



Deliverable D7.5 Exploitation strategy

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Report contributors		
Name	Beneficiary Short Name	Details of contribution
Daniele Barnaba, Fabio Cartolano, Nicola Bassi, Massimo Marciani	FIT	Document preparation
All partners	All partners	Input for business modelling and individual exploitation strategies
Giuseppe Rizzi	UITP	Contribution to Version 1.2
Jakub Grabiec	MZA	Contribution to Version 1.3

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1. Executive Summary

This document constitutes the Deliverable D7.5 Exploitation strategy of IP4MaaS, as final outcome of the project Task 7.4 dedicated to develop the exploitation strategy for the project results and to provide recommendations for the continuous use of the results after the project ends. Additional recommendations are included in *D6.3 Performance and impact assessment* and *D7.4 Outreach, Transferability and recommendations handbook*.

The task created the business framework for the commercial exploitation of the IP4MaaS products, along with the overall exploitation strategy for the evaluated services in order to satisfy partners' aims and interests.

The document starts with the introductory section, followed by the project background and the overall evaluation objectives of the deliverable (sections 3 and 4).

Section 5 reports the market analysis of MaaS, focusing on the main challenges and opportunities, highlighting key figures and players of the sector.

Section 6 describes the IP4MaaS assets, developed during the project lifetime and define the possible value propositions along with the business models.

Section 7 presents the business framework and outlines the exploitation strategies for each described value proposition.

2. Abbreviations and acronyms

Abbreviation / Acronym	Description
CFM	Calls for Members
DL	Dissemination and exploitation leader
DoA	Description of the Action
EL	Ethical leader
ER JU	Europe's Rail Joint Undertaking
EU	European Union
GA	Grant Agreement
H2020	Horizon 2020
IP4	Innovation Programme 4
IPR	Intellectual Property Rights
OC	Open Call
PC	Project coordinator
PM	Project manager
PMO	Project Management Office
PMT	Project Management Team
PO	Project Officer
QAIC	Quality Assurance and Innovation Committee
S2R JU	Shift2Rail Joint Undertaking
SUMP	Sustainable Urban Mobility Plan
TC	Travel Companion
TL	Technical leader
WP	Work Package
WPL	Work package Leader

3. Background

The initiatives for project Dissemination, Outreach and Exploitation were undertaken by WP7. A number of initiatives were carried out to raise awareness and disseminate IP4MaaS project developments to key stakeholders and external actors, to promote the Maas concept and its application in the Shift2Rail Joint Undertaking, initially, and in the Europe's Rail Joint Undertaking more recently.

The final step of this work, paving the way for future actions ensuring the project longer term impacts, is the exploitation of project products and results. The experience gained during the project was validated in all operational tasks and is here systematised and reported as final step, leading for commercialisation and take-up of innovative value propositions.

4. Objective/Aim

The objective of Task 7.4 is to outline the exploitation strategy of the project results, analysing the MaaS market and identifying suitable business models for each category of project partners along with respective product/services developed during the project. This strategy will identify the required actions and timeframes, to lead to sustainable plans for the exploitable assets.

5. MaaS Market Overview

Mobility-as-a-Service (MaaS) [5] is a transport concept that aims to provide integrated, on-demand mobility services to users. It combines various modes of transport, such as public transport, ridesharing, bike-sharing, car-sharing, and more, into a single platform or application. MaaS platforms offer users the convenience of accessing and paying for multiple mobility options through a single interface. This market analysis will provide insights into the current state of the MaaS industry, its growth potential, key market players, and future trends.

MaaS is a scheme that enables the response to the needs of demand and supply, ensuring the governance of mobility policies. Additionally, the **flexibility** of MaaS guarantees its adoption in different territorial areas. Where conditions exist, the needs of the territory can find a flexible, sustainable, and modern solution through MaaS. Therefore, it is necessary for the entities responsible for shaping new mobility policies to maximize this flexibility, so that demand can be met in different forms compared to the traditional ones. This means expanding the coverage of services provided through MaaS and simultaneously strengthening those with less impact or more sustainable options, such as collective and shared mobility in various private and public forms. In this regard, by increasing the presence of different types of operators, the supply of digital or digitally accessible content will also increase, enhancing the possibilities of replacing private transport modes for certain itineraries. Building integrated offers of transport segments and other connected services can generate significant volumes and transactions, capable of attracting additional investments.

This reflects a win-win model between demand/supply and complementary contents (so called *ancillary services*), which can find aggregation in MaaS. It is thus possible to construct dynamic pricing models, under certain guarantees that support different modes of transport in the territory, benefiting service coverage. Regulatory and administrative authorities can play a crucial role, especially in the initial phase of the model.

The expansion of shared mobility services, as well as the progressive integration of shared services of all types—accelerated by digitization and the advent of MaaS platforms—are key steps toward reducing the use and ownership of private cars, and for gradually shifting the dominance from individual mobility to shared mobility, especially in urban areas. The effects of such a transition have positive consequences for the sustainability of the transport sector. However, to date, these effects can only be estimated through the use of traffic simulation models that compare alternative scenarios. With this objective in mind, the International Transport Forum (ITF)[3] has conducted a series of simulations in three cities around the world—Lisbon, Helsinki, and Auckland—simulating what would happen if the entire motorized traffic in these cities were replaced by a combination of three families of mobility services: ride-sharing, DRT, and mass rapid transit. Such a combination would have an extremely positive impact on all dimensions of efficiency: reduction in vehicle trips (during peak hours, by 37%), reduction in consumption and emissions (30%), as well as congestion and accidents, drastic reduction in the vehicle fleet (3% of the current fleet), and available space in the city and for its inhabitants. According to this scenario, moving around would cost less for citizens, thanks to the high vehicle occupancy rate. Even in the absence of public subsidies, the cost of a trip in the city could decrease by up to 50% compared to current conditions. This simulation demonstrates that if the entire private road traffic of a city, while maintaining the same accessibility of the territory, were replaced by an optimal combination of different shared mobility services, private vehicle trips and all associated impacts, including energy consumption, pollutant emissions, congestion, and accidents, would be considerably reduced. Moreover, due to the much higher utilization of shared vehicles compared to private vehicles, a drastic reduction in the circulating fleet would be possible. However, the comparison among the different scenarios simulated by the ITF demonstrates that not all forms of integration between services possess the same level of overall efficiency. **The maximization of efficiency in**

the overall urban mobility system is achieved only when each mode and each mobility service is used to its best, thus ensuring that the performance of each service/mode is exploited to meet the needs of the different mobility segments existing in a given territory.

In addition to the aforementioned environmental benefits, the opportunity of MaaS must also be seen from an economic resource perspective. **The dynamic and flexible management of resources is necessary to distribute the economic benefits of MaaS.** From the user's perspective, the prevailing economic benefit lies in the reduction of individual mobility costs in favour of shared mobility costs. Individual transport entails a series of hidden costs (e.g., costs associated with assets and depreciation, insurance and accidents, ordinary and extraordinary maintenance, parking in high-density residential areas, and fuel consumption). These advantages vary in quantity and quality across geographical areas. However, the greater the pressure on fixed costs, the greater the benefit generated by the mode substitution effect. Looking at the ecosystem that includes the public administration, transport operators, and intermediaries, the effect of replacing private individual mobility with shared mobility brings benefits in terms of increased transport volumes and economic transactions. Furthermore, this also stimulates investments and transactions, such as the purchase of travel routes, connected services, or content associated with the destination or duration of the journey (e.g., multimedia content).

The development of MaaS can lead to a series of social benefits of various kinds with a broad impact. For certain user groups, the social benefit could be derived from saving resources equivalent to the cost of owning a second car. A comprehensive and efficient transportation system can also have an impact on the real estate sector by reevaluating housing prices, particularly in currently underserved areas. Consequently, it also improves the quality of life, especially when considering the time spent by each citizen on necessary home-work/school commutes. This directly relates to the positive impact within family structures, as they would benefit from the value of the recovered leisure time.

Finally, when it comes to people's choices and behaviours, a positive "mobility experience" for users of mobility as a service can succeed in changing consumer habits, moving them beyond their comfort zone. Through MaaS, mobility policies can find a new flexible implementation tool, and economic policies can further enhance their effects on the environment and the community. **The traditional paradigm of supporting sustainable collective transportation can be complemented in the near future by more innovative models, which involve direct support for the mobility demand of individuals.** Therefore, new forms of mobility policies for our communities can be imagined, capable of designing, implementing, and monitoring initiatives that incentivize the mobility demand of users who choose increasingly green and sustainable solutions, taking the form of dedicated discounts, bonuses, cashback, or other forms of loyalty. In this new scenario, individual mobility choices must become increasingly informed and aware of the impact they have on the environment, and accordingly, they can receive rewards and incentives for more sustainable behaviours, activating a virtuous circle of sustainable mobility. It seems clear that once new scenarios and policies for incentivizing sustainable mobility are defined, appropriate tools will be needed to implement them. In this sense as well, it is believed that MaaS platforms, if properly governed by public policies, can constitute a powerful tool to guide users' choices and behaviours towards more sustainable modes of transportation for their trips.

5.1. Challenges and Opportunities

This general overview shows the complexities of the market sector, characterised by multiple and diverse variables. It is therefore possible to outline opportunities and to identify challenges to be faced by market players, too:

- Opportunities

- Partnerships and Collaborations: to overcome the challenges of integration, MaaS providers are increasingly forming partnerships and collaborations with transport operators, technology companies, and public agencies. These alliances enable the creation of a comprehensive MaaS ecosystem.
- Multimodal Ticketing and Payments: streamlining ticketing and payment systems across different transport modes is a key focus area for MaaS providers. Seamless integration of payment methods and the ability to purchase multimodal tickets through a single app will enhance user convenience.
- Challenges:
 - Integration and Collaboration: MaaS requires collaboration among multiple transportation providers, which can be challenging due to different systems, data formats, and business models. Achieving seamless integration and interoperability is crucial for the success of MaaS.
 - Regulatory Environment: MaaS operates within the framework of existing regulations, which may vary across regions and transport modes. Adapting regulations to accommodate MaaS and ensuring a *level playing field* for different service providers is essential.

These evolving challenges and opportunities steer players' strategies and market evolution briefly summarised in the following.

5.2. Market Size and Growth

The MaaS market has been experiencing rapid growth over the past few years. According to various reports, the global MaaS market size was valued at around 56 billion US dollars in 2020 and is projected to reach over 230/350 billion US dollars by 2025[1][2]. The market growth is driven by factors such as:

- Increasing Urbanization: as more people move to urban areas, the demand for efficient and sustainable transportation options rises. MaaS provides a solution by integrating various modes of transport and reducing the reliance on private vehicles.
- Environmental Concerns: growing awareness about climate change and the need for sustainable transportation has supported the adoption of MaaS. By promoting shared mobility and reducing single-occupancy vehicle trips, MaaS contributes to a greener transport ecosystem.
- Technological Advancements: the proliferation of smartphones, satellite technology, and digital payment systems has made MaaS platforms more accessible and user-friendly. The convenience and ease of use provided by MaaS apps have attracted a large user base.
- Government Support: institutions and municipalities are actively supporting MaaS initiatives to address traffic congestion, reduce emissions, and improve overall transport efficiency. They often provide policy frameworks and funding to promote the development of MaaS infrastructure.

Compared to other regions, EU MaaS market demonstrated in the past few years a certain inertia deriving by policies and regulations of local and national authorities aimed at avoiding market distortions or social inequities, being the aggregated services a mix of public (subsidised) modes and private businesses. However, looking at the social effects of mobility, this inertia is not necessarily a negative aspect. Indeed, it reveals difficulties in the market uptakes of EU companies compared to other markets.

5.3. Key Market Players

Several industrial players demonstrated interest in MaaS concept. Initial experimentations started with research projects aimed at studying the effect of behavioural changes induced by aggregated

mobility packages. A second stage, taking advantage from technological advancements, was characterised by large investments of companies attempting the first-mover advantage strategies. Some of them are listed below:

- [Uber](#): known primarily as a ridesharing company, has expanded its services to include other modes of transport. It has integrated public transport options in some countries and partnered with bike-sharing and scooter-sharing services to offer a comprehensive MaaS platform.
- [Lyft](#): similar to Uber, Lyft has evolved from a ridesharing service to a MaaS provider. It offers multimodal transport options, including public transport integration, bike-sharing, and scooter-sharing.
- [Didi Chuxing](#): is a major player in the Chinese market, providing a wide range of transport services, including taxi hailing, car rental, bike-sharing, and more. It has been actively involved in MaaS initiatives and has expanded its services globally.
- [Whim](#): developed by MaaS Global, is a pioneering MaaS platform that originated in Finland. It offers a subscription-based model where users can access various transportation modes within a single app.
- [Citymapper](#): is a popular urban mobility app that provides real-time transport information and trip planning. It has also started integrating additional services like bike-sharing, scooter-sharing, and ride-hailing, positioning itself as a MaaS player.

6. IP4MaaS Exploitable assets

Within the evolving context described in the previous section, the unique aspect of IP4MAAS is that instead of providing a specific MaaS solution, it enhances existing local platforms and ecosystems. **It fostered a bottom-up approach by encouraging joint public-private initiatives in the fragmented transport market** and capitalized on the latest trends in smart, sustainable, shared, and micro mobility. The main focus of IP4MAAS revolved around several key pillars, addressing crucial aspects and developing effective and beneficial solutions for all stakeholders in the MaaS ecosystem through testing in various environments of its Demo sites.

Specifically, IP4MAAS tested multi-stakeholder partnerships and utilised data analysis to assist in designing the MaaS concept. Additionally, it provided components that enhanced the IT infrastructure of existing Transport Service Providers (TSPs) with advanced solutions provided by CFMs.

In summary, IP4MAAS introduced a range of innovations that contribute to the progress of the Mobility as a Service market in Europe:

- **Guidelines and methodologies:** IP4MAAS offered guidance to accelerate and expand the deployment of the MaaS market in Europe taking advantage from the existing IP4 technologies and partnerships. It provided experimental outcomes to actively engage multiple stakeholders in the MaaS concept, address governance challenges in a competitive public-private context and develop sustainable MaaS business models.
- **Software components:** IP4MAAS tested state-of-the-art software components (IP4 solutions) and techniques to ensure scalability, extensibility, openness, and adaptability to different environments. These components enhance the core functionalities of local platforms and scale the overall MaaS market.
- **Data sharing:** IP4MAAS extended comprehensive research on data sharing obstacles and opportunities already analysed in previous Europe's Rail Joint Undertaking (Shift2Rail) projects. It particularly addressed non-technical issues related to data collection, processing, and sharing, aiming for the scalability of MaaS and interconnection between platforms.
- **Testing in real-field Demo sites:** IP4MAAS validated and deployed all its innovations in 6 real environments across Europe. Valuable insights are derived from local authorities and operators who invested in this complex business area.

In *Deliverable D2.3 Demonstration requirements and scenarios F-REL*, the IP4 solutions have been clustered macro-categories [4]

- Traveller View: IP4 solutions targeting travellers:
 - *Travel Companion:* functionalities and features associated with the general usage of the Travel Companion, i.e., the personal interface for a traveller to access integrated travel services offered by different TSPs and/or enabled by IP4.
 - *Journey Planning:* functionalities and features improving the trip planning experience for a user with a mobility need.
 - *Booking/Issuing:* functionalities and features improving the process of buying tickets and obtaining entitlements to travel.
 - *Services during travel:* functionalities and features enabling additional services for a user during a travel.
 - *Other services:* functionalities and features enabling additional services for a user.
- TSP View: IP4 solutions targeting TSPs:
 - *Tools for TSPs:* a set of tools implementing functionalities for TSPs.

- *Enablers for TSPs*: enablers for a TSPs to support the technological integration and/or the implementation of specific functionalities.

Thanks to the availability of these solutions tested in Demo sites, the project’s partners enriched their portfolios with concrete results and knowledge that have become individual assets for companies and collectively supported an improved vision looking through the second generation of MaaS.

These assets are reported below:

- Products:
 - **Evaluation methodologies and toolbox** developed to assess performances and impacts of innovative actions and to provide significant inputs to validate the effectiveness of IT solutions and related business cases.
 - **Travellers’ mobile apps** built upon the experience gained with the Travel Companion and aimed to be used in local environments.
 - **Sentiment and emotion analysis** tool developed to assess the users’ perception from social networks and therefore to perform relevant analysis for validating innovations in transport.
 - **Commercial agreements with local providers** to extend the set of data available and enrich the transport offers.
 - **Transport data digitalisation processes**, developed to digitalise and standardise transport data, hence allowing integration with external components and ecosystems.
 - **APIs for transport data exchange**, developed to extend the interconnection for other providers.
- Knowledge:
 - **Design of IT services for TP integrations** between traditional modes of transport and innovative micro-mobility services into one digital platform and for connecting different back-end solutions into one solution.
 - **Competence on MaaS market dynamics and opportunities**, with reference to the perception and preferences of European travellers and to the interest of European mobility operators about MaaS innovative schemes.
 - **Transport data standards**, to allow integration harmonisation of mobility services.

6.1. Potential value propositions

The above-mentioned value propositions have been analysed to identify possible customer segments and related gain creators and pain relievers, reported in the following tables:

Table 1. Gain creators and pain relievers for IP4MaaS products and services

Projects products value propositions	
Products and services	<ul style="list-style-type: none"> • Evaluation methodologies and toolbox • Travellers’ mobile apps • Sentiment and emotion analysis • Commercial agreements with local providers • Transport data digitalisation processes, • APIs for transport data exchange
Gain Creators	Improve business offer: <ul style="list-style-type: none"> • Data for MaaS assessment • Advanced design and evaluation methodologies • Support market penetration

	<ul style="list-style-type: none"> • Enable interoperability with existing Journey and Travel Planners
Pain relievers	Low maturity/readiness of MaaS schemes

The specific market segment of IP4MaaS products and services is reported in the following table:

Table 2. Addressed customer segments for IP4MaaS products and services

Addressed customer segments for project results	
Customer job	<ul style="list-style-type: none"> • MaaS operators • Transport Operators • Public Authorities
Gains	<ul style="list-style-type: none"> • MaaS preliminary assessment • Market Analysis • Market share acquisition
Pains	<ul style="list-style-type: none"> • Missing expertise • Missing on field trial and related data • Not providing a fully comprehensive service to customer, and therefore not attracting customers • Fleet oversized to assure demand

Similarly, for the IP4MaaS acquired knowledge this analysis is reported below:

Table 3. Gain creators and pain relievers for IP4MaaS specialised knowledge

Projects knowledge value propositions	
Specialised Knowledge	<ul style="list-style-type: none"> • Design of IT services for TP integrations • Competence on MaaS market dynamics and opportunities • Transport data standards
Gain Creators	<ul style="list-style-type: none"> • Disseminate MaaS concept & benefits • Create awareness • Advanced design and evaluation methodologies
Pain relievers	<ul style="list-style-type: none"> • Promote data standardisation • Support IT integration

The specific market segment of IP4MaaS products and services is reported in the following table:

Table 4. Addressed customer segments for IP4MaaS specialised knowledge

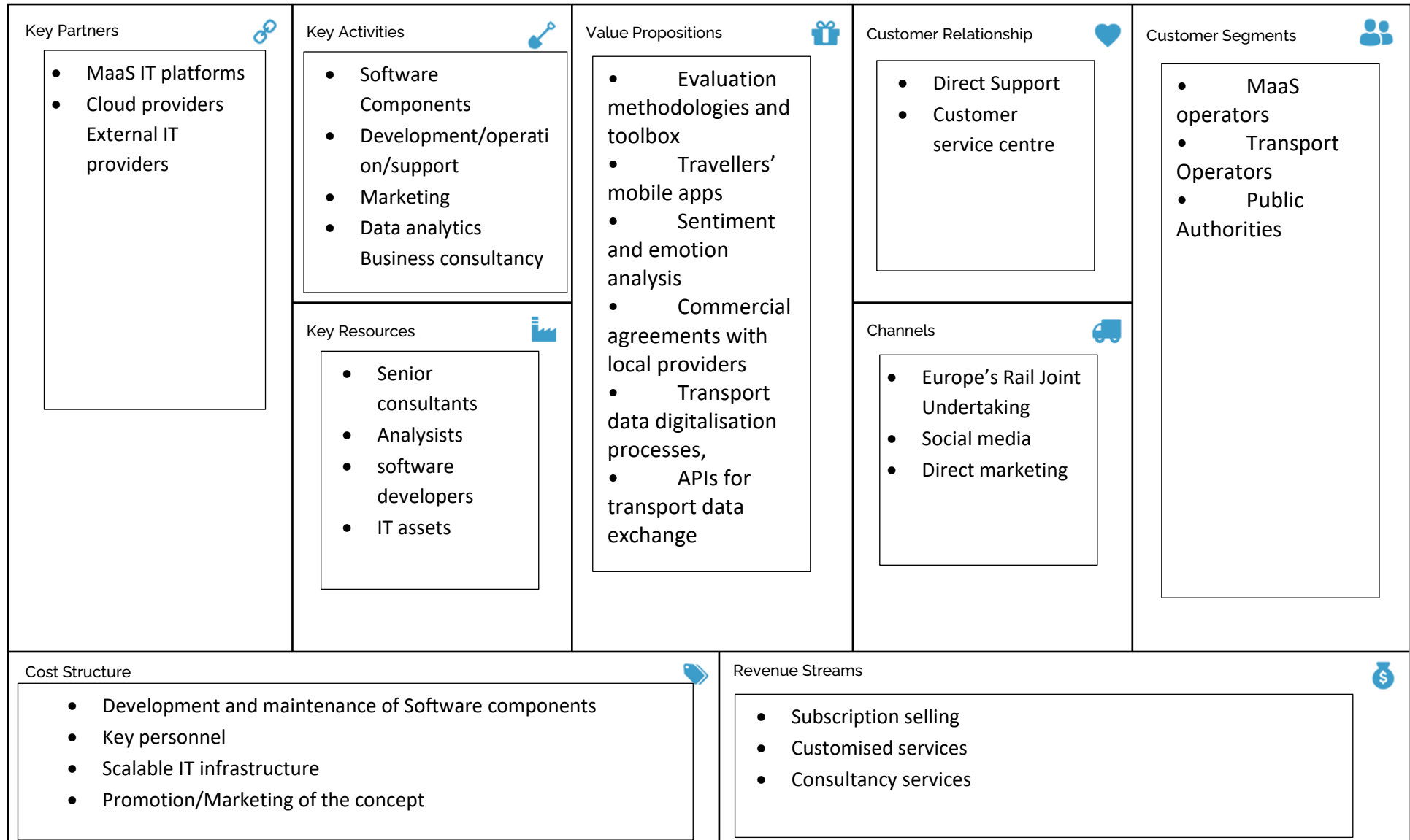
Addressed customer segments for project results	
Customer job	<ul style="list-style-type: none"> • Transport providers • MaaS Operators • MaaS Integrators • Public Authorities • Software developers
Gains	<ul style="list-style-type: none"> • MaaS expertise • Promote MaaS schemes in local ecosystems
Pains	<ul style="list-style-type: none"> • Data not standardised • Difficulties in IT integration

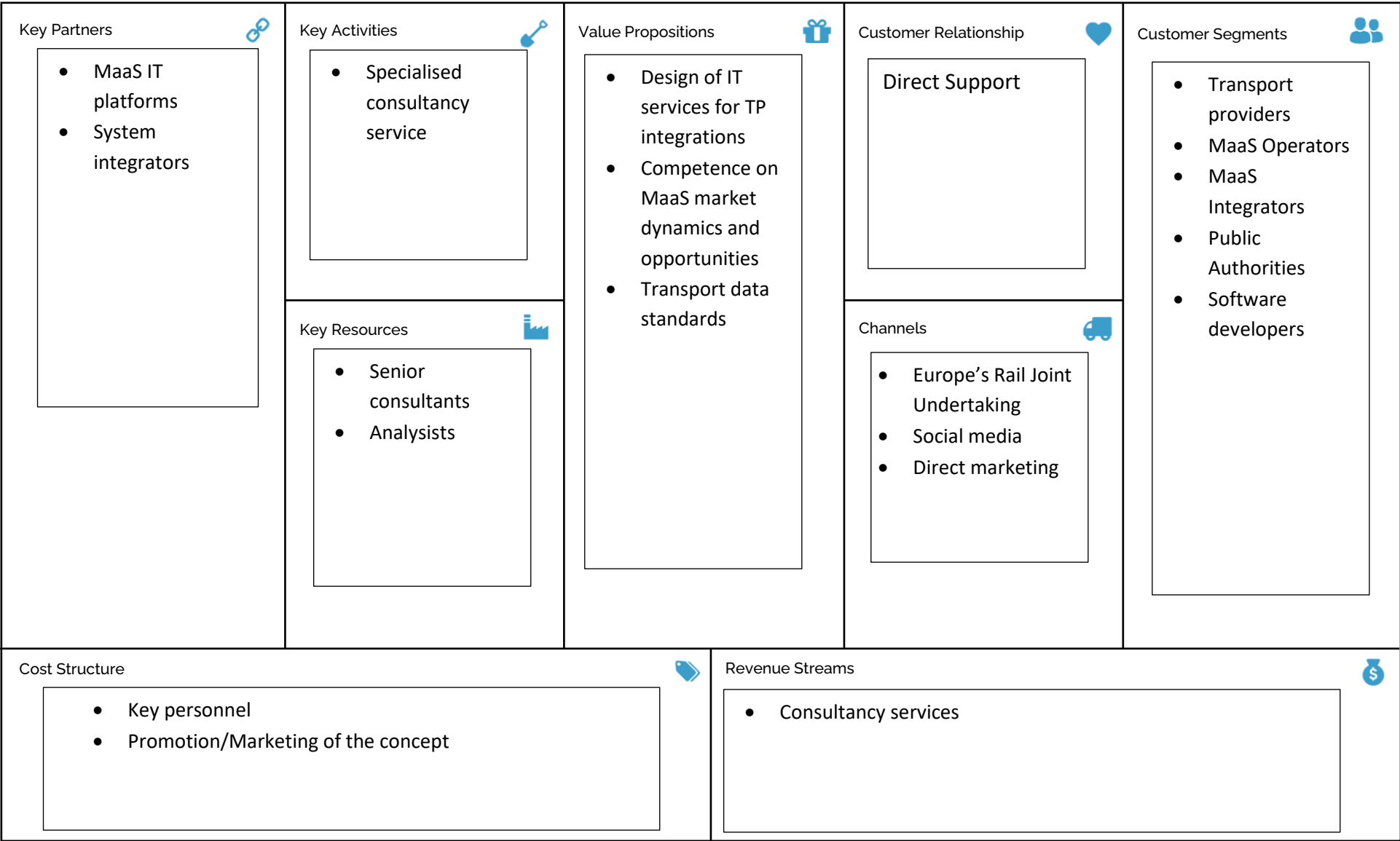
It can be noted that the value propositions above summarised have different maturities and cannot be seen as a unified product or service. Instead, they can be part of the improved competitive offer of each project partner.

For this reason, the business modelling generation have been scratched in the following paragraph, reminding not each single company the task to customise in their potential individual commercialisation strategies.

This business modelling is however the starting point for the exploitation strategies presented in the next section.

6.2. IP4MaaS Business Models





7. Business frameworks for the commercial exploitation

In accordance with the H2020 rules for participation, the project's Consortium Agreement governed dissemination, access rights and use of knowledge and intellectual property. This document regulates all items of knowledge relating to the work of the project by identifying owner, nature of the knowledge, perceived potential for exploitation, status of the item concerning plans to use the knowledge in exploitation and plans to disseminate it outside the consortium, measures required, or in place, to ensure protection of IPR for the item.

The added value of IP4MaaS has been found in enhancing existing local transport services by implementing and demonstrating large and standardised IT integrations around IP4 services.

The project consortium was composed by different categories of actors, each one expressing specific business requirements. Thanks to the experience gained from development and test activities and from the large amount of data collected during the experimentations, the project exploitation phase was devoted to identify the above reported value propositions that are categorised in the following table per actor category:

Table 5. Summary of value propositions per actor category

Actor category	Value proposition
Public entities	Improved knowledge about the creation of MaaS ecosystems and their governance
Academics and research centers	Advanced knowledge on new methodologies for design, analysis, assessment of MaaS solutions and services
Consultancy and IT companies	Tools and methodologies bringing added values to potential customers (MaaS operators, Transport Operators, Public Authorities): technologies, data processing methods, evaluation and analysis applications.
Transport Service Providers	IT modules for MaaS integration

Tools, methodology documents, benchmarks and case studies elaborated and analysed during the project are available to all partners. The maturity reached in the project lifetime did not generate discretions and terms of use claimed by respective owners, that did not express the need to register IPRs for developed products or knowledge. However, individual exploitation strategies were outlined by project partners, and they are based on the following guiding principles:

- The solutions tested in IP4MaaS potentially have a clear impact in individual partners businesses. The innovative character of IP4 solutions gives the project results high potential in a commercial environment. IP4MaaS use cases and related functionalities became new assets for the creation of second generation of MaaS platforms.
- The individual partners' interests in participating to the project guided the IP4MaaS business model generation process reported in this document. The business models support individual strategies of the project members in order to lead future investment plans.
- The market context analysed helps IP4MaaS partners to identify and evaluate opportunities for their exploitation and to monitor other initiatives (commercial or research driven) towards a stronger market positioning.

Based on these assumptions, the IP4MaaS exploitation strategy has been outlined around the following actions:

- Action 1 - Knowledge Agents: the consortium is well equipped to serve all relevant IP4MaaS target groups. The project partnership seeks to develop and maintain a culture of service orientation favoured by MaaS schemes both at respective local level in demo sites and at EU level within the Europe's Rail Joint Undertaking.
- Action 2 - Community marketing: WP7 made use of the available social community assets, and involved the high performing online communities, being a driver for project's outputs and partners' value propositions.
- Action 3 - Activation of multipliers: UITP as project coordinator and largest association for Public Transport will accelerate the take-up of project results for MaaS 2nd generation, taking advantage of collaborations activated with CFMs.
- Action 4 - Exploiting synergies with relevant parallel activities: a number of IP4MaaS consortium members are involved in other activities such as TRA, other IP4 or Horizon Europe research projects, international data spaces (IDS) standardisation actions. These synergies are multiplying the exploitation efforts of IP4MaaS partners.

7.1. Guidelines for business Exploitation Strategy

The general principles outlined above will be applied to derive exploitation strategies for entering or consolidating the positioning in the MaaS Market of project partners and they are based on the following specific steps:

- Market Research and Analysis:
 - Each partner should identify its Target Market by determining the specific geographic area or demographic segment to be targeted with the specific value proposition.
 - Specific market size and growth potential should be assessed as well to understand business projections in the target region and forecasted growth rates.
 - Competitors must be identified, analysing their strengths, weaknesses, and market share and evaluating their pricing models, service offerings, and customer feedback.
- Value Proposition and Differentiation:
 - The value proposition reported in the previous sections have different level of maturity; they must be individually articulated to define the unique value of the MaaS-related solution to be brought to customers, such as convenience, cost-effectiveness, sustainability, or a combination of factors.
 - The differentiators must be identified to determine the added values for customers, in terms of e.g. innovative features, partnerships with local transportation providers, superior customer service.
- Business Model Development:
 - The general business models outlined must be specialised by elaborating individual budgeting and related revenue streams models and quantifications.
 - The pricing strategy must be determined for each service, considering factors like the value delivered, customer willingness to pay, and competitive landscape.
- Technology Infrastructure and Integration for software components:
 - Partners willing to offer software components should analyse the potential integration environments, leveraging on the experience gained by IP4 collaborations. Factors like scalability, customization, and integration capabilities must carefully be considered.

- Data Integration: being data sharing one of the most relevant assets in MaaS ecosystems, strategies to integrate with various transport operators must be outlined, in order to preserve integrity while maximising the potential exploitation.
- Partnership Development with relevant actors:
 - Transport Providers: establishment of partnerships with relevant transport operators, are the crucial milestone to initiate an effective market positioning.
 - Technology Partners: collaborations with relevant technology partners to enhance the value proposition capabilities, such as data analytics or processing, software components are a relevant pillar in the partnership strategy.
 - Government and Regulatory Bodies: for specific value propositions, namely those addressing standardisation and harmonisation aspects, engaging with local governments and regulatory bodies is also essential to understand the regulatory landscape, seek support, and ensure compliance and steer innovations.
- Marketing and User Acquisition:
 - Branding and Positioning: each partner, also building upon project's dissemination actions, should develop a strong brand identity and positioning that resonates with its target audience.
 - Marketing Channels: each partner should identify and utilise relevant marketing channels, moving from the existing network linked to the Europe's Rail Joint Undertaking and other channels already activated during the Demo sites experimentations, to reach the target market.
 - User Acquisition Strategies: user acquisition campaigns, including commercial actions, referral funding programs, and incentives to attract and retain customers should be studied and planned.
- Continuous Improvement and Innovation:
 - Feedback Collection: as learned by the project evaluation activities, reported in WP6 deliverables, user feedback must carefully be collected and analysed and usage data strengthened to identify areas for improvement and optimisation, being MaaS an evolving concept, subject to market fluctuations.
 - Continuous Innovation: to ensure high competitiveness level, it is crucial to stay updated with emerging technologies, industry trends, and customer needs to drive ongoing innovation in the MaaS-related value proposition.

Some of these actions have already been undertaken, leading to synergies with existing initiatives, commercial agreements and local collaborations that led to the creation of local MaaS ecosystems, although not completely mature yet.

7.2. Project exploitation strategies

Detailed exploitation strategies, clustered per type of value proposition and involved project partners are reported in the following tables:

1 - Evaluation methodologies and toolbox	
Exploitable results & knowledge	Specific methodologies and a toolbox were developed and used to perform the evaluation of MaaS experimentations by assessing the effectiveness of IT innovations and evaluate longer term impacts. These outputs can easily be reused in similar contexts.
Organization(s) background	FIT and AITEC are both R&D and consulting companies providing services in the domain of transport and logistics.
Market synergies	The exploitation synergies have been identified in national and EU research projects that facilitate the market transferability.
Exploitation strategy	<p>The strategy of the "IP4MaaS assessment toolbox" and evaluation methodologies are based on the next actions that companies will individually undertake:</p> <ul style="list-style-type: none"> • Contact with CFMs and with IT local companies to foster data gathering and integration • Contact with large companies of the railways sector • Commercial proposal to potential customers (TSPs and Public authorities)

2 - Travellers' mobile apps	
Exploitable results & knowledge	KORID created and started a mobile app to similar to Travel Companion (product name Idolka). The comparison of TC and Idolka became the basis supporting further development for the entire Liberec region.
Organization(s) background	KORID is a coordinator of public transport services in Liberecký Kraj – Region of Liberec in the North Bohemia. The company is owned by Liberecký Kraj (self-government authority), which orders the regional public transport services from 3 rail operators and 5 bus operators
Market synergies	KORID has a very well-developed integrated transport system IDOL, which includes all modes of public transport - trains, regional buses, city transport including trams (19 TSPs). MaaS is recognised as the next level of multimodal travel scheme. KORID has been dealing with MaaS and the position of KORID in the role of MaaS organizer for 3 years. Promotion of MaaS in public administration is ongoing, project plans for partial MaaS projects based on the Idolka mobile application.
Exploitation strategy	<p>The immediate output of the IP4MaaS project is the processing of a differential analysis between Travel Companion and Idolka with a proposal for further development of the Idolka product.</p> <p>Another direct output is the use of a questionnaire system, which was developed by KORID as part of IP4MaaS, for periodically obtaining feedback from passengers. KORID has not done this activity before and considers the approach of the partners of the IP4MaaS project to be very inspiring.</p>

3 - Sentiment and emotion analysis

Exploitable results & knowledge	Mosaic Factor has developed the sentiment and emotion analysis tool. This tool performs the analysis of tweets published by common people related to specific topics in different regions. The level of maturity is high and it is exploitable considering that it would need adjustments for each different language and topics to be analysed. Customer segments Mosaic Factor is focused on are organisations playing an important role in mobility of people and transport of goods. The tool can be used also in other segments as it can be adjusted to any language and topic for analysis.
Organization(s) background	MOSAIC is an SME specialized in Big Data and Artificial Intelligence (AI) for sustainable Mobility of People and Goods. MOSAIC team has a large experience in research and innovation, having participated in multiple European, national and company research and innovation projects.
Market synergies	Synergies have been identified in national and EU research projects or other initiatives that facilitate the market transferability.
Exploitation strategy	The sentiment and emotion analysis tool is a fully exploitable project result. It is already available in the catalogue of solutions offered by Mosaic Factor and ready for commercial presentations to different stakeholders willing to perform adapted sentiment analysis to its specific business.

4 - Commercial agreements with local providers

Exploitable results & knowledge	<p>For the need of Warsaw demonstration execution, MIASTO WARSZAWA has signed a temporary agreement with the local Journey Planning API provider, Jakdojade. The City of Warsaw cooperates with Jakdojade on the basis of a long term contract, but the IP4MaaS project resulted in a new kind of cooperation that has not been practiced before.</p> <p>Similarly, the municipality of Heraklion collaborated with local partners to provide data promptly and in the exact form needed for integration. This collaboration is an asset now for the municipality and especially for its public transport, since the digitalization and standardization, as well as the publication of transport data have upgraded local operations internally and services to citizens that make use of our public transport.</p>
Organization(s) background	<p>The City of Warsaw is not a market entity and its mission is not to commercialise products and scale their uptake on the market. It is, however, an entity whose mission is to provide high quality solutions to its residents. One of the goals of the main current strategy of the City of Warsaw, #Warszawa2030, is to ensure a friendly transport system. The scope of the IP4MaaS project was compatible with this goal and the demonstration of the IP4 technologies in Warsaw brought new cooperations, although they cannot be considered commercial agreements.</p> <p>In Heraklion, the IT solutions tested during the demonstrations provided experience and knowledge of further possible upgrades in both operations and services to travellers.</p>
Market synergies	<p>The knowledge gained during the IP4Maas project can be used by the City of Warsaw to implement the objectives of the #Warszawa2030 urban strategy, as well as to implement elements of the SUMP for the Warsaw metropolitan area.</p> <p>In addition, the UITP Global Summit Exhibition in Barcelona was an interesting event to gain additional insight and network with other operators and private companies, which enriched the cities with more ideas to further assess and decide next steps towards upgrading public transport.</p>
Exploitation strategy	<p>The IP4MaaS cities provided the possibility of demonstration of the use of the IP4 technologies which are still under development. As a result, they got some knowledge and experience that were seeking.</p> <p>Future strategies will be aimed at improving operations and services and increase the readiness level of technological integration.</p>

5 - Transport data digitalisation processes	
Exploitable results & knowledge	Through the utilization of TransiTool AETHON assisted a TSP (MIRAKLIO) to standardize their data, so they could promptly and efficiently provide all that was needed to CFMs in order to be integrated in the Travel Companion and assess whether the TC application and its functionalities can truly add value to their operations and thus provide real, pragmatic and valuable feedback through the respective questionnaires.
Organization(s) background	AETHON Engineering Consultants is a start-up company based in Athens, Greece, created by individuals with European working experience and extensive academic knowledge. AETHON is a technology and innovation company focused on projects and products for the transportation system.
Market synergies	AETHON have an already established collaboration with MIRAKLIO which will be expanded beyond the IP4MaaS project. The company also planned to apply in future projects and contracts with operators, research centres and companies that wish to promote and innovate multimodality.
Exploitation strategy	<p>Until the end of 2023 the exploitation strategy is to carry on collaborating with most of the project's partners (operators included) to standardise and harmonize their transport data as per MIRAKLIO's case, in order for future similar endeavours to take place and be successfully even more promptly, thus elevating their readiness levels and realise the benefits of both data standardisation and uptake of CFMs' and other similar solutions.</p> <p>Due to the project experience in planning such a number of different demos across EU, the company wishes to assist relevant projects, initiatives in innovating transportation and achieving seamless multimodal door-to-door transport.</p>

6 - APIs for transport data exchange	
Exploitable results & knowledge	During the setup of demonstration activities, the integration of traditional modes of public transport with innovative micro-mobility services into one digital platform were facilitated by connecting different back-end solutions from different transport service providers into one solution through APIs for transport data exchange.
Organization(s) background	Dyvolve d.o.o. is a Croatian independent SME, founded in 2010. The organisation has a comprehensive knowledge, experience and professional competence in the fields of sustainable mobility and urban environment, with a particular focus on sustainable transport solutions, integrated mobility solutions and e-mobility ecosystems. BUSUP TECHNOLOGIES S.L. is a company which provides shared bus commuting services in Great Metro Areas of Barcelona through a booking platform which actuates as link between BusUp's customers and bus operators.
Market synergies	The IP4MaaS project is in synergy with the ongoing DREAM PACE project (Interreg Central Europe) in Split-Dalmatia County, Croatia, where a new DRT concept will be created and connected with other existing modes of transport. Dyvolve is one of the partners on the project. Other national and EU projects were connected to the subject. Dyvolve is in close relationship with OLTIS and GPP Osijek (transport service provider and partner at IP4MaaS project), for MaaS development potential cooperation and future development of a commercial MaaS system in the City of Osijek.
Exploitation strategy	The exploitation strategies of both companies are to: <ul style="list-style-type: none"> • provide a strategic planning approach to designing MaaS-related services for public (national/regional/local) authorities or business actors and offer broader consultancy services in the field of sustainable transport and MaaS-related technologies: providing transport analyses, strategies, and action plans (mostly related to MaaS and DRT), advisory services related to the regulatory framework and data preparation, etc • use network of partners and MaaS solution providers to advise clients about the best market-ready technologies and help them in the strategic planning of MaaS services • participate in future EU co-funded (R&D and implementation) projects • support the development of transport service also through APIs for third parties.

7 - Design of IT services for TP integrations	
Exploitable results & knowledge	The project allowed to acquire knowledge in the field of MaaS approach and gain experience in cooperation with other institutions involved in its development and popularization. It also allowed to learn the complexity of the process of designing IT services for TP integrations. The very conduct of the demonstration and the process of recruiting participants was also a valuable experience, which the essence of using incentives in the recruitment process for this type of actions.
Organization(s) background	Sparsity Technologies is a spin-off from UPC and commercializes the graph database Sparksee and different products stemming from European project. Miejskie Zakłady Autobusowe (MZA) is a municipal bus operator in Warsaw Metropolitan Area and experienced technological leader.
Market synergies	Sparsity organized in TRA an invited session which presented the complementary of IP4 projects with the project of ER4 of SESAR also showing the importance of Travel Companion applications. An event summarizing the tests of the Travel Companion application was held during popular public event of the opening of the summer season on the Vistula river on June 24, 2023. During the event, MZA stand visitors had a chance to learn about the IP4MaaS project, development of TC app and receive incentives for participation in TC tests.
Exploitation strategy	Demo results showed a need for further IT development of the app. Some issues have been fixed during project realization; however many other still need to be fixed and further developed in order for it to become an attractive tool for travellers. Besides future improvements the strategy will be based on the use the knowledge acquired of the demo activities design and execution in other EU projects to enhance companies' portfolio.

8 - Competence on MaaS market dynamics and opportunities

Exploitable results & knowledge	<p>IP4MaaS provided a better understanding of the MaaS market and opportunities, with special reference to:</p> <ul style="list-style-type: none"> • the perception and preferences of European travellers • the interest of European mobility operators for MaaS innovative IT solutions <p>The knowledge acquired relates to demo preparation, planning, coordination as well as user needs necessary for the development of an inclusive MaaS.</p>
Organization(s) background	<p>Transport association like UITP and UNIFE and research centres/universities such as CEFRIEL, CErTH, POLIMI are the selected partners for exploiting project competences related to MaaS and to steer the 2nd generation of such a mobility model.</p>
Market synergies	<p>UITP will try to boost synergies with actors in the sector, and in particular its own members, in order to take advantage of the knowledge and research produced within IP4MaaS project and make it visible to key actors in the sector. UITP vast network is particularly suitable for this purpose, with more than 1.900 members, and more than 20.000 contacts subscribed to its various newsletters. UITP's broad network is also very suitable for bringing the IP4MaaS research outcomes to a non-European audience, giving visibility to the project beyond EU borders.</p> <p>Cefriel has been involved in other Shift2Rail/EURail projects (such as Ride2Rail, Daydreams), other H2020/HE/CEF projects (like NAPCORE, Tangent, Keystone) and forthcoming DEP projects (like deployEMDS); Cefriel is also a member of different associations (like UITP and Ertico in the mobility domain and IDSA and GAIA-X in the area of data spaces) and participates to different related events (like the UITP Summit or ITS Congress or TRA conference).</p> <p>Synergies with other IP4 research projects (Connective, Extensive, Ride2Rail), including exchanges with partners from past IP4 projects (GoF4R, ST4RT, SPRINT, IT2RAIL) are in place for UNIFE and CErTH.</p>
Exploitation strategy	<p>The exploitation strategy will be based on dissemination actions (through UITP members' newsletter, IT-TRANS, INNO-TRANS and the UITP Global Public Transport Summit).</p> <p>In addition, networking for cooperative research and innovation projects in the mobility domain will be the focus of this specific asset strategy, especially looking for replicability of results obtained in the MaaS and multimodal transport domain towards other areas like traffic management and logistics.</p>

8. Conclusions

This deliverable presented the exploitation strategies for IP4MaaS products and services developed during the project lifetime.

The work of Task 7.4, conducted in synergy with the overall WP7 to strengthen the project outreach and exploitation, has been performed by all partners in the second half of the period, taking advantage by results of experimentation reported in WP5 and evaluated in WP6.

The market overview introduced this work, by presenting the specific MaaS domain, along with its peculiarities and highlighting challenges and opportunities.

The IP4MaaS assets have then been analysed in detail and systematised as value propositions along with an initial outline of business models.

Finally, the individual exploitation strategies have been reported and these can constitute the basis for maximising the project impacts after the project end, ensuring adequate added value for the EU and all involved partners.

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