RAIL4CITIES

Innovation Report

Deliverable 1.3

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Version: 1.0 07/07/2025

Due date of deliverable: 30/06/2025
Actual submission date: 07/07/2025

DISSEMINATION LEVEL		
PU	Public	X
SEN	Sensitive	

Start date of the project: 1st July 2023
Duration: 24 months

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Consortium of partners

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Document control sheet

Deliverable number	D
Deliverable responsible	Alice Lunardon
Work package	WP1
Main editor(s)	Alice Lunardon
Contributor(s)	Spyridon Koulouris, Stefanie Ruf, Benedikt Boucsein

Version	Date	Editor(s)	Change(s)
0.1	23.04.2025	Alice Lunardon	Initial version
0.2	15.06.2025	Alice Lunardon	Integration of partners inputs
0.3	17.06.2025	Alice Lunardon	Integration of review comments
1.0	07.07.2025	Eric Armengaud	Final layout checks

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List of Abbreviations

Abbreviations / acronyms	Description
IAB	International Advisory Board
KPI	Key Performance Indicator
LL	Living Lab
SUMI	Sustainable Urban Mobility Indicators
TOD	Transit-Oriented Development
TUM	Technical University of Munich
UGI	Urban Green Infrastructure
UIC	International Union of Railways
UN SDGs	United Nations Sustainable Development Goals

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1 Executive summary

Railway stations are at the heart of urban mobility systems, acting as gateways to cities and daily touchpoints for millions of people. In the face of growing environmental, social, and economic challenges, these infrastructures are increasingly seen not only as transportation hubs, but as strategic urban assets that can drive broader transformation in sustainability, accessibility, and community development.

The RAIL4CITIES project introduces a station transformation toolkit for European railway stations, positioning them as key enablers of sustainable and socially inclusive urban development. Funded by Europe's Rail Joint Undertaking and the European Union, the project delivers a structured approach to reimagining stations not merely as transit points, but as vibrant, integrated components of city ecosystems. The central aim is to catalyse station-led urban transformation by integrating green mobility, circular economy practices, energy efficiency, and social inclusion.

Central to RAIL4CITIES is the concept of integrated innovation, spanning technical, methodological, and organizational dimensions. The project's key innovations include the Sustainable City Promoter (SCP) model, a multi-dimensional impact assessment framework, and a co-creation methodology piloted in six Living Labs across Europe all together forming a station transformation toolkit. The SCP model offers a comprehensive and scalable approach for evaluating, planning, and redesigning stations based on local context and long-term sustainability objectives. Unlike existing decision-making frameworks, it combines quantitative indicators (such as KPIs on energy use or modal share) with qualitative inputs (such as stakeholder perceptions and citizen engagement), making it adaptable to stations of various sizes and roles within urban systems.

The project's innovations were tested and refined in Living Labs located in Italy, Belgium, France, Poland, Germany, and Portugal. Through real-world scenarios, stakeholder workshops, and user-centred fieldwork, these pilots provided valuable insights into the operational, governance, and design challenges of station transformation, validating the model's adaptability across diverse urban contexts. By merging data-driven analysis with human-cantered design, RAIL4CITIES equips policymakers, urban planners, and rail operators with practical tools to scale up impact and advance towards inclusive, climate-resilient urban futures.

RAIL4CITIES enables a shift from isolated, functional rail stations to thriving, integrated, and sustainable urban nodes that generate value for all key stakeholders. The changes realized through the project reach beyond infrastructure—they reshape relationships, unlock new opportunities for collaboration, and deliver tangible benefits across social, economic, and environmental dimensions.

This report provides a structured overview of the methodologies, findings, and implications developed and tested through RAIL4CITIES. It sets the foundation for understanding how the project contributes to shifting the role of railway stations—from isolated transit nodes to dynamic engines of urban sustainability and community cohesion.

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2 Introduction

In RAIL4CITIES, innovation is delivered at two levels: first, the introduction of the SCP model and related methodology creating benefits for the railway operators and station managers. The second level innovation is obtained through the application of the methodology in different living labs. This creates benefits for the living labs stakeholders, supporting a more efficient and more inclusive transformation of the station. Additionally, the application of the methodology for real cases supports to raise the maturity of the SCP model, and support later replication.

The report is organized as follow: Section 3 is presenting the key innovations introduced in RAIL4CITIES, while Section 4 discusses the potential impact through application of the proposed methodology. Section 5 concludes this document, and Section 6 (annexes) provide content for 1 pagers around the living labs and the station model definition.

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3 Key Innovations introduced

3.1 The SCP Model: A New Paradigm for Railway Stations

The Sustainable City Promoter (SCP) model is the cornerstone innovation of the RAIL4CITIES project. Unlike traditional station conceptual frameworks, the SCP model offers a multi-dimensional, flexible, and forward-looking structure for transforming railway stations into catalysts of sustainable urban development.

It provides a structured yet adaptable conceptual framework for guiding the sustainable transformation of European railway stations. Through dedicated stakeholder collaboration formats, the model facilitates the identification of specific Fields of Action (FoA)—key thematic areas where stations can meaningfully contribute to urban sustainability. These FoAs, developed within the RAIL4CITIES project, reflect the diverse opportunities for station-based urban regeneration.

Beyond identifying relevant FoA, the SCP model assists stakeholders in multiple ways. It provides Key Performance Indicators (KPIs) that allow them to assess both the current status and the future potential of stations within the chosen FoAs. It also introduces collaborative formats designed to help stakeholders generate innovative solutions for transformation while simultaneously identifying potential obstacles that might hinder implementation. In short, the model serves as a strategic planning tool, forming a solid basis for developing comprehensive plans for the redevelopment of individual railway stations and their surrounding urban environments, but also as a tool for structured data collection, supporting future research regarding the transformation of railway station areas. Thus, the SCP model enables a holistic, collaborative, and metrics-driven approach to reimagining railway stations as dynamic hubs of sustainable urban growth.

3.2 A Triangulated Impact Assessment Methodology

A key innovation of RAIL4CITIES lies in its advanced **impact assessment framework**, designed to evaluate proposed solutions across economic, environmental, and social dimensions — moving beyond traditional infrastructure evaluations. The methodology integrates three interconnected components: **Theory of Change (ToC)**, **Sustainable Return on Investment (S-ROI)**, and **Multi-Criteria Analysis (MCA)**. Together, these allow a robust, value-oriented, and participatory analysis of station area transformations.

- **Theory of Change (ToC): Defining Solution Pathways**

ToC serves as the foundation for the impact analysis methodology, defining how a specific **action leads to outcomes and long-term impacts**. Each Living Lab applied a tailored ToC based on one of the SCP fields of action to map out:

- Activities or interventions (e.g. install EV chargers, introduce composting, improve bike parking)
- Short-, medium-, and long-term outcomes
- Impacts aligned with KPIs and the Sustainable Development Goals (SDGs)

This structured logic model allows stakeholders to **make assumptions explicit**, identify measurement points, and contextualize sustainability strategies in each pilot.

- **Sustainable Return on Investment (S-ROI): Quantifying Total Value**

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S-ROI provides a **monetary ratio evaluation of social, environmental, and economic impacts**, going beyond conventional Cost-Benefit Analysis (CBA). Each solution proposed is assessed using the following equation:

$$S - ROI = Benefits/Costs$$

The ratio represents the social, sustainable, and environmental benefits per euro invested.

- **Benefits calculation: t**he benefit of each solution is determined based on its long-term outcomes, as defined by the Theory of Change (ToC), and assessed using one of the following methods.

  Option 1: unitary reference costs

  Some examples of unitary reference cost include:

- Cost per ton of CO2 emitted: €/T CO2
- Value of users' time (VoT): €/h

  The impact would be calculated as:

$$Impact(€) = Indicator(\#) \cdot Unitaryreference\cos t\ (€/\#)$$

  Where the indicator, for example in the previous cases, would be the kilometres of bike or bus lane, the square metres of solar panels, or the tons of CO2 emitted.

  Option 2: financial proxies

$$Impact = \left[Indicator(\#) \cdot Financial\ \Pr o\ xy\ \left(\frac{€}{\#}\right)\right] \cdot [Deadweight(\%) \cdot Attribution(\%)]$$

  Where:

  - **Financial proxies** estimate of the economic the value of non-market outcomes (e.g. walking health benefit)
  - **Deadweight** acts as a downward corrective factor on the impact, compensating for the common overestimations that arise when using financial proxies. Accounts for impacts that would have happened anyway
  - **Attribution** acts as a downward corrective factor on the impact, compensating for the common overestimations that arise when using financial proxies estimates the share of change attributable to the intervention

- **Costs:** Investment and maintenance costs are computed individually for each solution.

Once both the benefits and costs of each solution have been calculated, the S-ROI ratio for each solution is computed. This ratio supports the prioritization of solutions that deliver the greatest impact per euro invested, providing an objective foundation for decision-making in budget-constrained urban contexts.

These results are discounted over time to calculate the **Sustainable Net Present Value (SNPV)** and, ultimately, the **S-ROI ratio**:

- **Multi-Criteria Analysis (MCA): Participatory Prioritization**

MCA complements S-ROI by incorporating **stakeholder-defined priorities** using the Analytic Hierarchy Process (AHP). It structures evaluation into three levels:

1. **Objective**: Select the most suitable solution
2. **Criteria/Sub-criteria**: Categories like cost, social impact and environmental impact.

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3. **Alternatives**: The set of feasible solutions identified in each Living Lab

Through workshops and expert scoring (based on the Saaty scale from 1 to 5), stakeholders weight criteria and evaluate alternatives. Results are compiled into a **weighted score matrix**, enabling transparent comparison and alignment with local preferences.

- **Integrated and Transferable Tools**

The project developed practical **Excel-based tools** to perform both S-ROI and MCA analyses. These tools were used by the Living Labs to:

- Input context-specific data
- Compare solution rankings across financial, social, and environmental axes

By integrating ToC, S-ROI, and MCA, the methodology provides a comprehensive framework that is:

- **Actionable**: Enables decision-makers to select high-impact, cost-efficient solutions
- **Participatory**: Reflects local stakeholder input and values
- **Transferable**: Applicable across varied station types and national contexts

This holistic impact assessment framework ensures that RAIL4CITIES solutions are not only desirable and feasible but also **strategically grounded**, **value-generating**, and **aligned with long-term urban sustainability objectives**.

3.3 Living Labs as Real-World Innovation Environments

At the heart of the RAIL4CITIES methodology is the use of **Living Labs**—real-world environments where station innovations are co-created, tested, and validated in direct collaboration with local stakeholders, users, and communities. These Living Labs serve as experimental testbeds that move the SCP model from concept to action, providing crucial validation in diverse European contexts.

The methodology developed for these Living Labs is a structured, iterative process comprising six core steps:

1. **Understanding the Context:** Each Living Lab begins with an in-depth analysis of the station's local context through desk research and stakeholder questionnaires, mapping spatial, socioeconomic, and governance characteristics. This ensures that interventions are rooted in reality, not abstract theory.
2. **Applying the Methodological Toolkit:** Leveraging the toolkit developed in WP2, Living Labs adapt the SCP's seven fields of action (energy, mobility, logistics, circularity, resilience, station-city integration, and social inclusion) to the specific challenges and opportunities of the local station area.
3. **Involving Stakeholders:** A comprehensive stakeholder mapping and engagement process ensures that all relevant actors—railway operators, municipal agencies, private sector partners, NGOs, and, above all, end-users—are involved from the outset. This is operationalized through bilateral and multi-actor workshops, designed to build trust, surface conflicts, and align strategic objectives.
4. **Identifying Underserved Needs:** Employing Human-Centered Design (HCD) principles, the methodology integrates fieldwork (observations, behavioral mapping, user interviews) to uncover the needs, habits, and aspirations of everyday users, especially vulnerable or underserved groups. This step ensures solutions are anchored in lived experience.

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5. **Ideating Solutions:** Structured ideation workshops use collaborative templates (e.g., MIRO boards) to co-create interventions that respond to identified needs. These sessions are designed to bridge technical, operational, and community perspectives, generating a menu of possible innovations.
6. **Validating and Implementing Solutions:** Ideas are stress-tested against local governance and business model constraints, with selected solutions piloted through tactical urbanism and placemaking experiments. Implementation includes feedback loops for rapid learning and adjustment, culminating in events that communicate results and stimulate broader buy-in.

This methodology is consistently applied across Living Labs in Italy, France, Belgium, Poland, Germany, and Portugal, with context-specific adjustments—for example, a student-led summer school in Dorfen, or a strategic integration approach for the unfunded Portuguese case studies.

3.3.1 From Theory to Practice: Core Innovations of the Living Labs

The RAIL4CITIES Living Labs represent a core innovation of the project, translating conceptual methodologies into practice and validating the SCP model in diverse, real-world urban contexts. Far beyond conventional pilot projects, the Living Labs acted as **collaborative ecosystems**—places where railway operators, municipalities, citizens, planners, and designers converged to co-create sustainable, inclusive, and resilient station areas.

The Living Labs not only validated the SCP model's feasibility but also demonstrated its ability to respond flexibly to real-world complexity—from regulatory constraints and spatial limitations to stakeholder conflicts and differing visions of urban growth.

Key activities and innovations included:

- **Applying the SCP fields of action** to specific local challenges;
- **Engaging stakeholders in co-creation processes;**
- **Validating assumptions** through human-centered design, behavioral mapping, and user profiling;
- **Testing participatory tools** via MIRO boards, surveys, and in-person workshops;
- **Implementing tactical urbanism and placemaking** to prototype new uses of station spaces.

3.3.2 A Unified Yet Flexible Methodological Framework

All Living Labs (Italy, France, Belgium, Poland, Germany) and the three Portuguese case studies followed a common six-step methodology, with adjustments where needed:

1. Understanding the Context
2. Applying the Methodological Toolkit from the draft model version
3. Involving Stakeholders
4. Identifying Underserved Needs
5. Ideating Solutions
6. Crafting and Validating the Value Proposition

While the core approach was consistent, it was tailored to each context—allowing local specificity to guide the SCP model's application. This flexibility proved especially valuable given the wide spectrum of challenges addressed: from energy transition in Milano Rogoredo, to social integration in Tomaszów-Mazowiecki, and active mobility in Toulouse Matabiau.

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3.3.3 Human-Centered Co-Creation and Action-Oriented Urbanism

RAIL4CITIES elevated Human-Centered Design (HCD) from theory to implementation. Through fieldwork, Living Labs observed and interviewed station users, developed behavioral maps, and created detailed user personas. This enabled interventions to be grounded in the real needs and habits of everyday users, particularly vulnerable or underserved groups such as people with reduced mobility, students, or the elderly.

Participatory tools—such as MIRO boards, stakeholder mapping, and workshop formats inspired by the Cambridge Value Creation Model—enabled partners to:

- Visualize power dynamics and stakeholder relationships;
- Facilitate transparent dialogue between cities and rail operators;
- Generate ideas from diverse knowledge bases—including users, NGOs, SMEs, and mobility providers.

Each Living Lab culminated in placemaking experiments and temporary interventions—from Milan's community-designed seating installations to Toulouse's on-site mobility demonstrations. These activities:

- Validated co-created ideas before permanent investments;
- Sparked public interest and visibility;
- Served as low-cost tools for testing station transformations.

For instance, in Tomaszów-Mazowiecki, placemaking included a photo competition and open dialogue session showcasing alternative uses of station space, linking environmental identity with public participation.

3.3.4 A Comparative Innovation Testbed

By applying the SCP model across very different geographies and governance systems, the Living Labs enabled the project to:

- Compare methodology uptake between fully funded and lower-resourced contexts (e.g., Portugal);
- Examine how institutional readiness and local politics influenced adoption;
- Learn what types of tools worked best for ideation, negotiation, and implementation.

For example, the German Living Lab, executed as a Summer School in Dorfen, experimented with a design-led and academic co-creation format, demonstrating that education and urban transformation can be meaningfully linked under the RAIL4CITIES model.

3.3.5 Key Contributions to SCP Model Validation

The Living Labs contributed critical insights that helped validate and refine the SCP model:

- Confirmed the relevance of the SCP fields of action for real-world urban rail challenges;
- Demonstrated that co-creation can overcome institutional silos between rail and city actors;
- Proved that temporary placemaking can activate long-term partnerships and civic interest;
- Offered insights into mitigating stakeholder fatigue, resistance, or resource limitations with tailored facilitation and visual tools.

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Ultimately, the Living Labs played a dual role: advancing knowledge on sustainable station development and providing a feedback mechanism to improve the SCP model, paving the way for a robust methodology ready to scale across Europe.

3.4 Integration of Urban and Rail Governance through Co-Creation

One of the standout innovations of RAIL4CITIES is the **systematic inclusion of governance and institutional dynamics** into the transformation process. Rather than treating city and rail operators as isolated actors, the project fosters **integrated governance**, enabling joint planning and shared decision-making across sectors.

This is accomplished through:

- **Stakeholder Mapping**: A structured identification of decision-makers, operators, users, and potential partners, distinguishing between existing and potential relationships.
- **Bilateral Workshops**: Initial city-railway dialogues build trust and align strategic priorities, often uncovering conflicts or gaps in responsibility for station surroundings.
- **Multi-Actor Co-Creation Workshops**: Subsequent sessions involve wider stakeholders (e.g. mobility providers, social service agencies, energy companies) to co-define needs and ideate solutions.
- **Iterative Engagement**: Combining technical data, lived experience, and institutional insight over multiple sessions helps establish **actionable collaboration frameworks**.

This approach helped overcome **fragmentation in station area governance**, especially in contexts where the land or facilities are managed by multiple entities with limited coordination. It also strengthens **institutional capacity** for long-term transformation beyond the life of the project.

3.5 Operational Tools and Digital Innovations

To support replicability and real-world use, RAIL4CITIES developed several **operational and digital tools**, including:

- **MCA & S-ROI Excel tools**: Ready-to-use evaluation templates allow station managers and city partners to perform sustainable return-on-investment assessments and prioritize options based on stakeholder-defined criteria.
- **KPI Mapping Tables**: Linked to the fields of action, these tables allow practitioners to select and adapt indicators based on local goals, whether focused on energy reduction, service equity, or spatial reuse.
- **MIRO-based participatory templates**: Interactive digital canvases enable effective online and hybrid workshops, particularly for ideation, value mapping, and ToC creation.
- **UrbanistAI visualizations**: Some Living Labs used AI-generated visuals to **prototype physical changes** to the station and surrounding space (e.g. community gardens, mobility hubs, inclusive seating areas), supporting public dialogue and iteration.

These tools enhance the **practicality and transferability** of the SCP model, lowering the threshold for adoption by other European cities and rail operators. They also help **democratize innovation**, making strategic planning more accessible to non-technical actors such as NGOs, citizen groups, and local commerce representatives.

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4 What Could Be Changed Thanks to RAIL4CITIES, and for Whom?

RAIL4CITIES brings a fundamental change to how European railway stations are conceived, planned, and managed—moving beyond their traditional role as transit hubs and transforming them into drivers of urban sustainability, social inclusion, and community value.

4.1 For Rail Operators and Station Managers

- **What changes:** RAIL4CITIES introduces a suite of practical tools—including a robust Key Performance Indicator (KPI) framework, participatory co-creation methodologies, and impact assessment instruments (such as S-ROI and MCA tools). Operators can now systematically evaluate station performance across the different Fields of Action, which include topics such as energy, mobility, social inclusion, environmental protection, rather than relying solely on traditional operational metrics.
- **Benefits:** Through data-driven insights, operators can optimize the allocation of resources, streamline processes, and prioritize investments with clear sustainability and social return on investment benchmarks.
- **Improved stakeholder engagement:** The co-creation toolkit supports transparent dialogue with city authorities, service providers, and the public, reducing conflicts and aligning objectives from the outset.
- **Demonstrable progress:** The SCP model and associated tools enable operators to track and report their progress towards key sustainability targets, helping to secure funding and regulatory support for future projects.

Example:
In Milano Rogoredo, the adoption of SCP tools helped identify key barriers (legal, spatial, technical) and fostered a shared roadmap among operators, local authorities, and community members for advancing energy and circularity projects.

4.2 For City Authorities and Urban Planners

What changes:

The project breaks down longstanding silos between city planners and rail operators, replacing fragmented decision-making with integrated, cross-sectoral planning. The SCP model embeds station development within the city's broader goals for sustainable mobility, land use, and climate resilience.

Benefits:

- **Accelerated urban transformation:** By positioning stations as catalysts for regeneration, cities can anchor economic growth, improve public spaces, and revitalize surrounding neighborhoods.
- **Strategic land use:** Tools provided by RAIL4CITIES support evidence-based planning for mixed-use development, walkability, and green infrastructure around stations.

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- **Policy alignment:** City authorities can more easily align station area projects with national and European policy frameworks (such as the Green Deal and Urban Mobility Framework), enhancing their eligibility for EU funding and investment.

Example:
In Ottignies, Belgium, city planners used the SCP framework to bridge gaps between various public and private actors, creating a unified vision for the station area that balances housing, mobility, green spaces, and services.

4.3 For Passengers and Local Communities

What changes:

Railway stations become more than functional transfer points—they evolve into vibrant, safe, and inclusive civic spaces that welcome everyone, including non-travelers. Human-centered design principles ensure that station improvements are rooted in real user needs and local aspirations.

Benefits:

- **Enhanced user experience:** Improvements such as safer walking routes, better wayfinding, accessible facilities, and attractive public areas make everyday journeys smoother and more pleasant.
- **Community identity and engagement:** Temporary and permanent placemaking initiatives—such as art installations, events, and community gardens—turn stations into cultural anchors and gathering places.
- **Economic and social inclusion:** Stations host services and amenities (e.g., coworking spaces, local markets, social services) that cater to a broader spectrum of residents and foster a sense of ownership and pride.

Example:

In Tomaszów-Mazowiecki, Poland, placemaking activities and open-air events engaged residents of all ages, connecting the station's transformation to local identity and environmental stewardship.

4.4 For Policy Makers and the Broader Urban Innovation Ecosystem

What changes:
RAIL4CITIES provides a ready-to-use, evidence-based framework for scaling sustainable station transformations across different regions and countries. Policy makers and industry leaders benefit from validated methodologies that are adaptable, transparent, and aligned with European policy ambitions.

Benefits:

- **Replication and scalability:** The SCP model and tools are designed for transferability, enabling their adoption in diverse local contexts without losing rigor.
- **Accountability and impact tracking:** Quantitative and qualitative indicators support robust monitoring and evaluation, critical for policy reporting and future investment decisions.

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- **Innovation and leadership:** By adopting RAIL4CITIES methodologies, cities and countries position themselves as frontrunners in sustainable mobility and urban regeneration, strengthening their case for participation in international networks and funding programs.

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5 Conclusion

Railway stations are at the heart of urban mobility systems, acting as gateways to cities and daily touchpoints for millions of people. In the face of growing environmental, social, and economic challenges, these infrastructures are increasingly seen not only as transportation hubs, but as strategic urban assets that can drive broader transformation in sustainability, accessibility, and community development.

Central to RAIL4CITIES is the concept of integrated innovation, spanning technical, methodological, and organizational dimensions. The project's key innovations include the Sustainable City Promoter (SCP) model, a multi-dimensional impact assessment framework, and a co-creation methodology piloted in six Living Labs across Europe all together forming a station transformation toolkit. The SCP model offers a comprehensive and scalable approach for evaluating, planning, and redesigning stations based on local context and long-term sustainability objectives. Unlike existing decision-making frameworks, it combines quantitative indicators (such as KPIs on energy use or modal share) with qualitative inputs (such as stakeholder perceptions and citizen engagement), making it adaptable to stations of various sizes and roles within urban systems.

The project's innovations – as well as their expected impact for the different stakeholders – have been introduced in this report. Through the deployment of the methodology in different living labs, these pilots provided valuable insights into the operational, governance, and design challenges of station transformation, validating the model's adaptability across diverse urban contexts. RAIL4CITIES enables a shift from isolated, functional rail stations to thriving, integrated, and sustainable urban nodes that generate value for all key stakeholders. The changes realized through the project reach beyond infrastructure—they reshape relationships, unlock new opportunities for collaboration, and deliver tangible benefits across social, economic, and environmental dimensions.

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6 Annexes

6.1 Living Lab One-Pager: Milano Rogoredo (Italy)

Context & Needs

Milano Rogoredo is one of Milan's key intermodal transportation hubs, serving 12 million passengers per year and offering regional, suburban, and long-distance rail, as well as metro, bus, and car-sharing services. The station's strategic role is set to expand with the redevelopment under the Milano Santa Giulia Masterplan, aiming for a mixed-use district integrating residential, business, and leisure functions.

Needs identified:

- Enhance the sustainability of station operations—particularly energy consumption and waste management.
- Improve the integration between the station and its surrounding (mainly commercial/industrial) neighborhoods.
- Address challenges of energy reliance on the grid, inefficient public waste sorting, and lack of renewable energy production onsite.
- Prepare for future demand—projected to rise to 19 million passengers annually by 2031.

Pilot concepts & ideation:

- **Energy Hub:**
  - Developed a closed-loop renewable energy plan: installation of PV panels on roofs and parking, exploration of biogas from regional waste, integration of EV charging (currently 20 EV points), and battery/hydrogen storage.
  - Smart integration of energy demand across station uses: building HVAC, e-mobility, personal devices.
  - S-ROI analysis found EV charging via renewables offers a strong sustainable return (7.26:1).
- **Circular Economy Hub:**
  - Design of AI-powered waste sorting/collection (robotics + incentive systems, e.g., QR code rewards).
  - Campaigns on correct waste separation, children's sorting games, second-hand shops, bike repair stations, "Recup" reusable packaging.
  - Feasibility studies for using waste as energy input; identified limitations due to scale and technology readiness.

Benefits & Outcomes for Stakeholders

Rail operators & station managers:

- Roadmap for energy self-sufficiency, reduced emissions, and cost savings via renewables.
- Data-backed justification for infrastructure investment; clear KPIs for sustainability.

City authorities & planners:

- Strong alignment with city and EU sustainability targets (Milan's climate plan, Green Deal).

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- Improved integration of the station as an urban anchor for regeneration and green mobility.

Passengers & community:

- More accessible, energy-efficient, and user-friendly station.
- New amenities (secure e-bike parking, solar benches, sustainable shops), safer and more pleasant public space, local events.

Businesses & local employees:

- Increased foot traffic, potential new revenue from added services (charging, retail), incentives for sustainable practices.

Wider impact:

- Model for scalable, transferable energy and circular economy solutions at other European stations.
- Quantified environmental and social benefits (CO2 reductions, improved waste outcomes).

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6.2 Living Lab One-Pager: Toulouse Matabiau (France)

Context & Needs

Toulouse Matabiau is the main railway station in Toulouse, centrally located and serving as a vital node in the French rail network. Handling 35,000 passengers daily (54,000 total footfall), it connects high-speed (TGV), regional, and local lines, plus metro, bus, and bike networks.

Needs identified:

- Integrate emerging mobility modes and green infrastructure to foster inclusive, low-carbon travel.
- Address the lack of safe, dedicated cycling facilities and secure bike parking.
- Improve multimodal integration and wayfinding to support seamless transfers.
- Enhance user comfort and inclusivity through accessible amenities for commuters, tourists, and the local community.

Pilot concepts & ideation

- **Green Mobility & Multimodality Hub:**
    - Expanded and upgraded secure bike parking, including weather-protected, lockable hangars.
    - New, continuous 2.5 km bicycle lane directly connecting the station with surrounding neighborhoods—prioritizing safety, accessibility, and modal shift from car to active travel.
    - Improved station signage and navigation, co-working spaces, and commuter amenities (showers, changing rooms).
    - Bike-sharing and flexible rental schemes to encourage “last-mile” cycling.
    - S-ROI and MCA impact analysis showed the bike lane delivers a positive social return (S-ROI 1.40:1).
- **User-Centered Innovations:**
    - Consultations with cyclists, commuters, and neighborhood groups to identify needs.
    - Promotion of multimodal journeys—seamless transitions between train, bus, bike, and walking.

Benefits & Outcomes for Stakeholders

Rail operators & station managers:

- Data-driven investment justification for active mobility and intermodal services.
- Improved passenger flow, safety, and user satisfaction.

City authorities & planners:

- Strong alignment with Toulouse’s urban mobility and climate goals.
- Greater connectivity between station and city, supporting regeneration and economic vibrancy.

Passengers & community:

- Safer, more accessible station precinct.

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- Enhanced amenities: secure bike parking, bike-sharing, better navigation, and community spaces.
- Support for healthy, low-carbon lifestyles.

Businesses & local employees:

- More attractive location for retail and service businesses, increased foot traffic.
- Benefits for employees (active commute options, co-working).

Wider impact:

- Model for integrating rail and active mobility for other European cities.
- Demonstrated CO2, air pollution, and noise reduction benefits.

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6.3 Living Lab One-Pager: Ottignies (Belgium)

Context & Needs

Ottignies station is a regional rail node in Wallonia, Belgium, bridging urban and rural communities. It is a multi-modal interchange with significant potential to become a hub for socially inclusive services and local economic activity.

Needs identified:

- Better integrate the station area with the town center and residential districts.
- Support social cohesion by offering community-focused services in the station area.
- Upgrade amenities to meet daily needs of both commuters and local residents.
- Address underuse of public spaces and lack of vibrant, accessible gathering places.

Pilot concepts & ideation

- **Socially Inclusive Services Hub:**
  - Co-designed community spaces for social services (health, education, childcare), co-working, and local commerce.
  - Placemaking: new public square, improved pedestrian access, green spaces for events and leisure.
  - Flexible use of station buildings for cultural programming, pop-up shops, and social enterprises.
  - MCA and S-ROI analyses highlighted strong potential for social return by bridging service gaps and enhancing inclusion.
- **Stakeholder Engagement:**
  - Participatory workshops with city officials, NGOs, business owners, and diverse resident/user groups.
  - Mapping of underused assets and opportunities for shared governance.

Benefits & Outcomes for Stakeholders

Rail operators & station managers:

- Increased station usage and improved reputation as a community anchor.
- Partnerships for co-managed services and facility upgrades.

City authorities & planners:

- Realization of urban regeneration and inclusion goals.
- New, accessible services for local families and rural populations.

Passengers & community:

- Welcoming, vibrant station area supporting daily needs.
- Enhanced safety, inclusiveness, and sense of belonging.

Businesses & local employees:

- New business and employment opportunities via social enterprise and pop-ups.
- More footfall and community events.

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Wider impact:

- Replicable model for community-driven, mixed-use station areas.
- Strengthened rural-urban connections and social resilience.

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6.4 Living Lab One-Pager: Tomaszów Mazowiecki (Poland)

Context & Needs

Tomaszów Mazowiecki station is a regional transport gateway in central Poland, positioned at the interface of city and nature.

Needs identified:

- Revitalize the station and its surroundings as a community hub and gateway to green spaces.
- Improve connectivity between town, station, and local parks/nature reserves.
- Address lack of green infrastructure, family amenities, and cycling access.
- Support sustainable tourism and social inclusion.

Pilot concepts & ideation

- **"Greening Engine" Concept:**
  - Creation of new green public spaces (gardens, small park) at/near the station.
  - Safe cycling and pedestrian connections linking station to city and local natural areas.
  - Installation of family-friendly amenities (playground, educational nature info point).
  - Shared bike service and outdoor seating to encourage active, inclusive use.
  - S-ROI and MCA assessments demonstrate tangible social, health, and environmental gains.
- **Community Co-Creation:**
  - Engaged residents, youth, environmental groups in design and activation of green spaces.
  - Focus on accessibility for all ages and abilities.

Benefits & Outcomes for Stakeholders

Rail operators & station managers:

- Enhanced image and increased usage through improved facilities.
- New partnerships with local organizations.

City authorities & planners:

- Support for local tourism and active mobility strategies.
- Contribution to city and regional climate/environmental objectives.

Passengers & community:

- More attractive, child- and family-friendly station.
- Accessible, welcoming link to local nature.

Businesses & local employees:

- Increased tourism and local spending.
- Opportunities for small enterprises (bike rental, cafés).

Wider impact:

- Blueprint for "green station" transformation in small cities.

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- Health, social, and sustainability co-benefits.


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6.5 Living Lab One-Pager: Dorfen (Germany)

Context & Needs

Dorfen is a small but growing town in Bavaria, Germany, with a regional railway station that primarily serves daily commuters to Munich and the surrounding region.

Needs identified:

- Generate concepts for a new railway station, which will be situated farther away from the city center due to the conversion of the railway line to high-speed rail.
- Better connect the new station area to the historic town center and residential areas.
- Enhance the user experience for commuters and visitors, particularly in terms of accessibility, comfort, and active mobility options.
- Address underused station surroundings, lack of green and public spaces, and limited multimodal connections.
- Foster a stronger identity for the station as a welcoming gateway to Dorfen and its community.

Pilot concepts & ideation

- **New station area as an integrated mobility & community hub:**
    - Develop concepts for the new Dorfen station and surrounding station area as a vibrant centrality hub.
    - Upgrade pedestrian and cycling infrastructure linking the station to key town destinations.
    - Carry out placemaking interventions to create participative planning formats for the design of the new station area and to integrate the needs and visions of the Dorfen inhabitants into the design proposals.
    - Pilot flexible mobility solutions tailored for commuters and residents in rural areas
    - Improve wayfinding, shelter, lighting, and digital information for all users.
    - Carry out stakeholder participation formats with local authorities, businesses, and residents shaped priorities and solutions.

Benefits & Outcomes for Stakeholders

Rail operators & station managers:

- Improved station attractiveness, customer satisfaction, and potential for increased ridership.
- Foundations for the new Dorfen railway station as a sustainable mobility hub.

City authorities & planners:

- Support for Dorfen's sustainable urban development and active travel plans.
- A more cohesive connection between the town's new transport node and its urban fabric.

Passengers & community:

- Easier, safer, and more pleasant access to/from the station.
- New public spaces for gathering, events, and leisure.
- Opportunities to participate in the planning of the new Dorfen railway station area

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Businesses & local employees:

- Boosted footfall for nearby shops and services.
- New business opportunities through station-area activation.

Students participating in the summer school:

- Insights on the topic of railway stations as catalysts for sustainable urban development and TOD urban transformation.
- Opportunity to engage in real urban transformation processes and interact with various stakeholders.

Wider impact:

- Scalable example of small-town station TOD centered transformation in a rural context.
- Contribution to Bavaria's regional mobility and sustainability goals.

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6.6 Living Lab One-Pager: Portuguese Case Studies (Portugal)

Context & Needs

Portuguese Living Labs are centered on new or renewed high-speed rail stations in key cities (e.g., Évora), as part of the national strategy for decarbonization and improved regional connectivity.

Needs identified:

- Plan and implement sustainable station areas as catalysts for wider regional development.
- Integrate stations with surrounding neighborhoods, economic activity, and public transport.
- Maximize environmental performance and social inclusion from the outset of design and operation.
- Develop governance and business models for long-term value creation.

Pilot concepts & ideation

- **Sustainable Station Area Planning:**
    - Integrated master planning linking the station to new urban development, services, and natural landscapes.
    - Early adoption of green infrastructure, nature-based solutions, and climate adaptation measures.
    - Emphasis on multimodal access: walking, cycling, buses, and e-mobility to/from the station.
    - Inclusion of public amenities (parks, community facilities) and spaces for social and economic interaction.
    - Participatory governance: involvement of municipalities, national railways, business sector, and local community.
- **Business & Policy Innovation:**
    - Feasibility studies for public-private partnerships and revenue generation from mixed-use development.
    - Scenario analysis for future-proofing investments and maximizing positive spillovers.

Benefits & Outcomes for Stakeholders

Rail operators & station managers:

- High-quality, future-ready stations with strong identity and local acceptance.
- Reduced risks through integrated design, operations, and stakeholder engagement.

City/regional authorities & planners:

- Leverage new stations for urban expansion, regeneration, and decarbonization.
- Enhanced coordination among transport, housing, and economic policy sectors.

Passengers & community:

- Convenient, multimodal access; more vibrant, attractive station districts.
- Improved quality of life through green spaces and accessible public services.

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Businesses & local economy:

- New commercial opportunities tied to station area growth and regional connectivity.
- Long-term investment in place-making and talent attraction.

Wider impact:

- Reference models for high-speed rail urbanism in Portugal and beyond.
- Progress toward national and EU climate, social, and territorial cohesion objectives.

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6.7 Station model definition One-pager

Context & Needs

The RAIL4CITIES project introduces a new model for current and future railway stations and demonstrates the changes necessary for them to play a significant role in a sustainable urban future. To date, there is a lack of a consistent concept to describe the sustainable transformative potential of railway stations, making it challenging for all stakeholders involved to envision collaborative sustainable transition pathways. Consequently, the objective of the model in the RAIL4CITIES project is to identify common sustainable transformation pathways for European railway stations and thus to emphasize their distinctive role in urban landscapes, not merely as mobility nodes but as integral elements of urban life, impacting a diverse range of stakeholders.

Activities performed in the project

Model development commenced with a literature review that underscored the diversity of stations. Subsequently, expert workshops were conducted, involving 42 experts from 15 different countries, including academics, urban governance practitioners, railway professionals, and industry experts. These workshops resulted in a draft model that outlined the areas of action, performance indicators, and stakeholder engagement methods. The model was subsequently tested in five Living Labs through workshops and user participation, followed by further refinement in expert sessions.

Benefits for the stakeholders

The resulting, refined model highlights station areas as opportunity zones for sustainable urban development, contributing to social, environmental, and economic sustainability. By analyzing the potential of stations and their surrounding areas through various formats, including expert workshops, fieldwork, user interviews, and placemaking, we identified a range of Fields of Action (FoA) and Key Performance Indicators (KPIs) that guide and assess the potential of stations for sustainable transformation.

Stakeholders can profit from the model as a robust methodology that assists each station's sustainable transformation based on the specific needs and urban context. Beginning from providing appropriate stakeholder collaboration tools, the model assists with the identification of the relevant FoA and the measurement of the station's current and future performance along appropriate KPIs. Based on the FoA selection, stakeholders can identify appropriate solutions that can lead to the station's sustainable development, as a promoter of a sustainable urban future. Last but not least, the model serves as a basis for structured data collection, supporting future research regarding the transformation of railway station areas.

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