EX-POST IMPLEMENTATION OF THE IMPACT ANALYSIS FRAMEWORK

Project deliverable D8.6

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MOVE21 – Multimodal and interconnected hubs for freight and passenger transport contributing to a zero emission 21st century

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Project Executive Summary

The main objective of MOVE21 is to transform European cities and functional urban areas into climate neutral, connected multimodal urban nodes for smart and clean mobility and logistics. MOVE21 will do this through an integrated approach in which all urban systems are connected, and which addresses both goods and passenger transport together. As a result, MOVE21 will improve efficiency, capacity utilisation, accessibility and innovation capacity in urban nodes and functional urban areas.

The integrated approach in MOVE21 ensures that potential negative effects from applying zero emission solutions in one domain are not transferred to other domains but are instead mitigated. It also ensures that European transport systems will become more resilient. Central to the integrated approach of MOVE21 are three Living Labs in Oslo, Gothenburg, and Hamburg and three replicator cities Munich, Bologna and Rome. In these, different types of mobility hubs and associated innovations are tested and means to overcome barriers for clean and smart mobility are deployed. The Living Labs are based on an open innovation model with quadruple helix partners. The co-creation processes are supported by coherent policy measures and by increasing innovation capacity in city governments and local ecosystems. The proposed solutions deliver new, close to market ready solutions that have been proven to work in different regulatory and governance settings. The Living Labs are designed to outlast MOVE21 by applying a self-sustaining partnership model.

MOVE21 partners

The MOVE21 consortium consists of 24 partners from seven different European countries, representing local city authorities, regional authorities, technology and service providers, public transport companies, SMEs, research institutions, universities and network organisations.

- **Norway**: City of Oslo, Akershus County, Ruter, Urban Sharing, Mixmove, Institute of Transport Economics, IKT-Norge
- **Sweden**: City of Gothenburg, Rise Research Institutes of Sweden, Business Region Gothenburg, Volvo Technology, Renova, Parkering Göteborg
- **Germany**: City of Hamburg, City of Munich, Hafencity University Hamburg, Deutsche Bahn Station & Service
- **Italy**: Metropolitan City of Bologna, Roma Servizi per la Mobilità, Roma Tre University
- **Belgium**: Eurocities, Polis
- **The Netherlands**: TNO
- **Greece**: Hellas Centre for Technology and Research

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Deliverable executive summary

Key words

#1 Impact Analysis, #2 Key Performance Indicators, #3 Ex-post assessment framework implementation #4 Innovative mobility solutions #5 Zero-emissions

Executive Summary

The current deliverable demonstrates the ex-post results of the implementation of the impact analysis framework for the Living Labs (Oslo, Gothenburg, and Hamburg) as described in the Deliverable D8.1 and the Replicator cities (Rome, Bologna, Munich) as described in the Deliverable D8.4. More detailed, the monitoring tools used for data collection are presented, along with the process for supporting their use. The result indicators of the ex-post period are demonstrated per MOVE21 impact area, per Living Lab city and per Replicator city, leading to conclusions drawn. The current ex-post evaluation report provides an overall picture of the innovations implemented during the project lifecycle and the impact of the innovations upscale to the society, traffic, and environment, based on the results of specific tools used along the whole process.

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1 List of abbreviations and acronyms

Acronym	Meaning
API	Application Programming Interface
B2B	Business to Business
B2C	Business to Consumer
DTs	Digital Twins
EC	European Commission
GDPR	General Data Protection Regulation
KPI	Key Performance Indicator
LLs	Living Labs
MNL	Multinomial Logit
NOK	Norwegian krone
PT	Public Transport
QS	Questionnaire Survey
RCs	Replicator Cities
RAs	Replicator Activities
UMMS	Urban Mobility Monitoring System
UNCC	Urban Nodes Competence Centre
WP	Work Package

2 Purpose of the deliverable

2.1 Attainment of the objectives and explanation of deviations

The current deliverable presents the application of Task 8.3: Ex-post Implementation of the Impact Analysis Framework, under which the measures implemented or replicated within the MOVE21 project are evaluated. The evaluation aims to ensure that the selected measures deliver the expected results while also identifies potential modifications to guide further work with focus on the Living Labs (LLs). D8.6 details the processes for data collection and analysis, the calculation of result indicators, and the assessment of impacts, ensuring alignment with MOVE21's sustainability and policy objectives.

D8.6 follows and implements the Impact analysis framework developed under D8.1 (Impact analysis framework for the LLs) and D8.5 (Impact analysis framework for the RCs) in order to estimate the impacts of the measures, solutions and innovations that LLs implemented and RCs replicated within MOVE21 project. In more detail D8.6 presents:

- a quantification of the different measures, solutions and innovations implemented within the project by the three LL cities and within the three RC cities
- an assessment of LLs and RCs representative's capacity after the measures' implementation and operation
- an assessment of freight operators as regards specific metrics related to the hub's operation
- final results from the indicators' calculation (defined in the evaluation framework)

The Deliverable's objective has been achieved to the fullest, even though it was not submitted on time due to the fact that the measures' and solutions' operation was postponed. This made the process of collecting the relevant data for the calculation of environmental impacts more challenging as a limited number of real users was noticed. However, and in order to calculate the relevant figures, it was decided by the consortium to include online surveys addressed to the general public living around the areas of the implemented hubs. Hypothetical questions were included in the surveys for capturing non-user insights that allowed the calculation of specific KPIs.

2.2 Intended audience

The main internal audience of this deliverable is the Project Coordinator, the WP Leaders, the Living Lab and the Replicator cities representatives, as well as the European Commission Services.

Moreover, D8.6 is a public document aiming to become a guide for any interested body, as it describes a framework and methodology implementation which is transferable to any relevant EU initiative or relevant research activity. Therefore, it is open to a wider audience.

2.3 The structure of the deliverable and links with other work packages/deliverables

The deliverable consists of six sections overall. Initially all the relative administrative information (authors, Deliverable number, document history, etc) and project information (project summary, project partners, is provided abbreviations and acronyms useful in order to guide through the deliverable). Following, the purpose and the objectives of the project are described, ending up to its construction and its links with other work packages. In the ***3rd section,*** the methodological framework of the ex-post impact analysis is presented, enriched with a detailed presentation of the MOVE21 monitoring tools used for data collection procedures, necessary for the monitoring and calculation of the result indicators. The ***3rd section*** also provides the definition of several concepts and notions enclosed by the results indicators of the impact analysis framework and express the way the MOVE21 project understands them. Moving forward, within the ***4th and 5th sections*** the result indicators are demonstrated per Level and Living Lab/Replicator city respectively, the ***6th and last section*** includes the conclusions of the impact analysis. The deliverable is completed with the section References and Annexes (A - F) presenting the structure and images of the monitoring tools.

The current deliverable is linked with D8.1 and D8.4 implementing the framework developed for the LLs and the RCs and also D8.3 and D8.5 using and comparing the ex-ante results indicators presented in these two deliverables with the final ones as these are presented within the following sections. D8.6 findings will also feed into D8.7 and will be used as a base for shaping the methodology to be followed for assessing the project's impact on the TEN-T network by scaling up the expected impacts from the LLs and the RCs against performance indicators identified for that purpose. Main evaluation results will be incorporated into the UNCC, thereby enriching its content and providing useful insights to other cities that aim to implement similar measures, solutions and innovations. In general, the results of the ex-post evaluation will be discussed and further analysed in the LLs and the RCs allowing each one to decide and organize the next steps that will lead to a swift transition to smart and zero emission transport fit for the 21st century.

3 Methodological Framework for the ex-post MOVE21 Impact Assessment

3.1 Ex-post impact assessment methodology overview

MOVE21 integrates smarter and cleaner mobility measures and solutions by applying a holistic and integrated approach to mobility planning, policies, and implementation in the MOVE21 cities. The approach facilitates two-way replication between the Living Lab cities of Oslo, Gothenburg, Hamburg and the Replicator Cities of Bologna, Rome, and Munich, ensuring shared learning and mutual adoption of effective solutions. This integrated approach forms the basis for positive impact delivery as regards long-term decarbonization, sustainability, inclusiveness, security, economic development, social cohesion, and accessibility improvements.

To assess the impact of MOVE21 mobility solutions implemented and/or replicated a three-level impact assessment methodology integrating three fundamental conceptual levels has been planned for both the LLs and RCs. ***Level one*** refers to the three innovation-enabling topics which are society, governance, and technology. ***Level two*** refers to the Living Labs co-creation procedures and the procedures followed by the RCs in their effort to replicate and/or implement specific solutions/innovations. ***Level three*** refers to the impact-oriented MOVE21 result indicators.

3.1.1 Level 1: Innovation-enabling topics

Within this level, a performance assessment takes place for assessing the number of innovations that were finally implemented in the three LLs and also the number of innovations that were finally replicated in the RCs, in the view of the ***three thematic areas***: urban social layer, governance, and technical integration.

The ***urban social layer*** considers the implemented innovations that provide close link between social and spatial components of the cities, enhance social acceptance, and maximize the impacts on social cohesion. The ***governance level*** is related to the needed innovative actions that should be done by the LLs and the RCs to solve specific problems and barriers as regards governance structures/mechanisms, and specific parameters such as regulatory knowledge, stakeholders, resource mobilization, direction of search, market and customers, legitimacy, and entrepreneurial experimentation. The ***technical integration*** is related to the technological innovations of the final implemented and/or replicated solutions as regards the achievement of the connectivity and interoperability among them analysing separately each of the cases in the six cities.

The KPIs included in this Level per thematic area are listed below:

Thematic Area	LLs	RCs
Urban Social Level	Number of MOVE21 social innovations implemented in the LLs	Number of MOVE21 social innovations implemented/replicated in the RCs
Governance Level	Number of MOVE21 innovative business models implemented in the LLs	Number of MOVE21 innovative business models implemented /replicated in the RCs

	Number of MOVE21 governance innovations implemented in the LLs	Number of MOVE21 governance innovations implemented/replicated in the RCs
Technical Integration	Number of MOVE21 technological innovations implemented in the LLs	Number of MOVE21 technological innovations implemented/replicated in the RCs
	Number of MOVE21 service innovations implemented in the LLs	Number of MOVE21 service innovations implemented/replicated in the RCs
	Number of interoperable systems of innovative solutions adopted in the LLs	Number of interoperable systems of innovative solutions adopted/ replicated in the RCs
Overall KPI	Number of implemented MOVE21 innovations in the LLs (total number of innovations per LL)	Number of implemented MOVE21 innovations in the RCs (total number of innovations per RC)

Table 1: KPIs per thematic area

3.1.2 Level 2: Living Lab procedures

The LL procedures refer to the co-creation, implementation, and upscaling of innovative mobility solutions, the efforts to increase innovation capacity in the cities and the local ecosystems, and the self-sustaining partnership models. Under this concept, there are three main targets that this Level serves:

- ✓ To evaluate the uptake of new knowledge and skills within the Living Lab cities, during the co-design and implementation procedures of the measures.
- ✓ To quantify any modifications occurred within the Living Lab cities' administrative and legal framework for strengthening the local innovation ecosystems.
- ✓ To quantify the collaborations created and the business models developed within the Living Lab cities for achieving a successful implementation and operation of innovative measures.

A total of 14 KPIs are included in this Level, addressing three targets:

Target Area 1: Uptake of new knowledge and skills

- Increased capacity to incorporate data-driven approaches in mobility planning
- Perceived improved understanding of governance drivers and barriers to implementation of measures
- Living Labs' increased innovation capacity regarding organizational issues for implementing innovative mobility solutions
- Living Labs' increased innovation capacity regarding knowledge management needed for implementing innovative mobility solutions
- Perceived improved understanding of the potential for the upscaling of MOVE21 solutions per Living Lab

Target Area 2: Modifications occurred within the Living Lab cities' administrative and legal framework as well as technological upgrade

- Number of policy solutions proposed for ensuring the successful establishment of MOVE21 mobility hubs per Living Lab

- Number of Commercial decisions proposed or implemented for ensuring the successful establishment of MOVE21 mobility innovations per Living Lab
- Number of Administrative decisions proposed or implemented for ensuring the successful establishment of MOVE21 mobility hubs per Living Lab
- Number of Governance decisions proposed or implemented for ensuring the successful establishment of MOVE21 mobility hubs per Living Lab
- Number of new Technological Equipment developed/installed/purchased for ensuring the successful establishment of MOVE21 mobility hubs per Living Lab
- Number of interoperable systems

Target Area 3: Quantify the collaborations created and the business models developed

- Number of MOVE21 business models developed
- Number of strategic plans that will be reformulated based on the results of MOVE21 in the three Living Labs
- Number of New Collaboration Schemes proposed or implemented for ensuring the successful establishment of MOVE21 mobility hubs per Living Lab

3.1.3 Level 2: Replicator Cities procedures

The procedures encompass the collaborative development and implementation of innovative mobility solutions, the efforts aimed to enhance innovation capabilities within the cities and the local ecosystems, and the adoption of self-sustaining partnership models by the cities participating in RAs. Under this concept, there are two out of the three project target areas that are used for the evaluation framework of RAs:

- ✓ The evaluation and uptake of new knowledge and skills within the six cities/urban areas during the replication and/or implementation procedures of the measures.
- ✓ The quantification of the collaborations created and the business models developed within the six cities/urban areas for achieving a successful replication and operation of innovative measures.

A total of four KPIs are included in this Level, addressing two target areas:

Target Area 1: Uptake of new knowledge and skills

- Perceived improved understanding of governance drivers and barriers to implementation of measures

Target Area 3: Quantify the collaborations created and the business models developed

- Number of MOVE21 business models developed
- Increased collaboration between public and private entities and transport domains
- Modal integration of transport

Target Area 2 is related to modifications within the cities' administrative and legal frameworks as well as technological upgrades (for example number of policy, commercial, administrative and governance decisions solutions, number of technological equipment, etc). These were additional KPIs (not included in the Grant Agreement) added by WP4 and WP5 in agreement with WP8 for the case of the LLs evaluation framework. When proceeding with the RCs evaluation framework the final list of KPIs did not include KPIs from Target Area 2.

3.1.4 Level 3: Impact-oriented result indicators

Under this level, the ***result indicators*** reveal the performance of the LLs' and RCs' measures and innovations in terms of i) long-term decarbonisation, ii) sustainable, inclusive, safe, secure mobility sustainability, inclusiveness, safety mobility systems, iii) improvements of the efficient and accessibility of the transport networks covering the TEN-T urban nodes and iv) social cohesion, economic development and public perception resulting in behavioural and policy change.

Impact Area 1: Long-term decarbonisation

This area is related to ambitious 2030 and 2050 climate goals. The integration of new and scalable technologies and measures into city transport system operations and existing transport infrastructures is essential for achieving long-term decarbonisation. This approach supports sustainable economic growth, environmental benefits, and advancements in policy frameworks over time.

Impact Area 2: Sustainable, inclusive, safe, and secure mobility system

This area is related to safety, inclusiveness and security by addressing and analysing issues as these are perceived by the LLs and RCs citizens. It emphasizes the importance of shaping these perspectives through collaboration with stakeholders (i.e., Innovation Co-creation Partnerships, quadruple helix partners, citizens and civil society). Furthermore, the new sustainable mobility solutions are expected to influence local air quality, safety, and quality of life positively. The expected reductions in noise and pollution can contribute to long-term health, wellbeing, environmental, social, and economic impacts and are potentially important considerations for public perception.

Impact Area 3: Improvements of the efficiency and accessibility of the transport networks/systems covering the TEN-T urban nodes

Due to the fact that the test sites are directly linked to the TEN-T access points, the MOVE21 innovations are expected to contribute to access improvements as regards the TEN-T corridor and the provided sustainable transport options, while also increase efficiency and capacity utilisation within the urban nodes. Thus, under this Impact Area, a contribution to short-term and long-term economic and environmental impacts is expected to be reached. Also, the collaboration through the Scan-Med Cities Observatory is expected to improve the identification and solving solutions to transport challenges at the interfaces between different spatial and governance levels, thus delivering long-term cultural, political, and capacity building impacts.

Impact area 4: Social cohesion, economic development, and public perception, resulting in behavioural and policy change

Improved alignment of planning mechanisms in different policy domains triggers 'win-win' effects between policy goals and creates space for enhanced innovation capacity through different levels: policy, governance, urban planning, financing, business models, infrastructure and technological solutions. MOVE21 facilitates policy change through policy-learning processes, supported by tools and methods, and through sectoral integration, ensuring greater policy coherence. The ambitious policy goals in the participating cities and in Europe (as expressed in EU's Green Deal) on reduced emissions and increased liveability in urban areas create business opportunities for innovative solutions, contributing to short- and long-term economic and policy impacts. Co-creation with industrial partners, citizens, and policy-makers ensures that real investment opportunities meet well-defined goals for

sustainable mobility and bring tangible outcomes and economic development opportunities and short- and long-term economic impact, ultimately resulting in new, green jobs in Europe.

This level of analysis aims to quantify the impact of the different MOVE21 innovative measures and services on reducing environmental emissions, influencing travel behaviour, and enhancing the quality of transport services offered to users in the city. Due to the limited operational time of the services before the data collection phase began and the challenges in gathering accurate data that could be scaled up, the KPIs that were finally quantified and used for the ex-post evaluation in the current report in the cases of LLs and RCs are presented thus:

Impact Area	**LLs ex-post KPIs**	**RCs ex-post KPIs**
Long-term decarbonisation	CO2 reductions from passenger transport in LLs Reduction in passenger transport related NOx air pollution as a result of deployed MOVE21 innovations Reduction in passenger transport related PM2.5 air pollution as a result of deployed MOVE21 innovations	
Sustainable, inclusive, safe, and secure mobility system		Increase in PT use
Improvements of the efficiency and accessibility of the transport networks/ systems covering the TEN-T urban nodes	No. of new (micro) hubs as a result of the Project No. of improvements in existing hubs as a result of the Project Reduced number of heavy (freight) vehicles in circulation as a result of the implementations Modal shift due to decrease of travel time (associated with MOVE21 hubs)	Increase in active modes due to RAs Number of new (micro) hubs as a result of the Project Number of improvements in existing hubs as a result of the Project
Social cohesion, economic development, and public perception, resulting in behavioural and policy change	Direct economic sectorial contribution to the welfare to the metropolitan area from city transport	

Table 2: Overview of impact areas and ex-post KPIs

3.2 Ex-post impact assessment methodology implementation

The ex-post impact assessment implementation is based on two monitoring tools, ***Questionnaire Surveys i) to cities' representatives, ii) to users/non-users of the implemented solutions and iii) to freight operators of implemented solutions*** and the ***Measures/Innovations Logbooks***. Complimentary to the monitoring tools, a ***communication process*** among WP8, LLs, RCs and project

partners has been implemented to present the monitoring tools, set their timelines, assure their accuracy and reliability, and propose ideas for improving them.

3.3 Ex-ante data collection methods

3.3.1 Questionnaire Survey to cities representatives

For the implementation of the MOVE21 Impact Assessment, a ***Questionnaire Survey (QS)*** was organised covering several MOVE21 impact areas and result indicators. The QS of this period aimed to collect from the LLS and RCs representatives, information in relation to ***the ex-post assessment,*** providing the final figures of specific indicators. The questionnaire was ideally intended to be completed by the same individuals who participated in the research during the ex-ante evaluation phase. However, this was not feasible, as many of them were no longer in the same professional roles. Consequently, not only were they no longer the most suitable respondents, but they were also unavailable for contact. The QS form is presented in ***Annex A*** for the LLs case and ***Annex B*** for the RCs case at the end of the current Deliverable and are similar to the ones used during the ex-ante phase.

As regards the LLs, the respective KPIs are: the city's increased capacity to incorporate data driven approaches in mobility planning, the city's perceived improved understanding of governance drivers and barriers to implement the measures, the city's increased innovation capacity regarding knowledge management needed for implementing innovative mobility solutions, the city's increased innovation capacity regarding organisational issues for implementing innovative mobility solutions, collaboration level between public private entities in the field of transport domain, and the city's perceived improved understanding of the potential for upscaling MOVE21 solutions per Living Lab.

As regards the RCs, the respective KPIs are: the city's perceived improved understanding of governance drivers and barriers to implement the measures, the city's increased collaboration between public and private entities and transport domains, the city's modal integration of transport and the potential to upscale measures. The level of participation was an important factor to ensure the accuracy and reliability of the QS results. Overall, 17 LL and 47 RC representatives participated in the survey. The professional background of the respondents is mobility, environment, and development sectors (e.g. climate, procurement, urban development, traffic management, transport planning).

3.3.2 Questionnaire Survey to users/non-users of the implemented solutions

To calculate specific KPIs related to Level 3, dedicated questionnaire surveys were conducted with users and non-users of the implemented hubs. The questionnaire was common for all three cities, provided in two different forms (on-site and online). The questionnaire was structured into seven sections as described below to capture data relevant to the study. The **Socio-Economic Data section**, which gathered demographic and personal information, the **Accessibility section**, which assessed participants' proximity to key locations, the **Travel Behaviour Information section**, focusing on vehicle ownership, public transport usage, and travel habits, the **Mobility Hubs Concept section**, exploring participants' awareness and usage of mobility hubs, **Current Users section**, examining usage patterns and perceptions (conditional on participants being users), the **Non-Users section**, identifying reasons for non-adoption and motivational factors (conditional on participants being non-users) and finally the **Additional Details section**, which collected opinions on travel preferences, environmental attitudes, and transport-related behaviours.

This structure ensured that the survey addressed all critical dimensions of mobility hub use and perception. Due to difficulties in recruiting participants, it was not always feasible to implement both methods (on site and online) in each city. As a result, some cities used only one of the two methods for data collection, adapting to the specific circumstances in each location.

More specific, in the city of Gothenburg both online and on-site surveys were conducted, with 250 participants completing the online survey and 39 participants taking part in the on-site survey. Among these participants, 90 were general users of mobility hubs, while 10 use specifically the Klippan mobility hub. In Oslo, only online surveys were conducted, with a total of 1027 participants completing them. Out of these, 202 respondents indicated that they are users of the mobility services in Groruddalen. Finally, in the case of Hamburg, only online surveys were conducted, with a total of 116 participants from the areas of Kaltenkircher Platz and Altona. None of these participants reported being users of the mobility hub. The Questionnaires included in ***Annex C*** at the end of the current Deliverable and is indicative representing Hamburg's case.

3.3.3 Questionnaire Survey to freight operators

For the calculation of specific KPIs related to freight activities that took place within the project, a short questionnaire survey was designed and distributed to the logistic companies operating within the hubs that were implemented in the three LL cities. The operators were asked to fill in specific information as regards the type of vehicles used for the deliveries before and after the measures, solutions and innovations implementation, the daily average km driven and also the load factors in the before and after situation. The analysis of this data allowed the final indicators calculation. The QS form is presented in the ***Annex D*** at the end of the current Deliverable.

3.3.4 Measures and Innovations Logbook

For the implementation of the MOVE21 impact assessment, a ***Measures and Innovations Logbook*** was designed for both the Living Lab cities and the Replicator Cities to fill in to cover several MOVE21 impact areas and result indicators. The aim of the Measures and Innovations Logbook of this period was to collect all the relevant information related to the measures and innovations implemented or upscaled in Living Labs and replicated and in Replicator Cities. The Measures and Innovations Logbook form is presented in ***Annex E*** for the LLs case and ***Annex F*** for the RCs case at the end of the current Deliverable. In the context of the Logbook, the LL and RC representatives were invited to fill in the measures and the built-in solutions proposed and describe the innovative aspects (technical/non-technical) finally adopted. Furthermore, they described all the administrative, commercial, and policy decisions taken to support the measures, solutions, and innovations as well as the technological innovations and the governance/collaboration/business models created. LLs and RCs representatives were familiar with the process of completing the Measures and Innovations Logbook as it was the same one followed within the two previous evaluation phases (ex-ante and ex-durante).

3.4 Definitions in Impact Analysis Framework

Before presenting the impact analysis results, it is important to provide the definition of several concepts enclosed by the results indicators of the impact analysis framework and express the way the MOVE21 project understands them. For the result indicator: ***Number of MOVE21 innovations implemented,*** it is important to clarify the concept of innovation as well as define the categories of innovations. As regards the innovation concept, the definition is found in D1.2 *Innovation Management Vision and Strategy* [1], and follows the ISO56000:2020 approach. Accordingly, innovation is defined as a new or

changed entity, realising, or redistributing value. MOVE21 has chosen LLs as its innovation model which is quintessentially an open innovation model.

MOVE21 uses the following categories of types of innovations. It is important to note that overlaps between categories often occur and that "bundled innovations" are prevalent, meaning that innovations can have characteristics from more than one category. For monitoring purposes, different innovations are only counted in one category, although they might exhibit many characteristics with other categories.

1. ***Social***
   According to the OECD, social innovation refers to the design and implementation of solutions that imply conceptual, process, product, or organizational change, which ultimately aim to improve the welfare and wellbeing of individuals and communities. [2]

2. ***Governance***
   Governance innovation is defined according to D4.1: *Initial Governance Innovation and Capacity Context Analysis for the Living Labs*. Consequently, governance innovations concern developing better ways to organize and govern, with the goal of significantly improving the provision of public goods and services [3] This includes various co-governance and partnership models, innovation capacity in government and policy innovation.

3. ***Process***
   According to the OECD, process innovation is referring to the implementation of a new or significantly improved production or delivery method in either public or private sector. This includes significant changes in techniques, equipment and/or software [4]. Changes in operational aspects can be a part of process innovation.

4. ***Business***
   According to the OECD and Eurostat, business innovation refers to a new or improved business process for one or more business functions that differs significantly from the firm's previous business processes and that has been brought into use in the firm. This concerns the different functions of a firm, including production of goods or services, distribution and logistics, marketing and sales, information and communication systems, administration and management, and product and business process development [5].

In MOVE21, the category of business innovation also includes innovation related to pricing and revenue models. Pricing model refers to a way an organisation maximizes profits and can pertain to pricing strategies such as flat rates, freemiums, premiums, or flexible pricing. Revenue model refers to the way an organisation generates income and can pertain to for example pay-per-use, licensing, leasing, advertising, or subscriptions.

5. ***Technological***
   According to the OECD, technological innovation refers the comprise of new products and processes and significant technological changes of products and processes [6].

6. ***Service***
   Service innovation can pertain either to innovation of new service products, processes, or new service companies or organizations. Service innovation can pertain to both immaterial innovation

but also be linked to manufacturing. Service innovation is about significantly improving user experiences [7].

Regarding the result indicator ***Number of implemented MOVE21 innovations,*** the term "implemented innovations" indicates the real operation of the innovations within the project duration.

For the result indicator ***Number of MOVE21 innovations implemented*** or ***replicated,*** it is, also, important to clarify ***the meaning of the test sites and measures*** (related to passenger and freight mobility). The test sites represent the spatial (e.g., urban, peri-urban) content where the measures, solutions and innovations will be implemented. The ***measures*** refer to the urban and mobility planning decisions accompanied with the policy, administrative, and commercial decisions that will be implemented, while the ***solutions*** are closely linked to the measures and describe in detail the different components of the measures. Consequently, a measure is defined in a more strategic level (e.g., a hub network) and several solutions are enclosed by it (e.g., business models among involved stakeholders, freight and passenger mobility planning, land-use in the context of infrastructure allocation).

For the result indicator ***Number of MOVE21 business models intended to be developed,*** it is important to define the business model meaning. In the context of MOVE21, a business model is a plan for how the measure in question will generate value for its users.

Regarding the result indicator ***Modal integration***, this defines the availability of intermodal connections (between different transport modes) and the quality of the interchange facilities, number and frequency.

For the result indicator ***Number of interoperable systems of innovative solutions adopted in the Living Lab cities*** it is important to define interoperability. In general, interoperability is the ability of different systems, devices, applications, or services to communicate and exchange data effectively and efficiently. It is a key requirement for many complex and dynamic systems, such as healthcare, transport and e-commerce. In the transport policy concept, *"interoperability"* is the ability of two, or more, transport systems to operate effectively and efficiently together to fulfil consumers' requirements of a transport system. In the context of MOVE21, an interoperable system is consisted of two or more transport modes or mobility services used for the completion of a seamless trip between the origin and the destination [8].

4 LLs ex-post Impact Analysis Results

The current section presents a monitoring card for each Level, Living Lab city, and result indicator. The monitoring card follows a structure that continues the corresponding card in the D8.1 *Evaluation Framework* and refers to the baseline, the ex-ante and ex-post time periods, after the implementation of the measures, innovations, and solutions in the context of the LL cities.

4.1 Level 1: Innovation Enabling Topics

4.1.1 Oslo

Result Indicator 3.1: No of implemented MOVE21 innovations in the Oslo Living Lab

Result indicator 3.1	**Number of MOVE21 innovations implemented in Oslo**
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA	2025 : 15 (innovations)
Method/ Monitoring tools used	Measures and Innovations Logbook
Ex-ante evaluation result	39 innovations 5 innovation categories
Ex-post evaluation result	18 innovations 5 innovation categories

Table 3: Result indicator 3.1 (OSL)

In the ***four test sites*** of Oslo (CCVEST, Groruddalen, Oslo (within ring road 3), and Filipstad (Kaia mobility hotel), several measures and innovations were implemented, as described in the Measures and Innovations Logbook. Figure 1 demonstrates the planning and implementation of ***4 measures summing up to 14 solutions and 18 innovations of five different types:***

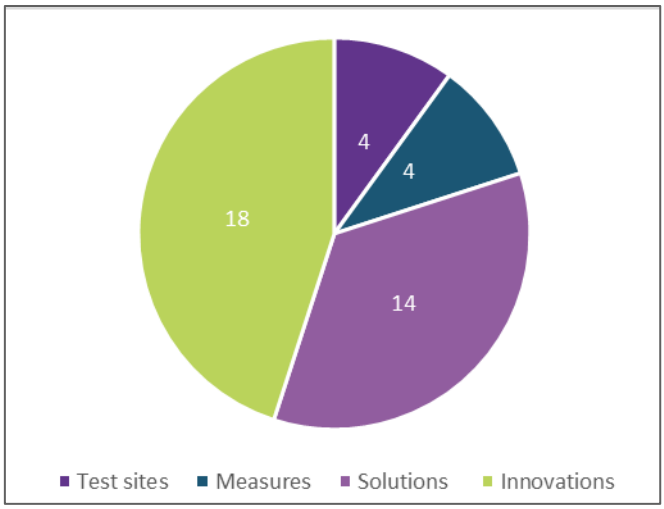

Figure 1 Test sites/Measures/Solutions//Innovations distribution in Oslo

The categories of the above-mentioned indicators intended to be integrated are social, business model, technological, service and governance innovations and their distribution is presented in Figure 2.

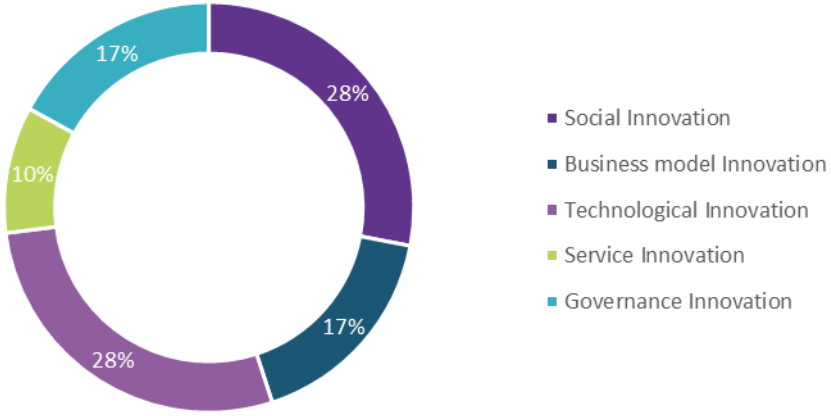

Figure 2 Innovation types in Oslo

In the case of Oslo, the ***social innovations*** refer i) on enabling visits to shops and restaurants without the use of private car, ii) offering home transport of goods from stores that do not offer such capabilities, iii) the promotion of active and green mobility outside the city centre (ring road 3) and on enabling the public to combine the use of public transport with privately owned, on-demand micromobility.

The ***business model innovations*** are related to the pricing models of CCVEST for the transport of goods to consumers' residents, the combination of different mobility services for specific locations in Groruddalen and the pricing structure for integrating micromobility services in the city's public transport system.

The ***technological innovations*** refer mainly to the combination of existing mobility services as for example the integration of micromobility services to the public transport system, or the integration of different technologies as for example integrating freight management systems (cargo consolidation

software) to carriers that primarily provides mobility on demand services for people (public transport routing and on-demand transport booking).

The ***service innovations*** refer mainly to the combination of passenger and freight transport in the same vehicles (CCVEST) and the services at the Kaia Mobility Hotel.

The ***governance innovations*** are related to i) combining freight transport on a commercial basis with on-demand transport for passengers (CCVEST case) ii) Planning of transport modes and locations based on user needs, availability of locations and operator feedback (Groruddalen case) and iii) Kaia the public-private business model developed as part of Kaia Mobility.

Result Indicator 3.14: No of interoperable systems of innovative solutions adopted in Oslo Living Lab

Result indicator 3.14	No of interoperable systems of innovative solutions adopted in Oslo Living Lab
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tools used	Measures and Innovations Logbook
Ex-ante evaluation result	2 (1 in Groruddalen site and 1 in Oslo within ring road 3 site)
Ex-post evaluation results	2 (1 in Groruddalen site and 1 in Oslo within ring road 3 site)

Table 4: Result indicator 3.14 (OSL)

Regarding Oslo Living Lab, two interoperable systems are adopted (one in Groruddalen site and one in Oslo within ring road 3 site). Regarding Groruddalen, different modes are combined for limiting the use of private vehicles and covering Grorud residents' transport requirements. For the other it is about integrating public transport and private micromobility offers in the PT ticket offer.

4.1.2 Gothenburg

Result Indicator 3.1: No of implemented MOVE21 innovations in the Gothenburg Living Lab

Result indicator 3.1	No. of MOVE21 innovations intended to be implemented
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1

Measurement unit	Number
Target value according to GA	2025: 15 (innovations)
Method/ Monitoring tools used	Measures and Innovations Logbook
Ex-ante evaluation result	22 innovations 5 innovation categories
Ex-post evaluation result	21 innovations 5 innovation categories

Table 5: Result indicator 3.1 (GOT).

In the ***three test sites*** of Gothenburg (Nordstan, Klippan, Lindholmen) several measures and innovations are planned to be implemented. The current situation, as described in the Measures and Innovations Logbook and presented in Figure 3, demonstrates the intention for planning and implementing ***three measures*** including ***10 solutions*** and ***21 innovations*** of ***five different types.*** The categories of innovations and their distribution is presented in Figure 4.

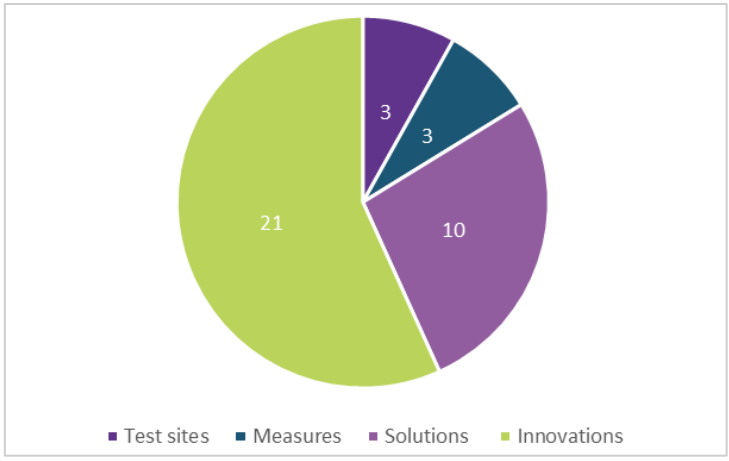

Figure 3 Test sites/Measures/Innovations in Gothenburg

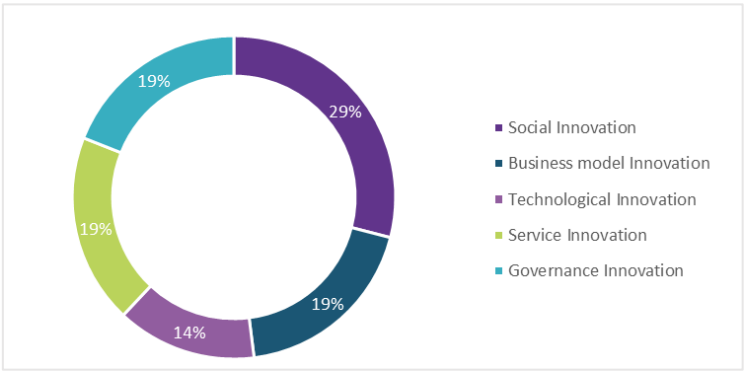

Figure 4 Innovation types in Gothenburg

Social innovations refer to services i) that aim to transform areas by reducing the use of private vehicles (Nordstan Mobility Hotel and Lindholmen cases) and improving the working environment

through active mobility for local service providers (Nordstan Mobility Hotel case), ii) improve perceived safety for bikers and enhance the place identity (Klippan case).

Business model innovations are identified for clarifying issues as regards shared space and new uses of central real estate (Nordstan Mobility Hotel Case), for public-private collaboration as well as overcoming barriers of private-public partnership (which can be considered also as a ***governance innovations***). As regards the Klippan case, the business model innovation is related to the combination of fees for parking and bike rent, while a model for financing the cargo-waste co-freight to Lindholmen with collaboration between operator, tenants, landlord and logistics companies is the business innovation related to Lindholmen case.

The ***technological innovations*** refer to technological integration, in the view of i) the creation of an one stop e-shop for park and bike and combined multimodal fee for parking and bike (Klippan case), ii) the investigation of integrating a technological data platform including logistics data (Lindholmen case) and iii) a solution where the parcel box informs Lindholmsleveransen that parcel is placed in the parcel box (Lindholmen case).

The ***service innovations*** are related i) to urban logistics planning and organisation referring to the picking up and delivery of goods from local companies through parcel boxes (Lindholmen case) ii) the one stop e-shop for park-and-bike in Klippan, for improving user experience and provide an easier orientation between different transport modes. and iii) integrations between different services (Nordstan mobility hotel) making the end user experience much easier (for example order a tool needed right away from Ahlsell and get it delivered to you with Pling).

The ***governance innovations*** are related to i) overcoming barriers of private-public partnership, facilitating innovative mobility and logistics solutions through public procurement processes and exploring ways for the municipality to act as incubator for innovative initiatives (Nordstan Mobility Hotel case), ii) benefiting from formalised collaboration between actors not typically working together (Lindholmen case and Nordstan case).

Result Indicator 3.14: No of interoperable systems of innovative solutions adopted in Gothenburg Living Lab

Result indicator 3.14	**No of interoperable systems of innovative solutions adopted in Gothenburg Living Lab**
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tools used	Measures and Innovations Logbook
Ex-ante evaluation result	1 (in Klippan)

Ex-ante evaluation result	1 (in Klippan)

Table 6: Result indicator 3.14 (GOT).

Regarding the Gothenburg Living Lab, an interoperable system is adopted in Klippan as the concept motivates people to combine the use of private vehicle with other sustainable transport modes (half of the trip can be completed by private car and the other half by public transport, shared bike or a shared e-scooter, provided in the site). To make the transition to multimodal transport easier, Göteborgs Stads Parkeringsaktiebolag (city parking agency) and the City of Gothenburg are investigating if Göteborgs Stads Parkeringsaktiebolag's app could be used to gather more mobility services. The benefit for the users is using the same app when parking and for continuing a trip. The integration of different mobility services from different operators in the same app is not only a MaaS-integration, since integrating this in the parking app can nudge traditional motorists to try other modes of transport for the first time.

4.1.3 Hamburg

Result Indicator 3.1: No of implemented MOVE21 innovations in Hamburg Living Lab

Result indicator 3.1	**No. of MOVE21 innovations intended to be implemented**
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA	2025: 15 (innovations)
Method/ Monitoring tools used	Measures and Innovations Logbook
Ex-ante evaluation result	43 innovations 5 innovation categories
Ex-post evaluation result	36 innovations 5 innovative categories

Table 7: Result indicator 3.1 (HAM).

In the ***three test sites*** of the Hamburg LL (Holstenstrasse, Kaltenkircher Platz, Harkortrasse), several measures and innovations have been implemented and also one service (combined transport by MOIA), as described in the Measures and Innovations Logbook and presented in Figure 5, which demonstrates the intention for planning and implementing ***four measures***, summing up to ***12 solutions*** and ***36 innovations*** of ***five different types.***

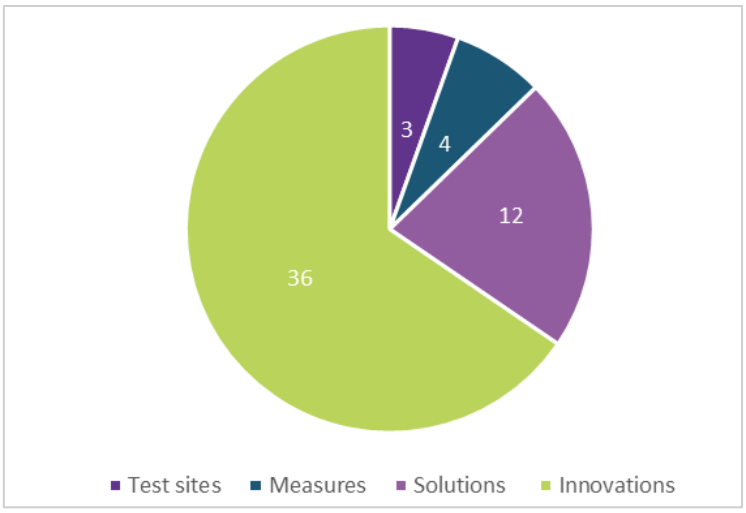

Figure 5 Test sites/Measures/Innovations in Hamburg

The distribution of innovations categories is presented in Figure 6.

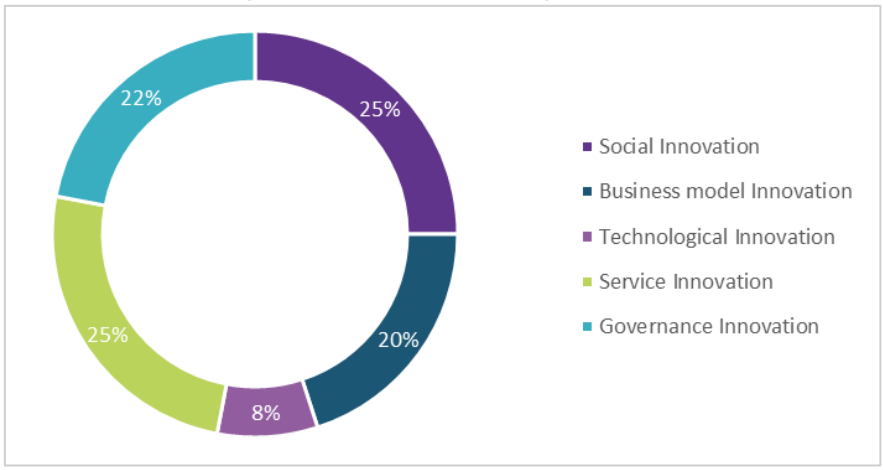

Figure 6 Types of innovations in Hamburg

The ***social innovations*** refer to i) co-existence of various logistics users in the same space with citizens, in the context of a mixed user group, logistics and socio/cultural multi-functional hub, and the strengthening of the neighbourhood identity and social cohesion in a socially disadvantaged neighbourhood (neighbourhood hub Holstenstrasse), ii) increase the options for intermodal mobility by connecting public transport with other mobility services and make mobility solutions more visible for the local community (Hub Kaltenkircher Platz), iii) offers for person mobility and participation in activities that optimise the test site (Hub Harkortstrasse) and iv) through the provision of new delivery methods to enable easier delivery of social goods/donations for people in need.

The ***business model innovations*** refer to new business models for achieving the co-existence of various logistics users in the same space and supporting social service offer (covering costs of space and building a user base through public-private partnerships. For Kaltenkircher Platz case a business model for multi-user logistics micro-hub is proposed consisting of three main aspects related to logistic users, passenger mobility aspects and the social use of the hub. For achieving this business model, issues related to contracts and the ownership status quo should be clarified. In the MOIA service, the business model innovation focuses on identifying key elements for functional new business models for

combined transport including fitting use cases (e.g. social and courier-case) and mobility/logistics partners.

The ***technological innovations*** refer mainly to Harkortstrasse hub and is related to the testing of new digital citizens participation tools. In the MOIA service, technological innovations are related to the modifications need to take place in vans, and also on the operational system of the on-demand service provider.

The ***service innovations*** refer to the augmentation of the user experience and the logistic services through the multifunctional hubs that have a clear social and cultural function not usually seen in traditional mobility hubs. The implementation of new transport services in the MOIA case that use human resources more efficiently and the implementation of parking zone for e-scooters including surrounding zones where e-scooter parking is not allowed.

The ***governance innovations*** refer to the urban and mobility planning in the context of the LL and more detailed in the spatial planning of mobility solutions, the sharing of resources, the spatial connection between existing multi-modal/mobility solutions and new services as well as overcoming and solving all the issues resulting from the permission/administrative processes. In particular, establishing a clear process by which the city or other organisations quickly and with low cost can take temporary dark spaces in the city in use (empty buildings or parts of buildings) can represent an interesting governance innovation. Noting that the concept of combined mobility (freight and passenger) is considered also an innovative mobility planning approach and service innovation as well.

Result Indicator 3.14: No of interoperable systems of innovative solutions adopted in Hamburg

Result indicator 3.14	**No of interoperable systems of innovative solutions adopted in Hamburg Living Lab**
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tools used	Measures and Innovations Logbook
Ex-ante evaluation result	0
Ex-post evaluation result	1

Table 8: Result indicator 3.14 (HAM).

Regarding the Hamburg Living Lab, an interoperable system has been adopted in Kaltenkircher Platz Hub, providing several transport mode options. In more detail, the provided mobility services for private users include e-car sharing, a parking zone for micro-mobility and additional bicycle racks, and with a

bus station located near the hub promoting the use of PT. Electric charging points for commercial vehicle users (e.g. taxis) are also installed.

4.2 Level 2: Living Lab procedures

4.2.1 Oslo

Result Indicator 1.6: Increased capacity to incorporate data-driven approaches

Result indicator 1.6	Capacity to incorporate data-driven approaches in mobility planning
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (1: decreased, 5: increased)
Target value according to GA	2025: 5
Method/ Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	3.4
Ex-post evaluation result	3.2

Table 9: Result indicator 1.6 (OSL).

The capacity to incorporate data-driven approaches in Oslo was appraised by the LLs representatives coming from the mobility, environment, and development sectors. They assessed the capacity after all the knowledge and experience gained from the measures' implementation. For the assessment a qualitative scale from 1 (decreased) to 5 (increased) was used, resulting in a mean score of 3.2, which is slightly lower than the one noted during the ex-ante phase. This may reflect the challenges encountered during the measures' implementation (e.g. technical constraints, resource limitations).

Result indicator 4.1: Perceived improved understanding of governance drivers and barriers to implementation of measures

Result indicator 4.1	Current improved understanding of governance drivers and barriers to implementation of measures
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (1: decreased, 5: increased)
Target value according to GA	2025: 5
Method/ Monitoring tools used	Questionnaire Survey to city's administrations

Ex-ante evaluation result	4.0
Ex-post evaluation result	3.2

Table 10: Result indicator 4.1 (OSL).

The perceived understanding of governance drivers and barriers are related to governance structures and specific parameters, such as regulatory knowledge, stakeholders' collaboration, resource mobilisation, legitimacy and entrepreneurial experimentation. Based on these, the perceived understanding was assessed on a qualitative scale from 1 (decreased) to 5 (increased), resulting in a mean score of 3.2 in Oslo. The reduction in score from the ex-ante phase probably reflects the challenges encountered in real-world application, which were not entirely foreseen during the planning stage. The mean score of 3.2 suggests that while the understanding of governance drivers and barriers was still relatively positive, there was a noticeable drop from the initial expectations.

Result indicator 4.8: Number of strategic plans that will be reformulated based on the results of MOVE21 in the three Living Labs

Result indicator 4.8	**Number of strategic plans that will be reformulated based on the results of MOVE21 in the three Living Labs**
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	2.0
Ex-post evaluation results	3.0

Table 11: Result indicator 4.8 (OSL).

The Oslo Living Lab has influenced the city's ongoing work on its green mobility strategy. This is to be developed based on the SUMP principles and is to have urban logistics as one of two main goals. Furthermore, the assignment to develop this plan specifically states that the work must draw on experiences from MOVE21. In Oslo, MOVE21 has also succeeded in, along with other partners, gaining understanding of the need for urban logistics to be a theme in the upcoming revision of the regional plan for land use and transport, as well as in the revision of both the land use and community part of the municipal master plan.

Other policies influenced include:

- Regulation of micro-mobility (electric scooters and electric bicycles)
- Value realisation plan
- Revision of Oslo's procurement strategy

Result indicator 4.9: Increased innovation capacity regarding organizational issues for implementing innovative mobility per Living Lab

Result indicator 4.9	Innovation capacity regarding organizational issues for implementing innovative mobility solutions
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (: decreased, 5: increased)
Target value according to GA	Not included in GA
Method/Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	3.0
Ex-post evaluation result	3.2

Table 12: Result indicator 4.9 (OSL).

The Oslo LL representatives, based on the experience gained from the measures implementation, rated the municipality from 1 (very low) to 5 (very high) as regards the innovation capacity concerning organisational issues for implementing innovative mobility solutions. The mean score is 3.2. The slight increase in the mean score from 3.0 to 3.2 reflects a small improvement in Oslo's organisational capacity for implementing innovative mobility solutions. This indicates that, while the municipality has made progress in addressing organisational issues, such as adapting processes and structures, challenges still remain. The improvement comes out from the experience gained during implementation, which helped identify and address some organizational barriers, though more work may be needed for a significant shift in innovation capacity.

Result indicator 4.10: Increased innovation capacity regarding knowledge management needed for implementing innovative mobility solutions per Living Lab

Result indicator 4.10	Innovation capacity regarding knowledge management needed for implementing innovative mobility solutions
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA	Not included in GA
Method/ Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	3.1
Ex-post evaluation result	3.4

Table 13:Result indicator 4.10 (OSL).

As regards the capacity in knowledge management needed for implementing innovative mobility solutions, this reached a mean score of 3.4 according to Oslo's representatives' assessment, resulting

in a slight increase in relation to the score noticed at the beginning of the project (3.1). The increase from 3.1 to 3.4 depicts an improvement in Oslo's capacity as regards knowledge management related to the measures' implementation.

Result indicator 4.11: Perceived improved understanding of the potential for the upscaling of MOVE21 solutions per Living lab

Result indicator 4.11	Perceived improved understanding of the potential for the upscaling of MOVE21 solutions
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (1: decreased, 5: increased)
Target value according to GA	Not included in GA
Method/ Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	3.7
Ex-post evaluation result	3.2

Table 14: Result indicator 4.11 (OSL).

The Oslo LL representatives, based on knowledge and experience gained through the measures implementation, rated the municipality from 1 (very low) to 5 (very high) as regards the potential for upscaling MOVE21 solutions. The mean score is 3.2. The respective one noticed at the beginning of the project was 3.7, a fact that can be justified as the process of implementing the measures and solutions with the numerous innovative aspects in different innovative fields, seemed to be more complicated than expected.

For the innovations (part of the measures) to be successfully established, commercial, governance and administrative decisions need to be taken, new collaboration schemes should be created, policy solutions should be proposed, new business models should be developed, and new technological equipment should be developed/installed/purchased. The Oslo LL representatives, based on knowledge gained from the measures' implementation, filled in the relevant information in the respective Measures and Innovations Logbook. In the four test sites, several commercial, administrative, and governance decisions have been taken, collaboration schemes have been created, policy solutions have been proposed, new business models have been developed and technical equipment has been purchased/installed for ensuring the successful establishment of MOVE21 mobility hubs. All the above are described in the Measures and Innovations Logbook and presented in Figure 7.

Result indicator 4.2	Number of policy solutions proposed for ensuring the successful establishment of MOVE21 Mobility hubs in Oslo
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number

Target value according to GA	6 (2024)
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	2 (1 in CCVEST and 1 Filipstad)
Ex-post evaluation result	1 (CCVEST)

Table 15: Result indicator 4.2 (OSL).

Result indicator 4.3	**Number of MOVE21 business models developed**
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number
Target value according to GA	6 (2025)
Method/ Monitoring tool used	Measures/Solutions/Innovations Logbook
Ex-ante evaluation result	1 (Grorudalen site)
Ex-post evaluation result	None (there is need for new business and operation model)

Table 16: Result indicator 4.3 (OSL).

Result indicator 4.12	**Number of Commercial decisions taken for ensuring the successful establishment of MOVE21 mobility innovations per Living Lab**
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	7
Ex-post evaluation result	5

Table 17: Result indicator 4.12 (OSL).

Result indicator 4.13	**Number of Administrative decisions proposed or implemented for ensuring the successful establishment of MOVE21 mobility hubs per Living Lab**
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives

Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	6
Ex-post evaluation result	7

Table 18: Result indicator 4.13 (OSL).

Result indicator 4.14	**Number of New Collaboration Schemes proposed or implemented for ensuring the successful establishment of MOVE21 mobility hubs per Living Lab**
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	4
Ex-post evaluation result	4

Table 19: Result indicator 4.14 (OSL).

Result indicator 4.15	**Number of governance decisions proposed or implemented for ensuring the successful establishment of MOVE21 Mobility hubs per Living Lab**
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	4
Ex-post evaluation result	2

Table 20: Result indicator 4.15 (OSL).

Result indicator 4.16	Number of new Technological equipment developed/installed/purchased for ensuring the successful establishment of MOVE21 Mobility hubs per Living Lab
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	1 (refers to CCVEST measure)
Ex-post evaluation result	3 (refers to CCVEST measure)

Table 21: Result indicator 4.16 (OSL).

The total number of commercial, administrative and governance decisions taken, policy solutions proposed, collaboration schemes created and equipment developed/installed/purchased in the Oslo Living Lab is shown in Figure 7.

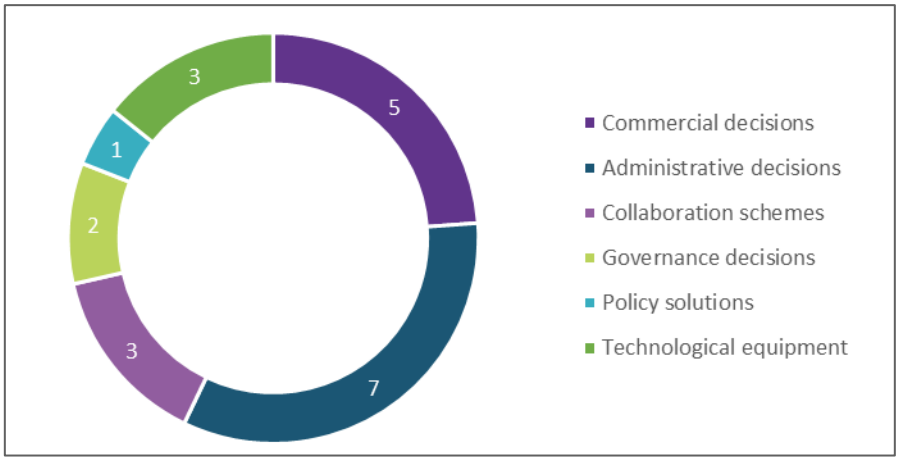

Figure 7 Innovation types in OSLO

4.2.2 Gothenburg

Result indicator 1.6: Increased capacity to incorporate data-driven approaches in mobility planning

Result indicator 1.6	Capacity to incorporate data-driven approaches in mobility planning
Level of evaluation	2

Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (1: decreased, 5: increased)
Target value according to GA	2025: 5
Method/ Monitoring tool used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	3.2
Ex-post evaluation results	2.8

Table 22: Result indicator 1.6 (GOT).

The current capacity to incorporate data-driven approaches of Gothenburg was appraised by the LLs representatives coming from the mobility, environment, and development sectors. They assessed the capacity to incorporate data-driven approaches in mobility planning on a qualitative scale from 1 (decreased) to 5 (increased), resulting in a mean score of 2.8, lower than the one noted in the ex-ante phase, most probably due to unforeseen challenges that hindered the full realization of data-driven approaches.

Result indicator 4.1: Perceived improved understanding of governance drivers and barriers to implementation of measures

Result indicator 4.1	**Current improved understanding of governance drivers and barriers to implementation of measures**
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (1: decreased, 5: increased)
Target value according to GA	2025: 5
Method/ Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation results	3.1
Ex-post evaluation results	3.8

Table 23: Result indicator 4.1 (GOT).

The perceived understanding of governance drivers and barriers are related to governance structures and specific parameters, such as regulatory knowledge, stakeholders' collaboration, resource mobilisation, legitimacy and entrepreneurial experimentation. Based on these, the perceived understanding was assessed on a qualitative scale from 1 (decreased) to 5 (increased), resulting in a mean score of 3.8 for Gothenburg case. The process followed for the measures' implementation seems to have a positive effect in Gothenburg case, as the LLs representatives rating was increased in relation to the initiative score of 3.1 given at the beginning of the project.

Result indicator 4.8: Number of strategic plans that will be reformulated based on the results of MOVE21 in the three Living Labs

Result indicator 4.8	Number of strategic plans that will be reformulated based on the results of MOVE21 in the three Living Labs
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tool used	Questionnaire Survey to city's administrations
Ex-ante evaluation results	2
Ex-post evaluation results	3

Table 24: Result indicator 4.8 (GOT).

In Gothenburg's case plans and policies updated, developed and influenced by MOVE21 are listed and described below:

1) **Comprehensive Plan.** It is one of the most important documents regarding Gothenburg's long-term development. It is a masterplan for the municipality as regards the use of land and water. The plan was finalised in 2022, however, this version was produced prior to MOVE21. Now, there has been a decision in the city to use the comprehensive plan to a bigger degree, to work in different policies and strategies, and update it by incorporating new experiences. Results from MOVE21 are especially important in the chapter regarding mobility and infrastructure.

2) **Sustainable urban logistics plan.** Captured experiences from MOVE21 in the SULP which presents a strategic direction and an action plan that outlines how Gothenburg prioritises measures in the short-term. There is a clear MOVE21-connection in the SULP action plan in form of measures such as securing land for logistics, also connected to points where personal mobility is high.

3) **Traffic safety plan 2023-2024**. Experiences from MOVE21 were incorporated to the work. The connection between road safety and transition to sustainable travel based on the existing conditions of areas such as Lindholmen (walkability and bikeability, consolidation of goods and waste) and Klippan where the new traffic safety plan has a focus on the topic of Safe walking and Safe cycling.

Other influencing policies influenced include:

- **Parking policy:** Highly influenced by MOVE21 project, as representatives participated in working and editing groups. The parking policy was raised to the City Planning Committee in November 2023 for decision to start consultation while the political process was ongoing.
- **Body of knowledge of mobility hubs**: Developed within the project around the concept of mobility hubs in Gothenburg, encompassing best practices, design principles, and operational strategies for integrating various modes of transport. The body of knowledge on mobility hubs will feed into policies i.e. for parking and the implementation of parking policy, the

comprehensive plan and into a strategic collaboration between City of Gothenburg and public transport company Västtrafik regarding development of a planning tool for ideal transit points.

- **Concept for parking of shared micro-mobility:** Developed and accepted during MOVE21, implemented spring 2023. Both for shared micromobility but also designed to be able to be used for parking of other micromobility such as personally owned electric scoter, cargo bikes, per mobiles, mopeds etc.

Result indicator 4.9: Increased innovation capacity regarding organizational issues for implementing innovative mobility solutions in Gothenburg

Result indicator 4.9	Innovation capacity regarding organizational issues for implementing innovative mobility solutions
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA	Not included in GA
Method/ Monitoring tool used	Questionnaire Survey to city's administrations
Ex-ante status evaluation results	3.7
Ex-post evaluation results	3.2

Table 25: Result indicator 4.9 (GOT).

The Gothenburg LL representatives, based on the experience gained from the measures implementation, rated the municipality from 1 (very low) to 5 (very high) as regards the innovation capacity concerning organisational issues for implementing innovative mobility solutions. The mean score is 3.2 revealing that the process of implementing the measures and solutions with the numerous innovative aspects in different innovative fields, seems according to their opinion to be more complicated than expected at the beginning of the project (relative mean score 3.7).

Result indicator 4.10: Increased innovation capacity regarding knowledge management needed for implementing innovative mobility solutions per Living Lab

Result indicator 4.10	Increased innovation capacity regarding knowledge management needed for implementing innovative mobility solutions
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA	Not included in GA
Method/ Monitoring tool used	Questionnaire Survey to city's administrations
Ex-ante status evaluation results	3
Ex-post evaluation results	3.8

Table 26: Result indicator 4.10 (GOT).

The Gothenburg LLs representatives, based on their experience from the measures implementation, rated the municipality from 1 (very low) to 5 (very high) as regards the capacity in knowledge management needed for implementing innovative mobility solutions. The mean score has been increased to 3.8 since the beginning of the project, revealing that the process followed provided to Gothenburg's representatives useful knowledge regarding managerial aspects.

Result indicator 4.11: Perceived improved understanding of the potential for the upscaling of MOVE21 solutions per Living Lab

Result indicator 4.11	**Potential for the upscaling of MOVE21 solutions**
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (1: decreased, 5: increased)
Target value according to GA	Not included in GA
Method/ Monitoring tool used	Questionnaire Survey to city's administrations
Ex-ante status evaluation results	3.4
Ex-post evaluation results	3.7

Table 27: Result indicator 4.11 (GOT).

The Gothenburg LL representatives, based on experience gained after the measures' implementation, rated the municipality from 1 (very low) to 5 (very high) as regards the potential for upscaling MOVE21 solutions. The mean score is 3.7 and has slightly increased (from 3.4) since the beginning of the project. The increase in the mean score from 3.4 to 3.7 reflects a growing confidence of Gothenburg LL representatives in the municipality's potential for upscaling MOVE21 solutions. This improvement likely comes out from lessons learned during the implementation phase, which enhanced understanding of practical challenges and opportunities.

For the innovations (part of the measures) to be successfully established, commercial, governance and administrative decisions need to be taken, new collaboration schemes should be created, policy solutions should be proposed, new business models should be developed, and new technological equipment should be developed/installed/purchased. The Gothenburg LL representatives, based on knowledge gained from the measures' implementation, filled in the relevant information in the respective Measures and Innovations Logbook. In the three test sites of Gothenburg several commercial, administrative, and governance decisions have been taken, collaboration schemes have been created, new business models have been developed and technical equipment has been purchased/installed for ensuring the successful establishment of MOVE21 mobility hubs. All the above are described in the Measures and Innovations Logbook and presented in Figure 8.

Result indicator 4.3	**Number of MOVE21 business models developed**
Level of evaluation	2

Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number
Target value according to GA	6 (2025)
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	6
Ex-post evaluation result	4

Table 28: Result indicator 4.3 (GOT).

Result indicator 4.12	**Number of Commercial decisions taken for ensuring the successful establishment of MOVE21 mobility innovations per Living Lab**
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	17
Ex-post evaluation result	19

Table 29: Result indicator 4.12 (GOT).

Result indicator 4.13	**Number of Administrative decisions proposed or implemented for ensuring the successful establishment of MOVE21 mobility hubs per Living Lab**
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	11
Ex-post evaluation result	16

Table 30: Result indicator 4.13 (GOT).

Result indicator 4.14	Number of New Collaboration Schemes proposed or implemented for ensuring the successful establishment of MOVE21 mobility hubs per Living Lab
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	10
Ex-post evaluation result	10

Table 31: Result indicator 4.14 (GOT).

Result indicator 4.15	Number of governance decisions proposed or implemented for ensuring the successful establishment of MOVE21 Mobility hubs per Living Lab
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	1
Ex-post evaluation result	2

Table 32: Result indicator 4.15 (GOT).

Result indicator 4.16	Number of new Technological equipment developed/installed/purchased for ensuring the successful establishment of MOVE21 Mobility hubs per Living Lab
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives

Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	0
Ex-post evaluation result	9

Table 33: Result indicator 4.16 (GOT).

The total number of commercial, administrative and governance decisions taken, policy solutions proposed, collaboration schemes created and equipment developed/installed/purchased in Gothenburg Living lab is depicted in Figure 8.

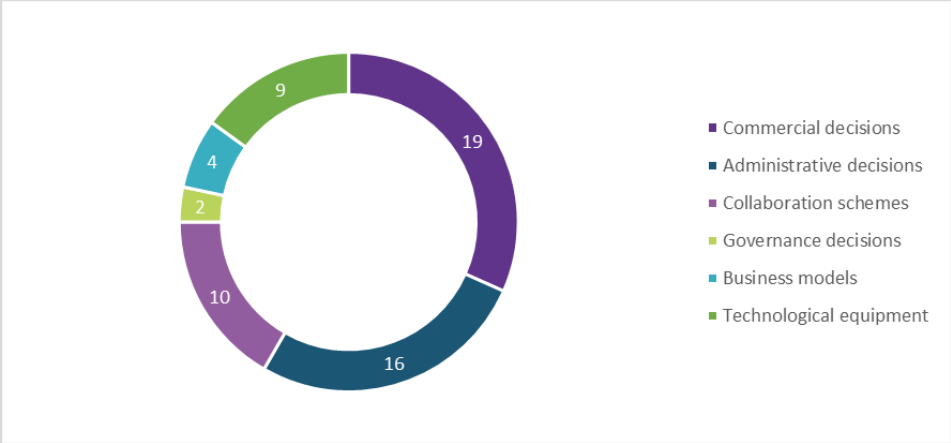

Figure 8 Number of commercial, governance and administrative decisions, policy solutions, collaboration schemes, business models and technical equipment (GOT)

4.2.3 Hamburg

Result Indicator 1.6: Increased capacity to incorporate data-driven approaches

Result indicator 1.6	**Capacity to incorporate data-driven approaches in mobility planning**
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (1: decreased, 5: increased)
Target value according to GA	2025: 5
Method/ Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	4
Ex-post evaluation result	3.8

Table 34: Result indicator 1.6 (HAM).

The capacity to incorporate data-driven approaches in Hamburg was appraised by the LLs representatives coming from the mobility, environment, and development sectors. They assessed the capacity after all the knowledge and experience gained from the measures' implementation. For the assessment a qualitative scale from 1 (decreased) to 5 (increased) was used, resulting in a mean score of 3.8, slightly decreased since the beginning of the project. The slight decrease may reflect some challenges Hamburg faced in incorporating data-driven approaches, despite the knowledge and experience gained during the measures' implementation. This decrease suggests that while progress was made, there were obstacles that hindered a more significant improvement in capacity.

Result indicator 4.1: Perceived improved understanding of governance drivers and barriers to implementation of measures

Result indicator 4.1	Current improved understanding of governance drivers and barriers to implementation of measures
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (1: decreased, 5: increased)
Target value according to GA	2025: 5
Method/ Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	4.0
Ex-post evaluation result	3.7

Table 35: Result indicator 4.1 (HAM).

The perceived understanding of governance drivers and barriers are related to governance structures and specific parameters, such as regulatory knowledge, stakeholders' collaboration, resource mobilisation, legitimacy and entrepreneurial experimentation. Based on these, the perceived understanding was assessed on a qualitative scale from 1 (decreased) to 5 (increased), resulting in a mean score of 3.7 for Hamburg, which indicates a relatively positive understanding of governance drivers and barriers, suggesting progress in areas like regulatory knowledge, stakeholder collaboration, and resource mobilisation. This score reflects the city's ability to address governance challenges and foster entrepreneurial experimentation, although some barriers may still exist. The rating highlights the importance of continuous efforts to strengthen legitimacy and collaboration to further enhance governance capacity.

Result indicator 4.8: Number of strategic plans that will be reformulated based on the results of MOVE21 in the three Living Labs

Result indicator 4.8	Number of strategic plans that will be reformulated based on the results of MOVE21 in the three Living Labs
Level of evaluation	2

Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	3.0
Ex-post evaluation result	4.0

Table 36: Result indicator 4.8 (HAM).

In Hamburg, four Strategic Plans have been reformulated based on MOVE21 results:

- Traffic Development Plan: In Hamburg, the Ministry of Transport and Mobility Transition has released the Strategy for Mobility Transition, an update of the existing Traffic Development Plan which includes solutions for last mile logistics. Ideas and solutions regarding last mile logistics have been drawn from the strategy for last mile logistics as a well as from MOVE21.
- Strategy for Digital Mobility, released in April 2024: MOVE21 is explicitly mentioned as reference for the importance of developing new micro-hub concepts highlighting learnings from the project such as multifunctionality as a door-opener and the importance for cooperation with the real estate sector.
- The Climate Action Plan: special focus on mobility for the district of Altona (MOVE21 hub).
- Strategy for last mile logistics: In 2025 a progress report is due for this strategy, which will take the results of MOVE21 into account and use them for refining the goals of the strategy.

Other influences on policy include:

- Regulation of micro-mobility (electric scooters and electric bicycles)
- City-wide model for new public mobility stations
- Spatial planning to utilise (temporary) dark spaces (vacant buildings/ spaces)
- Guideline document on developing multi-functional neighbourhood hubs

Result indicator 4.9: Increased innovation capacity regarding organizational issues for implementing innovative mobility per Living Lab

Result indicator 4.9	**Innovation capacity regarding organizational issues for implementing innovative mobility solutions**
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (1: decreased, 5: increased)
Target value according to GA	Not included in GA
Method/Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	4.0
Ex-post evaluation result	4.0

Table 37: Result indicator 4.9 (HAM).

Hamburg LL representatives, based on the experience gained from the measures implementation, rated the municipality from 1 (very low) to 5 (very high) as regards the innovation capacity concerning organisational issues for implementing innovative mobility solutions. The mean score is 4.0, proving that the process of implementing the measures and solutions with numerous innovative aspects in different innovative fields, is quite manageable, however there is still room for improvements.

Result indicator 4.10: Increased innovation capacity regarding knowledge management needed for implementing innovative mobility solutions per Living Lab

Result indicator 4.10	Innovation capacity regarding knowledge management needed for implementing innovative mobility solutions
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA	Not included in GA
Method/ Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	4.0
Ex-post evaluation result	4.2

Table 38:Result indicator 4.10 (HAM).

As regards the capacity in knowledge management needed for implementing innovative mobility solutions, this reached a mean score of 4.2 according to Hamburg's representatives' assessment, resulting to a slight increase in relation to the score noticed at the beginning of the project (4.0). The slight increase in the mean score from 4.0 to 4.2 reflects Hamburg's growing capacity in knowledge management for implementing innovative mobility solutions. This improvement likely comes out from enhanced learning processes, better knowledge-sharing practices, and practical experience gained during the project.

Result indicator 4.11: Perceived improved understanding of the potential for the upscaling of MOVE21 solutions per Living lab

Result indicator 4.11	Perceived improved understanding of the potential for the upscaling of MOVE21 solutions
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (1: decreased, 5: increased)
Target value according to GA	Not included in GA
Method/ Monitoring tools used	Questionnaire Survey to city's administrations

Ex-ante evaluation result	3.4
Ex-post evaluation result	3.4

Table 39: Result indicator 4.11 (HAM).

The Hamburg LL representatives, based on knowledge and experience gained through the measures implementation, rated the municipality from 1 (very low) to 5 (very high) as regards the potential for upscaling MOVE21 solutions. The mean score is 3.4. The mean score of 3.4, consistent with the ex-ante phase, suggests that while Hamburg has made progress in implementing MOVE21 solutions, there are still significant challenges to overcome in terms of upscaling. The lack of change may reflect ongoing barriers such as resource constraints or the complexity of scaling solutions across different areas. Despite the experience gained, these factors might have limited the perceived potential for upscaling at this stage of the project.

For the innovations (part of the measures) to be successfully established, commercial, governance and administrative decisions need to be taken, new collaboration schemes should be created, policy solutions should be proposed, new business models should be developed, and new technological equipment should be developed/installed/purchased. The Hamburg LL representatives, based on knowledge gained from the measures' implementation, filled in the relevant information in the respective Measures and Innovations Logbook. In the four test sites of Hamburg several commercial, administrative, and governance decisions have been taken take, collaboration schemes have been created, policy solutions have been proposed, new business models have been developed and technical equipment has been purchased/installed for ensuring the successful establishment of MOVE21 mobility hubs. All the above are described in the Measures and Innovations Logbook and presented in Figure 9.

Result indicator 4.2	**Number of policy solutions proposed for ensuring the successful establishment of MOVE21 Mobility hubs in Oslo**
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number
Target value according to GA	6 (2024)
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	3
Ex-post evaluation result	0

Table 40: Result indicator 4.2 (HAM).

Result indicator 4.3	**Number of MOVE21 business models developed**
Level of evaluation	2

Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number
Target value according to GA	6 (2025)
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	5
Ex-post evaluation result	6

Table 41: Result indicator 4.3 (HAM).

Result indicator 4.12	**Number of Commercial decisions taken for ensuring the successful establishment of MOVE21 mobility innovations per Living Lab**
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	9
Ex-post evaluation result	3

Table 42: Result indicator 4.12 (HAM).

Result indicator 4.13	**Number of Administrative decisions proposed or implemented for ensuring the successful establishment of MOVE21 mobility hubs per Living Lab**
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	28
Ex-post evaluation result	17

Table 43: Result indicator 4.13 (HAM).

Result indicator 4.14	Number of New Collaboration Schemes proposed or implemented for ensuring the successful establishment of MOVE21 mobility hubs per Living Lab
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	6
Ex-post evaluation result	6

Table 44: Result indicator 4.14 (HAM).

Result indicator 4.15	Number of governance decisions proposed or implemented for ensuring the successful establishment of MOVE21 Mobility hubs per Living Lab
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number
Target value according to GA	Not included in the GA
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	3 (Holstenstrasse, Kaltenkircher, Rissen)
Ex-post evaluation result	1

Table 45: Result indicator 4.15 (HAM).

Result indicator 4.16	Number of new Technological equipment developed/installed/purchased for ensuring the successful establishment of MOVE21 Mobility hubs per Living Lab
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1 Mission board climate neutral and smart cities objectives
Measurement unit	Number

Target value according to GA	Not included in the GA
Method/ Monitoring tool used	Measures and Innovations Logbook
Ex-ante evaluation result	5
Ex-post evaluation result	0

Table 46: Result indicator 4.16 (HAM).

The total number of commercial, administrative and governance decisions taken, policy solutions proposed, collaboration schemes created and equipment developed/installed/purchased in Oslo Living Lab is shown in Figure 9.

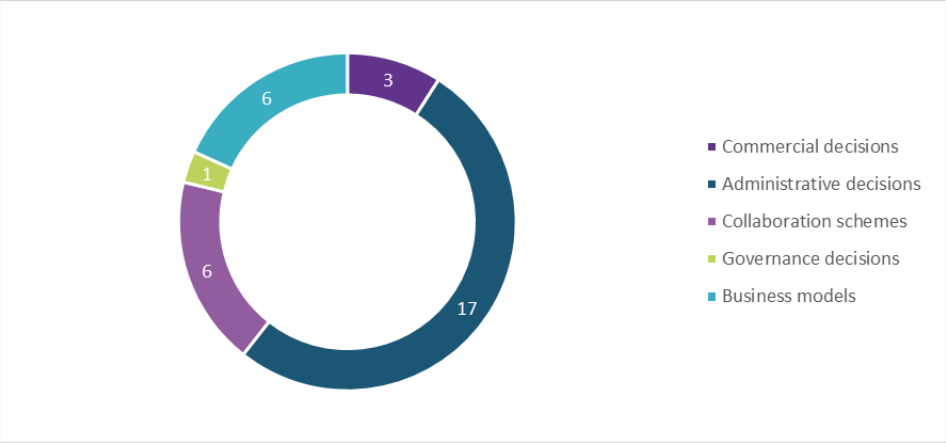

Figure 9 Number of commercial, governance and administrative decisions,

4.3 Capacity building insights and lessons learnt from the LLs

The survey related to the capacity of cities' administrations to implement innovative mobility solutions, provided useful insights as regards strengths and challenges faced. These are briefly discussed below. It should be noted that people who participated in the survey of the ex-post phase were not the same ones of the ex-ante phase, a fact that might introduce a degree of inconsistency in the responses. This difference may potentially affect the comparability of the data and the accuracy of conclusions drawn about changes or impacts over time; however, it provides a broader perspective by incorporating insights from individuals with different experiences, roles, and viewpoints. The table below includes a summary of all scores as regards the five key capacity areas examined.

Capacity building result indicators for the LLs	OSL	GOT	HAM
Capacity of city administration to incorporate data driven approaches	3.2	2.8	3.8
Capacity of city administration as regards organizational issues for implementing innovative mobility solutions	3.2	3.2	4

Capacity of city administration as regards the knowledge management needed for implementing innovative mobility solutions	3.4	3.8	4.2
Assessment of city's level in understanding governance drivers and barriers to the implementation of measures	3.2	3.8	3.7
Assess the potential to upscale the measures in your city	3.2	3.7	3.4

Table 47: Capacity building result indicators for all three LLs.

According to the results, the cities demonstrate comparable levels of capacity, with some minor differences in their effectiveness in managing innovation processes and addressing related challenges.

The overall capacity to incorporate data-driven approaches is notable, with an average score of 3.2 indicating that the three cities are well equipped to use data for decision-making and innovation. In MOVE21, data-driven approaches, including the use of Digital Twin (DT) simulations, have been integrated to some extent. These simulations have allowed the cities to model and test various scenarios in real time, providing valuable insights into how systems interact and how they can be optimized for efficiency and sustainability.

In terms of organisational capacity there is a need for improvement in managing innovation-related processes. This issue is also highlighted in the D6.6 *Reflective Monitoring: Interim Report*, which points out shared challenges across the cities, such as disjoint structures and limited collaboration between departments.

Oslo struggles with a large and fragmented organisation, which makes cross-departmental work difficult. The focus on specialized tasks leaves little space for creativity, and constant organisational changes disrupt efforts to build a culture of innovation. Communication is generally open, but horizontal collaboration depends heavily on informal connections. Additionally, finding and retaining qualified staff remains a challenge due to low salaries in certain agencies, and a bureaucratic culture dampens willingness to experiment. In Gothenburg, recent reorganisation aimed to foster cross-departmental collaboration is taking place but the pace of change is slow. While innovation leaders have been appointed in each department, much of the innovation work depends on personal motivation and trust-building. The city's risk-averse culture and fear of failure remain significant obstacles, and innovation is not yet fully integrated into core tasks. Hamburg's classical administrative structure allows for transparent decision-making but hinders innovation. The focus on stability and risk management limits experimentation, and funding is mostly allocated to core tasks rather than innovation processes. Although younger civil servants are more open to innovation, cross-departmental collaboration remains weak, relying on informal personal connections.

While each city has made efforts to promote innovation, there is a clear need for stronger cross-departmental collaboration, reduced risk aversion, and formal support for innovation processes to move beyond individual efforts. This need is also highlighted in Deliverable 6.7 *MOVE21 guide on improving city's capacities for promoting sustainable mobility and logistics innovation* where the creation of dedicated roles that focus on bridging departmental gaps and the establishment of cross-departmental working groups is suggested to tackle organisational issues.

Knowledge management practices also need improvement even though the average score is 3.8, which indicates a relatively high level of effectiveness but with room for further enhancement. This result is in line with Deliverable 6.7 insights, where also the need for more standardized and formalized knowledge

management approaches across the cities is highlighted. While efforts have been made to share knowledge informally, there remains significant potential for improving documentation and ensuring that best practices and lessons learned are more systematically captured and transferred.

D6.6 highlights that all three cities recognize the need for more structured and accessible knowledge management systems to improve sharing, retention, and strategic alignment. In more detail, Oslo seems to lack of a dedicated knowledge management system, with knowledge sharing occurring informally and often limited to success stories. The city also struggles with retaining knowledge as employees leave, especially when hired for short-term projects. In Gothenburg knowledge management is organised within collaboration projects and assignments with cross-departmental working groups (e.g. the regular fora for sustainable travel ("Forum för hållbart resande") with representatives from different parts of the city etc). In Hamburg, knowledge sharing is still limited due to the lack of a comprehensive overview of projects and reliance on personal connections. Retaining valuable knowledge is also a challenge, though the city is piloting an off-boarding process to address this.

Governance understanding is a critical element. The three cities face challenges in addressing governance issues and unlocking the full potential of innovative mobility measures implementation. In D4.2 analysis findings, all three cities face common challenges in implementing innovative transport solutions. One major difficulty was the harmonisation of local, regional and national regulations, as the transport sector involves multiple stakeholders with varying interests, making it hard to align policies in a short timeframe. Another issue was the development of sustainable business models that ensure the longevity of the pilots beyond the project's duration, as new regulations could potentially drive innovation and create new markets. Additionally, confusion was noticed over the roles and responsibilities of different actors, with unclear lines of responsibility. Private sector competition also seems to have complicated collaboration, as profit-driven actors were reluctant to work together. Finally, a lack of internal cooperation within municipal departments, insufficient time, and resource constraints further hindered a bit the successful implementation of innovative solutions.

Upscaling is a key goal of the MOVE21 project, which aims to expand the successful innovations tested in the LLs to broader areas. MOVE21 seeks to not only upscale these innovations within the cities but also create a ripple effect across Europe, sharing best practices and insights. Having gained the appropriate knowledge and experience throughout the implementation on MOVE21 measures, the three cities have already started their processes on scaling up solutions and initiatives, exemplified through work done to reach milestone 9 in the project where the cities share their upscaling plans.

4.4 Level 3: Impact-oriented result indicators

The ex-post evaluation of the environmental and traffic impacts of intermodal passenger and freight hubs, specifically related to the MOVE21 project, relies on the analysis of user opinions, primarily collected through surveys conducted between June and September 2024 in the three cities. The focus of these surveys was to assess the potential and actual modal shift toward more sustainable transport options facilitated by the development of multimodal hubs. These shifts are key in evaluating environmental benefits, particularly emission reductions due to the use of public or sustainable transport instead of private cars.

4.4.1 Data Collection Methods

Questionnaire Surveys Scope: The surveys aimed to capture changes in behaviour among both users and non-users resulting from the introduction of MOVE21 services and innovations.

Survey Methods:

- On-the-Spot Surveys: These surveys targeted actual users of the pilot services, providing direct insights into the impact of MOVE21. Given the limited availability and reach of some services, on-the-spot surveys were complemented by online surveys to gather more extensive data.

The main characteristics of the surveys are presented in the following table:

City	Type of Survey	Sample on-site	Sample on-line	Collection of trip characteristics (length/mean of transport)
Oslo	On-line + on-site	0	1027	Yes
Gothenburg	On-line + on-site	39	250	Yes
Hamburg	On-site	116	0	No

Table 48: Main characteristics of the LLs surveys.

It should be noted that due to the complexity of the KPIs and the extensive data required for their calculation, only a minimal number of questionnaires were completed during the on-the-spot surveys. As a result, the primary outcomes were derived primarily from the online survey, with the exception of Hamburg.

In Hamburg, no online survey was conducted due to regulatory constraints. Furthermore, the data collected from Hamburg's on-the-spot surveys did not include information on private car vehicle kilometers (veh/km) savings. Consequently, CO2 savings or reductions in veh/km for the Living Lab (LL) of Hamburg could not be calculated, as the necessary data for this analysis was not available. Therefore, Hamburg was excluded from the detailed estimation of emission reductions based on the modal shift to more sustainable transport modes.

4.4.2 Methodological Framework for Data Integration and Analysis

The main steps of the methodological framework used for calculating the KPIs is described below.

4.4.2.1 Determinants of Mobility Hub Adoption

To calculate the KPIs a Multinomial Logit (MNL) model was employed in Oslo and Gothenburg to estimate the adoption of mobility hubs based on data gathered from the online and on-site surveys in the three cities. However, due to the lack of specific data collected in Hamburg (as mentioned previously), it was not possible to develop or apply the MNL model for this city.

The MNL model is a statistical tool used to understand how different factors influence a person's decision to adopt a particular mode of transport or mobility solution, in this case, the mobility hubs developed as part of the MOVE21 project. By using the survey data, the model evaluates how various characteristics of individuals, their travel habits, and their proximity to mobility hubs impact the likelihood of adopting these new transport options. The models for each city are presented in the following table:

City	Variable	Coef.	Rob t-test
Oslo	Constant (specific to Hub User alternative)	7.91	8.14
	Logarithm of Age (numeric)	-2.69	-10.8
	Gender (women-categ.)	-0.584	-3.12
	Driver's Licence (binary)	0.471	2.08
	Level of Smartphone Usage (ordinal)	0.202	2.24
	N. obs.: 942 R^2: 0.371 Initial Log likelihood: -652.95 Final Log likelihood: -405.70 Likelihood Ratio Test: 494.49		
Gothenburg	Constant (specific to Hub User alternative)	4.05	2.67
	Logarithm of Age (numeric)	-1.98	-4.7
	Gender (women/categ.)	-0.345	-1.05
	Hub Access Travel Time Bike (numeric)	-1.01	-3.8
	Hug Egress Travel Time Bike (numeric)	0.539	4.39
	Level of Public Transport Usage (ordinal)	0.152	1.51
	Level of Smartphone Usage (ordinal)	0.659	5.3
	N. obs.: 250 R^2: 0.246 Initial Log likelihood: -173.2868 Final Log likelihood: -123.6497 Likelihood Ratio Test: 99.27		

Table 49: Main determinants of Mobility Hub Adoption.

4.4.2.2 B. Environmental Impact of Existing and Future Mobility Hubs

During this phase, the calculation of CO_2 savings per mobility hub user in each city takes place, using the estimated model and additional travel behaviour data and car usage metrics.

Step 1: Determine the Joint Probability of Being a Hub User and a Car Driver
The first step is to calculate the proportion of people who are both mobility hub users and car drivers. This is important because for the biggest part, car drivers contribute to CO_2 savings when using mobility hubs.

Step 2: Calculate Average Car Driver Habits
Quantification of the average kilometres driven by mobility hub car drivers and their accessibility to the nearest hub.

Step 3: Estimate Modal Shift Behaviour
This step assesses the extent to which mobility hubs encourage their existing users to replace car trips with more sustainable travel modes calculating per city the veh/kms that can be replaced from sustainable modes of transportation.

Step 4: Assess Current Environmental Impact
Based on the previous data, the environmental impact of mobility hub use was calculating, focusing on the reduction in CO_2 emissions. By accounting for fuel consumption, emission factors, and the proportion of trips shifted to mobility hubs, we estimate the CO_2 savings per car-driver user for a petrol fleet.

Step 5: Scenarios Evaluation
For the upscale of the result, during this phase the potential environmental benefits of mobility hubs under varying levels of adoption and accessibility were examined, focusing on medium and high penetration scenarios. These scenarios consider different probabilities of car drivers becoming hub users, percentages of trips transitioned to sustainable modes, and metrics of hub accessibility.

The Baseline Case serves as a reference point, reflecting current adoption rates and hub accessibility. The Medium Penetration scenario envisions a moderate increase in both adoption rates and accessibility, while the High Penetration scenario represents a strong shift with substantially higher adoption and accessibility improvements. These scenarios enable a stepwise assessment of the environmental impact of mobility hubs, highlighting their role in lowering emissions and enhancing car-driver savings.

Baseline Case
1. Probability of Car-Driver Hub-Users: 10%
2. Percentage of Trips Shift: 30%
3. Hub Mean Accessibility: 3.5km

Medium Penetration
1. Probability of Car-Driver Hub-Users: 20%
2. Percentage of Trips Shift: 40%
3. Hub Mean Accessibility: 3.0km

High Penetration
1. Probability of Car-Driver Hub-Users: 30%
2. Percentage of Trips Shift: 50%
3. Hub Mean Accessibility: 2.5km

4.4.3 Impact Area I: Long-term decarbonisation

Regarding the result indicators of Impact Area I, it seems that upscaled implemented innovations can bring a significant reduction in air emissions. The percentage for CO_2 emissions reduction can reach the 16% for Gothenburg and 13% for Oslo. The NOx and PM2.5 savings were calculated in kg savings due to the reduction of the car use and can reach the 34kg/day for the NOx and the 18kg/day for the PM2.5.

Comparing the ex-post results of CO2 and NOx emissions, insights into the relative success of each city's efforts towards cleaner and more sustainable mobility can be gleaned. Oslo achieved a 13% reduction in CO_2 emissions from passenger transport and a 12% reduction in NOx air pollution while Gothenburg outperformed Oslo with a 15.8% and a 14% reduction in CO_2 and NOx air pollution respectively. This suggests that, if Gothenburg upscales its measures, these will be slightly more effective in reducing CO_2 emissions compared to Oslo's efforts in the same area.

It should be noted that Tables 46 and 47, include both the result indicators for the ex-ante and the ex-post phase. The calculation of the specific KPIs was based on different methods. Regarding the ex-ante phase Digital Twins simulations took place (as described in Deliverable D8.3 *Ex-ante implementation of the impact analysis framework for the Living Labs*), while for the ex-post phase the calculation was based on the development of a Multinomial Logit (MNL) model (as described in Section 4.3.2 of the current Deliverable).

#	Result indicator	Assessment mechanism	Time framework Expansion of measures	OSL	GOT	HAM
Result indicator 1.1a	CO2 reductions from passenger transport in LL cities	Transport modelling, Digital Twins (results are referred to the upscales)	Long Time/ Upscaled of Measures	**CO2-eqv.**		
				Ex-ante 15% Ex-post 13%	Ex-ante 3% Ex-post 15.8%	Ex-ante 9% Ex-post N/A
Result indicator 1.3	No. of MOVE21 innovations upscaled in the LLs	WP8 LLs Logbooks/Digital Simulations	Long Time	**No.**		
				Ex-ante 150 Ex-post Mean accessibility of hub 3km	Ex-ante 5 Ex-post Mean accessibility of hub 2.5 km	Ex-ante 20 Ex-post N/A
Result indicator 2.5a	Reduction in passenger transport related NOx air pollution as a result of deployed MOVE21 innovations	Transport modelling, Digital Twins (results are referred to the upscales)	Long Time/ Upscaled of Measures	**Ex-ante: µg/m3 Ex-post: Kg/day**		
				Ex-ante 15% Ex-post 12%	Ex-ante 3% Ex-post 14%	Ex-ante 9% Ex-post N/A
	Reduction in passenger	Transport modelling, Digital		**Ex-ante: µg/m3 Ex-post: Kg/day**		

Result indicator 2.6a	transport related PM2.5 air pollution	Twins (results are referred to the upscales)	Long Time/ Upscaled of Measures	Ex-ante 15% Ex-post 12%	Ex-ante 3% Ex-post 8%	Ex-ante 9% Ex-post N/A

Table 50: Result indicators Impact area I (OSLO-GOT-HAM).

4.4.4 Impact Area II: Sustainable, inclusive, safe, and secure mobility system

One of the main impacts of the innovations implemented, which has contributed to the reduction of emissions, is the shift of hub users to more sustainable modes of transport. After analysing and scaling up the survey data, the shift is presented in the table below. Based on the data, it seems that the shift to micromobility (e.g., e-scooters, bicycles) as well as public transport modes (e.g., buses, trams, trains) due to the implementation of mobility hubs can reach the percentage of 21%.
This shift indicates a significant change in user behaviour, where individuals who previously relied on private cars are now adopting more sustainable transport options, driven by the convenience and accessibility provided by the mobility hubs. The exact percentage value would depend on the detailed analysis of the survey data, but this shift is a key factor in achieving the emission reductions associated with the MOVE21 project.

	Result indicator	**Assessment mechanism**	**Time framework/ Expansion of measures**	**OSL**	**GOT**	**HAM**
Result indicator 2.3	Modal shift to sustainable modes due to MOVE21 hubs	Ex-ante: Digital Twins Ex-post: Questionnaire Survey	Long Time/ Upscaled of Measures	**% of modal shift to more sustainable modes**		
				Ex-ante 32%	Ex-ante 5%	Ex-ante 31%
				Ex-post 18%	Ex-post 21%	Ex-post N/A

Table 51: Result indicators Impact area II (OSLO-GOT-HAM).

4.4.5 Impact Area III: Improvements of the efficiency and accessibility of the transport networks/systems covering the TEN-T urban nodes

As regards the Impact area III and result indicators 3.3: Number of new (micro) hubs and 3.4: Number of improvements in existing hubs intended to be implemented, it should be noted that the measures in the three cities are in different phases and may necessitate clarifications later on for calculating the final numbers.

However, until now it has been approximated that:

- The Oslo LL aims to establish or improve *seven mobility hubs*. For instance, a Mobility Hub Network is planned in Groruddalen (an area between Furuset, Haugenstua and Grorud train

station) where hubs of different sizes, typically small, medium, and large will serve different transport modes for freight and passenger mobility as well as parcel distribution. As for the improvements in already existing hubs in Oslo, representatives of the Oslo Living Lab estimate that specifically for Groruddalen site (measure: integration with public transport) improvements will be implemented in almost all existing hubs (approximately 50).

- The Gothenburg LLestablished one mobility hotel in Nordstan, with different measures. It also improved the existing hub in Klippan/Jaegerdorff (ferry and tram stop improvements and establishment of a micromobility hub area) and in Lindholmen here the logistics hub was improved. Also, minor improvements made by GOT-Park in many different existing spots where we already had car parking, car sharing, bike parking and bike sharing with better signsThe Hamburg LL established three mobility hubs (one in Holstenstrasse, one in Kaltenkircher Platz and one in Harkortstrasse). As for the improvements in already existing hubs in Hamburg, representatives of the Hamburg LL estimate for the moment no improvements in existing hubs will take place.

#	Result indicator	Assessment mechanism	Time framework/ Expansion of measures	OSL	GOT	HAM
Result indicator 3.3	No. of new (micro) hubs as a result of the Project.	LLs Logbooks	Short Time	**No.**		
				Ex-post 7 ex-ante (7)	Ex-post 3 Ex-ante (2)	Ex-post 2 Ex-ante (2)
Result indicator 3.4	No. of improvements in existing hubs as a result of the Project	LLs Logbooks	Short Time	**No.**		
				Ex-post 50 Ex-ante (50)	Ex-post 3 Ex-ante (2)	Ex-post - Ex-ante -

Table 52: Result indicators Impact area III (OSLO-GOT-HAM).

As regards the result indicator 3.10: Increase in charging stations, both Oslo and Gothenburg have installed 1 battery swapping station each. In Hamburg, at the car sharing station at Kaltenkircher Platz, still no charging station has been installed by the operator HOCHBAHN and it is still not clear, when this will happen, as there are organisational changes ongoing in Hamburg regarding the ownership and operation of the (semi-)public charging station network.

As regards result indicator 3.7: Reduced number of heavy (freight) vehicle in circulation as a result of the implementation of hubs is not applicable in MOVE21 cases, due to the fact that the hubs were implemented within functional urban areas of the cities thus they are not designed for high delivery vehicle turnover. As regards the result indicator 3.8: Increase in zero emission light duty electric vehicles the relative figures for Oslo, Gothenburg and Hamburg are 9, 8 and 8.

4.4.6 Impact Area IV: Social cohesion, economic development, and public perception, resulting in behavioural and policy change.

Regarding the direct economic sectorial contribution to the welfare of the metropolitan area from city transport, Oslo stated approximately 6%, based on figures from Statistics Norway [9], the national statistical agency, and the main producer of official statistics, collecting and producing statistics related to the economy, population, and society at national, regional, and local levels. According to the value

of this result indicator the mobility sector is very significant for the economy of the city. The contribution of MOVE21 measures, solutions and innovations is expected to offer additional economic benefits. In Gothenburg the direct economic sectorial contribution of the welfare to the metropolitan area of the city from the mobility sector is approximately 4.8%. In Hamburg the direct economic sectorial contribution of the welfare to the metropolitan area of the city from the mobility sector is approximately 9.5%.

#	Result indicator	Assessment mechanism	Time framework/ Expansion of measures	OSL	GOT	HAM
Result indicator 4.4	Direct economic sectorial contribution to the welfare to the metropolitan area from city transport	WP8 LL Questionnaire Survey	Long Time/ Upscaled of Measures	**% contribution**		
				Ex-ante 62804NOK million Ex-post 5%-6%	Ex-ante 7.1% Ex-post 4.8%	Ex-ante 9.3% Ex-post 9.5 %

Table 53: Result indicators Impact area IV (OSLO-GOT-HAM).

5 RCs ex-post Impact Analysis Results

The current section presents a monitoring card for each Level, Replicator city, and result indicator. The monitoring card follows a structure that continues the corresponding card in the D8.4 *Evaluation Framework* and refers to the baseline and ex-post time periods, both before the implementation of the measures, innovations, and solutions in the context of the RCs.

5.1 Level 1: Innovation Enabling Topics

5.1.1 Bologna

Result Indicator 1.4: No of MOVE21 innovations replicated in Bologna

Result indicator 1.4	Number of MOVE21 innovations replicated in Bologna
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA. It refers to all 6 RCs	2025: 12 (innovations)
Method/ Monitoring tools used	RAs procedures Measures and Innovations Logbook
Ex-ante evaluation result	10 innovations 4 innovation categories
Ex-post evaluation results	10 innovations 4 innovation categories

Table 54: Result indicator 1.4 (BOL).

Taking into consideration its needs, Bologna replicated i) the “Provider-neutral parcel boxes in public spaces” of Munich, testing an innovative delivery solution in three new logistic micro hubs for the consolidation and transhipment of parcels from conventional vans to cargo bikes, ii) the “Cargo-waste co-freight” measure in Gothenburg, for testing the waste material disposal by cargo bikes and iii) the “Mobility hub” of Kaltenkircher Platz of Hamburg, for exploring the legislative and regulatory framework regarding the prerequisites needed for implementing the mobility hub and for establishing the appropriate logistics operator network. Detailed descriptions are provided for Bologna as well as for all the other cities in D7.2 *Replication action plans for Oslo, Gothenburg, Hamburg, Munich, Bologna and Rome*.

As described in the Measures and Innovations Logbook and depicted in Figure 10, the three measures Bologna replicated sum up to four solutions and ten innovations of four different types.

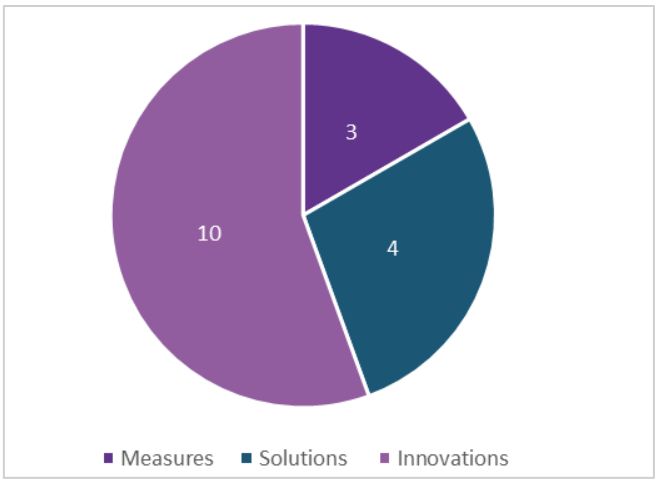

Figure 10 Measures and Innovations distribution in Bologna

The categories of the above-mentioned indicators intend to be integrated are social innovations, business innovations, service and governance innovations. Their distribution is presented in Figure 11.

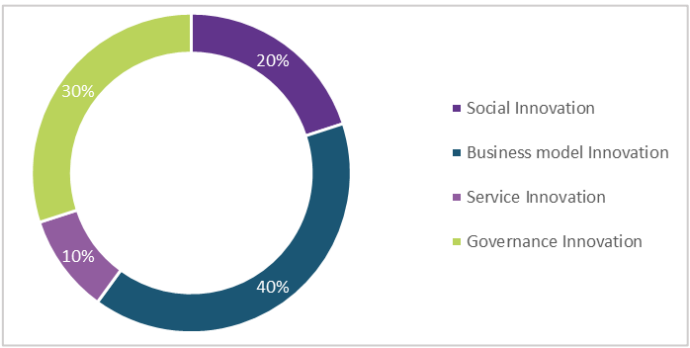

Figure 11 Innovation types in Bologna

As regards the social innovations, the Bologna case incudes a total of two. The first one, associated with the "cargo-waste co-freight" measure, focuses on the area's liveability improvements due to the number of trips transports reduce. The other one is related to the "mobility hub" measure and refers to the adaptation of innovative and more sustainable logistics and mobility solutions visible for the local community.

The number of ***business innovations*** are related to i) innovation funds creation for financing innovative concepts in commercial transport, ii) the promotion of fleet renewal in commercial transport, iii) the testing of a model to finance the "cargo-waste co-freight" service with collaboration between different partners and iv) the testing of a model to allow the mobility hub to operate without external funds. In total, four innovative business models are included in Bologna case.

Technological innovations as well as ***interoperable systems*** of innovative solutions are not reported. As regards the ***service innovations,*** there is only one included in the "co-waste co-freight" measure, referring to the incorporation of a new service (cargo-bike service).

Finally, there are ***three governance innovations*** related to i) enabling the provision of public street space for logistics purposes, ii) benefitting from formalised collaboration between actors not typically working together and iii) the creation and operation of neighbourhood hubs in different kind of spaces.

Result Indicator 3.1: No of implemented MOVE21 innovations in Bologna

Result indicator 3.1	No of implemented MOVE21 innovations in Bologna
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA. It refers to all 6 RCs	2025: 9 (innovations)
Method/ Monitoring tools used	RAs procedures Measures and Innovations Logbook
Ex-ante evaluation result	4
Ex-post evaluation result	4

Table 55: Result indicator 3.1 (BOL).

Bologna implemented four solutions in total as reported in the Measures and Innovations Logbook. More specifically regarding the “Provider-neutral parcel boxes in public spaces” measure the micro-consolidation hubs network and the use of a dedicated platform to centrally manage the operations are operational. Regarding the “cargo-waste co-freight” measure the innovative service will be operated by a cargo bike and as for the “mobility hub” measure, public (and private) areas will be temporary used as bike and cargo bike parking, in occasion of public events in the city.

5.1.2 Rome

Result Indicator 1.4: No of MOVE21 innovations replicated in Rome

Result indicator 1.4	Number of MOVE21 innovations replicated in Rome
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA. It refers to all 6 RCs	2025: 12 (innovations)
Method/ Monitoring tools used	RAs procedures Measures and Innovations Logbook
Ex-ante evaluation result	18 innovations

	6 innovation categories
Ex-post evaluation results	12 innovations 6 innovation categories

Table 56: Result indicator 1.4 (ROM)

Rome replicated i) the "Park and Bike node" measure of Klippan Gothenburg, focusing on the improvement for bicycles and micro-mobility in a specific metro station of the city, by providing bicycle parking services (Bike Box and Bike Park app), cargo bike rental services (rental station) and parcel lockers, ii) the "Emission free goods transport" measure from Oslo, for attaining zero emissions logistics within the city centre and initiating a fruitful dialogue with logistics service companies to drive decarbonisation efforts and enhance the charging network infrastructure (number of charging stations increase) and iii) the "Technical guidelines for designing metropolitan mobility hubs" of Bologna.

As described in the Measures and Innovations Logbook and depicted in Figure 12, the three measures Rome replicated sum up to six measures and 12 innovations of five different types.

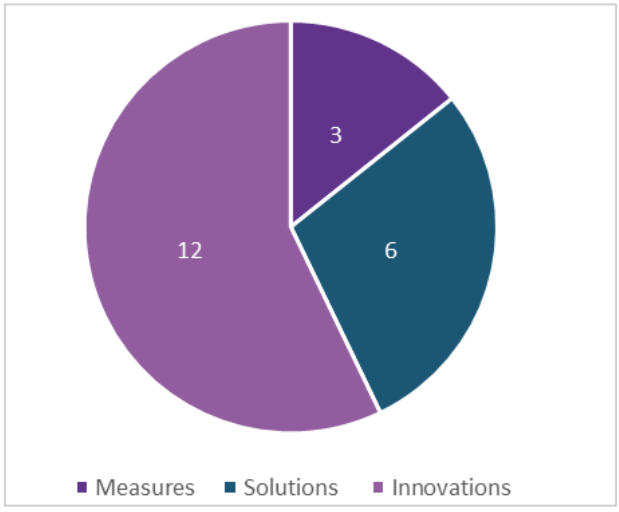

Figure 12 Measures/Solutions//Innovations distribution in Rome

The categories include social innovations, business innovations, technological, service and governance innovations as well as interoperable systems of innovative solutions. Their distribution is presented in Figure 13.

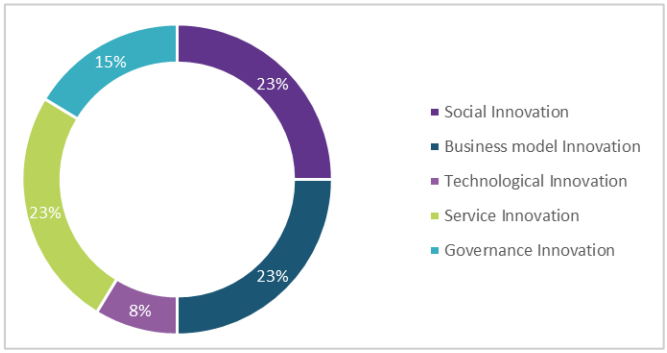

Figure 13 Innovation types in Rome

Regarding the ***social innovations***, these mainly refer to the adoption of a more sustainable freight distribution system through the creation of a mini hub and the use of environmentally friendly vehicles, the increasement of liveability levels for residents and tourists in the historic centre and the improvement of accessibility, attractiveness and sustainable intermodality.

The number of ***business innovations*** are related to i) the establishment of the new cargo bike service and the definition of a fare system for bike box users and discounts for PT users as regards the "Park and Bike node" measure and ii) the managerial scheme to operate the hub and the pricing model to be applied as regards the "Emissions free goods transport" measure.

The introduction of the "Bike Park" app for PT subscription holders is the only ***Technological innovation*** described in Rome's Logbook and is included in the "Park and Bike Node" measure to be replicated.

As regards the ***service innovations***, these are related to secure bike boxes for storing bicycles, the electric charging points for the bike boxes and the cargo bike services.

The ***governance innovations*** mainly refer to a governance tool ensuring a four-year framework agreement for bike boxes in order to avoid tender procedures each time and the launch of a participation process between local authorities and the private sector (transport operators, logistics companies, etc).

Finally, one ***interoperable system*** of innovative solutions is adopted in the first measure Rome replicated, as the concept motivates people to combine the use of bicycle with public transport (half of trip will be completed by bicycle and the other half by metro).

Result Indicator 3.1: No of implemented MOVE21 innovations in Rome

Result indicator 3.1	No of implemented MOVE21 innovations in Rome
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA. It refers to all 6 RCs	2025: 9 (innovations)
Method/ Monitoring tools used	RCs procedures Measures and Innovations Logbook
Ex-ante evaluation result	3
Ex-post evaluation results	3

Table 57: Result indicator 3.1 (ROM).

Rome implemented in total three solutions as reported in the Measures and Innovations Logbook. More specifically regarding the "Park and Bike node" measure, bike boxes and cargo bike sharing are operational. Regarding the "emission free goods transport" measure, a hub for loading/unloading freight

was implemented. Finally, an analysis of the technical guidelines took place by technicians to support the deployment of future hub projects.

5.1.3 Munich

Result Indicator 1.4: No of MOVE21 innovations replicated in Munich

Result indicator 1.4	Number of MOVE21 innovations replicated in Munich
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA. It refers to all 6 RCs	2025: 12 (innovations)
Method/ Monitoring tools used	RAs procedures Measures and Innovations Logbook
Ex-ante evaluation result	20 innovations 6 innovation categories
Ex-post evaluation result	23 innovations 6 innovation categories

Table 58: Result indicator 1.4 (MUN).

Munich replicated i) the “Neighbourhood hub” measure of Holstenstrasse Hamburg by transforming a vacant space into a multifunctional hub for the transport of parcels and goods by electric cargo bikes, ii) the “Park and Bike Node” of Klippan Gothenburg by enhancing current mobility hubs and create new ones, the so called “mobility points”, with an emphasis on augmenting the multimodal offerings and on making notable improvements for bicycles and shared micromobility options within the hubs and iii) the “Integration of micromobility with PT” of Oslo by offering users a seamless multimodal experience and to operators an easy-to-use solution for switching from bus to bike, all provided in one app.

As described in the Measures and Innovations Logbook and depicted in Figure 14, the three measures Munich replicated sum up to 10 solutions and 23 innovations of five different types.

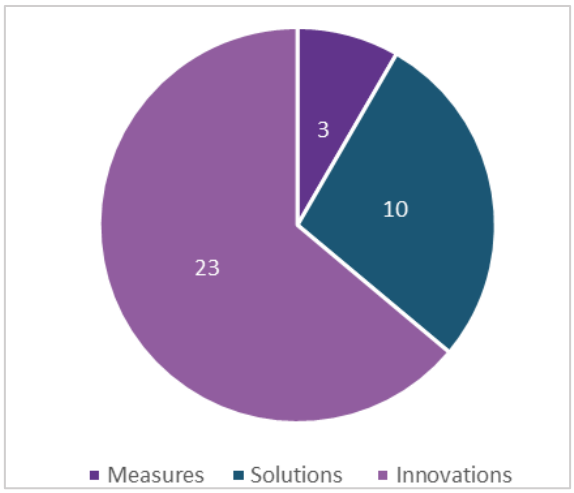

Figure 14 Measures/Solutions//Innovations distribution in Munich

The categories of the above-mentioned indicators are social innovations, innovative business models, technological, service and governance innovations as well as interoperable systems of innovative solutions. Their distribution is presented in Figure 15.

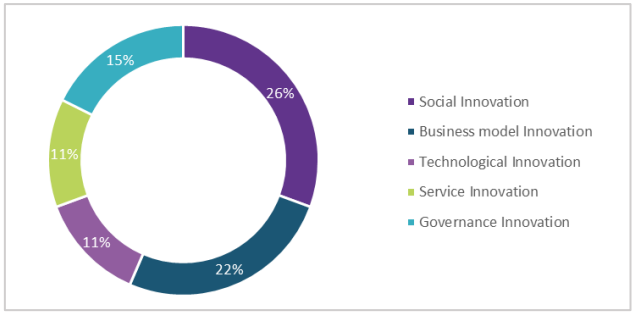

Figure 15 Innovation types in Munich

Regarding the ***social innovations***, these are related to the coexistence of different logistics users in the same space and to the reduction of traffic in the area, transforming it into a more liveable and safer area (as regards the "neighbourhood hub" measure replication) and the promotion of active and environmentally friendly mobility outside the city centre where the "mobility points" are created.

The ***business innovations*** are related to the multifunctional and multi-user hub creation (contracts, operators, ownership, etc), and the appropriate models to finance the provided services.

The **technological innovations,** mainly refer to the combination of existing mobility services with each other in the "mobility points" measure and a common API that shared mobility companies can connect to.

One of the ***service innovations*** is the digital and physical integration of mobility services within one visible location to improve user experience and ease navigation between modes (mobility hub Klippan case replication). The user experience improvement is also reported as a service innovation in the "integration micro-mobility with PT".

The ***governance innovations*** mainly refer to i) the development of a procedure that will allow the creation and operation of neighbourhood hubs and the introduction of new mobility services, ii) public procurement processes enabling innovative logistic solutions, iii) definition of location availability for implementing innovative solutions, iv) methodology to convert of parking spaces into mobility points with traffic management.

Finally, an ***interoperable system*** of innovative solutions is adopted due to the second measure Munich intends to replicate, as the concept of "mobility points" motivates people to combine the use of different transport modes for a trip completion.

Result Indicator 3.1: No of implemented MOVE21 innovations in Munich

Result indicator 3.1	No of implemented MOVE21 innovations in Munich
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA. It refers to all 6 RCs	2025 :9 (innovations)
Method/ Monitoring tools used	RAs procedures Measures and Innovations Logbook
Ex-ante evaluation result	13
Ex-post evaluation result	13

Table 59: Result indicator 3.1 (MUN).

In Munich,13 solutions have been implemented so far: i) the first logistics hub was built in 2023 and will operate for at least two years (Holstenstrasse replication measure), ii) 12 existing mobility points have been converted and by mid-2025, there will be at least 100 mobility points (Klippan replication measure). In the case of micromobility integration measure, the bike-sharing system will provide a link to public transport and other services and will be centrally bookable via the two local MaaS apps from July 2025.

5.1.4 Oslo

Result Indicator 1.4: No of MOVE21 innovations replicated in Oslo

Result indicator 1.4	Number of MOVE21 innovations replicated in Oslo
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA. It refers to all 6 RCs	2025 : 12 (innovations)

Method/ Monitoring tools used	RAs procedures Measures and Innovations Logbook
Ex-ante evaluation result	2 innovations 1 innovation category
Ex-post evaluation result	2 innovations 1 innovation category

Table 60: Result indicator 1.4 (OSL)

Oslo replicated Bologna's "Technical guidelines for Metropolitan Mobility Hubs". As described in the Measures and Innovations Logbook this measure consists of three parts, i) a strategic framework for the establishment of new hubs, connected to overall city policy and other related key strategies, ii) a step by step guide for public and private actors waiting to establish hubs, including principles for involvement and iii) design guidelines for mobility hubs, regardless of private or public land, ensuring that the visitor immediately recognizes that it is a mobility hub. In total two governance innovations are reported in Oslo's Logbook, referring to i) a clear understanding of the work division between the involved agencies and other stakeholders and ii) efficient establishment of further mobility hubs, either on private or public land.

Result Indicator 3.1: No of implemented MOVE21 innovations in Oslo

Result indicator 3.1	**No of implemented MOVE21 innovations in Oslo**
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA. It refers to all 6 RCs	2025 : 9 (innovations)
Method/ Monitoring tools used	RAs procedures Measures and Innovations Logbook
Ex-ante evaluation result	-
Ex-post evaluation result	-

Table 61: Result indicator 3.1 (OSL).

5.1.5 Gothenburg

Result Indicator 1.4: No of MOVE21 innovations replicated in Gothenburg

Result indicator 1.4	**Number of MOVE21 innovations replicated in Gothenburg**
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1

Measurement unit	Number
Target value according to GA. It refers to all 6 RCs	2025 : 12 (innovations)
Method/ Monitoring tools used	RAs procedures Measures and Innovations Logbook
Ex-ante evaluation result	2 innovations 1 innovation category
Ex-post evaluation result	2 innovations 1 innovation category

Table 62: Result indicator 1.4 (GOT).

Gothenburg has decided to replicate the "Technical guidelines for Metropolitan Mobility Hubs". As described in the Measures and Innovations Logbook this measure consists of two parts, i) a new parking policy for the City of Gothenburg with clear priority on sustainable mobility and mobility hubs. The policy aims to establish a direction towards a comprehensive network of mobility hubs and ii) a body of knowledge with connections to city policy, existing knowledge and experiences and recommendations for mobility hubs in Gothenburg.

Result Indicator 3.1: No of implemented MOVE21 innovations in Gothenburg

Result indicator 3.1	**No of implemented MOVE21 innovations in Gothenburg**
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA. It refers to all 6 RCs	2025 : 9 (innovations)
Method/ Monitoring tools used	RAs procedures Measure and Innovations Logbook
Ex-ante evaluation result	2
Ex-post evaluation result	2

Table 63: Result indicator 3.1 (GOT).

As regards Gothenburg, the policy is under political process and is anticipated to be formally adopted in spring/early summer 2025 and the body of knowledge was finalized and presented July 2024.

5.1.6 Hamburg

Result Indicator 1.4: No of MOVE21 innovations replicated in Hamburg

Result indicator 1.4	Number of MOVE21 innovations replicated in Hamburg
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Number
Target value according to GA. It refers to all 6 RCs	2025 : 12 (innovations)
Method/ Monitoring tools used	RAs procedures Measures and Innovations Logbook
Ex-ante evaluation result	5 innovations 3 innovation categories
Ex-post evaluation result	5 innovations 3 innovation categories

Table 64: Result indicator 1.4 (HAM).

Hamburg replicated the “Mobility on demand” measure from Oslo by testing the combined transport of people and goods on a bus line of the PT provided by Hamburg. For this pilot, existing resources and capacities are used more efficiently as people and goods travel in one shared vehicle achieving traffic emissions reduce.

As described in the Measures and Innovations Logbook, the measure Hamburg replicated consists of two parts and five innovations of three different types (one social, one technological and three service innovations).

The ***social innovation*** refers to the increase of people with reduced mobility visiting the hub.

The ***technological innovation*****,** refers to the software needed to be developed for serving the different stakeholders involved (customers, suppliers, transport providers, etc).

The ***service innovations***, are related to i) the identification of the test site that needs to concentrate a high percentage of elderly people, ii) the implementation of new transport services for local shops and iii) the new delivery service for elderly people (people can buy from local shops without using their private cars for carrying their shopping back home).

Result Indicator 3.1: No of implemented MOVE21 innovations in Hamburg

Result indicator 3.1	No of implemented MOVE21 innovations in Hamburg
Level of evaluation	1
Contribution to additional impacts	Mission board climate neutral and smart cities objectives Sustainable Development Goals / Goals 9 / Target 9.1

Measurement unit	Number
Target value according to GA. It refers to all 6 RCs	2025 : 9 (innovations)
Method/ Monitoring tools used	RAs procedures Measures and Innovations Logbook
Ex-ante evaluation result	2
Ex-post evaluation result	2

Table 65: Result indicator 3.1 (HAM)

Hamburg implemented and pilot tested for a short time period (October 2023 – December 2023) the service for elderly people and people with reduced mobility offering them the opportunity all of their shopping to be delivered by local buses in the district of Rissen.

5.2 Level 2: Living Lab procedures

5.2.1 Bologna

Result indicator 4.1: Perceived improved understanding of governance drivers and barriers to implementation of measures

Result indicator 4.1	**Current improved understanding of governance drivers and barriers to implementation of measures in Bologna**
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (1: very low 5: very high)
Target value according to GA	2025: 5
Method/ Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	3
Ex-post evaluation result	2.5

Table 66: Result indicator 4.1 (BOL).

The perceived understanding of governance drivers and barriers are related to governance structures and specific parameters, such as regulatory knowledge, stakeholders' collaboration, resource mobilisation, legitimacy and entrepreneurial experimentation. Based on these parameters, the perceived understanding was assessed on a qualitative scale from 1 (decreased) to 5 (increased), resulting in a mean score of 2.5 for Bologna.

Result indicator 4.3: Number of MOVE21 business models developed
For the innovations (part of the measures) to be successfully replicated and/or implemented, new business models should be developed. Bologna RC representatives, based on their experience and perception, organized a meeting supported by WP9-leader to fill out the Logbook. Regarding the three measures of Bologna, in total three business models were developed in Bologna for ensuring the successful replication and/or implementation of MOVE21 /solutions.

Result indicator 3.12: Increased collaboration level between private public entities and transport domains
The collaboration level between private and public entities and different transport domains of Bologna was appraised by the RCs representatives coming from the mobility, environment and development sectors. They assessed the level on a qualitative scale from 1 (very low) to 5 (very high), resulting in a mean score of 2.9.

Result indicator: Modal integration (SUITS)
The level of modal integration in the city of Bologna was assessed by the RCs representatives using a qualitative scale from 1 (very low) to 5 (very high), resulting in a mean score of 3.0 slightly increased from the beginning of the project (2.8).

Result indicator: Potential to upscale the measures
As regards the potential to upscale the measures, Bologna's representatives assessed it on a qualitative scale from 1 (decreased) to 5 (increased), resulting in a mean score of 3.3.

5.2.2 Rome

Result indicator 4.1: Perceived improved understanding of governance drivers and barriers to implementation of measures

Result indicator 4.1	Current improved understanding of governance drivers and barriers to implementation of measures in Rome
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (1: decreased, 5: increased)
Target value according to GA	2025: 5
Method/ Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	2.8
Ex-post evaluation result	3.3

Table 67: Result indicator 4.1 (ROM).

In the case of Rome, the perceived understanding as assessed by the city's representatives resulted in a mean score of 3.3 and was slightly increased (2.8) after the measures were implementations when several actions took place for solving specific problems coming out from the existing governance structures.

Result indicator 4.3: Number of MOVE21 business models developed
In the case of Rome, two new business models were developed for the replication of the "Park and Bike Node" measure and the "Emission Free Goods Transport" measure. Both business models refer to the definition of market segments targeted and the type of services offered (including fares), to private and public transport users.

Result indicator 3.12: Increased collaboration level between private public entities and transport domains
The collaboration level between private and public entities and transport domains of Rome as appraised by the city's representatives, resulted in a mean score of 3.0.

Result indicator: Modal integration (SUITS)
The level of modal integration in the city of Rome was assessed resulting to a mean score of 3.3.

Result indicator: Potential to upscale the measures
As regards the potential to upscale the measures, Bologna's representatives assessed it on a qualitative scale from 1 (decreased) to 5 (increased), resulting in a mean score of 3.3.

5.2.3 Munich

Result indicator 4.1: Perceived improved understanding of governance drivers and barriers to implementation of measures

Result indicator 4.1	Current improved understanding of governance drivers and barriers to implementation of measures in Munich
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (1: decreased, 5: increased)
Target value according to GA	2025: 5
Method/ Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	3.3
Ex-post evaluation result	4.1

Table 68: Result indicator 4.1 (MUN)

Munich's perceived understanding of governance drivers slightly increased in relation to the assessment score of the ex-ante evaluation phase resulting to ***a mean score of 4.1,*** increased since the beginning of the project (3.3).

Result indicator 4.3: Number of MOVE21 business models developed
Regarding the three measures Munich implemented, in total 9 business models need to be developed.

Result indicator 3.12: Increased collaboration level between private public entities and transport domains
The collaboration level between private and public entities and transport domains of Munich as appraised by the city's representatives coming from mobility, environment and development sectors, resulted in a mean score of 4.1, increased enough since the beginning of the project (3.3).

Result indicator: Modal integration (SUITS)
Regarding the current level of modal integration in the city of Munich, the mean score is 4.3.

Result indicator: Potential to upscale the measures
As regards the potential to upscale the measures, Munich's representatives assessed it on a qualitative scale from 1 (decreased) to 5 (increased), resulting in a mean score of 4.3.

5.2.4 Oslo

Result indicator 4.1: Perceived improved understanding of governance drivers and barriers to implementation of measures

Result indicator 4.1	Current improved understanding of governance drivers and barriers to implementation of measures in Oslo
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (1: decreased, 5: increased)
Target value according to GA	2025: 5
Method/ Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	3.3
Ex-post evaluation result	3.7

Table 69: Result indicator 4.1 (OSL).

For Oslo, the perceived understanding of governance drivers and barriers resulted to a mean score of 3.5.

Result indicator 4.3: Number of MOVE21 business models developed
The development of "Technical guidelines for designing metropolitan Mobility Hubs" does not require any new business models to be successfully prepared and established.

Result indicator 3.12: Increased collaboration level between private public entities and transport domains
The current collaboration level between private public entities and transport domains of Oslo as assessed by the city's representatives, resulted in a mean score of 3.7, increased since the beginning of the project (3.1).

Result indicator: Modal integration (SUITS)
The current level of modal integration in the city of Oslo, resulted in a mean score of 2.7.

Result indicator: Potential to upscale the measures
As regards the potential to upscale the measures, Oslo' representatives assessed it on a qualitative scale from 1 (decreased) to 5 (increased), resulting in a low mean score of 2.0.

5.2.5 Gothenburg

Result indicator 4.1: Perceived improved understanding of governance drivers and barriers to implementation of measures

Result indicator 4.1	Improved understanding of governance drivers and barriers to implementation of measures in Gothenburg
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (1: decreased, 5: increased)
Target value according to GA	2025: 5
Method/ Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	3.2
Ex-post evaluation result	3.6

Table 70: Result indicator 4.1 (GOT).

The perceived understanding of governance drivers and barriers for Gothenburg resulted in a mean score of 3.6 (3.2) slightly increased after the completion of the "Technical guidelines for designing metropolitan Mobility Hubs" as it allowed an alignment with the existing governing procedures.

Result indicator 4.3: Number of MOVE21 business models developed
For the "Technical guidelines for designing metropolitan Mobility Hubs" measure replication, no business models are reported in the Logbook.

Result indicator 3.12: Increased collaboration level between private public entities and transport domains
As regards the collaboration level between private and public entities and transport domains of Gothenburg case, this resulted to a mean score of 4.0.

Result indicator: Modal integration (SUITS)
The level of modal integration in the City of Gothenburg as assessed by the city's representatives, resulted in a mean score of 3.6.

Result indicator: Potential to upscale the measures
As regards the potential to upscale the measures, Gothenburg's representatives assessed it on a qualitative scale from 1 (decreased) to 5 (increased), resulting in a mean score of 4.2.

5.2.6 Hamburg

Result indicator 4.1: Perceived improved understanding of governance drivers and barriers to implementation of measures

Result indicator 4.1	Improved understanding of governance drivers and barriers to implementation of measures in Hamburg
Level of evaluation	2
Contribution to additional impacts	Sustainable Development Goals / Goals 9 / Target 9.1
Measurement unit	Qualitative scale: (1: decreased, 5: increased)
Target value according to GA	2025: 5
Method/ Monitoring tools used	Questionnaire Survey to city's administrations
Ex-ante evaluation result	4.2
Ex-post evaluation result	4.0

Table 71: Result indicator 4.1 (HAM).

The perceived understanding of governance drivers and barriers for Hamburg case, was slightly decreased in relation to the one assessed in the beginning of the project resulting in a mean score of 4.0, slightly decreased since the beginning of the project (4.2).

Result indicator 4.3: Number of MOVE21 business models developed

For Hamburg two ***business models*** have already been developed. The first one is related to the Public Transport operator who will run the service for the elderly. The second one concerns an agreement with local shops agreed to offer their customers delivery services. The agreement has been signed by in total 12 local shops.

Result indicator 3.12: Increased collaboration level between private public entities and transport domains

The collaboration level between the private and public entities and the transport domains of Hamburg as assessed by the city's representatives, resulted in a mean score of 4.0.

Result indicator: Modal integration (SUITS)

The level of modal integration in the city of Hamburg was slightly increased and rated in a mean score of 4.0, increased since the beginning of the project (3.6).

Result indicator: Potential to upscale the measures

As regards the potential to upscale the measures, Hamburg's representatives assessed it on a qualitative scale from 1 (decreased) to 5 (increased), resulting in a mean score of 3.6.

5.3 Level 3: Impact-oriented result indicators

5.3.1 Impact Area II: Sustainable, inclusive, safe, and secure mobility system

Regarding the Impact Area II and the result indicator 3.9 increase in public transport use this was estimated by the cities' representatives In Oslo, Gothenburg and Bologna cases, such a percentage cannot be estimated due to the fact that the replication activities had no influence in the public transport use. For Hamburg, it is not possible to estimate the influence of the measures at Kaltenkircher Platz, which have a direct connection to public transport, regarding the use of public transport. The number of busstops and potential users affected is too small to have an impact on the entire public transport network. Moreover, shifting effects between different stops cannot be ruled out with this narrow focus

As regards Rome, the city's representatives estimate a 2% - 3% increase due to MOVE21 measures implementation in combination with similar actions included in the city's SUMP. Finally, within the scope of MOVE21 and the replication activities in Munich, the specific increase in public transport was not evaluated. The evaluation on to the impact of mobility points is a currently ongoing activity within the City of Munich.

5.3.2 Impact Area III: Improvements of the efficiency and accessibility of the transport networks/systems covering the TEN-T urban nodes

Regarding the Impact area III and result indicators 3.3: Number of new (micro) hubs and 3.4: Number of improvements in existing hubs intended to be implemented accordingly, i) Bologna established 27 new (micro) mobility hubs and proceeded with improvements in one existing hub, ii) Rome established 2 (micro)mobility hubs and improved one existing, iii) Munich established 201 (micro)hubs and improved 24 existing. For the rest three RCs, no new (micro)hubs were implemented and no improvements in existing hubs were observed.

#	Result indicator	Assessment mechanism	BOL	ROM	MUN	OSL	GOT	HAM
Result indicator 3.3	No of new (micro) hubs as a result of the project	WP8 Logbooks	27	2	201	-	-	-
Result indicator 3.4	No of improvements in existing hubs as a result of the project	WP8 Logbooks	1	1	24	-	-	-

Table 72: Result indicators Impact area III (BOL-ROM-MUN-OSLO-GOT-HAM).

Result indicator 2.3: Increase in active modes due to RAs

As regards the result indicator 2.3: Increase in active modes due to RAs, this was estimated by both the LLs and RCs. In Bologna case, i) no impact in increasing active modes is expected for the Automated logistic micro-hubs measure and the combined raw /waste material shipment as these two measures are related with logistics procedures, ii) for temporary hubs for micro mobility supporting major events measure, according to the pilot phase results it has been calculated that 1 out of 3 people used the bicycle as a substitute for private vehicle (570 people out of 1.645 that used the temporary

hubs in 24 events that took place during the pilot phase). In Rome, a 3-4% increase has been noticed while in Munich the specific increase in active mode was not evaluated. The evaluation of the impact of mobility points is a currently ongoing activity within the City of Munich. For shared mobility in general, a study estimated a potential shift from motorised individual traffic to multimodal mobility pattern (combined public and shared mobility) of up to 8.3% in Munich. As regards Oslo, Hamburg and Gothenburg cases no increase will be noticed as RAs have no influence in active modes increase.

6 Conclusions

MOVE21 has made significant strides in urban mobility by integrating more than 100 innovations and into the transport systems and infrastructures of the three Living Lab (LL) cities Oslo, Gothenburg, and Hamburg. These cities acted as European "lighthouses" for long-term decarbonisation efforts, with the goal of improving sustainability and efficiency in transport systems.

6.1 Key Aspects of Innovation in MOVE21

1. Social Innovations:
    - Focused on expanding on-demand mobility services, including home delivery options.
    - Promoted green mobility outside city centres and integrated private on-demand services with public transport to offer multimodal solutions in areas with limited access to sustainable transport.
    - Enhanced neighbourhood identity and social cohesion through the creation of mixed-use hubs.

2. Technological Innovations:
    - Focused on integrating mobility services with public transport and developing common APIs for shared mobility.
    - Created integrated logistics data platforms and parcel box systems for delivery management.
    - Integrated cargo management with on-demand mobility solutions.
    - Allowed the technological integration for shared mobility companies and one stop e-shop for park and bike.
    - Defined needed modifications for operational systems of on-demand service providers.

3. Business Model Innovations:
    - Implemented innovative business models such as integrating micro-mobility systems with public transport, reusing central real estate, and developing public-private partnerships.
    - Created logistics micro-hubs to foster multi-user co-existence.

4. Governance Innovations:
    - Focused on urban planning for consolidation terminals and optimizing infrastructure for car-sharing.
    - Integrated shared mobility into public transport ticketing systems.
    - Addressed governance challenges by overcoming barriers to public-private partnerships and formalizing collaborations for innovative solutions.

5. Service Innovations:
    - Tested the combination of passenger and freight transport in the same vehicles.
    - Focused on the augmentation of the user experience and the logistic services through multifunctional hubs that have a clear social and cultural function not usually seen in traditional mobility hubs.

- Improved user experience and eased navigation between modes through the digital and physical integration of mobility services with one visible location and the integration of micro mobility with PT services.

6. Interoperability:
   - In the three LL cities different interoperable systems of innovative solutions were adopted to facilitate seamless travel across multiple modes of transport.
   - This was strongly supported by:
     - integrating micromobility and shared mobility services in PT services;
     - integrating different mobility services from different operators in parking app:
     - established more than 100 “mobility points”, providing people the opportunity to combine different transport modes for a trip completion.

6.2 Contributions of Living Lab procedures

LL procedures were integral to the MOVE21 project’s success, facilitating the co-creation, implementation and upscaling of innovative mobility solutions. These procedures addressed three key targets: fostering knowledge and skills, implementing administrative and legal modifications, and strengthening collaborations and business models.

As regards the uptake of new knowledge and skills, LLs:

- Enhanced their capacity for data-driven approaches;
- Gained better insights into governance challenges including regulatory constraints, fragmented responsibilities and stakeholder engagement and coordination;
- Enriched innovation capacity within city administrations by building knowledge-sharing frameworks;
- Increased the potential for upscaling measures.

As regards the modifications that occurred within the LLs administrative and legal frameworks more than 4 policy decisions, 40 administrative decisions, 5 governance decisions and 27 commercial decisions were made to ensure the successful establishment of MOVE21 innovations.

As regards MOVE21 collaborations and business models,11 new business plans were created which increased the financial viability of sustainable mobility solutions, and 19 collaboration schemes were created to ensure the solutions’ long-term success.

Additionally, the LL procedures defined how MOVE21 experiences and lessons learned could be adopted and even incorporated to the cities’ strategic plans, to ensure continuity, scalability and alignment with broader sustainability goals.

The success of the LLs highlights the importance of co-creation, data-driven planning, and adaptive governance. By addressing challenges and scaling these innovations, European cities can achieve their climate neutrality goals and set a global standard for sustainable urban mobility.

6.3 Outcomes and Impact

With regards to efficiency, accessibility, integration, and social cohesion, the project focused on reducing private vehicle use, improving public transport systems, and fostering collaboration between

public and private sectors. Nine new (micro)hubs were created and more than 50 improvements in existing hubs took place in the LL cities. As regards the RCs, 230 new (micro)hubs were created (200 in Munich RC) and more than 20 improvements in existing ones took place.

With regards to environmental Impact, the integration of multimodal microhubs and other mobility services could attract many new users. Upscaled, the implemented multimodal hubs in a distance no more than 3kms for the users' origin/destination, leads to:

- A 15% reduction in CO_2 emissions from the shift of 20% of citizens from private cars to more sustainable transport options.
- Up to 12% reduction in NOx and PM2.5 emissions.
- Short-Term Social, Economic, and Wellbeing Impacts: These innovations not only benefited the environment but also created short-term improvements in social and economic wellbeing.

6.4 Transferability and Replication

The innovations introduced in the LL cities were easily transferable to the RCs of Bologna, Rome, and Munich, which managed to adopt 51 innovations from the LL cities. Of these, 20 were implemented during the project lifetime. This success was driven by:

- Innovation Co-Creation Partnerships: By bringing together relevant stakeholders in each LL to co-design services and governance frameworks, these partnerships played a crucial role in ensuring that the knowledge and measures developed enabled the efficient transfer of knowledge to follower cities.
- Capacity Building Actions: Targeted actions aimed to improve the capacity-building of both the LL and the follower cities to design and implement innovative solutions. These efforts provided cities' representatives expertise and abilities to successfully carry out complex projects.
- Improved Governance Understanding: Through the knowledge exchange and capacity-building efforts, the understanding of governance drivers and barriers was strengthened, facilitating smoother implementation and replication of measures. The deeper understanding of local governance dynamics helped identify potential obstacles and allowed for the development of solutions to overcome them, leading to more effective implementation/replication of the innovations in the RCs.

6.5 Upscaling impacts

The framework used for calculating the impact in the LLs and Replicator cities (RCs) can be applied to upscale the project's impact to the level of TEN-T axes. This upscaling will build on the knowledge and tools already developed and tested in the LL and RC cities, and it will consider the results of the action plans of other cities. The ex-post evaluation tools and models from the project will also play a key role in this upscaling process.

In conclusion, the MOVE21 project successfully demonstrated the integration of innovative mobility solutions, which not only achieved measurable environmental and social impacts but also created a model for replicating these solutions in other cities across Europe.

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Annex A: Questionnaire Survey for the Ex-post Impact Assessment – LLs

Introductory - Informative Text

Dear representatives of the Living Lab cities,
Thank you for making use of the Questionnaire Survey form. The information provided here will be used for the implementation of the MOVE21 impact assessment. The Questionnaire survey covers MOVE21 impact areas and indicators. The aim of the Questionnaire Survey of this period is to collect all the relevant information in relation to the ex-post assessment phase.

Should you have any questions or difficulties in filling in this form, please contact CERTH in the following emails: marmor@certh.gr or nilia@certh.gr.

*

☐ Data protection declaration: The data shared by you through this form will be used for monitoring the progress of impact assessment of MOVE21 and it may be quoted anonymously in publicly available online reports. Personal data may be shared with MOVE21 partners, all of whom are contractually bound to abide to EU data protection law. Under no circumstances will any data submitted to this form be given to third partners. Please tick to confirm that you understand and agree with the above.

* The city you are representing:

- ○ Oslo
- ○ Gothenburg
- ○ Hamburg

The organization / department you are working for:

1. City's Perceived Capacities

1.1 How do you perceive your city's capacity to incorporate data driven approaches in mobility planning, now that MOVE21 measures/solutions are implemented?

From 1-very low to 5-very high, please rate the level of capacity to incorporate data-driven approaches in mobility planning.

	1 (Very Low)	2 (Low)	3 (Neutral)	4 (High)	5 (Very High)
Level	○	○	○	○	○

1.2 Which do you believe is the level of innovation capacity of your city administration as regards organizational issues for implementing innovative mobility solutions, now that MOVE21 measures/solutions are implemented?

From 1-very low to 5-very high, please rate the innovation capacity regarding organizational issues for implementing innovative mobility solutions.

	1 (Very Low)	2 (Low)	3 (Neutral)	4 (High)	5 (Very High)
Level	○	○	○	○	○

1.3 Which do you believe is the level of innovation capacity of your city administration as regards the knowledge management needed for implementing innovative mobility solutions, now that MOVE21 measures/solutions are implemented?

From 1-very low to 5-very high, please rate the innovation capacity regarding knowledge management needed for implementing innovative mobility solutions.

	1 (Very Low)	2 (Low)	3 (Neutral)	4 (High)	5 (Very High)
Level	○	○	○	○	○

1.4 Which do you believe is the city's level of understanding governance drivers and barriers to implementation of measures, now that MOVE21 measures/solutions are implemented?

From 1-very low to 5-very high, please rate the perceived understanding of governance drivers and barriers to implementation of measures.

	1 (Very Low)	2 (Low)	3 (Neutral)	4 (High)	5 (Very High)
Level	○	○	○	○	○

1.5 Based on experience gained from MOVE21 solutions' implementation, what do you believe is the potential to upscale them in your city?

From 1-very low to 5-very high, please assess the potential for the upscaling the MOVE21 solutions.

	1 (Very Low)	2 (Low)	3 (Neutral)	4 (High)	5 (Very High)
Level	○	○	○	○	○

1.6 What is the direct economic sectorial contribution to the welfare to the metropolitan area from city transport?

Please state a percentage.

2. Comments

2.1 Feel free to share any comments you may have here.

Submit

Annex B: Questionnaire Survey for the Ex-post Impact Assessment - RCs

Save a backup on your local computer (disable if you are using a public/shared computer)

QUESTIONNAIRE SURVEY FOR THE REPLICATOR CITIES_EX-POST-PHASE

Disclaimer

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Introductory text

Dear representatives of the Replicator Cities (RCs),

Thank you for making use of the Questionnaire survey form. The information provided here will be used for the implementation of the MOVE21 impact assessment. The Questionnaire survey covers specific MOVE21 indicators.

This Questionnaire survey is the second out of two similar surveys planned within MOVE21 for the RCs.

The aim of this period's Questionnaire survey is to collect all the relevant information in relation to the ex-post assessment phase.

Should you have any questions or difficulties in filling in this form, please use contact CERTH in the following emails nilia@certh.gr and marmor@certh.gr.

Data protection declaration:
The data shared by you through this form will be used for monitoring the progress of impact assessment of MOVE21 and it may be quoted anonymously in publicly available online reports. Personal data may be shared with MOVE21 partners, all of whom are contractually bound to abide to EU data protection law. Under no circumstances will any data submitted to this form be given to third partners.

Please tick to confirm that you understand and agree with the above.

Confirmation

- ○ I agree

City you are representing

- [ ] Bologna
- [ ] Rome
- [ ] Munich
- [ ] Oslo
- [ ] Hamburg
- [ ] Gothenburg

Type of Organization you are representing (Municipality, Public Transport Operator, etc)

City's perceived capacities

1.1 What is the collaboration level in your city between public private entities in the field of transport domains after MOVE21 measures'/solutions' implementation?

	1 (Very Low)	2 (Low)	3 (Neutral)	4 (High)	5 (Very High)
Level	○	○	○	○	○

1.2 What is your city's level of understanding the governance drivers and barriers after MOVE21 measures'/solutions' implementation?

	1 (Very Low)	2 (Low)	3 (Neutral)	4 (High)	5 (High)
Level	○	○	○	○	○

1.3 How do you assess the level of modal integration in your city (modal integration is the availability of intermodal connections (between different transport modes) and the quality of physical, information and fare integration facilities) after MOVE21 measures'/solutions' implementation

	1 (Very Low)	2 (Low)	3 (Neutral)	4 (High)	5 (Very High)
Level	○	○	○	○	○

1.4 Based on experience gained from MOVE21 solutions' implementation, what do you believe is the potential to upscale them in your city?

From 1-very low to 5-very high, please assess the potential for the upscaling the MOVE21 solutions.

	1 (Very Low)	2 (Low)	3 (Neutral)	4 (High)	5 (Very High)
Level	○	○	○	○	○

1.5 Feel free to share any comments you may have here.

Submit

Annex C: Questionnaire Surveys to users/non-users of implemented measures – LLS

ONLINE SURVEY ON MULTIMODAL MOBILITY HUBS IN HAMBURG
PURPOSE OF THE HUB: PARK AND BIKE/RIDE TO A CENTRAL AREA

Section 1. Socio economic Data

1. How old are you?.....

2. What is your gender?

1	Male	3	Other
2	Female	4	Prefer not to answer

3. What is the highest degree or level of education you completed?

1	No formal qualifications	5	Master's degree
2	High school or less than high school	6	Doctorate degree
3	Vocational school	7	Other
4	Undergraduate		

4. What is your employment status?

1	Full time paid employment	7	Unemployed and not looking for work
2	Part-time paid employment		
3	Full time self-employment	8	Retired
4	Part time self-employment	9	Homekeeper
5	Student	10	Other
6	Unemployed and looking for work		

5. Thinking about all sources of income such as salary/wages, benefits, pensions and so on, which numbers best represent the total annual income of your household before taxes and other deductions?

1	less than 20,000€	6	60,000€-69,999€
2	20,000€-29,999€	7	70,000€-79,999€
3	30,000€-39,999€	8	80,000€-89,999€
4	40,000€-49,999€	9	more than 90,000€
5	50,000€-59,999€	10	Prefer not to answer / Don't know

6. Do you hold any of these types of driving licences? Please check all that apply if licence is currently valid.

1	No	3	Full licence – motorcycle or scooter
2	Full licence - car		

7. What is the travel time from your primary residence to your main daily activity? .....min (by car, bike, PT, walk)

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yΦ I 2ø ŦI-ℕ I-ℕŜ űKŜ Ŧ2ff2øʎyƎ LJfI·ŎŜă I·øI·è ŦℕƳ ès2dzℕ K2Y ŜK

1. Less than 0.5 mile, 2. 0.5-1 mile 3. 1-2 mile, 4. 2-3 mile 5. 3-5 mile, 6. 5-7 mile, 7. 7-10 mile, 8. More than 10 miles

Nearest bus/tram stop	
Nearest train station	
Nearest grocery store	
Nearest park/green space	

{ŜŎűʎ2ƴ oƳ ¢ℕI·ØŜf ōŜKI·ØʎƩ2dzℕ ʎyŦ2ℕY I·űʎ2ƴ

фΦ I 2ø Y I·yè ŎI-ℕă Ř2Ŝă ès2dzℕ K2dzăŜK2fŘ 2øyK

0. 0
1. 1
2. 2
3. 3
4. 4+

млΦ ! ℕŜ ès2dz űKŜ Y I·ʎƴ ŘℕʎØŜℕ 2Ŧ I·yè 2Ŧ űKŜăŜ ŎI-ℕăK

0 No - I do not have regular access to any cars
1 I share a car with other household members
2 Yes

ммΦ C2ℕ űKŜ ØŜKʎŎfŜ ès2dz I-ℕŜ űKŜ Y I·ʎƴ ŘℕʎØŜℕƵ LJfŜI·ăŜ ℕŜLJfè ű2 űKŜ Ŧ2ff2ø IjdzŜăűʎ2yãΦ

млI·Φ ² KI·ű ʅʎyŘ 2Ŧ ØŜKʎŎfŜ ʎă ʎűK

1 Hatchback
2 Estate
3 SUV
4 Saloon
5 Coupe
6 Convertible
7 MPV
8 Pickup

млōΦ ² KI·ű úèLJŜ 2Ŧ ŦdzŜf Ř2Ŝă ès2dzℕ ØŜKʎŎfŜ dzăŜK

1 Petrol
2 Diesel
3 Compressed natural gas (CNG)
4 Liquefied petroleum gas (LPG)
5 Hybrid
6 Plug-in hybrid
7 Electric
8 Other energy sources (e.g. ethanol,)

млŎΦ I 2ø 2ŦűŜƴŘ2 ès2dz dzăŜ űKʎă ŎI-ℕK

1 Never
2 Once in a fortnight
3 Couple of times per week
4 3-4 times a week
5 Once per day
6 Several times per day

мнΦ I 2ø Y I·yè Y2ű2ℕŎèŎfŜă 2ℕ ăŎ22űŜℕă Ř2Ŝă ès2dzℕ K2dzăŜK2fŘ 2øyKΦΦΦΦΦΦΦΦΦΦΦΦΦΦΦ

мοΦ ó/hb5L¢Lhb ! [ű2 мнЂлú I 2ø 2ŦűŜƴŘ2 ès2dz dzăŜ ès2dzℕ Y2ű2ℕŎèŎfŜ 2ℕ ăŎ22űŜℕ Ŧ2ℕ ès2dzℕ úℕʎLJăK

1 Never
2 Once in a fortnight
3 A Couple of times per week
4 3-4 times a week
5 Once per day
6 Several times per day

мп¢ l 2ø 2ŦűŜy˙Ř2 è2dz dzädzI·ffè dzäŜ LJdzōfłŎ úNJI·yăLJ2Nú óŜ¢∃¢ ōdzäΣ úNJI·Y˙Σ úNJI·łyűK

1 Never
2 Once in a fortnight
3 A couple of times per week
4 3-4 times a week
5 Once per day
6 Several times per day

мр¢ 52 è2dz KI·ØŜ l· LJl·ää Ŧ2N LJdzōfłŎ úNJI·yăLJ2Nú Y˙2ŘŜäK

1 Bus
2 Tram
3 Train
4 None above (exclusive option)

мс¢ 52 è2dz 2øy˙l· ăY˙l·NűLJK2yŜK

0 No
1 Yes

мт¢ l 2ø ø2dzfŘ è2dz Nl·űŜ è2dzN dzäI·∃Ŝ 2Ŧ ăY˙l·NűLJK2yŜ l·LJLJă ű2 ŎKŜŎ] úNJI·ØŜf łyŦ2NY˙l·űł2y˙óŜ¢∃¢ Y˙2ŘŜΣ N2dzűŜΣ úNJI·ØŜf űłY˙Ŝú ōŜŦ2NŜ l·yŘ ŘdzNły∃ l· úNłLJK

1 Not using apps at all
2 Sometimes using apps
3 Often using apps
4 Frequently using apps
4 Moderately dependent
5 Extremely depen

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1 Planning trips (e.g. check routes, mode, departure time)
2 Navigation
3 Checking other real-time information, e.g. travel time, road congestion
4 Buying mobility services (e.g. buy train tickets through train apps)
5 Contactless payment for mobility services

Section 4. Mobility hubs Concept

Short paragraph introducing the Kaltenkircher Platz mobility hub pilot concept.

мф¢ ! NŜ è2dz l·ø l·NŜ 2Ŧ űKŜ YI·fűŜy]łNŎKŜN tfI·űÎ úKI·ű KI·ä ōŜŜy˙LJłf2ú ŘŜLJf2èŜŘ ły˙ l l·Y˙ōdzN∃ Ŧ2N Ŝy˙KI·yŎły∃ űKŜ dzäŜ 2Ŧ ōł]ŜκNłŘŜ Ŧ2N úKŜ fI·äű Y˙łfŜ úNłLJ ű2 úKŜ ŎŜyúNJI·f l·NŜI·äK

1 Yes
2 No

нл¢ LŦ èŜäΣ KI·ØŜ è2dz ŜØŜN dzäŜŘ l·yè 2Ŧ łűä łyűŜ∃NJI·űŜŘ äŜNØłŎŜä 2N äłY˙łfI·N äŜNØłŎŜä 2Ŧ l·y2űKŜN Kdzō ły˙ l l·Y˙ōdzN∃K

1 Yes
2 No

(If no, go to section 6)

нм¢ ² KI·ű łä űKŜ úNJI·ØŜf űłY˙Ŝ ŦN2Y˙ è2dzN LJNłY˙l·Nè NŜäłŘŜyŎŜ ű2 úKŜ Ŏf2äŜäű Y˙2ōłfłúè KdzōK ¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢Y˙ły˙óōè ŎI·NΣ ōł]ŜΣ t¢Σ ø l·f]ú

22. What is the travel time from your main activity to the closest mobility hub?
.....min (by car, bike, PT, walk)

Section 5. (CONDITIONAL TO 20==1) Current Users

23. How often do you use a mobility hub for park and bike/ride to a central area?

1. Daily
2. 3-4 times a week
3. 1-2 times a week
4. 2-3 times a month
5. Rarely

24. What time of day do you typically use this mobility hub?.....

25. Please describe your trip now that you are using the hub and what will be your trip if you do not use (for some reason) the hub.

Description of your trip if you don't use the hub	Time (minutes)	Description of your trip if you use the hub	Time (minutes)
1. My private car		1a. My private car	
		1b. Shared e-car	
2. My motorbike		2. My motorbike	
3.The regular bus line		3.The regular bus line	
4. My bike/scooter		4a. My bike/scooter	
		4b. Shared bike/scooter	
5. Walking		5. Walking	
6. Other (Please specify).....		6. Other (Please specify).....	

26. What is your primary purpose for using this mobility hub?

1. Commuting to work or school
2. Personal errands
3. Shopping
4. Leisure/sport activities
5. Other (please specify): .....

27. How has the introduction of mobility hubs impacted your travel habits?

1 Significantly improved
2 Somewhat improved
3 No change
4. Somewhat worsened
5. Significantly worsened

28. What are the main benefits you experience from using mobility hubs? (select max 2)

1. Time savings
2. Cost savings
3. Environmental impact
4. Convenience

29. Have you experienced any difficulties in using mobility hubs? (select all that apply)

1. Navigating the hub
2. Understanding the services offered
3. Availability of shared vehicles/scooters
4. Scheduling and timing
5. Cost of services
6. Other (please specify): .....

30. Have you noticed any of the following negative impacts since the introduction of mobility hubs?

1. Increased congestion around the hub
2. Difficulty in finding parking
3. Crowdedness within the hub
4. None of the above

31. What additional improvements would enhance your experience at mobility hubs? (select all that apply)

1. Mobile app for real-time updates
2. Integrated booking system
3. Integrated payment options
4. Package delivery/pickup services
5. Other (please specify): .....

32. How important do you consider the role of mobility hubs in the motivation of the citizens to use sustainable transport modes?

1. Essential
2. Important
3. Neutral
4. Not very important
5. Irrelevant

33. What locations would you like to see additional mobility hubs? (select all that apply)

1. Near residential areas
2. Near major workspaces
3. Near shopping centres
4. Near schools/universities
5. Near parks and recreational areas
6. Other (please specify): .....

(please go to section 7)

Section 6. (CONDITIONAL TO 20==2) Non-users

Short paragraph introducing the mobility hub pilot concept.

34. What are the main reasons that you do not currently use a mobility hub for park and bike/ride to a central area?

1. Unaware of services
2. Inconvenient location
3. Prefer personal vehicle
4. Service availability
5. Cost of services
6. Other (please specify): .....

35. What would be the main motivational factor for you to start using mobility hubs? (select max 2)

1. Time savings
2. Cost savings
3. Environmental impact
4. Convenience

36. Which of the following aspects would you also consider important? (select all that apply)

1. Proximity to home/work
2. Variety of shared vehicle options
3. High frequency of services
4. Availability of amenities
5. Other (please specify): .....

37. If a mobility hub was placed near your primary trip destination and will offer you park and bike/ride services, how likely would you be to use it?

1. Very Likely
2. Likely
3. Neutral
4. Unlikely
5. Very Unlikely

38. Can you please describe the current primary trip of yours (for work or education etc)?

Mode used	Travel Time (minutes)
1. My private car	
2. My motorbike	
3.The regular bus line	
4. My bike/scooter	
5. Walking	
6. Other (Please specify).....	

39. How important do you consider the role of mobility hubs in the motivation of the citizens to use sustainable transport modes?

1. Essential
2. Important
3. Neutral
4. Not very important
5. Irrelevant

Section 7. A few additional details about you

40. To what extent do you agree or disagree with the below statements? (1. Completely disagree, 2. somewhat disagree, 3. neither agree nor disagree, 4. somewhat agree, 5. completely agree)

I almost always carry baggage (e.g. a backpack, a bag) while travelling	1 2 3 4 5
Public transport is a convenient mode of transport	1 2 3 4 5
Cost is the most important factor when choosing a mode of transport	1 2 3 4 5
Travel time is the most important factor when choosing a mode	1 2 3 4 5
Payment flexibility determines my choice for a mode of transport	1 2 3 4 5
Maintaining the use of a private car important to me	1 2 3 4 5

I do not think environmental pollution is a serious problem in my city	1 2 3 4 5
The work that is currently being done to reduce our societal environmental footprint is rather enough	1 2 3 4 5
When ordering, I trust that my purchases will be safely and securely delivered to my home.	1 2 3 4 5
I prefer having my purchases delivered home rather than shopping myself	1 2 3 4 5
The availability of a delivery service encourages me to make larger purchases than I normally would	1 2 3 4 5

Annex D: Questionnaire Survey to freight operators - LLs

Type of vehicle used	BEFORE		AFTER THE CURRENT PILOT		IF THE SERVICES CONTINUE OPERATE AND EXPANDED (many routes of MOIA service will offer logistic services throughout the city)	
	Number of Vehicles (1)	Daily average km driven (2)	Number of Vehicles (3)	Daily average km driven (4)	Number of Vehicles (5)	Daily average km driven (6)
Diesel vans up to 3.5ton						
Petrol vans up to 3.5ton						
Electric vans up to 3.5ton						
Hybrid vans up to 3.5ton						
Plug-in hybrid up to 3.5ton						
Cargo bikes						
Cargo e-bikes						
Petrol cars up to 2ton						

Load factors (%) of freight vehicles	BEFORE	AFTER THE CURRENT PILOT

Annex E: Measures and Innovations Logbook LLs

Proposed measures (please describe each measure separately)	Describe the MAIN INNOVATIVE ASPECTS of each measure using the following categorization: Social Business model Technological Service Governance	Number of innovative aspects / category	min.number of measures upscales needed, for maximizing the impact	No. of new (micro) hubs included in the specific measure	No. of improvements in existing hubs, included in the specific measure	Main categories of the implemented components of the measure MEASURES/SOLUTIONS SERVICES	Solution code

No. of different solutions, services, systems that will be implemente as components of the measure.	Please describe the different solutions, services, systems that will be implemented as components of the measure. SOLUTIONS/SERVICES COMPONENTS	number of administrative decisions	Description of Administrative decisions that will be taken through the project life time for supporting the implementation of the solution	number of commercial decisions	Description of Commercial decisions hat will be taken through the project life time for supporting the implementation of the solution

	number of policy decisions	Description of Policy decisions that will be taken through the project life time for supporting the implementation of the solution	number of Technological equipment	Description of the Technological equipment that will be developed/installed/purchase for supporting the solutions	number of Governance Decisions	Description of Governance decisions needed for implementing the solution (e.g. changing a law)	number of Collaboration Schemes	Description of New collaboration schemes needed for implementing the solution(e.g. new public private partnership)	number of Busisness Models	Description of New Business models needed for the implementation of the solution

Replication measure RC	Measure Code	Describe the MAIN INNOVATIVE ASPECTS of each measure using the following categorization: - Social - Business model - Technological - Service - Governance	Number of innovative aspects / category	Number of MOVE21 solutions replicated in RC	Please describe the different solutions, services, systems that will be replicated as components of the measure.	Solution code	
SUMS							

No. of interoperable systems of innovative solutions adopted/replicated in RC	No. of imlpemented MOVE21 innovations in RC	No. of new (micro) hubs included in the specific measure	No. of improvements in existing hubs, included in the specific measure	number of Busisness Models	Description of New Business models needed for the implementation of the solution