



Implementing Mobility as a Service: A Roadmap for Scotland



Project supported by:





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Executive summary

Like much of modern society, the transport and mobility sector is being influenced by a rate of technological change beyond anything we have previously experienced.

Rapid advancements in electrification, autonomy, and digitalisation are providing the backdrop to an exciting transport future. There is much to be optimistic about and we remain hopeful that these advancements will create significant positive impact on our lives and the future health of the planet.

Yet significant uncertainties remain, and, until now, we have yet to see these technological advancements yield their full positive influence. Carbon emissions in the transport sector remain stubbornly high, modal shift to more sustainable transport choices remains limited and the efficiency and long term sustainability of public transport modes is still challenging.

Despite this, it remains clear that technological innovation is key to addressing these priority challenges within the sector. It must, however, be carefully directed and managed, requiring leadership and strategic guidance to ensure it is implemented in a way that supports wider policy objectives.

Technology can only be the answer if we are asking the right questions. Ultimately our goal is to provide

transport services that connect people to the important things in their lives – work, education, healthcare, friends and family.

As we look to the future, there is an increasing focus on doing this in the most inclusive and environmentally sustainable way possible and there is universal agreement that we must dilute our dependency on the private car. To do this we must address the barriers to shared transport, some real and some perceived.

The solution to this challenge is of course multi-faceted, addressing challenges around cost, convenience, integration, safety, personal comfort, accessibility, and awareness. This roadmap will focus on the role of digitalisation, and the implementation of **Mobility as Service (MaaS)** in particular, as one of a toolkit of solutions that will generate positive modal shift and improve access to sustainable transport modes for all.

This roadmap, funded through the Smarter Choices, Smarter Places programme, and developed in partnership with Tactran, SEStran and HITRANS, will highlight the role of MaaS in meeting the increasing consumer demand for **access to key services through digital means**. It will detail how this demand for digital access can be leveraged to address known barriers to shared transport use, promoting modal shift and

ensuring that the societal benefits of a simplified, efficient transport network can be secured.

This roadmap provides **16 recommendations** across key themes including leadership, governance, investment, user engagement, evaluation and data. These have been developed in consultation with MaaS Scotland members and the wider transport community and are designed to provide an important framework to guide stakeholders — including government, public sector bodies, transport operators, and technology providers — towards realising the vision of a more integrated, user friendly transport network.

While each recommendation should be considered important in its own right, it is only through wider implementation across all thematic areas that the true benefit of MaaS can be fully exploited and we would encourage Scottish Government, Transport Scotland and all other stakeholders to identify their role in delivering on this important model for future transport delivery.



Summary of recommendations

Leadership & governance

- 1 Transport Scotland must provide leadership and long term commitment to MaaS as part of a wider ambition for digitalisation in transport. This should include the appointment of a **Chief Digitalisation Officer**.
- 2 In partnership with stakeholders, Transport Scotland should lead the development of a **Scottish MaaS Code of Practice** to provide guidance and support for future MaaS implementation in Scotland.
- 3 Scotland would be best served by the implementation of a single, centralised **National MaaS Platform**, benefiting from the user base and economies of scale that this would bring, and complimenting adjacent national activity in transport data and smart ticketing.
- 4 Public bodies must continue to play a central role in the development and scale up of MaaS to ensure that any future platform(s) **meet local and national policy objectives**, in transport and adjacent areas such as net zero, reducing inequalities, inclusive growth and public health.

Innovation & funding

- 5 Scottish Government must illustrate their longer term commitment to digital transport integration by providing **multi-year funding support** for any future MaaS implementation(s).
- 6 Public bodies should drive future MaaS deployments and consider more **flexible and simplified procurement processes**, with greater focus on project outcomes and less emphasis on technical requirements.
- 7 All relevant public tenders/licenses should consider the impact of digital transport innovation, **future proofing** against integration of both physical and digital infrastructure.
- 8 A **knowledge exchange platform** should be established and supported to facilitate best practice and knowledge exchange across the MaaS ecosystem.

Behaviour change

- 9 Future MaaS deployments must include **greater focus on user engagement** to ensure that services meet the needs of all in our society.
- 10 Using evidence gained through the user engagement phase, more effort should be focussed on the **productisation of MaaS**, moving beyond minimum technical requirements towards the creation of a genuinely attractive consumer centric product.
- 11 Support should be given for a **coordinated marketing campaign** to improve the visibility of MaaS implementations and highlight their benefits.
- 12 Greater efforts must be made to coordinate behavioural change interventions, utilising MaaS as a part of a portfolio of **'toolkit measures'** that could be used to catalyse positive modal shift towards more sustainable transport options.

Evaluation

- 13 A **National MaaS Evaluation Framework** should be established to provide a coordinated and consistent approach to future project/pilot assessments.
- 14 Further efforts must be made to understand and measure the **social value** of MaaS implementations, including its impact on key policy areas such as net-zero and public health.

Data

- 15 Transport Scotland should author and publish a **Transport Data Strategy for Scotland**, covering all modes of transport and mobility and all types of data across the data spectrum. This strategy should include a move towards a 'presumed open' approach that will encourage innovation and promote the appropriate use of data.
- 16 Consideration should be given to the creation of a **Mobility Implementation and Governance Entity (MIGE)** to be the independent service and technical design authority on MaaS mobilisation and delivery.

1. Introduction

The implementation of digital technology across transport has been growing steadily in recent years, fuelled by technological innovation and catalysed by regulatory pressures, and the need for improved efficiency and sustainability. At the same time, consumer demand for digital access to key services has been increasing, a phenomenon accelerated by the COVID-19 pandemic. There is a wider public expectation that our day to day lives will be supported by an array of digital platforms. This started in areas such as banking and retail but has now extended to service areas such as health and education where significant efforts have been made to meet this demand. Transport will need to follow suit and while progress is certainly being made, it is arguable that it remains behind other key services in this regard.

Mobility as a Service (MaaS) represents an important step forward. Not only will it meet the wider demand for digital access to key services, but it also provides an opportunity to improve the consumer experience and address some of the known barriers to shared transport use – awareness, integration, accessibility and simplicity.







1.1 Mobility as a Service




Many attempts have been made to define MaaS and it is not our intention within this report to add to a long list of existing definitions. Indeed, we believe that MaaS can often be difficult to define simply because its implementation is so heavily influenced by its locality, e.g. available modes, governance structure, rural vs. urban environments, adjacent policy frameworks, etc. However, to provide important context for this roadmap, it is useful to consider the wider characteristics of MaaS and the key goals for its implementation.

In simple terms, MaaS enables transport users to plan, book, and pay for multiple modes of transportation, such as public transport, ridesharing, car rentals/clubs, DRT services and bicycles, through a single digital interface, often an app. While the modal mix will vary significantly depending on location, the vision for such services remains the same - to create a user-centric, integrated, flexible transport ecosystem built on simple, seamless, and personalised access.

As well as meeting an increasing demand for digital access to key services, particularly from our younger generations, MaaS offers the opportunity to provide transport users with:

 Improved awareness of travel options Encouraging users to explore alternative modes to the private car.	 Managed user journeys that build trust Supporting long term transitions to more sustainable transport choices.
 Simplified user experience Streamlining access to various transport modes, allowing travellers to seamlessly switch between modes and making mobility more efficient, affordable, and convenient.	 Personalised service Offering passengers the option to customise their user experience, prioritising transport options based on personal preference and building community based platforms.

In addition, MaaS provides the catalyst for collaboration between public and private transport providers, technology developers, and local governments. As well as being a vehicle to support optimisation of infrastructure and a reduction in traffic congestion, these collaborations will be vital in our efforts to meet our ambitions in adjacent policy areas. Importantly, MaaS and the innovative technologies developed in its implementation, will support the overarching ambitions set out in the National Transport Strategy:

 Helps deliver inclusive economic growth By improving the efficiency of our transport network and improving connectivity to health, education and employment.	 Improves our health and wellbeing By reducing transport emissions, improving air quality and encouraging use of active travel modes.
 Reduces inequalities By bridging the gap in transportation access, ensuring equity for all users, including those with disabilities, elderly users, and people in rural or underserved areas.	 Takes climate action By reducing barriers to more sustainable transport options, diluting dependency on the car and reducing carbon emissions.

As positive as its potential impact could be, MaaS should never be described as a magic bullet. It does represent an important tool in our efforts to cultivate positive behavioural change, but it must be utilised alongside further investment in our public transport network and additional carrot and stick interventions such as free bus access, low emission zones, parking levies, and congestion charging. Only by applying a full toolkit of measures will we be able to achieve the meaningful behavioural change we need to make impact.

However, without MaaS, and without accelerated efforts to meet public expectations regarding digital access, the challenges to modal shift may prove to be too great.

1.2 Scottish policy context

Mobility as a Service has been discussed within a Scottish context for well over a decade. Awareness of its potential benefits have grown over this time as the global evidence base for its implementation has risen.

In 2020, the National Transport Strategy stated that *'Improvements in digital technology and connectivity could impact on ways in which people work and travel, and these links could be an essential part of how transport is able to contribute to Scotland's emissions targets.'* This was followed two years later by the Strategic Transport Projects Review which called for more investment in Demand Responsive Travel and Mobility as a Service.

More recently, Transport Scotland published its route map to achieve a 20% reduction in car kilometres by 2030. This report highlighted the role of MaaS in achieving the behaviour change required to meet these targets, noting that *'By providing more reliable, personalised and dynamic information about public and shared transport services, MaaS can reduce car dependency and use in the areas surrounding Scotland's towns and cities.'*

Finally, 2024's Smart, Digital, Integrated Ticketing and Payments Delivery Strategy explored the role of digital platforms in implementing a national ticketing platform. In this report, Transport Scotland committed to *'supporting work to set out the future strategy for MaaS in Scotland, to improve integrated journey planning, booking and payment.'* The interplay between MaaS and our ambitions in smart ticketing is discussed later in this report.

1.3 Scotland's MaaS Investment Fund

In 2018, Scottish Government announced the creation of the **MaaS Investment Fund (MIF)**, a £2M programme to test, in a practical application, the viability of MaaS in Scotland. Originally designed to be a three-year programme, the fund was extended to 5 years as a result of the COVID-19 pandemic and has supported 5 pilot projects in this time – GetGO Dundee, Go-Hi, Enable, GoSESTRAN and St. Andrews MaaSsterplan. Together these projects have created a vital evidence base on which to plot the future course of MaaS in Scotland.

However, we must not rely solely on evidence generated through the MIF programme to inform our future MaaS strategy. Since 2020 there has been a significant uptick in MaaS activity across the UK (catalysed by the Future Transport Zone programme) and further afield. This roadmap leverages this wider evidence base, through either direct interview with key stakeholders or through published data from MaaS implementations across Europe.

1.4 Adjacent areas of activity

In addition to the MaaS Investment Fund programme, Transport Scotland is leading two adjacent areas of activity with the potential to enable future MaaS implementation.

In 2023, the **Digital Travel Data Services Project** was initiated to make travel information and journey planning easier and more accessible. This project, delivered in partnership with Traveline and Trapeze Group (UK) aims to provide a single source of truth for public transport and travel information in Scotland. This data will be hosted by Transport Scotland and will be made universally available, including to third party journey planners and MaaS providers. This represents a hugely encouraging step forward in relation to data integration and access and should be a real catalyst for MaaS implementation. The project began with a new version of the Traveline app in 2024, and 2025 will see data access testing via a series of test use cases.

In parallel to this activity, the **National Smart Ticketing Advisory Board (NSTAB)** has also been created to advise Scottish Ministers on the strategic direction for smart ticketing and the specification of a national technological standard to help improve interoperability in Scotland. The overall aim being to set the foundation for better ticketing integration, and a more consistent customer experience.

2024 also saw the welcome publication of Transport Scotland's Smart, Digital, Integrated Ticketing and Payments Delivery Strategy. This plan sets out a vision: *"To increase the use of sustainable public transport by providing smart and integrated ticketing, payment, and journey planning data enhancements, contributing to a healthier, fairer and more prosperous Scotland."*

The objectives of MaaS clearly align with this vision and the actions outlined in this report will have important implications for future delivery in Scotland. Indeed, the report recognises the role of MaaS in delivering on wider smart ticketing aims and states a medium term aim: *"To identify how to support integrated journey planning, booking, payment and ticketing, we will develop our long-term plan for Mobility as a Service."*

It is expected that this roadmap will provide a valuable reference in the creation of this longer-term plan.

2. Process and aim of roadmap

While the global evidence base for MaaS is accelerating, and excellent data has been created at a local level through the MIF, as yet there have been no efforts to develop a strategy to exploit the MaaS opportunity in Scotland. This roadmap represents a first step towards that strategy, exploring known challenges to upscale in areas such as governance, investment, data and user engagement. It is our intention that the roadmap will become a key reference point for those tasked with delivering the MaaS opportunity to Scotland, defining a series of recommended interventions that can support this process. Interventions have been developed in consultation with stakeholders from across the MaaS landscape, leveraging the collective experience of a host of individuals and organisations who have been at the coal face of early MaaS implementations over the last 10 years.



2.1 Methodology

Since its creation in 2017, MaaS Scotland has been the focal point for MaaS activity in Scotland, establishing the largest MaaS network in Europe. This has given MaaS Scotland a 'front seat' view of the development and evolution of the practical implementations of MaaS in Scotland and further afield. It has also provided the perfect platform to engage with the 'hive' mind across the community, developing a deep understanding of the MaaS landscape and challenges ahead through a series of Special Interest Group meetings, workshops, and conferences.

Within the context of this project, the following activities have been used to further develop and define our understanding:

Special Interest Group (SIG) Meetings – MaaS Scotland runs a programme of three SIGs which meet on a regular basis – Data & Governance, Behavioural Change and Evaluation Processes and Frameworks. Outputs from these meetings have been integrated into this report.

MaaS Scotland Annual Conference – The 8th edition of this annual event held on the 6th of June 2024, the event was themed around the creation of this roadmap and brought together around 120 stakeholders from across the MaaS supply chain to discuss the future direction of MaaS in Scotland.

Strategic workshops – 2 smaller workshops were held, including a range of Scottish stakeholders and representation from the MIF projects. These workshops were used to develop and refine the final recommendations in this report.

1:1 Interviews – a series of interviews were conducted with over 20 experts from across the UK MaaS community.

All organisations that have provided input to this roadmap are listed in Appendix A.

3. Governance and leadership



3.1 Leadership

In any emerging market, particularly one that has the potential to be disruptive, it is crucial to establish a vision around which key stakeholders can coordinate. This is particularly true for MaaS which involves the alignment of a vast array of stakeholders to ensure success. Without a clear future pathway, it will be impossible to develop sustainable, long-term models for MaaS, limiting stakeholder interest and reducing public and private investment opportunities. So many of the acknowledged enablers of MaaS in Scotland are currently stalled by a lack of longer term commitment, stifling progress in areas such as funding, policy formulation and coordination, procurement, and technology integration.

Ownership of this vision, and responsibility for the leadership to deliver on it, is a vital consideration. Those charged with this role must **define the overarching objectives of MaaS**, prioritising areas such as addressing inequalities, improving environmental sustainability and reducing dependency on the private car. While there must be a collective responsibility for its development, it is our view that the vision must be owned and led by Transport Scotland. As Scotland's national transport body, there is no other organisation with the ability to define, fund and coordinate future activity.

In particular Transport Scotland has the:

- Authority to coordinate public stakeholders to deliver and upscale MaaS in Scotland.
- Access to the public investment required over the coming years to support an immature market.
- Opportunity to collaborate with regulators and policymakers to create supportive legal frameworks and standards for data sharing, privacy protection, and interoperability.
- Responsibility for adjacent projects in data and smart ticketing and their impact on wider government policy.
- Remit to establish a national ambition for wider digitalisation in transport.
- Connections to coordinate cross-department collaboration in digitalisation across Government.

To establish Transport Scotland's leadership position, and in order to integrate this with wider ambitions relating to digitalisation within transport, it is recommended that a **Chief Digitalisation Officer** is appointed. This should be a senior level appointment, recognising the importance of digitalisation to our future transport strategy. This individual should regularly engage with counterparts across Scottish Government departments to ensure the required level of coordination and integration with other public services, in particular health and education. This engagement is crucial if we are to establish the potential social benefits that MaaS affords, including improved accessibility, inclusive growth, increased educational attainment, and public health improvements.

1

Transport Scotland must provide leadership and long term commitment to MaaS as part of a wider ambition for digitalisation in transport. This should include the appointment of a **Chief Digitalisation Officer**.

As a first step in this leadership position, it is recommended that Transport Scotland lead the development of a **MaaS Code of Practice**, similar to that published by the Department for Transport in 2023. This should be developed in consultation with key stakeholders and, in addition to setting out the Government's longer term commitment to MaaS, should provide a set of standard definitions and practical guidelines to support future MaaS delivery in Scotland. This should include (but not be limited to) key areas such as procurement, data management, consumer rights, and accessibility. Consideration should also be given to developing consistent and comprehensive regulations that encourage innovation while ensuring safety, fairness, and accessibility.

2

In partnership with stakeholders, Transport Scotland should lead the development of a **Scottish MaaS Code of Practice** to provide guidance and support for future MaaS implementation in Scotland.

3.2 Developing a national approach

Since the concept of MaaS first emerged, there has been a long standing debate over how it is best delivered. At a national level? Or a regional level? Different approaches have been taken, informed by geography and destination, demographics, existing policy frameworks, availability of funding and the strength of local leadership. In many cases, a regional approach has been adopted, simply because local transport leaders have been further ahead on their thinking relating to MaaS than counterparts in national government.

In Scotland, to date, MaaS has been delivered exclusively at a regional level, a strategy driven by the MaaS Investment Fund. This approach has had many benefits, not least that it has allowed the testing of MaaS in different use cases, assessing different technical platforms, partnership approaches, marketing strategies and business models. This has created a rich evidence base on which to build our future strategy.

However, the regional approach has also identified challenges, perhaps the largest of which is cultivating a user base of the scale required to make MaaS a commercially viable proposition. While further work needs to be done to develop our approach to user engagement (see Section 5), it must also be conceded that, when analysed individually, local implementations simply do not generate the numbers required to build a sustainable case for MaaS.

When assessing a national approach to MaaS, it is important to consider two key elements – the 'back end' **platform** for implementation and the customer facing **application**.

It is our view that Scotland would be best served by the implementation of a single, centralised **National MaaS Platform**.

Such an approach has additional significant benefits:

- There are economies of scale to be leveraged through a single MaaS implementation.
- It aligns well with similar national approaches to transport data and smart ticketing.
- It reduces barriers to entry for all stakeholders, particularly transport operators who would (understandably) be reluctant to support integration to multiple platforms.
- It shows a level of commitment required to coordinate all stakeholders behind a single, simplified vision.

Current activities in data and smart ticketing must also be considered, and a national platform must align with the recently published Smart and Integrated Ticketing Strategic Delivery Plan (led by the National Smart Ticketing Advisory Board) and the ongoing work to deliver the Digital Travel Data Services Framework, cited as the 'one true source' of transport data. These projects represent a huge opportunity to support MaaS upscale, but activities must be coordinated to avoid duplication and confusion. Again, leadership is key, and Transport Scotland is best placed to provide this.

In addition to the clear advantages of a centralised implementation platform, there are further benefits to be gained from considering a national customer facing application:

- It simplifies the market for the user (particularly for cross-regional travel) and allows for coordinated marketing efforts across Scotland.
- It can be used to encourage longer distance, cross-regional travel via public transport modes, supporting the Scottish Government's ambition on car km reduction.
- It improves accessibility by creating a single point of contact for users with additional support needs.
- It has the potential to coordinate and simplify concessionary travel, including a providing a pathway to transition younger people from NEC cards in future.

Importantly, while there are clear benefits to a national approach, the MaaS Investment Fund projects also showed that there can also be some additional value where an application is created to meet a particular use case or user group. For that reason, while this report strongly recommends the delivery of a national MaaS application, it does not need to be *the sole* national MaaS application. That is to say that consideration should still be given to the delivery of additional applications that may bring added value in discrete cases. This is particularly important in these early stages of MaaS where the best routes to user engagement have yet to be clearly identified.

Of course, it is also crucial that the excellent work already undertaken in Scotland is not lost and any future national approach must build from the excellent evidence base developed under the MaaS Investment Fund and projects from further afield. Support must be given to current regional and multi-regional projects to bridge the gap until a national solution is developed. Failure to do so would result in loss of momentum and customer/stakeholder confidence.

It must also be acknowledged that a national approach does not come without its own challenges. In particular, it will be vital that such an approach recognises important regional differences in population needs, available operators, geography, etc. This is particularly important in Scotland's rural areas. A national approach, operating from a single, centralised back end, must allow for regional information to be available where it is relevant. For this reason, a national platform that allows for regionalisation of data should be prioritised.

A national approach could also be considered as an 'all eggs in one basket' strategy. As such, its development and early implementation is arguably even more important than when considering one of many regional platforms. Procurement will be key, and significant work must be undertaken to analyse, agree and define the specification of any national platform.

This specification should build on the learnings of the MaaS Investment Fund projects and, crucially, must reflect the Scottish Government's and Transport Scotland's vision for wider digitalisation in transport, including how MaaS will interplay with other interventions towards our ambition to reduce car use.

3

Scotland would be best served by the implementation of a single, centralised **National MaaS Platform**, benefiting from the user base and economies of scale that this would bring, and complementing adjacent national activity in transport data and smart ticketing.

3.3 The role of the public sector

The role of the public sector in the development of MaaS is another area that has seen significant debate over the last decade. Should they lead? Should they leave it to the private sector, perhaps only to act as a regulator or funder where appropriate?

It is interesting to note that there seems to be a developing consensus that MaaS is best delivered as a public-private partnership, with technical and commercial expertise provided by the private sector while the public sector ensures that MaaS platforms and services meet certain standards of delivery (accessibility, etc.), and align with wider policy goals.

This latter point is crucial. Transport is so ubiquitous to our lives and the wider economy that the public sector simply must play a leading role in its delivery. Their influence is crucial to ensure that policy objectives are met, not just in transport but in adjacent areas such as net zero, inclusive growth and public health. Failure to engage with future MaaS implementations presents the risk that these considerations will be de-prioritised.

For any of these considerations to be met, the public sector must set the 'rules of engagement' for MaaS, through setting policy frameworks but also considering regulation and legislation if required, *e.g.* in areas of data standards, consumer rights or safety. The MaaS Code of Practice outlined earlier would provide a good foundation for this.

The public sector will also play a key role in stakeholder engagement, in particular the participation of public transport operators, essential for successful delivery. Direct 'buy-in' from operators is clearly preferable and efforts in the short term must focus on establishing the benefits to this stakeholder group. This includes the benefits of collective marketing and the opportunity to build patronage. However, it may be necessary to leverage public sector contractual requirements to catalyse engagement.

4

Public bodies must continue to play a central role in the development and scale up of MaaS to ensure that any future platform(s) **meet local and national policy objectives**, in transport and adjacent areas such as net zero, reducing inequalities, inclusive growth and public health.

4. Funding and innovation



4.1 Funding

MaaS in Scotland has made significant progress over the last few years, catalysed by the MaaS Investment Fund. This relatively modest fund has allowed real world implementation of MaaS and developed an evidence base that will be crucial to future strategic decision making.

However, it is important to acknowledge that MaaS remains an immature concept, not just in Scotland but across the world. Challenges such as user acceptance, evolution of business models and stakeholder hesitancy means that there is still some hand holding to be done and future developments will need to be catalysed by further public funding.

The nature of this funding is crucial. The pilots in Scotland have shown that short-term, small scale projects simply do not deliver consistent, measurable outputs and that they do little to enthuse users, operators or other key stakeholders. It is important that we move beyond this stage and that we progress to a landscape in which users, operators, suppliers and public bodies can have confidence that MaaS is going to be an important part of our transport future. This requires a clear strategic vision (as set out in Section 3) backed by multi-year funding. It is only through a combination of these that we can address stakeholder hesitancy gain, transport operator buy in and, unlock additional public and private investment.

5

Scottish Government must illustrate their longer term commitment to digital transport integration by providing **multi-year funding support** for any future MaaS implementation(s).

4.2 Procurement

While MaaS remains a relatively immature model, procurement will present a significant challenge. This is perhaps exacerbated by the complex nature of any implementation and the extensive number of stakeholders involved in its delivery.

It is, however, critical to the success of MaaS. We must get this aspect correct or there is the risk that everything else that comes thereafter could be stifled and, in a worst case scenario, culminate in eventual failure. This challenge is accentuated in a national approach as proposed in this roadmap. Setting the foundations for procurement requires a comprehensive strategic vision that contains clear expectations and objectives, including social value and potential impacts on wider policy areas. This requires the type of leadership called for earlier in this roadmap.

The focus of the procurement exercise is also very important. It is interesting to note that, during the consultation phase of this roadmap, both public sector bodies and suppliers were clear that future procurements need to be less driven by technical specifications and shaped more by desired outcomes. There is a definite sense that MaaS to date has too often been driven by technical requirements and not end result and benefits.

6

Public bodies should drive future MaaS deployments and consider more **flexible and simplified procurement processes**, with greater focus on project outcomes and less emphasis on technical requirements.

It is also clear from consultation and the outputs from the MaaS Investment Fund projects, that greater consideration must be given during the procurement stage to aspects such as user engagement, adoption and marketing. These considerations should be given higher priority within any procurement process, alongside other key themes such as accessibility, data ownership and user rights. These considerations should form part of the MaaS code of Practice outlined earlier in this roadmap, consistent with the approach taken by the Department of Transport.

The potential impact of MaaS must also be considered within any relevant and adjacent procurement exercises, including any future local authority operator let contracts and Scottish Government franchises, particularly those where Government has most direct control. Consideration should also be given to both physical infrastructure (such as mobility hubs) or digital projects (in areas such as data and ticketing). Coordination here is key and efforts must be made to ensure that relevant procurement exercises are aligned.

7 All relevant public tenders/licenses should consider the impact of digital transport innovation, **future proofing** against integration of both physical and digital infrastructure.

Finally, any outcomes driven procurement process requires a clear understanding of what success looks like. This in turn requires a comprehensive and consistent approach to evaluation. Again, we can build on the learning garnered to date to establish a consistent set of guidelines to approach this. This is examined in more detail via a National MaaS Evaluation Framework presented in Section 6.

4.3 Collaboration

It is well understood that collaboration drives the most successful innovations. MaaS will be no different and it is important that we establish opportunities for knowledge exchange between the vast array of stakeholders involved in its delivery. We must also leverage the learnings from what has gone before, at both a Scottish and international level, minimising the risk of making mistakes already made. To this end, we propose the creation of a knowledge exchange platform to facilitate best practice and knowledge exchange across the MaaS ecosystem. This knowledge exchange platform would also be an important vehicle to facilitate feedback then update and refine the Code of Practice outlined in recommendation 2.

This platform will require adequate resourcing in order to generate stakeholder interest and maintain their engagement. As the neutral organisation charged with facilitating the MaaS opportunity in Scotland, we would propose that MaaS Scotland become the home for this platform and that the organisation be supported to provide the necessary resource.

8 A **knowledge exchange platform** should be established and supported to facilitate best practice and knowledge exchange across the MaaS ecosystem.

5. Behaviour change



5.1 User engagement

At its heart, MaaS has always positioned itself as an important tool in our efforts to catalyse behaviour change and generate meaningful modal shift away from the private car and towards more sustainable transport options. Indeed, we believe that if we are to have any chance of reaching our stated aims on modal shift, then Scotland must embrace the opportunity that digitalisation affords, much like many other sectors are already doing, *e.g.* retail, hospitality, health and education.

As we develop and implement these platforms, user engagement will be key. Gaining user trust and encouraging widespread adoption of MaaS platforms, especially in areas where traditional car ownership is deeply ingrained, will be a challenge. We cannot get carried away with the technical possibilities that digital platforms provide, and we must not let technology drive our strategic efforts. Instead, we must properly engage with users, understand their needs, preferences, fears and drivers, and integrate these into the design process. In short, we could build the best technical platform on the planet, but if it does not meet the needs of users then it will ultimately fail.

This process will take effort and starts with an acknowledgement that, until now, MaaS has been too focussed on technical implementation. We must start to think of MaaS as a consumer product and develop our design processes accordingly. This includes allocating significant resource to understanding multiple different user groups through focus groups, academic research and inclusive design processes. While accepting the scale of the challenge, MaaS must attempt to ensure that it offers a solution that meets the needs of all in our society.

9

Future MaaS deployments must include **greater focus on user engagement** to ensure that services meet the needs of all in our society.

Until now, MaaS has been focussed on the nuts and bolts aspects of delivery – planning, booking and payment. However, we know from multiple different MaaS pilots across several different countries that this alone is not enough to build a consistent user base.

We must begin to think about the **productisation of MaaS** to avoid the well-known issue commonly observed with digital apps - a significant majority are downloaded then quickly discarded or forgotten. We must ask what would encourage travellers to engage with a MaaS product and what can we do to keep them engaged.

This starts at the user engagement stage detailed above but and we can also learn from success stories in other areas. Often success is gained when users feel a sense of ownership or community through a particular app. This can be further emphasised through gamification and incentivisation tools, developing a hook that keeps users interested and engaged. Beyond this, there is a significant opportunity to develop personalisation tools, something that has been discussed as the heart of MaaS for many years.

This is a key challenge for MaaS in the 'next phase'. Yes, it is of course important that the nuts and bolts work and there will be a minimum expectation when it comes to the ability to plan, book and pay for journeys. But our thinking must evolve, and we must move towards the creation of a genuinely attractive consumer centric service.

10

Using evidence gained through the user engagement phase, more effort should be focussed on the **productisation of MaaS**, moving beyond minimum technical requirements towards the creation of a genuinely attractive consumer centric product.

5.2 Marketing

Like any consumer facing product or service, our ability to build users will depend on our ability to market it correctly. Of course, marketing is only effective if you have an attractive product to sell. All the marketing budget in the world will not help if you have not got the product design right in the first place (see above in Section 5.1).

However, assuming the platform has been designed correctly, a well-funded, well-resourced, well-planned marketing and communications strategy will be essential to longer term viability. This will not be cheap, and funding for any future MaaS implementations should contain significant provision for these efforts. Longer term, it is entirely possible that marketing budgets will far outstrip the technical/maintenance budget for a successful MaaS platform.

Getting this right is important from a stakeholder management perspective too. One of the great potential benefits to transport operators is the power of the collective marketing that MaaS affords. They will be aiming to capitalise on this and the increased number of users adopting a platform that encourages modal shift from the private car. Ultimately it is about generating patronage and increasing tickets sold.

A national approach to MaaS is attractive from this perspective, offering an opportunity to build a single, coordinated marketing campaign across all regions that would benefit from a larger collective budget to do so. Branding will be especially important in this case and efforts must be made to provide a clear message to users, avoiding confusion with existing services and leveraging these where appropriate to do so.

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Support should be given for a **coordinated marketing campaign** to improve the visibility of MaaS implementations and highlight their benefits.

5.3 Behaviour change toolkit

Catalysing significant behaviour change in any sector is problematic, but it is arguable that transport may be one of the most challenging areas. Behavioural trends, as illustrated by public transport usage patterns, are not moving in the direction that many would hope, and it is clear that Scotland's ambitions to reduce car usage by 20% will require a herculean effort.

MaaS can support this of course, providing as it does an opportunity to meet wider public demands for digitalisation of access. However, it must never be considered as a single solution to an incredibly complex problem.

Rather, MaaS should be defined as one of multiple tools to be considered as part of a 'Behaviour Change Toolkit'. The contents of this toolkit will of course vary from location to location but should consist of a variety of 'carrot' and 'stick' interventions that are designed to nudge behaviour change towards more sustainable modes. These tools may include (but are by no means limited to):

- Low emission zones
- Free young person travel
- Parking levies
- Congestion charging
- Peak fare reduction
- Active travel incentivisation packages

To maximise the chance of success, efforts must be made to coordinate the deployment of these interventions. This again speaks to the importance of leadership and a clear strategic vision. MaaS can help in this process, providing a platform that will allow dissemination of information, especially where this might be flexible, *e.g.* peak time congestion charging or daytime parking levies. MaaS also offers a useful tool to ensure that interventions are deployed in an equitable way, using personalised information provided by the user to ensure that charges or concessions are applied correctly.

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Greater efforts must be made to coordinate behavioural change interventions, utilising MaaS as a part of a portfolio of 'toolkit measures' that could be used to catalyse positive modal shift towards more sustainable transport options.

6. Evaluation



6.1 Key factors

The evaluation of MaaS is not a straight-forward exercise. As with any transport project/initiative, influences can be far reaching, its ubiquitous nature yielding impacts in many areas beyond simply transport. In addition, the relatively immature nature of MaaS, combined with the low user rates associated with short-term pilot projects, means that robust, quantitative data is hard to generate.

As a result, qualitative data is often used to project and model expected impacts over time. While this is clearly an imperfect analysis, it does at least provide a good framework for future evaluation as MaaS implementations scale. Work to date has also identified some key factors which must be considered as part of any evaluation programme. Some suggested evaluation parameters are detailed in Table 1 below (not intended as an exhaustive list).

These parameters include a mixture of short term impacts, easily measured within a pilot project, alongside longer term metrics, requiring continued analysis across scaled implementation. This distinction is important and must be acknowledged when developing a strategic approach to MaaS delivery and associated investment timelines.

Table 1: Suggested parameters to be included in National Evaluation Framework

Factors	Potential metrics
User engagement & user experience	<ul style="list-style-type: none"> • Adoption/retention rates • User demographics • User experience/satisfaction • Barriers – cost, access, confidence • Accessibility • Functionality and reliability • Cost per trip
Behaviour change & environmental sustainability	<ul style="list-style-type: none"> • Modal shift • Public transport patronage • Operation efficiency • Reduced emissions • Congestion
Technology & Infrastructure	<ul style="list-style-type: none"> • Modal integration • Seamless payment • Data management and interoperability • Effective use of real time information • Cybersecurity and data safety
Commercial	<ul style="list-style-type: none"> • Market penetration • Revenue generation • Partnership facilitation • Long term viability
Social impact	<ul style="list-style-type: none"> • Accessibility and affordability • Access to services • Employment creation • Education attainment • Health improvements • Social inclusion

6.2 A national approach

As is evident from the table detailed above in Section 6.1, the evaluation of MaaS is complex, leading to the inevitable risk that projects are scrutinised in different ways, using different methodologies and different parameters. This makes comparisons across projects difficult and stifles the opportunity to share learnings and data across multiple implementations.

To address this, a **National MaaS Evaluation Framework** should be established to provide a coordinated and consistent approach to future project/pilot assessments. This is clearly important where a multi-platform strategy is adopted but even a single national platform would benefit from an agreed list of definitions and parameters, facilitating simpler collaboration and stakeholder management.

This evaluation platform should be developed in consultation with all stakeholders and should be updated and refined as the evidence base for MaaS grows and our understanding of its potential impacts develops. Crucially, this prescriptive framework should be adopted pre, post and during any project, and should be integral to any strategic decisions or procurement exercise.

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A **National MaaS Evaluation Framework** should be established to provide a coordinated and consistent approach to future project/pilot assessments.

6.3 Understanding social value

Table 1 presented in Section 6.1 contains a section detailing evaluation parameters that come under the wider categorisation of social value. Until now, this is an assessment parameter that has gone largely ignored when evaluating MaaS projects, perhaps due to its inherent complexity and longer impact times. However, **social value** is being considered more and more across government departments when establishing return on investment relating to public spend.

In short, social value refers to the benefits and positive impacts that a particular project or initiative brings to society. Crucially, it is a concept that goes beyond financial impact, often the traditional Return on Investment parameter when carrying out project evaluation. Instead, it encompasses social, environmental and economic considerations that can contribute to the overall wellbeing of communities and the environment.

This is a particularly important consideration when assessing any transport related project, where impacts are often far reaching. It is an often complex consideration, but one that is important to incorporate into any evaluation framework. Not just because

it gives a wider illustration of the benefits associated with a particular project or proposal, but also because it provides a useful baseline when defining budget allocations, particularly where public investment is key. As a simple example, it is clear that MaaS has the potential to positively impact on areas such as environmental sustainability, education, rural connectivity and public health. Why then, must the investment burden fall solely on transport?

While it is acknowledged that measuring social value is a complex undertaking, the emergence of commercially available Social Value Engines (SVEs) is simplifying this process. These engines, already in use across public sector bodies, deliver an economic assessment of multiple social parameters, calculating a financial return for every pound spent. These engines utilise algorithms built on years of data gathering, an ongoing process that refines and updates likely impacts based on real world examples.

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Further efforts must be made to understand and measure the **social value** of MaaS implementations, including its impact on key policy areas such as net-zero and public health.

7. Data

Effective data management is critical to the success of MaaS, underpinning many benefits relating to efficient user experience, transport optimisation, journey management and, personalisation. It is, however, a very complex environment, with multiple data types, licences, formats and, sources, including real-time transport data, operational data, demand and supply data, user data, environmental data and, many others. Understanding and managing these diverse data sources remains a challenge and this section highlights the importance of strategy and leadership in delivering clarity to all stakeholders and setting the foundation for successful delivery of wider transport digitalisation.



7.1. The transport data spectrum

Understanding the complex data environment outlined above is a challenge. The language of data can be confusing and sometimes even contradictory, with terminology and definitions differing across sectors, stakeholders, and suppliers. On top of this, there are concerns relating to the openness (or otherwise) of data, interoperability and, security.

Efforts have been made to aid the understanding of the transport data landscape, most notably by The Open Transport Initiative and MaaS Scotland who proposed the Data Spectrum for Transport and Mobility, first published back in 2021.

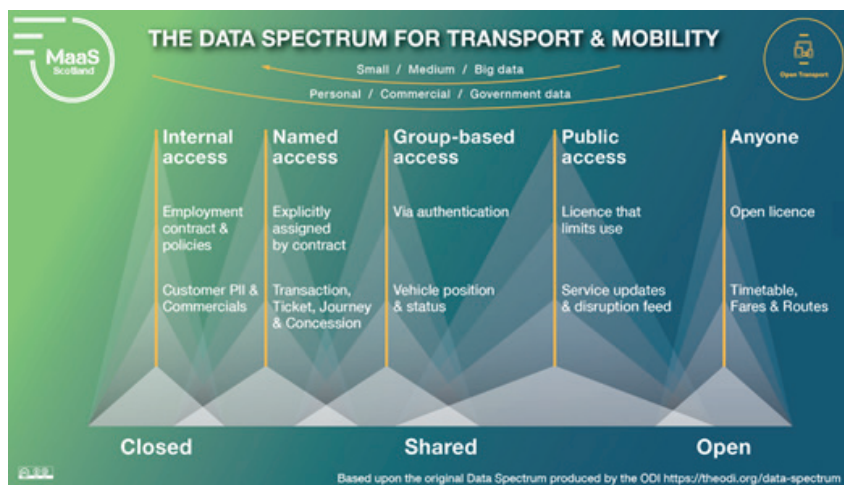


Figure 1: The Data Spectrum for Transport and Mobility (developed by MaaS Scotland and the Open Transport Initiative based on original data spectrum created by ODI)

This data spectrum was created to provide clarity on the emerging transport data ecosystem, allowing a simple and consistent way of defining the range and types of transport and mobility data and giving sector-specific examples. It is based on the more generic Data Spectrum originally created by The Open Data Institute and now aligns our sector to other data driven ones including utilities and finance. It was designed to be a first step towards achieving wider and more standardised data interoperability between transport providers, local and national transport authorities, MaaS platforms and, their solution providers. It is our proposal that this spectrum, or refinements thereof, be the basis of any future data strategy.

7.2 Development of a transport data strategy

The emerging transport data landscape is likely to become more complex in future as we leverage an accelerating volume of data from an ever increasing number of sources. Issues of fragmentation, data ownership and quality, interoperability, stakeholder coordination and, data security and privacy will only grow. Addressing these challenges, and unlocking the full value of our transport data, will require strong leadership and a clear strategic direction to ensure that innovation is supported and lock-in avoided.

Again, Transport Scotland is in best position to provide this leadership. Recent activities in transport data (Digital Travel Data Services Project) and smart ticketing (NSTAB and Smart Ticketing Delivery Plan) are an excellent starting point, but there must be efforts to publish a clear strategy for transport data in the decade ahead. Such a strategy was first mooted as part of the National Transport Strategy back in 2020.

A key component of this strategy should be to promote the 'presumed open' approach. This approach reverses the current default for data accessibility from closed to open, placing the onus on data owners to justify why any restriction might be required. More open data reduces friction across the sector, improving system management, supporting better decision making in asset procurement and deployment, and delivering overall cost efficiencies across the whole system. If managed correctly, this approach can be applied fairly and equitably across all transport stakeholders and maintain the privacy of the travelling public. The recent published Transport Data Strategy from the Department of Transport states an ambition to move towards "an *open by default*" approach that still protects commercial value and the privacy of the travelling public".

The data strategy should also include recognition of future technology developments (AI, blockchain, digital payments, etc.) and regulatory pathways as part of wider strategy to create a standardised and interoperable transport data landscape. Crucially, it should provide all stakeholders with clarity on the path ahead, allowing them to understand their role and data management commitments in providing a seamless, integrated, user friendly digital transport network.

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Transport Scotland should author and publish a **Transport Data Strategy for Scotland**, covering all modes of transport and mobility and all types of data across the data spectrum. This strategy should include a move towards a 'presumed open' approach that will encourage innovation and promote the appropriate use of data.

7.3 The Mobility Integration and Governance Entity

Implementing a centralised MaaS platform and creating a functioning country-wide mobility ecosystem does not happen by itself. As this roadmap has already highlighted, a successful MaaS scheme is not just about the deployment of innovative technology, but that also about meeting user needs and changing user behaviour as intended.

However, the set-up and effective operational running of such an important digital-based core system does need input and oversight from those who understand the MaaS technology landscape. Furthermore, the integration of many different transport providers, systems and, vendors into a cohesive and functioning transport service can be a complex task and one that significantly benefits from adopting an 'Intelligent Client' (AKA a knowledgeable customer) approach, rather than one that is supplier-led.

Such an approach was successfully used by the UK Government to drive the implementation of Open Banking across the UK Financial Services market, enabling the UK to create and then lead the Financial Technology (FinTec) sector globally. It did this by the creation of the Open Banking Implementation Entity (OBIE), an independent organisation that was given the role of setting the technology and data standards that all parties had to use and specifying the security architectures needed to integrate a range of disparate vendors & systems.

This report therefore recommends the formation of a **Mobility Integration and Governance Entity (MIGE)** to provide such a role across the Scottish MaaS ecosystem.

The services of the MIGE can include (but would not be limited to):

- Providing tangible technical assistance to all ecosystem participants from initial consideration and on-boarding through to ongoing support
- Providing architectural guidance for the procurement of new MaaS platform(s) and related applications and services
- Creating and maintaining any central digital functions – *e.g.* a directory service of different transport provider environments and configurations
- Acting as the Technical Design Authority [TDA] and resolving disputes of an integration nature – *e.g.* deciding which standards and protocols to use and when
- Documenting MaaS related technology and process information – *e.g.* by updating a publicly-accessible / digital knowledge base
- Maintaining the ongoing oversight and governance of a centralised platform – *e.g.* holding suppliers to account if they fail to meet agreed compliance or service levels.

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Consideration should be given to the creation of a **Mobility Implementation and Governance Entity (MIGE)** to be the independent service and technical design authority on MaaS mobilisation and delivery.

8. Summary



This roadmap was created to provide an important contribution towards our ambitions to develop a modern, integrated transport network, one that will meet increasing customer demand for digital access to key services. The report focuses on the role of Mobility as a Service, one of several tools that must be utilised if we are to dilute our dependency on the private car and overcome Scotland's stubborn resistance to more sustainable transport choices.

Meeting public expectations is key, and this roadmap clearly outlines the significant potential MaaS can offer if cultivated and delivered correctly. Specifically, this includes:

- **Improving awareness of travel options** – encouraging users to explore alternative modes to the private car.
- **Simplifying the user experience** – streamlining access to various transport modes, allowing travellers to seamlessly switch between modes and making mobility more efficient, affordable, and convenient.
- **Managing user journeys that build trust** – supporting long term transitions to more sustainable transport choices.
- **Personalising the transport experience** – offering passengers the option to customise their user experience, prioritising transport options based on personal preference and building community-based platforms.

However, positive impact can only be realised where a clear delivery strategy exists. This roadmap states 16 recommendations that can support this delivery, covering themes including leadership, governance, investment, user engagement, evaluation, and data.

While each recommendation should be considered important in its own right, it is only through wider implementation across all thematic areas that the true benefit of MaaS can be fully exploited. This takes active leadership, not just in MaaS but across wider digitalisation in transport. Without leadership, and the clearly defined strategy and objectives associated with this, the significant opportunities that technology offers will be lost, and our ambitions relating to car use and carbon emissions will be impossible to meet.

Through the process of developing this roadmap, it has become clear that **a lack of clear leadership is the single biggest challenge to successful delivery of MaaS in Scotland**. The absence of a longer-term vision is stifling progress, limiting stakeholder interest and, reducing opportunities for public and private investment.

While development of this vision must be a collaborative endeavour, Scottish Government and Transport Scotland must fulfil this leadership role and take responsibility and ownership for the delivery of MaaS and adjacent digital solutions across our transport network. As Scotland's national transport body, Transport Scotland is the only organisation with the ability to define, fund, and coordinate future activity.

MaaS Scotland encourages Scottish Government, Transport Scotland and all other stakeholders to identify their role in delivering on this important model for future transport delivery and looks forward to providing an important voice in the years ahead.

Appendix A – List of organisations providing input to this roadmap

Many thanks to the following organisations who provided direct input to the creation of this roadmap.

Arcadis
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George Hazel Consultancy
HITRANS
IdeallInterface
KPMG
Open Transport Initiative
Scottish Rural and Island Transport Community
SEStran
Tactran
Trafi
Transport for Wales
Transport for West Midlands
UrbanTide
Via
West of England Combined Authority
Worldline

Additional thanks to the many, many more organisations who shaped this roadmap through their contributions at multiple MaaS Scotland Special Interest Group sessions and the MaaS Scotland Annual Conference in June 2024.





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