1.6. Is there already accessible information on the measure for citizens (dissemination processes)?
- 1.7. Do you know / Have you considered citizens awareness and acceptance of the measure? How?
- 1.8. Is there already certain kind of behaviour that prompted the measure?

##### 2. IMPLEMENTATION

- 2.1. What is the current state of the measure?
- 2.2. Is it part of an already existing Project or its starting from scratch?
- 2.3. Is the time frame the same as the one in the Scale-Up proposal?
- 2.4. The impacts expected from the measure are in short-medium-long term?
- 2.5. Which stake holders will be part of the implementation process?
- 2.6. What is already defined in terms of implementation? Funding? Design + construction? Data Analysis?

##### 3. COOPERATION/ORGANISATION

- 3.1. Has the opinion of the citizens been considered for the measure?
- 3.2. Are there any public-private partnerships?
- 3.3. Can you identify the attitude of the citizens towards the measure? How?
- 3.4. Which is the funding source?



## **PART 2: CHALLENGES, BARRIERS & STRATEGIES (DRIVERS)**

- 4.1. Have you identified new challenges different from the ones presented in the grant agreement?
- 4.2. Which ones?
- 4.3. Do you consider there are legal or institutional barriers that may affect the measure? If yes, when? In the implementation? Operation? If so, how would you proceed?
- 4.4. Do you consider there are financial barriers that may affect the measure? If yes, when? In the implementation? Operation? If so, how would you proceed?
- 4.5. Do you consider there are political and cultural barriers that may affect the measure? If yes, when? In the implementation? Operation? If so, how would you proceed?
- 4.6. Do you consider there are practical or technological barriers that may affect the measure? If yes, when? In the implementation? Operation? If so, how would you proceed?

### 6.1.2. Internal comments

Barriers from SCALE-UP internal bilateral meetings and thematic knowledge exchange webinars (WP2-6). They have been organized according to the topics that were discussed in the 3 FGD.

*Table 5 Internal barriers and challenges for horizontal integration, in (1) urban policies integration and management*

#### **URBAN POLICIES INTEGRATION AND MANAGEMENT**

SUBTOPICS	NODE	BARRIERS AND CHALLENGES	PHYSICAL	DIGITAL	HUMAN
1.2	A				
	M	Difference in competences	X	X	
		Bureaucracy	X		
	T	Lack of vision alignment at different administrative levels		X	
Different visions between city and region No common administrative structure in the FUA level		X	X		
1.4	A	Data anonymization How to manage data obtained by the operator		X	
	M	No regulation for data management		X	
	T	No legal framework/agreements		X	
		Contractual issues related to data	X		



(1.1) Law, policies, ordinances, plans / (1.2) Public administration & management / (1.3) Political will / (1.4) Regulation of data & NMS (ownership & privacy issues)

Layer: Physical (Knowledge exchange **WP3** & Knowledge exchange **WP5**)  
 Digital (Knowledge exchange **WP4**)  
 Human (Knowledge exchange **WP6**)

Table 6 internal barriers and challenges for horizontal integration, in (2) economy-financing-business

### ECONOMY-FINANCING-BUSINESS

SUBTOPICS	NODE	BARRIERS AND CHALLENGES	PHYSICAL	DIGITAL	HUMAN
2.1	A	No incentives to share data		X	
	M				
	T	Financing to reach long-term sustainability?	X	X	
2.2	A	Financial incentives. Who assumes the cost? Complex to standardize/personalize incentives	X		X
	M				
	T	No clear technical ways of managing incentives			X
2.3	A	Different stakeholders=different visions	X		
	M				
	T				
2.4	A	No clear difference between public data and business data		X	
	M				
	T				
2.5	A	Missinformation	X		
	M	No synergy between stakeholders		X	
	T	No synergy between stakeholders		X	

(2.1) New business models & mindsets / (2.2) Economic incentives & UVARs / (2.3) PPP & stakeholders / (2.4) Commercialization of data services / (2.5) Power relations

Layer: Physical (Knowledge exchange **WP3** & Knowledge exchange **WP5**)  
 Digital (Knowledge exchange **WP4**)  
 Human (Knowledge exchange **WP6**)





Table 7 internal barriers and challenges for horizontal integration, in (4) ICT-innovation

ICT-INNOVATION					
SUBTOPICS	NODE	BARRIERS AND CHALLENGES	PHYSICAL	DIGITAL	HUMAN
4.1	A	External issues delaying measure implementation (COVID-19)	X		
	M	Controversy for using public space for private usage (on street charging points)	X		
	T				
4.4	A	How to link bikes with MaaS?	X		
	M	Inadequate data integration		X	
	T				
4.6	A				
	M	No unified approach for data collection	X		
	T	Problem in the data sources "there is not set of rules to start" Defining right codes, quality standards		X	
4.7	A	No systematic methodology to integrate data	X		
	M				
	T	How to link data from different service providers?			X
4.8	A				
	M				
	T	No systematic use of data for planning		X	
4.9	A	Data sharing: What, Why and How?		X	
	M				
	T	No systematic way for having agreement with companies. Who should sign the agreements?		X	

(4.1) EV,e-bikes, e-scooters / (4.2) New apps / (4.3) Technology & info / (4.4) MaaS & Integration of NMS / (4.5) Knowledge on data / (4.6) Collection & storage of data (4.7) Access & unification od data / (4.8) data-driven / (4.9) data-management & use / (4.10) user-centered

Layer: Physical (Knowledge exchange **WP3** & Knowledge exchange **WP5**)  
 Digital (Knowledge exchange **WP4**)  
 Human (Knowledge exchange **WP6**)

Table 8 internal barriers and challenges for horizontal integration, in (4) ICT-innovation

INCLUSIVE SOCIETY					
SUBTOPICS	NODE	BARRIERS AND CHALLENGES	PHYSICAL	DIGITAL	HUMAN
7.1	A				
	M	How to ensure user engagement	X		
	T				
7.2	A				
	M	Finding appropriate communication channels			X
	T	How to create the shared understanding of mobility services for the citizens and media			X
7.3	A				
	M	Low awareness	X		
	T				
7.4	A				
	M	Dealing with coexistence of bikes and pedestrians	X		
	T				
7.6	A				
	M	Not enough citizens/business participation	X		
	T				
7.7	A	No clear target groups	X		
	M	How to motivate people to use the services?	X		
	T	There is an understanding but not really an understanding of what customers need			
7.9	A				
	M				
	T	How to reach customers?			X

(7.1) Pattern of use & habits / (7.2) Communication / (7.3) Awareness / (7.4) Culture / (7.5) Training / (7.6) Participation / (7.7) Users needs (7.8) Perceptions-emotions / (7.9) Methods of inquiry

Layer: Physical (Knowledge exchange **WP3** & Knowledge exchange **WP5**)

Digital (Knowledge exchange **WP4**)

Human (Knowledge exchange **WP6**)

## 6.2. Annex 2 Guidance for Focus Group Discussions

### 6.2.1. THE FOCUS GROUP METHODOLOGY

Qualitative methodologies have been widely used in the fields of transport and travel behaviour when exploring new concepts. In the case of the SCALE-UP project and WP1 “Strategies for vertical and horizontal upscaling”, FGs are selected as the most appropriate data collection method, instead of other methods such as interviews or workshops.

#### 6.2.1.1 *FG added value*

WP1 addresses the framework to develop, implement and validate strategies for vertical and horizontal integration in the SCALE-UP urban nodes (Antwerp, Madrid, Turku) and beyond, supporting the take-up of data driven, multimodal, clean, safe and inclusive mobility, in a consistent and comprehensive manner. In addressing WP1’s first objective and completing deliverable D1.1. and D1.2. (Development of the framework for effective strategies on the vertical and horizontal approach), the FG methodology is selected as an appropriate one (which complements the other already taking place in the project), in order to:

- Examine this rather **innovative** framework introduced by the SCALE-UP project, that includes simultaneous **horizontal** (Physical, Digital and Human layers) and **vertical** (urban, FUA, TEN-T functional levels) study of mobility strategies in the city, and their barriers, drivers and challenges.
- Add an **additional** and **external** view coming from experts – outside SCALE-UP community - in each of the urban nodes, which differs from the already existing one in the SCALE-UP community (such as the inputs from WP 7 “Monitoring and Evaluation” analysis as well as the “Knowledge Exchange” and “Thematic Cooperation Workshops” inputs of WP2-WP6).

## PHASE 1 2022

Tasks 1.1 + 1.2 / Deliverables 1.1+1.2 **M18**  
Deliverables 1.5 **M18**

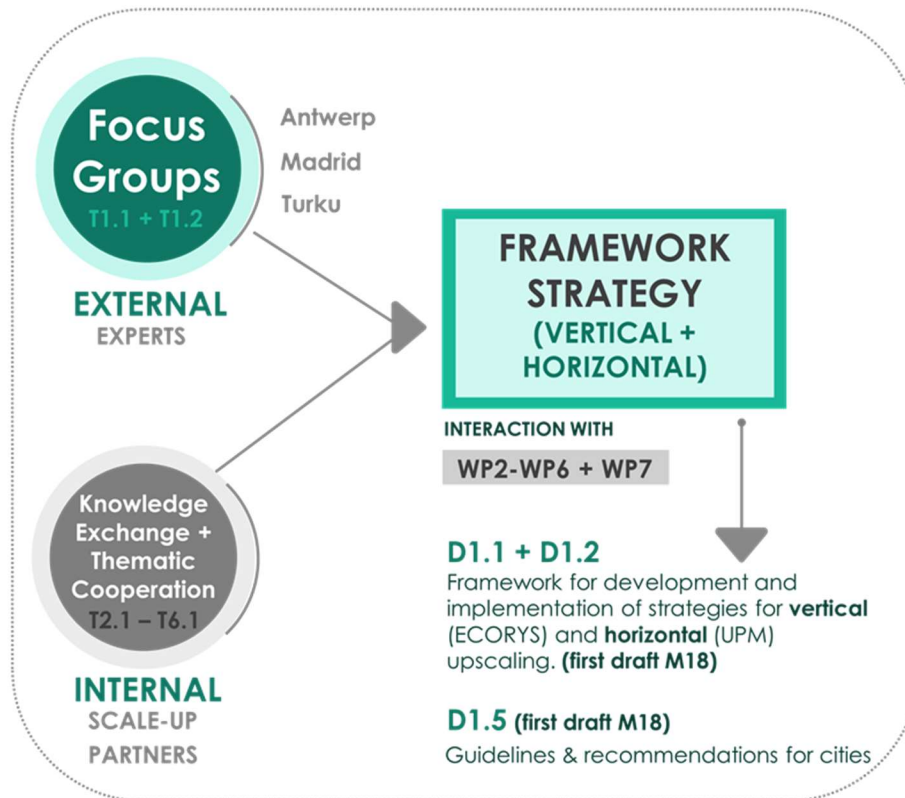


Figure 8 FG Methodology logic in WP1 phase 1 (year 2022 and deliverables 1 and 2)

Focus groups allow to assess innovative concepts that have to be further explored (Morgan, 1996). It is a co-construction research technique that involves **sharing** and **comparing**, as well as organizing and conceptualizing. It usually brings together **6-10 people**, cautiously **recruited**, based on some **specific criteria**. It employs a guided **interactional discussion**, as a means of **generating valuable information**. Information either **explores** and **identifies** potential **areas of inquiry** or **clarifies** a subject matter that eludes other research instruments **due to its particular nature** (Powell et al., 1996). These characteristics make it a good methodology at this particular stage of WP1, since it differs but at the same time complements the other methodologies used in SCALE-UP and WP1, such as workshops. Nevertheless, we must keep in mind both the added value in relation to other methodologies, as well as the weaker points in order to get the best benefit out of it.

## ADDED VALUE FOR SCALE-UP

The FG methodology brings the following strong points and added value to WP1 development of the framework for strategies on the vertical and horizontal approach:

- It allows to explore this **innovative** strategy framework, characterized still by a lack of documentation and reporting
- It will provide **greater insights** than other qualitative methods such as surveys or workshops, about the current status on horizontal and vertical integration in the 3 urban nodes, and find things the 3 urban nodes experts agree on and things they differ from.
- It brings new/different and **external** ideas on the **drivers** and **barriers** to consider on the **integration challenges**, which can help in proposing **recommendations** on integration actions in Antwerp, Madrid and Turku, and it will enable a cross-analysis between the 3 with the findings.
- It will be helpful as part of the **developmental stage** of constructing the “Guidelines and recommendations for cities” document (D1.5, due months 18 and 48), as well as preparing the workshops organized as part of WP1 in the coming years (2023, 2024) that will ultimately lead to the validation of strategies and guidelines (intermediate and final version of D1.3 and D1.4, months 24 and 48, as well as the final versions of D1.1 and D1.2)

## THINGS TO KEEP IN MIND

The following precautions and the logic behind this document have to be taken in account in order to take advantage of all the FG methodology possibilities:

- The role of the investigator can impact the process of data collection and its quality. The researcher has a more direct, intimate, and sustained contact with study participants than in other modes of inquiry. For these reasons, qualitative investigators must secure trust and develop a rapport with participants, engaging them in discussion, and guiding them through the session. This should be stated in the findings.
- Questions need to be carefully crafted in order to get as much feedback as possible from participants and in order to avoid entering in delicate matters (i.e. political orientation in Madrid's case).
- Findings are often suspected of having been unduly influenced by the investigator's biases and interpretations. Researchers should follow a **systematic process**, paying attention to **validity**, **consistency**, and **reliability** issues during data collection and analysis.



## 6.2.1.2 Goals of the urban nodes FGDs

Even though the scope of this FGD guide is set in phase 1 (year 2022) and deliverables D1.1 and d1.2 (and first draft of deliverable 5)- explained in figure 1, it is important to keep in mind the whole framework and work planning of WP1 (see Figure 8) and interconnections with other WPs.

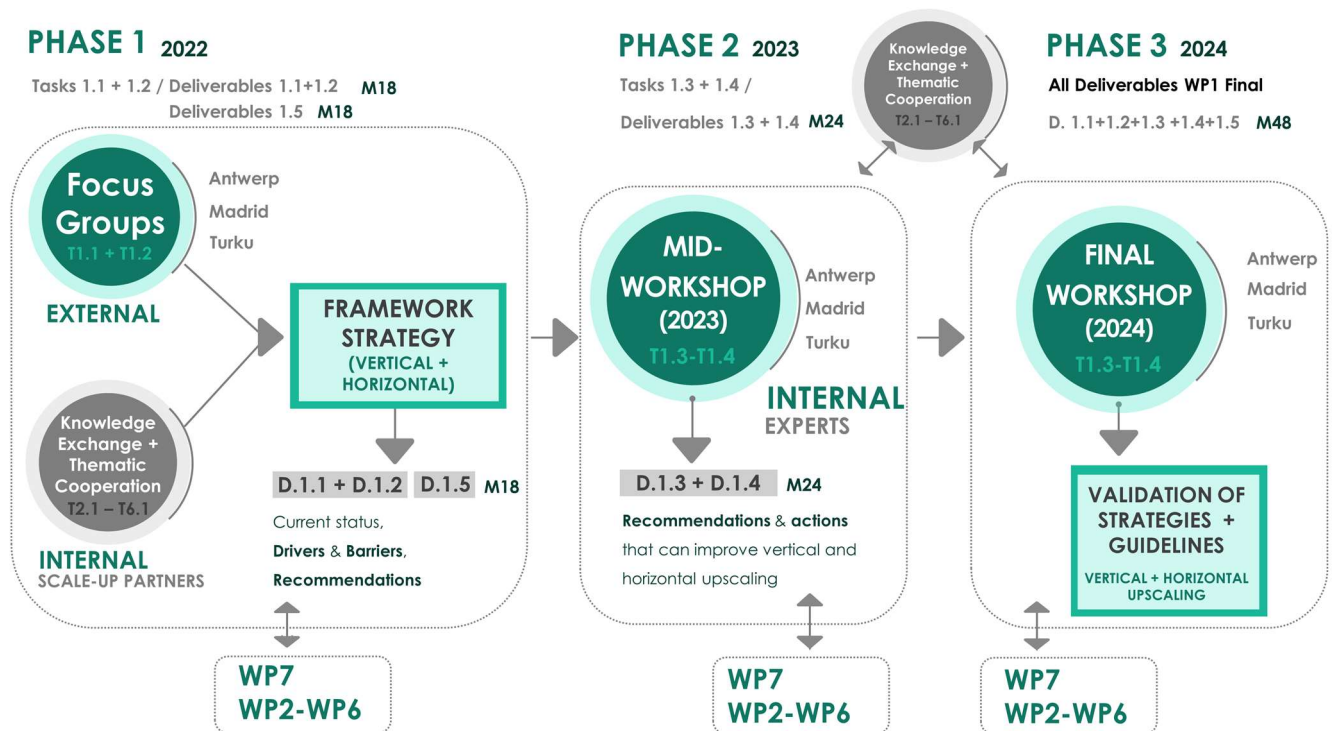


Figure 9 FG Methodology logic within WP1 framework and work planning

### INTERACTION OF WP1 WITH WP7

The interaction of WP1 and WP7 is an essential part of the SCALE-UP project, emphasizing the need of a thoroughly defined framework for the development and implementation of strategies for vertical and horizontal integration. This gives sense to the urban nodes Focus Groups, as an added tool to gain more knowledge (externally) than the one to be obtained by the internal methodologies proposed.

WP7, in charge of “Monitoring and Evaluation” develops and implements a layered **evaluation framework**, consisting of 3 main focusses: evaluation on the level of the SCALE-UP measures, evaluation on the level of the Functional Urban Area (FUA) and evaluation of the strategies for integration (TEN-T and multi-layered mobility system). **There is interaction with WP1 to discuss the crucial elements for effective vertical and horizontal integration, translated into indicators** of both concepts possible in SCALE-UP urban nodes and beyond.



WP7 will also conduct the actual evaluation of the measures. For each of the SCALE-UP intervention fields (WP2-WP6) intermediate evaluation findings will be produced as input for the thematic cooperation in WP2-6 and **the strategies for integration in WP1** (see Figure 9) Later on in the project, **starting from the frameworks developed in WP1** defining vertical (city-FUA- TEN-T-) and horizontal (multi-layered mobility system) integration, and the joint efforts to define indicators that measure the level of vertical and horizontal integration, WP7 will evaluate the level of integration of the SCALE-UP Urban nodes.

## INTERACTION OF WP1 WITH WP2-WP6

The thematic cooperation and knowledge exchange workshops (months 1-46) of the intervention fields (WP2-WP6), will exchange knowledge and build up capacity around each intervention field (Governance, Multimodal, Data, Clean-safe-and inclusive, and behavioural change) between the 3 SCALE-UP urban nodes, as part of tasks 2.1-6.1. Relevant stakeholders from the three urban nodes are meeting on a regular basis, ensuring a permanent cross-sharing of knowledge during the whole demonstration period. **There is a direct relation with WP1 Strategies for integration** which gives guidance on the vertical (across governance levels and boundaries) and horizontal integration (across the different mobility layers; physical/infrastructural, digital, and human). **The current status of the urban areas and challenges including recommendations – all of this coming from WP1 tasks T1.1 and T1.2 -, will be the starting point of discussion.** This is another key point where the findings from the urban nodes Focus Group Discussion, will help leaders of T1.1 (ECORYS) and T1.2 (UPM) have an in-depth analysis of the current status of the 3 urban areas, their main challenges and possible recommendations, in order to bring ideas to the thematic cooperation workshops.

## INPUT IN VERTICAL & HORIZONTAL UPSCALING FRAMEWORK

- Help define vertical and horizontal integration indicators (taking in account input from deliverables 2.1-6.1).
- Defining findings: most relevant criteria, elements, methods and processes required for vertical and horizontal upscaling
- Give guidance on vertical and horizontal integration(WP2-WP6)
- Recommendations guide

The outputs and general goals of SCALE-UP and in particular of those of WP2-6 have been taken in mind when putting together this guide. Figure 3 shows which are the main output of WP2-6, connected to each of the intervention fields each WP focuses on. Figure 4 shows the connection between these intervention fields and the FG dynamic, which is designed based on 5 open-ended questions that will generate a debate among the participants at various levels:



- Multidisciplinary: covering all the spectrum of disciplines related to urban mobility and the participants' areas of expertise (governance, economy/finance, transport/mobility, innovation/ICT, environment/sustainability, land use/urban planning, inclusive society)
- Multifunctional lens: what SCALE-UP refers to “vertical integration”, (city- FUA- TEN-T-)
- Multi-layered lens: what SCALE-UP refers to “horizontal integration”, (physical, data, human).

This complexity in the preparation of the document and the different lenses, will be used also when coding the transcription.

## SCALE-UP INTERVENTION FIELDS + MEASURES IN EACH URBAN NODE



MULTILEVEL GOVERNANCE MODELS & MULTI-STAKEHOLDER COOPERATION



MULTIMODAL TRANSPORT SYSTEMS (PASSENGER + FREIGHT)



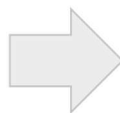
DATA DRIVEN STRATEGIES + TOOLS



CLEAN, SAFE & INCLUSIVE MOBILITY SOLUTIONS



BEHAVIOURAL CHANGE (ACTIVE + HEALTHY MODES FOCUS)



## OUTPUTS SCALE-UP IS TRYING TO ACHIEVE



Guidelines on how to evolve from the traditional SUMP or SULP (already in place in 3 urban areas) to an improved multi-level and multidisciplinary approach.  
Improved cooperative governance models with more collaboration between stakeholders, vertically across governance levels and horizontally across sectors and disciplines.  
Governance models going beyond the scope of urban nodes and focus on regional cooperation on the FUA level.  
Innovation partnerships for public-public and public-private cooperation and for the involvement of civic society and Innovative finance models.



Guidelines and recommendations to implement an urban area network approach of multimodal hubs to foster the demand for sustainable transport and mobility, including the selection, design and implementation of multimodal hubs based on user needs and experience.



Data framework analysis of the different data strategies within the urban areas including blueprints, Guidelines and lessons learned on how to build a data ecosystem and partnerships, Building blocks needed, Regulation (license models), Integration and Interoperability challenges



Design and demonstration of innovative clean and zero emission mobility solutions  
Regulatory framework translated into open data services  
Solutions based on efficient smart grid use



Toolbox based on awareness raising and nudging tools (human dimension), digital tools such as route planners and MaaS (digital dimension), creating space and options (e.g. multimodal hubs, extra offer, etc) (physical dimension). This tool will also pay attention to the need for user insights to validate behavioural change approaches, and the role events can play to stimulate sustainable travel.

Figure 10 SCALE-UP outputs for each intervention field

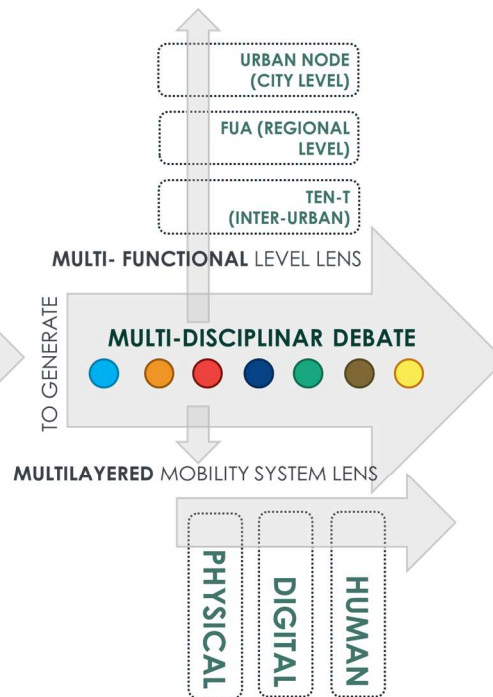
## WHAT ARE WE LOOKING AT?

- SCALE-UP INTERVENTION FIELDS + MEASURES IN EACH URBAN NODE**
-  MULTILEVEL GOVERNANCE MODELS & MULTI-STAKEHOLDER COOPERATION
  -  MULTIMODAL TRANSPORT SYSTEMS (PASSENGER + FREIGHT)
  -  DATA DRIVEN STRATEGIES + TOOLS
  -  CLEAN, SAFE & INCLUSIVE MOBILITY SOLUTIONS
  -  BEHAVIOURAL CHANGE (ACTIVE + HEALTHY MODES FOCUS)

## FGD FOCUS

5 OPEN QUESTIONS

## HOW ARE WE LOOKING AT IT?



## WHAT ARE WE TRYING TO FIND?

### FINDINGS

- CURRENT STATUS ON + HORIZONTAL UPSCALING
- DRIVERS AND BARRIERS ON THE INTEGRATION CHALLENGES
- RECOMMENDATIONS ON INTEGRATION ACTIONS TO ANTWERP, MADRID AND TURKU

### TO PROPOSE

Framework for development and implementation of strategies for vertical (ECORYS) and horizontal (UPM) upscaling.

Figure 11 Connection of SCALE-UP intervention fields with the FG dynamic and the findings expected with this methodology.

## 6.2.2. FOCUS GROUP PREPARATION

To organise an effective and qualitative focus group, the preparation phase is of great importance. This first phase consists mainly in planning beforehand certain aspects.

### 6.2.2.1 Moderator, Facilitator and Observer/Note-taker

A team composed of SCALE-UP members is brought together to **oversee and be in charge of the focus group** throughout the whole process (before, during and after).

Firstly, the team is in charge of picking participants and preparing the questions and main areas of discussion. The team also manages the FG and collects all the information. Finally, the team is in charge of coding, analysing and interpreting the results.

UPM, jointly with ECORYS, will oversee the process for the 3 FG's. Madrid's FG will be the first one (and the only one not conducted in English because of language limitations), and will serve as a guide for the next two (in Antwerp and Turku). UPM team will conduct the FG in Madrid, will present and moderate the FG, collect and manage the information, and transcribe the results which will be translated to English, in order to be shared with ECORYS (as part of WP1) and with the SCALE-UP community. Each urban node can name

moderator(s), facilitator(s) and observer(s), based on their criteria, preferably internal to SCALE-UP and familiar with the project, the measures in the particular node where the FGD is taking place and with knowledge on transport mobility and the areas of discussion.

A **Team Leader(s)** will be responsible for each FGD, who will be in charge of supervising the research team, overseeing the systematic coding of the information as well as keeping original copies of all the information, notes and recordings in a safe place. The leader must also provide guidance for interpretation and will be ultimately responsible for the final report, even if parts are written by other members.

**Moderator:** The individual taking the role of moderator, will be in charge of presenting the SCALE-UP project, the main measures in the urban node where the FGD is taking place and will close the discussion at the end of each FGD. He/she should be a partner of the SCALE-UP project.

**Facilitator:** Preferable 2 people who know really well the specific FGD context (of each urban node and cultural nuances, but do not necessarily have to be part of SCALE-UP) will be in charge of preparing questions and guiding the discussion. Facilitators assume a position of responsibility that influences group outcomes. While facilitators should assume responsibility for the group process, they should not attempt to apply content expertise (this role is taken by the moderator, who is the individual “presiding” over the discussion).

**Observer & note taker:** Preferably at least 2 people, who will be in charge of recording the process, as well as taking notes and writing down any detail worth mentioning, like body language, or any event that may happen that wasn’t planned. These people should know the SCALE-UP project really well.

### 6.2.2.2 Focus Group Discussion (FGD) Guide

#### Structure

A Focus Group Discussion Guide is developed to determine the information that will be collected. It will be the road map, which will lead the moderator through the different parts of the discussion. It is **simple, direct, and useful**.

The Focus Group Discussion (FGD) will have three main parts:

1. **INTRODUCTION:** In order to put participants at ease and inform them what we are seeking information about
2. **MAIN PART:** From a more general question, to more specific ones that narrow the focus. It gives the opportunity to see if topics arise spontaneously or not.
3. **CONCLUSION:** Has the objectives of summarizing what has been said and ask the participants for any corrections or clarifications, as well as thanking them for their input.

In the case of SCALE-UP FGDs, a semi-structured guide will be used (consistent with published methodologies), covering the following steps:

## **Introduction (5 min)**

First, the moderator introduce himself/herself and the facilitators. Later introduces the aim of the research project. We will introduce the SCALE-UP project and the measures in that particular urban node, as well as the main areas of discussion (Annex 1: Internal assessment) this is the only information shared with participants beforehand). Then we will explain the purpose and structure of the session.

- Confidentiality statement and participant information

The facilitators hands out the confidentiality statement (Annex 3: FGD findings), to be signed by the participants. They also ask the participants to complete a short questionnaire on their sociodemographic data, occupation, expertise, and contact details (this needs to be defined)

## Introductory question (10–15 min)

The aim of these first 10-15 minutes is to introduce the participants to the discussion topic and make them feel comfortable.

The facilitators launch the following open question: How would you describe the current mobility system in your city? Why? “En un titular” / “Elevator pitch” (this needs to be decided)

## **Core discussion of the focus groups (50–60 min)**

To delve further into the discussion topic and the participants' opinions. The facilitators steer the discussion to explore more in-depth and launch the following questions (see table 1).

The facilitators must ensure that the topics listed are covered. In specific cases, the facilitators will have to adopt a more “interventionist” role when required. If any of the topics listed was not spontaneously mentioned by the participants, the facilitators will raise it in order to gather the relevant information.

## **Close of the focus groups (5 min)**

After all the relevant topics have been covered, the facilitators will thank all the participants for their contributions. The moderator will pose an exit question, in order to check and ensure that we didn't miss anything- “Anything else you would like to add?”

## Main Questions

Regarding questions, it is vital that they are simple and short and worded in a way that cannot be answered with a simple “yes” or “no” answer, using words like “why” and “how”.

Since there is one-month difference between the FGD planned in Madrid, and the other two (Antwerp and Turku), Madrid's FGD will serve as an opportunity to see if any question or area

of discussion needs improvement or clarifying. There will be 5 main questions, which can be slightly adapted for each of the FGDs, due to differences in each urban node.

Below are Madrid's FGD main questions (in table 2 you can find them in Spanish, the local language that will be used in the first FGD). It is important to note that they will not be shared with participants in advance:

Table 9 Table 1 FGD Core Questions

FGD MAIN QUESTIONS	
<p><b>1</b></p> <p><b>VERTICAL INTEGRATION</b></p>	<p>Decision-making process &amp; <b>implementation</b> procedures. Are they really efficient for introducing new policies &amp; actions that could transform the Madrid mobility system? Consider the different planning levels: <b>city</b> (Urban Node), <b>region</b> (FUA), access to <b>interurban</b> transport (TEN-T)?</p>
<p><b>2</b></p> <p><b>HORIZONTAL INTEGRATION</b></p>	<p><b>Governance</b> of transport infrastructures, mobility services and data. Are they <b>integrated</b> and oriented to achieve a more <b>sustainable multimodal mobility behaviour</b>?</p>
<p><b>3</b></p> <p><b>TYPE OF COLLABORATIONS</b></p>	<p>To what extent Madrid <b>stakeholders work together with other policy-makers</b> across the different planning sectors: <b>environment, social, economic, urban development, innovation technologies</b>, etc? Is that collaboration efficient?</p>
<p><b>4</b></p> <p><b>CHALLENGES &amp; BARRIERS</b></p>	<p>Which are the main <b>challenges</b> and <b>barriers</b> of Madrid mobility system to disruptive <b>changes in mobility behaviour</b>?</p>
<p><b>5</b></p> <p><b>RECOMMENDATIONS</b></p>	<p>Are current transport policies and measures valid to solve Madrid <b>sustainable mobility challenges</b>? Could you identify the <b>main drivers</b> to do it?</p>



## Areas of Discussion

All of the questions are open-ended, in order to generate a **multidisciplinary debate** (in the topics: governance, economy/finance, transport/mobility, Innovation/ICT, Environment/sustainability, Land use/Urban Planning, Inclusive society) since the participants were selected based on those expertise criteria, and under two different lenses: **multifunctional** level (urban node-FUA-TEN-T) and **multi-layered** mobility reality (Physical, Digital, Human). See figure 5 below for key ideas. These can all be variables under which responses can be coded and filtered later in the process.

### HOW ARE WE LOOKING AT IT?

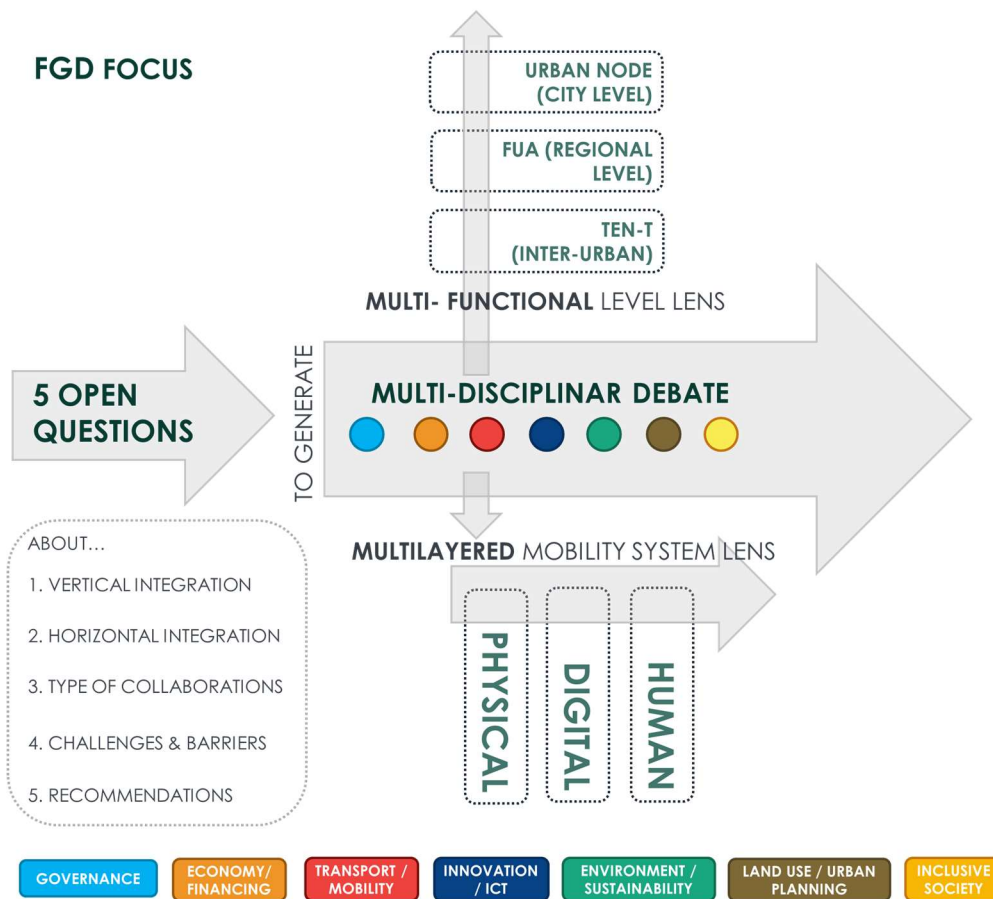


Figure 12 FGD dynamic: 5 open questions in order to generate a multidisciplinary debate, under a multi-functional and multi-layered lens.



## 1. GOVERNANCE

Inter-administrative cooperation, coordination and integration of the formal government, intertwining with civil society and the business fabric to manage public affairs. The administration understood as an agent of configuration of social spaces where the rest of the actors interact to make decisions and a real debate is initiated with all the actors of the mobility ecosystem and with society as a whole.



## 2. ECONOMY / FINANCING

Under the topic economy-financing-business we understand resources (time and money) needed to carry out a specific mobility measure or action. They can be public, private or through public-private agreements. This topic also includes anything business related, like start-ups or new business concepts.



## 3. TRANSPORT / MOBILITY

Mobility is understood as the set of movements, of people and goods, that occur in a physical environment (in the case of urban mobility, in the city and FUA). These trips are made in different types or transport systems: car, public transport, etc., and also by foot and bicycle.



## 4. INNOVATION / ICT

Technological innovation is based on the results of new technological developments, new combinations of existing technologies or the use of other acquired knowledge. The deployment of ICT mobility-related services can help address the challenge posed by urban transport.



## 5. ENVIRONMENT / SUSTAINABILITY

Under this topic we focus on the perspective of experts working to search for greener and cleaner mobility options to tackle the pollution caused by transport, especially in cities.



## 6. LAND USE / URBAN PLANNING

Decisions and actions related to land use and urban planning have an impact on the mobility model, and therefore on the environment and people's behaviour.



## 7. INCLUSIVE SOCIETY

Under this topic users' needs are taken into account, with special attention to those often disregarded because of age, gender or physical impairments





aligned with the “Leave no-one behind” Agenda 2030<sup>4</sup>. Citizenship awareness, communication and understanding are key elements considered for a transition towards a sustainable and safe mobility.

## Content Table

Preliminary codes can be thought in advance as part of the content table (annex 2 –in Spanish) as labels that will help organize the information later. Additional codes can be added later, after the FGD take place, when organizing the actual information.

The content table is the guidance used by the facilitators in order to make sure all topics that are important for the research, are covered. It consists in putting research questions in parallel with the topics and subtopics.

Under each of the 5 open-ended questions, and 5 topics associated with them, some key aspects and guidance questions are proposed (based on the SCALE-UP project objectives), as part of this content table, in order to guide the facilitators in the process. This will not be shared with participants, and will only be used as a guidance in case spontaneously, participants do not respond to the 5 open-ended questions or completely change subject.

## 1. VERTICAL INTEGRATION

**Core question:** “Decision-making process & implementation procedures. Are they really efficient for introducing new policies & actions that could transform the Madrid mobility system? Consider the different planning levels: city (Urban Node), region (FUA), access to interurban transport (TEN-T).”

### Guidance questions and topics

- How can **collaborative planning** be improved in Madrid, based on different governance and geographical levels?
- How can **cooperation between municipalities** at regional level be improved in the Functional Metropolitan Area (FUA)?
- What are the challenges to implement new and **more innovative governance systems**?
- How can we **integrate Madrid's urban node into the TEN-T network**, through collaboration between stakeholders at different levels of governance?

---

<sup>4</sup> E. Samman et al., ‘Leave no one behind’ – five years into Agenda 2030. Guidelines for turning the concept into action, ODI, 2021.

- Do you consider **citizens** are properly **informed**; and is their **opinion taken into account** when it comes to the analysis, decision-making and implementation of mobility measures?

## 2. HORIZONTAL INTEGRATION

**Core question:** "Governance of transport infrastructures, mobility services and data. Are they integrated and oriented to achieve a more sustainable multimodal mobility behaviour?"

### Guidance questions and topics

- Do social changes influence new policies or the other way around? Does mobility data influence behaviour?
- MULTIMODAL HUBS (IN MADRID): Requirements (at service level) + Digitalisation + Network approach + More inclusive and user-centered design
- MOBILITY RELATED DATA USE IN MADRID: Standardization and data sharing + Legal agreements and regulatory frameworks for sharing data + Open source applications
- How is data used? And, does it influence transport and mobility decisions?
- URBAN NODE MaaS (MADRID): MaaS enablement + Single ticketing system- Are the different mobility operators ready to implement MaaS?

## 3. TYPES OF COLLABORATION

**Core question:** "To what extent Madrid stakeholders work together with other policy-makers across the different planning sectors: environment, social, economic, urban development, innovation technologies, etc? Is that collaboration efficient?"

### Guidance questions and topics

- INSTITUTIONAL COOPERATION MODELS: Is there a real exchange of knowledge and expertise in decision-making and joint work between different departments (councils / areas / directorates and general sub-directorates) for a multidisciplinary approach to the city?
- CONTRACTS AND FINANCING (Public-public, public-private...):  
What administrative or legal obstacles are there to implementing new mobility measures in Madrid?  
E.g. mobility data platforms, private car use data, inclusion of freight transport data in the city's mobility model, renewable energies, charging infrastructure for safer and cleaner services, efficient use of the Smart Grid.

## 4. CHALLENGES AND BARRIERS

**Core question:** "Which are the main challenges and barriers of Madrid mobility system to disruptive changes in mobility behaviour?"

## Guidance questions and topics

- Which are the **main challenges** when implementing **Shared Electric Mobility** Services?
- What **strategies** can be used to **promote behavioral change** towards **active** and healthy travel modes?
- Are there incentives and mechanisms to motivate changes in mobility behavior? What about public awareness and acceptance for cleaner and safer transport?
- Are there any mechanisms to understand the user and/or strategies to reach the most vulnerable groups?
- How can we better understand the habits and needs of users and their mobility trends?

## 5. RECOMMENDATIONS

**Core question:** “Are current transport policies and measures valid to solve Madrid sustainable mobility challenges? Could you identify the main drivers to do it?”

### Guidance questions and topics

Using SCALE-UP measures as framework for discussion

- Network of multimodal hubs: passenger, P&R, logistics
- Last mile distribution
- Unified payment system + QR codes + plate- reader system
- Shared mobility + bike sharing programs
- Major events as catalysts for behavioral change
- Intelligent systems for real-time data use

### 6.2.2.3 FGD Participants

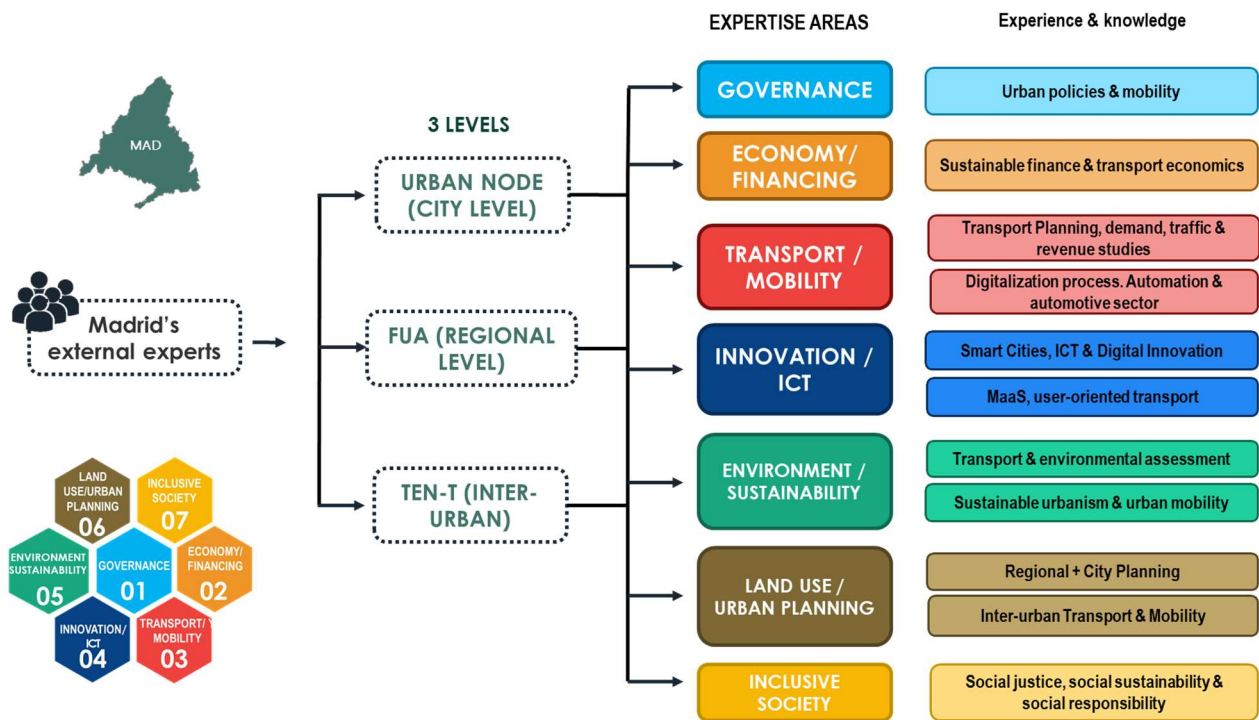
A criterion for selection of the participants is developed, along with the material to be shared with them (see annex 1). Then they must be invited to take part in the Focus Group.

#### Selection Criteria

In general, FGD sessions are organised based on one variable, that allows for differentiating patterns and trends among their members (Morgan, 1996).

In this case, the variable is their field of expertise in urban mobility issues in each one of the 3 urban nodes in SCALE-UP: Madrid, Antwerp and Turku.

The graph below shows the criteria followed to select the participants:



A2. Figure 1 Selection Criteria for FGD participants

## Number

There is no consensus in the literature for the number of participants, however, it is agreed that smaller focus groups have a greater potential. Most of the experts propose adopting group sizes of between 5-10 participants, (Krueger & Casey, 2015). Based on this criterion, group sizes of between **seven and ten members** are established in this research.

## Invitation

In accordance with previous studies, focus groups members are recruited **via email** (Cascajo et al., 2019). All participants will receive **2 pages of information on the SCALE-UP** project via email, the measures of the particular urban node where the FGD is located, and a summary of the main discussion areas of expertise.

## Debate format

The sessions will preferably take place in a round table format. All of them will be recorded to facilitate the subsequent analysis. The moderator will introduce the session and then the facilitators, with group management skills, are appointed to guide the discussion. They have to be careful not to intervene unless a relevant aspect is not spontaneously addressed by the participants. Like already mentioned, in addition to the moderator and the facilitators, (at least) two SCALE-UP members will participate as observers and note-takers. The latter will follow the sessions and make sure that everything runs smoothly and take note of the speaking time.



### 6.2.2.4 Time and resources

The recommended duration is approximately **1.5 hours** per FGD, although this timing is not strict (Morgan, 1996).

- In the SCALE-UP project, all the focus groups will last 1.5 hours (Introduction (5 min) + Open question (10–15 min) + Core discussion (50–60 min) + Closing (5 min))
- The FGD in **Madrid**, will be conducted in **Spanish** (due to the lack of fluency in English of most Spanish people) and later translated to English by UPM-Transyt.
- The FGD's in **Antwerp** and **Turku** are foreseen in **English**, following advice from SCALE-UP members from those urban nodes.

It is recommended to plan the sessions in advance and ensure a relaxed and permissive atmosphere, so that participants can freely express their opinions. Moreover, some flexibility is allowed in the questioning approach to get richer data.

These things have to be considered when picking time and place for the 3 FGD:

- Round table format: conduct the FGD in a room arranged in a way that all participants can see each other, favouring their interaction and active conversation, preferably in a round table.
- Make sure the acoustics are good, in order to record successfully the FGD.
- In Madrid's FGD it is organized at lunch time (2pm-3.30pm), due to people's schedule in Spain and also to favour a relaxed and informal discussion.

## 6.2.3. CONDUCTING THE FOCUS GROUP

### 6.2.3.1 Information collection & management

It is recommended, if possible, that all FGDs are recorded and also, that good notes are taken by the note-takers.

#### **Recording**

A microphone arrow connected to a computer will be used to record the FGDs. We will try it in advance, to make sure that all voices within a certain distance can be captured and differentiated.

#### **Note taking**

Writing down dialogues can be complicated. The note takers should use a systematic and organized method of taking notes and labelling them. All of the note takers should agree on the following points:

- Format for note taking (sample recording sheet or not)

- Language
- Type of statements to record verbatim (word-to-word) and which paraphrase
- Name/number participants (P1, P2 , etc) and decide what associated information about each should be written down, together with a diagram of the sitting arrangement and each person's label
- What non-verbal recommendations should be noted
- How to label notes

### 6.2.3.2 Debriefing & Transcribing

#### Debriefing

Immediately after the FGDs take place, it is important for the sub teams to reorganize all of their materials and discuss their impressions of the FGD, while it is still fresh in their minds. Things to be done after Madrid's FGD in order to improve the next two FGD in Antwerp and Turku:

- Listen to recordings to make sure they were recorded properly. If not, immediately help the note taker(s) to complete the notes with any important information.
- Label notes
- "Relive" the focus groups by talking about initial impressions, the group dynamics, and any important findings. Give feedback to the moderator about his/her performance and suggest areas for improvement for the next two FGDs (eg. Encouraging timid participants to speak more).
- Replay important parts of the discussion.
- Transcribe as soon as possible, and translate to English, to share with ECORYS in order to work together in improving this guide for the other two FGDs.

#### Transcribing

One of these apps to transcribe will be used: Transcribe, Amberscript, Happyscribe , Trint or Watson.

#### Managing information

At the end of each FGD, the entire team should come together and to share experiences, discuss logistical issues, if necessary, modify the discussion guide for the next two FGD.s Any members of the analysis team who did not directly participate in the FGD should attend the meeting so that they can learn what happened (this will be done in English, so that ECORYS can be properly informed). Sample debriefing questions:

- How did the focus groups go?
- What are the most important themes or ideas discussed?
- Were there unexpected or unanticipated findings?
- Do we need to change the wording of the questions for the next focus groups in Antwerp and Turku?



## 6.2.4. REPORTING AND INTERPRETING

### 6.2.4.1 Coding, Organizing, displaying and describing the information

Once we transcribe the FGD, we will start coding and organizing the information. This is an essential step, since coding helps identify patterns, relationships, and meaning in all the information gathered. In addition, coding reduces the quantity of information that we will have to analyse (by focusing on the dialogues relevant to the research questions).

Codes are labels that help analyse information. There are many different ways to code information, including:

- Letters
- Words
- Numbers
- Colours

A mixture of all will be used, following the logic of the areas of discussion colours and subtopics.

Steps to code information:

1. Review content table, containing questions and research themes (remember big picture)
2. Reread notes and transcripts
3. Expand preliminary code list.
4. Read the transcripts together as a team and decide which code to assign to each dialogue. Insert codes in the left-hand column as you go along.
5. Add new codes as needed

Once the transcripts have been coded, the next step is to organize the information. The same colours used for areas of expertise of the participants will be used in order to code what each participant says. It is important to have a record of what is said (and how many times) but also of who says what.

Then, information will be group together by codes. This will be done in excel spreadsheets.

Not all the topics will have the same amount of information. This could indicate that the participants considered those topics especially important or interesting. Also, some participants might talk more than others, and this could also vary between the 3 different FG's on the 3 urban nodes. This should be taken into consideration when analysing the findings. Different quantities of information can also serve as indicators of problems in the FG, however. For example, if one FG produced significantly less information than the others, this might indicate that the participants were not comfortable talking during the FGD.

Description of the information can be done from several different perspectives. Before the end of the analysis process, information will be described by:



- Focus group
- Code (across FGD)
- Research topic (across FGD)
- Participant expertise

Each one of these levels needs to be explored in order to get a clear picture of the findings. Under each of these levels we will use tables, matrices, diagrams, as well as text descriptions. Text description will form the basis of the final report, although tables, matrices and diagrams will be extremely useful for illustrating findings and explaining complex relationships.

**Tables** allow to group information, which in turn reveal patterns, trends and relationships. They can also help to see any information that might be missing.

**Matrices** are more sophisticated, with rows and columns. A cross-tabulation matrix of the themes and the “areas of expertise”, for example, will allow us to examine different variables in relation to one another. One set of variables is written in the left hand column (i.e. barriers for a more sustainable mobility system) and the other set of variables is written across the top row (i.e. recommendations). This way, we can put Xs in the boxes of the matrix when two of the variables go together (eg. When a particular recommendation can help overcome a particular barrier).

**Diagrams** will allow us to visually illustrate complex relationships and process. They are especially useful for illustrating cause and effect relationships. Findings can also be summarized using **tag clouds** (see figure 7). This mechanism allows to provide a simple and effective means to visually communicate the most frequent words (and themes) that come up in the FGDs (transcription texts) by using different font sizes (Li et al., 2018). To this end, the software Wordle will be used. Viégas et al. (2009) indicate two main advantages behind its broad uptake: the importance of design and the fact that the Wordle site works as a creation tool.



A2. Figure 2 Example of tag cloud, for Services expected by travellers regarding MaaS mobile-technologies. (Source: I. Lopez-Carreiro et al. 2020)

## 6.2.4.2 Interpretation: Identifying variables and considering the context

The next step in the analysis process will be interpretation. In order to interpret, we will need to explain what each finding means and what are the implications within the WP1 framework and SCALE-UP project.

Interpretation requires creativity and intuition. It also requires a good judgement and a solid technical knowledge of the subject, which both ECORYS and UPM (WP1) have. Interpretation can be subjective because it is dependent on the viewpoint of the interpreter. ECORYS and UPM will work as a team to help make the interpretation more objective (and locals from each of the 3 nodes who moderated/facilitated or took notes in each of the FGD will be asked to take part in the process in order to interpret possible nuances in each context).

Identification of **variables** that could influence interpretation. Examples:

- Participant dynamics: How did the participants relate to each other? Was there any tension or conflict between them (open or hidden)? Did some of the participants dominate the discussion? If the answer is yes, it is important to reread the results and give some details in the conclusions about the context of the group's dynamics.
- Tone of voice: A statement can be interpreted many different ways depending on the tone of voice used (i.e. differences between enthusiasm, doubt, etc).
- What was NOT said: For example, things we would have expected to come up (because they were part of the knowledge exchange workshops in WP2-6) but did not. Why is that? We will have to pay special attention to silences. Silence following a questions may have a significant meaning depending on the culture. In some, it may mean disagreement, while in others might be a sign of respect.
- What prompted the response: We will look at what provoked the response. I.e. was it directly the open-ended question? or another leading question made by moderator, or was it a response to another participant's comment? Etc.
- Other variables: frequency of the response, number of people who give a response, spontaneity, specificity, etc.

Consideration of the **context** of each of the FGD

This is important because it affects the comfort level of participants and consequently how they might answer questions. Things to consider:

**FGD setting and time.** Was the setting comfortable and the time convenient? Was it different on each of the FGD? Were the participants in a hurry to finish for any reason? Discussion might be shorter if the setting is uncomfortable, the time inconvenient or the participants in a hurry.

**Moderator(s), facilitator(s) and note-taker(s).** How did the participants react to the moderator? Were they comfortable? With a different moderator, the discussion would have taken another direction? The moderator always has an effect on the participants' responses, whether or not he or she intends to. Participants answer questions differently depending on

how comfortable they feel with the moderator and how skilfully the discussion is guided. This will be something to keep in mind when trying to figure out what the results mean.

### *6.2.4.3 Conclusions and recommendations*

Once having considered possible variables that could affect interpretation of findings, we can draw conclusions and make recommendations. This is basically saying WHO said WHAT and WHY, and what we think it means.

Here is where UPM and ECORYS will put together the findings of the FGDs, with those produced at WP2-6 till the moment, before putting together deliverables D1.1 and D1.2 “Development of the framework for effective strategies on the vertical and horizontal approach”, as explained in chapter 1 of this annex.

### *6.2.4.4 Validating results*

After finishing arguments, conclusions and recommendations, the report will be “validated” by sharing it with SCALE-UP community.

## Annex 6.2.1

Material to share with participants (Madrid documents are included as examples):

- SCALE-UP SUMMARY
- AREAS OF EXPERTISE FOR DISCUSSION AND FG DYNAMICS

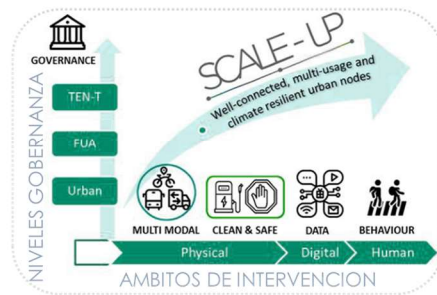


## PROYECTO

SCALE-UP es un proyecto europeo CIVITAS, con 28 actuaciones relativas a la mejora de la movilidad, en 3 nodos urbanos, y con el objetivo final de poder ser escaladas más allá del nivel urbano, en un ecosistema de movilidad interconectada.

## OBJETIVOS

- Gobernanza** (multinivel, multistakeholder): nuevos marcos de gobernanza y normativa a nivel ciudad, FUA<sup>1</sup> y TEN-T<sup>2</sup>.
- Hubs multimodales**: implementación de redes interconectadas y multimodales.
- Movilidad inclusiva, limpia y segura**: proporcionar medidas de movilidad que abarquen estos temas.
- Gestión de información**: Crear una capa de datos digital que sirva de interface con el usuario para mejorar la información y la gestión.
- Comportamiento social**: medidas relacionadas con el usuario y los cambios de comportamiento hacia un mayor uso de los modos activos (andar y bici).



## CONTEXTO

Los nodos urbanos son: Amberes, Madrid y Turku, que forman parte de corredores de la TEN-T. Se implica a actores clave a nivel urbano y regional (tanto de la administración como de los operadores y empresas de transporte) para colaborar y analizar las medidas de movilidad, creando una comunidad práctica.



- (1) Área Metropolitana Funcional
- (2) Red Transeuropea de Transporte
- (3) Mobility as a Service
- (5) Plan de Movilidad Urbana Sostenible
- (5) Park & Ride, Aparcamientos disuasorios

## 8 ACTUACIONES (MEDIDAS)

En el caso de Madrid, SCALE-UP va a evaluar el impacto de 8 medidas concretas, a nivel ciudad y FUA<sup>1</sup>, vinculadas directamente con los 5 campos de intervención:

GOBERNANZA	M1	<b>Relación y cooperación entre niveles de gobernanza</b> Nuevo modelo de gobernanza para el desarrollo de un MaaS <sup>3</sup> para la región involucrando a todos los agentes de la movilidad. PMUS <sup>4</sup> que guíen las políticas de movilidad sostenible	 
MULTIMODAL	M2	<b>Red de aparcamientos disuasorios a nivel local y regional</b> La integración de las instalaciones P&R <sup>5</sup> serán la base, tanto tecnológica como organizacional, para escalar la iniciativa "Aparca-T" a toda la región.	
	M3	<b>HUB de distribución de última milla en Canalejas / Uso datos HUB y V-E</b> Herramienta para ayudar a mejorar el sector de la logística urbana. Hub con alto potencial de replicabilidad en otras zonas, mediante el establecimiento de alianzas y convenios público-privados.	
DATA	M4	<b>MaaS<sup>3</sup> a nivel local y regional/ Análisis evolución patrones de movilidad</b> El piloto será la base para la ampliación de "MaaS CRTM". Madrid mobility 360 Las implementaciones de EMT ayudarán al proceso de digitalización.	
CLEAN & SAFE	M5	<b>Ampliación de BiciMAD fuera de la almendra /Estación móvil</b> Nuevas herramientas y mecanismos para mejorar la funcionalidad de BiciMAD, Posibilidades como los servicios flotantes gratuitos de e-bikesharing.	
	M6	<b>Red de puntos de recarga vehículos eléctricos, BiciPark, Piloto V2G</b> Probar soluciones innovadoras puede respaldar el despliegue de una red	
	M7	<b>Peatonalización de la Puerta del Sol / Estudio posibles peatonalizaciones</b> La creación de zonas peatonales permitirá luchar contra la contaminación del aire y promover modos activos.	
BEHAVIOUR	M8	<b>Campañas de comunicación en grandes eventos a nivel regional / Red de rutas verdes y su conexión con el transporte público</b> Campañas para promover los viajes sostenibles y multimodales en grandes eventos dentro de la región de Madrid.	





**PRINCIPIOS DEL FOCUS GROUP**

Es una discusión entre un grupo de personas sobre un tema concreto

Un moderador va dirigiendo la conversación

Es una discusión informal, por lo que se puede hablar cuando se quiera

**DINAMICA**

De 5-8 participantes, expertos en temas relacionados con la ciudad de Madrid.

Duración: 1.5 horas

**Moderador:** guiará el proceso, dosificando los temas a discutir y dirigiendo en todo momento preguntas al grupo, nunca a individuos concretos. En todo momento mantendrá una posición neutral, absteniéndose de opinar sobre los contenidos de la discusión.

**Observadores:** tomaran notas y analizaran las reacciones

**Monitorización:** Se grabará todo el proceso (consentimiento informado).

**A DEBATIR**

Hasta qué punto las 8 medidas de SCALE-UP ayudan a resolver los **problemas y desafíos** de una movilidad más sostenible, en la ciudad Madrid y la región.

¿Qué barreras / amenazas / sinergias tienen?  
¿Qué efecto sobre las 7 dimensiones de análisis?



**7**

**DIMENSIONES de ANALISIS**






- 1. GOBERNANZA**  
Cooperación, coordinación e integración interadministrativa del gobierno formal, entrelazándose con la sociedad civil y el tejido empresarial para gestionar asuntos públicos. La administración entendida como agente de configuración de espacios sociales donde el resto de actores interactúan para la toma de decisiones y se entabla un debate real con todos los actores del ecosistema de la movilidad y con la sociedad en su conjunto.
- 2. ECONOMIA / FINANCIACIÓN**  
El impacto del modelo de movilidad en la economía de una ciudad. Los recursos (en tiempo y dinero) necesarios para llevar a cabo una medida o actuación concreta sobre movilidad. Pueden ser públicos o mediante acuerdos público-privados.
- 3. TRANSPORTE / MOVILIDAD**  
Por movilidad se entiende el conjunto de desplazamientos, de personas y mercancías, que se producen en un entorno físico (en el caso de movilidad urbana, éstos se centran en la ciudad). Estos desplazamientos son realizados en diferentes medios o sistemas de transporte: coche, transporte público, y andando y en bici.
- 4. INNOVACIÓN / TIC**  
La innovación tecnológica se basa en los resultados de nuevos desarrollos tecnológicos, nuevas combinaciones de tecnologías existentes o en la utilización de otros conocimientos adquiridos. El despliegue de servicios relacionados con la movilidad de las TIC puede ayudar en el desafío planteado por el transporte urbano.
- 5. MEDIOAMBIENTE / SOSTENIBILIDAD**  
El sistema actual de transporte plantea desafíos crecientes y significativos para el medio ambiente, la salud humana y la sostenibilidad, en tanto que los actuales esquemas de movilidad se han centrado en mucha mayor medida en el vehículo privado que ha condicionado tanto las formas de vida de los ciudadanos y de las ciudades, como la sostenibilidad urbana y territorial.
- 6. USOS DEL SUELO / PLANEAMIENTO URBANO**  
Las decisiones y acciones que se toman sobre usos del suelo y planeamiento urbano, tienen un impacto sobre el modelo de movilidad, y por tanto sobre el medioambiente y el comportamiento de las personas
- 7. SOCIEDAD INCLUSIVA**  
Sensibilización y concienciación: elementos clave para avanzar hacia una movilidad sostenible y segura



## Annex 6.2.2

CONTENT TABLE (IN SPANISH- PREPARATION FOR MADRID FG)

### TABLA DE CONTENIDOS: GUIA PARA MODERADOR

PREGUNTAS	TEMA	POSIBLES ASPECTOS A DEBATIR
<p>1. Procesos para la <b>toma de decisiones e implementación</b> de medidas de <b>movilidad</b>. ¿Son efectivos a la hora de introducir nuevas políticas y medidas que transformen el sistema de movilidad de Madrid? Considera los distintos niveles de planificación: <b>ciudad</b> (Nodo Urbano), <b>región</b> (FUA), acceso al transporte <b>interurbano</b> (TEN-T).</p>	<p><b>INTEGRACIÓN VERTICAL</b></p> 	<ul style="list-style-type: none"> <li>- ¿Cómo puede mejorarse la <b>planificación colaborativa</b> en Madrid, basada en distintos niveles administrativos y ámbitos territoriales?</li> <li>- ¿Cómo puede mejorarse la <b>cooperación entre municipios</b> a nivel regional en el Área metropolitana Funcional (FUA)?</li> <li>- ¿Cuáles son los retos para implementar nuevos <b>sistemas de gobernanza más innovadores</b>?</li> <li>- ¿Cómo <b>integrar el nodo urbano de Madrid en la red TEN-T</b>, mediante colaboración entre <i>stakeholders</i> en los distintos niveles de gobernanza?</li> <li>- ¿Se informa a los ciudadanos y se tiene en cuenta su opinión en el análisis, toma de decisiones e implementación de medidas de movilidad?</li> </ul>
<p>2. La <b>Gobernanza</b> en la infraestructura del transporte, los servicios de movilidad y la utilización de datos. ¿Están estos aspectos <b>integrados</b> y enfocados a promover un cambio de <b>comportamiento</b> en los ciudadanos, hacia un modelo de <b>movilidad multimodal más sostenible</b>?</p>	<p><b>INTEGRACIÓN HORIZONTAL</b></p> 	<ul style="list-style-type: none"> <li>- ¿Los cambios sociales influyen en nuevas políticas o al revés? ¿Los datos de movilidad influyen en el comportamiento?</li> </ul> <p><b>HUBS MULTIMODALES EN MADRID</b></p> <ul style="list-style-type: none"> <li>- <b>Requisitos</b> (a nivel servicios) + <b>Digitalización</b> + Enfoque en <b>red</b> + Diseño más <b>inclusivo</b> y centrado en el <b>usuario</b></li> </ul> <p><b>USO DE DATOS DE MOVILIDAD EN MADRID</b></p> <ul style="list-style-type: none"> <li>- <b>Estandarización e intercambio de datos</b> + Acuerdos legales y marcos normativos para compartir datos + Aplicaciones de código abierto</li> <li>- ¿Cómo se usan los datos? ¿Influyen a la hora de tomar decisiones sobre transporte y movilidad?</li> </ul> <p><b>Maas EN MADRID</b></p> <ul style="list-style-type: none"> <li>- <b>Habilitación de Maas</b> + Sistema único venta de billetes ¿Están los diferentes operadores de movilidad preparados para implementar Maas?</li> </ul>
<p>3. ¿Hasta qué punto trabajan juntos los <b>stakeholders</b> y las <b>administraciones</b> relacionadas con la <b>movilidad</b> en Madrid, en los distintos campos del planeamiento urbano: <b>medio ambiente, sociedad, economía, desarrollo urbano, innovación y TICs</b>, etc? ¿Qué aspectos podrían mejorarse?</p>	<p><b>TIPOS DE COLABORACIONES</b></p> 	<p><b>MODELOS DE COOPERACION INSTITUCIONAL</b></p> <ul style="list-style-type: none"> <li>- ¿Existe un intercambio real de conocimiento y <i>expertise</i> en la toma de decisiones y un trabajo conjunto entre distintos departamentos (consejerías / áreas/ direcciones y subdirecciones generales) para un enfoque <b>multidisciplinar</b> de la ciudad?</li> </ul> <p><b>TIPOS DE ACUERDOS Y FINANCIACION</b> (publico-publico, publico-privado..)</p> <ul style="list-style-type: none"> <li>- ¿Qué trabas administrativas o legales existen a la hora de implantar nuevas medidas de movilidad en Madrid?</li> </ul> <p>Ej: Plataformas de datos de movilidad, datos uso coche privado, inclusión datos del transporte de mercancías en el modelo de movilidad de la ciudad, energías renovables, infraestructura de recarga para servicios mas seguros y limpios, uso eficiente del <i>Smart Grid</i></p>
<p>4. ¿Cuáles son los principales <b>retos y barreras</b> a los que se enfrenta Madrid a la hora de promover cambios radicales en el comportamiento en relación a la movilidad?</p>	<p><b>RETOS + BARRERAS</b></p> 	<ul style="list-style-type: none"> <li>- ¿Retos a la hora de implantar servicios de <b>movilidad eléctrica compartida</b>?</li> <li>- ¿Estrategias para promover <b>cambio de hábitos</b> hacia modas de desplazamiento <b>activos y saludables</b>?</li> <li>- ¿<b>Incentivos</b> y mecanismos para motivar cambios en el comportamiento de movilidad? <b>Concienciación</b> y <b>aceptación</b> ciudadana para un transporte mas limpio y seguro</li> <li>- ¿Mecanismos para comprender al usuario y estrategias para llegar a los grupos mas vulnerables?</li> <li>- ¿Cómo conocer los hábitos y necesidades del usuario y su movilidad?</li> </ul>
<p>5. ¿Son efectivas las políticas y medidas de transporte actuales a la hora de resolver los <b>retos para una movilidad más sostenible</b>? ¿Qué factores crees que impulsan y generan cambios en la movilidad?</p>	<p><b>RECOMENDACIONES</b></p> 	<p><b>MEDIDAS SCALE-UP</b></p> <ul style="list-style-type: none"> <li>- Red de <b>hubs multimodales</b>: pasajeros, de aparcamientos disuasorios (P&amp;R), de logística</li> <li>- Distribución <b>logística</b> (mas limpia) de <b>ultima milla</b>.</li> <li>- <b>Sistema unificado de pago</b> + códigos QRs + lector de matrículas</li> <li>- <b>Movilidad compartida</b> + Sistema <b>bicicletas</b> compartidas</li> <li>- Grandes <b>eventos</b> como <b>catalizadores</b> de cambios de comportamiento</li> <li>- Sistemas inteligentes de <b>usos de datos en tiempo real</b></li> </ul>

DEBATE MULTIDISCIPLINAR →

GOBERNANZA

ECONOMÍA / FINANCIACION

TRANSPORTE / MOVILIDAD

INNOVACIÓN / TIC

MEDIO AMBIENTE / SOSTENIBILIDAD

USOS DEL SUELO / PLANEAMIENTO URBANO

SOCIEDAD INCLUSIVA





## Annex 6.2.3

Confidentiality statement – Madrid's as an example (English version in word form)



UNIVERSIDAD  
POLITÉCNICA  
DE MADRID



**Consentimiento para participar en el grupo de discusión del 20 y 21 de abril de 2022 dentro del proyecto SCALE-UP (Soluciones centradas en el usuario y basadas en datos para nodos urbanos conectados)**

Nombre: .....

Apellidos: .....

DNI: .....

El objetivo de este grupo de discusión y la naturaleza de sus temas me han sido explicados al inicio del mismo.

Consiento en tomar parte en el grupo de discusión aportando mis experiencias y opiniones relativas a los temas discutidos.

Consiento en que el grupo de discusión sea grabado en audio con el único objetivo de facilitar la toma de notas del mismo, no pudiendo ser compartidos los archivos de dichas grabaciones con nadie externo al proyecto SCALE-UP.

Mis datos, así como las aportaciones que haga al grupo de discusión, no podrán ser compartidos con nadie externo al proyecto SCALE-UP, a menos que se haya eliminado cualquier tipo de dato o referencia que pueda identificarme.

Entiendo que mi participación es voluntaria y que puedo abandonar el grupo en cualquier momento si así lo deseo.

Madrid, \_\_de abril de 2022  
(Firma debajo)



## 6.2.5. Bibliography

Braun, V.; Clarke, V., Using thematic analysis in psychology, *Qual. Res. Psychol.* 3 (2) (2006) 77–101, <https://doi.org/10.1191/1478088706qp063oa>.

Cascajo, R. et al., User perception of transfers in multimodal urban trips: a qualitative study, *Int. J. Sustain. Transport.* (2019) 1–14, <https://doi.org/10.1080/15568318.2018.1476632>.

Cauwenberg, J. Van; et al., Environmental factors influencing older adults' walking for transportation: a study using walk-along interviews, *Int. J. Behav. Nutr. Phys. Activ.* 9 (1) (2012), <https://doi.org/10.1186/1479-5868-9-85>.

Debus M. (1998). *Handbook for excellence in focus group research*. Washington, DC: Academy for Educational Development

Denzin, N.K.; Lincoln, Y.S. *The SAGE Handbook of Qualitative Research*, fourth ed., Sage, Thousand Oaks, 2011.

Kidd, Pamela S. & Parshall, Mark B. (2000). "Getting the Focus and the Group: Enhancing Analytical Rigor in Focus Group Research". *Qualitative Health Research*.

Krueger, R.A.; Casey, M.A., *Focus Groups: A Practical Guide for Applied Research*, fifth ed., Sage, Thousand Oaks, 2015.

Kitzinger, J. The Methodology of Focus Groups: the importance of interaction between research participants. *Sociol. Heal. Illn.*, 1994, 16, 103-121.

Lopez-Carreiro, I., et al., (2020). Urban mobility in the digital era: An exploration of travellers' expectations of MaaS mobile-technologies. *Technol. Soc.* 63, 101392.

Li, Y., & Voegelé, T., (2017). Mobility as a service (MaaS): challenges of implementation and policy required. *Journal of Transportation Technologies*, 7(2), 95-106; doi:10.4236/jtts.2017.72007.

Morgan, D.L., (1996). Focus Groups. *Annual Review of Sociology*, 22, 129–152; doi:10.1146/annurev.soc.22.1.129.

Powell, R.A., et al., (1996). Focus groups in mental health research: enhancing the validity of user and provider questionnaires. *International Journal of Social Psychology*, 42(3), 193-206; doi: 10.1177/002076409604200303.

Sandelowski, M. Real qualitative researchers do not count. The use of numbers in qualitative research, *Res. Nurs. Health* 24 (3) (2001) 230–240, <https://doi.org/10.1002/nur.1025>.

Viégas, F.B., et al., (2009). Participatory visualization with Wordle. *IEEE Transactions on Visualization and Computer Graphics*, 15(6), 1137 – 1144; doi:10.1109/TVCG.2009.171.



## 6.3. Annex 3: FGD findings

Table 10 ANTWERP'S Current Mobility Ecosystem (part 1 Focus Groups)

### ANTWERP

Participation	LAYER	STRONG	WEAK	SUBTOPIC	1	2	3	4	5	6	7
					POL	ECON	MOB	ICT	SUST	PLAN	SOC
<b>INTRO</b>											
In a short statement, how would you describe Antwerp's mobility ecosystem? Which are its strong and weak aspects/points?											
<b>PHYSICAL</b>											
✓✓	Large municipal investment	X		1.4							
	Urban design focus	X		6.6							
	East-west connections-geographical barrier		X	6.2							
✓✓✓	Remove cars from city center-challenge		X	3.1							
	TEN-T European corridor impact on traffic		X	3.4							
	Car & trucks traffic issues		X	3.1							
	Highway-Barrier			6.2							
	Fast connections lack of hierarchy by PT			3.2							
✓✓✓	lack of consistency (plans, norms) in respect to cars		X	3.1							
<b>DIGITAL</b>											
-----											
<b>HUMAN</b>											
	Traffic & lack of space triggers sustainable transportation	X		7.4							
	Efficiency of advertisement campaigns	X		7.2							
✓✓✓	Cars still allowed-people get to choose		X	3.1							
<b>GOVERNANCE</b>											
-----											

Participation: ( ) few / (✓) some / (✓✓) many / (✓✓✓) almost all

Table 11 MADRID'S Current Mobility Ecosystem (part 1 Focus Groups)

**MADRID**

**INTRO** In a short statement, how would you describe Madrid's mobility ecosystem?  
Which are its strong and weak aspects/points?

Participation	LAYER	STRONG	WEAK	SUBTOPIC	1	2	3	4	5	6	7
	PHYSICAL				POL	ECON	MOB	ICT	SUST	PLAN	SOC
	Interconnected public transport (PT)	X		3.2							
	PT in expansion	X		3.4							
	Accessible PT	X		3.5							
	Good articulation metro-bus	X		3.5							
✓	Good PT offer & large offer	X		3.2							
	Many mobility options - diversity	X		3.7							
✓	Good frequency	X		3.2							
	Robust model of PT	X		3.2							
	Good quality PT	X		3.2							
✓	Inside m-30, PT good alternative to private vehicle	X		3.2							
<b>DIGITAL</b>											
	PT operators are well integrated	X		4.4							
	Ongoing effort to integrate NMS	X		4.4							
	Experimental platform for shared mobility start-up's	X		4.4							
<b>HUMAN</b>											
	High private vehicle rate of use		X	7.1							
<b>GOVERNANCE</b>											
	In terms of actions, periphery, "the forgotten"		X	1.1							
✓✓	Most problems located in periphery, more difficult		X	3.1							
	Reduce car use in the periphery										

Participation: ( ) few / (✓) some / (✓✓) many / (✓✓✓) almost all



Table 12 TURKU'S Current Mobility Ecosystem (part 1 Focus Groups)

**TURKU**

In a short statement, how would you describe mobility ecosystem?

**INTRO** Which are its strong and weak aspects/points?

participation	LAYER	STRONG	WEAK	SUBTOPIC	1	2	3	4	5	6	7
					POL	ECON	MOB	ICT	SUST	PLAN	SOC
	PHYSICAL										
	Dependant on car due to lack of PT alternatives		X	3.1							
	Lack of PT alternatives due to lack of demand		X	7.1							
	Lack of political willingness to develop PT systems & active modes alternatives		X	1.3							
	Traffic network not congested	X		3.5							
	90% People live 30 min cycling distance from city centre	X		6.1 / 3.3							
	Difficulty to find cycling routes for new users		X	3.3							
	Cycling networks (end in middle of nowhere)		X	6.6							
	Children and safeness		X	7.7							
	Potential of existing infrastructure to be bicycle friendly	X		3.4							
✓	Slowness of developing plans		X	3.1							
✓	Local businesses opposing to pedestrianization		X	2.4							
✓	Pedestrianization benefits local businesses	X		6.1							
	Availability of cycling routes	X		3.4							
	Penalization for car users (LEZ)	RECOMM.		2.2							
	Travel time		X	3.2							
	PT incentives (LEZ)	RECOMM.		2.2							
✓	Active modes: cheapest solution	X		3.3							
	PT as easiest choice	RECOMM.		3.5							
✓	PT available in City centre	X		3.5							
✓	PT not as available in metropolitan area (not city centre)		X	3.5							
	Multimodality in metropolitan area		X	3.7							
	Land use: sprawl		X	6.1							
	Active modes improvements benefit both cycling and pedestrianization	X		3.3							
	DIGITAL										
	HUMAN										



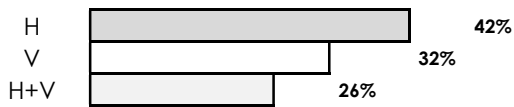
Lack of political willingness to develop PT systems & active modes alternatives	X	1.3							
Active modes: cheapest solution	RECOMM.								
PT as easiest choice	RECOMM.								
<b>GOVERNANCE</b>									

Participation: ( ) few / (✓) some / (✓✓) many / (✓✓✓) almost all

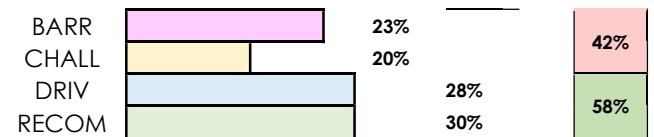
## Overall analysis of the FGD (tables 4-6)

Table 13 left (vertical-horizontal), right (barriers, challenges, drivers, recommendations)

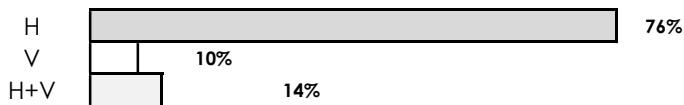
### Antwerp



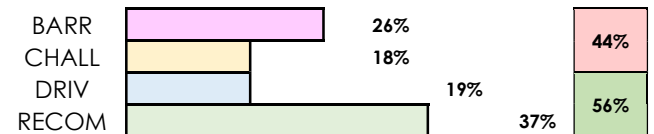
### Antwerp 42 + 26 %



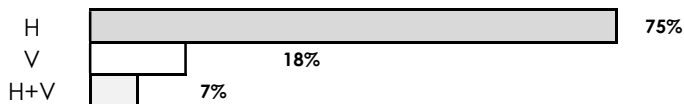
### Madrid



### Madrid 76 + 14 %



### Turku



### Turku 75 + 7 %

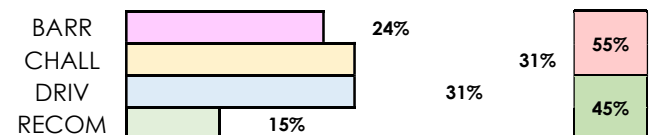


Table 14 comments organized by layers

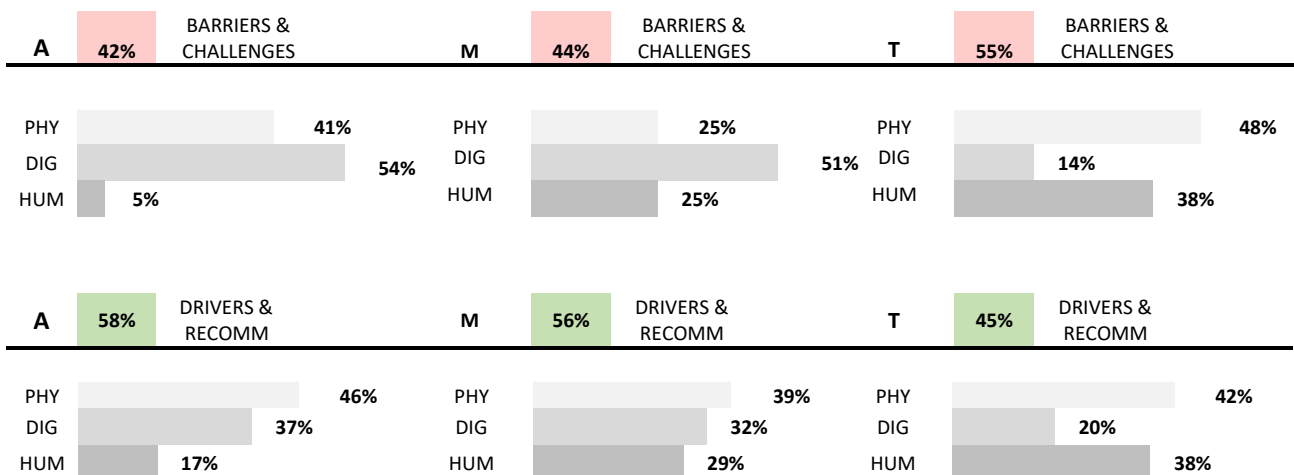
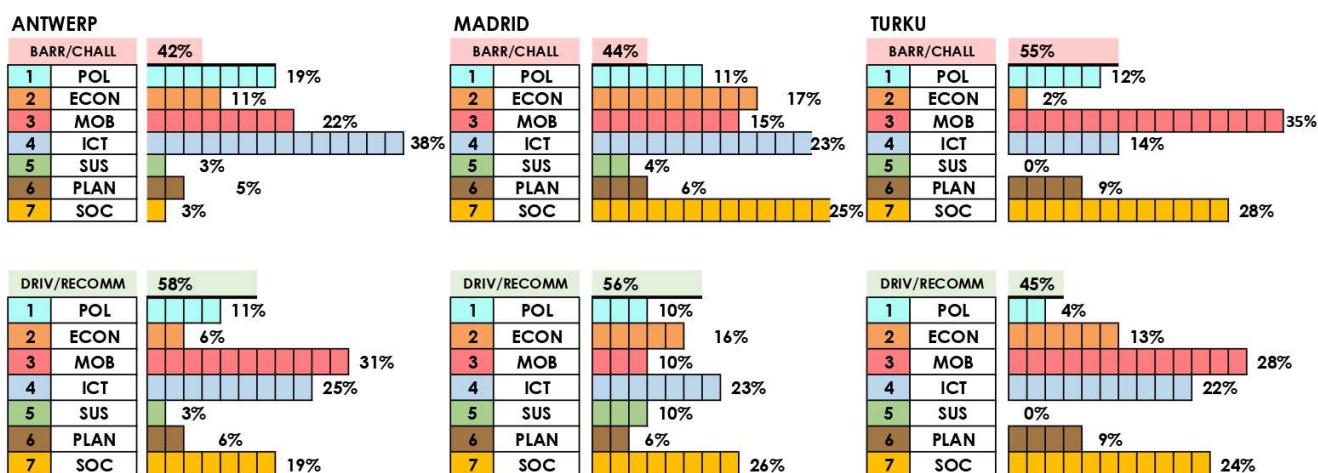


Table 15 Set of tables showing percentages of participation on barriers & challenges for the 7 topics of discussion on each of the urban nodes



Main barriers/challenges & drivers/recommendations by topic (tables 7-13)

Table 16 Urban Policies integration and management

### 1. URBAN POLICIES INTEGRATION AND MANAGEMENT

SUBTOPICS	NODE	BARRIERS AND CHALLENGES	LAYER	DRIVERS	LAYER
1.1	A	Contradictory parking measures ✓✓✓ No transport region parking policy Planning: Ambitious modal split	PHY PHY PHY	Decree on accessibility	PHY
	M	Pricing measures car	PHY		
	T	Unrealistic modal split targets regarding timeframe	PHY	We should figure out what they are willing to do, and then encourage that	HUM
		Slowness of developing plans ✓	PHY	bottom to the top, affect the end user behaviour ✓	HUM
1.2	A	Lack resources data-related issues small municipalities ✓	DIG	Federal urban planning and mobility team	PHY
	M	Political Uncertainty on public opinion	HUM	Transversal Mobility Concept ✓✓ No investment in car infrastructure	PHY PHY
	T				
1.3	A				
	M	Poor local authorities support to NMS ✓✓ Public Administration slow speed ✓	DIG DIG		
	T	Lack of political willingness/fear to public opinion	PHY		





		Lack of political willingness to develop PT systems & active modes alternatives	<b>HUM</b>		
<b>1.4</b>	<b>A</b>	Data won't be shared automatically	<b>DIG</b>	Mandatory to share data	<b>DIG</b>
		MaaS considered separately for each municipality	<b>DIG</b>	Free open data	<b>DIG</b>
		Unresolved privacy issues of sharing data	<b>DIG</b>		
	<b>M</b>	Lack of strategy for new actors/players	<b>DIG</b>		
		Data protection regulation unclear ✓✓	<b>DIG</b>		
		Perceived uncertainty data use ownership (M) ✓✓	<b>DIG</b>		
	<b>T</b>	Ownership, privacy, sensor infrastructure	<b>DIG</b>		

(1.1) Law, policies, ordinances, plans / (1.2) Public administration & management / (1.3) Political will / (1.4) Regulation of data & NMS (ownership & privacy issues)

Participation: ( ) few / (✓) some / (✓✓) many / (✓✓✓) almost all

(A) Antwerp / (M) Madrid / (T) Turku

Table 17 Economy-financing-business

## 2. ECONOMY-FINANCING-BUSINESS

SUBTOPICS	NODE	BARRIERS AND CHALLENGES	LAYER	DRIVERS	LAYER
<b>2.1</b>	<b>A</b>	Operator figure-not a role yet	<b>DIG</b>		
	<b>M</b>	Market distortion on mobility services concept ✓✓	<b>DIG</b>	Rapidly changing market	<b>DIG</b>
		Lack of service provider figure	<b>DIG</b>		
		No global image for services coverage	<b>DIG</b>	Business creation for data input + release ✓	
	<b>T</b>			Startup businesses closer to end user needs ✓✓	<b>PHY</b>
				Urban Tech, automatic searching for startups to solve city problems	<b>PHY</b>
				New platforms to find all available charging stations, regardless of who is providing the charging station	<b>DIG</b>
				We should figure out what they are willing to do, & encourage that	<b>HUM</b>
<b>2.2</b>	<b>A</b>				
	<b>M</b>			Pricing measures	<b>PHY</b>
	<b>T</b>			PT incentives	<b>PHY</b>
				Low Emissions Zones (LEZ)	<b>PHY</b>
<b>2.3</b>	<b>A</b>			PPP: unis + small municipalities opportunity for data analysis	<b>DIG</b>
	<b>M</b>	Poor PPP collaboration ✓✓✓	<b>DIG</b>	PPP: data on P&R	<b>DIG</b>
	<b>T</b>	(Lack of) PPP collaboration for ICT	<b>DIG</b>	Making PPP collaborations attractive	<b>DIG</b>
<b>2.4</b>	<b>A</b>	Data analysis profit-business	<b>DIG</b>		
	<b>M</b>	No business model for data provision ✓	<b>DIG</b>	Marketing-oriented approach to data	<b>DIG</b>
		Free processing + storage taken for granted	<b>DIG</b>		
	<b>T</b>				
<b>2.5</b>	<b>A</b>	Lack of coordination between operators collecting data & administration	<b>DIG</b>		



	Private companies power & non-mobility-oriented agenda ✓	<b>DIG</b>		
<b>M</b>	Private companies power-non-mobility-oriented agenda ✓✓	<b>DIG</b>		
	High competition between partners	<b>DIG</b>		
	Competitors lack of cooperation	<b>DIG</b>		
<b>T</b>				

(2.1) New business models & mindsets / (2.2) Economic incentives & UVARs / (2.3) PPP & stakeholders / (2.4) Commercialization of data services / (2.5) Power relations

Participation: ( ) few / (✓) some / (✓✓) many / (✓✓✓) almost all (A) Antwerp / (M) Madrid / (T) Turku

Table 18 Transport & Mobility

### 3. TRANSPORT-MOBILITY

SUBTOPICS	NODE	BARRIERS AND CHALLENGES	LAYER	DRIVERS	LAYER
3.1	<b>A</b>	CAR: Lack of good alternatives to car	<b>PHY</b>		
	<b>M</b>	Car ownership	<b>PHY</b>		
	<b>T</b>	Dependant on car due to lack of PT alternatives	<b>PHY</b>	Regulation of N° of cars ownership No need for hubs because you use your own bike or you go with your own car from your home to your destination	<b>PHY</b>
		Car ownership	<b>PHY</b>		<b>PHY</b>
		Medium cities: car is still an option willing to be sustainable, but lack of enough alternatives to car Getting used to car, difficult to go back to PT ✓✓	<b>PHY</b> <b>HUM</b> <b>HUM</b>		
3.2	<b>A</b>			Travel time	<b>PHY</b>
	<b>M</b>	Regulated offers + Fixed frequencies	<b>PHY</b>	PT available in city center	<b>PHY</b>
		Travel time Travel cost	<b>PHY</b> <b>PHY</b>		
	<b>T</b>	Travel time	<b>PHY</b>	PT available in City center ✓✓	<b>PHY</b>
		Using already existing infrastructure ✓ EV cannot replace PT ✓✓ Getting used to car, difficult to go back to PT ✓✓	<b>PHY</b> <b>PHY</b> <b>HUM</b>	PT as easiest choice	<b>HUM</b>
3.3	<b>A</b>			Making things easier for bikes	<b>PHY</b>
	<b>M</b>				
	<b>T</b>	Difficulty to find cycling routes for new users	<b>DIG</b>	Availability of cycling routes	<b>PHY</b>
				Active modes improvements benefit both cycling and pedestrianization Active modes: cheapest solution No need for hubs because you use your own bike or you go with your own car from your home to your destination	<b>PHY</b> <b>HUM</b> <b>PHY</b>
3.4	<b>A</b>	Modal Split in rural areas	<b>PHY</b>	Modal split in right direction ✓✓	<b>PHY</b>



		Measuring rate of use of new bicycle infrastructure Ten-T Connections	<b>PHY</b> <b>PHY</b>	More biking spots in city centre Less biking spots for cars Better biking infrastructure Transfer infrastructure from cars to active modes City bicycle highways Reusing already existing infrastructure ✓	<b>PHY</b> <b>PHY</b> <b>PHY</b> <b>PHY</b> <b>PHY</b>
	<b>M</b>	Ciclyng networks Excess car infrastructure	<b>PHY</b> <b>PHY</b>		<b>PHY</b> <b>PHY</b>
	<b>T</b>	Changing existing system	<b>PHY</b>	Potential of existing infrastructure to be bicycle friendly Availability of cycling routes	<b>PHY</b> <b>PHY</b>
<b>3.5</b>	<b>A</b>	Accesibility: analysis Accesibility: poor in the suburbs	<b>PHY</b> <b>PHY</b>		
	<b>M</b>	Poor accessibility & connectivity ✓✓ Lack of connections and PT in metropolitan areas	<b>PHY</b> <b>PHY</b>	Traffic network not congested Medium cities: fluency of traffic	<b>PHY</b> <b>PHY</b>
	<b>T</b>	PT-everything goes through the center-not connected between suburbs			
<b>3.6</b>	<b>A</b>			Shared bike system in all region Include shared mobility in parking norms	<b>PHY</b> <b>PHY</b>
	<b>M</b>				
	<b>T</b>				
<b>3.7</b>	<b>A</b>	Poor multimodality ✓	<b>PHY</b>		
	<b>M</b>	Poor multimodality ✓	<b>PHY</b>		
	<b>T</b>	PT/Multimodality not as available in metropolitan area ✓✓✓ Piloting P&R But we have not recognized a good place within the City of Turku area, there are in neighbouring locations	<b>PHY</b> <b>PHY</b>	Travel Centre- Larger network of regional trains- bus+ railway station together No need for hubs because you use your own bike or you go with your own car from your home to your destination	<b>PHY</b> <b>PHY</b>
<b>3.8</b>	<b>A</b>	Freight	<b>PHY</b>	Optimal location for logistic hubs	<b>PHY</b>
	<b>M</b>				
	<b>T</b>				

(3.1) Private vehicle / (3.2) Public transport / (3.3) Active modes / (3.4) Infrastructure, re-use, reallocation / (3.5) Accessibility & connectivity / (3.6) Shared mobility / (3.7) Multimodality / (3.8) Freight & logistics

Participation: ( ) few / (✓) some / (✓✓) many / (✓✓✓) almost all

(A) Antwerp / (M) Madrid / (T) Turku



Table 19 ICT-Innovation

4. ICT-INNOVATION

SUBTOPICS	NODE	BARRIERS AND CHALLENGES	LAYER	DRIVERS	LAYER
4.1	A	Shared bike system_efficiency related	PHY		
	M	Private EV contradictions	PHY	New Bicycle infrastructure city center	PHY
	T	EV cannot replace PT ✓✓	PHY		
4.2	A				
	M			New APPs ✓	DIG
	T			Urban Tech, automatic searching for startups to solve city-problems New platforms to find all available charging stations ✓	PHY DIG
4.3	A	No mobility data on everyday displacements within transport region & beyond Traffic model TRA just based on car Real time scheduled info is the challenge	DIG DIG DIG	Good IT transition Traffic modelling estimations open-source projects ✓	DIG DIG HUM
	M	Choosing Technology to apply to transport	PHY	ICT's powerful impulse	DIG
	T	Technology is not the solution for everything	PHY	Information system for PT fosters use of PT	DIG
		Using already existing infrastructure	PHY	New technology for charging stations ✓	DIG
		Techolonogy is no immediate solution	DIG		
4.4	A	MaaS not fully developed ✓ All services not integrated yet	DIG DIG	Electronic ticketing data All PT operators together in a platform	DIG DIG
	M	NMS not integrated ✓✓✓	DIG	New ticketing payment methods ✓✓✓	DIG
		Unified integrated ticketing ✓✓ Old service approach to mobility	DIG DIG	Unification of MaaS ✓✓✓	DIG DIG
	T			Unification of different providers of charging stations in 1 app ✓ information on P&R is usually available in our phones and such Piloting P&R combination ticket car + bus (multimodality)	DIG DIG DIG
4.5	A	MaaS considered separately for each municipality Finding the use of data Lack of insight on data available	DIG DIG DIG	Knowledge of data available ✓	
	M	Lack of know-how ICT/data among local authorities ✓ Data Reliability ✓	DIG DIG		
	T				
4.6	A	Lack of integrated strategy for data collection, provision and sharing services	DIG	Availability of data ✓✓✓ Car-pass data	DIG DIG
	M	No single repository for data integration & management ✓✓✓	DIG	Variety of data collection methods	DIG
	T			Existence of shared data available in the city Availability of mobility data ✓	DIG DIG



4.7	A	Survey data- scarce & sparse Federal Mobility Office does not have access to all data	DIG DIG		
	M				
	T	Lack of knowledge on quality and quantity of data.	DIG	Open data availability ✓	DIG
4.8	A				
	M	PT-centered data approach ✓ Data-centered approach	DIG DIG		
	T			Data driven businesses ✓✓	DIG
4.9	A	Lack of data sharing	DIG		
	M	No efficient use of data ✓	DIG		
	T	Lack of standardized system for data management	DIG		
4.10	A	Planning for people more challenging- individual person's needs	HUM	User-friendliness	DIG
	M	Not User-friendly ✓✓✓	DIG		
	T				

(4.1) EV, e-bikes, e-scooters / (4.2) New apps / (4.3) Technology & info / (4.4) MaaS & Integration of NMS / (4.5) Knowledge on data / (4.6) Collection & storage of data (4.7) / Access & unification of data / (4.8) data-driven / (4.9) data-management & use / (4.10) user-centered

Participation: ( ) few / (✓) some / (✓✓) many / (✓✓✓) almost all (A) Antwerp / (M) Madrid / (T) Turku

Table 20 Environment-sustainability-energy

### 5. ENVIRONMENT-SUSTAINABILITY-ENERGY

SUBTOPICS	NODE	BARRIERS AND CHALLENGES	LAYER	DRIVERS	LAYER
5.1	A				
	M			Urban design + Sustainable planning focus ✓✓✓	PHY
	T				
5.2	A				
	M	Temporary pandemic effect	HUM	Citizen science projects ✓ Pandemic Health-oriented + comfort discourse ✓✓	HUM PHY HUM
	T				
5.3	A				
	M	Energy transition transport ✓	PHY		
	T				
5.4	A	Data on pollution cause effect difficult to evaluate (i.e. Antwerp)	PHY		
	M				
	T				

(5.1) Sustainable planning / (5.2) Health / (5.3) Resources & energy / (5.4) Air quality

Participation: ( ) few / (✓) some / (✓✓) many / (✓✓✓) almost all (A) Antwerp / (M) Madrid / (T) Turku



Table 21 Land-use/urban planning

**6. LAND USE/URBAN PLANNING**

SUBTOPICS	NODE	BARRIERS AND CHALLENGES	LAYER	DRIVERS	LAYER
6.1	A	Land use: sprawl	PHY	Transit Oriented Development (TOD)	PHY
	M	No Land use-public space-P&R analysis ✓	PHY		
	T	Land use: sprawl	PHY	90% People live 30 min cycling distance from city center	PHY
6.2	A			Accessibility to services easy in city centre ✓	PHY
	M				
	T	Urban planning-PT-everything goes through the center-not connected between suburbs	PHY	Bike and ride accessible in city center	PHY
6.3	A	Outdated Urban planning & environment planning ✓			
	M	Undeveloped Urban Strategic Planning			
	T			Change of traffic planning priorities: sustainability	PHY
6.4	A				
	M	Zone of influence lack of consensus	PHY		
	T				
6.5	A				
	M			Policentric City Morphology Connect green spaces ✓	PHY PHY
	T	Cycling networks (end in middle of nowhere) Street infrastructure/planning to foster change behaviour ✓	PHY PHY	Pedestrianization benefits local businesses ✓✓	PHY

(6.1) Land use / (6.2) Services & accessibility / (6.3) Urban strategic planning / (6.4) Zone of influence (6.5) urban design & city structure

Participation: ( ) few / (✓) some / (✓✓) many / (✓✓✓) almost all

(A) Antwerp / (M) Madrid / (T) Turku



Table 22 Inclusive society

**7. INCLUSIVE SOCIETY**

SUBTOPICS	NODE	BARRIERS AND CHALLENGES	LAYER	DRIVERS	LAYER
7.1	A				
	M	Strong everyday habits ✓	HUM	Pandemic effect on active modes	HUM
	T	Difficult to use PT if accustomed to car (easiness) Lack of willingness to change behaviour	HUM HUM	Urban Tech, automatic search startups to solve city-problems Children should get used to PT & active modes ✓✓	PHY HUM
		Getting used to car, difficult to go back to PT ✓✓	HUM		
7.2	A				
	M	Poor communication methods & strategies ✓✓✓	HUM	Awareness campaigns on good behaviour Properly Communicating actions, measures, changes ✓✓✓	HUM HUM
	T			Strong EU message: need for stronger citizen engagement Regional forum (between main politicians, civil servants)	HUM HUM
7.3	A			NMS as bringing awareness on data ✓✓✓ MaaS under debate	DIG DIG
	M	Ignorance of MaaS among users ✓ Lack of awareness ✓✓✓	HUM HUM		
	T	Lack of political awareness (policies don't resonate Individuals' everyday life) ✓✓✓	HUM		
7.4	A				
	M	Slow change of mobility culture paradigm ✓✓✓ PT reputation & perception ✓✓	HUM HUM	Acceptance level of new methods NMS	HUM
	T			Children should get used to PT & active modes ✓✓	HUM
7.5	A				
	M	Lack of digital skills / resources ✓ Poor education + training in respecting "shared facilities" ✓	HUM HUM		
	T				
7.6	A			Citizen's participation led by access to data	HUM
	M	Poor citizenship involvement ✓✓✓	HUM		
	T	Lack of citizen (users) engagement in policies	HUM	Willingness on citizens policy-involvement (early stages)	HUM
7.7	A			Liveability focus	PHY
	M				
	T	Importance of time in our lives (makes us use car) Children and time travel T	HUM HUM	Bottom to the top, affect the end user behaviour ✓ Encourage new businesses: discuss needs with potential users ✓	HUM HUM
		Children learn to prioritize cars ✓✓ Children and safeness	HUM HUM		





7.8	A M	Digital inquiry methods (i.e.surveys)-Loss of citizen contact	HUM HUM HUM	Finding out about People's perception	HUM
		Lack of empathy ✓		User's perception of "the public"	HUM
		Car's emotional value ✓✓✓		Meet people's expectations-emotional value ✓✓	HUM
	T	Importance of time in our lives (makes us use car) ✓✓	HUM	Citizens opinion: not happy with current system	HUM
	T	Local businesses opposing to pedestrianization ✓	HUM	Citizens opinion: not happy with current system	HUM
7.9	A	Federal online panel, unrealistic mobility	HUM	Recurrent Travel Behaviors Survey often (3-4 years) ✓✓	HUM
	M	Unidentified cultural patterns	HUM	In-person surveys	HUM
	T	Importance of time in our lives (makes us use car) ✓✓	HUM	Identify non-customer ✓	HUM
				Citizens opinion: not happy with current system	HUM
				Figure out what users are willing to do, and encourage that	HUM

(7.1) Pattern of use & habits / (7.2) Communication / (7.3) Awareness / (7.4) Culture / (7.5) Training / (7.6) Participation / (7.7) Users needs / ((7.8) Perceptions-emotions / (7.9) Methods of inquiry

Participation: ( ) few / (✓) some / (✓✓) many / (✓✓✓) almost all

(A) Antwerp / (M) Madrid / (T) Turku

Table 23 Barriers most mentioned in the 3 FGs

## BARRIERS

1. URBAN POLICIES INTEGRATION AND MANAGEMENT		NODE	LAYER	SCALE-UP
(1.1) Law, policies, ordinances, plans	Contradictory parking measures ✓✓✓	A	PHY	
	Slowness of developing plans ✓	T	PHY	x
(1.2) Public administration & management	Lack resources data-related issues small municipalities ✓	A	DIG	
(1.3) Political will	Poor local authorities support to NMS ✓✓	M	DIG	
	Public Administration slow speed ✓	M	DIG	
(1.4) Regulation of data & NMS (ownership & privacy issues)	Data protection regulation unclear ✓✓	M	DIG	x
	Perceived uncertainty data use ownership (M) ✓✓	M	DIG	x
2. ECONOMY-FINANCING-BUSINESS				
(2.1) New business models & mindsets	Market distortion on mobility services concept ✓✓	M	DIG	
(2.2) Economic incentives & UVARs	Poor PPP collaboration ✓✓✓	M	DIG	
(2.4) Commercialization of data services	No business model for data provision ✓	M	DIG	
(2.5) Power relations	Private companies power & non-mobility-oriented agenda ✓	A	DIG	
	Private companies power-non-mobility-oriented agenda ✓✓	M	DIG	
3. TRANSPORT-MOBILITY				
(3.1) Private vehicle	Getting used to car, difficult to go back to PT ✓✓	T	HUM	
(3.2) Public transport	Using already existing infrastructure ✓	T	PHY	



(3.5) Accessibility & connectivity	EV cannot replace PT ✓✓	T	PHY	
(3.7) Multimodality	Poor accessibility & connectivity ✓✓	M	PHY	
	Poor multimodality ✓	A	PHY	
	Poor multimodality ✓	M	PHY	
	PT/Multimodality not as available in metropolitan area ✓✓✓	T	PHY	

#### 4. ICT-INNOVATION

(4.1) EV, e-bikes, e-scooters	EV cannot replace PT ✓✓	T	PHY	
(4.4) MaaS & Integration of NMS	MaaS not fully developed ✓	A	DIG	
	NMS not integrated ✓✓✓	M	DIG	x
	Unified integrated ticketing ✓✓	M	DIG	
(4.5) Knowledge on data	Lack of know-how ICT/data among local authorities ✓	M	DIG	
	Data Reliability ✓	M	DIG	
(4.6) Collection & storage of data	No single repository for data integration & management ✓✓✓	M	DIG	
(4.8) Data-driven	PT-centered data approach ✓	M	DIG	
(4.9) Data-management & use	No efficient use of data ✓	M	DIG	
(4.10) User-centered	Not User-friendly ✓✓✓	M	DIG	

#### 5. ENVIRONMENT-SUSTAINABILITY-ENERGY

(5.3) Resources & energy	Energy transition transport ✓	M	PHY	
--------------------------	-------------------------------	---	-----	--

#### 6. LAND USE/URBAN PLANNING

(6.1) Land use	No Land use-public space-P&R analysis ✓	M	PHY	
(6.3) Urban strategic planning	Outdated Urban planning & environment planning ✓	A	PHY	
(6.5) Urban design & city structure	street infrastructure/planning to foster change behaviour ✓	T	PHY	

#### 7. INCLUSIVE SOCIETY

(7.1) Pattern of use & habits	Strong everyday habits ✓	M	HUM	
	Getting used to car, difficult to go back to PT ✓✓	T	HUM	
(7.2) Communication	Poor communication methods & strategies ✓✓✓	M	HUM	x
(7.3) Awareness	Ignorance of MaaS among users ✓	M	HUM	x
	Lack of awareness ✓✓✓	M	HUM	x
	Lack of awareness (policies don't resonate individuals' everyday life) ✓✓✓	T	HUM	x
(7.4) Culture	Slow change of mobility culture paradigm ✓✓✓	M	HUM	
	PT reputation & perception ✓✓	M	HUM	
(7.5) Training	lack of digital skills / resources ✓	M	HUM	
	Poor education + training in respecting "shared facilities" ✓	M	HUM	
(7.6) Participation	Poor citizenship involvement ✓✓✓	M	HUM	x
(7.7) Users needs	Children learn to prioritize cars ✓✓	T	HUM	
(7.8) Perceptions-emotions	Lack of empathy ✓	M	HUM	
	Car's emotional value ✓✓✓	M	HUM	
	Importance of time in our lives (makes us use car) ✓✓	T	HUM	
	Local businesses opposing to pedestrianization ✓	T	HUM	



(7.9) Methods of inquiry	Importance of time in our lives (makes us use car) ✓✓	T	HUM
Participation: ( ) few / (✓) some / (✓✓) many / (✓✓✓) almost all			(A) Antwerp / (M) Madrid / (T) Turku

Table 24 DRIVERS most mentioned in the 3 FGs

DRIVERS			
1. URBAN POLICIES INTEGRATION AND MANAGEMENT		NODE	LAYER
(1.1) Law, policies, ordinances, plans	Multilevel + Multispatial Urban Strategic Planning ✓	M	PHY
	Bottom to the top, affect the end user behaviour ✓	T	HUM
(1.2) Public administration & management	Transversal Mobility Concept ✓✓	M	PHY
2. ECONOMY-FINANCING-BUSINESS			
(2.1) New business models & mindsets	Business creation for data input + release ✓	M	DIG
	Startup businesses closer to end user needs ✓✓	T	HUM
3. TRANSPORT-MOBILITY			
(3.2) Public transport	PT available in City center ✓✓	T	PHY
(3.4) Infrastructure, re-use, reallocation	Modal split in right direction ✓✓	A	PHY
	Reusing already existing Infrastructure ✓	M	PHY
4. ICT-INNOVATION			
(4.2) New apps	New APPs ✓	M	DIG
	New platforms to find all available charging stations ✓	T	DIG
(4.3) Technology & info	Open-source projects ✓	A	HUM
	New technology for charging stations ✓	T	DIG
(4.4) MaaS & Integration of NMS	New ticketing payment methods ✓✓✓	M	DIG
	Unification of MaaS ✓✓✓	M	DIG
	Unification of different providers of charging stations in 1 app ✓	T	DIG
(4.5) Knowledge on data	Knowledge of data available ✓	A	DIG
(4.6) Collection & storage of data	Availability of data ✓✓✓	A	DIG
	Availability of mobility data ✓	T	DIG
(4.7) Access & unification of data	Open data availability ✓	T	DIG
(4.8) Data-driven	Data driven businesses ✓✓	T	DIG
5. ENVIRONMENT-SUSTAINABILITY-ENERGY			
(5.1) Sustainable planning	Urban design + Sustainable planning focus ✓✓✓	M	PHY
(5.2) Health	Citizen science projects ✓	A	HUM
	Health-oriented + comfort discourse ✓✓	M	HUM
6. LAND USE/URBAN PLANNING			



(6.2) Services & accessibility	Accessibility to services easy in city centre ✓	A	PHY
(6.5) Urban design & city structure	Connect green spaces ✓	M	PHY
	Pedestrianization benefits local businesses ✓✓	T	PHY
<b>7. INCLUSIVE SOCIETY</b>			
(7.1) Pattern of use & habits	Children should get used to PT & active modes ✓✓	T	HUM
(7.2) Communication	Properly Communicating actions, measures, changes ✓✓✓	M	HUM
(7.3) Awareness	NMS as bringing awareness on data ✓✓✓	A	DIG
(7.4) Culture	Children should get used to PT & active modes ✓✓	T	HUM
(7.7) Users needs	Bottom to the top, affect the end user behavior✓	T	HUM
	Encourage new businesses: discuss needs with potential users✓	T	HUM
(7.8) Perceptions-emotions	Meet people's expectations-emotional value ✓✓	M	HUM
(7.9) Methods of inquiry	Recurrent Travel Behaviors Survey often (3-4 years) ✓✓	A	HUM
	Identify non-customer ✓	M	HUM
Participation: ( ) few / (✓) some / (✓✓) many / (✓✓✓) almost all		(A) Antwerp / (M) Madrid / (T) Turku	

Table 25 Common ideas in all 3 FGD

## COMMON BARRIERS, CHALLENGES & DRIVERS AMONG THE 3 CITIES

SUBTOPICS	BARRIERS AND CHALLENGES	DRIVERS
<b>1. URBAN POLICIES INTEGRATION &amp; MANAGEMENT</b>		
1.1 Law, policies, ordinances, plans	Unrealistic/too optimistic target modal split	
1.4 Regulation of data & NMS	Regulation unclear on ownership & privacy issues of sharing data	
<b>2. ECONOMY-FINANCING-BUSINESS</b>		
2.1 New business models & mindsets	Lack of service provider figure	
2.3 PPP & stakeholders	Lack of/poor PPP collaboration	
2.4 Commercialization of data services	No business model for data provision & analysis	
2.5 Power relations	Private companies power & non-mobility-oriented agenda	
<b>3. TRANSPORT-MOBILITY</b>		
3.1 Private vehicle	Car ownership/ car dependency	
3.2 Public transport	Travel time	
3.3 Active modes		Making things easier for bikes
3.4 Infrastructure	Challenge of transferring infrastructure from cars to active modes	
3.5 Accessibility & connectivity	Poor accessibility & lack of connectivity	
3.7 Multimodality	Poor multimodality or not available in metropolitan areas	



#### 4. ICT-INNOVATION

4.3 Technology & information		ICT power/driver in mobility
4.4 MaaS & NMS	MaaS not fully developed and NMS not integrated	Unification of MaaS
4.6 Collection & storage of data	Lack of integrated strategy for data collection, provision and sharing services / No single repository for data integration & management	Existence & availability of shared data in the city

#### 5. ENVIRONMENT-SUSTAINABILITY-ENERGY

5.2 Health		Health- debate and health-oriented discourse
------------	--	--

#### 6. LAND USE/URBAN PLANNING

6.1 Land use	sprawl	
--------------	--------	--

#### 7. INCLUSIVE SOCIETY

7.6 Participation	Lack of citizen (users) engagement & involvement	
7.8 Perceptions-emotions		know people's perception, expectations, emotions, opinions
7.9 Methods of inquiry		in-person surveys to gather user's information

Table 26 Antwerp's city specific barriers, challenges & drivers

### SPECIFIC BARRIERS, CHALLENGES & DRIVERS, RECOMM \_ ANTWERP

SUBTOPICS	BARRIERS AND CHALLENGES	DRIVERS & RECOMM.
<b>1. URBAN POLICIES INTEGRATION &amp; M.</b>		
1.1 Law, policies, ordinances, plans	Contradictory parking measures, no transport region parking policy MaaS considered separately for each Municipality	Decree on accessibility (D)
1.2 Public administration & management		
1.4 Regulation of data & NMS		Mandatory to share data + free open data (R)
<b>2. ECONOMY-FINANCING-BUSINESS</b>		
2.3 PPP & stakeholders		PPP – data from private companies, are a good asset for universities and small municipalities
2.5 Power relations	Lack coordination between operators collecting data&administration	
<b>3. TRANSPORT-MOBILITY</b>		
3.4 Infrastructure		More biking spots in city centre and less spots for cars Transfer infrastructure from cars to active modes Better biking infrastructure, including city bicycle highways
3.6 Shared-mobility		Shared bike system in all region  Include shared mobility in parking norms



3.7 Multimodality		
3.8 Freight	Freight	Find the optimal location for logistic hubs

#### 4. ICT-INNOVATION

4.1 EV, e-bikes, e-scooters	Shared bike system-efficiency related	
4.3 Technology & information	No mobility data on everyday displacements in transport region + Traffic model TRA just based on car	Open-source projects
4.6 Collection & storage of data	Realtime scheduled info is a big challenge MaaS not fully developed and NMS not integrated	Car-pass data
4.10 user-centered	Planning for people, more challenging	User-friendliness

#### 5. ENVIRONMENT-SUSTAINABILITY-ENERGY

5.2 Health		Citizen science projects
5.4 Air quality	Data on pollution cause-effect difficult to evaluate	

#### 6. LAND USE/URBAN PLANNING

6.1 Land use		TOD
6.2 Services & accessibility		Good accessibility to services already existing in city center
6.3 Urban strategic planning	Outdated urban planning and environment planning	

#### 7. INCLUSIVE SOCIETY

7.6 Participation		Citizen's participation led by access to data
7.7 Users needs		Liveability focus
7.9 Methods of inquiry	Federal online panel, unrealistic mobility	Recurrent travel behaviour surveys

Table 27 Madrid's city specific barriers, challenges & drivers

### SPECIFIC BARRIERS, CHALLENGES & DRIVERS, RECOMM \_ MADRID

SUBTOPICS	BARRIERS & CHALLENGES	DRIVERS & RECOMM.
<b>1. URBAN POLICIES INTEGRATION &amp; M.</b>		
1.1 Law, policies, ordinances, plans		Multilevel + multispatial urban strategic planning
1.2 Public administration & management		Transversal mobility concept
1.4 Regulation of data & NMS	Lack of strategy for new actors/players	
<b>2. ECONOMY-FINANCING-BUSINESS</b>		
2.1 New business models & mindsets	Market distortion on mobility service concept	Business creation for data input & release
2.3 PPP & stakeholders		Making PPP collaborations attractive
2.4 Commercialization of data services		Marketing-oriented approach to data



2.5 Power relations High competition between partners

### 3. TRANSPORT-MOBILITY

3.2 Public transport Regulated offers and fixed frequencies

### 4. ICT-INNOVATION

4.1 EV, e-bikes, e-scooters Private EV contradictions New bicycle infrastructure city center

4.3 Technology & information Choosing technology to apply to transport

4.6 Collection & storage of data Variety of data collection methods

4.8 Data-driven PT-centered data approach

### 5. ENVIRONMENT-SUSTAINABILITY-ENERGY

5.1 Sustainable planning Urban-design + sustainable planning focus

5.2 Health Pandemic-temporary effect

5.3 Resources & energy Energy transition of transport sector

### 6. LAND USE/URBAN PLANNING

6.3 Urban strategic planning Underdeveloped urban strategic planning  
Lack of consensus on the mobility zone of influence

6.4 Zone of influence

6.5 urban design & city structure Policentric city morphology

Connect green spaces

### 7. INCLUSIVE SOCIETY

7.1 Pattern of use & habits Strong mobility everyday habits

7.2 Communication Awareness campaigns on good behaviour

7.4 Culture Slow change mobility culture paradigm  
Good acceptance level of new methods  
NMS (D)

7.5 Training & education Lack of digital skills/resources

7.6 Participation Poor education when respecting "shared facilities"  
Poor citizenship involvement

7.8 Perceptions-emotions Car's emotional value

7.9 Methods of inquiry Unidentified cultural patterns Identify non-customers (R)





Table 28 Turku's city specific barriers, challenges & drivers

**SPECIFIC BARRIERS, CHALLENGES & DRIVERS, RECOMM \_ TURKU**

SUBTOPICS	BARRIERS AND CHALLENGES	DRIVERS & RECOMM.
<b>1. URBAN POLICIES INTEGRATION &amp; M.</b>		
1.1 Law, policies, ordinances, plans	Slowness of developing plans	bottom to top policy making
1.3 Political will & support	Lack of political willingness to develop PT alternatives-fear public	
<b>2. ECONOMY-FINANCING-BUSINESS</b>		
2.1 New business models & mindsets		Start-up businesses closer to end-user needs (R) Urban tech-automatic search for startups to solve city problems
<b>3. TRANSPORT-MOBILITY</b>		
3.1 Private vehicle	Getting used to car-difficult to back back to PT	Regulation number cars ownership
3.2 Public transport		PT as easiest choice
3.3 Active modes	New users have difficulties finding routes	Availability of cycling routes (D)  Active modes improvements benefiting bicycles + pedestrian Active modes explained as cheapest solution
3.4 Infrastructure		Potential of existing infrastructure to be bicycle friendly
3.7 Multimodality	Piloting P&R -not recognized good place yet	Travel Center
<b>4. ICT-INNOVATION</b>		
4.1 EV,e-bikes, e-scooters	Tech not an immediate solution + not solution for everything	
4.2 New apps		New platforms to find all available charging stations, regardless company provider
4.8 data-driven		data-driven businesses
<b>6. LAND USE/URBAN PLANNING</b>		
6.1 Land use		90% people live 30min cycling distance from city center
6.2 Services & accessibility	Urban planning-PT-everything goes through center, no suburb connect	
6.3 Urban strategic planning		Change of traffic planning priorities towards sustainability
6.5 urban design & city structure	Cycling networks ending in middle of nowhere Street infrastructure/planning that fosters change behaviour (Ch)	Pedestrialization-explained as benefiting local businesses
<b>7. INCLUSIVE SOCIETY</b>		
7.1 Pattern of use & habits	Facilities in everyday life of car -imp time (connect 7.9)	Children getting used to PT + actives modes (D)
7.2 Communication		Strong EU message- need for stronger citizen engagement (D)



7.3 Awareness	Lack of awareness-policies don't resonate with individuals life	Regional forum, politicians and civil servants
7.6 Participation		Willingness of citizen's policy involvement (early stages)
7.7 Users needs	Children: travel time, learning prioritize cars, safeness	Encourage new businesses to discuss needs with potential users
7.8 Perceptions-emotions	Local businesses opposing to pedestrianization	Citizen's opinion, not happy with current system
7.9 Methods of inquiry		

