SUMMARY OF ACHIEVEMENTS

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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 InfraGO
- **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

Multimodal hubs, TEN-T, zero emission transport solutions, urban mobility, urban logistics, innovation capacity, interoperability, governance innovation

Executive Summary

This deliverable summarises and highlights the main achievements of the MOVE21 innovation project, spanning from May 2021 to April 2025. The project involved 24 partners in seven countries, including six local and regional authorities in Oslo, Gothenburg, Hamburg, Munich, Bologna and Rome. It also engaged six cascade cities (Brasov, Sofia, Toulouse, Thessaloniki, Murcia and Stockholm) in a cascade city programme.

Key achievements include:

- The development of multimodal hubs for people and freight, and the augmentation of what a hub can be through the development of mobility hotels and multifunctional hubs.
- Substantial replication, transferability and cascading efforts to scale successful innovations and learnings to a large audience of European cities and regions.
- New, integrated policymaking on local and regional levels, as well as new business and governance models for smarter urban logistics and mobility.
- Increased innovation capacity in participating cities.
- New technological interoperability and interconnectivity across transport modes, facilitating seamless transitions between different transport systems.

Through this work, MOVE21 has significantly contributed to further decarbonisation of urban transport systems, in particular when pilots and measures are upscaled and transferred, setting a precedent and creating conditions for further sustainable mobility solutions across Europe.

In the following summary, key achievements are organised and detailed along three levels:

- Some of the actual developed innovations and measures that have been deployed in participating cities.
- Achievements related to local and regional policymaking and progress on policy coherence and innovation capacity.
- Achievements related to work on the TEN-T level and the new TEN-T regulation where 431 urban nodes are given heightened importance.

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1 List of abbreviations and acronyms

Acronym	Meaning
API	Application Programming Interface
B2B	Business to business
B2C	Business to customer
FUA	Functional urban area
GDPR	General Data Protection Regulation
LIHH	Logistik-Initiative Hamburg
MaaS	Mobility as a Service
MVG	Münchner Verkehrsgesellschaft
MVGO	Münchner Verkehrsgesellschaft Mobility App
MVV	Munich Transport and Tariff Association
PTA	Public Transport Authority
SME	Small and medium-sized enterprises
SULP	Sustainable Urban Logistics Plan
SUMP	Sustainable Urban Mobility Plan
TEN-T	Trans-European Transport Network
TOMP	Transport Operator MaaS Provider

2 Purpose of the deliverable

This deliverable summarises the main achievements of the MOVE21 innovation project, spanning from May 2021 to April 2025, and highlights the main components of the project's legacy. It draws on the work done in all work packages and by all partners, and the work done and embedded in the administrations of participating cities and regions in the project.

2.1 Attainment of the objectives and explanation of deviations

The objective of this deliverable has been attained in full and on time.

2.2 Intended audience

This deliverable is meant for wide dissemination and for both internal and external audiences.

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

The deliverable links back to the original specific objectives identified at the start of the project. These encompass all work done in the project, and as such this deliverable is a summary of work done across work packages and cities.

This deliverable builds on the measures and pilots developed in the project in both WP6 and WP7. In particular, the deliverable builds on the results, insights and recommendations from D6.6 *Reflective monitoring: interim report*, D6.7 *MOVE21 guide on improving city's capacities for promoting sustainable mobility and logistics innovations*, and D6.8 *Practitioners' guide for setting up self-sustaining innovation co-creation partnerships.* In WP7, D7.2 *Replication action plans for Oslo, Gothenburg, Hamburg, Munich, Bologna and Rome* are of particular importance. Related to these two work packages is the monitoring and evaluation of project measures, and then in particular D8.6 *Ex-post implementation of the Impact Analysis Framework* and D8.7 *TEN-T Analysis: TEN-T Accessibility and Project Impact on the TEN-T network*. The final exploitation plan (confidential) for the project is also important, codified in D9.5 *Final exploitation plan.* For work related to TEN-T and SUMPs, both D10.5 *Scan-Med Observatory Action Plan* and D10.7 *SUMP Topic* Guide are important. For all notions on upscaling and transferability potential, D3.3 *MOVE21 Upscaling plan and transferability assessment*, D4.3 *MOVE21 Upscaling plan and transferability assessment – governance*, and D5.3 *MOVE21 Technologies: upscaling and transferability assessment* are pivotal.

In addition, several events and policy briefs are important. Most notably, the MOVE21 White Paper *Working Together: Public-Private collaboration in urban mobility and logistics* (2024), the Policy Brief *Planning Urban and Trans-European Mobility Together* (2024) from the MOVE21 Urban Nodes Forum entitled Planning Urban and Trans-European Mobility Together, and the Urban Nodes Alliance position paper *Urban Nodes: Empowering cities and regions to build the TEN-T* (2024).

The deliverable starts with a short introduction to MOVE21, followed by a summary of key results organised on the basis of the specific objectives of the project. This is followed by concise summaries on main achievements and results on the level of specific measures and pilots, on the level of local and regional policymaking, and finally on the international and EU-level. The final chapter also contains some suggestions for future projects based on learnings from MOVE21 as well as an overall conclusion.

3 Introduction to MOVE21

MOVE21 was an innovation project running from May 2021 until April 2025 and funded by the EU's Horizon 2020 programme. It aimed to help European cities transform into smart and zero emission urban nodes for mobility and logistics. The project's ambitious goal was to help cities achieve substantial reductions of transport-related emissions by 2030 through the implementation of different types of measures, many of them centred around the development of multimodal mobility and urban logistics hubs. The cities and regions involved were Oslo, Gothenburg, Hamburg, Munich, Rome and Bologna, in addition to the cascade cities of Brasov, Sofia, Toulouse, Thessaloniki, Murcia and Stockholm.

Urban nodes were used as testbeds in MOVE21, and the project established three Living Labs in Oslo, Gothenburg and Hamburg. The Living Labs acted as testbeds where mobility and logistics solutions were developed and tested. In these labs, stakeholders from government, industry, academia and civil society worked together to create practical solutions. Alongside the Living Lab cities, the replicator cities of Munich, Bologna and Rome, were involved from the start in an ambitious two-way knowledge exchange and replication process. This two-way replication process allowed the cities to adapt and implement solutions through a flexible framework.

The Living Labs were designed to live on after the project through different types of innovation co-creation partnerships, and specific measures were put in place to ensure that work continues although the project has formally come to a close. The project also established a Scan-Med Observatory for coordination and collaboration on the TEN-T network and Scan-Med Corridor level.

MOVE21 adopted an integrated approach in which all urban systems are viewed as connected, and which addresses both urban logistics and urban mobility. The transport sector stands for 30% of the total EU climate emissions, and this number is expected to increase in the coming years. Road transport accounts for approximately 70% of the EU's total transport-related climate emissions. An effective and swift transition to zero emissions and climate resilient transport systems in Europe requires that passenger and freight transport no longer are addressed separately and in isolation from one another. In MOVE21 this integration took place on the levels of policy and governance, technology, infrastructure and vehicles.

Several results from MOVE21 have been commercialised, and cities and regions are committed to upscaling the most promising solutions developed as part of the project. In ambitious efforts to disseminate results and lessons, cascading efforts have taken place in six additional European cities, and the project has also developed several detailed transferability and upscaling assessments for uptake in cities and regions across Europe.

In the following summary, key achievements and results are organised and detailed along three levels:

- Achievements related to some of the actual developed innovations and measures that have been deployed in participating cities.
- Achievements related to local and regional policymaking and progress on policy coherence and innovation capacity.
- Achievements related to work on the TEN-T level and the new TEN-T regulation where 431 urban nodes are given heightened importance.

These link to the specific objectives of the project which are detailed in the next chapter.

4 Specific objectives of the project and summarised main achievements linked to these objectives

The main objective of the project has been to help European cities and functional urban areas transform into climate neutral, connected multimodal urban nodes for smart and clean mobility and logistics. This has been done by adopting an integrated approach in which all urban systems have been seen as connected and which addresses both goods and passenger transport together.

The project has had five specific objectives. These will be briefly detailed here together with a summarised overview of main achievements and results linked to each specific objective. These will be discussed in more detail in the subsequent chapters.

Specific objective 1: Test, deploy, replicate and upscale zero emission solutions through co-creation in urban nodes and functional urban areas on the TEN-T Scan-Med corridor.

Main results:

- Co-created solutions with quadruple helix partners (public authorities, researchers, businesses, citizens) in Living Labs. Many of these partnerships will outlive the project and follow-up actions and joint ventures are planned.
- Demonstration of different types of zero emission mobility and urban logistics hubs, some with integrated energy solutions such as battery swapping. Over 200 hubs have been developed or updated as part of MOVE21.
- Integrated transport services for people and freight through booking and on-demand solutions.
- Integration of different modes of transport, in particular digital integration and ticketing of:
    - public transport and micromobility;
    - parking fees and active modes (biking).
- New governance and collaboration models for transport services and infrastructure as well as for different types of mobility hubs and hotels.
- 20 new collaboration schemes that involve partners outside the MOVE21 project consortium linked to new solutions and governance and business models between public-and private entities. Most of these collaborations are set to continue also after the project ends.

Specific objective 2: Combine technological and non-technological innovations to facilitate effective implementation of decarbonised mobility solutions for people and goods.

Main results:

- Increased policy coherence and in particular sectoral integration between land use and transport planning – exemplified through specific new or updated policies such as spatial planning policy in Hamburg, parking policy in Gothenburg and the Oslo green mobility plan which seeks to have an integrated approach for considerations and priorities between passenger transport and urban logistics.
- Simulations to improve understanding of the impacts of measures on a systems level perspective.
- Developed 75 different types of innovations through the deployment of specific measures and pilots.
- Commitments to upscaling the most promising solutions in participating cities, and in parallel, detailed transferability assessments.

- Commercialisation of specific results, such as the OpenAPI that allows for the integration between public transport services and micromobility operators that has now been deployed in 10 cities across Europe, many of them outside the MOVE21 project consortium.

Specific objective 3: Increase liveability in European cities by focusing on social cohesion, identity as well as transport and health equity in all mobility implementations and upscaling efforts.

Main results:

- Considerations on social cohesion for specific measures and an innovative approach that combines urban mobility and logistics solutions with social services and one that includes urban logistics into placemaking and urban development practices that hitherto have not included urban logistics priorities.
- A gender-conscious approach to mobility planning, including wayfinding.
- Citizen involvement in co-creation activities.

Specific objective 4: Establish a platform for coordination, collaboration and data sharing for clean and efficient urban multimodal mobility on TEN-T corridor level and a self-sustaining partnership model in Living Labs.

Main results:

- Established a Scan-Med Observatory for coordination, collaboration and data sharing between urban nodes on the Scan-Med TEN-T corridor.
- Policy work on urban nodes related topics on local and international level, in particular related to the new (2024) TEN-T regulation with several policy briefs and position papers published or co-authored.
- A continuation of the TEN-T policy support work, especially towards new urban nodes, through the establishment of the Urban Nodes Alliance and The Baltic Sea Region Urban Mobility Platform project “BSR Urban Mobility” after the project formally has ended.

Specific objective 5: Maximise uptake of solutions through ambitious replication, uptake and dissemination activities to secure impact in Europe and beyond.

Main results:

- An ambitious two-way replication and knowledge exchange programme with altogether nine study visits and a replication programme.
- Detailed transferability assessments covering topics such as the urban social layer, governance innovation and technology.
- A learning programme for six cascade cities with peer learning and dedicated capacity building activities.
- Three e-courses on the topics of innovation capacity, integrating mobility measures, and public-private collaboration.
- An Urban Nodes Competence Centre that details key steps for the successful deployment of different types of mobility hubs and gathers best practice.
- Two Urban Nodes Forums that combined have gathered over 30 cities and urban nodes across Europe.
- A SUMP Topic Guide with policy recommendations on the development of mobility hubs.
- Over 20 synergies with other international projects, initiatives and networks in order to disseminate best practices, learnings and specific solutions.

- Almost 30 organised capacity building activities that have reached 1200 people directly across Europe.
- Participation as a speaker or organiser at over 100 international and local events, reaching a large audience across Europe and globally.

5 75 innovations and highlights of some deployed measures

In MOVE21, 75 different types of innovations have been developed through the deployment of specific measures developed as part of the project. The project has operated with the following definition of an innovation: innovation is defined as a new or changed entity, realising, or redistributing value (MOVE21 D1.2 *Innovation Management Vision and Strategy*, 2021).

Furthermore, the project has operated with six different categories of innovation types. The definition of the different types predominantly follows the OECD's definition (Oslo Manual, Guidelines for Collecting, Reporting and Using Data on Innovation, 2018). Bundled innovations have been prevalent in the project, meaning that innovations can have characteristics from more than one these categories:

- Social innovation
- Governance innovation
- Process innovation
- Business innovation
- Technological innovation
- Service innovation

The subsequent subchapters will detail specific measures and innovations in more detail.

5.1 Multimodal hubs, multifunctional hubs, mobility hotels

The EU Urban Mobility Framework advocates for the development of sustainable and multimodal transport solutions and multimodal hubs are identified as key infrastructure. Hubs are often defined as infrastructure that connect different transport modes with key features including facilities for bike parking, recharging stations for electric vehicles, and improved accessibility. The new TEN-T regulation emphasises the importance of multimodal hubs for passengers and freight in particular for first and last mile connections and more seamless connections between long-distance and local transport systems on the TEN-T corridor network. In many ways, multimodal hubs are hailed as a crucial cornerstone of EU transport strategies (MOVE21 D10.7 *SUMP Topic Guide*, 2025).

In MOVE21 both more traditional multimodal hubs have been developed and deployed as well as more innovative hubs where aspects such as integration of passenger transport and urban logistics and enabling support services for the switch to more sustainable modes are important. A further exploration of these new types of hubs and hybrid hubs should continue also after MOVE21 ends, adding to a European body of knowledge on what mobility hubs can be, how they operate, and what their impacts are on transport systems on different levels.

Almost 220 micromobility hubs have been created and more than 70 improvements in existing hubs have been made as part of the project. These range from traditional multimodal hubs linked to public transport stops (bus, metro, tram) and local or regional train stations. Multimodal hubs can include public transport hubs such as train stations, bus stops and airports or car and bike parking or designated areas for micromobility points. Multimodal hubs for urban logistics can include airports, seaports, freight terminals, consolidation centres and microhubs. Various aspects of passenger and urban logistics transport can also be combined in a single hub. In some instances, hubs can also include a variety of other socio-economic and socio-cultural services, in which case the hubs are labelled as multifunctional.

Furthermore, hubs may also be put in place to act as enablers of more sustainable transport modes, as it the case for the mobility hotels developed in MOVE21.

In Munich, several mobility points have been installed with more on the way. At the heart of the mobility points are information pillars that display the available mobility services and make them easier to find, both in the street and digitally. The use of uniform logos and columns helps passengers to find mobility points and use shared mobility wherever they are, regardless of the provider of the service. The Department of Mobility in the City of Munich, the Münchner Verkehrsgesellschaft (MVG), and the Munich Transport and Tariff Association (MVV) continue to work together to improve and expand the information available on mobility points and shared mobility services within the MVGO and MVV apps. Information on the different car sharing providers and other micro-mobility services is provided via the MVGO app, and on-demand services are also planned to be promoted. A particular achievement is also the efforts to scale and streamline the work on mobility points to cover the full functional urban area, very much in line with the new TEN-T regulation.

On the level of urban logistics and catering for the last mile, many of the participating cities have made great strides.

In Munich for example, a micro-depot for last mile deliveries using cargo-bikes has been trialled. This enables zero emission deliveries. In short, parcel services no longer drive their large transport vehicles to individual houses, but to the hub on a municipal site at the Viehhof. Deliveries for the last mile of the journey are transferred to electric cargo bikes in six containers and taken to the recipients. This pilot has proven to be a success, and Munich is in the process of looking to secure upscaled measures of this pilot.

In Bologna, automated parcel lockers streamlined urban parcel handling and consolidation. More specifically, the Bologna pilot tested how to best enable zero emission last mile deliveries in the historical centre of Bologna and its Limited Traffic Zone. The pilot is characterised by high level of automation (unattended and automated management) and an open multi-operator concept. A strong public-private partnership was formed to implement the pilot, and a formal agreement between the City of Bologna, the Metropolitan city of Bologna, Institute for Transport and Logistics, TNO, Due Torri and Salerno Trasporti was signed – testament to the many strong public-private collaborations formed as part of MOVE21.

The promotion and uptake of cargo-bikes is important in Rome's Sustainable Urban Logistics Plan (SULP) and an ingredient towards more sustainable urban logistics. Doctorbike, a cargo-bike service provider, was entrusted with last-mile distribution in a specific neighbourhood close to the S. Paolo metro station. Doctorbike provides free rental services of cargo-bikes and used by local markets and residents of the area in an effort to bring down transport by private cars.

In Oslo, the Mobility Hub network tested micromobility (e-scooters, e-bikes and bike lockers), car sharing and public transport in different co-locations. The aim was to investigate whether it was possible to achieve fewer journeys by private car and tilt modal share in favour of sustainable transport options for citizens (biking, walking, public transport). The network, located on the outskirts of the city in a valley covering approximately seven square kilometres with good connections has provided the City of Oslo with more insight on how to best combine shared mobility offers with public transport on the outskirts of the city. The e-scooters were used for longer distances than in central areas of Oslo. The car sharing operators have reported usage exceeding expectations. Additionally, interviews with inhabitants revealed that electric scooters combined with public transport make it easier for young people to spend more social time together which is beneficial for their wellbeing and health.

In Oslo, the Mobility Hub network highlighted the need for a coherent strategy for mobility hubs both for the city but also for a range of stakeholders such as privately owned transport service providers, the transport authority and real estate owners. A major achievement is the planned expansion and upscaling under development on how to best scale such networks in Oslo (codified in the Oslo SUMP) and collaboration with neighbouring municipalities to streamline local micromobility regulations in the Oslo functional urban area. Related to this, MOVE21 has highlighted the need for a comprehensive plan for how mobility points should be developed and evaluated in Oslo. This includes the need to create a cohesive branding and signage across the different operators so that citizens and visitors have an easier time identifying the different offers at any given mobility hub.

A major achievement in MOVE21 is the augmented definition of what a mobility hub can be and how it can operate. Through successful private-public and public-public collaborations, mobility hubs have been augmented to include socio-economic services or to primarily focus on services that enable the use of more sustainable modes and (cargo-) bike-based transport in city centres for both B2C and B2B segments. For this, local authorities often seek new collaborations with private companies and associations. Enhancing or reiterating the very meaning of mobility hubs can offer several advantages. By integrating diverse services, such as sales, service, reloading, financing, pick-up points, storage or social support, hubs can become more accessible and convenient for a wider range of users. This fosters greater community engagement, reduces the need for separate facilities, and maximises the use of available space. The hubs can also unlock traditional value chains and enable new roles and business models needed for the transition into a circular business ecosystem.

Together with local partners, the City of Hamburg piloted a multi-functional neighbourhood hub with use cases that combine mobility for people, logistics and social/cultural aspects. At the Holstenstrasse hub in the in the District of Altona, the team established a functional business model for multi-user micro-depots for urban logistics. This allowed for a cost-efficient approach through the shared use of space by the logistic companies but also other amenities such as shared support facilities such as restrooms and kitchen by all tenants. The urban logistics business side was augmented with social services in the same building. The coupling allowed the local authorities to cater for local demands for social services and counselling, while also allowing a strong dimension of social inclusion and prioritisation of local needs. The building used for the hub was previously vacant, and the hub has contributed to increased perceptions of local safety thanks to transparent windows with daily activities on display in contrast to an abandoned and closed-off building. In addition, the interim use with a commercial business model attached to it has led the local authorities in Hamburg to rethink their approach to how the city can take vacant buildings into use.

This unconventional approach allowed the team to raise awareness of how seemingly separate and different functions and services can be combined in shared spaces. This practical demonstration of how different types of services and sectors can be combined has spawned new ideas for the development of new and existing neighbourhoods in Hamburg. In addition to having a fresh take on how local authorities can use vacant or dark spaces, Hamburg has also trialled a flexible approach to urban space.

At the site Kaltenkircher Platz, a modular and flexible hub solution has been trialled. The modular approach allows for flexible approach depending on location and available urban space, in particular parking spaces, and demonstrates how cities can quickly adapt scarce urban space for mobility and logistics purposes. At Kaltenkircher Platz, a car park was transformed to cater for a variety of transport modes and needs. In it, different shared mobility offers were provided together with active modes and public transport offers. By doing so, the Hamburg team created synergies with seemingly unrelated services such as mobility and recycling as well as urban logistics. A study (*Design study: MOVE21 neighbourhood hubs in urban areas,* 2025) explores the potential for integration of different use cases

under the modular depots with the improved aesthetic appeal for better transferability and harmonized approach when implementing the modular approach across diverse locations in the city. The design study sets a baseline for future modular solutions in Hamburg while allowing for flexibility, site-specific and hyper-local considerations. Local authorities also aim to expand the car sharing service network ('switch points') in collaboration with public transport company Hochbahn.

A major or emergent innovation in MOVE21 is the development of mobility hotels. These are not traditional hubs where the focus is on the inter-change from one mode to another. Rather, the hotels primarily focus on services that enable the use of more sustainable modes and (cargo-)bike-based transport in city centres for both B2C and B2B segments. Groundbreaking mobility hotels have been trialled in both Gothenburg and Oslo as part of MOVE21.

Gothenburg's mobility hotel, situated in the shopping centre Nordstan in the heart of central Gothenburg, is a zero-emission micromobility hub with multiple functions. It includes a shared fleet of vehicles and bikes for service providers, mobility companies sharing space for the provision of services and sales, a battery swap station for micromobility operators, an unmanned 24/7 open warehouse store wholesaler for professional service providers and cargo bike hub with consolidation of goods and last mile delivery as well as a co-working space.

The Mobility Hotel in Gothenburg was developed through close collaboration based on trust, common goals and knowledge of different stakeholders' needs. The different actors in the mobility hotel share spaces, risks, successes and customers, and develop new collaborations and services together. A cluster analysis on micromobility was conducted prior to the development of the mobility hotel in Gothenburg. The analysis revealed that many new SMEs have emerged in the fields of micromobility and micrologistics, spanning both the manufacturing and service sectors, and the need for closer collaboration across value chains and the public-private divide. The mobility hotel has been developed based on this insight and will continue to be developed through three interconnected working groups. This unique model fosters collaboration among all actors, allowing them to share risks and successes while developing new services. The benefits of collaboration are well known, for example maximising resource utilisation, efficiency gains, and increased visibility. By adding non-traditional services in a mobility setting, there are additional gains to be mentioned such as increased foot traffic, diversification of revenue streams, building of ecosystems and enabling innovation and experimentation. This model of collaboration and risk sharing is one of the major achievements of the mobility hotel in Gothenburg.

In Oslo, the Kaia Mobility Hotel is based on research and development collaboration between the Oslo Living Lab in MOVE21 and private service providers. The aim of the hotel is to facilitate more bicycle-based urban logistics in the centre of Oslo and especially in the area intended as a future zero-emission zone. It offers a new and holistic service offer that makes it easier for couriers, service and maintenance workers, and last-mile operators to switch from cars and vans to bikes. More practically, it offers goods storage and transshipment, charging, battery swapping, break facilities and workshop facilities, in addition to financing, leasing agreements, service and modifications of bicycles for company-specific needs.

The pilot is based on the assumption that there is considerable potential in switching from vans and cars to smaller electric vehicles and cargo bikes, and according to a report from the Transport Economics Institute, 58% of all urban logistics in the city centre in Oslo comprise service delivery (Pinchasik et al, 2023). Based on this, it is assumed that the potential for enabling a switch from vans and passenger cars to cargo bikes and smaller electric vehicles is significant in the city centre and for the overall urban logistics in the area. There is a great demand for available land and urban space, but it is also important to emphasize that solutions such as the Kaia Mobility Hotel can provide significant

space savings in the long term through more appropriate organisation of transport activities and associated services. The Mobility Hotel and similar measures can also help facilitate the implementation of a future zero emissions zone in the centre of Oslo.

5.2 Integration between passenger and freight transport and between different transport modes

A central tenet in MOVE21 is an integrated and holistic approach to smarter and cleaner urban mobility and logistics. This has meant that the project has tried to see these two transport domains (passengers and freight) in a jointed fashion, rather than separate from one another.

Researchers have long advocated for a greater coordination between passenger and freight transport but this has proven to be difficult in a real-world setting due to complexity, legal barriers and high transaction costs and costs of coordination. However, the promise of integration still holds great potential, perhaps in particular in dense urban environments and specifically for last mile operations, which often are also the most inefficient and expensive from a logistics perspective. Similarly, the first/last mile often remains uncoordinated for passenger transport, regularly resulting in high externalities such as congestion.

In MOVE21, this topic and the potential integration and coordination between passenger and freight transport has been addressed on several different levels.

The project has for example placed focus on greater integration between passenger and freight transport on a planning and policy level. Here examples include Oslo's attempt to include urban logistics principles, priorities and measures into its forthcoming SUMP (Oslo green mobility plan) with the aim to create greater efficiencies and to remove bottlenecks, congestion and emissions. Another example is Gothenburg's SULP and corresponding action plan which to a greater degree deals with the transport flows of respectively passenger and freight transport in a more synchronised and holistic fashion.

On another level, pilots in MOVE21 have tried to conceptualise and test how the integration between passenger and freight transport can happen on a vehicle-level, while also looking at what that type of integration might entail in terms of new business models and legal implications. Pilots in both Hamburg and Oslo show a willingness to radically rethink the potential integration of passenger and freight transport.

In Hamburg, a pilot for combined transport of people and goods used one of the biggest on-demand courier services and public transport company to trial an efficient utilisation of the existing services as well as new forms and/or improved existing cooperation partnerships with social organisations, local retailers, courier services, housing associations, logistic companies and more. The city courier segment was selected in combination with the ride-pooling service provider MOIA. City couriers in Hamburg are usually responsible for single transport orders within the city, and a key objective was to see a reduction in empty runs and increase the use of the on-demand shuttles during midday hours. A key factor for the success of this collaboration lays within the intention of MOVE21 to inspire new forms of collaboration between the private and public sector and partners' motivation and willingness to test new things. An initial test period showed that free capacities outside peak hours for passengers can be used for logistics services without large or customised changes to the operation of the MOIA on-demand fleets.

In Oslo, the public-private collaboration between the public transport company Ruter, the logistics software company MIXMOVE, the shopping centre CC Vest and its parent company, the real estate company Mustad Eiendom, piloted the transport of goods from Oslo's largest shopping centre with on-

demand public transport shuttles. Use of information technology for ordering transport, organising it, including consolidating goods that have the same final address, and reporting on the status and confirming delivery of the goods is a prerequisite for its use. This requires the integration of solutions designed for logistics management with solutions designed for passenger transport. This was tested and validated in Oslo. The ambition to reduce traffic by combining goods and passenger transport was sound but the realisation did not fully meet expectations. Feedback from customers and mall management was generally positive, even though the service did not go as planned, mainly related to capacity issues on the vehicles used and scheduling and booking difficulties. This did however provide important learnings for the involved stakeholders and is an integrated part of any innovation process.

As a replicator city, The Metropolitan City of Bologna has taken a keen interest in some of the work streams and methodologies deployed in the Living Labs, one such topic being the integration between passenger and freight transport. Thanks to MOVE21 and measures implemented in the Living Labs, decision-makers and mobility planners in the Metropolitan City of Bologna and the 55 coordinated municipalities have been provided with inputs and suggestions to better plan innovative and effective solutions for improved sustainable mobility of people and logistics in light of future action plans. The lessons have centred around how to develop innovative solutions to combine passenger and freight transport beyond the traditional methods of spatial planning.

The regulatory, judicial, and technical aspects of combining people and goods in same vehicles or hubs should receive careful consideration. The regulatory framework in EU member states is fragmented, and in some member states, combined transport is de facto prohibited. Procurement practices must also be updated in those instances where passenger transport services and workers are not allowed to transport goods. Technical challenges are in many ways easier to overcome, and interoperability between service providers and domains should be a key priority. A key question for the future is also to what extent new business models and revenue streams can be developed to handle both cargo and people in one vehicle and what the potential savings are in terms of emissions savings and reduced number of vehicles on the roads.

5.3 The commercialisation of selected results

The most promising solutions developed in MOVE21 that are currently being commercialised include the different types of mobility hotels and hubs, but also in particular the technological integration work done as part of integrating different transport modes in a new MaaS offering. MOVE21 developed digital platforms for trip planning, booking, and payment, enhancing user experience. An open-source API was created for service integration and interoperability.

The new MaaS Application Programming Interface (API) was launched by Urban Sharing in 2024. The API is designed to provide a quick way to connect mobility operators with partners, improve customer experience and encourage multi-modal travel uptake without the need to exchange personally identifiable information. The API was first piloted with Oslo's' PTA Ruter by integrating the city bike scheme into the public transport route planner and ticketing system. With the Oslo-based API, operators do not need to comply with the more complex Transport Operator MaaS Provider (TOMP) standards for integration. Transactions are enabled by a unique ID instead of through the exchange of personally identifiable information, thus making the integration work easy and compliant with GDPR.

The API has proven so successful in Oslo that it is now publicly available with more than 10 cities currently implementing it. Cities can either implement it into their existing tenders or make it a requirement for future tenders. One such example is the City of Munich that will integrate the API into its existing bike sharing system. It will also use the API to facilitate the integration of a new service

provider. This means that the tender winners announced this year will be required to use the specification with the PTA applications.

5.4 The upscaling and transferability potential

Upscaling is a critical component in MOVE21, ensuring that successful innovations can be expanded and implemented beyond the so-called test sites. In MOVE21, upscaling is understood as the multiplication of a given measure or its elements within a city, or the increasement of size of an existing measure. Upscaling has been a particular focus for the Living Labs (Oslo, Gothenburg, Hamburg).

Next to upscaling, MOVE21 has also focused efforts on transferability in an effort to cascade learning and solutions to other parts of Europe. Transferability is taken to mean how attractive or easy it would be to transfer a measure or part of a measure, solution or innovation from one specific context to another one in Europe. MOVE21 put in a concentrated effort to discuss and determine what results, measures and innovations are most promising for upscaling and transferability, and this was done as a transversal effort across five different work packages and documented in several deliverables and in the achievement of milestones.

5.4.1 Three examples of upscaling plans in the three Living Labs

The Kaia Mobility Hotel is one of Oslo's pilots labeled as promising for upscaling, and follow-up plans regarding its upscaling potential are underway, developed by various agencies within the City of Oslo. A report from the Transport Economics Institute points to several short and long-term measures and policy instruments that the local authorities can use to increase the use of cargo bikes and also upscale the mobility hotel (Weir IV et al., 2025). This, together with the new business models developed as part of the Kaia Mobility Hotel, are the biggest achievements in Oslo and will continue to reverberate long after the project has been completed.

In Gothenburg, the Park & Bike pilot at the Klippan site introduced a targeted pilot approach to engage car-dependent users by integrating parking and cycling into a single payment system, paving the way for innovative mobility business models. Gothenburg expanded the concept to Lindholmen, an area with congestion and ongoing construction as part of a bigger redevelopment of the district. The Lindholmen pilot attracted significantly more users than the initial test, highlighting the effectiveness of combining practical incentives with sustainable alternatives. At the same time, efforts to upscale and further develop the Klippan hub remain strong. A multi-year agreement has been signed to secure and further develop the hub, and the physical area has been expanded with an additional former car parking spot now reserved for micromobility and a cargo bike pool.

At Kaltenkircher Platz in Hamburg, the micro-depot concept is integrated with the mobility hub concept. Existing infrastructure that supports personal mobility is also used for the urban logistics micro-depot. In terms of upscaling, the modular container solution developed in MOVE21 will be further upscaled and developed through explorations where and how the solution can be adapted and deployed to other locations in Hamburg. An additional guideline document for multifunctional hubs will also inform the implementation of future scalable and modular solutions that can be easily adapted to (hyper-)local needs and requirements, and where plans are being discussed in ministries in Hamburg.

5.4.2 Transversal topics for transferability efforts from the perspective of the urban social layer, governance and technological integration

In MOVE21, three different transferability assessments were made in D3.3 *MOVE21 upscaling plan and transferability assessment*, D4.3 *MOVE21 upscaling plan and transferability assessment – governance*,

and D5.3 *MOVE21 technologies: upscaling and transferability assessment* are pivotal. Each of these focused on specific topics, namely the urban social layer, governance and technological integration. Some common topics and findings emerged from analysis work, pointing out commonalities that transverse specific pilots. These point towards certain themes and questions that demand special attention in any transferability efforts. Conditions for successful transferability include:

5.4.2.1 Considerations on shared space or co-location of services

Encourage and facilitate shared use of space and/or co-location of different types of services beyond the collection of different transport modes in traditional mobility hubs. Such efforts can create payoffs along several different lines and they can be rooted in consideration on social cohesion, risk-sharing, economic efficiency, space utilisation or transport service efficiency. Shared space can for example foster new interactions among different groups of people through the design of such shared spaces. This is particularly valuable across demographic or socio-economic groups. It can also be valuable across different business value chains that are not accustomed to collaborate in shared spaces but where new business and operational models may emerge that increase the efficiency of different transport services. It can also be valuable for different and fragmented expert planning domains such as for example land use and transport planners, where new planning models can emerge.

An important lesson from MOVE21 is to use previously underutilised spaces to create new and vibrant multi-purpose spaces. Such efforts will also have a direct impact on perceptions of safety and the reach and potential in public-private collaborations. This is also true for city areas that are set out for re-development where transparency and activity can create an increased sense of safety through “eyes on the street” concept first developed by Jane Jacobs. This type of leveraging of temporary or underutilized spaces for interim mobility solutions can generate immediate benefits and also inform planning processes. Finally, there is a great potential to further consider and design co-located transport services that for example can include parcel lockers, recycling stations, and micro-mobility options. There are concrete examples on how transferability and replication on this topic has happened within the MOVE21 city partners and consortium and how these ideas are being picked up by cities outside the consortium, ensuring wide transferability across European cities.

5.4.2.2 User-centric design principles

Implement user-centred design principles when planning and designing new mobility services and infrastructure such as hubs. This includes well-lit, sheltered and spaces that are easy to navigate. Uniform and user-centric wayfinding is in this regard very important. Extra attention should also be devoted to gender aspects and physiological differences that determine the placement of different types of infrastructure.

To the extent possible, local communities should be engaged in co-designing mobility hubs to foster a sense of ownership and trust. Care must be taken to align roles and responsibilities so that these are clear and in a way that does not create false expectations on the side of citizens in terms of the actual elbow room local authorities have.

5.4.2.3 Public-private collaboration

Strengthen community acceptance and long-term viability through different public-private collaborations. A big part of this is ensuring that measures can serve multiple community needs over time as this ensures and increases relevance and importance, for example by integrating social services into hubs, or by co-locating mobility and urban logistics services with local businesses or cultural events

to increase foot traffic and economic benefits. In this, it is important to establish clear roles and responsibilities among stakeholders to streamline implementation.

There are examples from MOVE21 where these roles and responsibilities between private and public stakeholders have not been clear-cut, often because the policy areas involved are either new topics for policymakers or because a policy topic is in flux in terms of priorities and policy instruments. While roles should be clear and the commitments should be explicit, there still needs to be flexibility and adaptability in project implementation to allow cities to respond effectively to emerging challenges and to find the best ways in which to address new policy areas or priorities.

At the same time, special attention should be given to governance models, in particular for public-private collaboration. Pilots and different types of projects in urban mobility should be used explicitly as vehicles to test and refine governance models. A key point here is to develop and test business, governance and operational models that are fit for scaling on a larger scale within a city or a region.

5.4.2.4 Policy commitment

Having political backing is often highlighted as an important prerequisite to ensure prioritisation of specific mobility or urban logistics projects or interventions. At the same time, innovation projects often push the boundaries of what is possible and desirable, and there are several specific examples from MOVE21 on how projects give the impetus to developing new policies and policy priorities that hitherto did not exist – for example on how to use vacant space or so called dark spaces for urban logistics measures, and on urban logistics and last mile solutions as a policy priority. Therefore, one can argue that a pre-defined political backing is important, but just as well it is important to ensure that there is local political commitment to take on-board results that can prove to have high impact on their cities, even though such results represent a new policy area previously not prioritised.

It is also important to ensure commitment to upscaling promising solutions that can have considerable impact on cities and local environments. It is equally important to ensure that there is a willingness and preparedness to adapt local regulations to facilitate new mobility solutions, such as flexible use of urban space and integration of transport services. On an overall level, it is therefore important to ensure that there is certain flexibility in regulatory frameworks. In MOVE21 this realisation has been perhaps the most acute for the integration of new mobility services into existing transport offers, but also where one has attempted integration across the mobility and urban logistics domain, for example through the combination of passenger and freight offers.

5.4.2.5 Technology

A central tenet in MOVE21 is the integration of different transport modes, transport domains and planning disciplines, all to ensure more seamless and multimodal transport planning, booking, payments and service offers. On a technological level, many practical integrations have been hindered by questions and challenges related to GDPR and the development of MaaS-solutions. MOVE21 has taken a different approach and developed open APIs that do not require the exchange of personally identifiable information. This represents a turning point, since the project has proved that the integration of different modes and services is possible without running into GDPR-issues.

Key components for further technological integration in urban mobility and logistics are to prioritise seamless and multimodal solutions with user-friendly navigation tools (e.g., real-time digital displays, app-based guidance). In this and for public transport, discussions on how to expand the integration of bikes, e-scooters and cargo bikes should be factored in. Furthermore, considerations on how to best

integrate other sustainable mobility solutions (e.g., electric cargo bikes, shared micromobility) should play an important part.

6 Achievements related to local and regional policymaking and innovation capacity

6.1 Local and regional policymaking related to land use and transport policies

A major achievement and long-term impact indicator for the project has been the number of new policy measures and new regulations that have taken place as a direct influence or consequence from project activities and insights. Ten overall strategic plans in participating cities have been influenced and/or improved as a direct result of the project.

The policy changes on local and regional levels as part of MOVE21 are on an overall level concurrent with the ambitions and policy objectives of the EU's New Urban Mobility Framework which outlines key initiatives aimed at making urban mobility more sustainable, efficient, and inclusive. Some of the most important policy initiatives under this framework include:

- Policies focusing on reducing greenhouse gas emissions, promoting electric vehicles, and expanding low-carbon transport options in cities.
- Sustainable Urban Mobility Plans (SUMP) that ensure alignment between environmental, social, and economic goals for urban mobility and that reduce congestion and foster the transition to cleaner and more sustainable urban transport systems.
- Policies that aim to make European cities more walkable and bike-friendly, reducing car dependency and promoting healthier lifestyles.
- Policies that promote electric vehicles and charging infrastructure.
- Policies for digital platforms for multimodal transport, mobility-as-a-service (MaaS) solutions, and data-driven tools for traffic management and its optimisation.
- Policies that strengthen public transport and the integration of several modes to increase seamless journeys.
- Policies that address urban freight and logistics such as the promotion of electric cargo vehicles, the optimisation of delivery times, and improvement of supply chains in urban areas.
- Policies that promote equal access to transport for all citizens, including those with disabilities or other mobility challenges.

In Hamburg, a new forum for exchange and future collaborations has been setup as a new working group under the umbrella of the Logistik-Initiative Hamburg (LIHH). The pilot projects that have been trialled in MOVE21 feed into the city-wide strategic document on urban logistics in Hamburg and the city's public strategy for last mile urban logistics (*Urbane Logistik Hamburg – Strategie für die Letzte Meile*). The policy document sets as a goal that at least 25% of all courier, express and parcel shipments should be made using alternative transport vehicles, e.g. by cargo bikes operating from micro-depots or hub on the last mile in Hamburg by 2030. Trialled measures from MOVE21 will form part of the interim report for the same strategy document, due in 2025.

In the same vein, learnings from the Kaltenkircher Platz pilot and in particular local combinations of shared mobility, active mobility and public transport together with room and connections to additional services (e.g. logistics, recycling) will be taken into consideration in the development of a new concept for mobility hubs in Hamburg. This is part of the city's programme to reach the goal of 80% sustainable transport in Hamburg by 2030.

The business and collaboration model implemented at the multi-functional hub Holstenstrasse sets a good practice for similar projects also in private spaces. It builds on a potent success story that it is possible to revive vacant and abandoned buildings to the extent that it sets a policy precedent for the city and becomes an attractive replication and upscaling case for other organisations, including housing associations. This also serves as a powerful inspiration to other European cities and property owners looking to redevelop properties and urban areas and who wish to combine strong placemaking and a social profile with urban logistics and commercial uses.

In Oslo, MOVE21 has in particular highlighted challenges related to urban logistics and how the city participates in international innovation efforts that transverse several disciplines and sectors. It also sees the need for better uptake mechanisms for project results that will need to result in new policy areas for the city. To that end, the City of Oslo developed a value realisation plan that seeks to implement policy changes related to learnings and results from the project. The plan discusses in particular:

- Measures and policy changes related to modal share and measures that increase sustainable modes of transport (biking, walking and public transport). This entails for example the upscaling of mobility hubs in the Oslo FUA and in the outskirts of the city but also the upscaling of mobility hotels in areas of the future zero emission zone. It also entails a further integration of different modes of transport for more seamless transport offers, booking and ticketing operations. This includes an acknowledgement of the need to harmonise micromobility regulations across the Oslo FUA so as to enable more seamless options – a first step being the revised micromobility regulation in Oslo that came into force at the start of 2025.
- Measures and policies that reduce transport done by private cars and light duty vehicles and vans, both through own practices in the municipality and the through measures aimed at local businesses. This entails for example measures that shift service providers out of cars and vans and into different types of weather-protected cargo bikes, such as in the Kaia Mobility Hotel pilot. It also entails looking at municipal procurement practices and municipal transport operations that can benefit from a move away from cars to more fit-for-purpose vehicles.
- Measures and policies that increase sector integration between spatial and transport planning and between passenger transport and urban logistics. Oslo has taken great strides in adopting a more integrated approach to passenger transport and urban logistics, codified in the ambitions for the Oslo green mobility plan and forthcoming policy priorities and measures. Oslo has also taken great strides in a more integrated approach to land use planning and transport planning, in particular for the urban logistics domain. On a practical level this entails new practices and processes for the way urban areas are being regulated, but also a new understanding and priorities related to how dark space and vacant urban space or buildings can be used in a more agile and flexible way than previously.
- Measures and policies that increase Oslo's innovation capacity and develop the city further as a test arena for solving societal challenges. Here, the City of Oslo is in the process of proposing specific follow-up actions and measures to increase its own innovation capacity. In addition, the city aims to develop its work on the city as a test arena further, also linked to how the city uses urban space and vacant plots to pilot and test solutions that aim to increase the city's overall innovation pace, resilience and capabilities to address complex societal challenges.

The intention is that the follow-up work will mainly happen through existing planning and budget processes, and most notably the upcoming Oslo SUMP (Oslo Green Mobility Plan), the revised and upcoming regional plan for land use and transport for Oslo and Akershus, and Oslo's research and innovation strategy.

The City of Gothenburg has incorporated insights from the MOVE21 project into several important policies and policy packages. Most notably, Gothenburg has ensured that the Gothenburg Comprehensive Plan, which is the most important policy plan document for long-term development of the city, has an enhanced focus on mobility and infrastructure and that these reflect MOVE21 learnings. In addition to this, the City of Gothenburg has captured experiences from MOVE21 in its SULP and corresponding SULP action plan. The SULP presents a strategic direction that outlines how Gothenburg prioritises urban logistics development and measures. The SULP has a clear MOVE21 connection, in particular related to how to secure land and urban space for urban logistics purposes. It also contains considerations on how to view and prioritise urban logistics in places where urban logistics and passenger transport flows intersect or where passenger transport and active mobility (walking, biking) is dense. MOVE21 has also influenced Gothenburg's new Traffic Safety Plan on the topic of road safety and the connection between road safety and sustainable modes of transport (biking, walking) based on insights from MOVE21 test sites at Klippan and Lindholmen in Gothenburg.

On the topic of parking, Gothenburg has incorporated several related insights from MOVE21 into several new or updated policies. For example, Gothenburg's parking policy has been influenced by MOVE21 as a direct result of the work done on mobility hubs and the local body of knowledge and insights from that work which includes best practices, design principles, and operational strategies for integrating various modes of transport. The same body of knowledge is now being used together with the regional PTA to develop transit points within the Gothenburg FUA. Finally, the City of Gothenburg has developed and implemented a new parking concept for shared and private micromobility vehicles such as electric scooters, cargo bikes, electric mopeds, etc.

Progress on long-term policy level has also been made in the replicator cities, with specific topics that have emerged and that will feed into new or updated policies and their implementation. The Metropolitan City of Bologna will use their existing mobility hub guidelines to create an integrated framework for efficient transport solutions. Knowledge gained from replicating public-private collaboration models will also be leveraged to develop a comprehensive business model document, promoting best practices and encouraging investment in sustainable urban mobility and logistics and the upscaling of specific measures such as the BiciQui pilot. In Rome, future policy implementation focuses on activating the Logistics Living Lab to support the Rome SULP by scaling innovative solutions like cargo bike rentals initially trialed under MOVE21. The City of Munich's local policy implementation is very much related to the further development of their mobility points and the Munich SUMP. This includes a framework document which provides guidelines for scaling up and implementing bike logistic hubs and mobility points, and strategic guidelines for the Munich FUA that focus on site selection, design standards and operational protocols.

6.2 Achievements related to innovation capacity in the three Living Labs

Unlike most mobility projects, MOVE21 has focused efforts on not only developing new urban mobility and logistics solutions, but also to increase cities' innovation capacity to better equip them to continue work on mobility innovation, also after the project has finished. Thus, achievements related to innovation capacity strengthen long-term impacts in the cities by building and reinforcing specific capabilities. The topic of innovation capacity has also been applied more broadly to all types of complex societal challenges (or so called 'wicked problems') that may encompass mobility as one sector but also involve adjacent sectors.

To address these wicked problems, cities are often in need of developing new ways of working in addition to facilitating innovation, meaning that the cities need to transform their capacities. Innovation capacity is therefore seen as a set of conditions that support innovation or provide a supportive

infrastructure that either allows for innovation to happen or hinders it (D6.7 *MOVE21 guide on improving city's capacities for promoting sustainable mobility and logistics innovation*, 2024). In MOVE21, the Living Lab cities have learnt about and focused on how to articulate barriers that their organisations face in daily work and find ways to overcome them and to develop strategies or suggestions on how to increase the city authorities' innovation capacity and capabilities.

In MOVE21, this work has been organised along the dimensions of leadership, organisation, network, learning and knowledge management. Each Living Lab city has leveraged its strengths and worked on both drivers and hindrances related to innovation capacity.

Oslo has made strides in institutionalising innovation through structured initiatives that facilitate collaboration between public authorities and private stakeholders. Oslo has an established Business for Climate Network, which is a permanent platform for fostering collaboration between public and private entities to drive sustainability-focused innovation. As part of this, the city administration is now setting up a permanent test arena for urban logistics, a testament to the city's new-won priorities on urban logistics and public-private collaboration. The city's value realisation plan also explicitly mentions the need to systematise efforts related to public innovation work and innovation capacity and sets out a range of priorities and measures for the city to work on, encompassing all the dimensions (leadership, organisation, network, learning and knowledge management). In particular, cross-sectoral collaboration across the city administration has proven to be more challenging than anticipated at the start of MOVE21. Revealing such barriers has been valuable for the city, and strengthening Oslo's multi-sectoral collaboration has been a topic in the forthcoming Oslo SUMP. MOVE21 has in many ways made the city administration see the need to establish new partnerships, lines of communication and ways of working. The project has also fostered discussions regarding current regulations and policies as a first step towards more integrated mobility solutions that also take into account innovative measures and co-creation practices to a larger degree.

Gothenburg has made strides in advancing both cross-sectoral collaboration and public-private collaboration. A key structural advancement in Gothenburg has been the establishment of a city-wide Research and Innovation Platform. This platform facilitates collaboration across four urban development administrations, ensuring that innovation is embedded within regular city operations. The city has also created cross-unit knowledge networks to align strategic priorities across departments, improving coordination and knowledge-sharing mechanisms. A true testament to the work on innovation capacity is Gothenburg's embracement of a culture that does not fear risk or failure. An inherent component of all types of innovation work is the possibility of failure. Gothenburg has spearheaded a culture in which failures are seen as important results that are to be merited, celebrated and learnt from. This is one of the most important markers of a culture that is not afraid of innovation work and where employees are allowed and encouraged to test new things in an effort to drive innovation and positive societal changes.

Hamburg has excelled in creating multifunctional neighbourhood hubs which serve as focal points for integrating passenger and freight transport. These hubs facilitate last-mile logistics solutions, reducing congestion and emissions while enhancing mobility efficiency. As part of this work, Hamburg has established a cross-departmental working group focused on sustaining innovation beyond the MOVE21 project. This group ensures that the city's transport and logistics innovations are embedded in municipal operations and not limited to temporary projects. In order to disseminate this more broadly locally, Hamburg has developed a guideline document on multi-functional hubs. This document serves as a reference for district offices and other municipalities, offering insights into best practices and strategies for implementing similar hubs in different urban contexts, including how to best embed innovations into daily operations as well as scaling them.

7 Achievements related to TEN-T corridor level and the new TEN-T regulatory framework

MOVE21 has worked on several fronts to develop both understanding and capabilities in urban nodes on the requirements of the new TEN-T regulation. At the same time, the project has worked on international and EU level to put forward the views, concerns and priorities of cities and urban nodes in an attempt to ensure policy coherence and goal alignment across different levels of government. This work has happened through:

- The Scan-Med Observatory platform established by the project
- The two Urban Nodes Forums that the project has organised, respectively in April 2024 and April 2025
- Various talks given at events organised by the European Commission such as Urban Mobility Days 2023 and the roundtable *Urban Nodes along the trans-European transport network: how can stakeholders work together?* organised by the Schuman School of Regulation at the European University Institute in Florence
- Policy briefs and participation in policy round tables such as the 13th Florence Intermodal Forum: Urban Nodes Along the Trans-European Transport Network
- Participation in the Urban Nodes Alliance

In this work, primary focus has been given to strengthening urban nodes' integration into TEN-T policy but also decision-making and representation. A key here has been the acknowledgement that urban nodes and their governance need democratic legitimacy on local as well as TEN-T corridor level. Key responsible institutions in urban nodes need to determine and propose a multi-level governance structure that would allow for collaboration across governance and institutional boundaries with appropriate and necessary mandates. This structure should be able to negotiate and deliberate on behalf of the given urban node and as such can enjoy democratic legitimacy on local or FUA-level. Democratic legitimacy is also needed at TEN-T corridor level, and urban nodes should be given both agency and representation in TEN-T governance that is not dependent on the benevolence of member states (Ruohonen, 2024). MOVE21 has on this topic advocated for the formal inclusion of urban nodes in the TEN-T corridor governance and working groups.

Additionally, MOVE21 has supported urban nodes on SUMP adoption in line with the requirements in the new TEN-T regulation. Of particular importance has been to support cities and urban nodes in designing SUMPs that address long-distance transport flows, zero emission goals, and urban logistics integration. Central to this has also been the work on developing multimodal hubs for both people and freight, including different types of sustainable first/last mile options. Here, of particular importance is the concrete and tangible work done by the six urban nodes in MOVE21 which in different ways have contributed to considerable advancements on the topic of multimodal hubs in urban nodes. Much of the learning on this topic has been codified and summarised in the SUMP Topic Guide developed as part of MOVE21 (D10.7 *SUMP Topic Guide*, 2025).

A part of this work has also been to look at what types of policy incoherencies currently exist on the topic of TEN-T regulation and urban nodes and how to best bridge these in order to secure greater policy alignment and coherence both vertically across different governance levels and horizontally across different sectors such as for example land use and transport. Work on this has been particularly fruitful in relation to the Urban Nodes Forums but also local workshops in which the project has helped

cities and urban nodes navigate misalignments between urban mobility and spatial planning or between passenger and freight needs.

The Urban Nodes Alliance has particularly focused on the need to provide dedicated funding streams for urban nodes through EU programmes such as CEF, ERDF or the Cohesion Fund. This work will continue also after MOVE21 has ended. In addition, legacy projects that work on capacity building for new urban nodes on SUMPs and other topics will commence. The Baltic Sea Region Urban Mobility Platform project “BSR Urban Mobility” is one such example. It will commence during the summer of 2025 and aims to disseminate SUMP and TEN-T relevant lessons from MOVE21 to urban nodes in the Baltic Sea region.

8 Conclusions

8.1 Recommendations for future projects

On the basis of learning and experiences from MOVE21, some overall recommendations for future projects that focus on urban nodes' topics and different types of integrated transport planning and services are made.

On the topic of urban nodes and the new TEN-T regulation, more focus can be given to further improve and deepen the understanding and support of regional and local dynamics and planning concepts that together can ensure multi-level governance on TEN-T urban nodes level. This is particularly important for the over 300 new urban nodes that received this status in 2024. More specifically it means that actions should be taken to prioritise concrete projects that bring together urban and TEN-T dimensions with the right partners on all relevant governance levels. This can comprise both infrastructure projects but also governance and technology projects.

A large part of this would be to ensure that there is some kind of dedicated funding for urban nodes. Capacity building should also be prioritised, both between urban nodes and across governance levels. This will be particularly important for urban nodes that sit at specific junctions on the TEN-T core network corridors and/or intersect several TEN-T corridors such as in the case of the Metropolitan City of Bologna. Focus should be given to specific measures and infrastructure that can increase multimodality and the use of sustainable modes of transport, such as different types and configurations of mobility hubs and the integration of different modes for more seamless service offers.

On an educational level, MOVE21 has experienced a great interest from universities and educational institutions on the topic of curricula and needed skills for transport and land use planners currently undergoing professional training. The project has identified in particular the need for greater focus on interdisciplinarity and the integration between land use planners and transport planners. This is also true for a deeper integration between different transport modes and domains such as passenger transport and urban logistics. On a methodological level, greater focus should be given to back-casting methodologies and other types of methodologies that do not use forecasting as a starting point for investment decisions. There is also a need for a better understanding and focus on the impacts of new mobility and freight vehicles on overall urban transport system and infrastructure.

Finally, large and important cities in Europe such as those in MOVE21 (Oslo, Gothenburg, Hamburg, Munich, Bologna and Rome) purchase services and goods worth billions of euros every year. Greater focus should be given to how innovative public procurement can be used as a tool to accelerate the twin green and digital transition within urban nodes. In addition, future projects should increasingly delve on how innovative public procurement can be used to build infrastructure and interfaces where local transport systems meet the TEN-T corridor level and critical terminals on the core network. This is a topic with great potential for important work that can drive desired societal changes and market development in the future.

8.2 Main conclusions

MOVE21 has demonstrated that integrated, multimodal urban mobility and logistics solutions are not only feasible but also fit for upscaling and interesting cases for the development of new governance, operational and business models. By placing innovation, co-creation, and policy alignment at its core, the project has created a unique ecosystem of partners and pilot initiatives that address both current urban transport challenges and future resilience needs. MOVE21 partner cities have successfully

tested, adapted, and scaled innovations across technical, social, and governance domains. The project has achieved more than 75 distinct innovations, including multifunctional mobility hubs, new public-private governance models, and integrated digital tools for transport planning and logistics.

One of MOVE21's most notable achievements is in its integration of passenger and freight transport. The project has delivered pilots that tested this integration on vehicle, policy, and governance levels. These pilots highlighted the benefits of shared-use infrastructure, resource efficiency, and reduced emissions, while also uncovering practical barriers such as regulatory fragmentation and operational complexity.

MOVE21 has also substantially influenced local and regional policymaking, triggering updates in comprehensive plans, SUMPs, SULPs, parking policies and land use practices. It empowered city administrations to think systemically, act collaboratively, and institutionalize innovation capacity across departments and sectors. On the European level, MOVE21 contributed meaningfully to the development and implementation of the new TEN-T regulation, advocating for the recognition and empowerment of urban nodes. Through the establishment of the Scan-Med Observatory and strong collaboration with EU institutions and networks, the project has positioned urban nodes as critical enablers of sustainable, multimodal transport on the TEN-T corridors.

MOVE21 serves as a model for how cities can leverage integrated innovation processes to deliver real-world impact—socially, environmentally, and economically – that extend beyond the specific duration and scope of a project. MOVE21 has highlighted the importance of aligning pilots with long-term institutional, policy, and funding frameworks to ensure continuity, scalability and long-term impacts.

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