



Urban
Foresight

Scoping MaaS in Strathclyde: summary report

PREPARED FOR:

Strathclyde Partnership for Transport and Glasgow City Council





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.

© Urban Foresight Ltd, 2020

The Catalyst, 3 Science Square
Newcastle Helix
Newcastle upon Tyne, NE4 5TF
United Kingdom
+44 (0)191 814 2210

urbanforesight.org
Summary:

Flour Mill,
34 Commercial Street,
Dundee, DD1 3EJ
Scotland
+44(0)138 22 40 40

hello@urbanforesight.org

Mobility as a Service gives users a **single point of access for planning, booking and accessing all types of transport.**

This has the potential to make active and sustainable transport more convenient for users, increasing the use of lower-carbon transport and reducing private car use. SPT and GCC's evidence suggests people in Strathclyde are looking for more integrated travel – which MaaS offers.

There are some technical barriers but on the whole, major operators are technologically equipped to enable MaaS.

There are, however, **significant regulatory and cultural barriers to MaaS.** No operator is required to provide data to SPT or GCC, and bus operators lack trust in public authorities. This means that under current powers, a regional MaaS solution could have integrated journey-planning and some booking capabilities, but not for all transport options, not with access to a single price for multiple types of transport, and it would rest on **voluntary participation by operators.**

GCC and SPT should therefore begin a **MaaS Readiness Programme** which would build capabilities for a more sophisticated MaaS system over the next 1-5 years.

New powers under the Transport Act 2019 in smart ticketing and bus regulation could mandate operator participation in MaaS. These choices have significant financial and policy implications outwith the scope of this report, but for the purposes of MaaS alone, SPT and GCC should explore using these powers.

What is this project?

This project scoped Mobility as a Service (MaaS) for the Strathclyde region. It defines the concept, explores potential opportunities and barriers to MaaS, and gives options for developing MaaS. It was commissioned by Strathclyde Partnership for Transport (SPT) and Glasgow City Council (GCC).

What is MaaS?

MaaS makes transport more accessible by enabling users to plan, book and access multiple forms of transport from a single system.

This is usually through a smartphone app: a MaaS system in Strathclyde would mean that a user could travel across the region with tickets, payment and journey-planning for the entire journey managed from their phone. Unlike the current situation, this would put booking and ticketing in one place, and unlike existing apps it would include both traditional public transport and newer types of transport like car-sharing and bike-sharing.

This can lead to modal shift and support carbon reduction goals by increasing the relative convenience of public and active travel.

It can also support public authorities by creating a rich source of data on how people are moving around.

What new functions does MaaS offer?

MaaS offers users more integrated transport. Most discussions of MaaS distinguish between the varying level of integration any given MaaS system offers, usually derived from Sochor et al (all references are available in the full report):

- Level 0: No integration – single, separate services
- Level 1: integration of information – travel planners and price information across different types of transport.
- Level 2: integration of booking and payment – the ability to find, book and pay for a trip across multiple types of transport from a single platform.
- Level 3: integration of service – bundling of travel prices into point-to-point fares, monthly or annual subscriptions across multiple transport types and other consumer-facing services.
- Level 4: integration of societal goals, with MaaS part of a suite of transport and social policies.

This framework is common and is used throughout this project because it creates an internationally-comparable reference point. Some organisations suggest that level 2 is the minimum additional capability for a service to be considered a true MaaS system, adding new functionality to existing journey-planning services.

What is the potential for MaaS in increasing use of public transport?

In Scotland, HiTrans and Tactrans are developing MaaS apps and Dundee City Council is running mobility experiments through a MaaS app. Around 40 cities across Europe are trialling MaaS projects or have implemented MaaS solutions.

The experience of these places suggests that by bundling choices into a single package, offering seamless journey planning from point-to-point, and by making active and sustainable travel more convenient, it can lead to better transport outcomes:

- In Helsinki, after one year of a MaaS app offering annual and monthly subscriptions, 73% of trips were by public transport – compared to 48% of users outside the MaaS system.
- In Vienna, a trial of a MaaS app in 2014-16 found that 46% of participants changed their choice of transport on leisure trips – and 21% of users reduced their car use. 69% of users in a MaaS pilot said information outlining reduced journey times was their main motivation for using the system.
- In Gothenburg, 36% of non-car owner participants in a MaaS trial said they would delay purchasing a car thanks to the MaaS app.
- In Sydney, in a trial of 100 users a subscription MaaS system, 17% of participants reported a change in their view to be less in favour of car ownership.

How could MaaS address inequality?

There is limited practical evidence of MaaS reducing inequality. Beyond the general role of public transport in creating opportunities for lower-income groups, three cases are made on how MaaS could in theory tackle inequality:

- **Offering specific services for specific users.** MaaS is about user-centricity, could enable services aimed at people with specific disadvantages and needs – for example, a booking system concentrated transport with wheelchair access, or an app for people with learning difficulties.
- **Improving access to shared services.** Services like car-sharing are often targeted at lower-income groups, because they may want to have access to a car, without the costs of ownership. MaaS improves access to these services.
- **Reducing poverty premiums.** Lower-income households often face higher up-front costs for services. In transport, this can include season tickets being cheaper – but requiring good credit or high up-front costs – leaving low-income users to buy daily tickets which are overall more expensive. It can also include higher costs for car insurance, which is usually priced by postcode and demographic data. MaaS could tackle these challenges by supporting lower-income users to take up subscriptions or integrated payments. This could either be through direct subsidy (for example, discounting a MaaS subscription for lower-income households), implicit subsidy (for

example, risk premiums which are set city-wide, effectively cross-subsidising low-income users) or through ‘mobility credits’ – a token which can be used in any transport mode and are added to low-income users’ accounts.

How does this potential align with policy objectives in Strathclyde?

SPT and GCC both have strategic goals of reducing carbon and increasing use of public transport. These are outlined in:

- SPT’s draft Regional Transport Strategy, which prioritises reducing emissions and improving integrated transport.
- GCC’s Transport Strategy Case for Change, which has 8 objectives including low-carbon transport and improving integration of transport.
- GCC’s Climate Plan, which sets a target for carbon neutrality by 2030 and net zero emissions by 2045.

Wider city-region and city council policies emphasise the importance of inclusive growth and tackling inequality.

National policy also prioritises reducing carbon, with a Scotland-wide net zero target of 2045, a nationwide target for 20% fewer car kilometres by 2030, and a range of policies supporting sustainable travel and integrated ticketing.

Evidence from SPT and GCC on users’ current experience of accessing transport suggests that making transport more seamless and integrated is important to citizens. SPT’s RTS survey found that integrated ticketing was the most common theme among ‘residents, partners and stakeholders’ while in GCC’s Public Conversation, the most-selected statement for agreement (by 74% of respondents) was that ‘different ways to travel are not smart and integrated’.

MaaS therefore aligns well with key policies in Strathclyde.

What needs to be in place for MaaS to work in Strathclyde?

MaaS works when a number of conditions are in place. These come under 5 main themes:

- **Transport provision:** MaaS needs a frequent, dense public transport network with a range of options for users. This creates underlying confidence in the availability of public transport, and creates demand for a tool to seamlessly navigate the system.
- **Operator data:** MaaS needs operators to share data to enable a central planning and booking system – such as timetable information, service availability, booking protocols, and payment systems. This in turn requires operational agreements over data, customer service, risk and revenue. The technical and legal requirements can vary significantly but accessing operator data is fundamental to MaaS.
- **ICT infrastructure:** MaaS assumes that vehicles or stations can be accessed or unlocked via smartphone, and that operators are capable of mobile ticketing and booking. A

standardised, interoperable smart-ticketing system is a useful foundation for MaaS – particularly systems which create individual user accounts - but is not necessary.

- **Policy and regulation:** MaaS requires a policy and regulatory environment that makes responsibilities clear, and sets out governance of data, operations, and relationships with national policymakers.
- **Citizen willingness:** MaaS assumes that a critical mass of transport users have smartphones, and are willing and able to access public transport by smartphone.

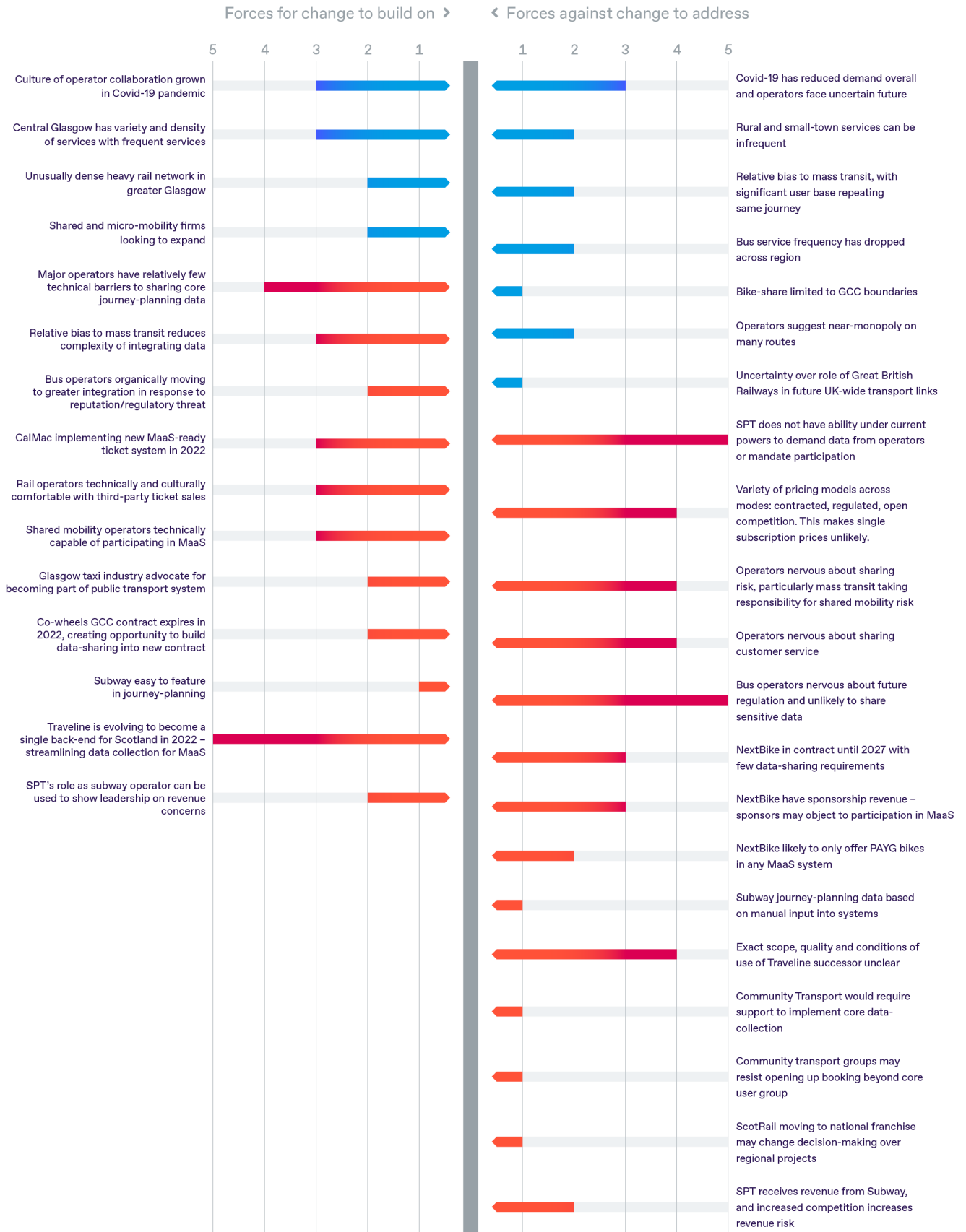
What are the biggest opportunities and barriers for MaaS in Strathclyde?

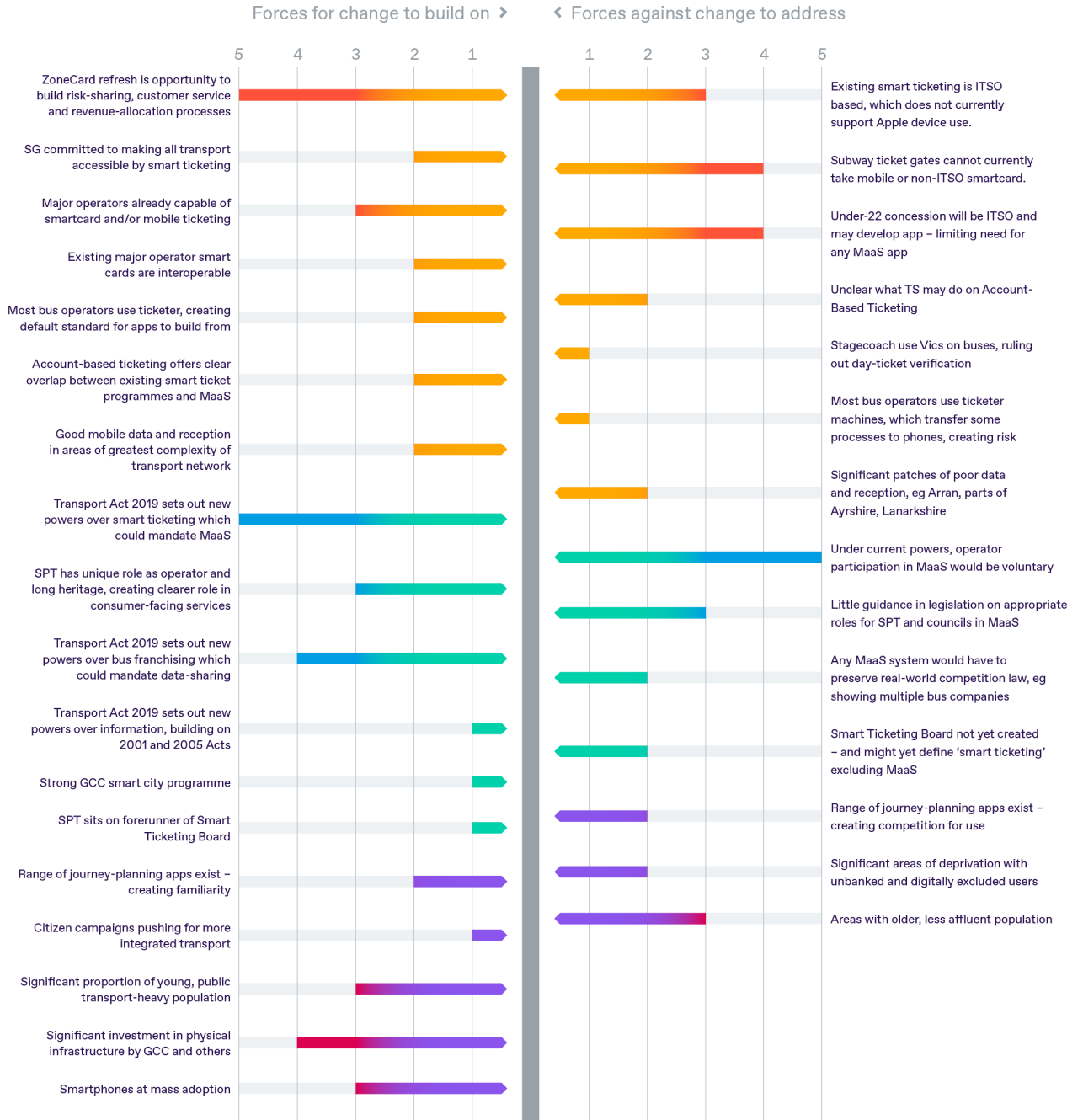
The project assessed how ready Strathclyde is for MaaS in each of these headings.

Summary chart 1 below shows the most important conclusions by theme and relative importance, and whether they support introducing MaaS – or represent a barrier to its introduction. The longer the bar, the more important each factor is to the future of MaaS in Strathclyde.

The narrative sections below isolate the most important factors and give more detail on each item.

■ Transport Services
 ■ Operators & Data





What are the current opportunities for MaaS in Strathclyde?

Transport provision

The Covid-19 pandemic has placed operators on a publicly-supported, more coordinated footing. As operators look beyond the pandemic a greater culture of collaboration which makes them favourable to MaaS-style integration may be sustained.

Glasgow in particular has density of transport options. The city centre has a range of options to make the same journey, while some inner suburbs have an unusual density of heavy rail services. This creates a core area of complexity which MaaS requires.

Operators and data

Major operators have relatively few technical barriers to sharing core data to enable MaaS. In particular, ScotRail already allows other organisations to book its tickets, and CalMac will have the ability to offer this from early 2022. Major bus companies are either ready, or could reasonably be expected to develop, the technological basis to share journey planning information, and make booking and ticketing available to third parties. Shared mobility providers are similarly equipped.

Traveline is evolving with Transport Scotland taking a more direct role and contracting with operators from next year. In effect this will be a single data system for all Scotland. For Strathclyde, this does create a significant dependency on the quality and structure of Traveline, but most likely this means capturing operator data on journey planning and service availability is significantly streamlined. If it includes interoperable booking, it makes MaaS radically simpler for SPT and GCC.

Co-Wheels' car-sharing contract with GCC is due to expire in 2022, creating a specific opportunity to request minimum data contributions when the contract is retendered.

ICT infrastructure

ZoneCard is being refreshed. ZoneCard is an existing multi-modal ticket with an established mechanism for revenue-sharing, risk-sharing and customer service – albeit procedures which rest on a legacy system. This creates a foundation for more complex processes in more integrated MaaS systems.

Major operators are familiar with smart ticketing and mobile ticketing. Major operators are participants in existing smartcard initiatives, such as interoperable smart-cards for subway, rail and some bus services. Most vehicles and railway stations accept mobile-based ticketing. Bus operators are moving towards more integrated ticketing on their own initiative.

Most of Strathclyde has acceptable mobile reception and data. Most of the region is covered by mobile networks, and the network is strongest where the transport network is most complex.

Policy and regulation

New powers. The Transport Scotland (2019) Act sets out powers in smart ticketing and bus franchising which create a clear basis for mandating data from operators. This would enable MaaS, and as important, would change the relationship with operators which would support more direct leadership. These powers are available to local transport authorities, which includes SPT and GCC.

Citizen Willingness

A core demographic of young public transport users. Glasgow city in particular has a significant population of young, digitally-savvy people. It also has generally higher usage of public transport than other places in Scotland. These types of people are more likely to use a MaaS system.

What are the current barriers to MaaS in Strathclyde?

Transport provision

Areas with less choice and complexity. Suburban, rural and small-town areas have significantly fewer options in transport. Shared mobility is concentrated on Glasgow. On some routes, there is limited choice of operators, and across the region frequency of bus services has dropped.

Operators and data

Under current regulatory arrangements, SPT and GCC do not have the ability to demand data from operators or mandate participation in a MaaS system. The ability to lead or commission a MaaS system rests on relationships, voluntary agreements, and partnership working. In the short term, this places strict limits on what kind of MaaS solution is possible. These are covered below.

Operators work under different pricing regimes – making single ticket prices across multiple modes complex. Ferries have prices set in legislation, rail fares are a mix of regulated and unregulated fares, and bus tickets are largely set by open competition. Over-60s have free travel and under-22s will soon have free bus travel, with operators reimbursed by a funding mechanism. This creates huge complexity, and means that agreeing a single ticket price (either pay-as-you-go or a monthly/annual subscription) for a journey which covers multiple modes is unlikely.

Bus operators are wary of potential plans for bus franchising, and relationships with public authorities are defined by mistrust. Bus operators are only likely to engage in a system if they can be confident it maintains or increases revenue, or preserves open competition, and does not expose information they consider commercially sensitive to either SPT, GCC or their competitors. In practice, that means they are likely to consider integrated journey planning and the ability to book services and show tickets – but not joint ticket prices, revenue-sharing, or information like how busy a bus is. It could also mean any MaaS solution simply links to operator's own app or sites when it offers booking, rather than being carried out in a single platform.

In the long-term, a voluntary arrangement creates significant dependency on other organisations. Any MaaS system risks operators seeing that they are exposed to new forms of competition and withdrawing. Unless a MaaS solution itself has a contract mandating participation on set terms – which is unlikely to be accepted by operators – it rests on operators believing it is in their interests to participate.

NextBike are not required to share data and will likely to be in contract until 2027. The NextBike contract with GCC is likely to run until its extension date of 2027 because it offers a yearly revenue stream to GCC. It does not require any data-sharing beyond minimum KPIs, or participation in integrated systems. NextBike would only gain revenue in any MaaS system by offering pay-as-you-go bikes, and NextBike also make significant advertising revenue from sponsorship, creating a wider risk that their sponsors object to diluting their brand through a common system.

Incentives are not aligned to promote active travel. While SPT could potentially see increased revenue by making the subway part of a much more integrated network it would also have to accept there is some risk of losing subway revenue to cycling and bus.

ICT infrastructure

Significant uncertainty over national initiatives. The remit and format of Transport Scotland's replacement for Traveline is unclear. The National Entitlement Card may in time develop into an app – which would include free bus travel for under-22s - and the future of smart ticketing will be shaped by a Smart Ticketing Board which is not yet established.

Fully including subway is difficult. Existing smart ticketing is largely smartcard-based. For subway, this is on the ITSO format – which could be included in a mobile phone-based MaaS app, but not currently on Apple devices. Subway ticket gates would also have to be upgraded to enable mobile payment other than ITSO on Android, such as contactless payment or other mobile ticketing.

Significant patches of poor reception and data. Some parts of the region, notably Arran, Ayrshire and parts of the Lanarkshires, have limited mobile reception and data.

Policy and regulation

Under current powers, MaaS would be entirely voluntary for operators. There is significant uncertainty over the roles of different organisations, with no single statement or policy on the appropriate roles of RTPs, national bodies, and councils. Under current relationships, MaaS would therefore be voluntary for operators.

Citizen willingness

Strathclyde has significant areas of deprivation. Some areas are on average older, less affluent, and more likely to lack bank accounts or smartphones. This creates a risk of digital exclusion with MaaS.

Strathclyde now has a range of consumer-facing mobility apps. This means that the relative quality and functionality of any new MaaS app has to be relatively strong to gain a user-base.

How integrated could a MaaS system be in Strathclyde at the moment?

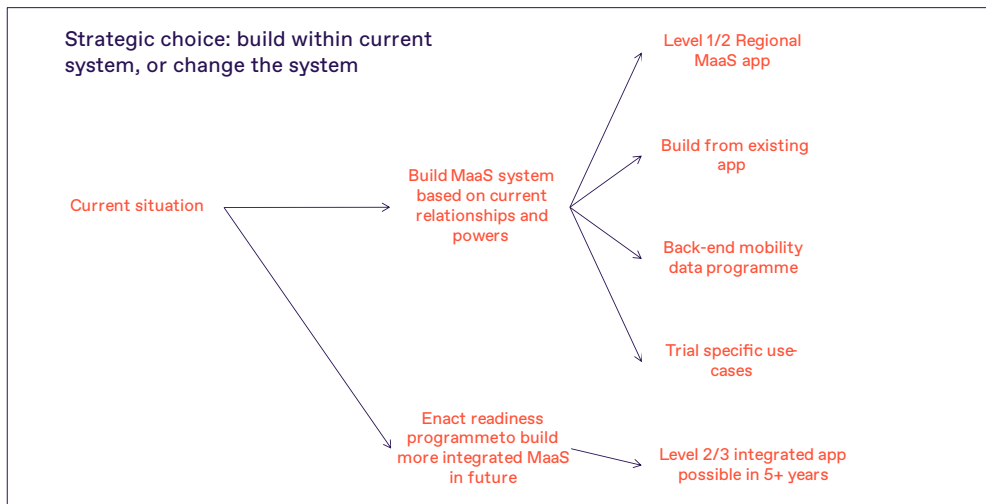
Summary table 1 shows the level of integrated MaaS service which is likely to be realistic, by type of transport, within the status quo of powers and relationships.

Summary table 1: level of integration likely, by mode.

| | Level 1 | Level 2 | Level 3 |
|----------------------|---------------------------------|---------------------------------------|-------------------------------------|
| | Integration of journey planning | Single point of booking and ticketing | Shared fares/subscriptions/services |
| Rail | ● | ● | ● |
| Ferry | ● | ● | ● |
| Subway | ● | ● | ● |
| Bus | ● | ● | ● |
| Taxi & ride-hailing | ● | ● | ● |
| Car-sharing | ● | ● | ● |
| Bike & micromobility | ● | ● | ● |
| Community transport | ● | ● | ● |

What does this mean for MaaS in Strathclyde?

This situation creates a strategic choice for Strathclyde: either to pursue a MaaS solution reflecting the current situation, or instead to focus on a MaaS readiness programme which builds capacity and aims to develop a more sophisticated system in future.



What models of MaaS could be implemented in the current situation?

Considering the opportunities and barriers to MaaS, and the likely level of integration, the options for a MaaS solution under the current situation in Strathclyde are:

1. **A consumer-facing app** which rests on a voluntary arrangement with operators focussed on journey planning, access to booking and access to payment from a single platform, concentrated on existing mass transit modes. This would not be useable for all subway users without other investment and there is no guarantee over operator participation.
2. **Working with an existing app** to add MaaS-style features. This could be an operator app, a commercial journey-planner, or other public sector apps.
3. Creating a city-specific **open mobility data programme** to enable a range of front-end services. This would build on GCC's existing smart city portal.
4. **Trialling** a MaaS system looking at a particular use-case or target audience.

These options are appraised in the full report and are summarised in table 2.

Summary table 2: options for MaaS

| Option | Governance | Spatial scale | Integration level | Transport included | Cost | Timescales |
|--|---|---------------------------------------|--|--|---|---------------------------------|
| 1: Build a new app focused on integrated booking and journey planning, | SPT/GCC commission app from software provider, manage contracts with operators for data sharing, voluntary participation from operators | Regional | Journey planning + some booking and payment | Rail, ferry, bus, car-sharing, bike-sharing. Subway only for journey-planning. | £200-500000 per annum Resource costs | 6-12 months |
| 2: Build out from an existing app/service focused on integrated booking and journey planning | SPT encourages/work with existing app providers to add multi-modal journeys & integrated ticketing | Regional | Journey planning + some booking and payment | Rail, ferry, bus, car-sharing, bike-sharing. | <£100,000 | 1-6 months |
| 3: A shared mobility data programme as part of wider smart city initiatives: | GCC hosts a single hub offering wider data sets on mobility | Glasgow city | Enabling others to offer journey planning + booking and payment | Workstreams on every mode | <£50,000 | Immediate start, 5-year horizon |
| 4: Build a trial/pilot service around use-cases or audiences. | SPT scopes, plans and delivers trials | Region-wide, local/hyper-local trials | Integrated journey planning, booking and pricing for selected groups | Mass transit + modes for particular user groups | £100-400,000 | 1-2 years |

What could enable a more sophisticated MaaS system in future?

A further option is not to target a solution immediately, but enact a **MaaS readiness programme**. This would start with an analysis of how to make the most of the opportunities and barriers outlined above. Potential responses could include:

Policy

This includes writing council and SPT policies which align with the requirements of MaaS, particularly in mandating data-sharing in mobility contracts.

It also includes understanding how national policymakers will pursue important themes such as smart ticketing and the NEC.

Relationship-building

This includes actions which focus on building trust: approaches which work within current powers to build operator comfort with integrated services through trials, cultural leadership and practical support.

Regulatory changes

Relationships between SPT, GCC and operators could change under the terms of the 2019 Transport Act which creates new powers in bus franchising and smart ticketing. The Act creates the ability for a local transport authority to mandate participation in smart ticketing schemes, which likely includes MaaS; and a different regulatory relationship with bus services could include data-sharing provisions.

These wider policy choices have significant questions which are beyond the scope of this report. However, using these powers is the clearest route to implementing a more integrated MaaS system. At a minimum, SPT and GCC could more fully explore these powers and how considerations for MaaS interact with wider policy questions.

Operations changes

This includes looking at changes to finance, legal and risk management processes to enable MaaS.

Technology upgrades

This means software and hardware changes required to enable MaaS.

What would a MaaS readiness programme involve?

A MaaS readiness programme would identify actions in policy, relationships, regulation, operations and technology. Taken as a whole, they would build capacity for MaaS.

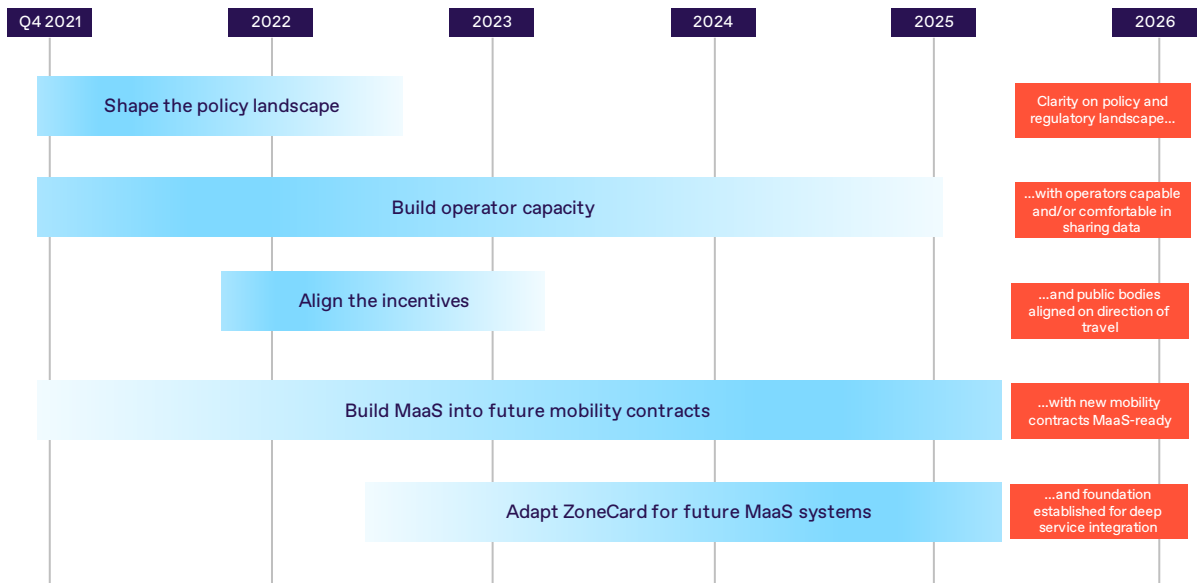
The objective is for SPT and GCC to be capable of commissioning a regional MaaS system which offers integrated journey-planning, booking, payment and ticketing verification – and

some elements of integrated pricing - in 5 years' time.

This programme should include actions under 5 headings, in broad order of priority:

1. **Shape the policy landscape.** SPT should push central policymakers to take decisions which support its ability to deliver a strong MaaS solution.
2. **Build operator capacity** for MaaS through tactical integrations between different operators, supporting hardware upgrades, and understanding operator projects.
3. **Align the incentives** for GCC and SPT to benefit from more integrated travel options in Glasgow City Centre.
4. **Build MaaS into new mobility contracts** with provisions for requiring data from operators.
5. **Develop ZoneCard** as a foundation for elements of a future MaaS system, such as using its revenue allocation method, risk-sharing and customer service tools.

Actions are summarised in table 3.



Summary table 3: a MaaS readiness programme for Strathclyde

| Responsibility | Type of intervention | Action | Timescale: action within... |
|---|----------------------|---|-----------------------------|
| Shape the policy landscape | | | |
| SPT | Policy | Engage with Smart Ticketing Board to define smart ticketing as including MaaS | 12 months |
| SPT | Policy | Engage with Transport Scotland to advocate for interoperable booking through Traveline | Immediate |
| SPT and GCC | Policy | Engage with Transport Scotland to understand future of account-based ticketing, the NEC and other services | 6 months |
| SPT | Regulation | Take legal advice on use of Transport Act 2019 and explore other policy questions | 6 months |
| GCC/councils | Policy | Pursue complementary policies in physical interchanges and core transport provision | Ongoing |
| Build operator capacity and willingness for MaaS | | | |
| SPT | Relationships | Build operator comfort by identifying value-added MaaS services – where there service is added to non-transport third parties | 2 years |
| SPT | Relationships | Use CalMac’s new capability to build operator comfort with MaaS: adding ferry to existing apps, eg bus operators’ apps | 12 months |
| GCC | Operations | Ask NextBike to speak to sponsors about MaaS and explore any potential conflicts | 12 months |
| SPT | Technology upgrade | Identify and support community organisations looking to upgrade technology | 2 years |
| SPT | Technology upgrade | Build mobile-first into future hardware upgrades including Subway accessible to mobile | 5 years |
| SPT | Relationships | Understand direction of bus operator ticketing integration | Ongoing |
| Align the incentives across organisations to pursue MaaS | | | |
| GCC/SPT | Policy | Agree on subway/bike-sharing alignment of strategic goals and process for sharing revenue/risks | 2 years |
| SPT | Policy | Coordinate new apps across region from public bodies | Ongoing |
| SPT and GCC | Relationships | Work with regional partners to upgrade digital connectivity | Ongoing |

| Build MaaS into future contracts | | | |
|--|--------------------|---|-----------|
| SPT GCC and councils | Policy | Require data-sharing to enable MaaS in future mobility contracts | Ongoing |
| SPT, GCC/councils | Policy | Require industry-standard data formats in mobility contracts | |
| GCC/councils | Policy | Require industry-standard vehicle unlocking in mobility contracts | |
| GCC/councils | Policy | Avoid vendor lock-in: contracts with providers who have exclusive agreements with other providers | |
| GCC/SPT | Policy | Limit exposure to contractors who will resist integration | |
| Adapt ZoneCard to build operational functions for future MaaS systems | | | |
| SPT | Policy | Secure option for SPT to access or own data from ZoneCard | 12 months |
| SPT | Operations | Design-in expanding ZoneCard's revenue allocation process to include future modes/contracts | 2 years |
| SPT | Technology upgrade | Explore potential for ZoneCard app with journey-planner | 5 years |
| SPT | Operations | Add shared mobility provider(s) to ZoneCard consortium | 3 years |
| SPT | Operations | Agree shared customer service protocols between partners | 5 years |
| SPT | Operations | Develop risk-allocation processes between partners | 5 years |



Urban
Foresight

© Urban Foresight Ltd, 2021

The Catalyst, 3 Science Square
Newcastle Helix
Newcastle upon Tyne, NE4 5TF
United Kingdom
+44 (0)191 495 7350

urbanforesight.org

Flour Mill,
34 Commercial Street,
Dundee, DD1 3EJ
Scotland
+44(0)138 22 40 40

hello@urbanforesight.org

