



Sustainable Energy Authority of Ireland

National Energy Research,
Development & Demonstration
Funding Programme

FINAL REPORT TEMPLATE

SECTION 1: PROJECT DETAILS – FOR PUBLICATION

Project Title	A Trusted and Interoperable Mobility as a Service Ecosystem for Ireland (MaaS4IRL)
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Project Summary (max 500 words)

The MaaS4IRL project—A Trusted Interoperable Mobility as a Service Ecosystem for Ireland—is funded by the Sustainable Energy Authority of Ireland (SEAI) and the Department of Transport. It seeks to establish a trusted and interoperable data-sharing ecosystem for Mobility as a Service (MaaS) applications within Ireland. At the heart of this project is the development of the Irish Mobility Data Space (IMDS), which will provide a framework for secure and efficient collaboration between public and private stakeholders in the mobility sector. This initiative aligns with Ireland's broader sustainable mobility goals by leveraging data-driven solutions to optimize transport services and enhance public mobility.

The project aims to study the technical, regulatory, and governance foundations necessary for the establishment of this data-sharing ecosystem for Irish mobility ecosystem. The MaaS4IRL project is specifically designed to explore global best practices in data-sharing mechanisms and governance models, assessing their applicability in Ireland's context. This includes compliance with key European regulations such as the EU Data Governance Act (DGA), General Data Protection Regulation (GDPR), and Ireland's Data

Sharing and Governance Act (DSGA). By focusing on legal compliance and governance, the project works to ensure that data sharing in the MaaS ecosystem remains secure, efficient, and aligned with public interests.

The project's primary objectives include conducting an in-depth study of the technical, regulatory, and governance aspects of data-sharing for MaaS. This study focuses on identifying global best practices and understanding how these can be applied to the Irish context. It investigates data-sharing mechanisms, governance structures, and interoperability frameworks crucial to supporting MaaS ecosystems. The project also aims to provide practical recommendations for creating a secure, decentralized data-sharing infrastructure, supporting real-time transport services and multimodal journey planning. In addition, the project identifies critical transport sectors where enhanced data sharing can offer substantial societal and environmental benefits, such as **Electric Vehicle (EV) charging networks, Demand-Responsive Transit (DRT) solutions, and freight logistics.**

The outcomes of the MaaS4IRL project are both profound and transformative. The proposal for the IMDS will lay the foundation for a connected, data-rich transport ecosystem that optimizes public mobility, fosters sustainable transport solutions, and enables more efficient infrastructure planning. IMDS will optimize real-time transport services, enhance multimodal journey planning, and support data-driven mobility applications. The project also delivers critical recommendations on data strategies, governance frameworks, co-creation methods, and data value creation, all essential for implementing IMDS. The project identifies priority areas for data-driven solutions that can advance sustainable mobility in Ireland. These include electric vehicle (EV) charging networks, demand-responsive transit (DRT) solutions, and freight logistics. A strategic roadmap has been developed for the implementation of IMDS, outlining a phased approach to creating an integrated, intelligent mobility ecosystem. This initiative will help improve the efficiency, accessibility, and environmental responsibility of transportation in Ireland.

In conclusion, the MaaS4IRL project lays the groundwork for a sustainable, data-driven mobility ecosystem in Ireland, advancing smart, environmentally responsible transport solutions for a connected future.

Keywords (min 3 and max 10)

Mobility as a Service, MaaS, Data Spaces, Mobility Data Spaces, Irish Mobility Data Spaces, Regulatory Frameworks, Data Act, Data Governance Act, Data Sharing and Governance Act

NB – Both Section 1 and Section 2 of this Final Report will be made publicly available in a Final Technical Report uploaded online to the [National Energy Research Database](#).

In the following Section, please provide a clear overview of your project, including details of the key findings, outcomes and recommendations. The section headings below are provided as a guide, please update or add to these as best suits your project.

By submitting this project report to SEAI, you confirm you are happy for Section 1 and Section 2 of this report to be made publicly available. If you wish to request edits to this section in advance of publication, please contact SEAI at EnergyResearch@seai.ie.

SECTION 2: FINAL TECHNICAL REPORT – FOR PUBLICATION

(max 10 pages)

2.1 Executive Summary

Mobility as a Service is revolutionizing transportation by integrating multiple travel modes into a seamless, user-centric digital platform that simplifies journey planning, booking, payments, and real-time updates. By promoting public and shared transport, MaaS has the potential to alleviate congestion, reduce carbon emissions, and improve urban and rural mobility. Global case studies such as Jelbi in Germany and Whim in Finland demonstrate the effectiveness of MaaS in enhancing user experience and reducing transport-related emissions. These implementations highlight the critical need for robust governance structures, data standardization, and cutting-edge technologies, such as integrated payment systems and real-time GPS tracking, to enable seamless data exchange. Furthermore, they emphasize the importance of public-private collaboration in driving innovation and delivering customer-centric mobility solutions.

Ireland is at a pivotal moment in transforming its mobility ecosystem to align with sustainability and efficiency goals. The introduction of MaaS in Ireland presents an opportunity to reshape the nation's transportation landscape by integrating various modes of transport into a unified, accessible, and sustainable digital platform. However, achieving this vision requires overcoming significant challenges, particularly in data sharing and integration. Currently, data-sharing practices within Ireland's mobility sector are fragmented and reliant on inefficient methods. This fragmentation hinders the development of a comprehensive MaaS ecosystem. To unlock the full potential of MaaS, Ireland requires a systematic, secure, and efficient data-sharing framework that fosters interoperability and collaboration across stakeholders.

The MaaS4IRL project—A Trusted Interoperable Mobility as a Service Ecosystem for Ireland—is funded by the Sustainable Energy Authority of Ireland and the Department of Transport. This initiative studies the technical and regulatory foundations necessary to establish a trusted and interoperable data-sharing ecosystem, specifically within the context of MaaS applications. At the core of this study is identify the requirements and challenges of building a data space—a trusted, interoperable framework based on common governance principles, standards, and enabling services. Data spaces facilitate secure and efficient collaboration between public and private sector participants, supporting the development of smart, data-driven mobility applications such as MaaS.

MaaS4IRL identifies key challenges and opportunities in enabling seamless data exchange, fostering stakeholder collaboration, and laying the groundwork for an innovative MaaS ecosystem that aligns with Ireland's sustainable mobility goals. The project proposes to align with broader European and national data strategies, including compliance with the EU Data Governance Act, General Data Protection Regulation (GDPR), and Ireland's Data Sharing and Governance Act. By addressing governance and legal compliance frameworks, the project aims to establish a secure and trusted data-sharing environment.

A significant outcome of the MaaS4IRL project is the proposal to establish the Irish Mobility Data Space (IMDS), a crucial step in transforming Ireland's transport ecosystem. IMDS will provide a secure and interoperable data-sharing environment that optimizes transport services, enhances public mobility, and positions Ireland as a leader in innovative, data-driven transport solutions. The project delivers key recommendations on data strategies, development, modelling, description, publication, discovery,

access, exchange, provenance, sovereignty, and trust. It also outlines governance frameworks, co-creation methods, and data value creation principles essential for the successful implementation of IMDS.

Additionally, MaaS4IRL identifies priority areas where data-driven solutions play a critical role in advancing sustainable mobility in Ireland. A strategic roadmap for IMDS implementation has been developed, providing policymakers with a phased approach to realizing a fully integrated and intelligent mobility ecosystem. This initiative proposes to leverage cutting-edge data-sharing mechanisms and governance principles which will set the foundation for a more accessible, efficient, and environmentally responsible transportation landscape in Ireland.

2.2 Introduction to Project

Dublin's severe traffic congestion highlights the urgent need for innovative mobility solutions in Ireland. According to the 2023 TomTom Traffic Index, Dublin ranks as the second slowest city in the world, with a 10-kilometer journey taking an average of 29 minutes and 30 seconds¹. Only London fares worse, with the same journey taking over 37 minutes. Additionally, Dublin's congestion level stands at 66%, the highest among all surveyed cities². These statistics underscore the need for smarter traffic management strategies and sustainable mobility solutions.

To address these challenges, the Department of Transport (DoT) introduced the National Sustainable Mobility Policy (SMP)³, which outlines a comprehensive plan to enhance sustainable transport options in Ireland. The policy emphasizes creating a safer, greener, and more inclusive mobility network while offering efficient alternatives to private car travel. A key element of this policy is advancing Mobility as a Service (MaaS), with specific measures to accelerate its implementation.

A collaborative study by Smart Dublin, Urban Foresight, and the DoT highlights the critical need for MaaS in Ireland, identifying models best suited to the country's transport landscape⁴. Several key publications explore MaaS's potential to transform Ireland's mobility ecosystem, offering valuable insights into sustainable, user-friendly transport solutions. However, while urban centres like Dublin, Galway, and Cork benefit from MaaS applications, significant challenges remain for rural areas, where nearly 35.53% of the population faces limited access due to inadequate connectivity infrastructure. This disparity highlights the need for an equitable transport strategy that includes rural populations.

Another major barrier is the lack of effective data-sharing mechanisms. Data serves as the foundation for MaaS and the broader mobility ecosystem, enabling transformative innovations in transport. MaaS operators rely heavily on data for operational optimization and enhancing the customer experience. While vast amounts of data are generated daily, the mobility sector, like many others, still struggles to access the high-quality data needed to drive innovation. Therefore, data-sharing practices are vital for MaaS. Additionally, data sharing is essential to support critical functionalities such as multimodal transport integration, real-time infrastructure planning, emissions monitoring, enhancing rural connectivity, and implementing demand-responsive transit systems. Ireland's mobility sector remains fragmented and reliant on inefficient data-sharing methods, preventing the creation of a cohesive, integrated mobility ecosystem. Fragmented data-sharing practices hinder the development of robust mobility solutions, limiting their effectiveness. Addressing this "data-sharing" challenge through secure and efficient data-sharing mechanisms is essential for creating smarter, more efficient mobility ecosystems.

Recently, the European Union (EU) Parliament introduced key regulatory frameworks to enhance data sharing. The Data Governance Act⁵ (DGA), adopted in April 2022, establishes a framework to improve data access for companies and startups, fostering the development of innovative products and services.

¹<https://www.irishnews.com/news/ireland/dublin-worlds-second-slowest-city-for-traffic-analysis-shows-XHU5HOF3YBFRZORTIPFERSHX4A/>

²<https://www.thejournal.ie/dublin-second-slowest-city-6268171-Jan2024/>

³<https://www.gov.ie/en/publication/848df-national-sustainable-mobility-policy/>

⁴Smart Dublin, Rethinking Mobility in Ireland.

⁵<https://digital-strategy.ec.europa.eu/en/policies/data-governance-act>

Building on this, the Data Act⁶, introduced in November 2023, unlocks vast quantities of high-quality industrial data, particularly from sources like the Internet of Things (IoT). Together, these acts form essential pillars of the European Data Strategy⁷, designed to create a unified data market and enable seamless data exchange across regions, sectors, and businesses of all sizes.

At the heart of this strategy is the concept of Data Spaces, which provide secure, multi-party data-sharing environments within trusted ecosystems. A data space is an interoperable framework that ensures trusted data exchanges through shared governance principles, standards, and enabling services⁸. The EU envisions establishing Common European Data Spaces across various sectors, including mobility, manufacturing, health, and sustainability. Within this vision, Mobility Data Spaces (MDSs) facilitate secure collaboration among data providers, recipients, governance authorities, and intermediaries, such as MaaS solution providers, to address real-world transportation challenges.

Ireland stands at a pivotal moment in modernizing its transport infrastructure and aligning with evolving data governance frameworks. The MaaS4IRL (A Trusted Interoperable Mobility as a Service Ecosystem for Ireland) project, an initiative supported by the Sustainable Energy Authority of Ireland and the Department of Transport, aims to explore the challenges and opportunities of data sharing within the transport sector in Ireland. The project specifically focuses on studying the technical and regulatory foundations for a trusted, interoperable mobility data-sharing environment. It also outlines the role of data within key areas of Ireland's transport ecosystem, including MaaS, infrastructure planning, the EV charging ecosystem, first-mile and last-mile freight delivery solutions, demand-responsive transit, and mobility hubs.

A key outcome of MaaS4IRL is a list of recommendations for building the IMDS, a secure ecosystem that facilitates seamless transport data exchange. The IMDS aims to create a collaborative digital ecosystem, enabling the secure and efficient exchange of mobility-related data among stakeholders. By leveraging IMDS, Ireland can enhance public transport operations, optimize multimodal transport solutions, and reduce emissions, ultimately fostering both environmental sustainability and innovation in the mobility sector. The project also provides strategic recommendations on critical aspects of data management, including data modelling, access control, sovereignty, trust mechanisms, and value creation. Moreover, it outlines a phased roadmap for IMDS implementation, offering policymakers clear guidance on transitioning from concept to execution.

By embracing trusted data-sharing principles, Ireland can position itself as a leader in data-driven transport solutions. It can harness data spaces to build a more sustainable, accessible, and efficient mobility system that serves both urban and rural populations. The successful implementation of interoperable and secure data-sharing frameworks will be essential in realizing a truly integrated MaaS ecosystem for Ireland.

2.3 Project Objectives

The MaaS4IRL project is not designed to develop a standalone solution but rather to conduct a comprehensive and strategic study that delivers meaningful insights into establishing a trusted, interoperable, and efficient data-sharing framework for MaaS operators in Ireland. This project aims to identify the opportunities to strengthen Ireland's transport ecosystem, enhance multimodal integration, and promote sustainable and accessible mobility solutions. Additionally, the project seeks to define the role of data in key transport areas and ensure that emerging MaaS ecosystems align with European data governance regulations, technical standards, and industry best practices.

The project specifically focuses on analysing the technical, regulatory, and governance aspects of data-sharing frameworks to facilitate seamless and trusted collaboration among mobility stakeholders, including public transport operators, private mobility providers, local authorities, and technology enablers. The outcomes of this study will contribute to the design and implementation of IMDS,

⁶<https://digital-strategy.ec.europa.eu/en/policies/data-act>

⁷https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-data-strategy_en

⁸<https://dssc.eu/space/bv15e/777333342/Alphabetical+List+of+All+Defined+Terms+in+Blueprint+v1.5>

supporting MaaS applications for multimodal journey planning and automating ticketing and payment, demand-responsive mobility, EV infrastructure planning, freight logistics, and emissions reduction strategies.

To achieve its vision, the MaaS4IRL project is structured around three core objectives:

- **Objective 1 (Comprehensive Study on Mobility as a Service, Mobility Data Spaces and MaaS Governance):** Conduct an in-depth analysis of Mobility Data Spaces, MaaS models, and regulatory frameworks, with a particular focus on global best practices and their applicability to the international and Irish context. This includes investigating data-sharing mechanisms, governance structures, interoperability frameworks, and technical enablers that support MaaS ecosystems. The study will explore how data-driven mobility solutions can improve efficiency, accessibility, and sustainability while ensuring compliance with the EU Data Governance Act and Data Act.
- **Objective 2 (Develop the recommendations for High-Performance, Secure, and Interoperable Data-Sharing Framework):** Design practical guidelines for establishing a scalable, decentralized, and trusted Irish Mobility Data Space that facilitates secure and efficient data exchange among mobility stakeholders. This Irish Mobility Data Space will serve as a foundational element for optimizing real-time transport services, multimodal journey planning, and user-centric MaaS applications. Additionally, it will support the development of data-driven intelligent applications that will help the transport authority make informed decisions.
- **Objective 3 (Identifying High-Impact Areas for Data-Driven Mobility Innovation):** Determine the most critical transport sectors where enhanced data sharing could drive the highest return on investment and societal benefits. This includes:
 - *Electric Vehicle Charging Networks* – Leveraging data-sharing mechanisms to optimize charging infrastructure deployment, real-time availability monitoring, and grid integration, contributing to Ireland’s carbon neutrality goals.
 - *Demand-Responsive Transit Solutions* – Enhancing flexible, on-demand transport services through improved data availability, particularly in rural and underserved areas.
 - *Freight and Last-Mile Delivery Logistics* – Improving data integration for urban freight, first-mile/last-mile connectivity, and sustainable logistics operations.
 - *Infrastructure Planning and Traffic Optimization* – Utilizing mobility data for smart urban planning, congestion reduction, and emissions monitoring, aligning with national and EU climate action policies.

2.4 Summary of Key Findings/Outcomes

This project conducted a comprehensive study to identify the challenges and opportunities of a data-sharing framework that can support MaaS applications in creating a sustainable mobility ecosystem in Ireland. The project combines extensive desk research with active engagement from expert communities across both the private and public sectors to gather valuable insights—an approach that has not been previously explored to this depth in identifying data-sharing challenges and opportunities.

To address these challenges and achieve the goal of sustainable mobility by supporting smart applications, the project proposed the establishment of the Irish Mobility Data Space. The IMDS addresses key challenges within the transport sector, including fragmented data-sharing practices, lack of standardized protocols, and inefficient infrastructure planning. By fostering collaboration between public and private stakeholders, the project introduces a fresh, inclusive approach to data-driven decision-making in mobility.

The novelty of the project lies in its comprehensive study of how to integrate of MaaS into the IMDS. This has not been investigated before. The project also pushes the boundaries of current practice by emphasizing a public-led governance model for MaaS, ensuring accountability and alignment with public interests while allowing room for innovation within a regulated framework.

Additionally, the integration of sustainability objectives into the data-sharing framework marks a significant leap forward. By prioritizing the reduction of transport-related greenhouse gas emissions through data analytics, the project introduces an innovative method of aligning environmental goals with mobility solutions. The project also uniquely highlights the potential of public-private partnerships (PPPs) to bridge gaps between regulatory authorities, mobility providers, and technology firms, ensuring that data-sharing initiatives are not only effective but also aligned with public needs and market-driven advancements

The following is a detailed summary of the key findings derived from the MaaS4IRL project, highlighting the critical insights and outcomes from the research and analysis conducted:

- *The Role of Mobility Data Spaces in Enhancing Transport Collaboration:* Mobility Data Spaces provide a structured, interoperable, and secure environment for data sharing, enabling real-time collaboration among transport stakeholders. By integrating multimodal transport data, MDS enhances congestion management, service efficiency, and user experience, as demonstrated by international examples like the German Mobility Data Space (GMDS). However, fragmented governance, lack of standardized data protocols, and gaps in digital infrastructure hinder seamless data sharing, necessitating investment in technology, public awareness, and transparent governance to foster a trusted ecosystem.
- *Balancing Privacy Protection and Innovation in Data Sharing:* Effective data sharing relies on strong regulatory frameworks that balance privacy protection with innovation. EU regulations like the Data Governance Act and General Data Protection Regulation establish clear guidelines, while Ireland's Data Sharing and Governance Act aligns national policies with global standards. Public-private partnerships (PPPs), as seen in Finland and the Netherlands, play a critical role in bridging gaps between regulatory authorities, mobility providers, and technology firms, ensuring that data-sharing initiatives align with public interests and market-driven advancements.
- *Governance Challenges for MaaS Implementation in Ireland:* One of the primary findings of this project, based on the workshops and discussions, was the strong consensus on the necessity of a public-led back-end governance model for the successful implementation of Mobility as a Service in Ireland. Stakeholders from the public and private sectors, academia, and industry emphasized the importance of such a model to ensure accountability, consistency, and alignment with public interests. While private-sector innovation is recognized as valuable, it must operate within a well-structured and regulated framework to overcome significant challenges, including data governance, private operator integration, and existing legislative gaps. This governance approach is critical for fostering trust and ensuring the effective and sustainable operation of MaaS in Ireland.
- *Ireland's Strategic Role in Leading Digital Mobility Transformation for a Sustainable Future:* Ireland is strategically positioned to lead digital mobility transformation through its alignment with the EU's Digital Decade Strategy and commitment to sustainable transport solutions. However, addressing governance, technical, and public engagement challenges is essential for building a resilient and future-ready MaaS ecosystem. Data sharing is not just a technical necessity but a strategic enabler of economic growth, sustainability, and social inclusion. By embedding robust governance, strong partnerships, and transparency into its data-sharing frameworks, Ireland can drive long-term advancements in mobility and beyond.
- *Irish Mobility Data Space:* This project proposed to setup the IMDS which is a transformative initiative designed to tackle systemic mobility challenges while aligning with European standards and future mobility strategies. By providing an interoperable and scalable framework, the IMDS enables seamless integration of diverse datasets, fostering collaboration between public and private sectors. This collaborative ecosystem supports real-time data exchange and long-term insights, enhancing data analytics capabilities. As a result, the IMDS can optimize the deployment of electric vehicle charging networks, improve transit systems, and guide

infrastructure planning, ultimately creating a more connected and accessible Ireland. By shifting from fragmented data-sharing practices to a cohesive, efficient model, the IMDS has the potential to redefine transportation, driving innovation, sustainability, and inclusivity across the sector.

- *The Role of Data Sharing in Advancing Sustainable Mobility Solutions in Ireland:* A comprehensive analysis of Ireland's transport ecosystem revealed the critical role of data sharing in enabling sustainable mobility solutions across key areas such as Mobility as a Service, infrastructure planning, electric vehicle charging, first-mile and last-mile freight delivery, demand-responsive transit, and mobility hubs. The study identified and prioritized areas where data sharing holds the highest potential to reduce transport-related greenhouse gas emissions, aligning with Ireland's broader sustainability objectives. This highlights data sharing as a key enabler for driving environmentally responsible and efficient transport solutions.

2.5 Project Impact

In alignment with national policy frameworks, the MaaS4IRL project works towards building a more sustainable, efficient, and inclusive mobility ecosystem. The SMP envisions a safer, greener, and more inclusive transport network in Ireland, with a specific focus on MaaS. The MaaS4IRL project contributes to this vision by investigating the opportunities for data-sharing frameworks to support MaaS operators in transforming the Irish mobility landscape. This research project also supports international policy objectives, such as the EU's Data Governance Act and Data Act, which aim to create a unified data market and promote data sharing across sectors. Ireland's participation in these EU frameworks will position it as a leader in digital mobility, fostering cross-border collaboration and enabling seamless integration of mobility solutions across European markets.

Key Impacts of the Project

- **Societal Impact:**
 - *Improved Mobility and Accessibility:* The project's emphasis on creating an interoperable and secure data-sharing framework for MaaS will enhance mobility options across Ireland, benefiting urban and rural populations alike. By improving public transport services, optimizing multimodal journey planning, and reducing congestion, the MaaS4IRL project will contribute to a more equitable and accessible mobility system. This will enhance the quality of life for citizens, especially those in underserved rural areas.
 - *Environmental Sustainability:* The integration of sustainability objectives into the data-sharing framework is one of the project's standout features. By leveraging data to monitor emissions, optimize routes, and promote electric vehicle infrastructure, the project directly supports Ireland's commitment to carbon neutrality and the EU's climate action policies. The project's focus on reducing transport-related greenhouse gas emissions will have a direct positive impact on Ireland's environmental sustainability goals.
- **Economic Impact:**
 - *Cost Efficiency and Innovation:* Through the implementation of a trusted and efficient Mobility Data Space, the MaaS4IRL project will enhance the efficiency of transport operations and infrastructure planning. This will not only reduce operational costs but also foster innovation in the mobility sector.
 - *Boosting the EV Ecosystem:* The project's focus on integrating data-sharing mechanisms for electric vehicle charging infrastructure will help optimize deployment, real-time monitoring, and grid integration. This is crucial for Ireland's transition to a low-carbon transport system, in line with national and EU sustainability goals.

- **Technological Impact:**
 - *Advancing Mobility Technology:* The MaaS4IRL project pushes the boundaries of current practices by establishing a framework for secure, scalable, and interoperable data sharing in the mobility sector. This framework will enable the development of smarter transport solutions, including demand-responsive transit, intelligent infrastructure planning, and real-time traffic management systems.
- **Policy and Regulatory Impact:**
 - *Alignment with EU Data Governance Regulations:* The MaaS4IRL project emphasises on compliance with the EU's Data Governance Act and Data Act ensures that Ireland's transport data-sharing initiatives align with broader European data governance strategies. This will facilitate cross-border data-sharing and interoperability, enhancing Ireland's integration into the European Digital Single Market. The project's recommendations for governance models and technical standards provide a roadmap for policymakers to create a secure, transparent, and inclusive data ecosystem for MaaS operators.

The Value of the Project in the Wider Context

In the broader context, the MaaS4IRL project represents a transformative shift in how mobility systems are planned, managed, and optimized in Ireland and beyond. By establishing a secure and interoperable data-sharing framework, the project has the potential to:

- *Transform the Mobility Ecosystem:* The integration of Mobility as a Service into a cohesive data-sharing framework will enable smarter mobility solutions, reducing congestion, improving service efficiency, and enhancing the user experience.
- *Align with EU Data Strategies:* By aligning with EU regulations, Ireland's role in the European Data Strategy will be enhanced, driving the development of Common European Data Spaces for mobility.
- *Foster Sustainability and Innovation:* Through its focus on data-driven sustainability, the project will contribute to the achievement of Ireland's environmental goals, promoting carbon-neutral transport solutions while fostering technological innovation and economic growth.

2.6 Recommendations

Alignment of Stakeholders

The success of MaaS for MDS in Ireland relies on the seamless integration of public transport operators, private mobility providers, and government regulators, each playing a pivotal role in shaping the future of mobility. To turn this vision into reality, it is crucial to form a unified coalition of stakeholders, all working together towards the shared goal of building a robust and innovative data-sharing framework that will drive the evolution of Ireland's transportation landscape.

Establish the Irish Mobility Data Space

Ireland has the opportunity to lead in sustainable and data-driven mobility by establishing a national Mobility Data Space. Our analysis of mobility data-sharing solutions—advanced blockchain-based models, centralized national data hubs, and data spaces—demonstrates that a mobility data space offers the most scalable, interoperable, and privacy-preserving framework. IMDS will facilitate collaboration between public agencies, private mobility operators, and end users, supporting Ireland's transition toward smarter, connected cities. It will enable government agencies to make data-driven decisions, enhance infrastructure planning, and develop smarter policies for sustainable mobility. For

mobility operators, it will maximize resource efficiency and improve service delivery. End users will benefit from a seamless, personalized, and efficient mobility experience, making transportation more accessible and sustainable.

Below is a set of recommendations for building the IMDS:

- *Organising the Data Space - Defining a Clear Scope and Scalable Deployment Process:* The successful organisation of an IMDS requires a well-defined scope and an iterative approach to deployment. This should balance initial clarity with future scalability, enabling the data space to grow and adapt while maintaining its core purpose.
- *Building and Maintaining Trust:* Trust both informal and formal, is fundamental to the successful establishment and long-term sustainability of the IMDS. Distrust among stakeholders could significantly jeopardise collaboration and hinder the initiative's success. Building trust requires intentional effort at every phase of the data space's development, with a focus on both informal and formal measures to create strong and enduring partnerships.
- *Investment Structure and Business Models for Deploying the IMDS:* Deploying the IMDS requires a comprehensive understanding of its investment structure, value creation mechanisms, and the selection of suitable business models.
- *Standardised Data Modelling:* Utilise widely recognised standards to ensure consistency and interoperability.
- *Data Description:* Metadata is an essential component of the IMDS, providing descriptive information about data assets to enhance discoverability, interoperability, and usability.
- *Publication and discovery:* Establish a catalogue where participants can explore datasets.
- *Secure Identification and Access Control:* Strengthen secure access, data authenticity, and participant identification using decentralised and interoperable standards.
- *Data Exchange:* Use transmission methods tailored to the diverse needs of stakeholders while ensuring scalability and compliance with local and EU mobility data standards.
- *Provenance and Traceability:* Adopt and implement widely recognised provenance and traceability standards such as W3C PROV-O, PAV Ontology, and CloudEvents instead of developing custom solutions.
- *Data Sovereignty and Trust.* Regularly revise governance rules to align with updates in technical standards and EU regulations (e.g., eIDAS2). Implement mechanisms for onboarding, validating, verifying, and revoking participant credentials securely. Align with eIDAS2 to ensure secure cross-border transactions through electronic identification and trust services.
- *Data Quality:* Define and enforce criteria for data completeness, accuracy, timeliness, and relevance. Align quality checks with existing guidelines and best practices to ensure consistency and reliability. Use DQV to describe the quality dimensions of datasets, such as accuracy, completeness, and timeliness.
- *Adopt DSSC Design Principles:* Adopting the design principles offered by the DSSC as a cornerstone for developing Ireland's Mobility Data Space. These principles are not just recommendations but essential building blocks for creating a data-sharing ecosystem that is effective, ethical, and sustainable.
- *Governance and Legal Frameworks:* A Data Space Governance Authority should be established to define governance models based on organizational structures, develop a comprehensive contractual framework, implement adaptive and transparent governance mechanisms, promote equitable participation in decision-making, and facilitate seamless cross-border integration.
- *Co-Creation:* Development and operational processes should be adopted using an iterative deployment approach that ensures continuous improvement while fostering a participant-centric ecosystem that encourages engagement and collaboration.
- *Data Reporting:* To establish effective data reporting frameworks while safeguarding privacy and fostering trust, robust governance structures should be adopted, with a focus on prioritizing non-personal data and ensuring the secure, purpose-driven use of sensitive information.

Establish a Centralized Data Governance Authority

A centralized data governance body could help harmonize data management practices across sectors, ensuring consistency, accountability, and efficiency. This body could develop and oversee standardized

protocols for data sharing, management, and security, while also serving as a central point for cross-sector collaboration.

Develop a National Data Governance Strategy

A comprehensive, cross-sectoral strategy is necessary to provide a unified vision for data governance in Ireland. This strategy should clarify data ownership, responsibility, and accountability across the public and private sectors, while outlining protocols for data sharing and protection. The strategy should be aligned with international best practices, as well as emerging EU regulations on data usage, artificial intelligence, and digital services.

Enhance Data Literacy and Capacity Building

Investment in education and training programs is essential to build Ireland's data governance capacity. Partnerships with academic institutions, private enterprises, and international organizations can help develop a workforce with the skills required to manage and analyse data effectively. Targeted capacity-building programs within the public sector are also critical to ensuring that government agencies are equipped to manage data responsibly and make data-driven decisions.

Engage the Public and Promote Transparency

Public trust is a critical factor in the success of any data governance framework. The government should prioritise public engagement campaigns to increase awareness of how data is used, protected, and managed. These campaigns should focus on explaining citizens' rights under GDPR, the benefits of data-driven innovation, and the safeguards in place to protect their privacy. Open dialogue with civil society organizations and advocacy groups will be key in building trust and ensuring transparency.

Align Data Governance with Cybersecurity

Given the growing threats to digital infrastructure, it is essential that data governance and cybersecurity strategies are aligned. Strengthening cybersecurity measures to protect sensitive data, especially critical national infrastructure and personal data, will safeguard against breaches and cyber-snacks, ensuring resilience and trust in Ireland's digital ecosystem. solutions, ensuring that Ireland remains at the forefront of innovation in sustainable and smart transportation.

2.7 Conclusions and Next Steps

This project presents a transformative opportunity to redefine mobility in Ireland by integrating data-driven solutions that enhance efficiency, sustainability, and inclusivity. By leveraging secure data-sharing frameworks, interoperable technologies, and strategic governance models, the Irish Mobility Data Space can create a seamless mobility ecosystem that meets the evolving needs of urban and rural communities alike. The successful implementation of Mobility as a Service and other innovative mobility solutions relies on robust collaboration between public and private stakeholders, ensuring equitable access to modern transportation services.

Data sharing serves as the foundation for this vision, enabling real-time journey planning, optimized transit operations, and intelligent infrastructure development. However, to fully realize the potential of IMDS, challenges such as fragmented data ownership, regulatory complexities, and technical interoperability must be addressed. The strategies outlined in MaaS4IRL project emphasize a balanced approach—combining innovation with compliance, flexibility with structure, and public benefit with commercial viability.

To transition from concept to execution, a structured implementation approach is essential. The following steps will guide the next phase:

- **Pilot Deployment of IMDS:** A minimum viable implementation of IMDS should be developed and tested in a controlled environment. This pilot will assess the feasibility of data integration, interoperability, and real-world application, generating valuable insights for scaling the system.
- **Stakeholder Engagement and Ecosystem Development:** Collaboration with transport operators, policymakers, technology providers, and end users will be crucial. Clear engagement strategies should be implemented to ensure alignment on governance, data-sharing policies, and commercial models.
- **Regulatory and Compliance Alignment:** Compliance with existing data governance frameworks, such as GDPR and the Data Governance Act, must be reinforced. Establishing legal and contractual structures for data exchange will enhance trust and mitigate risks.
- **Technical Infrastructure and Standards:** The IMDS should be built on a scalable, interoperable architecture that supports multimodal mobility services. Establishing unified standards for data exchange will be key to ensuring seamless integration across systems.
- **Public Awareness and Adoption Strategies:** For IMDS to succeed, user adoption must be prioritized. Awareness campaigns, clear communication of benefits, and accessible onboarding processes will encourage participation from commuters, businesses, and service providers.
- **Scalability and Long-Term Roadmap:** The lessons learned from the pilot will inform a phased expansion strategy. Scaling IMDS across regional and national levels will require continuous monitoring, iterative improvements, and adaptability to technological advancements.

By executing these next steps, IMDS will not only address immediate mobility challenges but also set the stage for Ireland to become a leader in sustainable, intelligent transportation. The path forward requires bold action, strategic investment, and a commitment to innovation—ensuring that mobility solutions are efficient, inclusive, and environmentally responsible.

SECTION 3: COMMUNICATION & DISSEMINATION

(max 3 pages)

3.1 Communication, Dissemination and Exploitation

During the project, we carried out a range of communication activities, which are outlined below:

- **Public Engagement Events:** MaaS4IRL was presented at several public events, including the following:
 - **FMCI hosted a dedicated MaaS4IRL conference:** This event brought together stakeholders from public authorities, industry, and higher education institutions (HEIs). It served as a platform to discuss key project developments and engage participants on MaaS4IRL's impact and future directions. The event flyer is provided below, along with a link for participant registration. [Link: <https://connectedhubs.ie/events/event/mobility-day-at-fmci>]. Figure 1 illustrates the event flyer.

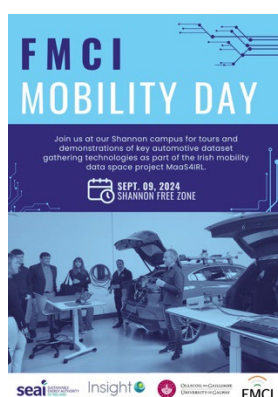


Figure 1: FMCI Mobility Day

- **FMCI leveraged the TRA conference in Dublin:** At the TRA conference, FMCI took the opportunity to promote and disseminate the MaaS4IRL project to an international audience, highlighting the project's innovative approaches and key findings.
- **FMCI participated in the ITS Ireland Annual Conference 2024:** FMCI contributed to the ITS Ireland Annual Conference, where the MaaS4IRL project was showcased to an audience of industry professionals, researchers, and policymakers, fostering dialogue on the future of intelligent transportation systems.
- **University of Galway organized a workshop with public sector stakeholders:** A workshop was hosted by the University of Galway, bringing together stakeholders from key public sector organizations such as the SEAI, Department of Transport, Transport for Ireland, and Transport Infrastructure Ireland. The workshop provided a platform for discussing MaaS4IRL's contributions to policy and infrastructure development. Figure 2 captures a moment from the workshop.

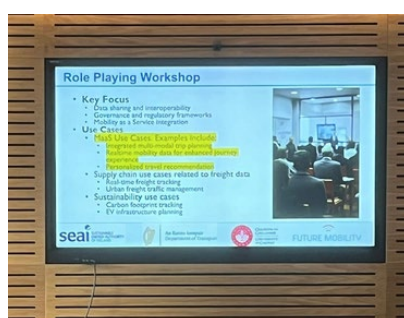


Figure 2: University of Galway Workshop

- **Email Campaigns:** We periodically updated stakeholders on the project's progress and results via email, ensuring ongoing engagement and communication with key individuals and organizations involved in MaaS4IRL.
- **Website**
 - **FMCI published a concise summary** of the MaaS4IRL project as a public engagement report on its website. This summary provided a comprehensive overview of the project's key findings and milestones, offering valuable insights to a broad audience.
 - **University of Galway published MaaS4IRL** on its university portal: [University of Galway MaaS4IRL Portal](#). Additionally, it was featured on the Insight portal: [Insight Centre for Sustainable Transport](#), further expanding the reach of the project within academic and research communities.
- **Social Media Campaigns: Social Media Campaigns:** We utilized LinkedIn to promote the MaaS4IRL project, sharing key updates and insights with a wider professional network. Figure 3 illustrates a sample of the MaaS4IRL publicity on LinkedIn, showcasing the project's impact and engagement.

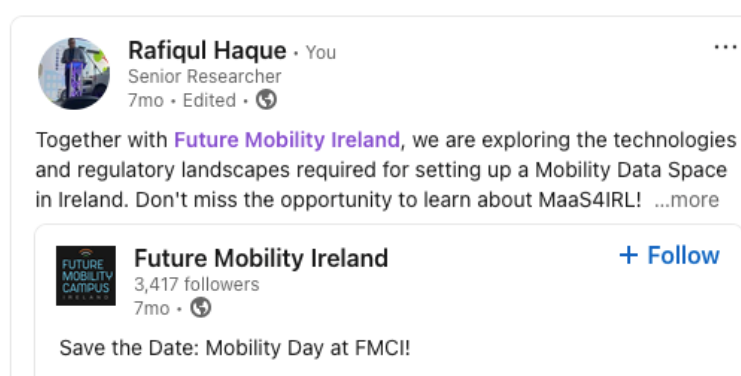


Figure 3: LinkedIn campaign

- **Project Branding and Visuals:** We developed a presentation template to represent the MaaS4IRL project. Figure 4 below showcases the template.



Figure 4: The presentation template of MaaS4IRL

- **Publications:** Publishing in conferences or journals requires substantial, publishable results. In the MaaS4IRL project, significant results were only produced towards the end, making it difficult to publish articles during the project's duration. However, we are currently in the process of preparing a journal paper and a book chapter.

Dissemination Summary Tables

3.2 Intellectual Property Management & Exploitation

Table 3.2 – List of Dissemination Activities

Type of Activity	Main Leader	Title	Date/Period	Location	Type of Audience*	Size of Audience
Seminar for gathering data	Future Mobility Campus	FMCI hosted a dedicated MaaS4IRL workshop	September 9, 2024	FMCI Office Shannon	SMEs and multinational corporations (MNCs), public sector bodies and academic institutions from across Ireland	35
Promote MaaS4IRL	Future Mobility Campus	FMCI leveraged the TRA conference in Dublin to promote and disseminate the MaaS4IRL project	April 15- 18, 2024	Dublin	Researchers, policymakers, industry experts, and practitioners	100+
Promote MaaS4IRL Conference	Future Mobility Campus	FMCI participated in the ITS Ireland Annual Conference to promote and disseminate the MaaS4IRL project	December 17 -18	Dublin	Public Authorities and Government Bodies, Industry Professionals, Academics and Researchers	100+
Workshop for Presenting Research Results	University of Galway	University of Galway hosted a dedicated MaaS4IRL workshop for presenting results and role playing.	November 6, 2024	Dublin	Public Authorities and Government Bodies,	30

