

The SmartHubs Integration Ladder - hubs as a game changer for inclusive mobility

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Content

- Intro
- Mobility hub typology: SmartHubs Integration Ladder
- SmartHubs Open Data Platform
- Conclusions and next steps

Smart Mobility Hubs as a game changer towards inclusive, sustainable urban mobility and accessibility in European cities

(May 2021-May 2024)

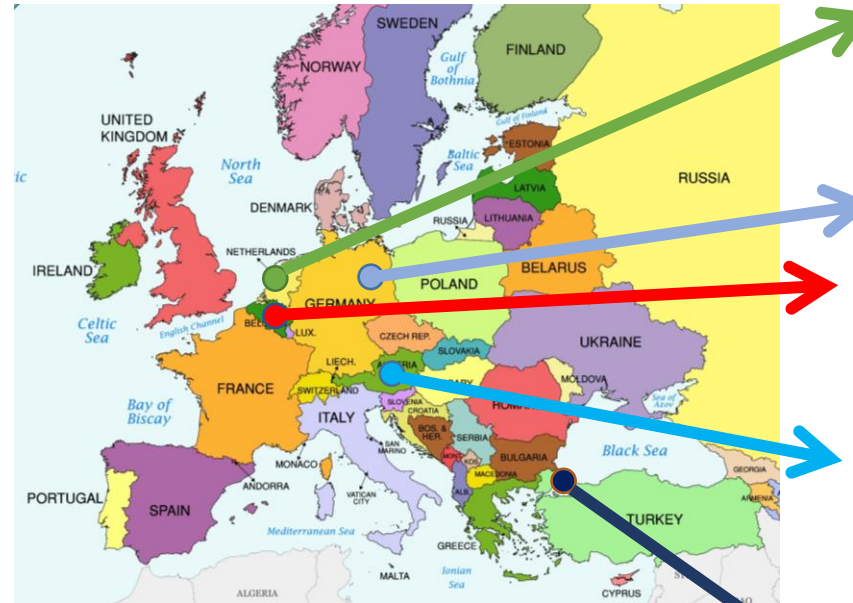
Full partners

UNIVERSITY OF TWENTE.

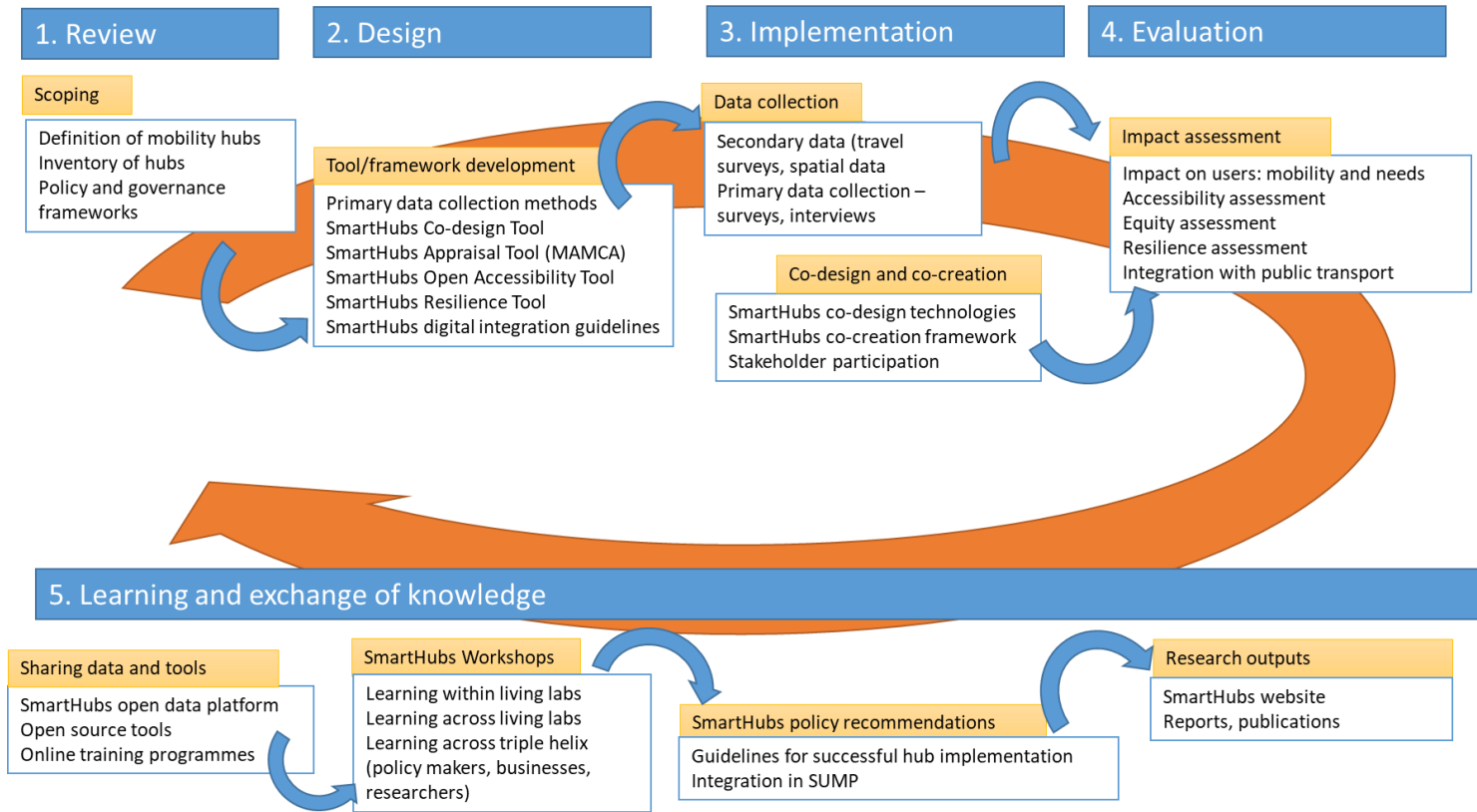


Living Labs and Associate partners

- **Rotterdam-The Hague (NLD):** Gemeente Rotterdam, Gemeente Den Haag, MRDH, HTM, RET, NS Stations, CROW
- **Munich (GER):** Munich PT (MVV), City of Munich, UPS
- **Brussels (BEL):** Anderlecht, Brussels mobility
- **Vienna (AUT):** Fed. Govt. Lower Austria, ITS Vienna region, Aspern-mobil LAB, Mobility Lab Graz, Stadt Umland Management Wien, 3420AG
- **Istanbul (TUR):** Istanbul Metropolitan Municipality



SmartHubs approach and outputs



- SmartHubs Open Data Platform
- SmartHubs Co-design Tool
- SmartHubs Appraisal Tool (MAMCA)
- SmartHubs Open Accessibility Tool
- SmartHubs Resilience Tool
- Guidelines (digital integration, integration of hubs into SUMP etc.)
- Online training programmes
- Dissemination, reports, papers

The main objective is to assess if a co-designed, user-centric development can enable mobility hubs to act as a game changer towards inclusive sustainable urban mobility and accessibility

SmartHubs Deliverable D2.1 (Jan 2022)

1. Literature review on definitions, impacts and practices of mobility hubs around the world from different viewpoints
2. Multidimensional mobility hub typology
3. Interactive open data platform that allows an easy “expert crowd” mapping of operational and planned mobility hubs

<https://www.smartmobilityhubs.eu/data>



L'échelle d'intégration SmartHubs

DESCRIPTION DE LA TYPOLOGIE PLURIDIMENSIONNELLE DES PÔLES DE MOBILITÉ



De SmartHubs Ladder

BESCHRIJVING VAN MOBILITEITSHUB TYPEN



Die SmartHubs Integrationsleiter

BESCHREIBUNG DER MULTIDIMENSIONALEN MOBILITÄTSHUBTYPOLOGIE



The SmartHubs Ladder

DESCRIPTION OF THE MULTIDIMENSIONAL MOBILITY HUB TYPOLOGY



A multidimensional mobility hub typology and inventory.

SmartHubs Deliverable D 2.1

Date: 27 January, 2022

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Synthesis and review

Many definitions of mobility hubs (36)

Many variations, e.g.

- Location, function
- Importance of access to PT
- Number of mobility options
- Presence of non-mobility services (placemaking)

“a mobility hub is a physical location where different shared transport options are offered at permanent, dedicated, well-visible locations, **and** public or collective transport is available within walking distance”.

Components of mobility hubs

Mobility hubs can be seen as an interface between the transport network and spatial structure of an area. Mobility hubs include a range of different components. This diagram illustrates some of the most commonly used components:

- A1: Mobility components: Public Transport**
- A2: Mobility components: Non - public transport**
- B: Mobility related components**
- C: Non-mobility & Urban realm improvement**

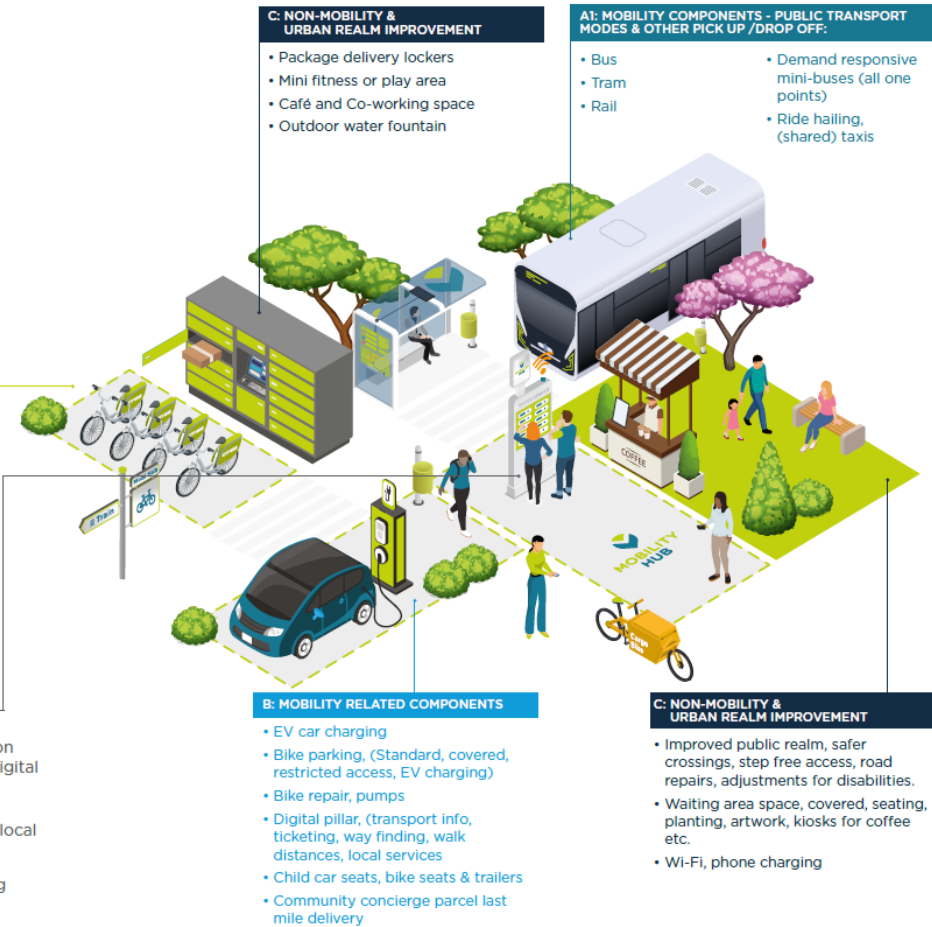
A2: MOBILITY COMPONENT: SHARED MOBILITY

- Car share: back to base, one way, electric.
- Bike share: back to base, one way, electric.
- Cargo bike share, cargo bike logistics store
- Other future micro-mobility options e.g. e-scooters, moped share
- Ride sharing

Branded pillar

Mobility hubs require a prominent sign or pillar with a common brand to make them visible to the public. The inclusion of a digital elements in a pillar can provide:

- Access to a local transport website for information on services
- A way finding option for local walking and cycling trips
- Registration and ticketing
- Customer services.
- A journey planning service for multi-modal trips



CoMoUK, 2019. UK Mobility Hub Guidance

SmartHubs Integration Ladder

- Mobility hub Typology using three integration dimensions:
 - Physical integration
 - Digital integration
 - Democratic integration
- Added value for users and citizens is ensuring that the planning and design of MHs follow the principles of **user-centred universal design** (in all three dimensions)

Physical integration

- Locations of mobility hub (residential density, proximity to other activities and services)
- Placement of different modes of transport in the vicinity of each other.
- Design of mobility hubs that are accessible for all (e.g. barrier free)
- Design of mobility hubs that are clearly visible with information and common logos
- Design of mobility hubs as a placemaker





Example Wien Mobil - measures to support inclusion

Design and development

- User Experience Labs (e.g. on station plans, orientation, non-digital user of stations) with participants recruited from Wiener Linien customers (newsletter)
- Associations for the disabled, deaf and visually impaired were involved in design of physical station elements in JourFixe Working group

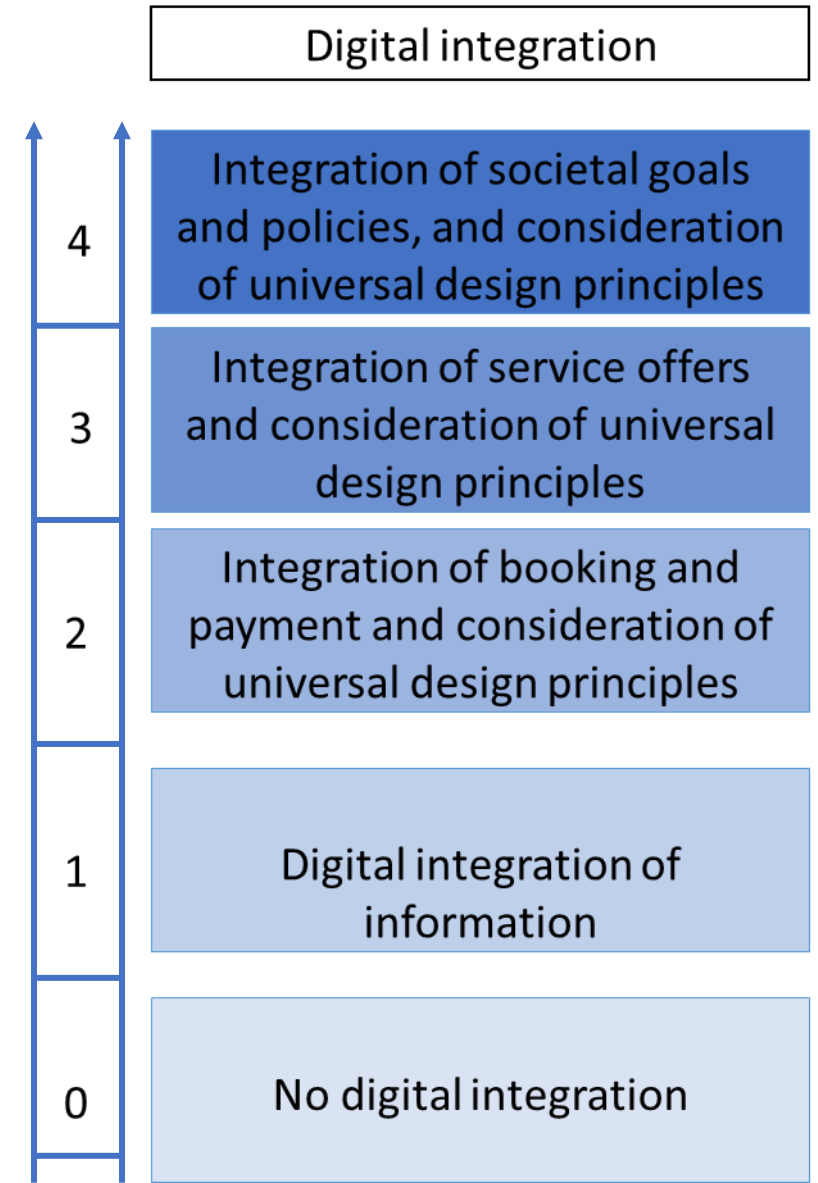


PROJEKT

User Experience Labs - Begleitung von Themenabenden für KundInnen der Wiener Linien

Digital integration

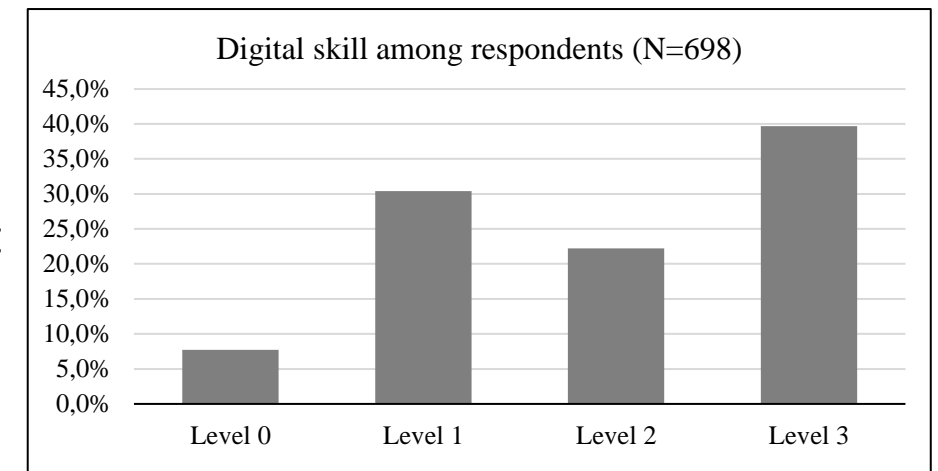
- The Mobility as a Service (MaaS) promise is to deliver digital integration of mobility options - planning, booking and payment using a single app or platform.
- Low levels of digital engagement may create a new layer of transport disadvantage on top of existing ones (Durand et al. 2021)



Measuring digital skills

Horjus, J., Gkiotsalitis, K., Nijënstein, S., Geurs, K.T., 2022. Integration of shared transport at a public transport stop: the role of digital skills in mode choice. *Journal of Urban Mobility*. Vol. 2 Pages 1-15

- A survey among residents and users of the Leyenburg tram stop in the Hague
- Digital Skills Scale:
 - Level 0 – **No skills at all** – A person in this level did not have any access to a smartphone in the past year.
 - Level 1 – **Low level of skills** – used a smartphone but not frequently performed planning activities via an app.
 - Level 2 – **Medium level of skills** – used to plan a trip using an app but less used to do digital payment activities via an app.
 - Level 3 – **High level of skills** – used to do both planning and payment/reserving related activities via an app.
- The intention to use shared transport is higher for people who are younger, have a high level of education and a high level of digital skills.



Example Wien Mobil – Measures to support inclusion

Operation:

- Digital Skills training with focus on multimodal WienMobil App
- Test events at station areas
- Central online-Reporting system to notify regarding existing barriers
- Analog options: part of services can be booked through phone

Digital Fit: Trainings für Senior*innen

Wir haben einiges vor. Im Rahmen unserer Digitalisierungsoffensive werden dieses Jahr endlich unsere langersehten und kostenlosen Kurse rund um die WienMobil App stattfinden. Wir laden Sie herzlich ein, unsere App in gemütlicher Runde ein bisschen besser kennenzulernen.



Barrieren auf wien.at - Meldung Stadt Wien

DATEN DER MELDUNG KONTROLLE ABSCHLUSS

Das gesamte Web-Angebot von wien.at muss von allen Menschen genutzt werden können, unabhängig von deren technischer Ausstattung, Sicherheitsinstellungen oder persönlichen Handicaps. Sollten Sie auf wien.at Barrieren finden, können Sie diese melden und somit helfen, das Web-Service der Stadt Wien weiter zu verbessern.

[Hinweise zum Verfahren](#)

Zuständige Stelle
Magistrat der Stadt Wien
Presse- und Informationsdienst
Lichtenberggasse 2
1010 Wien

Melderin

Familienname

Vorname

Academischer Grad

Academischer Grad (nachgestellt)

Adresse

Strasse

Hausnummer/Box als Straße Stock Tür

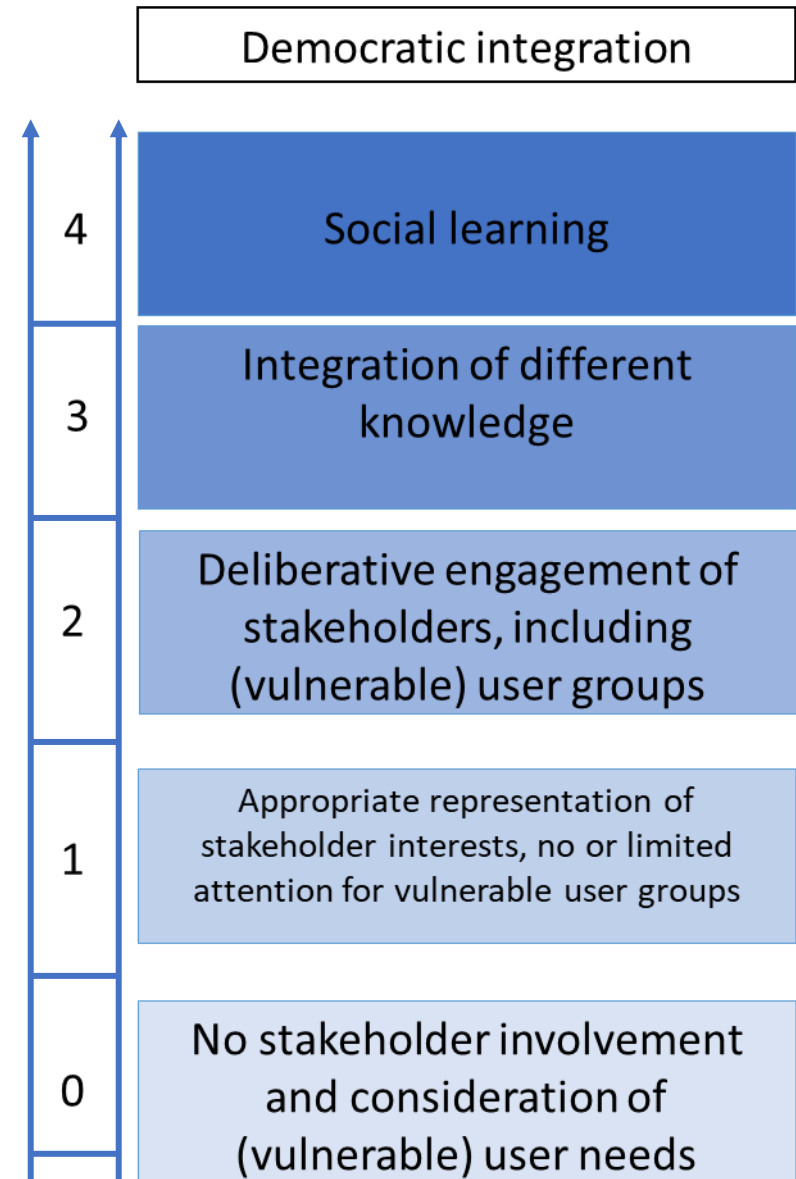
Postleitzahl Ort

Staat



Democratic integration

- Have residents, users and other stakeholders been consulted in the development of hubs?
- Have their inputs had an influence on the decision-making process?
- Have vulnerable user groups been reached?
- Different levels of democratic integration from no participation, information, and deliberate engagement to permanent participation



	Physical integration	Digital integration	Democratic integration
4	Conflict free and place making	Integration of societal goals and policies, and consideration of universal design principles	Social learning
3	Visibility and branding	Integration of service offers and consideration of universal design principles	Integration of different knowledge
2	Wayfinding and consideration of universal design principles	Integration of booking and payment and consideration of universal design principles	Deliberative engagement of stakeholders, including (vulnerable) user groups
1	Walking distance to shared and public transport, minimum inclusive design standards	Digital integration of information	Appropriate representation of stakeholder interests, no or limited attention for vulnerable user groups
0	No physical integration	No digital integration	No stakeholder involvement and consideration of (vulnerable) user needs



De SmartHubs Ladder

BESCHRIJVING VAN DE MULTIDIMENSIONALE MOBILITEITSHUB TYPOLOGIE



	Physical integration	Digital integration	Democratic integration
Level 3	<p>Visibility and branding</p> <p>At least two shared transport modes visible from a public transport stop and at least one service (e.g., shop, parcel locker, kiosk), information about the service and potential conflicts, attractive design of the mobility hub, branding and aesthetically pleasing scheme. Universal design principles are considered.</p>	<p>Integration of service offers</p> <p>Shared and public transport services at the hub are bundled, possibly subscription-based. Universal design principles are considered, including simple and intuitive app design and low-tech or analog booking alternatives</p>	<p>Integration of different knowledge</p> <p>Participation takers, including vulnerable users, argue or deny positions, their input is integrated into the participation process, participation givers create a room for decision making</p>

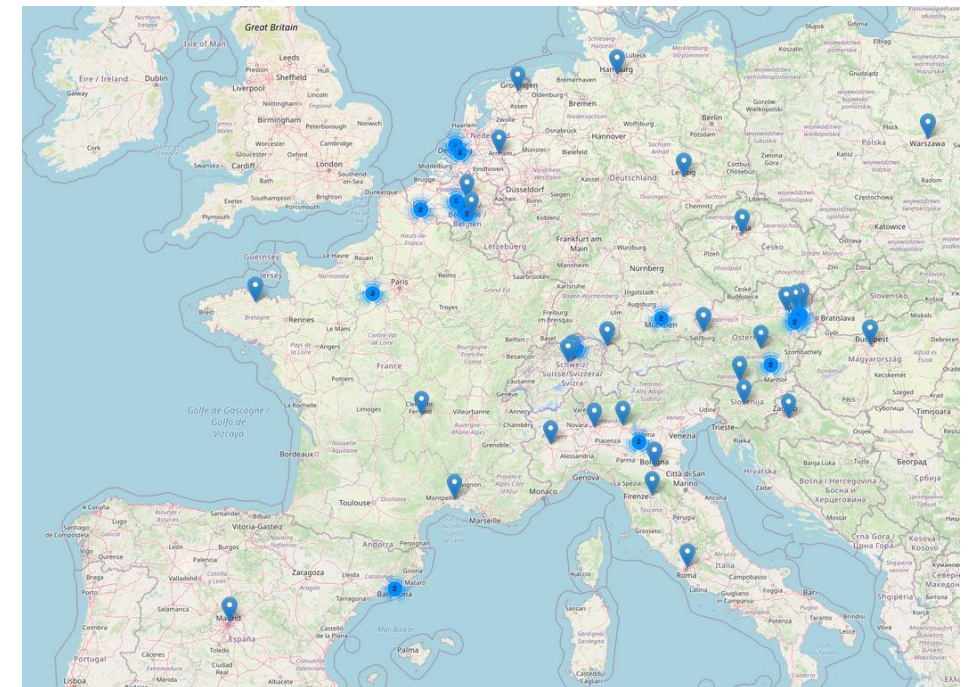
		Physical integration	Digital integration	Democratic integration
Smart Mobility Hub	4	Conflict free and place making	Integration of societal goals and policies, and consideration of universal design principles	Social learning
	3	Visibility and branding	Integration of service offers and consideration of universal design principles	Integration of different knowledge
	2	Wayfinding and consideration of universal design principles	Integration of booking and payment and consideration of universal design principles	Deliberative engagement of stakeholders, including (vulnerable) user groups
	1	Walking distance to shared and public transport, minimum inclusive design standards	Digital integration of information	Appropriate representation of stakeholder interests, no or limited attention for vulnerable user groups
Single mobility services	0	No physical integration	No digital integration	No stakeholder involvement and consideration of (vulnerable) user needs

Smart Hubs Open Data Platform (ODP)

The ODP is the **first cross-project open data platform for mobility hubs**

This Semantic-media Wiki based platform allows to ...

- ... collect data on mobility hubs following a **standardized layout**
- ... **compare** similar hubs
- ... analyze **integration levels** connected to other characteristics
- ... generate cross-network **overview** in regions
- ... download **data** for further analyses
- ... **collectively edit and contribute!**





[Become an Editor](#)

in the database: 82 Hubs (9 of which are Case Studies in the SmartHubs Project), 17 Mobility Hub Networks, 65 Mobility Providers

Mobility Hubs

data.smartmobilityhubs.eu

FILTER

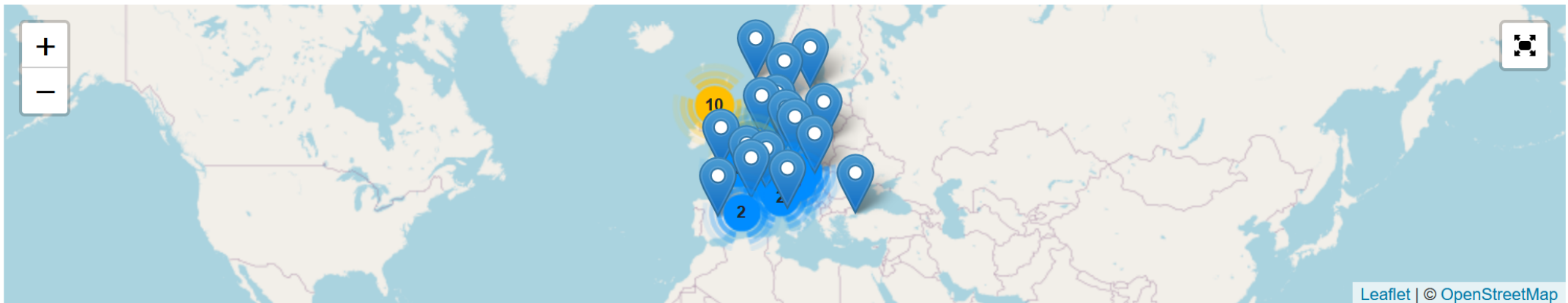
Typology: [central-urban](#) · [national](#) · [rural](#) · [urban-fringe](#) · [urban-large](#) · [urban-small](#)

Smartness: [Mobility Hub](#) · [Single Mobility Services](#) · [Smart Mobility Hub](#) · [unknown](#)

Physical Integration Level: [0](#) · [1](#) · [2](#) · [3](#) · [4](#)

Digital Integration Level: [0](#) · [1](#) · [2](#) · [3](#) · [4](#)

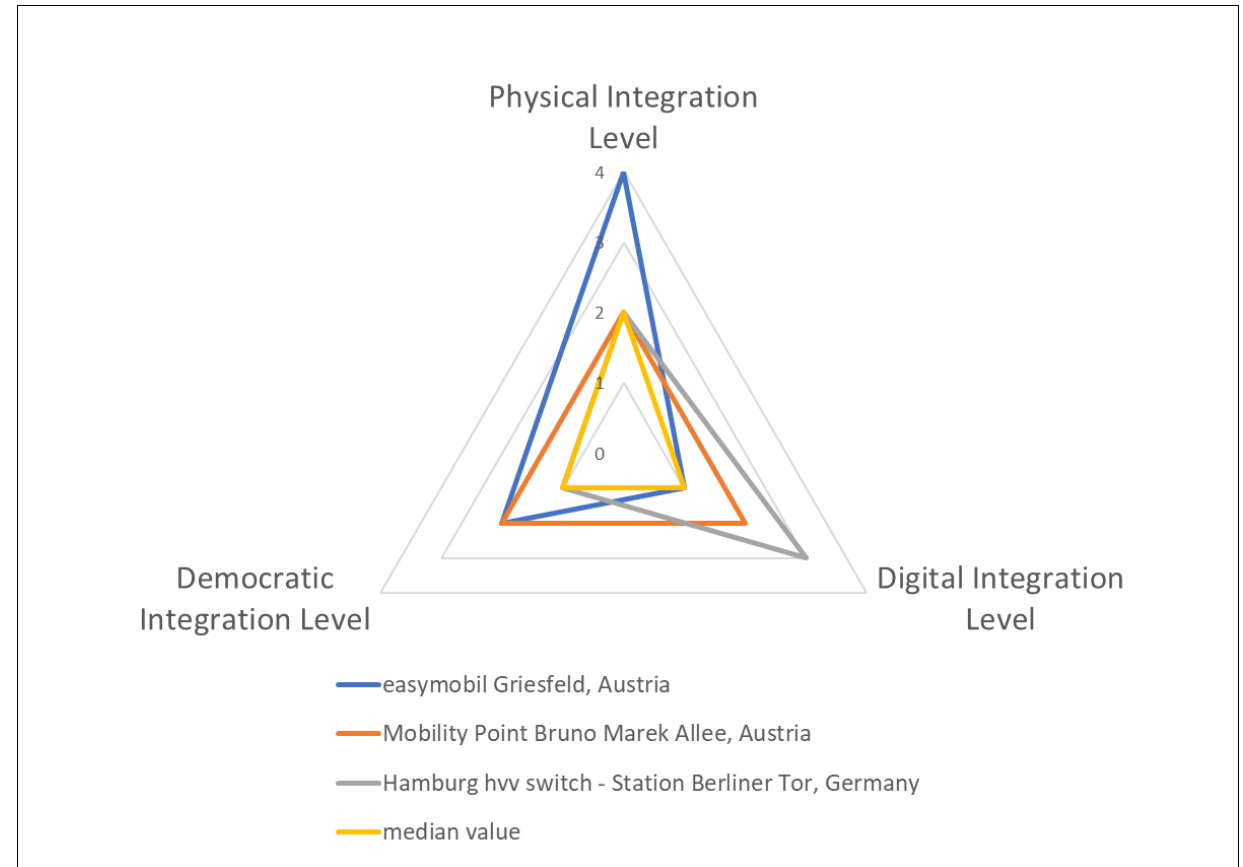
Democratic Integration Level: [0](#) · [1](#) · [2](#) · [3](#)



Analysis of expert verified hubs (N= 38)

Geurs, Grigolon et al. (submitted) te SmartHubs Integration Ladder: A Conceptual Model for the Categorisation of Mobility Hubs.

	Level 2 or higher		
	Physical	Digital	Democratic
Austria	9	6	3
Belgium	0	0	0
Croatia	0	0	0
Czech Republic	1	0	0
Denmark	0	0	0
Germany	2	1	0
Hungary	1	0	0
Italy	4	3	3
Netherlands	2	0	1
Slovenia	1	0	0
Spain	1	0	2
Sweden	0	1	0
	21	11	9



Smart Mobility Hub Bruno Marek Allee (Vienna, Austria)

- Physical integration at Level 2
 - Two shared transport modes (bike sharing and stationary car sharing)
 - Well visible from the tram station, and signs and maps show the location of vehicles at the stations, and universal inclusive design principles are considered.
- Digital integration at level 2
 - Integration through MO.Point App & WienMobil App. Information about vehicles is available in printed and digital versions, in words and pictograms, which makes the usage easy to understand.
 - It has a 24h service hotline available; analog booking options available (some modes).
- Democratic integration at Level 2
 - Discussion process with property developers on-site including the neighbourhood management.
 - Participation takers, including vulnerable groups, are invited to participate in the general station design, hosted by the public transport operator WienerLienen.

	Physical integration	Digital integration	Democratic integration
4	Conflict free and place making	Integration of societal goals and policies, and consideration of universal design principles	Social learning
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Smart Mobility Hub	Wayfinding and consideration of universal design principles	Integration of booking and payment and consideration of universal design principles	Deliberative engagement of stakeholders, including (vulnerable) user groups
Mobility hub	Walking distance to shared and public transport, minimum inclusive design standards	Digital integration of information	Appropriate representation of stakeholder interests, no or limited attention for vulnerable user groups
Single mobility services	No physical integration	No digital integration	No stakeholder involvement and consideration of (vulnerable) user needs

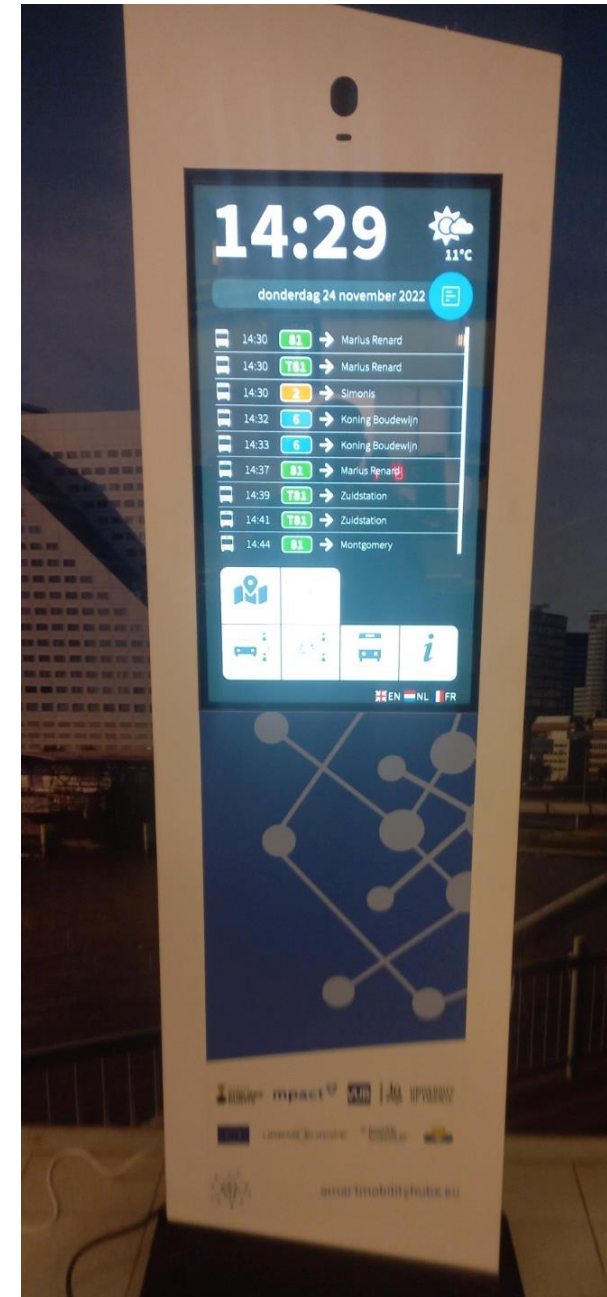
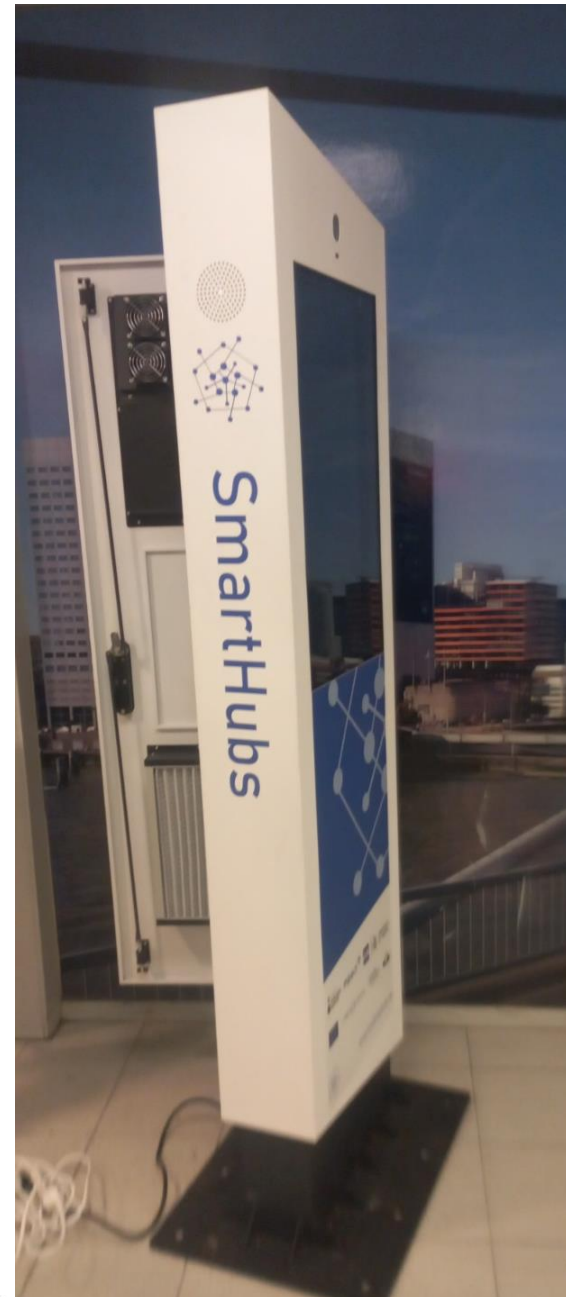
Conclusions

- Mobility hubs differ in size and functionality. Importance of public transport and non-mobility functions varies.
- **A *Smart Mobility Hub* is a mobility hub which offers advanced levels of physical, digital and democratic integration**
- The higher up the ladder, the “smarter” the mobility hub, and the higher the expected impact on user behaviour and societal impacts
- Mobility Hubs across Europe frequently have advanced levels on one or two integration dimensions, but not on all three dimensions (one exception).

Next steps

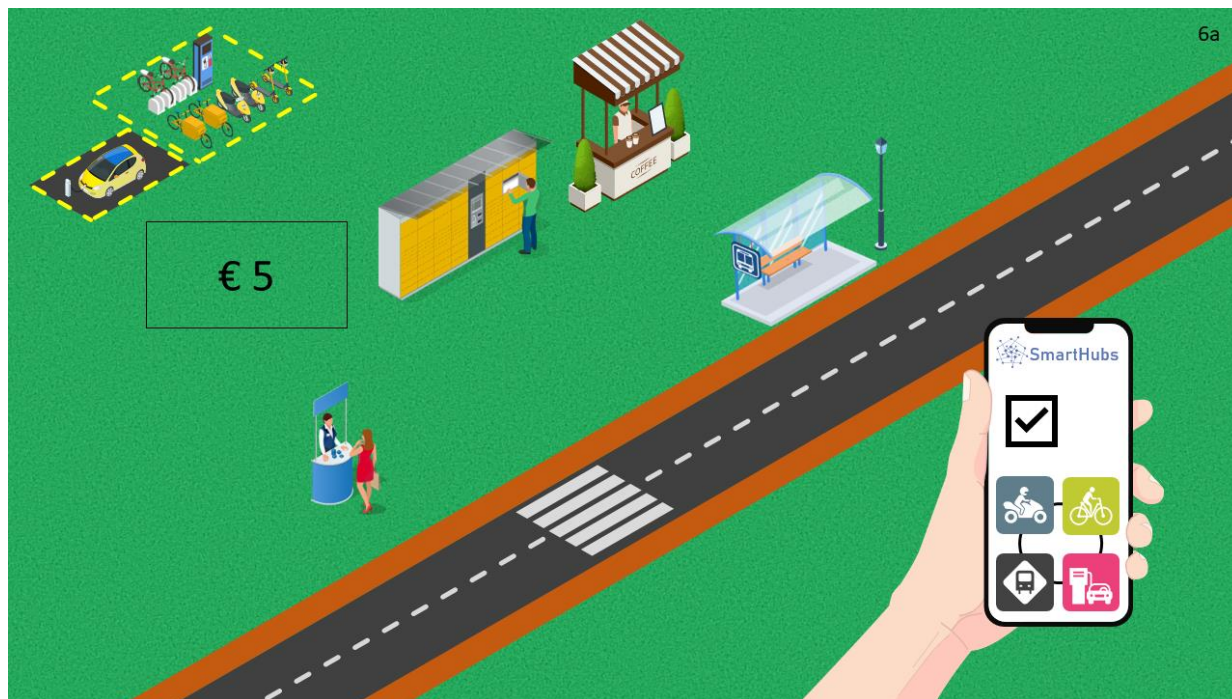
- Living Lab implementations:
experiment with DIGITAL PILLAR

mpact 



Next steps

- Impact analysis, including standardised RP/SP survey in **four Living Labs** to derive trade-offs between integration ladder dimensions and WTP to move up the ladder.



SmartHubs

Game changers in transport

www.smartmobilityhubs.eu

data.smartmobilityhubs.eu

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