

First version of validated Business models

Project Deliverable 5.4

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Project Executive Summary

The objective of the SUM project is to transform current mobility networks towards innovative and novel shared mobility systems (NSM) integrated with public transport (PT) in more than 15 European Cities by 2026, reaching 30 by 2030. Intermodality, interconnectivity, sustainability, safety, and resilience are at the core of this innovation. The outcomes of the project offer affordable and reliable solutions considering the needs of all stakeholders such as end users, private companies, public urban authorities.

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Deliverable executive summary

Deliverable 5.4, developed under the leadership of VEDECOM within Work Package 5 (WP5) of the SUM (Seamless Shared Urban Mobility) project, focuses on the design and validation of business activities that reflect the operational, organizational, and governance realities of mobility innovations implemented across nine European Living Labs (Rotterdam, Krakow, Fredrikstad, Jerusalem, Munich, Coimbra, Geneva, Larnaca, and Penteli). Building upon the theoretical and structural foundation established in **Deliverable 5.3**, this report translates the push and pull measures tested in each Living Lab into a set of clearly defined Primary and Supporting Business Activities (BAs) that can be assessed for their ecosystem viability.

The core of **Deliverable 5.4** is a multi-layered analytical framework designed to evaluate business activities from three integrated perspectives: economic, sustainability, and governance and control. This framework ensures a holistic approach to understanding the viability of shared mobility solutions by examining their underlying business logic, value exchange mechanisms, and stakeholder interdependencies. It includes detailed mapping of local stakeholders, analysis of the objectives behind each measure, and the development of a Business Model Canvas for each identified business activity. These canvases explore value propositions, key resources, partners, revenue streams, and cost structures, adapted to the local contexts of each Living Lab. A critical component of this deliverable is the engagement of stakeholders through one-to-one interviews. These interviews were conducted with actors involved in the design, operation, and governance of mobility services in each Living Lab mobility ecosystem, both within and outside the consortium. They aimed to gather insights on roles and responsibilities, organizational commitment to specific business activities, expected outcomes, perceived challenges, and success factors.

In summary, **Deliverable 5.4** provides a practical framework for identifying and validating business activities. It ensures that these activities are grounded in local context and supported by structured stakeholder engagement. The work carried out in this deliverable lays the foundation for an evidence-based assessment of business viability and the development of actionable recommendations for the transferability of successful mobility solutions across urban areas in Europe.

1.1 Key words

Business Activity, Value exchange, Stakeholders engagement, Governance mechanism, Business Viability

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List of abbreviations and acronyms

KPI	Key Performance Indicator
API	Application programming interface
BA	Business Activity
BMC	Business Model Canvas
DRT	Demand Responsive Transport
LL	Living Lab
MaaS	Mobility as a Service
NSM	New Shared Mobility
OEM	Original Equipment Manufacturer
PPP	Public Private Partnership
PT	Public Transport
PTA	Public Transport Association
PTO	Public Transport Operator
SUM	Seamless Shared Urban Mobility
WP	Work Package

2 Introduction

Urban mobility is undergoing a profound transformation, driven by the interplay of technological advancements, infrastructure developments, and policy-regulatory reforms. While mobility systems worldwide are evolving in response to these changes, European countries with well-developed transportation systems and a strong culture of active and smart mobility face opportunities and persistent challenges. Despite such progress, passenger cars still account for more than 80 % (in average) of the total passenger kilometres travelled, highlighting the dominance of car-dependent travel in Europe. This continued car dependency contributes to rising emissions, urban congestion, and inefficiencies, reinforcing the need for more sustainable, multimodal transport frameworks (Eurostat, 2024).

The European Project **SUM** (Seamless Shared Urban Mobility) focuses on enhancing shared mobility competitiveness and increasing its modal share by developing technological, co-creation, and policy tools and solutions to overcome barriers for car-focused individuals and households in urban areas. Accordingly, over the course of the project, **nine Living Labs (LL)** - **Rotterdam, Krakow, Fredriksted, Jerusalem, Munich, Coimbra, Geneva, Larnaca, and Penteli** - are implementing a diverse range of push and pull measures to encourage a modal shift towards sustainable alternatives. The long-term viability of these measures depends on effective stakeholder coordination and the structural integrity of the underlying mobility service business ecosystems in each local context. As a result, **one of the fundamental objectives of Project SUM** is the examination of business structures (leveraging on the experience to be gained from the LLs) which can be transformed into a **viable business operation**. In principle, **Business ecosystem viability**, is defined as the ability of an ecosystem to sustain effective value exchange across interdependent actors, enabling systemic performance, adaptability, and transferability.

2.1 D5.3: Business model decomposition

Guided by insights collected under **Deliverable 5.3**, the ecosystemic business structure perspective is established to explore how to effectively evaluate the innovation in hand (i.e. seamless business structure), how to create viable and sustainable business scenarios for the stakeholders, and how to measure the successful integration and adoption of these innovations in the market. **Deliverable 5.3** enables understanding the **structure**, the **content** and the **governance mechanism** of the ecosystemic business model to investigate. Based on a review of scientific literature and best practices, **Deliverable 5.3** identified **core building blocks** for a viable business operation, adapted to the domain of shared and integrated urban mobility. These building blocks - represented as an **Economic-Oriented Business Reflection** - are categorized under (1) **Value Proposition**, (2) **Value Creation and Delivery** and (3) **Value Capture**. This category is then **extended into 3 additional reflective dimensions** (i.e. Sustainability and Governance), leading to a holistic assessment lens:

1. **Economic-Oriented Business Reflection**
 - Value Proposition: Products & Services, Customer Segments, Customer Relationships
 - Value Creation and Delivery: Key Activities, Key Resources, Key Partners, Channels
 - Value Capture: Cost Structures, Revenue Streams
2. **Sustainability-Oriented Business Reflection**
 - Sustainability values for Customers, Society, and Environment
 - Sustainability values for Technology and Product Features
3. **Governance -Oriented Reflection**
 - Role and Responsibilities of governance and Stakeholder Challenges
4. **Control -Oriented Reflection**
 - Monitoring mechanisms, tools, and control points

This decomposition therefore provides guidance for the development of a framework for assessing **value exchange dynamics** among stakeholders within mobility ecosystems of each LL. Under [Deliverable 5.3](#), to deepen the investigation, an **expert online Interview** was conducted with relevant experts across Europe. The findings from this survey provides critical documentation laying the groundwork for evaluating the viability of the LL's push and pull measures through the lens of business ecosystem in the subsequent phases of the SUM project.

2.2 The objective of Deliverable 5.4

This deliverable was prepared under the leadership of VEDECOM, the partner responsible for coordinating [Work Package 5 \(WP5\)](#). From the outset, VEDECOM established a set of key activities to guide the development of this document, ensuring that it provides robust and actionable framework for the effective identification of content, structure and governance mechanism and stakeholder engagement processes of each LL. In order to maintain consistency with the project's broader framework, the authors drew upon information from other WPs notably **WP1**, **WP2**, **WP3** and **WP4**. Their inputs serve as commentary sources of information to ensure that the proposed methodologies outlined in this deliverable are fully aligned with the project's contractual obligations.

Accordingly, building on the foundational components of the business ecosystem outlined in [Deliverable 5.3](#), the [Deliverable 5.4](#) aims to build a **framework for designing and validating business activities in each LL**. The framework assesses **the value exchange dynamics** among stakeholders **reflecting the Push and Pull measures implemented** across **all nine LL**. These activities are then validated as a basis for assessing their viability (the assessment to be reported in next [Deliverable 5.5](#)) within an ecosystem-based business structure.

Unlike traditional business models built around a single value-creating entity, a viable mobility business ecosystem relies on **inter-organizational collaboration** among **diverse stakeholders**. The preparation of this [Deliverable 5.4](#) was therefore shaped by a **collaborative and consultative process**. Input was actively gathered from all LL partners, stakeholders involved in mobility ecosystem of each LL (outside the consortium) as well as from consortium members involved in related activities. This effort aligns with the WP5.3 objective stated in the Grant Agreement (GA): **“Conducting a workshop with relevant local mobility groups and living labs to foster deeper insights into the implications of each business model for all living labs and stakeholders involved.”**

As a design principle of business viability assessment framework, the co-development of integrated mobility business activities required a thorough understanding of the roles, responsibilities, and capabilities of stakeholders within each LL mobility ecosystem. This required a clear understanding of the **ecosystem's structure**, its functional **content**, and its **governance mechanisms**; as necessary elements defined in [Deliverable 5.3](#). This inclusive approach helps guarantee that the processes described in the document reflect a shared understanding and a coherent vision across the project team.

2.2.1 Workshop Framework: A Two-Stage Engagement Process

To ensure comprehensive and inclusive stakeholder engagement, we implemented a workshop framework structured in two sequential stages. This approach was designed to balance the need for in-depth individual stakeholder insights with the benefits of collective deliberation.

Stage 1 (Deliverable 5.4): Structured One-to-One Stakeholder Interviews: The first stage consisted of a series of one-to-one, semi-structured interviews with stakeholders from diverse sectors (Local and regional authorities, Public Transport Operators, New Shared Mobility provider, and Mobility as a Service providers) involved in the mobility ecosystem of each LL. These interviews were conducted in a **CONFIDENTIAL setting** to **encourage open discussions and to gather detailed opinions that might not be shared in a**

group setting. In total, **45 stakeholders** were interviewed over a three-month period, from January to March 2025.

This phase was **guided by a workshop-based engagement methodology**, ensuring that each interview followed a **consistent thematic framework** (See [Analytical Framework Chapter](#) for details). By doing so, we preserved thematic coherence across sessions while allowing stakeholders the flexibility to articulate business activity (BA) context-specific insights, experiences, concerns, and expectations related to the development and implementation of the business activities presented to them.

Accordingly, for each LL, three main stakeholder groups were identified: **Authorities, PTOs, and NSM providers (Note: User perspective input – as a stakeholder - to be collected from Customer Survey Results from WP4)**. The process was informed not only by the initial insights gathered from LL representatives but also by an **iterative learning approach**, where key findings from each stakeholder interview were fed forward into subsequent sessions. This method enriched the dialogue across interviews and enabled a dynamic understanding of the ecosystem. As a result, the approach allowed for the detailed collection of **individual roles, responsibilities, and expectations**, while also capturing **emerging collective perspectives** on each group's **level of commitment toward specific business activities relevant to their LL context**.

Stage 2 (Deliverable 5.5): Collective Workshop for Hypothesis Validation: The insights gained during the first stage were synthesized and systematically analyzed to extract themes, points of convergence, or divergence across stakeholder groups and reported in this deliverable. These findings now **serve as the foundational input** for the second stage: a group workshop session. This upcoming workshop is designed to:

- Validate the hypotheses underlying each BA by confronting them with collective stakeholder input from Stage 1.
- Present a synthesized view of individual stakeholder positions from Stage 1, including their levels of commitment, perceived value creation, and identified challenges.
- Facilitate collaborative problem-solving, where participants collectively explore actionable strategies to deal with those reported challenges, co-design potential solutions, and define practical pathways toward achieving the viability of each BA.

Through this distributed format, we ensure that all voices are captured—regardless of power dynamics, while also leveraging the benefits of participatory decision-making.

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

This report contributes to WP5 titled **"Impact Assessment, Knowledge Utilization, and Policy Recommendations."** Specifically, it addresses **Task 5.3 "Designing business models to leverage on the experience gained in the living labs"**. The methodological approach used for [Deliverable 5.4](#) is organized into following Chapters:

- **Introduction:** Chapter 2 of [Deliverable 5.4](#) explains the objectives of this report and link with other WPs.
- **Analytical Framework:** Chapter 3 of [Deliverable 5.4](#) introduces the multi-layered methodology developed for the analysis.
- **Design of Business Activities:** Chapter 4 of [Deliverable 5.4](#) describes the push and pull measures implemented in the LLs, the modes and services they integrate, and to define the stakeholder landscape.

HOW: As a starting point, the push and pull measures implemented across the SUM project's LLs are examined. Each measure was analysed in collaboration with local representatives to understand its content, objectives, and the stakeholders involved. Based on this investigation, **10 draft business activities (BAs)** were defined to capture the strategic and operational roles of the measures (categorized into two groups: Primary Business Activities and Supporting Business Activities). **These BAs will be further validated in the following phases of the project through a series of hypothesis-driven evaluations.**

- **Primary Business Activities Per Living Lab:** [Chapter 5](#), [Chapter 6](#), [Chapter 7](#) and [Chapter 8](#) of [Deliverable 5.4](#) reports the input data collected per LL; representing primary business activities per relevant LL. Each BA per LL is explored through their push or pull measures, potential stakeholders to be involved in implementing each BA in long term, and the business model canvas.

HOW: Once the draft list of business activities was established, targeted discussions were held with LLs representatives, city authorities, PTOs and NSM providers to validate their relevance to the measures implemented on the ground. Based on this initial validation, a Business Model Canvas exercise to map the structure and logic of each BA.

- **[The link to Supporting Business Activities:](#)** [Chapter 9](#) of [Deliverable 5.4](#) reports the link between primary business activities and supplementary business activities.
- **[Mobility Ecosystem Stakeholder Engagement – Roles and Responsibilities:](#)** [Chapter 10](#) of [Deliverable 5.4](#) reports the results from on-to-one interviews with potential stakeholders of each LL to understand roles and responsibilities.
- **[Mobility Ecosystem Stakeholder Engagement – Challenges and Factors for Successful Implementation of BAs:](#)** [Chapter 11](#) of [Deliverable 5.4](#) reports the results from on-to-one interviews with potential stakeholders to understand main challenges to implement or promote solutions and factors to enable the successful adoption of those business activities.
- **[Conclusion:](#)** Provides a summary of activities carried out during the course of project under [Deliverable 5.4](#).
- **[Future work:](#)** concludes by outlining the next phases of validation (stakeholder workshops, hypothesis building, KPIs, customer surveys) and how they will be integrated into a final viability assessment framework by the end of project.

2.3.1 Links with other Work Packages/Deliverables

This deliverable as part of **WP5 (Task5.3)** activities is connected to several components of the project and contribute to the overall evaluation strategy. It is directly aligned with **WP1**, which is dedicated to identifying the specific needs of each LL and establishing the corresponding **KPIs**. As the project progresses, these KPIs along with data collected through **user acceptance surveys** conducted by the LLs will be systematically integrated into an **evaluation framework** aimed at assessing the **business viability** of the implemented solutions. In addition, simulation results of selected push and pull measures developed in **WP2** will offer valuable insights into the medium- and long-term potential impacts of these solutions, serving as an additional input for the viability assessment model.

Additionally, **WP5 (Task5.3)** activities are linked to the **WP4** responsible for the **implementation of push and pull measures** across the LLs. At this stage of the project, the LLs are increasingly structured in their approach to deploying these measures and are actively engaged in conducting **customer and citizen surveys** to better understand public perception and acceptance of the tested initiatives. Furthermore, insights from **co-creation** activities carried out in **WP3** will offer valuable perspectives on **user perspective** toward the associated business activities, enriching the overall assessment. The data and insights generated from these activities – ranging from operational KPIs to user feedback – serve as essential inputs for our **multi-layered viability assessment framework**. By incorporating these diverse inputs, WP5 aims to deliver a holistic and evidence-based evaluation of each LL's business activities. **Table 1** provides an overview of the activities conducted as part of the initial **Deliverable 5.3** and outlines the additional activities completed during the development phase of **Deliverable 5.4**.

Table 1 - List of Tasks completed and next Tasks to be completed

Completed Tasks
Deliverable D5.3 (M12) - Ecosystemic business activity context - Best Practice analysis - Defining Business Model Building Blocks - Integrating sustainability Concept into Business activity building blocks - Categorising Building blocks into Economic-, Sustainability- and Governance- and Control-Oriented Business Reflection - Conducting Expert Survey to capture important aspects in value exchange dynamics of seamless and integrated solutions
Deliverable D5.4 (M24) - Define multi-layered analytical process to build foundation for business activities viability assessment - Identification of push and pull measures - Mapping of Stakeholders in each living lab - Definition of global objectives and relation with each push-pull measure - Definition of goals per push and pull measure - Definition of draft business activities (Primary and Supplementary) - Validation of business activities with LLs - Interviews of Stakeholders to capture governance and control dimension - Completion new business model canvas for primary business activities

3 Analytical Framework

The assessment framework of business ecosystem viability across nine LLs was carried out through a **multi-layered analytical process**. This framework integrates insights from business model theory, sustainability concept, governance analysis, and regulatory mechanisms. It comprises **four main layers**:

1. **Economic value chains**, assessing the economic structure of business activities;
2. **Sustainability value chains**, evaluating how ecosystem components contribute to sustainable mobility objectives;
3. **Governance and policy structures**, examining the roles, responsibilities, interests, commitments, capabilities, and value exchange among institutional actors of each LL;
4. **Control and value-enhancing measures**, identifying monitoring mechanisms, regulatory tools, and control points enabling or hindering ecosystem viability of each LL.

These layers are investigated through **3 parallel activities**:

1. Building the foundation of analytical framework begins with understanding the implemented push or pull measures, the objectives and goals of the LLs, and, based on these, to define the business activities guiding the subsequent two analytical framework phases. To support this process, five inputs must be examined:
 - i. Description of push and pull measures
 - ii. Mapping of Stakeholders in each LL
 - iii. Definition of goals per push and pull measure
 - iv. Definition of global objectives
 - v. Definition of draft business activities
2. Building upon the new **business model canvas** model and insights gained from components of business model captured from [Deliverable 5.3](#), economic and sustainability value chains of different business activities are investigated per LL. **Table 2** illustrates the identified building blocks and associated definitions based on which the value chains of business activities are investigated.

Table 2 - Business Model Canvas Building Blocks and Reflection Points

BUSINESS MODEL CANVAS		
Economic-Oriented Business Reflection		
Value Proposition: Products and services that create value for a specific Customer Segment	Products and Services	What bundles of products and/or services are you offering to different Customer Segment?
	Customer Relationships	What type of relationship does each of your Customer Segments expect you to establish and maintain with them?
	Customer Segments	For whom are you creating value?
Value Creation and Delivery: Value that is delivered to the new mobility services or technologies receivers	Key Resources	What Key Resources do your Value Propositions require?
	Key Activities	What Key Activities do your Value Propositions require?
	Channels	Through which Channels are Customer Segments reached?
	Key Partners	Who are your Key Partners? Who are your key suppliers?
Value Capture: Revenues, costs, & expenses that go into profit equation	Cost Structure	What are the most important costs in your business model?
	Revenue Streams	What value are customers willing to pay for?
Sustainability-Oriented Business Reflection		
Sustainability Value	Value for Customers	How does the provision of product or service encourage sustainable choices for customers?
	Value for Environment	How does the product or service reduce environmental impact and support ecological sustainability?
	Value for Society	How does product or service contribute to social sustainability and well-being?
	Value from Technology	How does the technology behind this product or service support sustainability?

3. In parallel, **governance and policy structures** as well as **control and value-enhancing measures** are investigated through series of **one-to-one interviews** with all stakeholders involved in the mobility ecosystem of each LL. **Figure 1** provides an overview of the flyer distributed to stakeholders for the mobility business ecosystem interviews, while **Table 3** details the set of questions addressed during these interviews.



Figure 1 - Overview of Flyer Distributed to Stakeholders for the Mobility Business Ecosystem Assessment in Each Living Lab

The interview framework is organized into three main parts:

1. **Role and Influence within the Mobility Ecosystem** – identifying the stakeholder's position, responsibilities, and influence within the design, operation, and governance of the local mobility ecosystem.
2. **Business Activity (BA) Analysis** – for each of the identified business activities, stakeholders are asked to provide insights on their **commitments, challenges, expected outcomes, citizen engagement efforts, and perceived success factors**.
3. **Perceived Importance of Objectives and Activities** – stakeholders are invited to assess the **importance of each overarching objective** of the SUM project and the **relevance of each BA** from their perspective.

Note: Primary outputs include detailed information on roles and responsibilities, implementation challenges, and perceived success factors for each BA. These findings are reported in **Deliverable 5.4**, while other collected inputs—such as **citizen engagement efforts, commitment levels and importance rankings**—are integrated into the **viability model** for the final evaluation (**Deliverable 5.5**).

This integration is essential, as these inputs will be combined with other data sources collected throughout the project, including:

- **Customer surveys and user acceptance studies**, which incorporate the perspectives of users and citizens to enrich the mobility ecosystem analysis;
- **Key performance indicators (KPIs)**, which capture and translate qualitative insights into measurable outcomes;
- **Weighting indices**, which are required for the WP5 analysis and rely on stakeholder-defined **commitment levels** and **importance levels** to evaluate the viability and performance of different business activities.

Together, these elements contribute to a comprehensive stakeholder-informed assessment of the ecosystem viability in each LL.

Table 3 - Interview Question Template for Stakeholder Assessment of Mobility Business Ecosystem

Date and time of call:	
Interviewee(s) case	
LL representative	
LL Interview Organization	
i. Role and influence within the mobility ecosystem	
• Brief introduction of role and organization of the interviewee(s) • How are mobility initiatives administered in your city? • (If public/private entity) Who are actors responsible for and where do you stand: ➢ Regulation ➢ Policies ➢ Incentives ➢ Deployment of new services ➢ Financial Aids and Investments ➢ Integration with other services ➢ Ticketing and Pricing ➢ Data exchange, Open data platform ➢ Promotion of related services i.e. booking, ticketing, etc. ➢ Coordination among Public and Private sectors • How do you engage citizens in defining/implementing your policies/initiatives? • What role do shared mobility or MaaS play in the city's SUMP? (<i>Priority, Moderately Important, Less Important</i>)	
2. For each Business Activity	
• On a scale of 1-5 (5 being the most), how committed is your organisation to promote/be engaged in this BA? • What outcomes do you want to achieve? • How do you involve/coordinate with different stakeholders in the development of such BA? • What do you see as the main challenges or critical decisions when deciding to promote or implement or get engaged in this BA? • What makes such a successful business activity?	
3.1. According to your organization's role and responsibilities, could you please score (0-100) the importance of following objectives?	
Reduction of Congestion, Reduction of Emission, Noise Hinderance, Improve Accessibility, Improve Mobility Service, Improve Multimodality, Improve Safety, Improve Public Transport	
3.2. For each relevant Business Activity, how effective do you believe the Push and Pull measures are in achieving their objectives?	
Not effective at all, Slightly effective, Moderately effective, Quite effective, Extremely effective	

4 Design of Business Activities

4.1 LL Push and Pull Measures

To understand the foundation of business activities within the SUM project, it is essential to first examine the specific implemented push and pull measures. **Table 4** presents a comprehensive list of 20 push-pull measures identified across the LLs. While some measures are implemented directly within the geographic scope of the LLs, others are applied at the broader city level but still could influence or complement the LL context.

Table 4 - List of Push-Pull Measures identified across the cities and Living Labs

Push/pull measures introduced in the Living Labs
PUSH INTERVENTIONS
Congestion charges
Parking charges
Restricted parking
Limited traffic zone / Pedestrianization of streets
Parking supply management
Speed limits
PULL INTERVENTIONS
Mobility hubs
Scheduling integration in MaaS services
Ticketing integration in MaaS services
Improved NSM infrastructure, e.g. bike lanes & "park & ride"
On demand vehicle sharing action plan
Nudging (gamification or rewards)
Dynamic pricing of NSM
Improved information about the availability of shared modes
Introduction of new NSM services (ex. bike-sharing)
Introduction of new PT infrastructures/lines (ex. e-buses, LRT)
Streets retrofitting/introduction of priority lanes
Dedicated parking spaces for carsharing/micromobility
Widening PT geographical area
Central PT planning and construction program

4.2 Stakeholder Mapping

Stakeholder mapping is a systematic, participatory process aimed at identifying all relevant individuals, groups, and institutions that should be involved in setting up, promoting, and implementing, relevant business activities. The expert survey results in **Deliverable 5.3** revealed varying perceptions of the importance and effectiveness of involving different stakeholders in implementing viable, seamless shared urban mobility business operations. According to the data, **mobility service providers** are considered the most critical, with 80% of experts highlighting their role. Other stakeholders include **governmental and regulatory bodies** (64.2%), **users** (65.8%), **infrastructure providers** (48.3%), **public transport associations** (PTA) (46.7%), and **data providers** (28.3%). Based on these insights, stakeholders within the mobility ecosystem are

categorized according to their functional roles. This classification leads to the identification of five core stakeholder groups:

1. Public Authorities (Municipalities, regional authorities, ministries and public transport authorities and providers)
2. Public Transport Operators (i.e. PTOs and PTAs)
3. Shared Mobility Providers (i.e. shared mobility service providers, micro-mobility service providers)
4. Digital Solution Providers (i.e. digital infrastructure providers, data providers, MaaS providers)
5. Academic and research institutions
6. Users and Citizens

Stakeholder mapping is not only about identifying who is currently involved, but also about recognizing what roles and responsibilities they play within the mobility ecosystem of each LL. It should be noted that the mapping process in SUM is iterative and evolving. The process began by identifying potential stakeholders who could benefit from the promotion of each push or pull measure implemented in each LL. This early exercise allowed us to identify main stakeholders as a baseline. Beyond identification, later on in collaboration with LL representatives, series of stakeholders within different sectors of mobility ecosystem are selected for one-to-one interviews to assess each actor's role and responsibilities and their point of view regarding each BA being implemented in their respective LLs. This helps identify challenges, and successful factors to achieve viable BA per point of view for each stakeholder category.

4.3 SUM Global Objectives

The **global objective** of SUM is to contribute to the **mobility transformation in European Cities** towards **new shared mobility modes integrated with PT**, which are **innovative, intermodal, interconnected, greener, safer, more resilient**, and **replicable**, while ensuring their **affordability** and reliability for the benefits of end users, as well as their **financial viability** for the benefit of European companies' **competitiveness**. To guide this transformation, the implemented push and pull measures are mapped against a set of **eight global goals**. Each LL targets a relevant subset of these goals, depending on its specific objectives and local context:

1. Reduction of Congestion
2. Reduction of Emissions
3. Reduction of Noise
4. Improvement of Accessibility
5. Improvement of Mobility Services
6. Enhancement of Multimodality
7. Improvement of Safety
8. Public Transport Improvement

4.4 Business Activities

A structured mapping exercise was conducted to identify the emerging business activities that are being supported or enabled through this push and pull measures. From this analysis, ten distinct Business Activities (BAs) were derived and categorized into two groups: **Primary Business Activities** and **Supporting Business Activities (Table 5)**. The Primary BAs represent the core strategic domains around which new mobility services and operational models are being structured. The remaining six supporting BAs complement and reinforce the viability and success of the primary domains.

Table 5 - List of identified potential primary and supplementary business activities across Living Labs

#	Primary Business Activities	Living Labs
BA1	Integrated Mobility Service Platform (MaaS)	Penteli, Geneva, Larnaca, Rotterdam, Coimbra
BA2	Demand-Responsive and On-Demand Mobility	Krakow, Coimbra, Geneva, Jerusalem
BA3	Mobility Hub Development	Geneva, Fredrikstad, Penteli, Coimbra
BA4	Integration of New Shared Mobility into Ecosystem	Penteli, Larnaca, Fredrikstad
#	Supporting Business Activities	Living Labs
BA5	Active Mobility Promotion	Penteli, Jerusalem, Coimbra
BA6	Incentive-Based Programs	Penteli, Geneva, Larnaca, Fredrikstad
BA7	Public Engagement and Awareness Initiatives	Fredrikstad
BA8	Enhanced Data Collection and Analysis	Fredrikstad
BA9	Electric and Low-Emission Infrastructure Expansion	Penteli, Geneva, Jerusalem
BA10	PT Scheduling and Frequency Optimization	Penteli, Larnaca

In the following **Sections**, each of the four **Primary Business Activities** is examined in detail with respect to the specific local context, and governance environments of each LL. This analysis focuses on how these core business activities are developed or tested locally and how they reflect unique challenges and opportunities across different urban settings.

5 BA1. Integrated Mobility Service Platform (MaaS)

General Concept: An Integrated Mobility Service Platform, commonly referred to as Mobility as a Service (MaaS), is a digital solution aggregating multiple transport modes into a single, user-friendly interface, offering unified and simplified access to diverse mobility services. In the European context, MaaS as a seamless and user-centric, intelligent mobility management and distribution system (Polydoropoulou et al., 2020), primarily focuses on integrating passenger mobility options through various pricing models. A defining feature of MaaS is its role as an intermediary; collaborating with transport providers to repackage and resell travel services as integrated, bundled offerings (Shaheen and Cohen, 2020). The platform enables users to seamlessly plan, book, and pay for their journeys through one application, enhancing convenience and promoting multimodal travel. MaaS appears to be a way to initiate a much-needed modal shift and to decarbonize transport, by simplifying and widening access to alternatives to private vehicles.

SUM Context: Within the SUM project, 5 LLs are actively developing, enhancing or deploying MaaS platforms adapted to their local contexts, goals, and mobility challenges. While LLs share the common objective of improving multimodal integration and enhancing user experience, each focuses on distinct priorities shaped by its specific mobility ecosystem and user needs. The success of these efforts therefore relies on leveraging the local context to design business operations that are both viable for stakeholders and adaptable to the evolving needs of cities and users. Table 6 presents the list of LLs implementing MaaS-related business activities.

Table 6 - Living Labs Implementing BA1 (Integrated Mobility Service Platform - MaaS)

BA/Living Labs	Munich	Geneva	Jerusalem	Penteli	Rotterdam	Krakow	Fredrikstad	Larnaca	Coimbra
BA1		✓		✓	✓			✓	✓

5.1 Geneva Living Lab

5.1.1 Description of Geneva Business Activity 1

The Geneva LL is focused on promoting seamless intermodal travel by encouraging the use of sustainable transport modes. The city is enhancing a **MaaS platform** that integrates **bundle ticketing options** and **real-time digital information** to simplify and **optimise trip scheduling and planning for users**. Under project SUM, the initiative aims to reduce congestion, emission and increase the accessibility, attractiveness and convenience of **combining existing PT with bike-sharing services**. **Table 7** describes implemented pull measures, expected goals, and expected contribution to global objectives in the LL's mobility ecosystem.

Table 7 – Geneva: Pull Measures reflecting BA1 (Integrated Mobility Service Platform – MaaS), Expected Goals, and Contribution to Global Objectives

BA1. Integrated Mobility Service Platform (MaaS)								
Pull Measure: MaaS Platform (Scheduling and Ticketing integration)								
Expected Goals - Optimize combined use of PT and NSM - Foster intermodal trips using sustainable modes with bundle tickets and digital support								
Contribution to SUM Global Objectives	YES	YES	NO	YES	YES	YES	NO	NO
Legend								
Reduction of Congestion	Reduction of Noise							
Reduction of Emissions	Improvement of Accessibility							
Enhancement of Multimodality	Improvement of Mobility Services							
Improvement of Safety	Public Transport Improvement							

5.1.2 Potential Stakeholders

Table 8 describes potential stakeholders in the LL's mobility ecosystem.

Table 8 – Geneva: Potential Stakeholders in the Mobility Ecosystem Related to Pull Measures for BA1 (Integrated Mobility Service Platform – MaaS)

BA1. Integrated Mobility Service Platform (MaaS)		
Pull Measure: MaaS Platform		
LL Potential Ecosystem Stakeholders	Residents	Geneva
	MaaS	TPG
	Authority	Great Geneva Region, Genevois français
	NSM	Donkey Republic (Bike-sharing), TCS Carvélo (Cargo bike), Hé !Léman (Carpooling)
	PTO	TPG, CFF, SNCF

5.1.3 Geneva Business Model Canvas

The business model canvas for the measure developed in Geneva is displayed in **Table 9**.

Table 9 – Geneva: Business Model Canvas for BA1 (Integrated Mobility Service Platform – MaaS)

BUSINESS MODEL CANVAS		
Economic-Oriented Business Reflection		
Value Proposition	Products and Services	- Transport mode integration Service Type: Bundle for PT and bike-sharing services with optimized pricing, scheduling and ticketing 24/7 availability
	Customer Relationships	- Easy to use apps - Convenient travel for users Special offers and rewards: Potentially 20% discount on a subscription to bike sharing service
	Customer Segments	End users: local users for business, leisure and commuting (including users with additional mobility needs), Visitors - PT passengers Shared mobility users: Bike-sharing - Support local authorities to deploy a successful seamless shared mobility solution scheme
Value Creation and Delivery	Key Resources	Technological platform: MaaS - API - Computing hardware - Digital payment systems - User data
	Key Activities	- Data analytics and data provision - Software and hardware maintenance - Customer support and Marketing - IT platform development + API development - Service & content development - Ticketing and Payment transaction - Revenue sharing
	Channels	- Website - Customer service and customer surveys - Invitation codes - Social media and blogs - Emails
	Key Partners	- MaaS Providers (e.g. tpg) - Organizers of collective transport - Shared mobility NSM providers (e.g. donkey republic) - Information technology providers - PTOs (e.g. tpg) - Private transport operators - Regional government (e.g. Geneva Canton Region) (Inter-) National government
Value Capture	Cost Structure	Platform maintenance and IT infrastructure
	Revenue Streams	Transport tickets sell
Sustainability-Oriented Business Reflection		
Sustainability Value	Value for Customers	- Incentivized to choose eco-friendly transport modes - Offer benefits for choosing sustainable options
	Value for Environment	- Prioritize integrating low-emission or zero-emission vehicles - Features to promote shared rides - Reducing the number of single-occupancy vehicles
	Value for Society	- Help alleviate traffic congestion and pollution - Contribute to a healthier society by promoting active and PT modes - Promoting a Cooperative mechanism rather than competitive
	Value from Technology	- Enhanced data driven mobility platform - Optimised and efficient service provision

5.2 Penteli Living Lab

5.2.1 Description of Penteli Business Activity 1

In the Penteli LL, the focus is on **promoting intermodal travel** through the integration of shared mobility solutions. As part of the SUM project, the city is working with FREENOW (i.e. ride-hailing taxi service provider) to **establish a MaaS platform connecting ride-hailing services with the interface of the AMCO app** (owned by Municipality of Penteli operating bike-sharing service), **enabling users to combine bike-sharing with existing taxi (i.e. ride-hailing) services**. The overall goal is to reduce congestion and improve accessibility, multimodality, attractiveness, and convenience by offering seamless connections between cycling, and ride-hailing options. **Table 10** describes pull measures, expected goals, and expected contribution of MaaS BA in the LL.

Table 10 – Penteli: Pull Measure reflecting BA1 (Integrated Mobility Service Platform – MaaS), Expected Goals, and Contribution to Global Objectives

BA1. Integrated Mobility Service Platform (MaaS)								
Pull Measure: MaaS Platform								
Expected Goals								
- Enhancement of smart and digital transport infrastructure - Development of a seamless urban mobility system								
Contribution to SUM Global Objectives	YES	NO	NO	YES	YES	YES	NO	YES
Legend								
Reduction of Congestion	Reduction of Noise							
Reduction of Emissions	Improvement of Accessibility							
Enhancement of Multimodality	Improvement of Mobility Services							
Improvement of Safety	Public Transport Improvement							

5.2.2 Potential Stakeholders

Table 11 describes potential stakeholders in the LL's mobility ecosystem.

Table 11 – Penteli: Potential Stakeholders in the Mobility Ecosystem Related to Pull Measures for BA1 (Integrated Mobility Service Platform – MaaS)

BA1. Integrated Mobility Service Platform (MaaS)		
Pull Measure: MaaS Platform – NSM and PT Integration		
LL Potential Ecosystem Stakeholders	Residents	Penteli
	MaaS	FREENOW
	Municipality	e-bike sharing, bus services
	NSM	AMCO (Bike-sharing)
	PTO	OASA at regional level
	Research	NTUA

5.2.3 Penteli Business Model Canvas

The business model canvas for the measure developed in Penteli is displayed in **Table 12**.

Table 12 – Penteli: Business Model Canvas for BA1 (Integrated Mobility Service Platform – MaaS)

BUSINESS MODEL CANVAS		
Economic-Oriented Business Reflection		
Value Proposition	Products and Services	- Service integration and 24/7 availability - Optimized synchronized services (shared vs PT) - Penteli's bikes integration into FREENOW app - A CRM campaign to users in the area of Penteli to inform them about the bikes and how to use them
	Customer Relationships	- Service centre and Community platform for users & inhabitants - Easy to use apps and Convenient travel - Inviting friend options with Community ecosystem - Special offers and rewards - Help desks: Mail Contact
	Customer Segments	- End users: local users for business, leisure and commuting (including users with additional mobility needs), visitors - Shared mobility users
Value Creation and Delivery	Key Resources	- Technological platform, User & driver apps - API and Computing hardware - Routing and matching algorithms, Digital payment systems - User data along with other data such as weather, etc. - Data analytic tools and Knowledge management system - Vehicles, and charging infrastructure - Human resources
	Key Activities	- Data analytics and provision, Real-time information provision - Software and hardware maintenance and Quality control - Integration of other MaaS/or/NSM providers - IT platform development + API development - Dynamic information provision - Booking, Ticketing and Payment transaction - Revenue sharing
	Channels	- Website and Mobile application (App store, Google Play) - Customer service and customer surveys - Social media and blogs, Emails and Newsletter
	Key Partners	- Universities and Researchers - Suppliers, manufacturers, Transport infrastructure providers - Municipalities and Local authorities - MaaS Providers and NSM providers - PTOs and Private transport operators
Value Capture	Cost Structure	- Platform maintenance and IT infrastructure - Operational costs and Infrastructure costs - R & D Costs and Intellectual properties - Salaries and personnel cost and Insurance - Customer service costs
	Revenue Streams	- Pricing mechanism: Subscription fee (monthly, hourly, km) - Fares (At first, this service will be free)
Sustainability-Oriented Business Reflection		
Sustainability Value	Value for Customers	- Incentivized to choose and combine eco-friendly modes - Inform customers about environmental impact of their choices - Offer benefits for choosing sustainable options
	Value for Environment	- Prioritize integrating low-emission or zero-emission vehicles - Features to promote shared rides - Reducing single-occupancy vehicles & increase active modes
	Value for Society	- Support access to sustainable transport options for all groups - Help alleviate traffic congestion and pollution - Contribute to a healthier society; promoting active & PT modes - Help cultivate an alternative mobility culture
	Value from Technology	- Data used to optimize resource allocation, reducing unnecessary energy consumption - Mechanisms for continuous improvement to make the product or service increasingly sustainable over time - Simple while valuable product

5.3 Rotterdam Living Lab

5.3.1 Description of Rotterdam Business Activity 1

Rotterdam LL is advancing MaaS development by leveraging technologies from the SUM project to support travelers in making informed mobility decisions and improving accessibility for all. The MaaS application will integrate various services to create a user-friendly platform. A key technical component under development is a **prediction model and Application Programming Interface (API)**, currently being developed in collaboration with research and technology providers, to enhance real-time decision-making capabilities. Service integration includes **RET ticketing, direct access to customer support, and an FAQ section** to facilitate ease of use. Personalization features allow users to create RET accounts and set preferences such as favorite stops or preferred travel modes. The platform will integrate **existing PT options** available, along with real-time location and availability data from shared mobility providers including **bikes and e-mopeds**, further promoting inter-modality and flexibility in urban travel. **Table 13** describes implemented pull measures, expected goals, and expected contribution to global objectives in the LL's mobility ecosystem.

Table 13 – Rotterdam: Pull Measure reflecting BA1 (Integrated Mobility Service Platform – MaaS), Expected Goals, and Contribution to Global Objectives

BA1. Integrated Mobility Service Platform (MaaS)								
Pull Measure: MaaS Platform								
Expected Goals								
- Lower barrier for combining Shared mobility with PT - Enhance multimodality - Better alternative for private car - Higher use of PT								
Contribution to SUM Global Objectives								
	YES	YES	NO	YES	YES	YES	NO	YES
Legend								
Reduction of Congestion			Reduction of Noise					
Reduction of Emissions			Improvement of Accessibility					
Enhancement of Multimodality			Improvement of Mobility Services					
Improvement of Safety			Public Transport Improvement					

5.3.2 Potential Stakeholders

Table 14 describes potential stakeholders in the LL's mobility ecosystem.

Table 14 – Rotterdam: Potential Stakeholders in the Mobility Ecosystem Related to Pull Measures for BA1 (Integrated Mobility Service Platform – MaaS)

BA1. Integrated Mobility Service Platform (MaaS)		
Pull Measure: MaaS Platform		
LL Potential Ecosystem Stakeholders	Residents	Rotterdam
	MaaS	Umob, Gaiyo (Private) + 9292 (Public service), NS (National railways), RET APP (SUM MaaS), Glimble, Tranzer
	Municipality	Rotterdam
	NSM	CHECK, Felyx, Lime, BAQME
	PTO	RET
	Technology	Siemens, Infoplaza
	Research	DU Delft

5.3.3 Rotterdam Business Model Canvas

The business model canvas for the measure developed in Rotterdam is displayed in **Table 15**.

Table 15 – Rotterdam: Business Model Canvas for BA1 (Integrated Mobility Service Platform – MaaS)

BUSINESS MODEL CANVAS		
Economic-Oriented Business Reflection		
Value Proposition	Products and Services	- Service integration – RET tickets and direct links to our customer service and FAQ - Personalisation – optional to create a RET account and set travel preferences like favourite stops, travel method etc. - Transport mode integration – all PT in the Netherlands + locations/availability of 3-5 NSM providers - Type of sharing – Bikes and e-mopeds - Service area – Greater Rotterdam
	Customer Relationships	- Service centres – 3 RET shops on strategic locations - Online and Telephone customer service - Easy to use apps and website - Convenient travel - Special offers and rewards (Voucher option in the app)
	Customer Segments	- Local users for business, leisure and commuting, visitors - PT and NSM users - First and last mile demands
Value Creation and Delivery	Key Resources	- Technological platform and API - Routing and matching algorithms and Journey planner - Digital payment systems - User data (+ weather, etc.) with Data analytic tools - Vehicles and Transport infrastructure - Human resources
	Key Activities	- Data analytics, provision & real time information provision - Software and hardware maintenance - Integration of other MaaS/or/NSM providers - Customer support and Marketing - IT platform development + API development - Service & content development - Trip planning, routing, booking, ticketing and payment - Revenue sharing
	Channels	- Website and Mobile application - Customer service and customer surveys - App store, Google Play with Invitation codes - Social media and blogs, Emails and Newsletter
	Key Partners	- Municipalities and Local authorities - MaaS Providers, Shared mobility NSM providers - Related Technology Providers (Charging, EV, AV, etc) - Business Partners including owners of parking lots, shopping malls, airports, and other places where bikes can park - IT providers and Transport infrastructure providers - PTOs and Private transport operators - Local, Regional and National government
Value Capture	Cost Structure	- Platform maintenance and IT infrastructure - Investment costs, Operational costs, Infrastructure costs - Customer service costs
	Revenue Streams	- Pricing mechanism: Subscription fee (monthly, hourly, km) - Fares, and brokerage fees or service fees
Sustainability-Oriented Business Reflection		
Sustainability Value	Value for Customers	- Enabled to choose eco-friendly transport modes - Inform customers about environmental impact of their choices - Perceived benefits for choosing sustainable options
	Value for Environment	- Facilitate integrating low-emission or zero-emission vehicles - Measures to promote shared rides
	Value for Society	- Support equitable access to sustainable transport options - Help to alleviate traffic congestion and pollution
	Value from Technology	- Enable efficient routing to reduce consumption - Can be used to optimize resource allocation, reducing emissions

5.4 Larnaca Living Lab

5.4.1 Description of Larnaca Business Activity 1

The Larnaca LL is dedicated to promoting seamless intermodal travel by encouraging the adoption of sustainable transport modes. **The city's multimodal digital platform, the PAME app, currently provides real-time bus arrival information and journey planning features.** The application is being enhanced to **include shared bike booking** (offered by NEXTBIKE), supporting a more connected and sustainable mobility experience. To support these efforts, the platform is being upgraded in coordination with local stakeholders: the MaaS service is managed by the Larnaca public transport operator (LPT), and user needs and travel behavior are being monitored to inform design decisions. Additionally, journey data collected through the app will be used to evaluate usage patterns and the effectiveness of the initiative. **Table 16** describes implemented pull measures, expected goals, and expected contribution to global objectives in the LL's mobility ecosystem.

Table 16 – Larnaca: Pull Measure reflecting BA1 (Integrated Mobility Service Platform – MaaS), Expected Goals, and Contribution to Global Objectives

BA1. Integrated Mobility Service Platform (MaaS)								
Pull Measure: MaaS Platform – NSM and PT Integration								
Expected Goals - Integration Netxtbike/Tier1 in PAME Application - Increase convenience: by creating seamless transitions between bus and Netxtbike/Tier1 services - Enhance accessibility Locate bike options right at bus stops or hubs to make transfers easy - Improve user experience: Make the integrated service faster, cheaper, and reliable than driving. - Promote sustainable behaviour: Frame combo service as modern, green, and socially responsible.								
Contribution to SUM Global Objectives	YES	YES	NO	YES	YES	YES	NO	NO
Legend								
Reduction of Congestion	Reduction of Noise							
Reduction of Emissions	Improvement of Accessibility							
Enhancement of Multimodality	Improvement of Mobility Services							
Improvement of Safety	Public Transport Improvement							

5.4.2 Potential Stakeholders

Table 17 describes potential stakeholders in the LL's mobility ecosystem.

Table 17 – Larnaca: Potential Stakeholders in the Mobility Ecosystem Related to Pull Measures for BA1 (Integrated Mobility Service Platform – MaaS)

BA1. Integrated Mobility Service Platform (MaaS)		
Pull Measure: MaaS Platform – NSM and PT Integration		
LL Potential Ecosystem Stakeholders	Residents	Larnaca
	MaaS	Moovit, PANGO, CON
	Municipality	Larnaca
	NSM	NextBike, Rightnow
	PTO	LPT

5.4.3 Larnaca Business Model Canvas

The business model canvas for the measure developed in Larnaca is displayed in **Table 18**.

Table 18 – Larnaca: Business Model Canvas for BA1 (Integrated Mobility Service Platform – MaaS)

BUSINESS MODEL CANVAS		
Economic-Oriented Business Reflection		
Value Proposition	Products and Services	- Service integration and Personalisation of PAME app - Transport mode integration and data analytics - End to end seamless MaaS system - Increased coverage of transport modes due to multimodality - Optimized pricing and ticketing and synchronized services
	Customer Relationships	- Service centres, 24/7 online and Telephone customer service - Easy to use apps and Convenient travel - Community ecosystem with special offers and rewards - Help desks: Hotline and Mail Contact
	Customer Segments	- Users for business, leisure and commuting, visitors - PT passengers and shared mobility users - Support local authorities to deploy seamless NSM scheme
Value Creation and Delivery	Key Resources	- User and driver apps with API and computing hardware - Routing and matching algorithms and journey planner - Digital payment systems, user data and data analytic tools - Transport infrastructure - Human resources
	Key Activities	- Data analytics, Software & hardware maintenance - Real-time information provision - Integration of other MaaS/or/NSM providers - Customer support and marketing and Quality control - Lobbying - IT platform, API development, content development - Trip planning and routing, fleet management, optimisation - Booking, Ticketing and Payment transaction
	Channels	- Website and Mobile application - Customer service, surveys and social media and blogs - Emails and Newsletter
	Key Partners	- Universities and Researchers - Suppliers and manufacturers and software vendors - Municipalities, Local authorities, MaaS, and NSM providers - Vehicle service technicians and IT providers and OEMs - PTOs, Transport infrastructure providers - Local, regional, and national government and road authorities - Investors, banks, venture capitalists & insurance companies
Value Capture	Cost Structure	- Platform maintenance and IT infrastructure - Investment and operational costs - Fee to access the MaaS platform - R & D Costs and Intellectual properties - Infrastructure costs, salaries, personnel cost and insurance - Customer service costs, Marketing and management costs
	Revenue Streams	Pricing mechanism: Subscription fee (monthly, hourly, km)
Sustainability-Oriented Business Reflection		
Sustainability Value	Value for Customers	- Incentivized to choose eco-friendly transport modes - Inform customers about environmental impact of choices - Offer benefits for choosing sustainable options
	Value for Environment	- Prioritize integrating low-emission or zero-emission vehicles - Minimize overall carbon footprint - Features to promote shared rides - Reducing single-occupancy vehicles
	Value for Society	- Support equitable access to sustainable transport options - Alleviate traffic congestion and pollution - Healthier society by promoting active modes
	Value from Technology	- Enable efficient routing to reduce consumption and emissions - Data used to optimize resource allocation

5.5 Coimbra Living Lab

5.5.1 Description of Coimbra Business Activity 1

Coimbra LL is advancing MaaS development by integration of new and shared mobility into PT ticketing systems. Currently, Coimbra **offers real-time information at bus stops** and is connected to travel planning services (e.g., Moovit). Coimbra's urban center is served with significantly frequent services, with buses running every 10 mins and linking several areas of the city. The goals of this BA are to **manage integrated booking services, while minimizing the user cost and waiting time**, and therefore managing the resources necessary to promote seamless mobility solution. By targeting elderly people in this initiative, the pull measure will introduce a call center that is able to support information excluded users. **Table 19** describes implemented pull measures, expected goals, and expected contribution to global objectives in the LL's mobility ecosystem.

Table 19 – Coimbra: Pull Measure reflecting BA1 (Integrated Mobility Service Platform – MaaS), Expected Goals, and Contribution to Global Objectives

BA1. Integrated Mobility Service Platform (MaaS)								
Pull Measure: MaaS Platform								
Expected Goals								
- Management of bookings - Management of resources - Minimizing costs and waiting times - Ask from the Operator to share								
Contribution to SUM Global Objectives								
	YES	YES	NO	YES	YES	YES	NO	YES
Legend								
Reduction of Congestion			Reduction of Noise					
Reduction of Emissions			Improvement of Accessibility					
Enhancement of Multimodality			Improvement of Mobility Services					
Improvement of Safety			Public Transport Improvement					

5.5.2 Potential Stakeholders

Table 20 describes potential stakeholders in the LL's mobility ecosystem.

Table 20 – Coimbra: Potential Stakeholders in the Mobility Ecosystem Related to Pull Measures for BA1 (Integrated Mobility Service Platform – MaaS)

BA1. Integrated Mobility Service Platform (MaaS)		
Pull Measure: MaaS Platform		
LL Potential Ecosystem Stakeholders	Residents	Coimbra
	MaaS	Moovit
	Municipality/Authority	Coimbra, OPT – Optimização e Planeamento de Transportes
	NSM	SMTUC
	PTO	SMTUC

5.5.3 Coimbra Business Model Canvas

The business model canvas for the measure developed in Coimbra is displayed in **Table 21**.

Table 21 – Coimbra: Business Model Canvas for BA1 (Integrated Mobility Service Platform – MaaS)

BUSINESS MODEL CANVAS		
Economic-Oriented Business Reflection		
Value Proposition	Products and Services	- Service integration - Personalisation - Data analytics 24/7 availability - Optimized synchronized services (shared vs PT)
	Customer Relationships	- Service centres 24/7 online and Telephone customer service - Easy to use apps - Convenient travel - Inviting friend options - Community ecosystem - Special offers and rewards - Help desks: Hotline and Mail Contact
	Customer Segments	- PT passengers - First and last mile demands - Support local authorities to deploy a successful seamless shared mobility solution scheme
Value Creation and Delivery	Key Resources	- Technological platform - User & driver apps - Routing and matching algorithms - Journey planner - User data
	Key Activities	- IT platform development + API development - Trip planning and routing - Booking - Fleet management, optimisation
	Channels	- Website - Mobile application - Customer service and customer surveys - Social media and blogs
	Key Partners	- Information technology providers - PTO
Value Capture	Cost Structure	- Platform maintenance and IT infrastructure - Investment costs - Operational costs - Salaries and personnel cost and Insurance - Customer service costs
	Revenue Streams	Fares
Sustainability-Oriented Business Reflection		
Sustainability Value	Value for Customers	Offer benefits for choosing sustainable options
	Value for Environment	- Prioritize integrating low-emission or zero-emission vehicles - Minimize its overall carbon footprint
	Value for Society	- Support equitable access to sustainable transport options for all social groups - Help alleviate traffic congestion and pollution
	Value from Technology	- Enable efficient routing to reduce fuel consumption and emissions - Data used to optimize resource allocation, reducing unnecessary energy consumption - Mechanisms for continuous improvement to make the product or service increasingly sustainable over time

6 BA2. Demand-Responsive and On-Demand Mobility (DRT)

General Concept: Demand-Responsive Transport (DRT) is a flexible mobility solution dynamically adjusting its route and/or schedules in response to user demands. It is increasingly recognized as an effective option for bridging first and last mile gaps, often integrated with PT networks to support multimodal travel (Krell and Hunkin, 2024). By linking passengers to mobility hubs or transfer hubs, DRT enables efficient transfers to conventional PT or NSM services.

SUM Context: Within the SUM project, 4 LLs are actively developing/enhancing/deploying demand responsive transport systems adapted to their local contexts, goals, and mobility challenges. While all LLs aim to improve multimodal integration and user experience, each tailors its approach to local priorities and mobility needs. **Table 22** presents the list of LLs implementing DRT-related business activities.

Table 22 – Living Labs Implementing BA2 (Demand-Responsive and On-Demand Mobility – DRT)

BA/Living Labs	Munich	Geneva	Jerusalem	Penteli	Rotterdam	Krakow	Fredrikstad	Larnaca	Coimbra
BA2		✓	✓			✓	✓		✓

Note: For the LL in **Fredrikstad**, while stakeholder interviews have been completed, we have not yet received sufficient input on the **business aspects**, **operational goals**, and **clear objectives** related to the primary business activities, Demand-Responsive Transport (DRT). As a result, the evaluation of Fredrikstad's contribution to these business activities remains incomplete. The current results are therefore **preliminary** and will be **complemented and finalized** in upcoming deliverables as additional information becomes available.

6.1 Geneva Living Lab

6.1.1 Description of Geneva Business Activity 2

The Geneva LL focuses on developing an **integrated on-demand mobility solution**. This BA aims to **optimize the combined use of PT and NSM services** by delivering on-demand services **for both people and goods**. It seeks to coordinate the existing on-demand transport service (tpgFlex) with a new goods transportation service. The main objectives include increasing user satisfaction, accessibility, boosting the modal share of alternatives to private cars with improving multimodality, and reducing perceived travel time. **Table 23** outlines the implemented pull measure, main expected outcome, relevant stakeholders, and the anticipated contribution of the DRT BA to the LL's mobility ecosystem.

Table 23 - Geneva: Pull Measure reflecting BA2 (Demand-Responsive and On-Demand Mobility - DRT), Expected Goals, and Contribution to Global Objectives

BA2. Demand-Responsive and On-Demand Mobility								
Pull Measure: Integrate on-demand mobility								
Expected Goals Optimize use of PT								
Contribution to SUM Global Objectives	NO	NO	NO	YES	YES	YES	NO	NO
Legend								
Reduction of Congestion			Reduction of Noise					
Reduction of Emissions			Improvement of Accessibility					
Enhancement of Multimodality			Improvement of Mobility Services					
Improvement of Safety			Public Transport Improvement					

6.1.2 Potential Stakeholders

Table 24 describes potential stakeholders in the LL's mobility ecosystem.

Table 24 - Geneva: Potential Stakeholders in the Mobility Ecosystem Related to Pull Measures for BA2 (Demand-Responsive and On-Demand Mobility - DRT)

BA2. Demand-Responsive and On-Demand Mobility		
Pull Measure: Integrate on-demand mobility		
LL Potential Ecosystem Stakeholders	Residents	Geneva
	Authority	Great Geneva Region
	PTO	TPG

6.1.3 Geneva Business Model Canvas

The business model canvas for the measure developed in Geneva is displayed in **Table 25**.

Table 25 - Geneva: Business Model Canvas for BA2 (Demand-Responsive and On-Demand Mobility - DRT)

BUSINESS MODEL CANVAS		
Economic-Oriented Business Reflection		
Value Proposition	Products and Services	- Type of sharing: DRT - Vehicle in MaaS Platform
	Customer Relationships	- Community platform for users and inhabitants - Easy to use apps - Convenient travel - Help desks: Hotline and Mail Contact
	Customer Segments	- End users: local users for business, leisure and commuting (including users with additional mobility needs), visitors - PT passengers - First and last mile demands
Value Creation and Delivery	Key Resources	- Technological platform - User & driver apps - API and Computing hardware - Routing and matching algorithms and Journey planner - Digital payment systems - User data and Data analytic tools - Vehicles and Transport infrastructure - Human resources
	Key Activities	- Data analytics and Data provision - Software and hardware maintenance - Real-time information provision - Integration of other MaaS/or/NSM providers - Customer support and Marketing - Lobbying - IT platform development + API development - Dynamic information provision, Trip planning and routing - Booking, Ticketing and Payment transaction - Fleet management, optimisation
	Channels	- Website and Mobile application - Customer service and customer surveys - App store, Google Play - Social media and blogs and Emails
	Key Partners	- Suppliers and manufacturers - Municipalities and Local authorities - MaaS Providers - Organizers of collective transport - Related Technology Providers (Charging, EV, AV, Sensors, etc) - Vehicle service technicians and Information technology providers - PTOs and Road authorities - Local, Regional and National government
Value Capture	Cost Structure	- Platform maintenance and IT infrastructure - Investment and Operational costs - Fee to access the MaaS platform - R & D Costs and Intellectual properties - Infrastructure costs and Customer service costs
	Revenue Streams	- Pricing mechanism: Subscription fee (monthly, hourly, km) - Fares
Sustainability-Oriented Business Reflection		
Sustainability Value	Value for Customers	Incentivized to choose eco-friendly transport modes
	Value for Environment	Features to promote shared rides, reducing the number of single-occupancy vehicles
	Value for Society	- Support equitable access to sustainable transport options for all social groups - Help alleviate traffic congestion and pollution - Contribute to a healthier society by promoting active and PT modes
	Value from Technology	On demand people transportation with electric vehicles

6.2 Jersusalem Living Lab

6.2.1 Description of Jerusalem Business Activity 2

The Jerusalem LL focuses on **introducing ride-pooling services** in the Yuvalim-Ganim area. This solution is a **demand-responsive mobility service designed to maximize vehicle occupancy** by dynamically matching passengers with similar routes. Unlike traditional public DRT systems, it takes a more commercially oriented approach. The BA aims to **expand the range of flexible transport options** available to residents, thereby **increasing PT usage** and **attracting new users**. **Table 26** outlines the implemented pull measure, main expected outcome, and the anticipated contribution of the DRT BA to the LL's mobility ecosystem.

Table 26 - Jerusalem: Pull Measure reflecting BA2 (Demand-Responsive and On-Demand Mobility - DRT), Expected Goals, and Contribution to Global Objectives

BA2. Demand-Responsive and On-Demand Mobility								
Pull Measure: Ride Pooling								
Expected Goals								
- Increase PT usage, - Decrease car dependency								
Contribution to SUM Global Objectives	YES	YES	NO	YES	YES	YES	NO	NO
Legend								
Reduction of Congestion	Reduction of Noise							
Reduction of Emissions	Improvement of Accessibility							
Enhancement of Multimodality	Improvement of Mobility Services							
Improvement of Safety	Public Transport Improvement							

6.2.2 Potential Stakeholders

Table 26 describes potential stakeholders in the LL's mobility ecosystem.

Table 27 - Jerusalem: Potential Stakeholders in the Mobility Ecosystem Related to Pull Measures for BA2 (Demand-Responsive and On-Demand Mobility - DRT)

BA2. Demand-Responsive and On-Demand Mobility		
Pull Measure: Ride Pooling		
LL Potential Ecosystem Stakeholders	Residents	Jerusalem
	Municipality/Authority	Jerusalem, JTMT, Ministry of Transportation
	Research	TAU, Sigma6

6.2.3 Jerusalem Business Model Canvas

The business model canvas for the measure developed in Jerusalem is displayed in **Table 28**.

Table 28 - Jerusalem: Business Model Canvas for BA2 (Demand-Responsive and On-Demand Mobility - DRT)

BUSINESS MODEL CANVAS		
Economic-Oriented Business Reflection		
Value Proposition	Products and Services	- Service integration, Personalisation and Transport mode integration - Type of sharing (ridepooling) - Service area (Yuvalim-Ganim) - Data analytics (performance management) - Increased coverage of transport modes due to multimodality and increased convenience - Vehicle in MaaS Platform (e.g. Moovit) - Optimized pricing and ticketing - Optimized synchronized services (shared vs PT)
	Customer Relationships	- Service centres (operating agency) - Easy to use apps and Convenient travel (e.g. Moovit) - Inviting friend options - Help desks: Hotline and Mail Contact (by operating agency)
	Customer Segments	- End users: local users for business, leisure and commuting (including users with additional mobility needs), visitors - PT passengers and NSM users - First and last mile demands - Support local authorities to deploy a successful seamless NSM scheme - Support city traffic managers to operate integrated multimodal management scheme - Customer type (smart & basic phone users) - Spatial dimension (to/from LL)
Value Creation and Delivery	Key Resources	- Technological platform (e.g. Via) - User & driver apps (e.g. Moovit) - Routing and matching algorithms (by platform provider) - Journey planner (by App) - Digital payment systems (by App) - User data and Data analytic tools - Vehicles and Transport infrastructure - Users
	Key Activities	- Data analytics, Data provision and Quality control - Real-time information provision (via App) - Lobbying - Fleet management, optimisation
	Channels	- Website and Mobile application - Customer service and customer surveys - App store, Google Play and Invitation codes - Social media and blogs, Emails and Newsletter
	Key Partners	- Universities and Researchers - Municipalities and Local authorities - MaaS Provider, collective transport and PTOs - Shared mobility NSM providers - Local and National government
Value Capture	Cost Structure	- Investment costs and Operational costs - Salaries and Personnel cost and Insurance
	Revenue Streams	Fares and Government subsidy
Sustainability-Oriented Business Reflection		
Sustainability Value	Value for Customers	Incentivized to choose eco-friendly transport modes
	Value for Environment	Features to promote shared rides, reducing the number of single-occupancy vehicles and integrating with PT
	Value for Society	- Support equitable access to sustainable options for all social groups - Help alleviate traffic congestion and pollution - Contribute to a healthier society by promoting active and PT modes - Promoting a Cooperative mechanism (with PT) rather than competitive
	Value from Technology	Moves private car trips to shared mobility and PT.

6.3 Krakow Living Lab

6.3.1 Description of Krakow Business Activity 2

The Krakow LL focuses on developing an **integrated van demand-responsive mobility solution**. This BA aims to enhance accessibility to PT by introducing a flexible van-based on-demand service, ultimately encouraging greater use of existing PT and reducing reliance on private cars. The objectives include improving accessibility, particularly for citizens and students, enhancing multimodality, and supporting a long-term goal of achieving a 50% modal shift from private vehicles to these new integrated services. **Table 29** outlines the implemented pull measure, main expected outcome, and the anticipated contribution of the DRT BA to the LL's mobility ecosystem.

Table 29 - Krakow: Pull Measure reflecting BA2 (Demand-Responsive and On-Demand Mobility - DRT), Expected Goals, and Contribution to Global Objectives

BA2. Demand-Responsive and On-Demand Mobility								
Pull Measure: New Demand-Responsive Transport Service								
Expected Goals								
- Introduce new Van responsive mobility to improve accessibility to PT services. - Increase PT usage - Decrease car dependency by providing alternative mode of transport to citizens, commuters & students. - Targeting users of services 50% shift from cars to on demand service								
Contribution to SUM Global Objectives	YES	YES	NO	YES	YES	YES	YES	YES
Legend								
Reduction of Congestion	Reduction of Noise							
Reduction of Emissions	Improvement of Accessibility							
Enhancement of Multimodality	Improvement of Mobility Services							
Improvement of Safety	Public Transport Improvement							

6.3.2 Potential Stakeholders

Table 30 describes potential stakeholders in the LL's mobility ecosystem.

Table 30 - Krakow: Potential Stakeholders in the Mobility Ecosystem Related to Pull Measures for BA2 (Demand-Responsive and On-Demand Mobility - DRT)

BA2. Demand-Responsive and On-Demand Mobility		
Pull Measure: New Demand-Responsive Transport Service		
LL Potential Ecosystem Stakeholders	Residents	Krakow
	Technology	ZF
	PTO	ZTP

6.3.3 Krakow Business Model Canvas

The business model canvas for the measure developed in Krakow is displayed in **Table 31**.

Table 31 - Krakow: Business Model Canvas for BA2 (Demand-Responsive and On-Demand Mobility - DRT)

BUSINESS MODEL CANVAS		
Economic-Oriented Business Reflection		
Value Proposition	Products and Services	- Service integration, Personalisation and Transport mode integration - Type of sharing (ride-pooling) - Service area (Skotniki) - Data analytics (access to travel data) - Increased coverage of transport modes due to multimodality and increased convenience - Additional vehicle equipment (child safety seats)
	Customer Relationships	- Easy to use apps and Convenient travel - Help desks: Hotline and Mail Contact
	Customer Segments	- End users: local users for business, leisure and commuting (including users with additional mobility needs), visitors - PT passengers and Shared mobility users - First and last mile demands - Customer type (all mobile phone users)
Value Creation and Delivery	Key Resources	- Technological platform, API and Computing hardware - User & driver apps - Routing and matching algorithms and Journey planner - Digital payment systems - User data and Data analytic tools - Vehicles and Transport infrastructure - Refuelling/charging infrastructure - Human resources and Knowledge management system
	Key Activities	- Data analytics and Data provision - Software and hardware maintenance - Real-time information provision and Dynamic information provision - Customer support and Marketing - IT platform development + API development - Trip planning and routing and Booking, Fleet management, optimisation
	Channels	- Website and Mobile application - Customer service and customer surveys - App store, Google Play - Social media and blogs and Emails
	Key Partners	- Universities and Researchers - Local authorities and Organizers of collective transport - MaaS Providers (in future) and Software Vendors - Shared mobility NSM providers - Related Technology Providers (Charging, etc) (in further development) - Business Partners including owners of parking lots, airports, where bikes can park or be returned (where virtual stops are implemented) - PTOs and Private transport operators - Regional government
Value Capture	Cost Structure	- Platform maintenance and IT infrastructure - Investment costs and Operational costs - Salaries and Personnel cost and Insurance
	Revenue Streams	Fares (the same like in PT)
Sustainability-Oriented Business Reflection		
Sustainability Value	Value for Customers	Incentivized to choose eco-friendly transport modes
	Value for Environment	- Prioritize integrating low-emission or zero-emission vehicles? (in future - when service will be developed) - Minimize its overall carbon footprint - Features to promote shared rides, reducing the number of single-occupancy vehicles
	Value for Society	- Support equitable access to sustainable options for all social groups - Help alleviate traffic congestion and pollution
	Value from Technology	- Enable efficient routing to reduce fuel consumption and emissions - Mechanisms for continuous improvement to make the product or service increasingly sustainable over time

6.4 Fredrikstad Living Lab

6.4.1 Description of Fredrikstad Business Activity 2

The Fredrikstad LL focuses on improving the city's waterborne transport system by piloting demand responsive ferry services and enhancing integration with broader PT. This includes the development of **on-demand ferry solutions** using mobile apps, tactile tools, and sensors to better meet passenger needs and support a shift from car use to sustainable transport modes. A component is the **testing of smart signage systems** at ferry stops and onboard vessels, aimed at improving passenger communication and navigation. The objectives of this activity include improving ferry responsiveness, promoting modal shift, advancing active mobility data collection, and supporting autonomous transport innovation. This description reflects the current state of activities, as the **business model canvas is still under development** and final goals and KPIs are yet to be confirmed.

6.5 Coimbra Living Lab

6.5.1 Description of Coimbra Business Activity 2

The Coimbra LL focuses on developing integrated on-demand transport services for peripheral areas of the city. This BA aims to introduce flexible, demand-responsive mobility solutions to serve as first- and last-mile access (using Mini buses) to existing PT services. The approach is to operate regular service during peak time with fixed routes and schedules and an on-demand service during off-peak time. The demand-responsive service requires booking in advance through either online platform or city's service centres. Reservations are possible to be made up to 24 hours before the trip scheduled. The objectives include optimizing resource utilization, reducing operational costs, and attracting new users through the flexibility offered by on-demand services. **Table 32** outlines the implemented pull measure, main expected outcome, and the anticipated contribution of the DRT BA to the LL's mobility ecosystem.

Table 32 - Coimbra: Pull Measure reflecting BA2 (Demand-Responsive and On-Demand Mobility - DRT), Expected Goals, and Contribution to Global Objectives

BA2. Demand-Responsive and On-Demand Mobility								
Pull Measure: On-demand transport services in peripheral area providing first/last-mile access to Public Transport								
Expected Goals • Optimization of resources • Reduction of costs • Improvement of attractiveness for new users • Ask from the Operator to share • Comparison with what we had before new On demand service								
Contribution to SUM Global Objectives	YES	YES	NO	YES	YES	YES	YES	YES
Legend								
Reduction of Congestion	Reduction of Noise							
Reduction of Emissions	Improvement of Accessibility							
Enhancement of Multimodality	Improvement of Mobility Services							
Improvement of Safety	Public Transport Improvement							

6.5.2 Potential Stakeholders

Table 33 describes potential stakeholders in the LL's mobility ecosystem.

Table 33 - Coimbra: Potential Stakeholders in the Mobility Ecosystem Related to Pull Measures for BA2 (Demand-Responsive and On-Demand Mobility - DRT)

BA2. Demand-Responsive and On-Demand Mobility		
Pull Measure: On-demand transport services in peripheral area providing first/last-mile access to the Public Transport		
LL Potential Ecosystem Stakeholders	Residents	Coimbra
	NSM	SMTUC
	Municipality/Authority	Coimbra, OPT - Optimização e Planeamento de Transportes
	PTO	SMTUC

6.5.3 Coimbra Business Model Canvas

The business model canvas for the measure developed in Coimbra is displayed in **Table 34**.

Table 34 - Coimbra: Business Model Canvas for BA2 (Demand-Responsive and On-Demand Mobility - DRT)

BUSINESS MODEL CANVAS		
Economic-Oriented Business Reflection		
Value Proposition	Products and Services	- Service integration (On demand service (mini bus) with PT) - Transport mode integration (PT service enhancement) - Increased coverage of transport modes due to multimodality and increased convenience - Optimized synchronized services (shared vs PT) - Additional vehicle equipment
	Customer Relationships	- Service centres at peripheral area 24/7 online and Telephone customer service - Easy to use apps - Help desks: Hotline and Mail Contact
	Customer Segments	- PT passengers - First and last mile demands - Support local authorities to deploy a successful seamless shared mobility solution scheme
Value Creation and Delivery	Key Resources	- Vehicles - Transport infrastructure - Human resources - Users
	Key Activities	- Trip planning and routing - Booking - Ticketing and Payment transaction - Fleet management, optimisation
	Channels	- Website - Mobile application - Customer service and customer surveys - Social media and blogs
	Key Partners	- Municipalities - Local authorities - Information technology providers - PTOs
Value Capture	Cost Structure	- Investment costs - Operational costs - Infrastructure costs - Salaries and Personnel cost and Insurance
	Revenue Streams	Fares
Sustainability-Oriented Business Reflection		
Sustainability Value	Value for Customers	Offer benefits for choosing sustainable options
	Value for Environment	- Prioritize integrating low-emission or zero-emission vehicles - Minimize its overall carbon footprint - Features to promote shared rides, reducing the number of single-occupancy vehicles
	Value for Society	- Support equitable access to sustainable transport options for all social groups - Help alleviate traffic congestion and pollution - Contribute to a healthier society by promoting active and PT modes - Promoting a Cooperative mechanism rather than competitive
	Value from Technology	- Enable efficient routing to reduce fuel consumption and emissions - Data used to optimize resource allocation, reducing unnecessary energy consumption - Mechanisms for continuous improvement to make the product or service increasingly sustainable over time

7 BA3. Mobility Hub Development

General Concept: A mobility hub is a strategically located space where multiple transportation modes such as PT, bike-sharing, car-sharing, trams, metro, and other shared or electric mobility services and infrastructures (e.g. charging stations, docking stations, etc) are co-located and integrated (Aydin et al., 2022; Rongen et al., 2022). By prioritizing shared and sustainable transport over private car use, mobility hubs help reduce greenhouse gas emissions and promote broader socio-economic benefits through improved accessibility and inclusivity. Main features of a mobility hub include the physical integration of various mobility services to support intermodal travel, the redesign of surrounding public spaces to reduce the dominance of private vehicles and enhance walkability, and a strong visual and digital identity that connects each hub to a wider network.

SUM Context: In European mobility context, the development of mobility hubs has become an important element within Sustainable Urban Mobility Plans (SUMP). Within the SUM project, **4 LLs** are actively developing mobility hubs adapted to their local contexts, and mobility challenges. Two essential components underpin this development. First, the **structural dimension** involving the network of stakeholders, resources, and cooperation mechanisms. This includes municipalities and regional governments, their administrative and, PT authorities, and shared mobility service providers. Second, the **policy instrument dimension** refers to the set of governance tools available to local and regional authorities to influence mobility behavior and guide infrastructure development. These tools include **pricing schemes, parking regulations, land acquisition strategies, creation of visual and digital identity** and also **contract models** that can require NSM service providers to integrate their services into mobility hubs. **Table 35** presents the list of LLs implementing mobility hub.

Table 35 - Living Labs Implementing BA3 (Mobility Hub Development)

BA/Living Labs	Munich	Geneva	Jerusalem	Penteli	Rotterdam	Krakow	Fredrikstad	Larnaca	Coimbra
BA3		✓		✓			✓		✓

Note: For the **Fredrikstad** LL, while stakeholder interviews have been completed, we have not yet received sufficient input on the **business aspects, operational goals, and clear objectives** related to the primary business activities, Mobility Hub Development. As a result, the evaluation of Fredrikstad's contribution to these business activities remains incomplete. The current results are therefore **preliminary** and will be **complemented and finalized** in upcoming deliverables as additional information becomes available.

7.1 Geneva Living Lab

7.1.1 Description of Geneva Business Activity 3

The Geneva LL is focused on developing mobility hubs to promote intermodal travel and strengthen the integration of sustainable transport services. The goal is to design hubs that are tailored to the local context and contribute to a strong sense of place and identity. A main aspect of this initiative involves forming commercial partnerships with various sustainable transport operators, whose integration into the hubs is seen as a primary driver of success. In particular, the goal for the Geneva LL is to expand the **availability and visibility of shared and active mobility services**, improve **user experience** through such transfer points, reduce user **perceived travel time**, and ultimately **increase the attractiveness** and usage of alternatives to private car travel such as **bike-sharing, carpooling, tram, bus** and other NSM infrastructure providers offering both physical and digital solutions. The activity also aims **to boost the usage ratio of shared bikes**. In parallel, the activity aims to **assess space use and user interaction with physical infrastructure** of mobility hubs, evaluating **accessibility** for active modes, and identifying **potential new functions for the hub space**. **Table 36** describes implemented pull measures, expected goals, and expected contribution to global objectives in the LL's mobility ecosystem.

Table 36 - Geneva: Pull Measure reflecting BA3 (Mobility Hub Development), Expected Goals, and Contribution to Global Objectives

BA3. Mobility Hub Development								
Pull Measure: Mobility hub								
Expected Goals								
- Enhance NSM/PT use - Reduce modal share of private car								
Contribution to SUM Global Objectives								
	YES	YES	YES	YES	YES	YES	NO	NO
Legend								
Reduction of Congestion				Reduction of Noise				
Reduction of Emissions				Improvement of Accessibility				
Enhancement of Multimodality				Improvement of Mobility Services				
Improvement of Safety				Public Transport Improvement				

7.1.2 Geneva Stakeholders

Table 37 describes potential stakeholders in the LL's mobility ecosystem.

Table 37 - Geneva: Potential Stakeholders in the Mobility Ecosystem Related to Pull Measures for BA3 (Mobility Hub Development)

BA3. Mobility Hub Development		
Pull Measure: Mobility Hub		
LL Potential Ecosystem Stakeholders	Residents	Geneva
	PTO	TPG, CFF, SNCF
	Region	Great Geneva Region
	NSM	Donkey Republic (Bike-sharing), TCS Carvélo (Cargo-bike), Hé !Léman (Carpooling)

7.1.3 Geneva Business Model Canvas

The business model canvas for the measure developed in Geneva is displayed in **Table 38**.

Table 38 - Geneva: Business Model Canvas for BA3 (Mobility Hub Development)

BUSINESS MODEL CANVAS		
Economic-Oriented Business Reflection		
Value Proposition	Products and Services	- Service integration and Transport mode integration - Type of sharing: Bike-sharing, Carpooling, Tram, Bus - Service area: Multiple - Increased coverage of transport modes due to multimodality and increased convenience - Options of renting vehicles - To improve the quality of city life, reduce Traffic Congestion - To provide healthy transport and accessible means of transport
	Customer Relationships	- Easy to use apps - Convenient travel
	Customer Segments	- End users: local users for business, leisure and commuting (including users with additional mobility needs), visitors - PT passengers - Shared mobility users - First and last mile demands - Support local authorities to deploy a successful seamless shared mobility solution scheme - Support city traffic managers to operate an integrated multimodal management scheme
Value Creation and Delivery	Key Resources	- Equipment - User data - Land
	Key Activities	- Data analytics and Data provision - Lobbying - Service & content development - Fleet management, optimisation
	Channels	- Website - Mobile application - Customer service and customer surveys
	Key Partners	- Municipalities and Local authorities - Organizers of collective transport - Shared mobility NSM providers (e.g. Donkey republic) - Related Technology Providers (Charging, EV, AV, Sensors, etc) - Business Partners including owners of parking lots, shopping malls, airports, and other places where bikes can park or be returned - Information technology providers - PTO (e.g. tpg) and Private transport operators - Local, Regional and (Inter-) National government
Value Capture	Cost Structure	- Investment costs - Operational costs
	Revenue Streams	- The end user doesn't pay for the infrastructure and human resources - The land owner will eventually rent the infrastructure and finance operational costs.
Sustainability-Oriented Business Reflection		
Sustainability Value	Value for Customers	- Ease accessibility to sustainable modes - Incentivized to choose eco-friendly transport modes - Offer benefits for choosing sustainable options
	Value for Environment	Features to promote shared rides, reducing the number of single-occupancy vehicles
	Value for Society	- Support equitable access to sustainable transport options for all groups - Help alleviate traffic congestion and pollution - Contribute to a healthier society by promoting active and PT modes
	Value from Technology	Product easy to maintain and recycle

7.2 Penteli Living Lab

7.2.1 Description of Penteli Business Activity 3

The Penteli LL focuses on developing a central mobility hub to support intermodal travel and improve the integration of both public and shared transport services. The hub will bring together a mix of mobility options, including **local and metropolitan public buses**, **ride-hailing services**, **e-bike-sharing**, and **e-scooter-sharing**, providing users with more flexible and accessible transport choices. To better understand user interaction and demand, trackable QR codes will be introduced at the hub which will allow for the **monitoring of user interactions and visibility** of the hub. The main objectives of this activity include **reducing door-to-door travel time** for multimodal trips, decreasing **perceived travel time** through seamless service integration, and **increasing user satisfaction** by enhancing the experience of switching between modes. In parallel, the LL will analyse **user interaction with the hub's physical infrastructure**, evaluate accessibility for active modes, and explore potential new uses of the space to improve functionality and impact. **Table 39** outlines the implemented pull measure, expected goals, and expected contribution to global objectives in the LL's mobility ecosystem.

Table 39 - Penteli: Pull Measure reflecting BA3 (Mobility Hub Development), Expected Goals, and Contribution to Global Objectives

BA3. Mobility Hub Development								
Pull Measure: Sustainable mobility hubs (PT, e-bikes, taxis)								
Expected Goals								
- Develop seamless urban mobility system - Sustainable mode Promotion								
Contribution to SUM Global Objectives								
	YES	YES	NO	YES	YES	YES	NO	NO
Legend								
Reduction of Congestion			Reduction of Noise					
Reduction of Emissions			Improvement of Accessibility					
Enhancement of Multimodality			Improvement of Mobility Services					
Improvement of Safety			Public Transport Improvement					

7.2.2 Penteli Stakeholders

Table 40 describes potential stakeholders in the LL's mobility ecosystem.

Table 40 - Penteli: Potential Stakeholders in the Mobility Ecosystem Related to Pull Measures for BA3 (Mobility Hub Development)

BA3. Mobility Hub Development		
Pull Measure: Sustainable mobility hubs (PT, e-bikes, taxis)		
LL Potential Ecosystem Stakeholders	Residents	Penteli
	PTO	OASA
	Municipality	Penteli, e-bike sharing, bus services
	NSM	AMCO (Bike-sharing), FREENOW (Taxi Ridehailing)

7.2.3 Penteli Business Model Canvas

The business model canvas for the measure developed in Penteli is displayed in **Table 41**.

Table 41 - Penteli: Business Model Canvas for BA3 (Mobility Hub Development)

BUSINESS MODEL CANVAS		
Economic-Oriented Business Reflection		
Value Proposition	Products and Services	- Service integration and Transport mode integration - Type of sharing: local and metropolitan public buses, ride-hailing services, e-bike-sharing, and e-scooter-sharing - Service area: local Penteli area - Data analytics: user satisfaction, interaction with hub, travel time 24/7 availability - Optimized synchronized services (shared vs PT)
	Customer Relationships	- Automated Services, Communities, Co-creation - Convenient travel and improved visibility of hubs - Community ecosystem
	Customer Segments	- End users: local users for business, leisure and commuting (including users with additional mobility needs), visitors - PT passengers - Shared mobility users (e-bike-sharing, e-scooter sharing, ride-hailing) - First and last mile demands - Support local authorities to deploy a successful seamless shared mobility solution scheme
Value Creation and Delivery	Key Resources	- User & driver apps - Data analytic tools and Knowledge management system - Vehicles - PT service (local and metropolitan) - Transport infrastructure - Bikes charging infrastructure
	Key Activities	- Data analytics and Data provision - Real-time information provision - Integration of other MaaS/or/NSM providers - Fleet management - Central provision of info about multimodal transport options
	Channels	- Website, Customer service and customer surveys - Social media and blogs - Emails and Newsletter
	Key Partners	- Universities and Researchers - Municipalities and Local authorities - Organizers of collective transport and Shared mobility NSM providers - PTO and Private transport operators - Transport infrastructure providers - Local government
Value Capture	Cost Structure	Establishment and maintenance costs
	Revenue Streams	Free service
Sustainability-Oriented Business Reflection		
Sustainability Value	Value for Customers	- Incentivized to choose and combine eco-friendly transport modes - Offer sustainable and efficient transport options
	Value for Environment	- Prioritize integrating low-emission or zero-emission vehicles - Minimize its overall carbon footprint - Features to promote shared rides, reducing the number of single-occupancy vehicles - Increase active modes
	Value for Society	- Support equitable access to sustainable transport options for all social groups - Help alleviate traffic congestion and pollution - Contribute to a healthier society by promoting active and PT modes - Promoting a Cooperative mechanism rather than competitive
	Value from Technology	- After its installation, the hub requires only minor maintenance - No energy consumption

7.3 Coimbra Living Lab

7.3.1 Description of Coimbra Business Activity 3

The Coimbra LL is considering the development of a mobility hub to improve accessibility and strengthen intermodal connections. **While the municipality has not yet finalized the approach for implementing the hub**, the current strategy prioritizes the **stabilization of the on-demand transport system** as a first step. Once the service is operating reliably, efforts will shift toward **improving pedestrian infrastructure and developing the mobility hub**. The main objectives of this activity include enhancing **accessibility** to transport services, **reducing waiting times**, and improving the overall comfort and security of **multimodal journeys for users**. **Table 42** outlines the implemented pull measure, expected goals, and the potential contribution of the mobility hub activity to the Coimbra LL's overall mobility ecosystem.

Table 42 - Coimbra: Pull Measure reflecting BA3 (Mobility Hub Development), Expected Goals, and Contribution to Global Objectives

BA3. Mobility Hub Development								
Pull Measure: Implementation and/or improvement of sidewalks and mobility hubs								
Expected Goals - Improvement of accessibility - Improvement of waiting time - Improvement of comfort - Improvement of security								
Contribution to SUM Global Objectives								
	NO	NO	NO	YES	YES	YES	YES	NO
Legend								
Reduction of Congestion			Reduction of Noise					
Reduction of Emissions			Improvement of Accessibility					
Enhancement of Multimodality			Improvement of Mobility Services					
Improvement of Safety			Public Transport Improvement					

7.3.2 Coimbra Stakeholders

Table 43 describes potential stakeholders in the LL's mobility ecosystem.

Table 43 - Coimbra: Potential Stakeholders in the Mobility Ecosystem Related to Pull Measures for BA3 (Mobility Hub Development)

BA3. Mobility Hub Development		
Pull Measure: Implementation and/or improvement of sidewalks and mobility hubs		
LL Potential Ecosystem Stakeholders	Residents	Coimbra
	NSM	<Under Evaluation by Local Authorities>
	Municipality	Coimbra

7.3.3 Coimbra Business Model Canvas

The business model canvas for the measure developed in Coimbra is displayed in **Table 44**.

Table 44 - Coimbra: Business Model Canvas for BA3 (Mobility Hub Development)

BUSINESS MODEL CANVAS		
Economic-Oriented Business Reflection		
Value Proposition	Products and Services	Interface where users can access to NSM and PT services
	Customer Relationships	- Convenient travel - Community ecosystem
	Customer Segments	- PT passengers - First and last mile demands - Support local authorities to deploy a successful seamless shared mobility solution scheme
Value Creation and Delivery	Key Resources	Transport infrastructure
	Key Activities	Improvement of infrastructure related to public transportation
	Channels	- Website - Mobile application - Customer service and customer surveys - Social media and blogs
	Key Partners	- Suppliers and manufacturers - Municipalities - Local authorities
Value Capture	Cost Structure	Infrastructure costs
	Revenue Streams	Fares
Sustainability-Oriented Business Reflection		
Sustainability Value	Value for Customers	Offer benefits for choosing sustainable options
	Value for Environment	Features to promote shared rides, reducing the number of single-occupancy vehicles
	Value for Society	- Support equitable access to sustainable transport options for all social groups - Contribute to a healthier society by promoting active modes
	Value from Technology	Mechanisms for continuous improvement to make the product or service increasingly sustainable over time

8 BA4. Integration of New Shared Mobility into Ecosystem

General Concept: Shared mobility typically refers to services like bike-sharing, e-scooters sharing, and ride-hailing platforms where users can access services from a shared fleet for short trips. These services can be integrated with PT to create a more connected, multimodal system. Such integration has the potential to enhance sustainability by offering alternatives to private car use. Shared mobility's actual sustainability benefits depend on how well it supports PT use (Luo et al., 2023). A well-integrated multimodal system can improve access to all solutions and encourage people to shift away from their private cars. However, the presence of shared mobility services in cities alone doesn't guarantee positive outcomes; its effectiveness depends on thoughtful planning and integration with the existing transport network.

SUM Context: Within the SUM project, 4 LLs are actively developing/promoting different types of new share mobility solutions and integrating with conventional PT services (fixed routes and DRT) adapted to their local contexts, and mobility needs. This development is supported by two main dimensions:

- **First, the structural dimension** refers to the organizational setup and collaborative framework that supports these initiatives. It includes the network of involved stakeholders such as municipalities, regional governments, PT authorities, PTOs and NSM providers as well as the resources and cooperation mechanisms that connect them.
- **Second, the policy instruments dimension** encompasses the governance tools available to local and regional authorities to shape mobility behavior and infrastructure planning. These tools include pricing and fare schemes, parking regulations, land-use and acquisition policies, visual and digital branding of mobility services, and contractual requirements that oblige new shared mobility providers to integrate their services into mobility hubs. **Table 45** presents the list of LLs implementing mobility hub.

Table 45 - Living Labs Implementing BA4 (Integration of New Shared Mobility into Ecosystem)

BA/Living Labs	Munich	Geneva	Jerusalem	Penteli	Rotterdam	Krakow	Fredrikstad	Larnaca	Coimbra
BA4	✓			✓			✓	✓	✓

Note 1: For the **Munich** LL, stakeholder interviews have been completed, and a **preliminary overview** of the business activity "Integration of New Shared Mobility into the Ecosystem" has been received. However, further clarification and discussion with the LL are still needed. As such, the current results are considered **preliminary** and will be refined and finalized in upcoming deliverable as additional information becomes available.

Note 2: For the **Fredrikstad** LL, while stakeholder interviews have been completed, we have not yet received sufficient input on the **business aspects, operational goals, and clear objectives** related to the primary business activities, Integration of New Shared Mobility into Ecosystem. As a result, the evaluation of Fredrikstad's contribution to these business activities remains incomplete. The current results are therefore **preliminary** and will be **complemented and finalized** in upcoming deliverables as additional information becomes available.

8.1 Munich Living Lab

8.1.1 Description of Munich Business Activity 4

The Munich LL focuses on the integration and expansion of carsharing services within the city's mobility ecosystem. The use case aims to significantly scale up shared mobility infrastructure by increasing the number of designated carsharing parking spaces, supporting both free-floating and station-based models. This expansion is expected to promote greater multimodal travel behaviour, enhance the use of shared mobility in combination with PT, and contribute to a long-term reduction in private car ownership. In addition, the initiative is aligned with Munich's broader climate-neutrality targets for 2030 and aims to free up urban space by reducing the need for private parking. Nevertheless, through close collaboration with **the City of Munich**, this study has successfully identified **eight stakeholders** involved in the local mobility ecosystem. These include representatives from the **municipality, PTOs, and shared mobility service providers**. Each stakeholder's role and responsibilities have been mapped in detail, providing valuable insights into the structure, governance, and operational dynamics of urban mobility in Munich. **Table 46** outlines the implemented pull measure, expected goals, and the contribution of the shared mobility integration activity to the Munich LL's broader mobility ecosystem. **While the use case and expected goals have been defined, this activity has only recently been approved. Therefore, the current information requires further analysis in close collaboration with LL representatives. A more detailed description including operational models, and a business model canvas will be developed and presented in the next project deliverable.**

Table 46 - Munich: Pull Measure reflecting BA4 (Integration of New Shared Mobility into Ecosystem), Expected Goals, and Contribution to Global Objectives

BA4. Integration of New Shared Mobility into Ecosystem								
Pull Measure: Carsharing service								
Expected Goals								
- Expand carsharing infrastructure by increasing parking spaces, accommodate free-floating & station-based services. - Encourage multimodal travel by integrating NSM with PT options, enhancing user convenience and connectivity. - Increase shared mobility usage through improved accessibility and availability of carsharing services citywide. - Support a modal shift away from private car toward shared and PT options, reducing reliance on car ownership. - Contribute to Munich's climate-neutrality goals for 2030; lower transport-related emissions through sustainable choices. - Reduce demand for private parking, enable reallocation of public space for green areas, bike lanes, or pedestrian zones.								
Contribution to SUM Global Objectives	YES	YES	NO	YES	YES	YES	NO	YES
Legend								
Reduction of Congestion	Reduction of Noise				Improvement of Accessibility			
Reduction of Emissions	Improvement of Mobility Services				Public Transport Improvement			
Enhancement of Multimodality								
Improvement of Safety								

8.1.2 Munich Stakeholders

Table 47 describes potential stakeholders in the LL's mobility ecosystem.

Table 47 - Munich: Potential Stakeholders in the Mobility Ecosystem Related to Pull Measures for BA4 (Integration of New Shared Mobility into Ecosystem)

BA4. Integration of New Shared Mobility into Ecosystem		
Pull Measure: Carsharing		
LL Potential Ecosystem Stakeholders	Residents	Munich
	Research	TUM
	Municipality	Munich
	NSM	Miles Mobility, Sixt share, Flinkster, CarVia, Free2move, STATTAUTO GmbH

8.2 Penteli Living Lab

8.2.1 Description of Penteli Business Activity 4

The Penteli LL is advancing the integration of new shared mobility services into its local transport ecosystem, with a particular focus on **launching and connecting an e-bike-sharing system** to existing public bus transport and ride-hailing services. As part of this BA, **docking stations** have been strategically placed across the LL, equipped with **electric bikes** that can be **rented free of charge** by citizens during the **first three years of operation**. Based on the 3-year contract, the aim is to promote active mobility and environmental awareness of Penteli citizens while reducing the use of their private cars, particularly for short trips previously made by buses or taxis. **The integration of shared e-bike services is closely linked to the development of a MaaS platform under BA 1.** In this effort, the Municipality of Penteli is collaborating with a ride-hailing service provider to connect its services with the AMCO app, a platform managed by the municipality for the operation of the bike-sharing system. This integration allows users to **plan and combine new bike-sharing services with existing ride-hailing services** within a single interface, improving convenience and supporting multimodal travel. Throughout this activity, the municipality of Penteli aims to explore spatial and temporal usage patterns of the bike-sharing system by analyzing unlocking and locking behavior at docking stations and comparing these with cycling flows, ride-hailing activity, and access/egress taxi trip data across the municipal area. The objectives of this activity include reducing the cost ratio of multimodal trips and encouraging recreational cycling by providing a viable, sustainable alternative. **Table 48** outlines the implemented measures, expected goals, and the contribution of the shared mobility integration activity to the LL's broader mobility ecosystem.

Table 48 - Penteli: Pull Measure reflecting BA4 (Integration of New Shared Mobility into Ecosystem), Expected Goals, and Contribution to Global Objectives

BA4. Integration of New Shared Mobility into Ecosystem								
Pull Measure: E-bikes renting, bike parking installation and NSM integration								
Expected Goals								
- Environmental protection - Active mobility promotion - Car usage reduction - Cycling infrastructure								
Contribution to SUM Global Objectives	NO	NO	NO	YES	YES	YES	NO	NO
Legend								
Reduction of Congestion	Reduction of Noise							
Reduction of Emissions	Improvement of Accessibility							
Enhancement of Multimodality	Improvement of Mobility Services							
Improvement of Safety	Public Transport Improvement							

8.2.2 Penteli Stakeholders

Table 49 describes potential stakeholders in the LL's mobility ecosystem.

Table 49 - Penteli: Potential Stakeholders in the Mobility Ecosystem Related to Pull Measures for BA4 (Integration of New Shared Mobility into Ecosystem)

BA4. Integration of New Shared Mobility into Ecosystem		
Pull Measure: E-bikes renting, bike parking installation and NSM integration		
LL Potential Ecosystem Stakeholders	Residents	Penteli
	NSM	AMCO (Bike-sharing)
	Municipality	Municipal e-bike sharing, Penteli

8.2.3 Penteli Business Model Canvas

The business model canvas for the measure developed in Penteli is displayed in **Table 50**.

Table 50 - Penteli: Business Model Canvas for BA4 (Integration of New Shared Mobility into Ecosystem)

BUSINESS MODEL CANVAS		
Economic-Oriented Business Reflection		
Value Proposition	Products and Services	- Service area: e-bike sharing services - Increased coverage of transport modes due to multimodality and increased convenience - Options of renting vehicles - Dedicated bike parking spaces 24/7 availability
	Customer Relationships	- Automated Services, Communities, Co-creation - Community platform for users and inhabitants - Community ecosystem - Help desks: Mail Contact
	Customer Segments	- End users: local users for business, leisure and commuting (including users with additional mobility needs), visitors - Shared mobility users - First and last mile demands - Support local authorities to deploy a successful seamless shared mobility solution scheme Customer type Customer mobility style
Value Creation and Delivery	Key Resources	- Technological platform and API - Vehicles - Bikes charging infrastructure
	Key Activities	- Data analytics and Data provision - Software and hardware maintenance and Quality control - Real-time information provision - Lobbying - IT platform development + API development - Dynamic information provision and Booking - Fleet management
	Channels	- Website and Mobile application - Customer service and customer surveys - App store, Google Play - Social media and blogs, Emails and Newsletter
	Key Partners	- Municipalities, Local authorities and regional government - Investors
Value Capture	Cost Structure	- Platform maintenance and IT infrastructure - Operational costs and Infrastructure costs - R & D Costs and Intellectual properties - Salaries and Personnel cost and Insurance - Customer service costs
	Revenue Streams	- Pricing mechanism: Subscription fee (monthly, hourly, km) - Fares (At first, this service will be free for 3 years)
Sustainability-Oriented Business Reflection		
Sustainability Value	Value for Customers	- Incentivized to choose eco-friendly transport modes - Offer benefits for choosing sustainable options (free usage)
	Value for Environment	- Prioritize integrating low-emission or zero-emission vehicles - Minimize its overall carbon footprint - Increase bike usage
	Value for Society	- Support equitable access to sustainable transport options for all social groups - Help alleviate traffic congestion and pollution - Contribute to a healthier society by promoting PT modes - Help cultivate an alternative mobility culture
	Value from Technology	- Mechanisms for continuous improvement to make the product or service increasingly sustainable over time - Simple while valuable product

8.3 Larnaca Living Lab

8.3.1 Description of Larnaca Business Activity 4

The Larnaca LL is enabling the introduction and integration of new shared mobility services into the city's transport ecosystem, with a specific focus on the **expansion of the bike network** and the launch of a public bike-sharing service for the first time. Prior to the SUM project, Larnaca had no operational bike-sharing system. However, through the support of the project, the Municipality of Larnaca approved the deployment of Nextbike's shared bike service in a designated pilot area, laying the groundwork for the city's first official network of rental bikes. As part of this initiative, local authorities collaborated closely with Nextbike and LPT (the PTO) to strategically identify and confirm the locations of new bike stations within the pilot zone. The goal of this coordination was to ensure maximum accessibility and integration with the existing transport services, improving last-mile connectivity and providing an alternative to short car trips. In parallel, LPT conducted a series of consultations with the Transport Authorities to explore the introduction of subsidies aimed at reducing bike usage costs, supporting affordability and encouraging user adoption. This activity is designed to extend Larnaca's cycling infrastructure, promote the use of non-NSM services, and encourage a modal shift away from private car use. **Table 51** outlines the supporting initiatives, expected goals, and how the deployment of the bike-sharing service strengthens the overall strategy of the Larnaca LL.

Table 51 - Larnaca: Pull Measure reflecting BA4 (Integration of New Shared Mobility into Ecosystem), Expected Goals, and Contribution to Global Objectives

BA4. Integration of New Shared Mobility into Ecosystem								
Pull Measure: Expansion of Bike Network								
Expected Goals								
- Extension of bike network - Provision of NSM services - New bike rental service for the city of Larnaca - Reduce private car usage - Make driving less attractive								
Contribution to SUM Global Objectives	YES	YES	YES	YES	YES	YES	NO	YES
Legend								
Reduction of Congestion				Reduction of Noise				
Reduction of Emissions				Improvement of Accessibility				
Enhancement of Multimodality				Improvement of Mobility Services				
Improvement of Safety				Public Transport Improvement				

8.3.2 Larnaca Stakeholders

Table 52 describes potential stakeholders in the LL's mobility ecosystem.

Table 52 - Larnaca: Potential Stakeholders in the Mobility Ecosystem Related to Pull Measures for BA4 (Integration of New Shared Mobility into Ecosystem)

BA4. Integration of New Shared Mobility into Ecosystem		
Pull Measure: Expansion of Bike Network		
LL Potential Ecosystem Stakeholders	Residents	Larnaca
	MaaS	Moovit, PANGO
	Municipality/Authority	Larnaca and Ministry of Transport and Works
	NSM	NextBike

8.3.3 Larnaca Business Model Canvas

The business model canvas for the measure developed in Larnaca is displayed in **Table 53**.

Table 53 - Larnaca: Business Model Canvas for BA4 (Integration of New Shared Mobility into Ecosystem)

BUSINESS MODEL CANVAS		
Economic-Oriented Business Reflection		
Value Proposition	Products and Services	- Service integration: Expansion of Bike Network with bike-sharing service - Transport mode integration: integration with local PT - Increased coverage of transport modes due to multimodality and increased convenience - Optimized synchronized services (shared vs PT)
	Customer Relationships	- Service centers - Community platform for users and inhabitants 24/7 online and Telephone customer service - Help desks: Hotline and Mail Contact
	Customer Segments	- PT and First and last mile demands - Support local authorities to deploy a successful seamless shared mobility solution scheme
Value Creation and Delivery	Key Resources	- Vehicles - Transport infrastructure - Human resources - Users
	Key Activities	- Trip planning and routing - Booking - Ticketing and Payment transaction - Fleet management, optimisation
	Channels	- Website - Mobile application - Customer service and customer surveys - Social media and blogs
	Key Partners	- Municipalities (Larnaca) - Local authorities - Information technology providers - PTO (i.e. LPT) - Shared mobility service providers (NEXTBIKE)
Value Capture	Cost Structure	- Investment costs - Operational costs - Infrastructure costs - Salaries and Personnel cost and Insurance
	Revenue Streams	Fares
Sustainability-Oriented Business Reflection		
Sustainability Value	Value for Customers	Offer benefits for choosing sustainable options
	Value for Environment	- Prioritize integrating low-emission or zero-emission vehicles - Minimize its overall carbon footprint - Features to promote shared rides, reducing the number of single-occupancy vehicles
	Value for Society	- Support equitable access to sustainable transport options for all social groups - Help alleviate traffic congestion and pollution - Contribute to a healthier society by promoting active and PT modes - Promoting a Cooperative mechanism rather than competitive
	Value from Technology	- Enable efficient routing to reduce fuel consumption and emissions - Data used to optimize resource allocation, reducing unnecessary energy consumption - Mechanisms for continuous improvement to make the product or service increasingly sustainable over time

9 The link to Supporting Business Activities

Within each primary BA, the relevance and contribution of the **Supporting Business Activities** are also analyzed, highlighting how these supplementary measures interact with, enable, or enhance the primary activities on a case-by-case basis. This approach allows for a deep understanding of how the ecosystem is influenced by different combinations of push-pull measures across diverse urban mobility systems.

9.1 Penteli Living Lab

In Penteli LL, BA1, which integrates bike-sharing with ride-hailing services via the AMCO MaaS app, is supported by BA5 (Active Mobility Promotion) and BA6 (Incentive-Based Programs) through the promotion of cycling services and services of free fares for bike-sharing services during the initial phase. BA3, which involves the development of a mobility hub integrating public and shared transport services, is supported by BA5 through the installation of e-bike infrastructure and by BA9 (Electric and Low-Emission Infrastructure Expansion) through the introduction of local e-bus lines and the construction of pedestrian and cycling infrastructure, including new cycling tracks and the regeneration of pavements. BA4, which aims to integrate NSM services such as e-bike-sharing into the existing transport network, is supported by BA5 through co-creation of street space for NSM and by BA10 (PT Scheduling and Frequency Optimization) through vehicle and crew scheduling and the retiming of PT services. **Table 54** details the specific supporting initiatives that contribute to the delivery of each primary BA.

Table 54 - Penteli: Potential Impact of Supporting Business Activities on Primary Business Activities

#	Description of Primary Business Activity	Supporting Business Activities	Initiative with potential impact
BA1	Establishing a MaaS platform that connects ride-hailing services with the interface of the AMCO app , enabling users to combine bike-sharing with existing taxi (i.e. ride-hailing) services.	BA5: Active Mobility Promotion BA6: Incentive-Based Programs	Fares for bike-sharing services at first will be free
BA3	Developing a central mobility hub to improve the integration of both public and shared transport services; bringing together a mix of mobility options, including local and metropolitan public buses, ride-hailing services, e-bike-sharing , and e-scooter-sharing	BA5: Active Mobility Promotion	E-bikes installation (cycling infrastructure)
		BA9: Electric and Low-Emission Infrastructure Expansion	Introducing local e-bus lines (connect local centres and neighbourhoods with rail stations) Construction of pedestrian and cycling infrastructure (cycling tracks, regeneration of pavements and surfaces)
BA4	Integration of NSM services into its local transport ecosystem, with a particular focus on launching and connecting an e-bike-sharing system to existing public bus transport and ride-hailing services .	BA5: Active Mobility Promotion	Co-creation of street space for NSM
		BA10: PT Scheduling and Frequency Optimization	Scheduling (Vehicle & Crew) and Retiming PT

9.2 Geneva Living Lab

In Geneva LL, the delivery of primary business activities is reinforced by a set of supporting initiatives. BA1, focused on establishing a MaaS platform that integrates different transport services could be supported by **BA6 (Incentive-Based Programs)** through the implementation of dynamic pricing via a tap-in/tap-out app offering 20% discounts for off-peak travel. This initiative is expected to shift travel behaviour and improve system efficiency. Additionally, **BA9 (Electric and Low-Emission Infrastructure Expansion)** contributes by modernizing the transport fleet (50% of which will be electric); aligning the integration of electric PT with shared mobility solutions and offered through MaaS platform with sustainable transport goals. BA2, which introduces an integrated on-demand solution for people and goods, is supported by **BA10 (PT Scheduling and Frequency Optimization)** through activities such as developing models to increase occupancy rates,

optimize fleet size, and reduce unnecessary mileage, directly enhancing operational efficiency. BA4, focused on the development of mobility hubs to promote inter-modality, could be strengthened by **BA5 (Active Mobility Promotion)** through accessibility enhancements. These include journey planning tools with route filtering based on individual needs, such as wheelchair access, which can significantly improve user experience. **Table 55** details the specific contributions of each initiative in reinforcing the city's mobility transformation strategy.

Table 55 - Geneva: Potential Impact of Supporting Business Activities on Primary Business Activities

#	Description of Primary Business Activity	Supporting Business Activities	Initiative with potential impact
BA1	Establishing a MaaS platform that integrates bundle ticketing options and real-time digital information , combining existing public transport with bike-sharing services	BA6: Incentive-Based Programs	Dynamic pricing for PT using an innovative tap-in/tap-out app, aiming for assessing pricing incentive for travelling off peak offering 20% discounts and tracking time of travel.
		BA9: Electric and Low-Emission Infrastructure Expansion	PTO operates a fleet of 450 vehicles; as of 2024, 50% of the fleet is electric and powered by renewable energy;
BA2	Developing an integrated on-demand mobility solution to optimize the combined use of public transport and NSM services by delivering on-demand services for both people and goods	BA10: PT Scheduling and Frequency Optimization	Mobility-on-demand and ride-pooling tool to optimise fleet size, occupancy, and mileage;
BA4	Developing mobility hubs to promote intermodal travel and strengthen the integration of sustainable transport services, expand the availability and visibility of shared and active mobility services while increasing the of alternatives to private car travel such as bike-sharing, carpooling, tram, bus.	BA5: Active Mobility Promotion	Enhanced accessibility, route filtering based on individual needs (e.g., wheelchair accessibility) and accessibility information for each journey

9.3 Larnaca Living Lab

In Larnaca LL, BA1, focused on establishing a multimodal MaaS platform with real-time bus arrival information, journey planning, and shared bike booking, is supported by BA6 (Incentive-Based Programs) through ticketing strategies that apply price setting and nudging techniques to influence user behaviour. Additionally, **BA10 (PT Scheduling and Frequency Optimization)** contributes by **assessing and optimizing** the existing PT network in collaboration with local authorities and PTOs, leading to the identification and implementation of increased service frequencies where needed. **BA4**, which aims to expand the bike network and launch a **bike-sharing service** in designated areas, is supported by **BA6 (Incentive-Based Programs)** through the implementation of **parking restrictions**. This initiative is intended to reduce reliance on private cars and support a modal shift towards cycling by making bike use more convenient and accessible. **Table 56** outlines the connections between each initiative and its contribution to the city's sustainable mobility development.

Table 56 - Larnaca: Potential Impact of Supporting Business Activities on Primary Business Activities

#	Description of Primary Business Activity	Supporting Business Activities	Initiative with potential impact
BA1	Establishing a MaaS platform as multimodal digital platform, integrating bus real-time arrival information and journey planning features with shared bike booking .	BA6: Incentive-Based Programs	Ticketing (Price Setting & Nudging)
		BA10: PT Scheduling and Frequency Optimization	Increase Service Frequency: Through collaborative activity with local authorities, and PTO, the initiative conducted analyse of the existing transport network model and identify areas for improvement, such as increasing service frequencies where necessary.

BA4	Expansion of the bike network within the city, and introduction of bike-sharing service in the designated area and determine the locations of all new bike stations	BA6: Incentive-Based Programs	Parking restriction
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9.4 Jerusalem Living Lab

In the Jerusalem LL, the primary BA focuses on introducing integrated on-demand mobility through ride-pooling services, aiming to maximize vehicle occupancy and provide flexible transport options to support PT usage and attract new users. Two supporting business activities including **BA5 (Active Mobility Promotion)** and **BA9 (Electric and Low-Emission Infrastructure Expansion)** have strong potential to enhance the effectiveness and integration of NSM services such as ride-pooling with PT. The implementation of BA5, through the addition of a new bike lane and bike rental stations, promotes first- and last-mile connectivity and reduces car dependency, which in large scale can synergize with ride-pooling by making multimodal travel more attractive and seamless. Meanwhile, BA9 supports structural integration by expanding the LRT Line with new LRT stations, a park-and-ride facility, and public elevators for station access, directly improving accessibility and reducing travel time for PT users. Together, these initiatives have potential to create a supportive environment for integrated NSM and PT by enhancing modal integration, facilitating user transitions between active, shared, and PT, and reinforcing the overall objective of increasing PT usage. **Table 57** outlines the potential connections between each initiative.

Table 57 - Jerusalem: Potential Impact of Supporting Business Activities on Primary Business Activities

#	Description of Primary Business Activity	Supporting Business Activities	Initiative with potential impact
BA2	Developing an integrated on-demand mobility by introducing ride-pooling services to maximize vehicle occupancy and to expand the range of flexible transport options available to residents, thereby increasing public transport usage and attracting new users .	BA5: Active Mobility Promotion	Adding New bike lane on Golomb st and 20 new JERUFUN bike rental stations in LL with objective of Increasing cycling, and decreasing car dependency
		BA9: Electric and Low-Emission Infrastructure Expansion	Red Line will add 6 new LRT stations in the LL and New LRT park, ride facility and New public elevators for accessing LRT station with objective of Reduce PT travel time, increase PT usage and decrease car dependency

9.5 Fredrikstad Living Lab

In the Fredrikstad LL, the primary business activities centre on Mobility Hub Development and the Integration of New Shared Mobility Services into the Ecosystem, aiming to create a seamless, multimodal transport offering to support a shift away from private car use. While supporting business activities such as **BA6 (Incentive-Based Programs)**, **BA7 (Public Engagement and Awareness Initiatives)** implemented through co-creation processes and **BA8 (Enhanced Data Collection and Analysis)** are being actively pursued, their strategic alignment with the primary business activities still requires further exploration and will be reported in next deliverable. However, these supporting activities have strong potential to reinforce the LL's goals: **BA6** can directly stimulate user adoption of NSM through targeted financial or behavioral incentives; **BA7** can increase acceptance for mobility hubs by involving users in design and operational decisions; and **BA8** can provide critical data insights on usage patterns, user needs, and system performance.

9.6 Coimbra Living Lab

In the Coimbra LL, three primary business activities are being implemented to enhance the local mobility ecosystem: **BA1** focuses on developing a Mobility-as-a-Service (MaaS) platform; **BA2** introduces flexible, demand-responsive transport (via minibuses) to improve first- and last-mile connections to existing PT networks; and **BA3** targets enhancements to pedestrian infrastructure and the development of a mobility hub to increase accessibility and user comfort. These activities are supported by **BA5 (Active Mobility Promotion)** through the implementation and improvement of sidewalks, which enhance safe and direct pedestrian access to transport services, facilitate integration between active modes and shared or PT, and play an important role in increasing the attractiveness and usability of the entire multimodal system. **Table 58** outlines the potential connections between each initiative.

Table 58 - Coimbra: Potential Impact of Supporting Business Activities on Primary Business Activities

#	Description of Primary Business Activity	Supporting Business Activities	Initiative with potential impact
BA1	Developing MaaS Platform by managing integrated booking services, while minimizing the user cost and waiting time, and therefore managing the resources necessary to promote seamless mobility solution	BA5: Active Mobility Promotion	Implementation and/or improvement of sidewalks
BA2	Introducing flexible, demand-responsive mobility solutions to serve as first- and last-mile access (using Mini buses) to existing public transport services		
BA3	Stabilizing on-demand transport , then improving pedestrian links and mobility hub , aiming to boost accessibility , cut wait times , and enhance multimodal journey comfort and safety .		

10 Mobility Ecosystem Stakeholder Engagement – Role and Responsibilities

As part of the one-to-one interviews conducted with stakeholders, each participant was asked to define the role and responsibilities of their organization in relation to 8 aspects of the mobility ecosystem. The objective was to gain a detailed understanding of how different actors contribute to the design, operation, and governance of mobility services within the local context of LLs. This structured approach helps to map institutional responsibilities, and assess the level of stakeholder engagement in areas necessary for enabling sustainable and integrated mobility solutions.

10.1 Geneva: Roles and Responsibilities of Stakeholders

In Geneva's mobility ecosystem, the regional authority (Canton de Genève and Communes) holds the primary regulatory and policy-making power, setting rules and determining strategies for both PT and NSM services. The TPG (Transports Publics Genevois) is the designated PTO, tasked with deploying services, promoting integration across modes (buses, trams, etc.), and coordinating with both public entities (e.g., police, communes) and private service providers (e.g., DonkeyRepublic). While ticket prices and financial subsidies are determined and allocated by the regional authority, TPG manages implementation, including operating services, planning new initiatives, and promoting booking and ticketing solutions. TPG also maintains an open data platform to share operational data like trip counts and passenger flows. Furthermore, through the B2G subsidy platform, TPG supports and expands PT initiatives, with future plans to include e-bike, cargo bike, and electric charging infrastructure development into their offering. **Table 59** presents a combined evaluation of stakeholders' responses regarding 8 factors.

Table 59 - Geneva: Stakeholder Roles and Responsibilities (Findings from Stakeholder Interviews)

Responsibilities	Stakeholder Comments
Regulation	The regional authority (Canton de Genève) is responsible for setting regulations related to transportation.
Policies	The regional authority defines policies for PT (buses, trams) and new shared mobility (NSM) services. It acts as the main policymaker in Geneva's mobility ecosystem, delegating operational responsibilities to TPG.
Incentives	The regional government provides funding to TPG for PT (including rail) subsidies, sourced from tax revenue. Subsidies: TPG manages subsidies as part of a B2G (Business-to-Government) platform for PT services. Planned expansions include public bike sharing, cargo bikes, and e-bike purchase schemes. TPG will also take on responsibility for new mobility infrastructure such as electric charging stations.
Deployment of new services	TPG is responsible for initiating and planning the deployment of new services and related initiatives. It holds the official mandate to operate all PT in Geneva.
Financial Aids and Investments	Financial support is approved for TPG on a project-specific basis by the regional authority.
Integration with other services	TPG oversees the operation and integration of buses, trams, and other shared public mobility services. TPG collaborates with the Canton de Genève, local communes, and the police department for public sector coordination. TPG is in charge of coordinating with private mobility service providers.
Ticketing and Pricing	The pricing of PT tickets is set by the regional authority.
Data exchange, Open data platform	TPG maintains an open data platform that provides information on the number of trips, passenger boarding and alighting, and other metrics for bus and tram services.
Promotion of related services i.e. booking, ticketing, etc?	TPG is responsible for promoting services such as booking and ticketing and coordinating with NSM providers (e.g., DonkeyRepublic).

10.2 Penteli: Roles and Responsibilities of Stakeholders

In the mobility ecosystem of Penteli, responsibilities are distributed between the municipality, the state, and private partners. The Penteli Municipality plays a central role in coordinating local mobility solutions, including designing mobility hubs, regulating local speed limits, setting pricing for municipally led services, and operating PT services. It also hosts and facilitates partnerships with private e-bike and scooter operators by providing land and advocating for regulatory adjustments, though licensing and core regulations remain state-controlled. Policy direction and integration of services are mainly driven at the municipal level, especially where state involvement is minimal, while regional entities take over for inter-municipal coordination. Incentives and subsidies, particularly for new services like free bike-sharing schemes, are generally state-funded, as municipal self-funding is rare. While there are possibilities for Public Private Partnership (PPP) investment, the data governance remains with the NSM providers, with the municipality facing delays and indirect access to performance data. **Table 60** presents a combined evaluation of stakeholders' responses regarding 8 factors.

Table 60 - Penteli: Stakeholder Roles and Responsibilities (Findings from Stakeholder Interviews)

Responsibilities	Stakeholder Comments
Regulation	Penteli Municipality is responsible for managing and coordinating local mobility solutions, including the design of mobility hubs and determining bike station locations.
	General mobility regulations (such as traffic rules for bikes and their allowed areas) are defined by the state. However, the municipality sets local speed limits and enforces conditions for safe operation.
Policies	Strategic direction and promotion of sustainable mobility options are initiated at the municipal level.
	For inter-municipal or cross-regional initiatives, policy responsibility shifts to the regional authority.
Incentives	Based on a specific agreement, a new bike service will be offered free of charge for three years, with full subsidies (covering the app, e-bikes, and related technology) provided by the state.
	Municipal self-funding is rare, with most initiatives led and financed by the state.
Deployment of new services	New service deployment is primarily managed by the state.
	Penteli Municipality collaborates with private partners for e-bike services and docking stations. While it hosts the system infrastructure, it does not oversee day-to-day operations.
	Scooter service licenses are issued by the state. However, the municipality can advocate for changes and improvements, even though it cannot revoke services.
	Local PT is operated directly by Penteli Municipality.
	The municipality provides land to NSM (New Shared Mobility) providers for docking stations, without charging rent.
Financial Aids and Investments	In addition to state funding, Public-Private Partnerships (PPPs) may also be considered to support mobility initiatives.
Integration with other services	The municipal PT system currently lacks a digital application for its bus operations.
	The state plays a minimal role in integration efforts. The municipality primarily leads the integration of services, development of mobility hubs, and spatial coordination.
Ticketing and Pricing	For municipally initiated services, Penteli Municipality determines pricing and fare structures.
Data exchange, Open data platform	NSM providers retain ownership of operational data. Penteli Municipality has the right to request data for evaluation purposes, but it does not have direct access.
	The process of requesting and obtaining data is often time-consuming, taking several days to months.

10.3 Larnaca: Roles and Responsibilities of Stakeholders

In Larnaca, the Ministry of Transport is the primary authority overseeing regulations, ITS infrastructure, and daily coordination between PTOs, mainly LPT. The Ministry, along with the Department of Road Transport and the Public Works Department, manages regulations on PT routes, bike services, and infrastructure standards. The policy framework (e.g. service design, pricing models, and performance monitoring via KPIs) is also controlled by the Ministry. LPT operates bus services in urban and peri-urban Larnaca, receiving per-kilometre subsidies. The Ministry defines pricing incentives and can adjust fares to encourage PT use. It also initiates and funds smart infrastructure (e.g., bike lanes, smart bus stations) and coordinates with the Ministry of Economics for cost approvals. The integration of services, including plans for integrated ticketing and the PAME multimodal app, is in progress. Ticket pricing penalizes cash payments, while rewarding digital usage. Lastly, Larnaca supports open data through the Ministry's ITS system and publishes public transport GTFS data via the MotionBusCard platform. **Table 61** presents a combined evaluation of stakeholders' responses regarding these 8 factors.

Table 61 - Larnaca: Stakeholder Roles and Responsibilities (Findings from Stakeholder Interviews)

Responsibilities	Stakeholder Comments
Regulation	The Ministry of Transport is the lead authority, coordinating with PTOs (e.g., LPT) and managing ITS infrastructure. The Department of Road Transport regulates bus operations, while the Public Works Department oversees route planning, bus lanes, and biking services.
	LPT is responsible for operating and optimizing PT services under a 10-year contract with the Ministry.
Policies	The Ministry of Transport controls service and pricing policies, ticketing schemes, and service design. It monitors performance via a KPI-based system (12 KPIs total; 7 linked to telematics). PTO performance is evaluated against these KPIs.
Incentives	LPT receives per-km subsidies for PT operation approved by Ministry of Transport.
	The Ministry also defines fare-related incentives such as discounts for bike users transferring to buses. Operators may set minimum and maximum ticket prices, but the Ministry can reduce fares and reimburse operators to incentivize public use.
Deployment of new services	LPT operates all urban and peri-urban bus services in Larnaca. Its core mandate is to deliver bus-based PT.
	The only multimodal app currently available is PAME.
	The Ministry of transport contributes to the planning of new services, including demand-responsive transport or new routes proposed by operators.
Financial Aids and Investments	The Ministry instructs PTOs to install infrastructure like bike racks on buses and coordinates with the Ministry of Economics for cost approvals.
	Government funds also cover smart bus stations and other infrastructure, with no direct investment required from operators.
Integration with other services	Plans are in place to develop an integrated ticketing system for seamless access to parking, bike-sharing, and other services. This integration is being developed within the Ministry's telematic platform.
	Integration of PAME with bike services is under implementation within SUM project.
Ticketing and Pricing	Fixed fare pricing is used. Cash payments are penalized with higher prices, while Motion Card users benefit from discounts.
	The Ministry is involved in reviewing and supporting new pricing proposals from operators.
Data exchange, Open data platform	Bus operation data is openly available. The Ministry maintains two ITS data systems: one private (for ministry-operator communication) and one public via the MotionBusCard platform, which offers GTFS data access. There is an example of NSM data sharing with LPT (one sided sharing)

10.4 Rotterdam: Roles and Responsibilities of Stakeholders

In Rotterdam, governance of mobility services is shared between the Regional Transport Authority which sets regulations for PT and the City of Rotterdam, which regulates and oversees NSM services. The municipality handles permits, policies, routing, parking, and infrastructure for NSM, and develops mobility hubs. Through its department of mobility, the city defines the vision for shared mobility, issues permit, and ensures regional alignment by collaborating with neighboring municipalities via the Rotterdam Metropole. While no direct subsidies are provided to NSM operators, citizens may receive mobility-related financial support during construction projects. The municipality also oversees the deployment of NSM services, evaluates providers based on affordability and accessibility, and obliges them to maintain service quality throughout their permit period. It does not set ticket prices but mandates that NSM operators uphold pre-approved pricing. Data exchange is mandatory for NSM providers, with conditions included in permits to ensure compatibility with future MaaS applications, and for continuous monitoring and evaluation. **Table 62** presents a combined evaluation of stakeholders' responses regarding these 8 factors.

Table 62 - Rotterdam: Stakeholder Roles and Responsibilities (Findings from Stakeholder Interviews)

Responsibilities	Stakeholder Comments
Regulation	The Regional Transport Authority regulates PT.
	The City of Rotterdam is responsible for regulating NSM, including issuing permits, setting policies, defining routes, and managing parking and infrastructure for NSM operators. RET cooperates closely with regional authority. The PTO defines contract every 5 to 10 years and considered as client with respect to PT operation.
Policies	The municipality sets policies for NSM, including development of mobility hubs and providing physical infrastructure to NSM providers. RET also coordinates with municipality of Rotterdam to see how the PT network could be combines with mobility hubs (both in terms of routing & infrastructure) as well as integration into MaaS Platforms.
	The Department of Mobility formulates policy visions, issues permit for micro-mobility and shared cars, and leads initiatives such as soft traffic zones and hub development. It also collaborates with smaller municipalities in the Rotterdam metropolitan area to establish a regional shared mobility framework.
	Regional Transport authority subscribes how RET delivers PT in the Region.
Incentives	No subsidies are provided directly to NSM providers. However, residents may receive subsidies related to road construction and mobility impacts.
	RET receives subsidies for bus and metro services and also providing travel information. It also receives direct subsidies to provide services, staff cost and creation of new tracks.
Deployment of new services	RET is the PTO in the city and region. It provides core infrastructure for buses, trams and metro operations. For new operation, RET creates the network and provides action plan and then delivers the plan to regional authority for validation.
	Municipality of Rotterdam is responsible for overseeing deployment of NSM across the city.
Financial Aids and Investments	Not applicable (no financial aid mechanisms directly available for NSM operators).
Integration with other services	There is currently no city-led public shared mobility service. However, National railway-operated shared bikes are available, but they must be returned to the same station and are located on private property, outside municipal integration efforts.
	RET as PTO is in coordination with other share mobility service providers to extend the reach of the service network where RET services are not accessible.
Ticketing and Pricing	The City of Rotterdam does not set prices for NSM. However, during the permit process, it evaluates the provider's pricing model to ensure affordability and accessibility. Once approved, pricing must remain consistent unless changes are justified and re-reviewed.
	Currently, within the application of RET, location and availability of Cooltra mopeds, Felyx mopeds, Lime bikes, DR bikes and CHECK e-moped are integrated. However, for now, it is only location & availability and not ticketing & booking. The plan in SUM is to integrate bike services (CHECK e-mopeds) into RET app while including booking and ticketing services.
Data exchange, Open data platform	NSM providers are obliged to share data with municipality for monitoring & evaluation.
	RET also has some terms of agreements with NSM providers to share data in between.
	Permit conditions require NSM providers to generate standardized datasets compatible with MaaS platforms. The city defines the expected data structure and delivery mechanisms.

10.5 Coimbra: Roles and Responsibilities of Stakeholders

In Coimbra, the governance of PT is shared across national, municipal, and inter-municipal levels. The national transport authority (AMT) serves as the main regulator and funds several public service incentives, such as free transport for students under 23 years old. Meanwhile, the Municipality of Coimbra acts as the local transport authority, overseeing the organization, planning, and coordination of passenger services. It also regulates local taxi services, particularly important for elderly populations. Although the inter-municipality community CIM Coimbra Region manages transport for 18 surrounding municipalities, Coimbra itself is excluded and retains autonomy. The city defines policies related to bus lines, schedules, parking, and infrastructure development, and coordinates public-private cooperation. The Municipal Urban Transport Services of Coimbra (SMTUC) ensures passenger service delivery, while the city also develops new systems such as the Metro Mondego, which will operate jointly with the state and neighbouring municipalities. Municipality of Coimbra is responsible for setting tariffs, facilitating service integration, and is actively developing an open data platform compatible with national datasets. **Table 63** presents a combined evaluation of stakeholders' responses regarding these 8 factors.

Table 63 - Coimbra: Stakeholder Roles and Responsibilities (Findings from Stakeholder Interviews)

Responsibilities	Stakeholder Comments
Regulation	The AMT (National Transport Authority) is the primary regulator.
	The Municipality of Coimbra regulates local taxi services, which are legally classified as PT and are commonly used by elderly residents.
	Coimbra also acts as a local transport authority responsible for organizing and coordinating public passenger networks.
	The CIM Coimbra Region manages transport for 18 other municipalities but not Coimbra.
Policies	The Municipality of Coimbra defines operational policies for bus stops, routes, schedules, and parking.
	It coordinates both public and private sector stakeholders and leads investment in PT networks, vehicles, and related infrastructure.
Incentives	PT subsidies are provided through national policies, including free travel for students under 23, funded by AMT.
Deployment of new services	Coimbra is responsible for managing and deploying new PT services.
	The SMTUC ensures passenger services within the municipality.
	The city is implementing a Metrobus system (Metro Mondego) in collaboration with the national government and neighbouring municipalities, with power shared 50/50.
Financial Aids and Investments	Funding comes from both AMT and the Municipality of Coimbra, particularly for transport infrastructure and service improvements.
Integration with other services	The municipality promotes the adoption of transport planning instruments to improve integration across mobility services.
Ticketing and Pricing	Coimbra is responsible for setting and approving fare regimes applicable to public passenger services under its jurisdiction.
Data exchange, Open data platform	The Municipality of Coimbra is developing an open data platform integrated with the national platform, supporting transparency and standardized data exchange.

10.6 Jerusalem: Roles and Responsibilities of Stakeholders

In Jerusalem, the governance of the mobility ecosystem is distributed across multiple levels, with responsibilities shared between the Ministry of Transport, the Municipality, and the Jerusalem Transportation Master Plan Team (JTMT). The Ministry of Transport acts as the central regulatory authority, overseeing legal frameworks, setting standards for public and micro-mobility services, and managing financial incentives and PT investments. It also retains pricing authority for national rail and LRT services, in coordination with the Ministry of Finance. Although JTMT has no formal regulatory power, it is the de facto planning authority for the Jerusalem metropolitan area. JTMT coordinates urban mobility planning and advises both short- and long-term strategies, including route alignment, frequency recommendations, and infrastructure planning. JTMT also liaises directly with bus and LRT operators to manage services during daily operations and peak demand periods, including holidays and major cultural or religious events.

The Municipality of Jerusalem plays a central role in regulating parking policies, carsharing, and micro-mobility services. It manages franchise agreements with shared mobility providers and holds the authority to approve or restrict services (e.g., scooters are currently banned due to safety concerns). The Parking Department within the municipality oversees carsharing policies and infrastructure allocation. Unlike some other Israeli cities, Jerusalem does not subsidize shared mobility services directly. Instead, the city allows private operators to function under a market-based model. However, for micro-mobility services (e.g., public bike-sharing), the municipality does co-finance infrastructure such as bikes and docking stations, while operational costs are partially recovered through rental revenue. In addition, while Jerusalem lacks service integration between private shared mobility and PT, data exchange does occur through national platforms.

Table 64 provides a synthesized overview of stakeholder roles across these 8 dimensions.

Table 64 - Jerusalem: Stakeholder Roles and Responsibilities (Findings from Stakeholder Interviews)

Responsibilities	Comment
Regulation	The Ministry of Transport holds national regulatory authority.
	The Jerusalem Transportation Master Plan Team (JTMT) acts as the strongest planning authority (though not officially regulatory), coordinating long-term strategic mobility planning.
	The Municipality of Jerusalem retains regulatory power over parking spaces and specific service permissions (e.g., banning scooters for safety).
	For PT: JTMT handles strategic planning and short-term operational supervision, particularly for buses and LRT. Operational changes due to holidays, religious events, or mega-events are managed in coordination with PT operators.
	For PT: JTMT provides recommendations on routes, station locations, and frequencies, which are usually accepted by the ministry.
	For Carsharing: Carsharing is regulated at the municipal level through the Parking Department (franchise management and operations).
	For micromobility: Micro-mobility (e.g., e-scooters, bikes): Governed by national standards from the Ministry of Transport, though municipalities can impose local changes.
Policies	For LRT: A national monopoly exists, with a single government-owned operator; no privatization is allowed.
	For Micromobility: The municipality decides on the expansion of services within city limits.
Incentives	Municipal Level: Parking services are indirectly subsidized by the municipality.
	Municipal Level: Special programs for micro-mobility users (e.g., discounted yearly subscriptions) are supported through municipal tenders.
	State-Level: Decisions are taken by the Ministry of Transport, often based on JTMT recommendations.
Deployment of new services	For Infrastructure Projects such as LRT project, they are funded in two phases: Phase 1: Ministry finances infrastructure. and Phase 2: Municipality (via MORIA) constructs infrastructure and a franchisee operates based on a state decision involving private sector operators.
Financial Aids and Investments	General Funding Distribution: Typically, 90% by the Ministry and 10% by the Municipality.

	For Carsharing: No centralized regulation; each city defines its model. Jerusalem is less financially involved than other cities (e.g., Tel Aviv), treating carsharing as a market-driven service. For Micromobility: The city contributes to bike and station supply, while operational costs are shared with service providers. Revenue from rentals sustains the service but cannot fund expansion.
Integration with other services	For example, based on one of NSM providers, Carsharing services are independent and not integrated with other transport systems. Only several cars are digitally tracked and publicly report location data.
Ticketing and Pricing	For LRT: Prices are set by the Ministry of Transport For Buses: Ministry-led, based on a state-wide pricing system, following recommendations by JTMT and the Ministry of Finance. For Micro-mobility: Municipalities set prices, with a defined minimum and continues as free market. For carsharing: Operates in a free market model. The municipality awards franchises based on offers (price, quality, etc.).
Data exchange, Open data platform	An Example of data sharing is where: For LRT: Managed through CFIR (validation pool); data is centrally collected for reimbursement. For Bus: Operated by five companies, data flows to CFIR. For Trains: Operated by Israel Railways (national operator); serves intercity routes, not urban networks.

10.7 Krakow: Roles and Responsibilities of Stakeholders

As part of the Krakow LL's stakeholder engagement, interviews were conducted with local authorities and service providers to define their roles in regulation, service planning, policy-making, integration, financing, and digital data exchange. This mapping process provides a foundational understanding of how responsibilities are distributed and how stakeholders contribute to sustainable and integrated urban mobility in Krakow. In Krakow, the governance of the mobility system is coordinated primarily by the Public Transport Authority in Krakow (ZTP), a dedicated unit within the Municipality of Krakow. ZTP is responsible for planning, implementing, and supervising PT services across the city. This includes infrastructure maintenance (e.g., modular bus shelters and signage), operations of multiple micromobility and bicycle programs, and management of paid parking and Park & Ride (P+R) systems. As a PT authority, the Municipality contracts private service providers for daily operations, while ZTP monitors service quality through performance indicators and centralized dashboards. The Municipality of Krakow retains political oversight, with the Mayor holding formal authority over organizational decisions in compliance with local law. Policies relating to bicycle infrastructure, and pedestrian movement are implemented by ZTP and approved by the local council. PT operations are largely subsidized by the municipal budget. The city provides discounts for specific groups, but does not receive funding from national sources. ZTP is also tasked with deploying new mobility services, though some require prior approval from the city council. Infrastructure investments similarly rely on the city's financial resources, with no direct support from central government. Integration with other systems is led by ZTP. In addition, ticketing and fare systems are managed by ZTP, although the city currently lacks a single unified ticketing platform. Data exchange in Krakow is well-established, with shared systems between public and private operators. Real-time data on schedules and vehicle positions are synchronized to support coordinated service delivery. **Table 65** presents a combined evaluation of stakeholders' responses regarding 8 factors.

Table 65 - Krakow: Stakeholder Roles and Responsibilities (Findings from Stakeholder Interviews)

Responsibilities	Comment
Regulation	The Public Transport Authority in Kraków (ZTP) is an organizational unit of the Municipality of Kraków, responsible for: Planning, implementing, and supervising PT services, Managing and maintaining modular bus shelters, stops, and PT infrastructure and operations of LajkBus, Cargo bikes, E-Bike Parks, paid parking zones, Park&Ride facilities and Bike rental systems (long-term e-bike sharing)
	The Municipality of Kraków is the PT authority that (1) contracts private companies for services (drivers, dashboards, branding) and (2) monitors service performance and key KPIs.
	Final authority over organization rests with the Mayor of Kraków, under local law.
Policies	ZTP implements municipal policies related to (1) Bicycle and pedestrian traffic and (2) Personal transport devices (e.g., scooters).
	Policies are approved by the local council and designed by the city.
Incentives	PT is subsidized by the city; fare revenues cover less than half of operating costs.
	No national-level subsidies are provided.
	Fare discounts are offered for specific groups, including the elderly and youth.
Deployment of new services	ZTP is responsible for deploying new services.
	City council approval is required for certain services, based on regulations.
Financial Aids and Investments	Investments primarily come from the municipal budget of the City of Kraków.
Integration with other services	ZTP manages service integration within the city.
	Rail is regulated by regional authority: Marshal's Office of Małopolska Region.
	ZTP coordinates regional bus operations through agreements with 18 surrounding municipalities.
Ticketing and Pricing	ZTP is the operator and sets pricing (with local council approval required for new systems like bike rental).
	A common monthly or yearly ticket is available for both buses and trains, through agreement with the Małopolska Region.
	Tickets are available through: Various mobile apps, Ticket machines at bus/tram stops and Retail shops. Kraków lacks a central ticketing app
Data exchange, Open data platform	ZTP provides open APIs for integration.
	A shared data system exists between ZTP, MPK, and private operators (e.g., MOBILIS), enabling Real-time schedule and vehicle position sharing and Integration of private and public services under common datasets.

10.8 Munich: Roles and Responsibilities of Stakeholders

The City of Munich governs its mobility ecosystem through a complex multi-level structure involving municipal departments, regional associations, and state-level regulations. The Mobility Department within the municipality leads strategic planning, traffic regulation, and enforcement, as well as the licensing and quality control of both PT and NSM services. While the city sets many operational rules, certain elements such as parking fees are determined within the legal framework established by the State of Bavaria. PT in the city is managed by MVG, a municipal company fully owned by the city, operating buses, trams, and the U-Bahn. Regional rail (S-Bahn) and bike-sharing services for first/last mile access are handled by Deutsche Bahn (DB).

Shared mobility services, such as e-bikes, e-scooters, and carsharing, fall under the city's regulation and require licensing. Providers operate under voluntary agreements that include fleet caps and deployment catalogues to prevent oversaturation and operational conflicts. Carsharing remains largely unregulated but is expected to evolve with upcoming contracts that introduce stricter pricing rules and operational boundaries based on area density and usage. The Munich Transport and Tariff Association (MVG), co-owned by the state, city, and region, is responsible for fare policies and finances regional transit services. NSM services operate on a free-market basis, using pay-per-minute or subscription models. Integration efforts between PT and NSM are ongoing, with the city actively financing projects to ensure seamless user experience through MaaS platforms. Finally, data sharing is an integral part of the city's mobility governance. All NSM and PT operators contracted by the city are required to provide both operational and user data. NSM providers supply real-time and historical data for service monitoring. Carsharing data is integrated into MVG platforms. **Table 66** presents a combined evaluation of stakeholders' responses regarding 8 factors.

Table 66 - Munich: Stakeholder Roles and Responsibilities (Findings from Stakeholder Interviews)

Responsibilities	Comment
Regulation	The Municipality of Munich has 14 departments, with the Mobility Department responsible for (1) Strategic mobility planning, traffic enforcement, and public space regulation (2) Licensing shared mobility services and overseeing efficient use of public space (e.g. parking) and (3) Quality control and service monitoring of both PT and NSM operators.
	For parking regulation, fees are defined at the state level, but cities decide the structure within that framework.
	PT in Munich is 100% publicly owned and financed by the city: (1) PT provider MVG (Münchner Verkehrsgesellschaft) operates only within the city. (2) DB (Deutsche Bahn) operates the S-Bahn (regional) and bike-sharing fleet for first/last-mile access. No regulation on fleet size exists for bike-sharing services operated by DB. (3) MVG also operates tram, U-Bahn, and bus services, and is a municipal subsidiary.
	For shared mobility (e-bikes and e-scooters): Regulation handled by the Mobility Department. Can also be influenced by political mandates from the city council. Voluntary agreements with NSM providers include fleet caps and service catalogues to avoid conflicts between providers. Where no infrastructure exists, NSM providers use free-floating models. Virtual parking is managed within apps; providers adjust deployment based on availability and catalogue agreements.
	For carsharing services: Regulation is primarily by the City of Munich. Current contracts allow minimal regulation, but new contracts will increase restrictions. Proposed regulations include: (1) Parking prices based on business area size. (2) Higher fees in low-density areas with high idle time. (3) Fleet size is not regulated, but area-based pricing impacts cost.
Policies	The Munich Transport and Tariff Association (MVG) includes: The State of Bavaria, The City of Munich, The region's governmental district. Each partner owns one-third and finances the MVV. Ticketing revenue and financial needs are shared equally.
Incentives	For carsharing, NSM providers offer incentives: (1) To use vehicles with high idle time (2) To refuel/recharge. And (3) To pick up vehicles at charging points. No subsidies are provided to NSM operators.
	The city provides incentives for PT, including: (1) Special offers for the elderly and groups. And (2) Monthly/daily subscriptions. The Deutschlandticket (nationwide ticket, launched at €9), co-financed by the federal government and MVV.
	DB receives no subsidies, hence operates through B2C and B2B models.

Deployment of new services	The City of Munich is responsible for new NSM services and license approvals. All NSM providers are contracted by the city. Different rules apply for micromobility vs. carsharing due to German national traffic laws. Example: Carsharing: license and parking are defined in contracts. Bike-sharing: city regulates parking, although there's no national law governing it. DB is free to deploy new services in new areas without needing city approval.
Financial Aids and Investments	City of Munich provides financial aids selectively, including: (1) Tenders for station-based carsharing and bike-sharing. and (2) For free-floating carsharing, incentives are given: (A) License fees vary based on the size of the operational area. and (B) Larger coverage results in lower fees per car per month.
Integration with other services	The city promotes integration between PT and NSM through: (1) Two frontends at city and regional levels (MVV and MVG) for information and routing and (2) Shared integration backend for MaaS. Funding of NSM integration projects leads to data availability in MaaS apps (currently 2 apps: 1 for MVV, 1 for MVG). Integration of DB with MVV App: (1) MVV App covers the broader region, not just Munich. (2) MVV is a public body organizing PT; it does not own transport assets. DB app handles payment separately; MVV app is for routing only. For e-bike and e-scooter NSM services: (1) Deployed based on expected demand and park-and-ride areas. (2) Daily adjustment to maintain reliable service. One carsharing provider integrates multiple modes in one app: Taxi, ride-hailing, rented cars, carsharing, e-scooters, and bike-sharing.
Ticketing and Pricing	MVV manages fare and tariff setting for the entire Munich region, including: (1) Fare policies and (2) Public bus tenders. City of Munich handles responsibilities within city boundaries. DB ticketing (no public price regulation): (1) Type 1: occasional riders (2) Type 2: moderate users (3) Type 3: frequent users (30 min per ride for €5) with flexible plans (4) Loyalty program: BahnBonus (free minutes based on ride volume) For NSM providers: (1) Cargo bikes: operate in a free market. (2) E-bikes and e-scooters: (A) Pay-as-you-go pricing and (B) Passes for daily commuters (e.g., worker subscriptions).
Data exchange, Open data platform	All municipal mobility contracts include data-sharing clauses with providers: (1) Internal monitoring of service levels. And (2) User routing and booking information. DB shares data with the city to support development of the city's mobility hub. Currently based on a one-sided partnership approach. For e-bike and e-scooter services: (1) City receives both real-time and historical data. (2) Data is shared via CSV, integrated into DB's curb-side management system. For carsharing: (1) Vehicle availability is shown in MVG App. (2) Actual booking takes place on the NSM provider's app.

10.9 Fredrikstad: Roles and Responsibilities of Stakeholders

In Fredrikstad, the governance of mobility services is shared between the Fredrikstad Municipality and the Østfold County Municipality (OFK). The city's key transport modes (buses, bikes, ferries, and on-demand minibuses) are managed through this multi-level coordination system. In this context, OFK plays a leading role in planning, funding, and regulating bus services, pedestrian and bicycle infrastructure across the region, while the municipality retains regulatory authority over bike infrastructure and ferry operations. The City Package Initiative serves as the primary channel for collaboration, enabling new mobility pilots and co-financing services between municipal and national government budgets. While OFK handles bus routing, ticket revenues, and subsidies, the municipality supports implementation through infrastructure, planning, and parking policies designed to shift users from cars to PT. However, the municipality's failed attempt at traditional bike-sharing has prompted new studies into electric bikes and better docking systems. Ferries, which are entirely operated and funded by the municipality, have been fare-free since 2013 as part of a local green policy. These services are co-financed via the City Package Initiative and municipal budgets. The municipality also grants permissions for mobility hub development, while road-related services require coordination with OFK. In addition, integration of services is jointly managed by both the county and the municipality, though county decisions generally carry more weight. Pricing is divided, for example bus fares are set by OFK, while ferry pricing is locally controlled by municipality. Data sharing remains a challenge, with different operators (especially for bikes) not fully participating in open data systems. The state road authority provides some useful traffic flow datasets, but OFK continues working toward improving data exchange across the city. **Table 67** presents an evaluation of stakeholders' responses regarding 8 factors.

Table 67 - Fredrikstad: Stakeholder Roles and Responsibilities (Findings from Stakeholder Interviews)

Responsibilities	Comment
Regulation	The city has three main modes of transport: buses, bikes, ferries, and on-demand minibuses. Regulation and control are divided between Fredrikstad Municipality and Østfold County Municipality (OFK). Through the City Package Initiative, municipalities help strengthen regional mobility with shared funding from municipal, toll, and national sources.
	OFK handles tasks too large for individual municipalities, such as planning, building, and maintaining county roads, and infrastructure for vehicles, bicycles, and pedestrians.
	Buses: regulated and administered by OFK (including 13 municipalities). OFK facilitates PT across Østfold. Bus services are contracted to a private operator. OFK handles bus route planning, subsidy allocation, and finances service continuity via ticket revenue.
	Bikes and ferries: regulated by the municipality, including decisions on fleet size and route paths. Bike-sharing: previously attempted by the municipality but faced reallocation issues. Now exploring electric bikes and better parking options.
	The municipality supports local implementation via infrastructure (e.g. stops, roads) and policies (e.g. downtown parking restrictions to reduce car usage).
	Ferries: operated & funded by municipality under green policy. Free since 2013. Municipality is considering reintroducing ticketing but finds current free service effective. Ferries are co-financed by the City Package Initiative and local budget.
Policies	Responsibility lies with OFK, in cooperation with the municipality.
Incentives	Bus subsidies provided by OFK under the City Package Initiative. Ferry subsidies provided directly by the municipality.
Deployment of new services	Within municipal areas (e.g., ferry-related hubs), municipality grants permissions. When involving roads or intermunicipal infrastructure, agreement between county and municipality is required.
Financial Aids and Investments	The state supports PT through grants and urban mobility funds.
Integration with other services	The municipality has a technical department that prepares proposals. E.g., Funding sources include the City Package Initiative.
	A shared responsibility of both municipality and county.
Ticketing and Pricing	While county has overarching authority, municipality has influence at local level.
	OFK sets prices for buses. Buses in Norway are generally subsidized. Municipality sets prices for ferries.
Data exchange, Open data platform	State road department provides open traffic and flow data. However, data sharing among service providers is currently insufficient. Or different companies operate the bike systems and do not share data.
	OFK is working on improving data exchange mechanisms.

11 Mobility Ecosystem Stakeholder Engagement – Challenges and Factors for Successful Implementation of Bas

The following analysis of each business activity draws upon insights gathered through stakeholder interviews conducted across the LLs.

11.1 Challenges

BA1. Integrated Mobility Service Platform (MaaS): The development of a centralized MaaS platform faces several challenges such as navigating political involvement and complex, layered decision-making processes. A significant hurdle is securing funding, particularly the lack of financial commitment from the ministry of transport despite recognizing the future need. Operational complexities arise from coordinating a large mass of operators and supply. Addressing cross-border (For example between France and Switzerland) demand increases the complexity. Further challenges involve promoting user adoption and behavioural change towards non-private vehicle mobility, potentially influenced by factors like citizen age and technological familiarity.

BA2. Demand-Responsive and On-Demand Mobility: Integrating Demand-Responsive Transport (DRT) services into PT systems represents a strategic goal aimed at advancing and scaling these evolving solutions, intended to foster customer adoption and improve system flexibility. The ability of operators to deploy and maintain their services is influenced by both internal operational factors such as dynamic demand and external constraints, including municipal regulations governing the placement of equipment and service boundaries. For instance, high concentrations of vehicles like scooters in certain areas may prompt municipal requests for their removal. Collaboration among relevant actors, specifically municipalities and operators, is described as effective. Despite a notable degree of public acceptance for shared mobility alternatives, the predominant mode remains the private vehicle. Shifting this reliance requires extended educational and awareness initiatives, particularly in the context of increasing traffic congestion. A significant infrastructure challenge involves the scarcity of unique or dedicated parking facilities for vehicles, a deficit projected to worsen given plans to substantially increase modal share. The absence of dedicated parking locations impairs user connectivity, despite strong public demand for services. In all LLs, promoting PT remains a primary focus, representing a relatively recent but ongoing effort. Effective communication practices are highlighted, including identifying target audiences, employing suitable outreach methods, and systematically gathering feedback.

BA3. Mobility Hub Development: Significant challenges exist due to limited public space and infrastructure constraints, impacting the placement of service offerings. Existing mobility hubs, even where implemented, often cannot meet demand, require costly rebalancing efforts and highlight a need for more hubs to enhance fleet density and revenue. In parallel, a critical focus must be placed on cultural habits and user needs to raise citizen awareness, particularly in areas characterized by high private vehicle density resulting from decades of car-prioritizing infrastructure. This necessitates the application of appropriate push and pull measures, suggesting an initial emphasis on pull strategies. Effective implementation is supported by a good data foundation, with some actors already possessing relevant data. Making these systems readable and easy for users is paramount. Addressing these issues may involve exploring possibilities for solution placement in specific areas and potentially redefining land use. Collaboration and actor responsibility are noted as being dependent on funding.

BA4. NSM Integration into Mobility Ecosystem: A significant challenge is the city's lack of funds for direct financial support, which leads to the closure of conversations regarding monetary aid. Instead, efforts focus on encouraging municipalities to promote PT use among residents, possibly through purchasing and reselling discounted subscriptions. Free services, such as free bike and shuttle programs, are noted as costly,

perceived as a significant economics investment. Funding for such programs involves a subsidy split, with 40% from OFK and 60% from the municipality. When a municipality finances a free shuttle, it may rely on revenue from parking spots to cover costs, which is also possible to set up for active mobility. When demands increase operators' costs of operation, collaboration is needed. Efficiency is a concern, the possibility of stopping incentives to see if the service is used without them is also mentioned. An objective is associating the community with the use of PT.

BA5. Active Mobility Promotion: It discussed that within a specific urban area, operations are limited by fixed restrictions set by local authorities, which prevent any expansion or additional actions to be taken by NSM providers to promote active modes. However, outside this restricted zone, operators have more freedom to manage their fleets. They can decide where to operate and whether to add more services. One other challenge is encouraging citizens to change their usual travel habits. The growing number of NSM providers in the city seems to be linked to a rise in the use of shared bicycles. At the same time, providing the necessary physical infrastructure is difficult mainly due to a shortage of available labor. Finally, getting people to use active travel modes like walking and cycling is essential, but it requires a slow and steady effort to build acceptance and habit change.

BA6. Incentive-Based Programs: Based on interviews conducted with stakeholders involved in this business activity, there is a clear consensus among beneficiaries on the desirability of extending such programs beyond the pilot or experimental phase. Several interviewees emphasized that short-duration pilots, while useful for testing feasibility, do not capture the broader societal and behavioral shifts needed to embed such incentives into everyday mobility choices. As a result, many stakeholders advocate for longer-term trials with broader territorial reach and user diversity, accompanied by robust monitoring and evaluation frameworks to determine not only effectiveness but also social acceptance, administrative feasibility, and integration with existing mobility services.

BA7. Public engagement and Awareness Initiatives: Good communication has been identified as the main action in order to succeed in the BA7. Stakeholders emphasized that good communication is not only about delivering information but also about building trust, fostering dialogue, and ensuring that the public feels involved in and informed about the ongoing mobility transformations. In addition, communication should be **two-way**: not only informing the public but also actively collecting feedback, concerns, and suggestions through surveys, workshops, digital platforms, or town hall meetings (Refers to co-creation mandates).

BA8. Enhanced Data Collection and Analysis Challenges: One of the central challenges identified in BA8 is the clear definition of responsibilities regarding data collection and management. This responsibility includes determining not only who is in charge (whether public authorities, mobility operators, platform providers, or third-party data managers) but also how the processes are organized and governed across different initiatives. Stakeholders stressed the need to establish a common data governance frameworks, defining roles for data producers, and data consumers while also ensuring data interoperability across different organizations (Public or private) and platforms like MaaS.

BA9 Electric and Low-Emission Infrastructure Expansion Challenges: The main challenges identified are the loading point and pricing model of the infrastructure. Environmental impact and long-term maintenance were also raised as challenges, as expanding low-emission infrastructure should not create unintended logistical burdens.

BA10. PT Scheduling and Frequency Optimization Challenges: One of the most pressing issues is the shortage of qualified personnel, which significantly affects the ability to maintain reliable and frequent service levels. In parallel, financial constraints - many of which have been exacerbated in the aftermath of the COVID-19 pandemic - continue to limit investment capacity. PTOs face declining revenues from fares due to changes in travel behavior, coupled with rising operational costs. On top of that, the technical complexity of MaaS systems creates additional issues for optimization of multi-modal services. While MaaS aims to provide seamless multimodal travel experiences, its implementation demands advanced data integration, real-time coordination between service providers, and adaptive scheduling algorithms.

11.2 Factors for Successful Implementation of BAs

Based on conducted interviews with stakeholders involved in this business activity, following main factors are identified to achieve the goals of business activities successfully.

BA1. Integrated Mobility Service Platform (MaaS): A successful PT system and related integrated services appear to be characterized by several components. A core measure of success is the increase in the number of users of PT. This is closely linked to the integration of various mobility options, particularly the seamless integration of PT with bikes, often through positioning bike stations near transit points to serve last-mile needs. High utilization rates of integrated services, such as bike rentals reaching a number of uses per day, are indicative of successful integration and service adoption. Operational reliability is also paramount, necessitating consistency of service and dependable time schedules. Achieving success requires the acceptance of relevant technology by the public, including the use of digital ticketing and effective digital routing for intermodal journeys. Underlying these factors are essential organizational elements like effective communication and the proper assignment of roles among involved parties. While the integration of large entities like national train companies is a strategic aim, challenges related to investment, despite potential governmental support, can impact the realization of this integration.

BA2. Demand responsive and On-demand Mobility: Successful business activities in this context appear multifaceted, encompassing economic growth evidenced by demonstrating "user growth, more people using the service" and fostering a modal shift where individuals transition from private vehicles to the service. Quantitative benchmarks, such as achieving a specific "Number of rents/day," exemplified by the target of "Not being under 8000 rent/day," signify operational success. Crucially, success extends to social contributions, enhancing "mobility options for citizens" and providing a "sustainable and cleaner service". Comprehensive and equitable "Good territorial coverage, leaving no one behind" is also deemed essential. From an implementation standpoint, success requires operational reliability ("operational robustness") from the service provider. Strategically, the service must effectively integrate with and add value to existing PT. Finally, achieving long-term "economic efficiency is key" and cultivating "Travellers engagement" are fundamental to sustained success.

BA3. Mobility hub development: A successful BA in this context is primarily defined by robust user engagement, with the number of rides considered the most important metric. Operational effectiveness is gauged through measures such as trips per vehicle per day and Turnover ride. Achieving success requires operational reliability, mandating that approximately 90% of the fleet be available to provide a consistent and dependable service to users. Economically, it is essential that the coverage of basic costs is met. The service must be perceived as a desirable alternative solution that the public genuinely wants to use, characterized by a simple user experience, particularly for components like biking. Facilitating awareness through effective information for users, such as signage, is also critical. Ultimately, successful implementation contributes to the reduction of individual car use and fosters the development of the modal share of mobile vehicles

BA4. Integration of New Shared Mobility into Ecosystem: A successful BA in this domain is primarily characterized by achieving high user adoption, demonstrated by an increase in the number of travellers. A significant factor in driving this growth is the effective implementation of incentives, such as free trials, which can lead to substantial increases in ridership. Success appears contingent on a large proportion of users, ideally around 80%, utilizing these incentives. Furthermore, essential components include support from governmental bodies and municipalities, alongside efforts to enhance public awareness and promote the service. The service must also be underpinned by easy-to-use technology and receive adequate technical support. Finally, the strategic context, including policies that may introduce restrictions on private vehicle use, contributes to success by encouraging the desired modal shift away from individual cars.

BA5. Active Mobility Promotion: N.A.

BA6. Incentive-Based Programs: The main indicators of success are based on the monitoring of activity. First, the increase in usage of the subsidized mode (number of use, trip length in distance and time) and the combination of intermodal trips.

BA7. Public engagement and Awareness Initiatives: A successful BA in this domain aims to reach a significant percentage of citizens. Such an activity functions as a service completing public transit, adding demonstrable value to the existing system. Key indicators of success include cost efficiency and, more crucially, long-term economic efficiency. Operational success relies on the robustness of the underlying technology. Furthermore, success hinges upon traveller engagement and seamless integration with PT.

BA8. Enhanced Data Collection and Analysis: The KPI for this BA is based on the number of data collection integrated in the service.

BA9. Electric and Low-Emission Infrastructure Expansion: Success in this specific business context is predicated on establishing infrastructure access points at a competitive cost, ideally around a frequency of every two KM, potentially utilizing dedicated facilities to prevent usage conflicts. Operational efficiency is significantly influenced by the presence of sufficient municipal infrastructure, which can mitigate regulatory complexity and bureaucratic hurdles by reducing bureaucracy. Overcoming critical operational challenges, notably the recruitment of drivers, the provision of adequate customer support, and the implementation of effective fare collection mechanisms, is essential. Furthermore, the level of support extended by governmental and municipal entities represents a crucial factor in achieving project viability and widespread adoption.

BA10. PT Scheduling and Frequency Optimization: A successful BA in this domain is defined by its capacity to attract new target groups. The fundamental aim is to draw these novel users towards the existing public transit network, thereby facilitating a seamless integration between PT and the new service. Ultimately, success is measured by the extent to which the activity contributes to increasing the overall user base of the transportation system. It is important to note that success in this context is not contingent upon generating revenue directly from the application providing the service. The service itself acts as a mechanism to bring new participants into the broader transit system.

12 Conclusion

Deliverable 5.4 builds on the foundational work of **Deliverable 5.3** by operationalizing a framework for assessing the business viability of mobility solutions implemented across the nine SUM LLs. It introduces a structured, multi-layered analytical approach to define, validate, and evaluate Primary and Supporting Business Activities derived from the push and pull measures deployed in each city. These business activities were identified in close collaboration with LL representatives and further explored using Business Model Canvas tools to capture their structure, stakeholders, and potential long-term sustainability.

Another core focus of **Deliverable 5.4** is the integration of stakeholder engagement into the business ecosystem viability analysis. To ensure inclusive engagement, a structured workshop framework was applied, consisting of two sequential stages. The first stage - developed and reported in this Deliverable 5.4 - comprised a series of one-to-one interviews with 45 stakeholders across nine Living Labs.

Conducted in a confidential setting, these interviews encouraged open discussion, enabling stakeholders to share detailed, context-specific insights, challenges, and expectations that might not surface in group settings. For each LL, three primary stakeholder groups were targeted—authorities, PTOs, and NSM providers—while user perspectives will be integrated via survey results from WP4 in later steps of the project.

13 Future work

The next steps in the project will focus on finalizing the Business Ecosystem Viability Assessment Model and completing the remaining data collection and evaluation tasks to support an evidence-based analysis. The key areas of future work include

- **Finalization of the Viability Assessment Model:** This involves defining and refining specific business activity hypotheses for each LL, which will be validated through dedicated workshop. This workshop will serve both to verify the identified business activities and to discuss and adjust the proposed hypotheses in collaboration with LL representatives and stakeholders.
- **Completion of Qualitative and Quantitative Inputs:** To ensure comprehensive evaluation, multiple sources of data will be integrated including customer surveys, new dedicated interviews with LL representatives which will offer updated qualitative insights into implementation strategies, challenges, and perceived impacts and collected KPIs and operational data will contribute measurable indicators of performance and effectiveness.
- **Business Activity Viability Assessment:** Using the finalized model and compiled inputs, the viability of each BA will be systematically assessed across LLs
- **Transferability Recommendations:** Based on the viability assessments, a set of recommendations will be developed to support the transferability of successful business activities to other urban contexts across Europe. These recommendations will inform policy and practical guidelines for broader implementation.

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