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RETHINKING MOBILITY IN IRELAND

The case for Mobility as a Service



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Phoiblí agus Athchóirithe
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Expenditure and Reform

CONTENTS

3	EXECUTIVE SUMMARY: WHAT DOES THIS PAPER RECOMMEND?	13	WHAT KIND OF MAAS FOR IRELAND?	29	WHAT HAPPENS NOW?
		14	What have other places learnt about MaaS?	31	About this project
		16	What do stakeholders in Ireland think about MaaS?		
5	WHY MAAS FOR IRELAND?	17	Stakeholder organisations engaged in this project	32	APPENDIX
6	What is Mobility as a Service?	18	What design principles should a MaaS system in Ireland have?	32	Varieties of MaaS
6	Why do we need to rethink mobility in Ireland?	19	The right model for Ireland	33	What are the main pros and cons of each model?
8	What sustainable mobility initiatives are currently happening in Ireland?	21	What are the components of the model?	34	How do these models score against our design principles?
10	Why MaaS? The potential for Ireland	24	Who does what under this model?	35	References
11	What quantifiable benefits could MaaS deliver?	26	What does this model look like in practice?		
12	Why now - what happens if we do nothing?				

**This is a unique
moment in Ireland.**

**New pressures, ideas
and opportunities are
forcing change.**

EXECUTIVE SUMMARY

WHAT DOES THIS PAPER RECOMMEND?

This is the moment to rethink mobility in Ireland. We have stretching targets of reducing transport emissions by half by 2030. We have an opportunity to rethink how people get around after the Covid-19 pandemic. And there are rapid technological advances in transport, smartphones and connectivity.

This paper proposes a Mobility as a Service (MaaS) model for Ireland led by **public authorities**.

Public Authorities should commission a **new data and services hub** which pools a **minimum standardised data set** and interoperable services from mobility providers into a shared system. Relevant and value-add data related to End Users, Policy, Infrastructure, and other contextual information would also be collated.

This system would be accessible to accredited organisations, who could use this common data and service exchange hub to build consumer-facing services which offer **integrated planning and booking for users and expand the customer base for public and private shared mobility operations**.

The scope of the system should cover all services across Ireland, **both urban and rural**.

This model allows for scalability up or down in terms of service provision. For example, a national service (e.g. TFI

EXECUTIVE SUMMARY

WHAT DOES THIS PAPER RECOMMEND?

branded App) could be developed whilst hyperlocal services could exist in parallel. Or, an events company, tourist site or hospitality business would have the ability to add a mobility service to their existing website or app. An employer could create a bespoke mobility package for their staff. A University could create a bespoke mobility package for their students. Apps which allow users to book multiple services in one place would be enabled. The model enables the creation of many targeted user services nationwide, which considered collectively can significantly impact modal shift.

This new shared data and services hub **builds on existing projects** in Ireland in smart ticketing and integrated travel. It would **work alongside active travel, physical infrastructure and modal shift policies**.

This public authority-led approach is gaining momentum **as a European consensus**, as per recent strategy papers such as The European Strategy for Data¹ and Sustainable and Smart Mobility Strategy – putting European

transport on track for the future², and endorsed by organisations like the European Metropolitan Transport Authorities³.

This approach defines MaaS **as prioritising public investment in foundational digital infrastructure, not apps**. This keeps the option open of publicly-led apps in future, but avoids taking on too much complexity and risk at first.

This report is intended to outline a high-level model for MaaS in Ireland based on stated design principles. It is intended to provide the foundation for more detailed design of the workings of the system (such as subscription models, payment and settlement process, or liability). We believe that those topics are best addressed once stakeholders recognise their role within the model and understand the opportunities for their operations.

This report recognises there is significant risk in doing nothing: if there is no shared plan for Ireland

on MaaS, both public and private organisations will continue with aspects of integration. Either a single private monopoly, or competing closed systems, could emerge, and public authorities will lose the opportunity to shape MaaS.

The next steps are to build on the **Department of Transport's Sustainable Mobility Policy** which calls for the establishment of a MaaS governance framework led by the National Transport Authority (NTA). A lead organisation (most likely but not necessarily the NTA) should fully scope and commission the proposed data and services hub on public terms. Mobility providers (public and private) operating in the Irish jurisdiction should start making their operations 'MaaS ready'. Councils should look at new ways of using data to improve oversight and collaboration with their regulated shared mobility providers.

WHY MAAS FOR IRELAND?

A person wearing a cap is plugging a charging cable into the front of an electric vehicle. The scene is overlaid with a blue tint, and the text 'WHY MAAS FOR IRELAND?' is prominently displayed on the left side of the image.

WHAT IS MOBILITY AS A SERVICE?

Traditionally transport is accessed by mode: a traveller books or pays for each bus, train or taxi separately.

The term MaaS is often used to describe apps or digital platforms that bring a range of transport options into one place for the user, or to subscriptions which give a user access to transport for a single annual or monthly fee.

This report focusses on the back-end arrangements in data, policy and governance that could enable that kind of service - not necessarily the development of those services themselves.

Therefore, our report defines MaaS as a suite of integrated components, both old and new, working together in a dynamic way to promote sustainable mobility. The rest of this report explores this definition in more detail.

WHY DO WE NEED TO RETHINK MOBILITY IN IRELAND?

This is a unique moment in Ireland. New pressures, ideas and opportunities are forcing change.

There is a once-in-a-generation moment after the coronavirus to rethink how people get around

Not going back to congested streets.

Before lockdown, many places in Ireland, particularly Dublin, had busy streets, bad traffic, and long journey times: car satnav firm TomTom ranked Dublin 11th-worst of 239 European cities for congestion in 2019⁴.

A reset of expectations and behaviour.

At the start of the pandemic, car traffic fell to about 30% of pre-Covid levels, bus usage on city services dropped by 90% and rail usage reduced by about 97%, according to the NTA⁵. Travellers are now thinking about how much they travel into work, and how.

WHY DO WE NEED TO RETHINK MOBILITY IN IRELAND?

We need to meet ambitious environmental goals

Climate change targets

The Programme for Government⁶ aims to reduce carbon emissions by 51% by 2030 to net zero emissions by 2050. The Climate Action Plan⁷ sets the target of a 45-50% reduction in transport CO2 emissions by 2030.

Public transport targets

The Climate Action Plan aims to reduce car use by inducing an additional 500,000 public transport and active travel journeys by 2035. The National Energy and Climate Plan 2021-2030⁸ prioritises improving capacity and efficiency of public transport and improving transport links. The NTA's 2018 - 22⁹ strategy prioritises shifting people from cars to sustainable transport.

And there are major developments in technology, society and policy

New forms of mobility provider.

New firms offering electric scooters, bike sharing, car clubs and ride-hailing have rapidly grown and created a new range of transport options and innovations. Some of these are already operating in Ireland whilst others will be attracted to Ireland if the right market conditions are in place.

A rapid shift to electric vehicles.

Electric vehicles are approaching price parity with petrol and diesel cars. The Climate Action Plan targets nearly a million electric vehicles by 2030, and the Programme for Government identified the need for regulation on personal powered transport.

Radical new technologies.

Ireland is a global tech hub. It has one of the most smartphone-savvy publics in Europe. 5G is rolling out across the

country. International journey planner apps like Citymapper have launched in Dublin. Technology in payment, connected devices and autonomous vehicles is rapidly advancing.

A policy push for sustainable mobility and defined projects.

A wide range of sustainable mobility initiatives are happening - which are summarised in the next section.

WHAT SUSTAINABLE MOBILITY INITIATIVES ARE CURRENTLY HAPPENING IN IRELAND?

Across local and national government, there is a policy push for sustainable mobility. Any MaaS solution for Ireland needs to recognise and build on this work.

This section summarises projects which were raised with us in the course of the project: other relevant initiatives may be underway or planned.

Policy initiatives include:

- At a national level, the Department of Transport has published its [sustainable mobility policy](#), with an emphasis on smart and integrated mobility.
- The Five Cities Demand Management Study¹⁰ by the Department of Transport will inform the direction of complementary demand management policy measures at a local and national level.
- Legislation is planned to regulate e-scooters and e-bikes, setting out minimum safety requirements and how these new vehicles fit into existing policies.
- The Climate Action plan gives Councils the action of introducing low emission zones.

Projects in end-user services include:

- A new journey planner under the Transport for Ireland (TFI) brand is expected to launch in 2022.
- Public and private mobility operators are actively exploring new opportunities to integrate services, particularly mass transit and micromobility providers looking at joining-up booking.

Projects in data and services include:

- Next Generation Ticketing (NGT)¹¹, an NTA project to renew ticketing infrastructure and introduce an account-based ticketing payment system, making ticketing mobile-first, with options over payment method and move validations to the cloud.
- Automatic Vehicle Location¹², an NTA project to upgrade the technology providing real-time information on bus locations.

Projects in transport production include:

- Connecting Ireland¹³, the NTA's programme to expand options for rural areas, with better bus links and new forms of demand-responsive transport.
- DART+¹⁴, a programme to triple the DART network, invest in carriages and expand rail options in greater Dublin.
- MetroLink¹⁵, a new metro line for Dublin, connecting Dublin Airport, the city centre and suburbs north and south.

Infrastructure projects include:

- BusConnects¹⁶, a huge expansion of priority bus lanes, new bus stops and shelters, new park and rides, new technology to move the fleet towards zero-emissions, as well as simpler fares, in cities across Ireland.
- New cycling and walking infrastructure is being built across Ireland, with new national infrastructure too such as the Galway-Dublin cycleway, and the NTA announcing EUR240m¹⁷ for councils to deliver segregated cycle lanes, walking infrastructure and other projects.
- Mobility hubs¹⁸ including park and rides, and new mobility management tools for residential areas and employers.
- New electric vehicles charging infrastructure across Ireland.

These projects create huge momentum for sustainable mobility in Ireland. Any MaaS solution should build on them – adding new data and services initiatives, and accelerating the integration of these different projects into a better service, built around users.

WHY MAAS?

THE POTENTIAL FOR IRELAND

The apparent convenience and cost-effectiveness of private car use makes it the dominant mode: about 70% of passenger journey miles in Dublin are by car, according to Google¹⁹.

MaaS is a new tool to encourage modal shift. The concept is that by offering customised information and integrated transport for users, they have a much more seamless, painless experience. It improves the relative ease and cost of accessing public transport and gives better access to new forms of shared mobility – making them collectively much more competitive with private car use. This in turn could reduce emissions, congestion and improve journey times. At the same time, data on those journeys created and held in a MaaS system can give public authorities and accredited

parties a clearer understanding of transport, and allows service providers give better information to users on how to get around - creating a virtuous proactive circle of transport planning.

This ability to unlock new insight and innovation means that combined with faster journey times, MaaS represents a significant economic opportunity.

Because MaaS is about establishing the digital connections between existing and new types of transport, it can complement more politically and financially risky policies such as expensive new infrastructure or re-prioritising space use away from cars. As highlighted, Ireland is investing heavily in the physical connections between transport, such as BusConnects, Dart+ , Active Travel infrastructure, etc. Projects like the Leap card and NGT have built momentum for integrated travel in public transport. MaaS builds on these projects and takes them to their logical conclusion: seamless, integrated travel

across all modes, public and private, and made accessible to a wider range of innovators.

With new developments in autonomous vehicles and electrification, creating an integrated, data-led mobility system is the foundation for future technologies – an enabler of much more radical changes in how we get around.

The concept of MaaS is therefore that it gives us an additional way to encourage modal shift and reduce journey times, by creating something more comprehensive and insightful than the current system.

WHAT QUANTIFIABLE BENEFITS COULD MAAS DELIVER?

MODAL SHIFT

Vienna

A 2014 trial of a MaaS app found that **46% of participants** changed their modal choice on leisure trips – and **21% of users** reduced their car use.

Gothenburg

36% of non-car owner participants in a MaaS trial of around 200 users said they would delay purchasing a car thanks to the MaaS app.

Sydney

In a trial of around 100 users of a subscription MaaS system, **17% of participants** reported a change in their view to be less in favour of car ownership.

BEHAVIOUR CHANGE

Singapore

96% of users of a private app which ran from 2019-2021 said they preferred using public transport after using the MaaS app.

Helsinki

After one year of a full MaaS subscription app, with a total of 70,000 unique users, **73% of trips** were by public transport – compared to **48% of users** outside the MaaS system.

JOURNEY TIMES

Vienna

69% of users in a MaaS pilot said information outlining reduced journey times was their main motivation for using the system.

FIRST & LAST MILE JOURNEYS

Helsinki

12% of all bike trips are taken within 30 minutes before using mass transit – and **30% within 90 minutes** after using public transport.

EMISSIONS REDUCTION

Dublin

Dublin's CO₂ emissions would **reduce by 22%**, if 20% of car journeys were replaced with shared mobility or public transport.

See references section for sample sizes and links to publications

WHY NOW – WHAT HAPPENS IF WE DO NOTHING?

There is no such thing as ‘doing nothing’ in MaaS.

This is a dynamic, evolving area of transport where some movement by different organisations is inevitable. If there is no shared plan for Ireland then the likely result is:

1. Private organisations will continue with aspects of integration and make choices for users on how they can access transport.

Private firms are investing heavily in mobility: European micromobility providers alone raised over 500 million Euros from investors in 2020²⁰. If public authorities do nothing, there is a high probability that disruption in the transport sector will happen anyway without direction or control by government - which can possibly lead to harmful social outcomes. This could be a major tech player like Google or Facebook, a MaaS platform, or a mobility provider, developing some kind of MaaS system. In some places, like New York²¹, choices for consumers are defined by agreements between companies, rather than any sense of the user's needs, or public objectives. Either a single private monopoly, or competing closed systems, could emerge.

2. Public authorities will lose the opportunity to radically improve transport using new mechanisms.

Pressure to improve transport through traditional infrastructure will continue, and options for achieving change will be narrowed to more expensive and less politically attractive means.

WHAT KIND OF MAAS FOR IRELAND?

WHAT HAVE OTHER PLACES LEARNT ABOUT MAAS?

The theory of MaaS first emerged in 2014.

We can learn from trials and real-life case-studies since then. These lessons include:

1. It's not just about an app: public authorities have a range of levers in MaaS systems.

Public-led doesn't need to be public-operated. In particular, public authorities can develop or commission apps – but they can also set the terms of data-sharing and participation in a transport system, without providing such an app, data solution or transport themselves. Public authorities are not always best-placed to develop these tools as it is not their core activity. The best MaaS systems will define a role for public authorities which aligns to their current core activities – and avoid creating new and unrealistic expectations on them.

2. There's no MaaS without mass transport: MaaS keeps public transport relevant.

Mass transit should be the backbone of any MaaS system – and MaaS is particularly useful in adding transport options to onward connections from mass transit. Where MaaS has achieved changes in behaviour, it was as a supplement to public transportation - not a replacement

3. Different levels of integration are possible.

Systems can range from integrating travel information in a journey planner, through booking of individual legs of

a journey, through to single payment systems covering a range of options. MaaS used to be taken to mean purely subscription models, like a mobile phone or video streaming subscription structure for transport: now, there is an understanding that it can look at different levels of integration.

Level 0 – Services have separate tools for users

Examples: Irish rail app, Dublin bus app

Level 1 – Information: travel planning and price information

Examples: Google maps, Transport For Ireland

Level 2 – Booking and payment: individual trip-finding and payment

Examples: Jelbi in Berlin, Smile in Vienna

Level 3 – Services: complex journeys, payment subscriptions

Examples: Whim in Helsinki

Level 4 – Societal Goals: MaaS integrates societal goals

Examples: Netherlands trials in 7 cities, Sydney trial looking at subscription and modal shift policy

4. There are opportunities across these levels of integration to shift users to active travel or low carbon modes.

Modal shift can happen through different means: convenience and awareness of low-carbon modes; through new price points and fare structures,

subscriptions and payment; or through app design and nudges, or giving people credits to use services in front-facing apps.

5. It's all about data.

Without integrating data, MaaS cannot work. Relevant data in the optimal format enables insight which in turn enables the creation of innovative services.

6. But brokering data-sharing requires careful choices.

There are some technical barriers in cleansing data and making it secure, and handling personal information. But the major barriers to data and service integration tend to be not technical, but in relationships and agreements between different organisations.

7. MaaS is not a substitute for every type of transport provision and regulation.

Not all policy goals are best served through a MaaS system. For example, rural or remote routes which cannot support a commercially viable transport option and have to be subsidised will still need funding. People without smartphones or bank accounts cannot access tech-based systems. Regulation of vehicle safety, physical street space or electrification of vehicles are complementary policy challenges. MaaS works best when it is deployed in tandem with these policies – not

seen as a single tool to fix everything.

8. Innovation isn't just about new types of mobility, it's about building mobility into other sectors.

Innovation in mobility is often used to mean new types of vehicle, like e-scooters, or simply a service with an app. But the 'as a service' label is increasingly understood to be about allowing a range of different organisations to access mobility - in the way that sectors like banking have unlocked new innovations by creating common open data standards. For example, if a hotel wanted to offer mobility as part of selling its rooms, or an event wanted to offer mobility as part of selling its tickets, or an employer organise transport for its staff, that expands the potential pool of customers for shared mobility and makes transport more convenient for that user group. That is the promise of MaaS – not just an app, but seeing mobility as something that different organisations can package up in new ways that reach their customers.

9. People are ruthless at choosing the most user-friendly experience.

Transport users vote with their feet. App users vote with their thumbs. Some places which have developed MaaS apps have been surprised at how difficult it is to get people to change to a new app, and systems which try to create an app – but don't build a product which gives users what they want – will fail.

10. MaaS is great politics.

Politicians across the world are looking for ways to promote sustainable transport – but are nervous of reactions if they go too far (e.g. using blunt instruments to discourage car use). MaaS adds to the suite of tools which policymakers can use for modal shift by increasing convenience for users, and enabling them to choose more sustainable means.

All of this experience gives Ireland a unique opportunity.

MaaS has matured, and gone from meaning an app with transport options and price bundles – to an entire way of thinking about mobility, where access to lower-carbon and faster transport is more accessible and convenient, for a range of organisations and types of transport user, with public and private organisations understanding what they are best placed to do. The opportunity for Ireland is to develop a model at the cutting edge of this thinking.

MaaS is no longer just about an app. It's about making mobility a genuine service which can be accessed by a range of organisations, who are empowered to find new ways of adding sustainable transport to a range of products.

WHAT DO STAKEHOLDERS IN IRELAND THINK ABOUT MAAS?

We spoke to 35 organisations across Ireland and Europe to understand their views on MaaS, and the views of their customers, users and citizens.

There were some clear themes in these conversations, building on the international experience with views on Ireland:

1. Rural transport matters – and this isn't just about Dublin.

Ireland is big enough and has a complex enough transport network that MaaS could play a meaningful role in creating a more sustainable, accessible transport network. But it is small enough that it makes no sense for separate MaaS systems across the country. Any system should therefore cover all of Ireland, and understanding the needs of towns, suburban and rural areas, and building in intercity journeys, is essential.

2. This is also about Ireland's reputation.

With a vibrant tech sector, a strong emphasis on foreign direct investment, a range of Ireland-based mobility providers looking to expand across the EU, and a world-class tourism offer, Ireland has the chance to create a MaaS system that secures its reputation as a leader in innovation, tech and sustainability. This is about quality of life, too - and what it means to be a pleasant, healthy place to live.

3. Data needs to be held neutrally.

There are consumer concerns about privacy. Providers have mixed views on the range of data that is appropriate to share with potential competitors. Building trust of both public and private organisations therefore point to finding a way for neutral, proportionate and secure data arrangements.

4. There are particular users which a MaaS system needs to serve.

Tourism and business travellers, rural and remote communities, and accessibility for disadvantaged groups were all identified as user groups which need particular attention in any MaaS system.

5. There is an opportunity for seamless links with other jurisdictions.

A MaaS system which allows a user to arrive in Ireland from the UK, elsewhere in the EU or worldwide and be able to access transport is a significant opportunity for Ireland's economy. The Northern Ireland Executive is looking at MaaS projects, and given the importance of the Belfast-Dublin corridor and routes from the Antrim coast to the Atlantic coast, this creates significant potential to improve cross-jurisdiction services for tourist and business travellers.

STAKEHOLDER ORGANISATIONS ENGAGED IN THIS PROJECT

We engaged with the following stakeholders during this project. We envisage the Maas ecosystem for Ireland to be more extensive.

POLICYMAKERS



TRANSPORT AUTHORITIES



SHARED MOBILITY PROVIDERS



LOCAL GOVERNMENT



MAAS SERVICE PROVIDERS



PUBLIC TRANSPORT PRODUCERS



TOURISM



WHAT DESIGN PRINCIPLES SHOULD A MAAS SYSTEM IN IRELAND HAVE?

Based on the international experience and conversations with stakeholders, we believe that a MaaS system in Ireland should have the following principles guiding its design:

1. It should allow public authorities to define what is best for society and reflect those in a MaaS system.

The overall shape, purpose and structure of a MaaS system has to reflect social and environmental goals, place public transport at the heart of MaaS, and work in tandem with other quality of life policies and choices.

2. Be practical about pressures on public authorities – and keep their options open.

Public authorities can decide to create MaaS apps which they run, own and manage themselves. They can commission public MaaS apps from private developers. Or they can focus on establishing the foundations for other organisations to create MaaS apps. These choices depend on their capacity, their technical ability, their budgets, and appetite for new projects. Any MaaS model has to recognise that at first, public authorities might want to proceed with some aspects of MaaS, particularly data integration – but may want to reserve the right to take on app development in future. Preserving their ability to do so is an important principle. More generally, we do not know where the market will go or what innovations will emerge – so a system which keeps options open for public authorities, and avoids dependency on a particular technology or provider, is preferable.

3. Don't limit transport options in 'walled gardens' of options.

A MaaS system should avoid steering users into closed systems, where agreements between providers limit their choices – for example, locking out certain forms of private micromobility provider from complementing mass transit, or the situation in New York where two competing systems lock users out of the other's bike-sharing or ride-hailing schemes. Instead, the system should be open to accredited parties to participate in the digital infrastructure, where all services which have been given license to operate are made available.

4. Respect the reality of consumer behaviour on app use.

A MaaS system should acknowledge high expectations from users of apps, respect the 'stickiness' of good apps, and recognise that different users might need different things from apps.

5. Encourage innovation in mobility.

The prize is not just to make today's system better, but to unlock combinations of mobility by a range of innovators that cannot be foreseen – and enable new developments in mobility.

THE RIGHT MODEL FOR IRELAND

This project went through an options appraisal process: identifying the broad models of MaaS model emerging across the world, discussing their benefits and risks with a range of organisations, and evaluating them against design principles. A fuller discussion of this process is included as an appendix.

As outlined in the illustration overleaf, we believe that the MaaS system which best meets Ireland's needs is one in which public authorities focus on overseeing a new data and services hub, set the rules of the game, provide or commission the core public transport network and lead overall public objectives – but leave some aspects of transport provision, consumer-facing apps and customer ownership to other organisations, at least at first.

In practice, this means commissioning a new digital infrastructure for pooling data from providers, asking mobility providers to contribute a minimum standardised data set into that shared system, plus making their services interoperable, and allowing other organisations to develop consumer-facing services from that back-end.

In effect, we are refining what MaaS means. It is about creating the conditions for a dynamic range of mobility services, which empowers innovation, but on terms

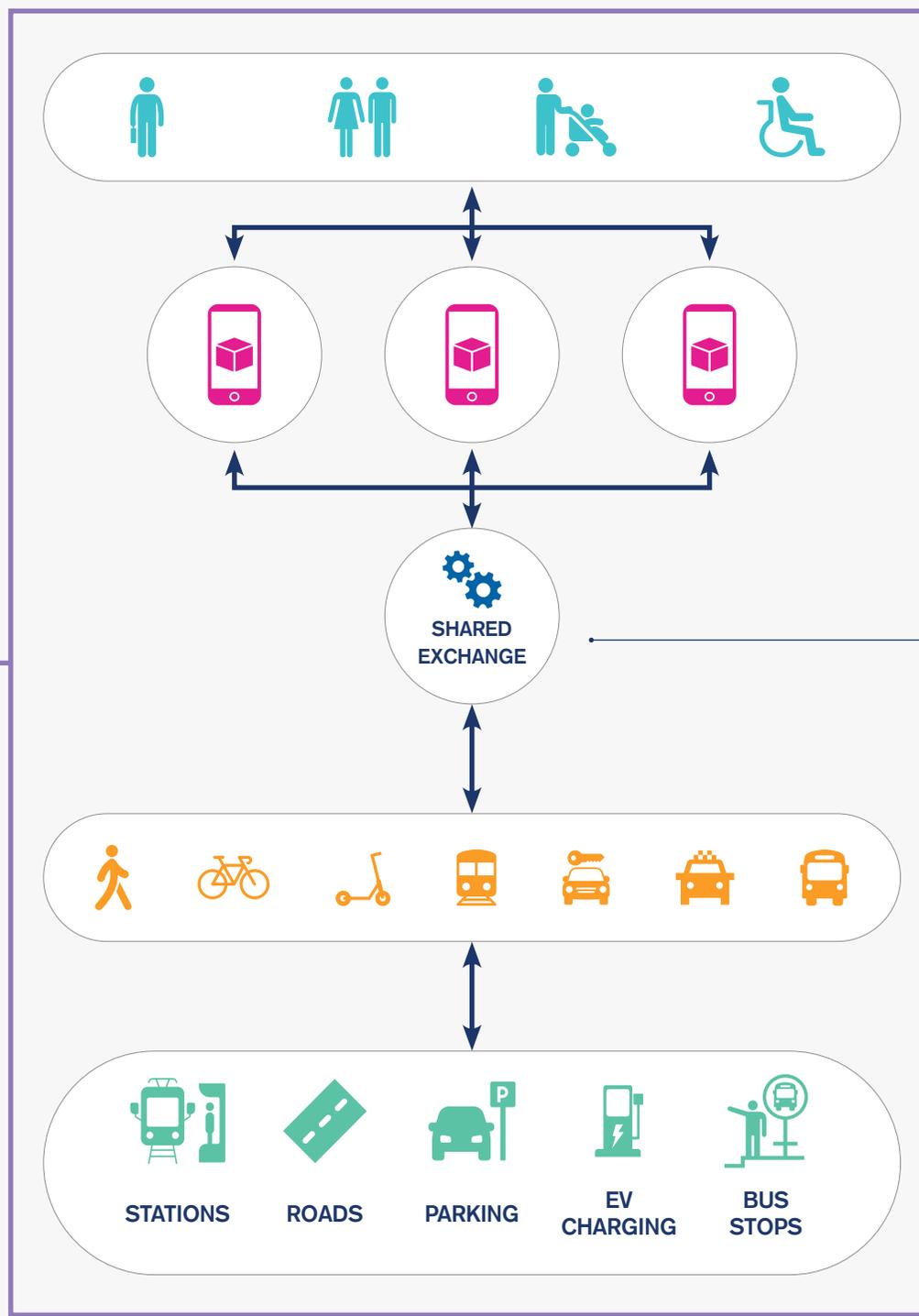
set by public oversight. This could require regulation, and requires policy work from public bodies – but we see this as a long-term investment in a system, not a short-term investment in a particular front-end technology.

MaaS is sometimes referred to as a 'netflix of mobility' – which suggests that this is about setting choices in a single app for consumers. In our view, MaaS is more like a creating a social equivalent of Etsy, Ebay or Amazon for mobility: a publicly-managed marketplace in which a range of organisations can participate.

This model is not just the right blend of ambition and practicality. It also positions Ireland as a leader in MaaS: learning from the best case-studies worldwide, and pursuing a vision which is about a systemic change in transport use and attitudes.

POLICY & REGULATION

Policy has an opportunity to influence each of the components using existing and new levers



END USERS

The consumers of a service

SERVICE PROVISION

The front end/service provision e.g. apps and mobility packages

DATA & SERVICES HUB

The public-led back end

TRANSPORT PRODUCTION

Old and new forms of sustainable mobility modes

INFRASTRUCTURE

Old and new forms of public realm improvements and physical infrastructure

WHAT ARE THE COMPONENTS OF THE MODEL?

One way of describing this MaaS model is to break it down into its component parts, so we can then map who does what within each of those components. As outlined in the model illustration, there are six main interacting components:

1. End Users

Users are the foundation of a MaaS system. A dynamic system would find ways to systematically incentivise transport providers, policymakers and front-end providers to reflect the needs of the user – and give them relevant data to better understand users.

Most MaaS pilots and small-scale trials have segmented users by their current level of car or public transport use, usually as a basis for tracking impact. For mature systems, the main consideration is finding ways to reflect the diverse needs of users, at scale.

2. Service Provision

Services are the range of consumer-facing products, apps and innovative business models which can offer mobility services. This includes:

- Journey planners are offered by Transport for Ireland and apps like Citymapper now work worldwide and include Ireland.
- Most transport producers have their own apps and offer some kind of smartphone/App booking.
- Dedicated MaaS apps have been developed, and increasingly there is a market in white-labelled MaaS apps for public authorities with organisations like Trafi or Moovit offering software for cities/regions to launch MaaS apps.
- MaaS ‘aggregators’ are a business model which tries to mimic mobile phone providers: it creates a single subscription with transport packages. Whim in

Helsinki is the only model operating at scale, though there have been subscription-based trials elsewhere.

- Some organisations outside transport are looking to add mobility to their offering, such as a major event which allows visitors to book tickets and transport at the same time.
- Services which cater for a particular user need, such as disabled access or a rural mobility service.

Each of these types of service creates a range of options in policy and design. Behavioural change in app design is well-established and placing transport options in different locations or with different designs can nudge users towards those choices. Information on the mode with the lowest carbon emissions, or best route for air quality, can be added to help consumers make informed choices..

The model proposed for Ireland allows for scalability up or down in terms of service provision. For example, a national service (e.g. TFI branded App) could be developed whilst hyperlocal services could exist in parallel (e.g. an app) for students of a University, for staff of a large employer, for residents of a new residential area, etc. All of these services are enabled by the other components of the MaaS model, in particular the new data and services hub component.

3. Data & Services hub

The core of our proposal is to create a new data and services hub which asks transport and service producers to present relevant data and services, to

enable a range of consumer-facing services. Providers can be encouraged to participate through incentives, such as the ability to access new customers in a MaaS system; or via regulation by making data and service sharing a requirement of their operation.

This proposed new data and service hub aligns with the current EU direction as stated in recent strategy papers such as **The European Strategy for Data²³** and **Sustainable and Smart Mobility Strategy – putting European transport on track for the future²⁴**, both of which call for the creation of a...

“Common European mobility data space, to position Europe at the forefront of the development of an intelligent transport system, including connected cars as well as other modes of transport. Such data space will facilitate access, pooling and sharing of data from existing and future transport and mobility databases.”

Trust in the oversight, use and accessibility of data is important to all stakeholders. From our engagement during this project, stakeholders have identified public authorities as best positioned to perform the oversight of this new data and service hub.

Principles

A general principle of FAIR²⁵ should be applied where the data and services are Findable, Accessible, Interoperable and Reusable (FAIR). In the context of MaaS for Ireland, the following additional principles are appropriate:

1. Adopt a policy-led and use-case approach
2. Identify the minimum necessary data to share

3. Leverage existing frameworks

1. Adopt a policy-led and use-case approach

A policy-led and use-case approach will help identify what data and services should be provided, for what purpose, from whom, the frequency, the appropriate granularity, the format, any rules surrounding the use of a service, and similar considerations.

This ‘what-are-we-trying-to-achieve’ approach will enable the definition of a high level data & service architecture (similar to projects such as UMOS²⁶, or that created in the Lisbon MaaS Platform²⁷ draft data architecture) where a mix of static and dynamic data on journey planning, service availability, service alerts, users, payments, and more, are identified as adding value to the ecosystem.

Another example of a use-case driven approach is the Mobility Data Specification (MDS) from the Open Mobility Foundation²⁸ which defines a catalogue of use cases for which data & services are then sourced.

Once defined, the collated data & services will provide the means to:

- Demonstrate the effectiveness of policy
- Demonstrate compliance with regulation
- Allow a service to be used in conjunction with other services within or outside the mobility sector

2. Identify the minimum necessary data to share

As a rule, we should establish the minimum data requirements from stakeholders to meet regulatory goals and make service integration a possibility.

Therefore, the approach is not to work top-down from the total possible range of data-sharing but focus first on the data with the fewest complex consequences in commercial, legal and risk management.

For example, for providers, this should distinguish between:

- **The minimum data which providers should report to public authorities** – but which might not be shared with each other. MaaS has significant potential to support public authorities’ planning and hold providers to account for their services. But some data which is useful in this regard may be commercially sensitive – particularly the profitability of certain routes, the exact usage numbers of mass transit systems, or analytics which model demand. This kind of data might therefore be reported to public authorities, but not shared amongst other stakeholders.
- **The minimum data required for providers to share to enable MaaS services.** Some data is essential for the most basic integration – such as service location or timetable data. Others are of interest to all providers and might therefore be logical to put in a central pool. For example, it may make sense to create a central mechanism for users to permit a range of organisations to access the same personal data; information on users which is required for multiple services, such as driver licence details, could also be held in common.
- **Data which is not required from providers but which they can use as differentiators to innovate.** Companies often see their value as being

rooted in data and resist the ‘commodification’ of transport so that they are seen as not simply providing vehicles, but capturing data and offering value-added services with that data. A system that encourages innovation would respect the value of data, and encourage organisations to use data to refine services and come up with new ideas. Our approach is therefore best considered as a resource for innovative service provision: if providers want to design new business models or innovations using proprietary data, they should be able to do so – the proposed data & service hub should not at first ask them to share this advantageous information.

3. Leverage existing frameworks

There is widespread understanding of the value of data and service exchange to unlock synergies in the Irish mobility ecosystem. Examples of recognised exchange standards include:

- Common formats for public transportation schedules and associated geographic information (e.g.) the General Transit Feed Specification (GTFS²⁹)
- Information flows between providers and policymakers for a variety of shared mobility modes, such as the MDS or the recently initiated City Data Standard – Mobility (CDS-M³⁰).
- Open data standards for specific modes (e.g.) General Bikeshare Feed Specification (GBFS³¹)
- Standards for communication between Transport Providers and MaaS Providers (TOMP API³²). The TOMP-API describes a full MaaS journey, including operator information, planning, booking, support,

payments, and trip execution.

In principle, these tools have the same end: to enable integration by creating common standards of data and interoperability. This is a crucial foundation for MaaS, and our approach proposes to leverage these existing frameworks.

4. Transport Production

This is the provision of vehicles and transport options for travellers by public or private providers. This model proposes that the existing tools for regulating, funding and operating transport are retained. It is designed to be flexible enough to reflect any future changes to the regulation of transport, such as over new forms of vehicle.

5. Infrastructure

These are the physical systems that underpin MaaS: public transport infrastructure, the space available for shared mobility, EV charging points, mobility hubs, parking spaces and road use. The NTA and Transport Infrastructure Ireland (TII) are major public institutions leading on national infrastructure development, but Councils also play a major role in providing infrastructure. A wide range of stakeholders in this project were clear that many aspects of modal shift are rooted in physical changes, and noted that major projects like BusConnects are significant investments. We firmly agree MaaS is a complement to these projects – not an alternative.

6. Policy and Regulation

These are the functions which determine the overall policy objectives, who is licensed to provide transport, how they relate to a MaaS system, and how MaaS relates to other regulatory functions.

National policy set by the Department of Transport and other central departments includes data law, passenger rights, competition law, and any underpinning legislation governing transport. They should also, in our view, set overarching policy statements for the objectives of MaaS.

The NTA is the national regulator and sets licences and regulations on most mobility providers, and leads on technical projects in ticketing, timetabling and technology. Councils locally licence some shared mobility providers like bike-sharing, car clubs and they also play a role in local policy-setting over road space, parking, and linking up transport with wider economic, quality of life and public health programmes.

We can therefore distinguish between different types of regulation required for a MaaS system; leveraging existing regulation and identifying where new regulation is required, in particular for the new activities which the MaaS system introduces.

WHO DOES WHAT UNDER THIS MODEL?

Shaded boxes denotes a new function for this organisation

Organisation/stakeholder	Role in Policy & Regulation	Role in Infrastructure	Role in Transport Production	Role in Data & Services hub	Role in Service Provision
User	Democratic input	User - expressing preference through actions	User – expressing preference through actions	Active data participant	User - expressing preference through actions
Department of Transport	Setting overall legislative and policy shape for system	Funding and setting national priorities	Setting overall legislative and policy shape for system	<ul style="list-style-type: none"> Setting relevant policy framework (e.g. for data reporting, data sharing) Funding of new roles and responsibilities for MaaS 	Setting relevant policy framework (e.g. for presenting information to users)
National regulators and public providers: NTA, TII	Implementing policy and legislation in detailed guidance to providers.	Implementing national infrastructure priorities	Regulating providers, providing/commissioning core public transport network	<ul style="list-style-type: none"> Potential to lead oversight of this component Establishing minimum data standards, defining service interoperability protocols, etc. 	Potential to provide own branded service including integration with new services.
Councils	<ul style="list-style-type: none"> Local regulation of shared mobility schemes. Stakeholder for policy, shaping policy through contextual data sharing. 	Regulating road use and public realm access for transport providers, (e.g. mobility hubs)	Commissioning various forms of mobility (e.g. bike-sharing, scooter schemes)	<ul style="list-style-type: none"> Defining data requirements as part of licensing arrangements Offering local contextual data to app providers e.g. parking restrictions, road schedules, etc. 	

WHO DOES WHAT UNDER THIS MODEL?

Organisation/stakeholder	Role in Policy & Regulation	Role in Infrastructure	Role in Transport Production	Role in Data & Services hub	Role in Service Provision
Public transport providers	Stakeholder for policy, shaping policy through contextual data sharing	<ul style="list-style-type: none"> • Providing information on mobility patterns and use of infrastructure. • In some cases providing complementary infrastructure, eg bike storage at train stations 	Providing transport for users, including subsidised routes and core intercity network	Sharing relevant data and services to enable MaaS	Maintaining own customer relationships in own branded apps or provide services via Third Party
Private transport providers	Stakeholder for policy, shaping policy through contextual data sharing	<ul style="list-style-type: none"> • Providing information on mobility patterns and use of infrastructure • Providing storage/pick-up points 	Providing transport for users	Sharing relevant data and services to enable MaaS	Maintaining own customer relationships in own branded apps or provide services via Third Party
MaaS platforms, journey planners, aggregators and other apps	Stakeholder for policy, shaping policy through contextual data sharing	Providing information on mobility patterns and use of infrastructure	Potential in future to broker new services (e.g. subscription packages)	Sharing relevant data and services to enable MaaS	Providing consumer-facing apps which may bundle services

WHAT DOES THIS MODEL LOOK LIKE IN PRACTICE?

This section answers some of the common questions about MaaS, and how this recommended model for Ireland would address them.

For the End User

Does this mean there will be a single MaaS subscription?

Not at first – but it means that in time, if a subscription model is right for organisations to design, negotiate and introduce, they can do so.

Does this mean there will be a single MaaS app for Ireland?

No. It means that in time, MaaS apps covering all of Ireland can emerge, or be commissioned by public authorities. So there could in time be a single Transport for Ireland app, for example, covering all the transport in the country. But this will sit alongside a range of consumer-facing apps.

Wouldn't one app be easier for the user to understand?

Consumers already have apps they are used to using. Building a single app is itself a big task - and we want to avoid creating an unrealistic expectation on public authorities – while merging every aspect of user information into a single place can create complex commercial questions, like who takes risk for which service. But more importantly, we think MaaS is no longer just about creating an app. It's about making mobility a service that can be packaged up by a range of organisations in different ways. That is an iterative,

ongoing process, to enable combinations of services which are not yet imagined.

So what transport options would be available?

Licences to operate, decisions on subsidised services and routing are all questions of transport production and those would be addressed through existing regulation channels. We envisage though that all transport services are ultimately part of the common system.

Scope

Surely this is all about cities – what about rural areas?

Our model is clear the MaaS isn't a substitute for provision of transport – so this is not about suddenly stopping rural areas having subsidised travel. However, a single system should include those services and can provide better access to them – and one benefit of MaaS is that it improves the data coming to public authorities on where demand is. For services which are always going to be subsidised or on fixed timetables, like some rural bus services, this can help plan routes and timetables to better reflect user needs.

What about the needs of particular areas, disadvantaged communities or minority groups?

The benefit of this model is that it allows the development of services which specifically reflect

WHAT DOES THIS MODEL LOOK LIKE IN PRACTICE?

different user groups – rather than trying to fit them all into the same single front-facing app. For example, specific features or a dedicated app which caters for the needs of disabled users could be developed, or a specific rural MaaS service.

Policy

So is this a public-led or private-led MaaS system?

It's a public-led back end model.

How does this model meet policy goals?

Each component of this MaaS model has an opportunity to more actively implement policy goals plus demonstrate the effectiveness of those policy goals using real data and insight. A user-focussed system is encouraged by enabling services which are based around point-to-point services, rather than built around silo'd modes or providers. MaaS is all about the integration of transport services – so policy goals of a more seamless, integrated system align well with MaaS.

How does this model promote active travel?

Each component of a MaaS system has the opportunity to promote active travel. Journey planning algorithms can be set to encourage active modes. Front End Apps can include contextual information like weather – making walking or cycling more attractive – and

there is good evidence that placing active options in a convenient location for users increases uptake. Public authorities could set a general requirement that consumer-facing apps must promote active travel where appropriate, or promote low-carbon modes first.

Implementation

Will mobility providers have to be part of the model?

What will actually make them get involved in the system?

There are two options: either a public authority could establish data standards as a voluntary code for mobility providers. The benefit for mobility providers is making their services accessible and expanding their customer base, particularly in adding onward connections to the core mass transit network. Or, it could be a matter of regulation: contributing core data sets or a requirement to make services interoperable could become part of a provider's licence to operate in Ireland.

Who would oversee the data & services hub component, decide what is in it, and run its management?

It's vital that data is held by a trusted, neutral organisation. So it should be regulated and coordinated by public authorities, who would decide what data is required from transport providers. It could be run

WHAT DOES THIS MODEL LOOK LIKE IN PRACTICE?

on a day-to-day basis by either public bodies, or commissioned to a middleware provider, or hosted by a neutral third party – but it would work under terms set by public authorities.

How does this fit with existing projects like the Leap card, or NGT?

It's designed to work alongside them. Public transport providers can continue to build an account based solution for their services. If in future all providers in a MaaS system see merit in establishing a common user view (account), then NGT could be the platform to do so.

How does revenue sharing between mobility providers work?

This model avoids tackling complex (and unproven) revenue-sharing arrangements between providers, because that is only required if a single subscription or joint ticket is developed. If providers want to develop those arrangements in future, they can – but this model focusses on the foundation of policy, data and service interoperability first.

What about a pilot to trial some of this?

We believe that a pilot is not necessary to begin establishing the outlined digital infrastructure. A pilot could be a useful way to explore some of the more

complex questions e.g. price points of subscription models or a trial with a specific user cohort.

Does each private and public provider have to wait for this model to happen?

They don't need to. We would expect mobility providers to be working on MaaS regardless of public action, and there is an opportunity for all providers to start getting 'MaaS ready' by assessing the impact of this proposed MaaS model on their own operating model. But the reason we propose a public-led model is to make sure that integration reflects societal goals – and we hope that kind of broad mindset is taken by providers, too.

Could there be any financial incentives introduced to encourage a user to use MaaS?

There could be. This model provides a foundation for more complex forms of incentives, such as mobility credits – where Employers, a University, a Business District, Council or public authorities can offer a 'credit' for choosing sustainable mobility. This could, in the long term, be a significant tool for improving mobility for lower-income and deprived groups.



**WHAT
HAPPENS
NOW?**

WHAT HAPPENS NOW?

This is a proposed model for MaaS in Ireland. Getting there will require a range of organisations to work together.

The steps outlined in this section are designed to work alongside related activities and avoid unnecessary burdens on public authorities.

We believe that starting from now:

The Department of Transport should:

Set the Policy direction - by factoring our thinking on MaaS into the governance framework as actioned in the Sustainable Mobility Policy. The Department should describe an overall vision for a MaaS system for Ireland and confirm its objectives. We firmly believe this should be about the principle of a dynamic, innovative mobility system with modal shift and expanded low-carbon transport at its heart, not only focussing on creating apps.

Provide funding - to enable the initiation of a MaaS programme. It could also look at funding assistance for stakeholders impacted by MaaS as outlined below, in the way that Finland supported providers to prepare for change³³.

The NTA should:

Initiate a MaaS programme – to establish the governance framework as actioned by the Department and deliver the model outlined in this document.

Appoint a lead organisation for building the digital infrastructure - identify a suitable organisation for developing the proposed model in this document on public terms. This could be the NTA, however other public organisations may have the capacity, remit and interest in providing this function.

Councils across Ireland should:

Get insightful data - factor in better data sharing and reporting into existing and new shared mobility regulation (e.g. bike-sharing, car-clubs, scooters). Analytics can be performed to better understand the effectiveness of these operations.

Unlock the public realm - plan for the overall increase in shared mobility considering any steps they can take to unlock the public realm to cater for new mobility services.

Mobility providers (public and private) should:

Get 'MaaS ready' - providers can look to this document and others as to the likely requirements on them for data sharing, data reporting and service interoperability.

Avoid Walled Gardens - providers are encouraged not to enter agreements which may ultimately limit user choice.

Once the above steps are underway, we expect to see the potential for MaaS outlined in this report begin to materialise.

We encourage any organisation with an interest in mobility in Ireland to get in touch. We actively seek the feedback of interested parties, user groups, mobility providers, MaaS platforms, etc. to refine our sense of how this model could work.

ABOUT THIS PROJECT

This project is a collaboration between Smart Dublin and Urban Foresight, funded by the Department of Public Expenditure and Reform through its Public Sector Innovation Fund.

We would also like to acknowledge the input and guidance from the NTA in both the preparation and delivery of the project.

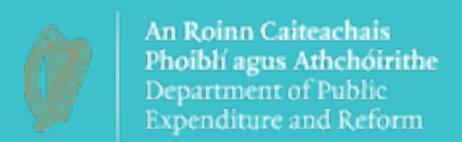
It follows the publication of a point of view on MaaS by Smart Dublin in November 2019, and a MaaS Gap Analysis workshop held in Dublin in March 2020 looking at potential visions of MaaS for Ireland.



Smart Dublin brings together technology providers, academia and citizens to transform public services and enhance quality of life. An initiative of the four Dublin Local Authorities, the goal is to future-proof the Dublin region by trialing and scaling innovative solutions to a wide range of local challenges.



Urban Foresight is a multidisciplinary innovation practice that is dedicated to accelerating the next generation of technologies, services and policy frameworks for cities. We work with ambitious organisations around the world on projects that improve lives, protect the environment and boost local economies.



DPER serves the public interest by supporting the delivery of well-managed, well-targeted and sustainable public spending through modernised, effective and accountable public services.

APPENDIX

VARIETIES OF MAAS AND ACTIONS TO DEVELOP MAAS

This project reviewed the known options of MaaS system structures. This appendix sets out more detail on how these options were appraised.

What are the known options for a MaaS system structure?

There are four main models of MaaS which have emerged across Europe:

- **Market-Led:** a minimal role for public authorities and with no specific public leadership or regulation beyond existing functions.
- **Public-Led Front End:** a completely public MaaS system: a single, fully public MaaS system where public authorities manage the integration of different services itself, on a platform it owns and operates.
- **Public-Led Front End (whitelabel):** a white-labelled public MaaS system: where PT commissions a single white-labelled platform from a technology provider, and potentially also asks them to lead integration of services.
- **Public-Led Back end:** an ecosystem of multiple MaaS providers, working from back-end integration overseen by public authorities. This can be commissioned to a private or neutral data host, but its works to publicly-set requirements.

APPENDIX

WHAT ARE THE MAIN PROS AND CONS OF EACH MODEL?

Model	Pros	Cons
Market-led	<ol style="list-style-type: none"> 1. No direct operational or financial risk for taxpayer 2. Companies will aim to develop user-friendly tools 3. Public regulators can wait and see what happens 	<ol style="list-style-type: none"> 4. No policy oversight or mechanism to prioritise social objectives 5. Long-term potential for private provider to win monopoly control, or competing closed systems to emerge
Public-Led Front End	<ol style="list-style-type: none"> 6. Total oversight of customer, routes, modes and user-facing product for public goals 7. Critical mass through all public transport in model 8. Mobility providers may feel they trust the public bodies as an honest broker 	<ol style="list-style-type: none"> 9. Operational, financial risk taken by public transport with significant development burden 10. Stifles competition from other front-end service providers 11. Mobility providers may refuse to join model. 12. Assumes consumers will switch from familiar apps
Public-Led Front End (whitelabel)	<ol style="list-style-type: none"> 13. Reduces development risk and cost for public authorities 14. Decisions on service integration taken by public authorities 15. Mobility providers may feel they trust the public bodies as an 'honest broker' 	<ol style="list-style-type: none"> 16. Potential to stifle innovation 17. Need to mitigate risk of whitelabel providers locking-in certain mobility providers 18. Assumes consumers will switch from familiar apps
Public-Led Back End	<ol style="list-style-type: none"> 19. Wide range of risk/financial options for public authorities 20. Users can continue using familiar services and apps 21. Different user groups will have apps that meet their specific needs 22. Public can set shape of system through data rules 23. Future innovation more likely – creating a marketplace, not just an app 24. Potential to pursue public-owned app in time 25. Mobility providers may feel they trust the public bodies as an 'honest broker' to oversee governance of the system 	<ol style="list-style-type: none"> 26. Modal shift policy may be harder with no single app/interface 27. Need strong link with regulation in each component to ensure policy impact

APPENDIX

HOW DO THESE MODELS SCORE AGAINST OUR DESIGN PRINCIPLES?

	Market-led	Public-Led Front End	Public-Led Front End (whitelabel)	Public Led Back-End
Ability to reflect public goals in MaaS	NO	YES	YES	YES
Respect consumer app choices and user needs	YES	NO	NO	YES
Don't limit consumer transport choices in walled gardens	NO	YES	YES	YES
Practical for public authorities and keep options open	NO	NO	NO	YES
Encourage innovation in mobility	YES	NO	NO	YES

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