MaaS Gap Analysis Workshop

REPORT FOR DUBLIN

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SMART DUBLIN

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Executive Summary

Background

During 2019, Smart Dublin engaged with local and international stakeholders to explore the opportunities, which Mobility as a Service (MaaS) could bring to Dublin. In November 2019, Mastercard CityPossible hosted a MaaS event at the Smart City World Congress in Barcelona, which was attended by Smart Dublin and the MaaS Alliance. Following this event, plans were put in place to facilitate a collaborative workshop with the relevant Dublin stakeholders to develop a high-level roadmap to making MaaS a reality in Dublin.

Workshop Approach and Output

A MaaS Gap Analysis Workshop was held on **March 5th 2020 in Dublin,** where MaaS stakeholders identified the characteristics of the current mobility ecosystem, defined what a potential future state MaaS environment should be, then created and prioritised several initiatives to move Dublin towards a MaaS environment.

As part of the introductions, the NTA provided an overview of the Next Generation Ticketing Systems (NGTS) to the workshop and it was widely acknowledged that this new account based platform would become a central tenet of MaaS in the future. It was also noted by the NTA that the topic of MaaS should be progressed as a national initiative and not only for Dublin.

At the workshop, participants identified a total of 176 initiatives. Participants then reviewed and prioritised 23 of those initiatives. These 23 initiatives provide direction on how to progress the MaaS conversation and are summarised in the diagram below by theme and timelines. The numbering 1-23 indicates the priority of the initiative with #(1) voted the most important *(please note that the duration of each initiative is only indicative at the stage).*

Theme	Near-Term					Mid-Term				Far-Term			
	Q2/20	Q3/20	Q4/20	Q1/21	Q2/21	Q3/21	Q4/21	Q1/22	Q2/22	Q3/22	Q4/22	Q1/23	Q2/23
Org.		Create Executive Steering Committee (1)				Ongoing Governance							
			Setup of Org. Structure to manage the Operation Platform (14)										
Study			Public Consultation of Future Mobility (3)										
			Learn from Other Pilots (5)			Demand Responsive Pilots (20)							
Education			Educate Travellers (Users) on MaaS (22)										
Policy			Govt. Fund for Mobility Pilots (4)			MaaS Adoption/Pilots (e.g.) 250 Organisations (13)							
						Inclusive of all modes and forms of mobility (8)							
						Review relevant Local/National Policy (18)							
			Review MSP License Fees (9)										
			Bus Lane Enforcement (15)										
			Data Standardisation (17)										
										Review Congestion Zone Charging (23)			
						Subsidize Off-Peak & Dynamic Pricing (16)							
Data			National Data Audit/Catalogue (10)										
						Adopt Open APIs (11)							
Technology		Procurements – NGTS, Multi-model Journey Planning, AVL (2)				Ongoing Procurement and Implementation							
			Coordinate Timetables across Modes (19)										
			Door-to-Door (First Mile Last Mile) (12)										
						Build MaaS Open Platform (6)							
						National User CRM System (7)							
										Loyalty Points Scheme (21)			

Having completed similar workshops in other cities, it is noted that the majority of initiatives highlighted in Dublin aligned with those identified by other cities. However, the Dublin workshop provided far more detail on each of the initiatives.

COVID-19

Immediately following the workshop, the spread of COVID-19 across the world affected all aspects of everyday life, including mobility. With public transport numbers seeing reductions of up to 90%, and travellers' perceptions on safety coming to the fore, the use of MaaS will be even more critical going forward. MaaS offers options and preferences to the individual traveller and these options will allow them to make decisions based on how they perceive their own comfort and safety.

Next Steps

Feedback from the workshop prioritised the establishment of an Executive Steering Committee to formally initiate a MaaS programme. This report gives a first high-level view as to the key initiatives, which the programme could deliver. The report will be published for consideration by relevant stakeholders with a view to establishing the Executive Committee.

It is noted that Dublin/Ireland is well placed to adopt key aspects of mobility integration and a path towards MaaS. The MaaS Alliance remains a key ally of Smart Dublin and we have identified several areas within this document where the Alliance can provide information and insights as needed to help deliver MaaS for Dublin/Ireland.

Introduction

This report is the output from the MaaS Gap Analysis workshop held in Dublin on March 5th 2020.

Please note the following:

- The original scope of the workshop was a MaaS Gap Analysis for Dublin with only local stakeholders in attendance. However, as noted by the NTA during the workshop, the scope of a MaaS programme for Dublin may be expanded to be a national initiative; hence, in some cases reference is made to Dublin/Ireland where appropriate. It is understood that if a MaaS programme were defined as national initiative, many non-Dublin stakeholders would be part of the conversation.
- Any references to Ireland implies the Republic of Ireland.
- All the slides presented at the workshop are available in the Appendices.

Mobility-as-a-Service (MaaS) Overview

Over the last ten years, several converging market forces, social trends and advancements in technology have started to reshape the way we understand transportation, the way we want to experience it and the way we expect it to be delivered. Once a realm dominated by private vehicles juxtaposed with public transit, today transportation is a much more complex and multi-layered topic, facing new, formidable challenges but also standing on the brink of vast new opportunities.

The concept of “Mobility as a Service” or “MaaS” is central to the idea of change in transportation. Generally understood as a vision of future mobility where travel happens through a combination of public, private and shared transportation modes. It remains an ambiguous term, originated from the private sector and often misunderstood, which complicates discussions about MaaS and its implementation.

The workshop and this resulting report aim to provide clarity on MaaS, its key stakeholders and primary objectives within the Dublin/Irish context. In doing so, it hopes to encourage a wider discussion about the role that transit agencies – the backbone of mobility – could play in driving MaaS forward and the unique density that only the transit mode brings. If MaaS is to truly make a difference and make transportation better, faster, more connected and more personal, we must think carefully about the role that transportation plays in our society and all the people it serves.

Key Elements of MaaS and a Definition

The following components were reviewed and discussed as the key aspects of any MaaS system:

- **Integration of Transport Modes**
  - MaaS is the combination of public transport services with private services, e.g. taxi, car-sharing, ridesharing, bike-sharing, car-rental, on-demand bus services.
  - MaaS is also envisioned to be a service that goes beyond the regular urban boundaries, and will embrace long-distance buses and trains, flights, and ferries.

- **Tariff options**

  - Many discussions on MaaS often refer to “mobility packages”, which offers bundles of various transport modes (both public and private) and includes a certain amount of km/minutes/points that can be utilised in exchange for a monthly recurring payment.
  - Many MaaS operators also provide a “Pay-as-you-go” solution, which charges travellers according to the effective use of the service. These services can also include pre-purchased multi-modal products or include fare-capping initiatives.

- **Single Platform**
  - MaaS relies on a digital platform (mobile app or web page) through which the end-users can access all the necessary services for their trips: trip planning, booking, ticketing, payment, and real-time information.
  - Travellers might also access other useful services, such as weather forecasting, synchronisation with personal activity calendar, travel history report, invoicing, and feedback.

- **Multiple Actors**
  - A MaaS ecosystem is built on interactions between different groups of actors through a digital platform:
    - demanders of mobility (e.g. private customer or business customer),
    - suppliers of transport services (e.g. public or private), and
    - platform owners (e.g. third party, PT provider, authority).
  - Other actors can also cooperate to enable the functioning of the service and improve its efficiency. These can include but are not limited to:
    - local authorities,
    - payment clearing houses,
    - telecommunication and data management companies.

- **Use of technologies**
  - Different technologies will be combined to enable MaaS: devices, such as mobile computers and smartphones; a reliable mobile internet network (Wi-Fi, 3G, 4G, LTE, 5G); GPS; e-ticketing and e-payment system; database management system and integrated infrastructure of technologies.

- **Demand Orientation**
  - MaaS offers a transport solution that is best from customer’s perspective, to be made via multimodal trip planning feature and inclusion of demand-responsive services, such as taxi. The travellers will be able to pre-plan a journey, but also call for services on-demand.

- **Registration requirement**
  - The end-user is typically required to join the platform to access available services. The traveller will use this account for all bookings, payment solutions and will be used to identify the traveller to the different transport modes.
  - An account can be valid for a single individual or, in certain cases, an entire household.
  - The subscription not only facilitates the use of the services but also enables the service personalisation.
  - It also captures the Terms and Conditions that are pertinent to the individual service provider.

- **Personalisation and Customisation**
    - Personalisation and Customisation ensures end users' requirements and expectations are met more effectively and efficiently by considering the uniqueness of each customer.
    - This can increase MaaS' attractiveness among travellers and its customers' satisfaction and loyalty.

All of these components are combined into a single definition of MaaS:

Mobility as a Service is a combination of public and private transportation services within a given regional environment that provides holistic, optimal and people centred travel options, to enable end-to-end journeys paid for by the user as a single charge, and which aims to achieve key public policy objectives.

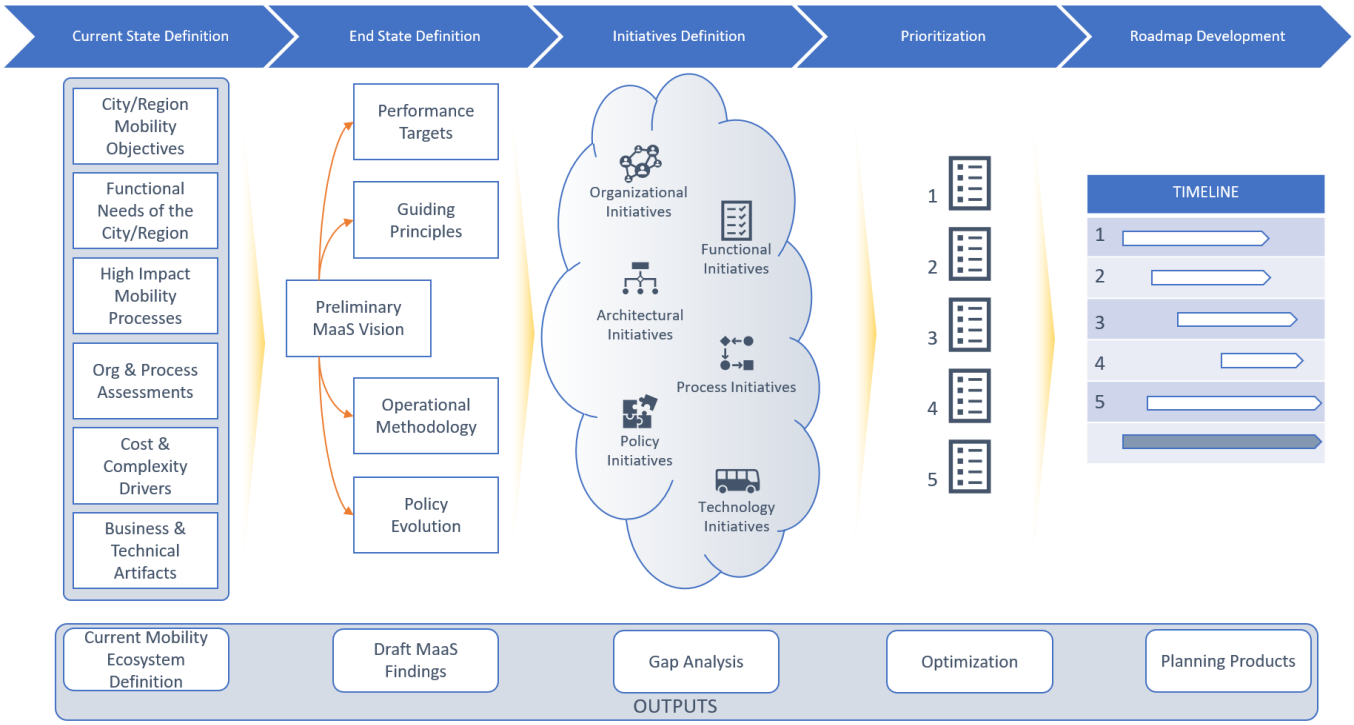
Workshop Outline

The workshop was held on March 5th 2020 at the Mastercard offices in Dublin. There were 32 participants on the day who represented a good mix of public agencies, government offices, public transport operators, public transport authorities, private mobility service providers (MSP), industry, academia and policy makers. A full list of attendees is provided in *Appendix A: Workshop Attendees.*

The attendees were split into five teams and were seated in groups to facilitate discussion and collaboration. At the start of the event, we had round table introductions where people provided their key focus on MaaS, which was captured in a Word Cloud (see below).

An introduction to the MaaS Alliance and the general history and evolution of MaaS was then provided, followed by an introduction and perspective on MaaS from NTA and SAP (representing a large employer in the region).

The initial part of the day provided context and overview on MaaS that then allowed us to progress into the Gap Analysis part of the workshop. The diagram below outlines the overall approach to the workshop.



The Gap Analysis follows the path of defining what the Current State of Mobility is within the region through a round of questions that elicit responses from the teams. The next phase is an open-ended discussion between the team members on what the End State Definition would be for MaaS to be successful. The end state definition is often a more freethinking exercise to allow participants to express their hopes and expectations for MaaS.

Once the current state and end states have been identified, each participant individually then defines initiatives from a technological, policy, educational, organisational, data management or standards perspective. Each initiative was then:

1. Tagged as to when it would be expected to be implemented: in the short term (0 to 12 months), mid- term (12 to 24 months) or far term (beyond 24 months).
2. Placed on a wall where the facilitators clustered similar initiatives together.
3. Prioritised by individual participants to identify the initiatives most critical to the success of MaaS.

These clustered and prioritised initiatives were then collected and noted for further analysis and are provided in the following sections of this report, along with a road map of how these initiatives can be implemented and what are deemed the critical ones for success in the delivery of MaaS in Dublin.

Workshop Outputs

The following sections provide the direct outputs from workshop and are reported verbatim to ensure the outputs from the attendees are captured correctly. Where necessary the author has **annotated in bold** where more context is needed to understand a specific answer or statement.

ACTION 1: Current State Analysis

The first board exercise was to identify the current state analysis. Each question is listed below with the summation of each teams' responses, hence in some response listings there may be contrasting items reflecting the different opinions from different teams. The questions are asked in this order to allow for the participants to think in a logical approach to the operation, management and policy oversight for mobility within the region today.

Question 1: What is the current City/Region Mobility Objectives?

Summary of responses from all teams:

- Move people around to create social and economic mobility
- To enact policies and strategies (NTA Transport strategy)
- To use traffic light priority
- Deploying new cycle lanes
- To ensure arterial link up
- To maintain public engagement
- To coordinate across agencies to ensure a common vision (This is a national issue)

Question 2: What does the city need to operate an effective transport network?

Summary of responses from all teams:

- Good capacity, good pricing, ease of use, flexibility, integration
- Safety
- Metrics – need good data, more sharing by all mode providers and a way to bring it all together
- Good legislation to enable local vs. national responsibilities
- Measurable KPI's – emissions, journey times, utilisation
- Low density rural transport balanced with dense urban networks
- Better information on multi-modal journey planning

Question 3: What works well and what doesn't in the city/region from a transport perspective?

Summary of responses from all teams:

- Works well:
    - Good data collection - traffic lights, environmental sensing, having a national survey on journeys, tolling data, etc.
    - Bus lanes, cycle lanes
    - Good Real Time Passenger Information (RTPI)
    - Leap card

    - Bus Connects program
- Doesn't work well:
    - Congestion
    - Data isn't joined up, shared, unclear ownership
    - Siloed coordination
    - Environmental **[Air quality issues and lack of communication on exact policy]**
    - Enforcement – lots of people don't follow the rules (bus lane enforcement)
    - Poor segregation of cycles and traffic

Question 4: Who runs what and who's responsible for what?

Summary of responses from all teams:

- Department of Transport, Tourism and Sport (DTTAS) **[Responsible for National Policy on Mobility]**
- National Transport Authority (NTA) **[Responsible for implementing National Policy on Mobility]**
- Local Authorities (who manage the curb side) **[Responsible for Local Policy on Mobility]**
- Transport Infrastructure Ireland (TII) **[Responsible for ensuring National Infrastructure for Mobility]**
- Road Safety Authority (RSA) **[Responsible for ensuring Safety on National Infrastructure]**

Question 5: What's the biggest cost of running the transport network?

Summary of responses from all teams:

- Funding comes from State (40-50%) and remainder from fares; Tax payer subsidising transport; rider pays for use
- Infrastructure vs. digital investments – easier to get investment in tangible/visible projects
- CAPEX – infrastructure, retrofits/upgrades
- OPEX – people to operate
- Centralisation and accountability would make network more efficient **[An effort to coordinate data and services is seen as a potential large cost saver and increase overall efficiency]**
- Centralised data for information
- Procurements tend to be a barrier

Question 6: How do we run it today? What systems do we have?

Summary of responses from all teams:

- Transport system is a regulated market
- Leap card

- TFI journey planner
- Irish Rail app
- Luas app
- No / limited interoperability; Opportunity to improve
- Private mobility services – car share, bike share, ride share, etc. Limited/no dialogue. **[Assuming the Mobility Service Provider (MSP) feels communication between national and regional policy makers is not enough to allow coherent and coordinated operations]**
- Good data available but not well coordinated
- 31 Local Authorities with local by-laws not always consistent with national policy
- Enforcement could be improved

The outputs of the six questions were consolidated into what was considered the key factors that drive the current state of mobility in Dublin and are summarised in the list below.

ACTION 2: Future State Analysis

The second board exercise was to identify the future state definitions which the city and country must achieve to deliver MaaS. This was an open-ended exercise used to let freethinking about what a future vision of MaaS should be for Dublin. The statement questions that were posed to the teams were as follows:

- What would we like to achieve for the MaaS Vision for the City/Region?
- How do we achieve the objective of meeting policies (Social Equity)?
- What additional services can be provided and how do we provide those?
- Do we feel mobility subscriptions are viable?
- What model for MaaS and who owns and operates it?
- Who regulates a future MaaS Environment?
- When do we want it? (near/mid/far)

A summary of each of teams' outputs are provided here.

Team 1:

- A platform model which is government (NTA) owned and publicly controlled and regulated
    - Aims to deliver public policy
    - Becomes a trusted entity
    - Fastest route to deliver mobility improvements
- Open to all MSPs both public and private.
    - Contract with private should be light touch/agile and ensure revenue is shared equitably
    - Private operators to sign up to standards and obligations for quality of service and data provision and they will need to provide what they say they'll provide (accountability)
    - Pilots should start slow to build trust with the operators and let the operators continue to provide services directly, outside the platform to retain customer contact/ownership.
    - Use universities, hospitals, industrial parks as pilot test cases, maybe even small villages.

Team 2:

- A MaaS Platform for all modes of transport (public and private) with the ability to take payments
- Reduce public transport journey time; journey time as a defining characteristic
- Make public and private transportation options more reliable and trustworthy
    - Have confidence with the data
    - Quality of the experience in addition to journey time
- Country-wide MaaS solution, useable in Dublin and integrated with rural areas

- Include the ability to pay for parking
- Pedestrianise Dublin city centre where appropriate
- Segregated cycling infrastructure within the city centre
- Manage Service Level Agreements (SLA's) **[To ensure adequate and controlled service delivery across all stakeholders]**
- Off-peak time pricing incentives

Team 3:

- Integrated software and infrastructure (mobility hub e.g. Hamburg)
- Increased visibility of options/modes according to user profile
- Gov't role to define the rules of the game; define the parameters of the business model; deliver the society impacts
- Capture the data on the route/mode which the traveller may have wished to take but made another choice to inform how services can be improved
- Social inclusion
- Rewards and incentives
- Proposition to be better than car ownership

Team 4:

- Sustainable public transport as backbone of MaaS system
- High density so people don't need to travel far to begin their journey **[The prevalence of the public transport network should be increased to provide better access closer to people's locations to facilitate better connectivity]**
- Inclusivity – everybody should be able to use the system and the system should change daily as the traveller's needs change
- Hub and spoke infrastructure **[The current public transport network should be changed to allow hub and spoke operations where better interconnections between modes]**
- Complementary between modes **[Interconnectivity of modes of transport needs to be better aligned to have seamless transitions]**
- Dynamic pricing for all modes; smart pricing
    - Drive behaviour to optimise environmental impact
- Dynamic demand management e.g. shifting peak, facilitating events, etc.
- Additional services:
    - Single view of all options to facilitate journey choice
    - Include smart parking
    - Polluter pays

- Model – open ecosystem with PPP. Public owns infrastructure and private delivers the capabilities
- Single platform with views to all modes- public / private
- Should be owned by the people of the country
- Should be regulated
- Multiple MaaS service providers to facilitate competition

Team 5:

- Inclusive of access tools (may include call centre), use services, pricing and affordability
- Reliable – integrated journeys should be joined up so multi-link journeys are coordinated
- Intuitive /logical to use
- Personalised and tailored to the traveller
- Sustainable – promote environmental responsibility
- Geographically equal – rural and city get good results
- Single platform
- Data safe
- Publish impacts of changes in journey shifts
- Regulated by NTA/DTTAS/Gov't agencies
- Ownership may be a PPP between Gov't and private industry
- Needs good branding – (e.g.) "Leap Plus" as the Leap brand already exists **[www.leapcard.ie]**
- Subscriptions which may support some customers. E.g. companies buying subscriptions for their employees
- When:
    - Near term – create policies
    - Mid-term – build platform
    - Long term – use system **[Assuming that the period 24 months out that the MaaS Solution would be usable]**

ACTION 3: Initiative Definition

The third exercise was an individual exercise to identify initiatives to transition from the Current State (Action 1) to the Future State (Action 2).

Each participant was provided with sticky notes and asked to identify initiatives, which could enable Dublin to move towards the MaaS Future State. These individual initiatives were then posted to a wall under various themes to allow consolidation as follows:

- **Organisational** – initiatives, which require examination or changes to organisational structure at a local, regional or national level.
- **Technology** – initiatives, which are reliant upon or require new technology for the initiative to happen.
- **Study** – initiatives, which require additional analysis.
- **Policy** - initiatives, which require examination or changes to local, regional or national policy for MaaS to become effective.
- **Education** – initiatives which require the concept and idea of MaaS to be more widely distributed to the general population and MaaS Stakeholders
- **Data** – initiatives, which are reliant upon changes to data collection, processing, storage, sharing, management or policy. This applies to data in the Public and Private stakeholder groups.

Following the process, 176 initiatives were identified and then further grouped into 33 thematic initiatives namely; ***Organisational (3), Technology (7), Study (5), Policy (15), Education (1), Data (2).***

Although many initiatives related to or mentioned data in them, the overarching theme for those initiatives was in relation to policy, study or technology, whilst only two initiatives were specifically aimed at data to deliver MaaS. The table below list the 33 thematic initiatives collected on the day.

Thematic Area	Initiative Description
Data	Adoption of open API's and Microservices (ensure Open APIs are embedded in all future contracts and licenses)
Data	Data audit to create a data catalogue for Ireland including which agency is responsible for creation and management incl. NTA, TII, DCC, private data providers, mobile, google, etc.)
Education	Educate the Public on MaaS and effect behaviour change, how do we sell integrated mobility and how do we build excitement around MaaS?
Organisational	Creation of an Executive Steering Committee to align on a MaaS vision supported by a Stakeholder Forum
Organisational	Development of company structure to manage the operation platform

Thematic Area	Initiative Description
Organisational	Aligning Local technology Roadmap with individual local Roadmaps and ensure interoperability **[A consistent discussion was the lack of coherent decision making between local policy and national policy on mobility]**
Policy	Identify the 250 organisations that create most traffic in Dublin. Incentivise them to offer free public transport for staff, Free electric vehicles for staff to make business trips, coordinate work from home days, coordinate shuttle bus services **[Assume employers or public agencies]**
Policy	Add data sharing obligations (using a single data structure and KPIs) to public operator charters, private MSPs' licenses, and MaaS Operators
Policy	Apply subsidies to off-peak travel across modes and implement simplified and dynamic pricing
Policy	Data Standardisation. How can we align with EU standards and what are they? What policy on data sharing can we adopt?
Policy	Enforce no private cars in bus lanes
Policy	Engage with revenue commission to understand appetite/possibility of introduction of tax credits to reward travellers who choose sustainable modes of travel
Policy	Government funding to support the development of test areas, mobility hubs and pilot programs to support MaaS
Policy	How do we mitigate the reduction in car and fuel tax if people adopt sustainable mobility? How do we balance the income from mobility operations? Road User Charging?
Policy	Inclusive of all modes and forms of mobility
Policy	Introduction of Congestion Charging and/or Toxic Emission Charging in designated City areas
Policy	Perform assessment of relevant policy, regulations and byelaws and department and local government level to understand policy that may need to change to enable MaaS
Policy	Reduce license and fees as well as increasing ceilings for car clubs and bike clubs - focus on KPIs and Impact
Policy	Revenue Sharing Model **[The determination of revenue sharing models between public and private MSPs and across different mobility modes – a necessary agreement to ensure equity across the mobility platforms]**
Policy	Review urban planning guidelines to ensure promotion of public transport and car/bike share in all new developments, and collocate jobs, housing and creches for example

Thematic Area	Initiative Description
Policy	Stop prioritising private cars
Study	Demand Responsive Transport (DRT) Pilot in and around Dublin to augment the Public Transport Network (low risk way e.g. Small group of users, specific geography, specific modes, university campuses, etc.) **[Execution of MaaS Pilots]**
Study	Learning from other pilots, policy decisions and research. What can we learn from international experiences and cities?
Study	Public consultation about what mobility future the population would like. What are their needs and priorities? What's the propensity of smartphone use? Conduct a day in the life of studies with 100 travel personas
Study	Study into MaaS in the regions v Dublin - What's the difference?
Study	Trial of a MaaS App pilot with public and private mobility options (low risk way e.g. Small group of users, specific geography, specific modes)
Technology	Build a platform that links apps and all relevant MaaS data to allow unified planning, payment and ticketing
Technology	Coordination of schedules and services across modes to ensure inter-modal transfer
Technology	Create a national user CRM and commence outreach
Technology	Door-to-Door - First Mile Last Mile
Technology	Loyalty points to earn reduced fares on public transport across modes
Technology	Next Generation Ticketing (Account based) + National Multi-Modal Journey Planner + Automatic Vehicle Location (AVL) Procurements
Technology	Trial L Rounding Engine and fully integrate Happy Path **[Unsure of context]**

ACTION 4: Identification of Priority Initiatives to Implement MaaS

Following the posting of the initiatives on the wall and subsequent grouping into themes, the participants were asked to review all the initiatives and vote on which initiative (or group of initiatives) is considered a priority to enabling MaaS in Dublin. The table below outlines the priority 23 initiatives plus indicative timelines as to when the initiative could be performed (*please note these timelines were added by the author after the workshop based on the time periods written on each initiative by the stakeholders*.).

#	Initiative Description	Theme	Timeline	Votes
1	Creation of an Executive Steering Committee to align on a MaaS vision supported by a Stakeholder Forum.	Organisational	Near	12
2	Next Generation Ticketing (Account based) + National Multi-Modal Journey Planner + Automatic Vehicle Location (AVL) Procurements.	Technology	Mid	7
3	Public consultation about what mobility future the population would like. What are their needs and priorities? What's the propensity of smartphone use? Conduct a day in the life of studies with 100 travel personas.	Study	Near	7
4	Government funding to support the development of test areas, mobility hubs and pilot programs to support MaaS.	Policy	Near	5
5	Learning from other pilots, policy decisions and research. What can we learn from international experiences and cities?	Study	Near	4
6	Build a platform that links apps and all relevant MaaS data to allow unified planning, payment and ticketing.	Technology	Mid	3
7	Create a national user CRM and commence outreach.	Technology	Mid	3
8	Inclusive of all modes and forms of mobility.	Policy	Mid	3
9	Reduce license and fees as well as increasing ceilings for car clubs and bike clubs - focus on KPIs and Impact.	Policy	Near	3
10	Data audit to create a data catalogue for Ireland including which agency is responsible for creation and management (incl. NTA TII- DCC private data providers, mobile, google, etc.).	Data	Near	3
11	Adoption of open API's and Microservices (ensure Open APIs are embedded in all future contracts and licenses).	Data	Mid	2

#	Initiative Description	Theme	Timeline	Votes
12	Door-to-Door - First Mile Last Mile.	Technology	Near	2
13	Identify the 250 organisations that create mot traffic in Dublin. Incentivise them to act: free public transport for staff, Free electric vehicles for staff to make business trips, coordinate work from home days, coordinate shuttle bus services.	Policy	Mid	3
14	Development of company structure to manage the operation platform.	Organisational	Near	2
15	Enforce no private cars in bus lanes.	Policy	Near	1
16	Apply subsidies to off-peak travel across modes and implement simplified and dynamic pricing.	Policy	Mid	1
17	Data Standardisation. How can we align with EU standards and what are they? What policy on data sharing can we adopt?	Policy	Near	1
18	Perform assessment of relevant policy, regulations and byelaws and department and local government level to understand policy that may need to change to enable MaaS.	Policy	Mid	1
19	Coordination of schedules and services across modes to ensure inter-modal transfer.	Technology	Near	1
20	Demand Responsive Transport Pilot in and around Dublin to augment the Public Transport Network (low risk way e.g. Small group of users, specific geography, specific modes, university campuses, etc.).	Study	Mid	1
21	Loyalty points to earn reduced fares on public transport across modes.	Technology	Far	1
22	Educate the Public on MaaS and effect behaviour change, how do we sell integrated mobility and how do we build excitement around MaaS?	Education	Near	1
23	Introduction of Congestion Charging and/or Toxic Emission Charging in designated City areas.	Policy	Far	1

The following section provides a narrative on each of the 23 initiatives, how they can benefit Dublin, plus any interdependencies amongst certain initiatives. Where appropriate, examples from other cities and regions are provided where the initiative has resulted in positives steps to MaaS. The views and comments are those of the author.

1. Creation of an Executive Steering Committee to align on a MaaS Vision supported by a MaaS Stakeholder Forum Group (12 votes)

The Executive Steering committee should include representatives from various stakeholder groups that will represent the development of MaaS in Dublin/Ireland and in specific cities. The committee should include representation from:

- The Department of Transport, Tourism and Sport (DTTAS)
- The National Transport Authority (NTA)
- Transport Infrastructure Ireland (TII)
- City representation from relevant agencies responsible for mobility, road management and the delivery of public transport.

It is also important that the Executive Steering committee oversees the development of MaaS for Dublin/Ireland and will include all aspects of urban, suburban and rural MaaS developments. The Executive Steering committee should have the remit to review and guide the progress of MaaS in Dublin/Ireland, to call on external advice and guidance to support the development of MaaS and should meet regularly to ensure the delivery of MaaS.

The first action of the Executive Steering committee should be to organise and create the development of a document that outlines the MaaS Vision for Dublin/Ireland. The Executive Steering committee can be guided by this report as well as from an external MaaS Stakeholder Group. The MaaS Stakeholder Group can be comprised of agencies and bodies within Dublin/Ireland that have a direct interest in MaaS, as well as representatives of public and private MSPs such as public transport operators, demand responsive transport operators, bike share operators, car clubs, etc. The MaaS Stakeholder Group should also include representation of the travelling public who will be the users of the MaaS systems. The Executive Steering committee can also be the conduit for coordination with Northern Ireland to allow potential future roaming between jurisdictions.

International References

Good examples of Executive Steering Committees in operation globally are the management teams established in Antwerp, Belgium and South Queensland, Australia.

2. Development and Roll-out of Next Generation Ticketing (Account based), National Multi-Modal Journey Planner, and Automatic Vehicle Location (AVL) Systems (7 votes)

The NTAs current procurements of the Next Generation Ticketing Systems (NGTS), National Multi-modal Journey Planner and Automatic Vehicle Location Systems are all pivotal to the nationwide roll-out of MaaS.

- ***NGTS*** - the ability to offer a unified account-based payment solution on all public transport, and the ability to use that account to pay for third party private MSPs will become a central tenet of MaaS in Dublin/Ireland. The addition of Contactless Bank Cards (cEMV) will also make the enablement of MaaS more rapidly available.

- ***Multi-modal Journey planning*** is another key tenet of MaaS and the ability to allow coherent and accurate multi-modal journeys, spanning both public and private MSP will be an underpinning functionality needed for MaaS. Journey planning will be based on accurate information from which to determine the optimal journeys for the travellers.
- ***AVL*** - the provision of accurate vehicle location to determine the timeliness and arrival times for services will be critical to the delivery of accurate journey options to the end user. Journeys provided purely off schedule data and perceived locations will result in inaccurate estimates for arrival times and failed journey plans for the end user who will in turn lose trust in the journey options provided.

While the procurement of these three solutions will vastly improve the functionality and ability to deliver MaaS, there are several programs and initiatives (identified below) which can occur prior to the roll-out of these systems to advance the MaaS acceptance in Dublin/Ireland.

3. Public consultation about what the mobility future for Ireland Should be (7 votes)

A key element to getting government and stakeholder support for the development of MaaS will be evidence of the need and willingness to use MaaS solutions. One of the initial tasks of the Executive Steering Committee should be to oversee the creation and execution of several public studies to determine the following pertinent issues:

- What are the specific needs of the travelling public? What are the obstacles to using different mobility options other than a private car today? What would be the critical factor for people to stop using their own vehicle and to switch to a MaaS type solution?
- What is the propensity of smartphone solutions and what other methodologies would the traveling public prefer to use in order to plan, book, pay and execute their journeys?

International References

A useful exercise that many countries (Sweden, Helsinki and the Netherlands for example) have developed is to create personas for the people who will be using the MaaS solutions. This persona document can be used internally to vet new proposals for integrated mobility but can also be provided to prospective MSPs to see if they can deliver services that are suitable for most of the personas, and if not declare why they cannot deliver the service.

4. Government funding to support the development of test areas, mobility hubs and pilot programs to support MaaS (5 votes)

The development of test areas for new mobility experiments and trials can allow the rapid evolution and testing of new integrations between mobility types, new incentivisations and new processes to improve mobility options. Many pilots across Europe have evolved over time to into specific operational mainstream programs. Examples of pilot programs and how they have evolved can be found on the MaaS Alliance website.

International References

It has also been demonstrated at several locations across Europe, specifically Hamburg and Barcelona, that the creation and deployment of mobility hubs at major interchanges can have a dramatic effect on people's ability and propensity to select multi-modal journeys. Mobility hubs are often located at major public transport interchanges and will have facilities to allow travellers to switch modes seamlessly, as well as ancillary services such as convenience stores and toilet facilities. In Hamburg for example, the major transport interchanges are co-located with cycle rental, secure cycle parking, car club schemes, electrical vehicle charging stations, and areas for ride haling and taxi pick up and drop off.

5. Learning from other pilots, policy decisions and research. What can we learn from international experiences and cities? (4 votes)

Many countries and cities across Europe and the world have started pilot programs with numerous MSPs to test and see what works and what does not in terms of mobility integration and differing service levels for mobility. A comprehensive list of the pilot programs can be found on the MaaS Alliance website and representatives can be connected directly to the pilot leads in the relevant region for on-to-one discussions on the specifics of the pilot, the outcomes and lessons learned. The list is not exhaustive, but the MaaS Alliance can provide connections to many pilots and representatives of the private MSP community that are carrying out these pilots.

One lesson learned from the pilots to date is to be selective and focused on the pilot in terms of geographic and demographic scope. Often pilots have been located on university or hospital campuses where the demographic has a high propensity of using public transport and are usually cognisant with the use of smart phone technology and applications. Successful programs like this have been carried out across Europe and in Singapore and Australia.

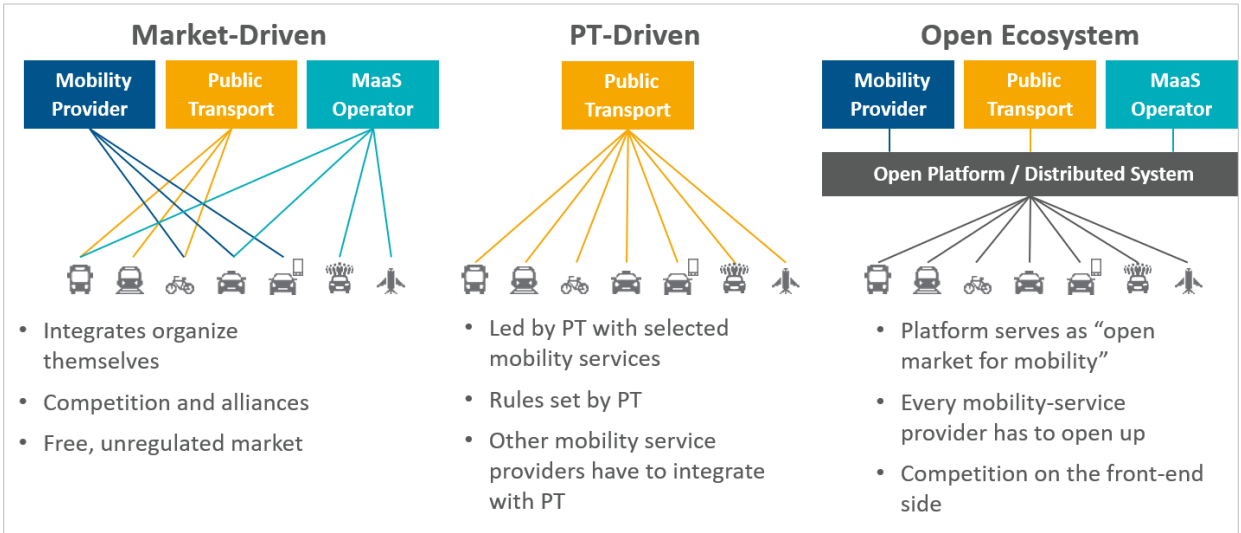
International References

Good examples of focused pilot programs include:

- *Green Class CFF E-Car in Switzerland*
- *Door-to-Door Gate Services, Munich, Germany.*
- *Uber - JUMP biking partnership, San Francisco, USA*

6. Build a platform that links apps and all relevant MaaS data to allow unified planning, payment and ticketing (3 votes)

One of the business models described for MaaS is the development of an open ecosystem where an integration platform can connect all players in the MaaS ecosystem in order to facilitate the planning, booking, payment and execution of journeys. This was the third (i.e.) the Open Ecosystem model, of the three business models presented at the workshop where there is an integration platform that acts as an impartial gateway providing and connecting mobility services to MaaS operators.



It would be envisaged that the new NGTS, Multi-modal Journey Planner and AVL systems would be an essential to this platform. The controlling authority of the platform (assumed to be the NTA) would have the power to regulate and control all stakeholders who have access to the platform and use it to conduct mobility service offerings. The controlling authority would have the ability to set geographic and temporal regulations on MSPs such that certain services cannot be used in certain regions at certain times of the day. For example, the controlling authority would have the ability to regulate the use of ride hailing services in the central business district such that they do not operate at morning or evening rush hour unless in a multi-share mode.

The use of such a platform would allow the use of a traveller's public transport account to be used to pay for private mobility services and *vice versa*. In this way a traveller should be able to pay for a bike rental with their Leap account. This aligns with initiative #2 outlined previously.

There are several platforms available on the market that allow varying degrees of functionality and configurability and can enable integrated mobility planning, payment and execution seamlessly, while reporting analytics on the utility and quality of service provision of the MSPs so that the controlling authority can ensure its policy goals and customer standards are being met.

7. Create a national user CRM and commence outreach (3 votes)

One aspect of MaaS that is often overlooked is Customer Relationship Management (CRM). CRM is an approach to manage a networks interaction with current and potential customers. It uses data analysis about customers' history with a service to improve relationships with customers, specifically focusing on customer retention and ultimately driving re-use of the network.

In terms of MaaS for Dublin/Ireland, the use of account-based solutions as part of the NGTS will be a major step forward in terms of CRM, but in the wider scope of MaaS, there will be a need to include other MSPs into the solution.

An example of this comes when a journey is planned across many modes and is paid for by the travellers' public transport account. For example, let's assume a traveller books a taxi from their home to the train

station to connect into the city. If the taxi is late arriving and then gets held up in traffic on way to the station, and then the traveller then misses their connecting train, who is responsible for compensation if necessary and who is providing the direct customer support to the traveller? When all modes are separate, the individual is self-booking and paying for each leg, so they are solely responsible for any issues that result in missed connections. In a MaaS ecosystem where multi-modal journeys are planned as several trips with a single payment from a single source, the responsibility of who needs to manage customer support needs to be well defined.

A comprehensive national CRM solution could be an effective solution to managing and supporting customer service and outreach specifically when associated with the account management aspects of the NGTS.

8. Inclusive of all modes and forms of mobility (3 votes)

The central tenet of MaaS is that the solutions provided to a consumer should include all modes of transport, both from public and private MSPs in the region. It should be up to the traveller to select which modes they prefer and when to use them, as they select their journey from all provided options.

As the discussion on MaaS progresses in Dublin/Ireland, the Executive Steering committee should ensure that all regulated MSPs should be included in the discussion and planning.

9. Reduce license and fees as well as increasing ceilings for car clubs and bike clubs - focus on KPIs and Impact (3 votes)

Part of any Mobility strategy for a city or region should have regular reviews of the operating paradigm to see how it has affected the private MSP and what they have contributed to the delivery of mobility services in the city or region.

International References

As part of this review and often associated with relicensing of MSPs (a good example of this is when San Francisco cancelled and relicensed all their bike and scooter service providers under new terms and conditions), the controlling authority can look to include metrics for collection and reporting on the impact that the MSP has had in the region.

10. Data audit to create a data catalogue for Ireland including which agency is responsible for creation and management (incl. NTA, TII, DCC, private data providers, mobile, Google, etc.) (3 votes)

Data and sharing data are the life blood of any MaaS ecosystem. It was very apparent from the workshop that there are numerous agencies in the country and region that have access to differing volumes of data that can be pertinent and be used to deliver operational improvements to other agencies and service providers. The issue was raised that the types of data available, the regulation over sharing and ownership and data privacy, and the cost of providing data are key to achieving a MaaS ecosystem.

The Executive Steering committee should examine the benefits of auditing relevant local datasets, publishing a catalogue of datasets whilst highlighting any issues for data sharing. This catalogue will probably highlight issues of data standardisation as well as any existing duplication of effort to create

datasets. The cataloguing effort will also allow the policy over data management to be addressed in a coherent manner once all public and private mobility datasets have been identified. It should be noted that this is not an insignificant task and will require cooperation from across all stakeholders, but the potential benefits could unlock valuable insights into delivering MaaS, as well as methodologies to vastly improve operational services today.

MaaS Alliance Accelerators

The MaaS Alliance has a good paper on Data within the MaaS Ecosystem which can be used as a good starting point.

11. Adoption of open API's and Microservices (ensure Open APIs are embedded in all future contracts and licenses) (2 votes)

Many MSPs today are providing data and services using common open APIs. The MSPs operating in Dublin/Ireland may already or wish to operate internationally and as such use a common open API and associated services to deliver their mobility offerings.

Companies and agencies that do not use common open APIs require additional engineering and resources to make their data and services compatible with the overall MaaS Ecosystem Architecture. Given some private MSPs have only been in the market for a short duration, it is imperative that the cost of integrating these new private providers does not become a burden for the parties involved.

To that end the controlling authority should enforce policy to ensure that they and any other service provider that wants to be part of the MaaS ecosystem should be using open APIs and Microservices.

MaaS Alliance Accelerators

The MaaS Alliance as part of its technical working group is building out a directory of common APIs for the MaaS ecosystem. New MSPs can have their APIs tested for inclusion in the directory and the controlling authority in Ireland can have access to the directory to check and download information on open APIs.

12. Door-to-Door - First Mile Last Mile (2 votes)

The concept of MaaS exists in order to offer travellers options for mobility aside from reliance on a private vehicle. As such all MaaS offerings must include the concept of providing multi-modal journeys from wherever the traveller wants to begin their journey to their destination. More commonly than not this is from their home to a place of work, education or study, and as such the concept of Door-to-Door is key in ensuring that the planned journey starts and ends where the traveller needs it.

Also, key to delivering MaaS is the core assumption that public transport is the backbone of MaaS. Only public transport has the regularity and capacity to move the high volumes of people required for MaaS. To that end, the concept of First Mile-Last Mile is also key to MaaS. Most planned multi-modal journeys will probably require a trip leg from the departure point, to a node on the public transport network for the next trip leg, then a connection from the public transport network to the destination for the final trip leg. It is the connecting trip legs to and from the public transport and how seamless and easy those trip legs can be made that will determine the success of MaaS.

It is also important to understand that those multimodal trip legs could be active modes of transport such as walking or cycling to the public transport network, so you may walk to a bus stop, get a bus that connects to the tram, then cycle the last trip leg to your destination. In this way, MaaS can be used to promote active modes of mobility over other modes such as demand responsive transport or ride hailing services.

13. Identify the 250 organisations that create the most traffic in Dublin. Incentivise them to offer free public transport for staff, free electric vehicles for staff to make business trips, coordinate work from home days, coordinate shuttle bus services (2 votes)

This may seem an optimistic initiative but engagement with local businesses to help manage the demand on the public transport network and road networks can deliver sizeable benefits.

International References

For example, in Chicago, the headquarters of Bank of America, McDonalds, United Airlines and Boeing all worked with the city to examine methodologies to reduce the impact that their staff have on the transport network. Staggering start times for employees has helped flatten the demand on certain stations near the headquarters, which has meant that the network runs more efficiently and, in the morning, and evening peak periods the available capacity can cope with the demand more effectively.

All city workers in Chicago can also use their government issued identification to get access to public transportation, which when combined with a robust internal messaging exercise led to a significant reduction in the use of government owned vehicles on the road during the day, and a corresponding peak in the utilisation of the public transport network.

These simple initiatives can be used in isolation or conjunction to look at means to improve the transport network experience for all travellers.

Given the development of industrial parks in and around Dublin/Ireland and the issue that sometimes the parks may not be efficiently connected to the public transport network, focusing on a specific employer or a specific park to offer alternate means to connect to the network without having to resort to a private car could be a useful means to fast-track deployment of mobility programs and to start to engender a sense of multi-modal transportation for the commute.

A good example of this is the Smart Mobility hub project in operation in each of the Dublin Local Authorities, which provides a shared pool of EVs and eBikes for staff to use as part of their day-to-day jobs.

14. Development of company structure to manage and regulate the operation of MaaS and associated platforms (2 vote)

The development of a MaaS ecosystem will be a complex set of interactions that will encompass the political sphere, the economic management of the various stakeholders, the underlying technologies to deliver a connected solution, and the societal changes need to be bought about to make the MaaS a reality.

In a politically and managerially fragmented environment, it becomes hard to garner consensus and to effectively deliver a MaaS vision. The cities where a single authority has overall responsibility for coordination, messaging and management (e.g. TfL in London, TfNSW in Sydney, MTA in New York) the

ability to effect network wide change and to regulate and control is often seen as more effective. Other cities where an overarching agency exists, but the need to coordinate and get agreements across several policy stakeholders often leads to piecemeal solutions being adopted and to issues of mass implementation of incoherent solutions (e.g. Clipper payment system in the Bay Area of California where 23 individual transit agencies negotiate their specific requirements on any overall solution).

Having a single authority with responsibility for regulation and management of the network, but with the specific remit to coordinate and message into the individual regions and agencies can and will help the development of nationwide solutions. For Dublin/Ireland, the logical agency to take the lead on the development of a MaaS vision would be the NTA, and in conjunction with the Executive Steering committee could effectively manage the numerous specific requirements and policy issues from the various stakeholders. This is a similar approach taken by the Netherlands (Translink) and New Zealand (NZTA).

15. Enforce no private cars in bus lanes (1 vote)

A critical element of the delivery of MaaS is ensuring the accuracy of the estimated times or arrival for people's journeys. This becomes even more critical when you are considering that people may have to change between modes and that a delay on the first leg could cause them to miss a connection.

Ensuring buses have unimpeded movement and can stay to their schedules will be a key requirement for transport network management in the future and making sure the bus lanes remain free of car traffic will help in making schedule adherence consistent.

Active enforcement of infringements is needed to ensure that people are aware of the nature of bus lanes, but to also show that the benefits of keeping the lanes free are beneficial to the entire network. Active messaging ahead of and during enforcement will allow private car users to understand the penalty of infringement and what the city/region is trying to achieve with active enforcement.

16. Apply subsidies to off-peak travel across modes and implement simplified and dynamic pricing (1 vote)

Price differentials across times of the day are an effective methodology to nudge people's behaviours and travel times. Simple price differentials outside of peak hours have demonstrated significant shift of demand away from the available capacity. This ability to direct people's journey via fare incentives (off peak or dynamic pricing) can provide the additional capacity on the network necessary to deliver MaaS solutions effectively.

Dynamic pricing (hour-to-hour variations on the normal fare) is often used to incentivise across competing routes into the city to nudge ridership. For example, if a bus line and tram line serve the same community into a central region, there may be an incentive for the public transport operator to nudge people to use an under-demanded bus journey when they know the tram will be oversubscribed (special events for example).

International References

A good example of this is the work done in Chicago where a trial managed to shift 17% of registered travellers on a particular metro line out of peak hours by offering pricing incentives and free trips.

17. Data Standardisation. How can we align with EU standards and what are they? What policy on data sharing can we adopt? (1 vote)

There are numerous initiatives and programs ongoing in Europe now, most reviewed or managed by the European Union to promote issues of data standardisation, management and policy.

MaaS Alliance Accelerators

The MaaS Alliance is associated with all these initiatives and can provide a common interface to all the ongoing communications and programs. More information on the EU Digital Strategy can be found here, or on the MaaS Alliance website. Like Incentives Number 10 and 11 above, the need to harmonise data management, transmission and policy is paramount on ensuring a coherent MaaS implementation.

18. Perform assessment of the relevant policy, regulations and byelaws and department and local government level to understand policy that may need to change to enable MaaS (1 vote)

This will be an important process necessary to enable the widespread roll out of MaaS. Often in MaaS pilots and deployments to date, the limiting factor on success has not been the desire of the community, the will of the organisations, or the technology being deployed; but the lack of coordination on policy between public bodies and across boundaries.

A complete review of local policies, regulations and byelaws for the enablement of MaaS across the regions necessary will be needed in order to enable MaaS. This will need to be carried out if a single entity (possibly the NTA) takes national policy lead on MaaS.

19. Coordination of schedules and services across modes to ensure inter-modal transfer (1 vote)

On reason often cited across cities is the lack of coordination between services, which puts people off utilisation of the public transport services. Simple schedule planning and coordination between different modes of public transport and between specific operators in a region will helpfully reduce the wait time between trip legs and make the travelling experience more pleasant.

International References

This was the case in Sydney where initially there was little schedule coordination and for certain locations, a ferry would arrive as per the schedule, to find that the connecting bus had left 3 minutes earlier. This meant a dwell time of over 27 minutes to wait for the next bus operation, which the community found too much so resorted to private cars and ride hailing services. After coordination of the schedules to allow connections between modes, public transport utilisation on these routes increased significantly.

20. Demand Responsive Transport Pilot in and around Dublin to augment the Public Transport Network (low risk way e.g. Small group of users, specific geography, specific modes, university campuses, etc.) (1 vote)

Demand Responsive Transport (DRT) trials are a growing focus of many cities globally as it combines the connectivity of a bus service and the on-demand nature of ride-hailing services. Many trials in Australia

have demonstrated the high acceptance rate from the communities to connect them to the public transport network and on to their final destination.

DRT is often useful to augment the public transport network in low density areas, or to connect specific geographies to the network. For example, DRT solutions are often deployed in industrial parks, educational campuses or hospital locations. Areas where you have a contained customer base and the regions are not served well by existing public transport are prime for DRT trials.

In this instance, it may be useful for Dublin to look at specific DRT trials in and around industrial parks, hospital and academic campuses, or suburbs currently underserved by public transport.

International References

A good example of this is the Mobility-X trial at NTU Smart Campus where the DRT solution was autonomous, but still provided on demand solutions.

21. Loyalty points to earn reduced fares on public transport across modes (1 vote)

Miami-Dade has recently introduced a methodology of rewarding their passengers with points for every journey they complete on the network. Once the traveller collects a certain amount of points, they can trade these points for free rides on the network, or for vouchers for different services (coffee, pharmacy, etc.). This incentive solution has been incredibly popular in region and the subscription rate has been very high.

The incentive system also includes a process to allow a traveller to collect points for watching short, targeted advertising videos. Each video watched adds a fixed amount of points to their account. Effectively this has enabled passengers on limited incomes to access the public transport network at reduced cost and the revenue collected as fares is offset from advertising income.

These processes of incentivisation can be built into any mobile application and have a demonstrated benefit and acceptance from the travelling public.

22. Educate the Public on MaaS to effect behaviour change, how do we sell integrated mobility and how do we build excitement around MaaS? (1 vote)

MaaS as a concept is often quite hard to sell to the travelling public not because of the tangible benefits, but the nomenclature and phraseology used in this domain is often not understood by the average traveller.

The combination of travel modes into a single digital interface for a traveller to plan, book, pay and execute a journey is a concept that has been embraced in certain areas, but the perceived complexity of the process is often seen as daunting and has created issues of trust in the service provided, or caused travellers to question why they even need a mobility service.

MaaS Alliance Accelerators

Extensive work has been done by some MaaS Operators (MaaS Global, Mobility-X and UbiGo to name a few) on messaging and education for the travellers. The MaaS Alliance also has material on these and several other issues that could be pertinent on creating education material necessary to engage the public on the MaaS discussion.

23. Introduction of Congestion Charging and/or Toxic Emission Charging in designated City areas (1 vote)

With congestion on the increase in cities (both pre-Covid19 and potentially after movement restrictions ease up), the road network becomes over utilised and this has an immediate impact on people's journey times for both private and public transportation modes, but also the environment.

International References

Many cities have implemented congestion charging policies and toxic emission charging policies to manage the impact on the city itself. The prime example for this would be London who have a successful congestion charging and an Ultra Low Emissions zone policy that has generated revenue to feed back into the transport network but has also seen a measurable improvement in air quality in the city. Many cities including New York, Los Angeles and Sydney are now considering this to improve transport operations and manage the environmental impact of mobility in their city.

Having a congestion charging zone may require investment in the public transport network as people may be economically forced to not use private transport and rely on the public transport network. Pushing people to public transport can be a precursor to more MaaS type solutions offered to complete people's journeys.

ACTION 5: Roadmap to MaaS

After the workshop, the priority initiatives defined under Action 4 were assigned to one of three-time windows. The time-window assignment was based on the individual written initiatives in Action 3 and based on the judgement of the author based on previous experiences. As outlined in the Executive Summary, the diagram below provides a consolidated view of the prioritised 23 initiatives categorised by theme and time-window *(please note that the duration of each initiative is only indicative at the stage).*

Theme	Near-Term					Mid-Term				Far-Term			
	Q2/20	Q3/20	Q4/20	Q1/21	Q2/21	Q3/21	Q4/21	Q1/22	Q2/22	Q3/22	Q4/22	Q1/23	Q2/23
Org.		Create Executive Steering Committee (1)				Ongoing Governance							
			Setup of Org. Structure to manage the Operation Platform (14)										
Study			Public Consultation of Future Mobility (3)										
			Learn from Other Pilots (5)			Demand Responsive Pilots (20)							
Education			Educate Travellers (Users) on MaaS (22)										
Policy			Govt. Fund for Mobility Pilots (4)			MaaS Adoption/Pilots (e.g.) 250 Organisations (13)							
						Inclusive of all modes and forms of mobility (8)							
						Review relevant Local/National Policy (18)							
			Review MSP License Fees (9)										
			Bus Lane Enforcement (15)										
			Data Standardisation (17)										
										Review Congestion Zone Charging (23)			
						Subsidize Off-Peak & Dynamic Pricing (16)							
Data			National Data Audit/Catalogue (10)										
						Adopt Open APIs (11)							
Technology		Procurements – NGTS, Multi-model Journey Planning, AVL (2)				Ongoing Procurement and Implementation							
			Coordinate Timetables across Modes (19)										
			Door-to-Door (First Mile Last Mile) (12)										
						Build MaaS Open Platform (6)							
						National User CRM System (7)							
										Loyalty Points Scheme (21)			

Concluding Remarks

A MaaS Gap Analysis Workshop was held on March 5th 2020 in Dublin where relevant MaaS stakeholders participated in identifying the characteristics of the current mobility ecosystem, defined what a potential future state MaaS environment should be, and then created and prioritised many initiatives to move Dublin/Ireland towards a MaaS environment.

The NTA provided an overview of the Next Generation Ticketing Systems (NGTS) to the workshop and it was widely acknowledged that this new account based platform would become a central tenet of MaaS in the future.

Of the 176 initial initiatives identified, these were consolidated and prioritised into 23 key initiatives. Having completed similar workshops in other cities, it is noted that the majority of initiatives highlighted in Dublin aligned with those identified by other cities. However, the Dublin workshop provided far more detail on each of the initiatives.

It is the viewpoint of the author that the initiatives outlined in this report will place Dublin/Ireland on a good path to having a coherent and adaptable transportation system, which will utilise MaaS to the greatest effect.

In conclusion, Dublin/Ireland is well placed to adopt key aspects of integrated mobility and a path towards MaaS.

The MaaS Alliance remains a key ally of Smart Dublin and we have identified several areas in this document where we can provide information and insights as needed to help deliver MaaS for Dublin/Ireland.

Appendices

Appendix A: Workshop Attendees

#	Name	Organisation	Role
1	Andy Taylor	MaaS Alliance	Facilitator
2	David Roat	MaaS Alliance	Facilitator
3	Jonathan Williams	MaaS Alliance	Facilitator
4	Will Judge	Mastercard CityPossible	Key Contributor
5	Dave Fleming	Mastercard CityPossible	*Welcome Note only*
6	James Crawford	SAP	Large Employer
7	Christopher Manzira	Dublin City Council (DCC)	Local Government
8	Niall Bolger	Dublin City Council (DCC)	Local Government
9	Jamie Cudden	Dublin City Council (DCC) Smart Cities	Local Government
10	Veronica Mariti Sesoko	Dublin City Council (DCC) Smart Cities	Local Government
11	Niamh Russell	Fingal County Council	Local Government
12	Alan Murphy	Smart Dublin	Local Government
13	Carol O'Reilly	Department of Transport, Tourism and Sport (DTTAS)	Policy
14	Shane Prendergast	Sustainable Energy Authority of Ireland (SEAI)	Policy
15	Matthew Mullarkey	University of South Florida	Research
16	Bidisha Ghosh	Trinity College Dublin (TCD)	Research
17	Vinny Cahill	Trinity College Dublin (TCD)	Research
18	Fiona Brady	FreeNow	Technology Provider
19	Peter Soutter	Good Travel Software (GTS)	Technology Provider
20	Richard Doody	Good Travel Software (GTS)	Technology Provider
21	Barry Dorgan	National Transport Authority (NTA)	Transport Authority
22	Jason Clark	National Transport Authority (NTA)	Transport Authority
23	Stephen Downes	National Transport Authority (NTA)	Transport Authority
24	Hugh Cooney	Bleeperbike	Transport Operator - Private
25	Ben Lawson	Enterprise Holdings (EHI)	Transport Operator - Private
26	Gary Killeen	Enterprise Holdings (EHI)	Transport Operator - Private
27	Rob Kearns	GoCar	Transport Operator - Private
28	David Dobbyn	Lime	Transport Operator - Private
29	Thomas O'Connell	Moby	Transport Operator - Private
30	Aiden Connolly	Toyota (Yuko)	Transport Operator - Private
31	Charlie Gleeson	Zipp Mobility	Transport Operator - Private
32	Ciaran Rogan	Dublin Bus	Transport Operator - Public
33	Michael Power	Irish Rail	Transport Operator - Public

Appendix B: Glossary of Terms

Term	Description
API	Application Program Interface
AVL	Automatic Vehicle Location
CAPEX	Capital Expenditure
cEMV	Contactless Bank Cards
CFF	Swiss Federal Railways
CRM	Customer Relationship Management
DRT	Demand Responsive Transport
eBikes	Electric Bikes
EV	Electric Vehicle
GPS	Global Positioning System
MaaS	Mobility as a Service
MSP	Mobility Service Provider
MTA	Metropolitan Transportation Authority (New York)
NGTS	Next Generation Ticketing Systems
NTU	Nanyang Technological University
NZTA	New Zealand Transport Agency
OPEX	Operational Expenditure
PPP	Public Private Partnership
PT	Public Transport
RSA	Road Safety Authority
RTPI	Real Time Passenger Information
SLA	Service Level Agreement
TFI	Transport for Ireland
TfL	Transport for London
TfNSW	Transport for New South Wales

Appendix C: List of External Links

1. **Data makes MaaS happen - MaaS Alliance Vision Paper on Data**

   https://maas-alliance.eu/wp-content/uploads/sites/7/2018/11/Data-MaaS-FINAL-after-plenary-1.pdf

2. **European Data Strategy - Priorities 2019-2024 - European Commission**

   https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-data-strategy_en

3. **Green Class CFF E-Car in Switzerland – SBB, Switzerland**

   https://www.sbb.ch/en/home.html

4. **MaaS in Action - MaaS Alliance**

   https://maas-alliance.eu/maas-in-action/

5. **MaaS Alliance White Paper - Guidelines and Recommendations to create the foundations for a thriving MaaS Ecosystem**

   https://maas-alliance.eu/wp-content/uploads/sites/7/2017/09/MaaS-WhitePaper_final_040917-2.

6. **Mobility-as-a-Service: Real-time routing service reducing travel time of air passengers - Munich, Germany**

   https://www.globalairrail.com/images/events/2017/Airport_Access_Ideas_Forum_2017/Case_Studies/AAIF2017%20-%20Case%20Studies-MaaS.pdf

7. **Mobility-X trial at NTU Smart Campus - Autonomous Vehicles, Singapore**

   https://www.mobility-x.com/press/ntu-partners-smrt-and-2getthere-to-test-autonomous-vehicles-on-the-ntu-smart-campus/

8. **Relicensing of MSPs (all bike and scooter service providers under new terms and conditions) - San Francisco, USA**

   https://www.thedrive.com/tech/20950/regulating-san-franciscos-electric-scooter-problem

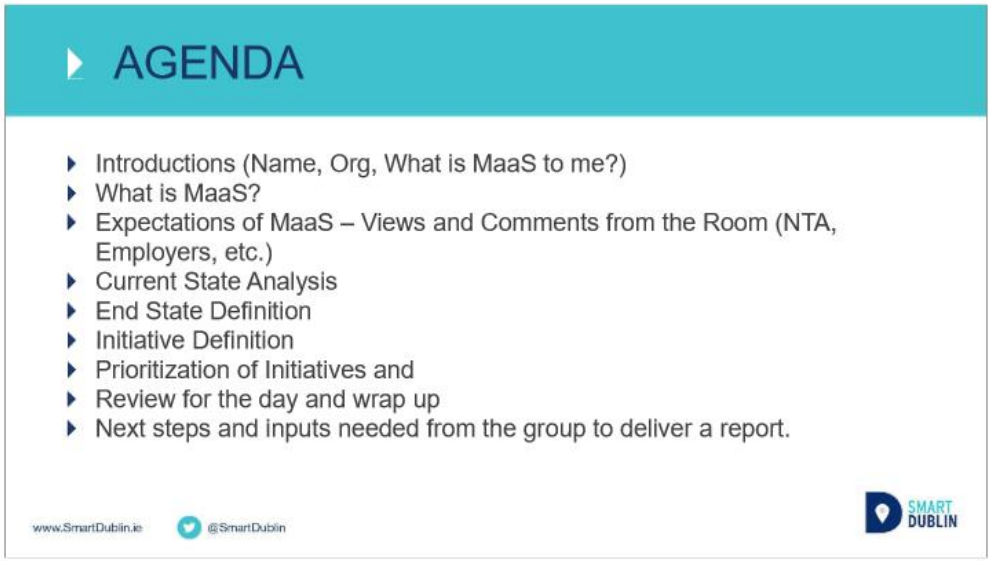
9. **Smart Mobility Hub project - Smart Dublin, Dublin, Ireland**

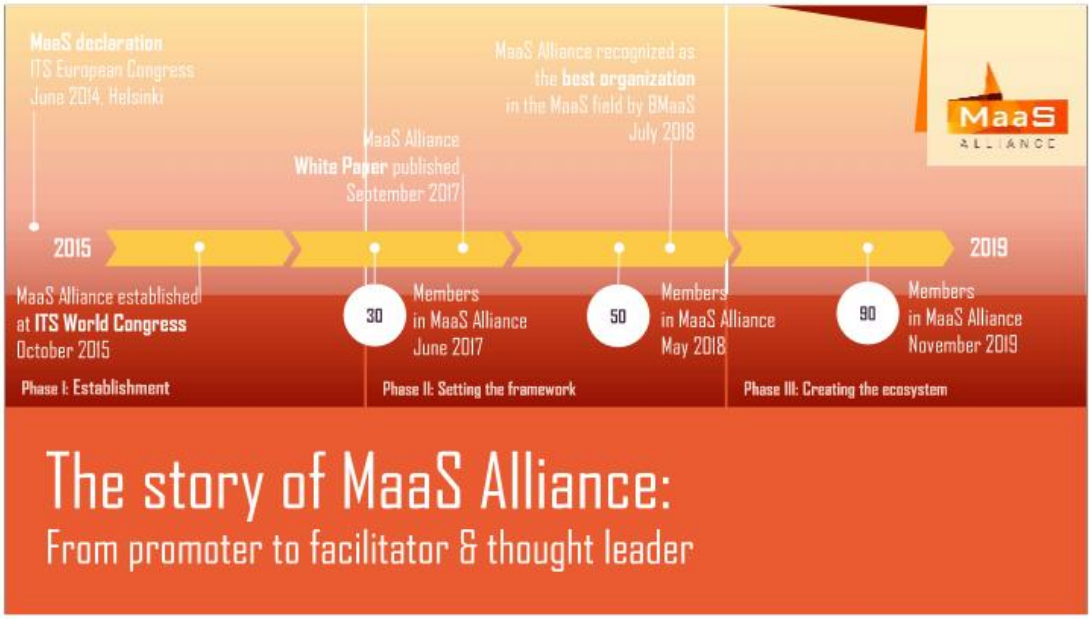
   https://trello.com/support/ie11?returnUrl=https%3A%2F%2Ftrello.com%2Fc%2FGq4L8498

10. **Uber - JUMP biking partnership - San Francisco, USA**

    https://medium.com/uber-under-the-hood/understanding-multimodality-an-analysis-of-early-jump-users-4a35d647b7e6

Appendix D: Main Presentation Material from the Workshop




MaaS declaration
ITS European Congress
June 2014, Helsinki
MaaS Alliance
White Paper published
September 2017
MaaS Alliance recognized as
the best organization
in the MaaS field by BMaaS
July 2018
MaaS
ALLIANCE
2015
2019
MaaS Alliance established
at ITS World Congress
October 2015
30
Members
in MaaS Alliance
June 2017
50
Members
in MaaS Alliance
May 2018
90
Members
in MaaS Alliance
November 2019
Phase I: Establishment
Phase II: Setting the framework
Phase III: Creating the ecosystem
The story of MaaS Alliance:
From promoter to facilitator & thought leader


What is MaaS?
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Mobility-as-a-Service (MaaS) - Definitions

A mobility distribution model that deliver users' transport needs through a single interface of a service provider. It combines different transport modes to offer a tailored mobility package, like a monthly mobile phone contract – Hietenan (2015)

MaaS gives the user the possibility to plan his/her journey, in terms of booking and paying the several transport modes that might be required, all in one service. To access the service, travelers will be asked to register or make an account. - Holmberg, Collado, Sarasini and Williander (2017)

Based on the traveller's needs, they can have the choice of 'pay-as-you-go' or pre/post pay, considering their registration and a monthly subscription. At a second stage, subscription results in personalisation, framing mobility services around traveller's preferences, which is one important advantage that is absent from conventional public transport services and thus not covering passenger's needs which might result in inconvenience (Atasoy, Ikeda, Song, & Ben-Akiva, 2015).

At a first level, this is to make booking and payment easier, as the concept envisions a 'seamless' combination of all transportation modes and a 'Mobility Aggregator' that gathers and sells all services through a single smartphone app, allowing easy fare payment and one-stop billing (CIVITAS, 2016).

MaaS as a new way to provide transport, which facilitates the users to get from A to B by combining available mobility options and presenting them in a completely integrated manner. Atkins (2015)

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Mobility-as-a-Service (MaaS) – Core Components

- **Integration of Transport Modes**
  - public transport, taxi, car-sharing, ride-sharing, bike-sharing, car-rental, on-demand bus services.
  - Envisioning a service beyond the urban boundaries, it will embrace also long-distance buses and trains, flights, and ferries.
- **Tariff options**
  - "mobility package" - offers bundles of various transport modes and includes a certain amount of km/minutes/points that can be utilized in exchange for a monthly payment.
  - "Pay-as-you-go" - charges users according to the effective use of the service.
- **One Platform**
  - MaaS relies on a digital platform (mobile app or web page) through which the end-users can access to all the necessary services for their trips: trip planning, booking, ticketing, payment, and real-time information.
  - Users might also access to other useful services, such as weather forecasting, synchronization with personal activity calendar, travel history report, invoicing, and feedback.

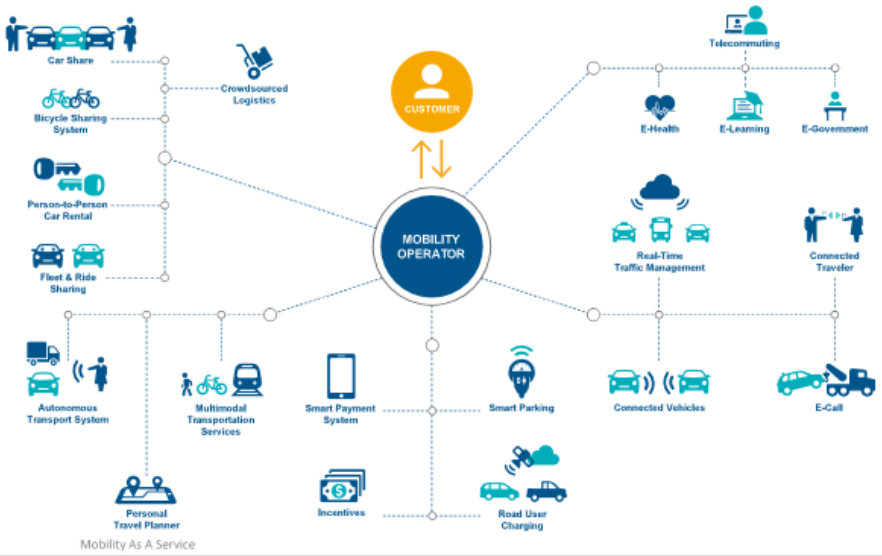
Mobility-as-a-Service (MaaS) – Core Components

- **Multiple Actors**
  - MaaS ecosystem is built on interactions between different groups of actors through a digital platform: demanders of mobility (e.g. private customer or business customer), a supplier of transport services (e.g. public or private) and platform owners (e.g. third party, PT provider, authority).
  - Other actors can also cooperate to enable the functioning of the service and improve its efficiency: local authorities, payment clearing, telecommunication and data management companies.
- **Use of technologies**
  - Different technologies are combined to enable MaaS: devices, such as mobile computers and smartphones; a reliable mobile internet network (WiFi, 3G, 4G, LTE); GPS; e-ticketing and e-payment system; database management system and integrated infrastructure of technologies (i.e. IoT).
- **Demand Orientation**
  - offers a transport solution that is best from customer's perspective to be made via multimodal trip planning feature and inclusion of demand-responsive services, such as taxi.

Mobility-as-a-Service (MaaS) – Core Components

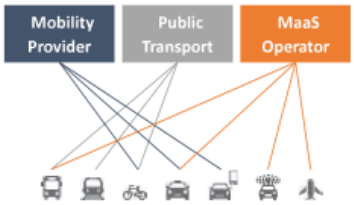
- **Registration requirement**
  - The end-user is required to join the platform to access available services.
  - An account can be valid for a single individual or, in certain cases, an entire household.
  - The subscription not only facilitates the use of the services but also enables the service personalisation.
- **Personalisation and Customisation**
  - Personalisation and Customisation ensures end users' requirements and expectations are met more effectively and efficiently by considering the uniqueness of each customer.
  - This can increase MaaS' attractiveness among travelers and its customers' satisfaction and loyalty.

What is MaaS?



MAAS MAIN BUSINESS MODELS

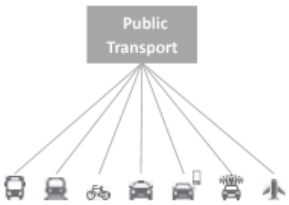
Market-Driven



- Integrates organize themselves
- Competition and alliances
- Free, unregulated market

Can private and public co-exist without a framework?

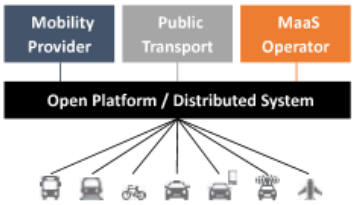
PT-Driven



- Led by PT with selected mobility services
- Rules set by PT
- Other mobility service providers have to integrate with PT

Will all private mobility service providers agree to work with PT?

Open Ecosystem



- Platform serves as "open market for mobility"
- Every mobility-service provider has to open up
- Competition on the front-end side

Can an open framework create value for everyone?

MAAS MATURITY MODEL

4	**Integration of Societal Goals** *Policies, Incentives, etc…*
3	**Integration of the Service Offer** *Bundling/Subscription, Contracts, etc…*
2	**Integration of Booking and Payment** *Single Trip – Find, Book and Pay*
1	**Integration of Information** *Multimodal Travel Planner, Price Info*
0	**No Integration** *Single, Separate Services*

Maas.Global - Helsinki

- The whole MaaS discussion was started around the work done by MaaS.Global in Helsinki
- Required a change in the national law of Finland to promote open standards for data and access to ticketing systems
- Ideal location to test the concept based on the well regulated, cost-efficient and controlled public transport and taxi services
- The geographic location and layout of the city also make delivering combined services in a city the size of Helsinki (pop. 628,000) a relatively easy solution

MAAS.GLOBAL – The WHIM APP

- The Whim app allows subscribers access to a variety of transportation options, from taxis to rental cars, to public transport and bike share
- Offers multiple packages:
  - Whim to Go (€0) - Pay-as-you-Go account
  - Whim Urban (€49) - unlimited public transport, taxi rides under 5km charged at €10, car hire for €49 a day and bike share services
  - Whim Unlimited (€499) - unlimited public transport, unlimited taxi ride: under 5km, unlimited car rental and bike share services
- Average car costs in Helsinki is €500 – will people opt for a MaaS package?

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Maas.Global Expansion

- Global's second launch site is the West Midlands in the UK
- An area with a population in excess of 5.6 million being served by multiple deregulated bus companies, several train operating companies, and a diverse population geographically spread out
- Deployment fully funded by MaaS.Global
- The deployment has hit several issues:
  - Multiple negotiations with multiple service providers
  - Acceptance and utilization of the application during trial phase
- The current deployed app is only in a Pay-as-you-go format and even then it does not have the multiple fare structures implemented in the payment section
- Monthly packages have been postponed based on uptake

Lessons learned

- Trials in Europe have shown MaaS to deliver benefits to the travelling public
- Feedback was positive that integrating mobility is a benefit to the user
- There are very few cities/regions that can go 'full MaaS' overnight and deliver a workable solution that people would use
- Incremental additions to the public transport network with private transportation providers seems a sensible and manageable approach
- MaaS Operators have indicated that they are only looking to target around 20% to 30% of a regions population – so what of the remaining population?
- The private transport providers have acknowledged that the key to a successful MaaS deployment is to support the public transportation network and not replace it
- The public transportation network needs to be the backbone of MaaS

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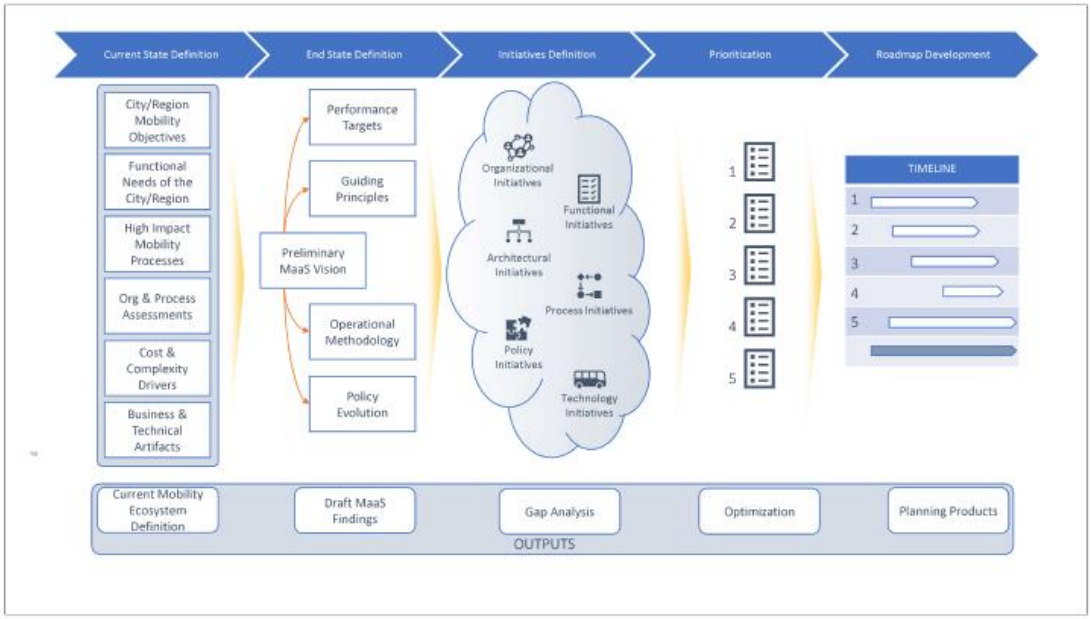
Lessons learned (cont.)

- Ownership of the customer is key – but who own's the customers
- Users of public transport expect the agency to deliver the solution
- First mile/Last mile delivery of users to and from the public transport system will be key. Take away their excuses to drive.
- Holistic solutions need to be offered. Experience has shown that a piecemeal solution will cause many issues.
- Decide what's in and what's out of the MaaS Ecosystem – School transit, non-emergency medical transport, etc.
- Pilots can work – but failure of a pilot is still a lesson learned

18


Current State Definition
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High Impact Mobility Processes
Org & Process Assessments
Cost & Complexity Drivers
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Preliminary MaaS Vision
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Policy Evolution
Organizational Initiatives
Functional Initiatives
Architectural Initiatives
Process Initiatives
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Technology Initiatives
1
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3
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TIMELINE
Current Mobility Ecosystem Definition
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OUTPUTS


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Current State Definition
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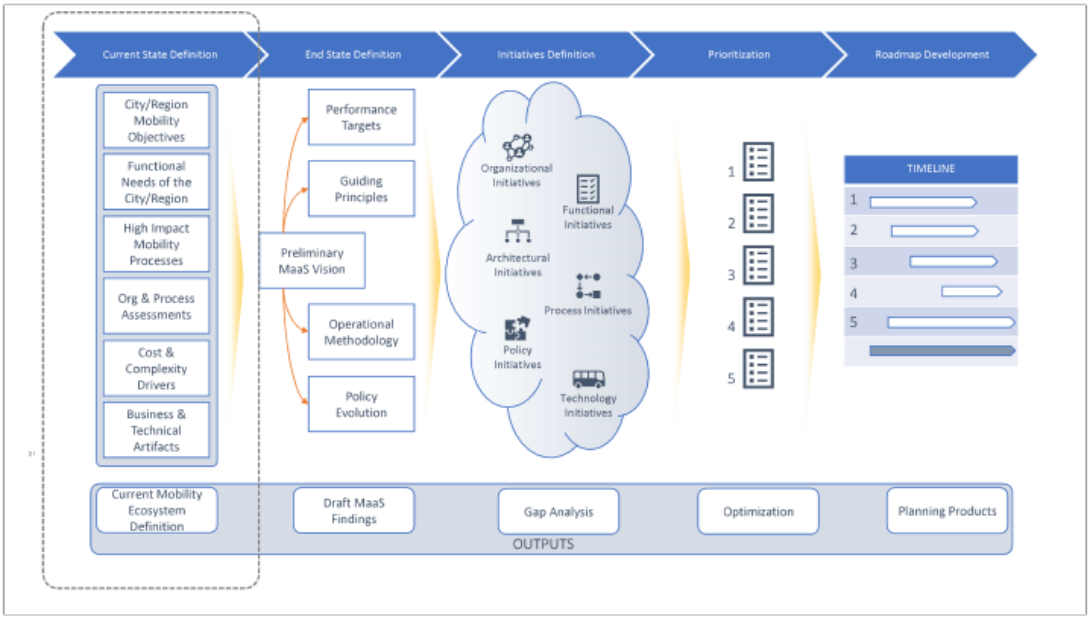
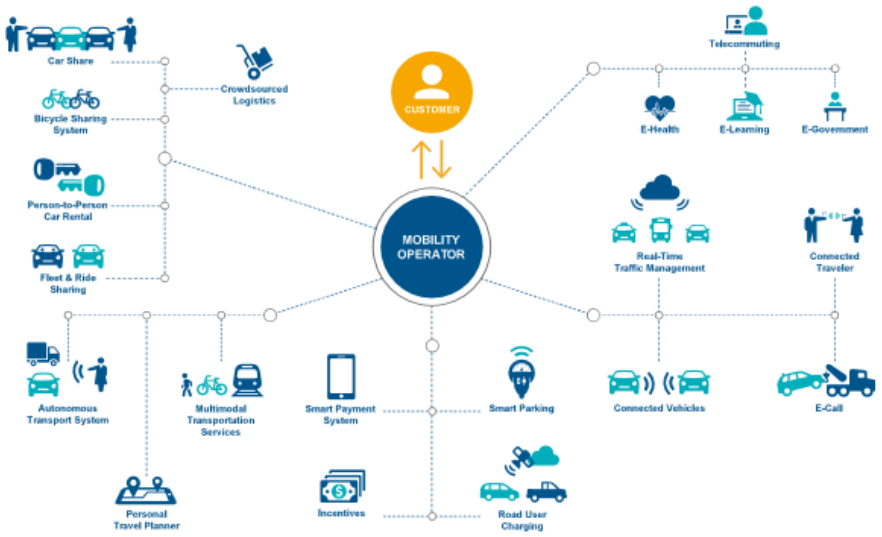


What to do.....

- Break into teams
- Flipchart each – don't worry about writing too much – just try and write legibly
- 60 minutes to answer the questions on the next slide
- Facilitators will wander between teams to assist and answer questions

- "*Garbage In, Garbage Out*" – your inputs make the deliverables useful for taking MaaS forward for the City/Region

What is MaaS?



Current State Analysis

1. What are the current City/region Mobility Objectives
2. What does the city need to operate an effective transport network
3. What works well and what doesn't in the city from a transport perspective
4. Who runs what and who's responsible for what?
5. What's the biggest cost of running the transport network
6. How do we run it today? What systems do we have?

Q1. What are the current City/Region Mobility Objectives?

- Why do we have transport networks?
- What policies exist now or will be implemented to help travel?
- How does government help the transport network?
- What level of coordination exists between transport management centers? (road v public transport)

Q2. What does the city need to operate an effective transport network?

- What are the key limitations of the city/regions transport network to date?
- What can be done to improve the metrics that a city/region measures itself against?
- How is the current transport network managed

Q3. What works well and what doesn't in the City/Region from a transport perspective?

- Congestion?
- Data?
- Coordination?
- Policy?
- Environmental?

Q4. Who runs what and who's responsible for what?

- Who is responsible for network management?
- Who coordinates public/private integration?
- Who manages the curbside?
- Who oversees the current policies?

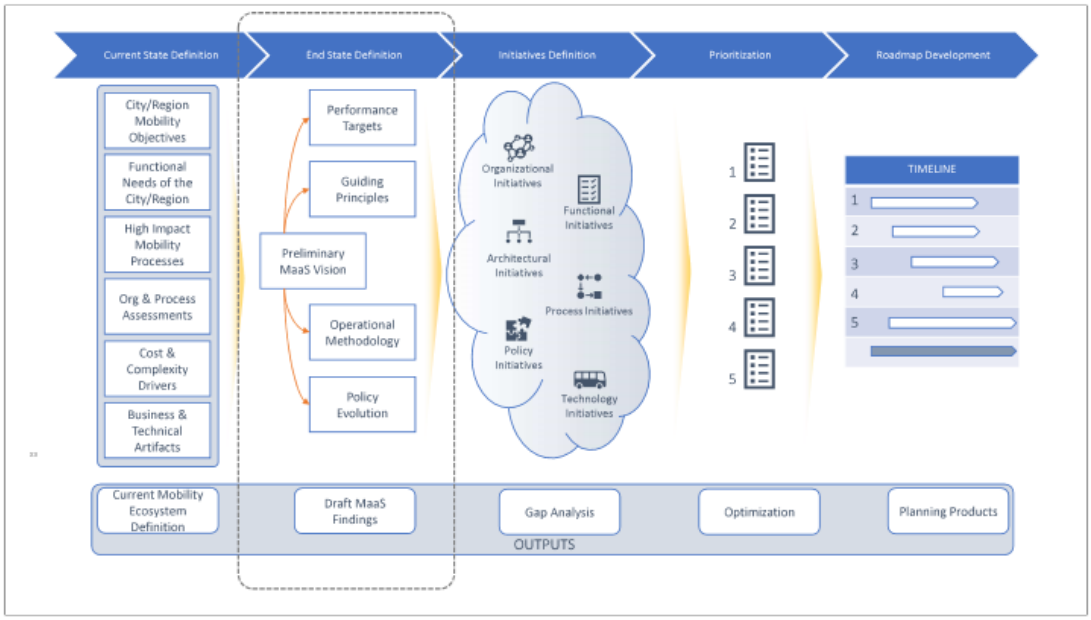
Q5. What's the biggest cost of running the transport network?

- Who pays for what?
- Who subsidises what?
- What is the level of investment?
- What would you need to make operations more efficient?

Q6. How do we run it today? What systems do we have?

- How do we run the transport system today (what platforms)?
- What's the level of interoperability (if any)?
- How do we share data?
- How do we enforce policy?

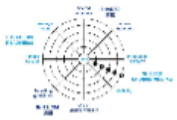
- Transport exists to move people around to create social and economic mobility
- Policy decisions are silo'ed and need to balance competing agendas
- Issues with bus network underserving certain areas and working arterially
- Metrics – need good data, more sharing by all modes and bring it all together
- Consistent KPI's
- Lack of information on multi-modal and public/private
- Works Well (Good data, bus/cycle lanes, RTPI, Leap Card, Bus Connects)
- Doesn't Work Well (Congestion, Data sharing, Silo'ed coordination, environmental, enforcement)
- Funding comes from State (40-50%) and remainder from fares (Tax payer subsidising transport; rider pays for use)
- CAPEX v OPEX
- Centralisation and accountability would make network more efficient
- Procurement Methodologies can be a barrier
- Plenty of apps today
- Limited to no interoperability with public and private – limited to no data sharing



Future State Analysis

- MaaS Readiness Assessment as the catalyst
- What are performance, policy, and operational metrics for the future state
- What are the overarching guiding principles for MaaS operation (ownership, control, oversight, etc.)

CIVITAS MaaS Readiness Assessment



- MaaS development aims to bring sustainable mobility to the customers.
- The user of the services is at the center and all the different components start from the needs of the users or creating new opportunities for the users.
- MaaS indicators consist of eight different components:
  - 1. Strategic readiness
    - a. Strategic focus - to promote, support and incentivise MaaS
    - b. Parking policies - to implement and manage parking policies
  - 2. Internal use
    - a. Internal travelling - Travelling guidelines for the staff and politicians
    - b. Use of shared mobility - Use of shared mobility within the local administration
  - 3. Shared use
    - a. Shared economy - availability and market penetration of shared and combined travel options
    - b. Public transport – accessibility and interoperability of transportation solutions
  - 4. Shared understanding
    - a. Integration platform – level of interoperability
    - b. Visibility - how obvious and easy to get are the shared mobility offers to the citizens

MAAS MATURITY MODEL

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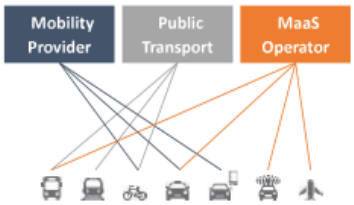
Future State Analysis – What Do We Want?

- What would we like to achieve for the MaaS Vision for the City/Region?
- Meeting policy (Social Equity)
- Provision of additional services
- Mobility subscriptions
- What Model and who owns
- Who regulates

- When do we want it? (near/mid/far)

MAAS MAIN BUSINESS MODELS

Market-Driven



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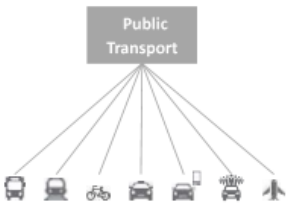
PT-Driven



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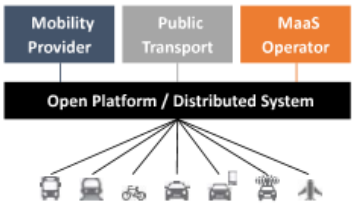
Open Ecosystem



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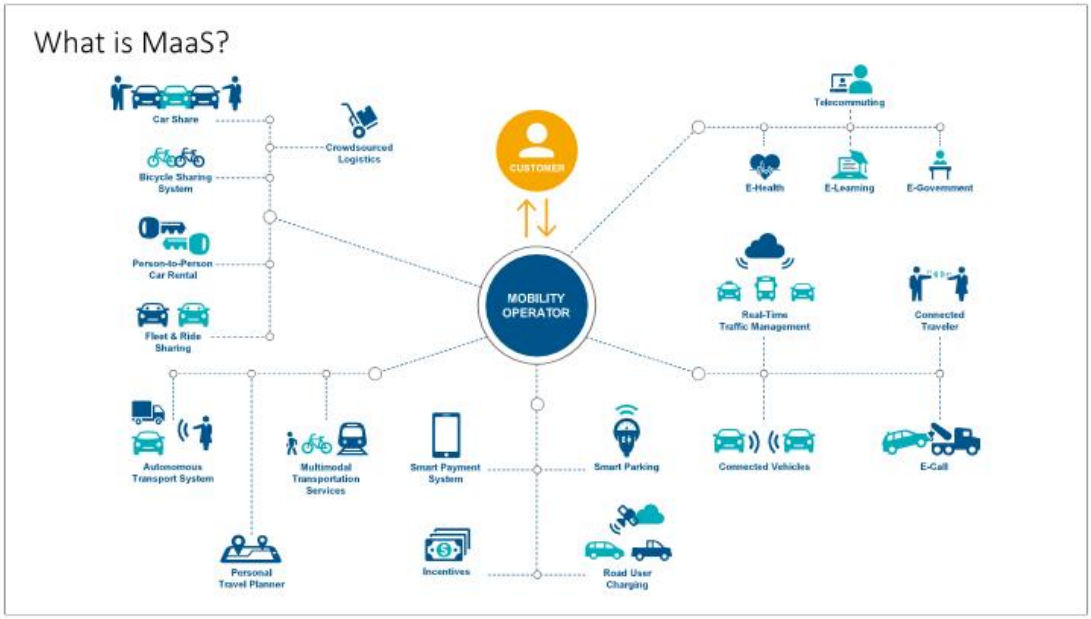
What is MaaS?
Car Share
Crowdsourced Logistics
Bicycle Sharing System
Person-to-Person Car Rental
Fleet & Ride Sharing
CUSTOMER
MOBILITY OPERATOR
Telecommuting
E-Health
E-Learning
E-Government
Real-Time Traffic Management
Connected Traveler
Autonomous Transport System
Multimodal Transportation Services
Smart Payment System
Smart Parking
Connected Vehicles
E-Call
Personal Travel Planner
Incentives
Road User Charging


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Initiative Definition
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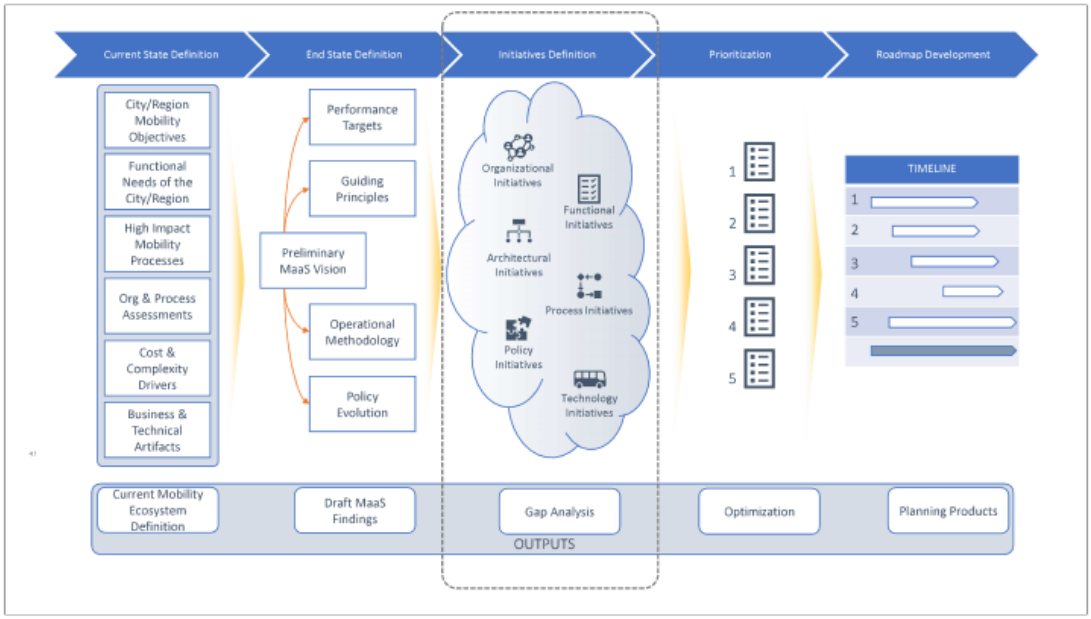
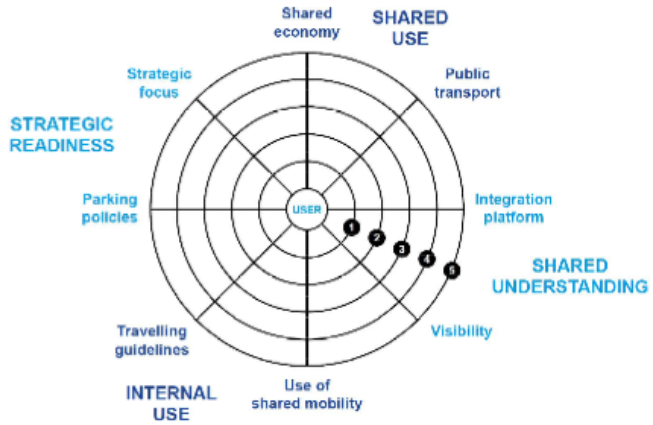


MaaS Readiness Assessment



Initiative Definition

- What are the key programs and initiatives we need to get us from the today scenario to the future vision on MaaS?
- What Time Periods (Near/Mid/Long)
- What programs and initiatives do we need to address:
  - Architectural Initiatives
  - Organizational changes
  - Functional Improvements
  - Process changes (including customer education)
  - Policy changes/alignment/creation
  - What technology needs to be changed/created/integrated

- CURRENT STATE HEADLINES
- Transport exists to move people around to create social and economic mobility
- Policy decisions are silo'ed and need to balance competing agendas
- Issues with bus network underserving certain areas and working arterially
- Metrics – need good data, more sharing by all modes and bring it all together
- Consistent KPI's
- Lack of information on multi-modal and public/private
- Works Well (Good data, bus/cycle lanes, RTPI, Leap Card, Bus Connects)
- Doesn't Work Well (Congestion, Data sharing, Silo'ed coordination, environmental, enforcement)
- Funding comes from State (40-50%) and remainder from fares (Tax payer subsidising transport; rider pays for use)
- CAPEX v OPEX
- Centralisation and accountability would make network more efficient
- Procurement Methodologies can be a barrier
- Plenty of apps today
- Limited to no interoperability with public and private – limited to no data sharing

- FUTURE STATE HEADLINES
  - One
  - Two
  - Three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Prioritisation
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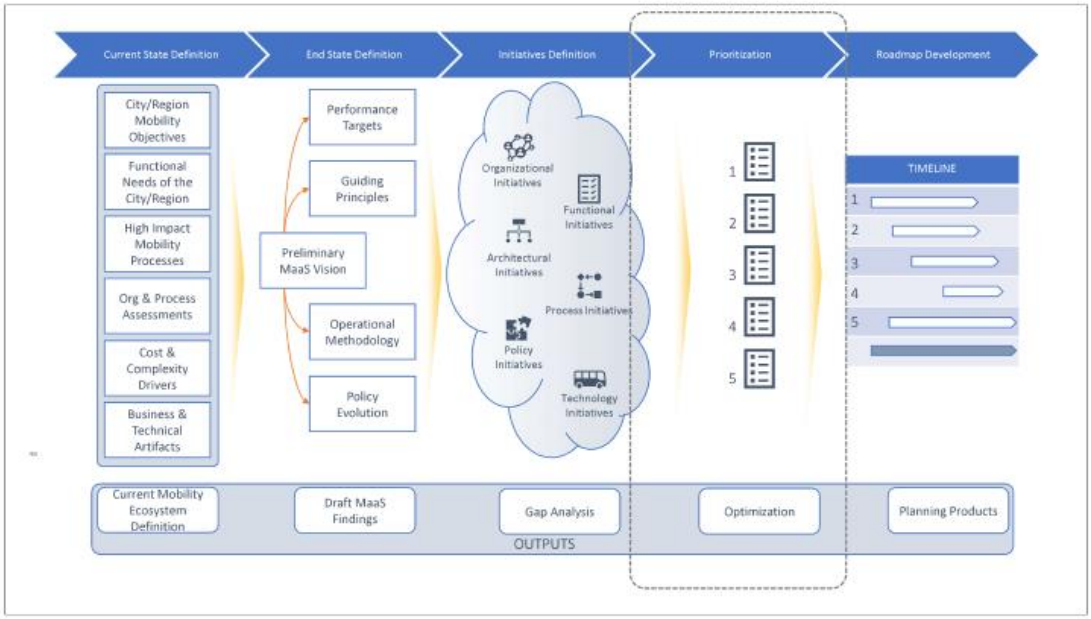
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Technology Initiatives
1
2
3
4
5
TIMELINE
Current Mobility Ecosystem Definition
Draft MaaS Findings
Gap Analysis
Optimization
Planning Products
OUTPUTS

Prioritization

- Group the Identified Initiatives into Thematic Groups
- Process
  - Walk the boards so you know what the thematic initiatives are
  - You have 3 stickers
  - You can put 1 sticker against each thematic area, or you can double or treble up if you think it the Identified Initiatives are more important
- Summation of the rankings to identify a priority
- Discussion on linkages between Identified Initiatives

- What have we learned?

What are the next logical steps to implementing a MaaS solution

- Ascertain the needs of the traveling public – will they use it
- Analysis of Origin/Destination data to see travel patterns
- Assess accessibility options for the Public Transport network (disabilities, transit deserts, etc.)
- Assess price points and financial barriers to entry
- Technological review – can the current system adapt to deliver MaaS?
- System Integration analysis - Can I integrate public and private technology providers
- Ensure regulation and legislation is in place to allow 3rd party resale of tokens/tickets
- Outreach to private TNC's to discuss the commercial and technological integration issues
- Contract/select MaaS Operators for the region
- Define KPI's for measurement of success of MaaS, monitor and review
- Determine the level of ownership of the MaaS system by the city/region

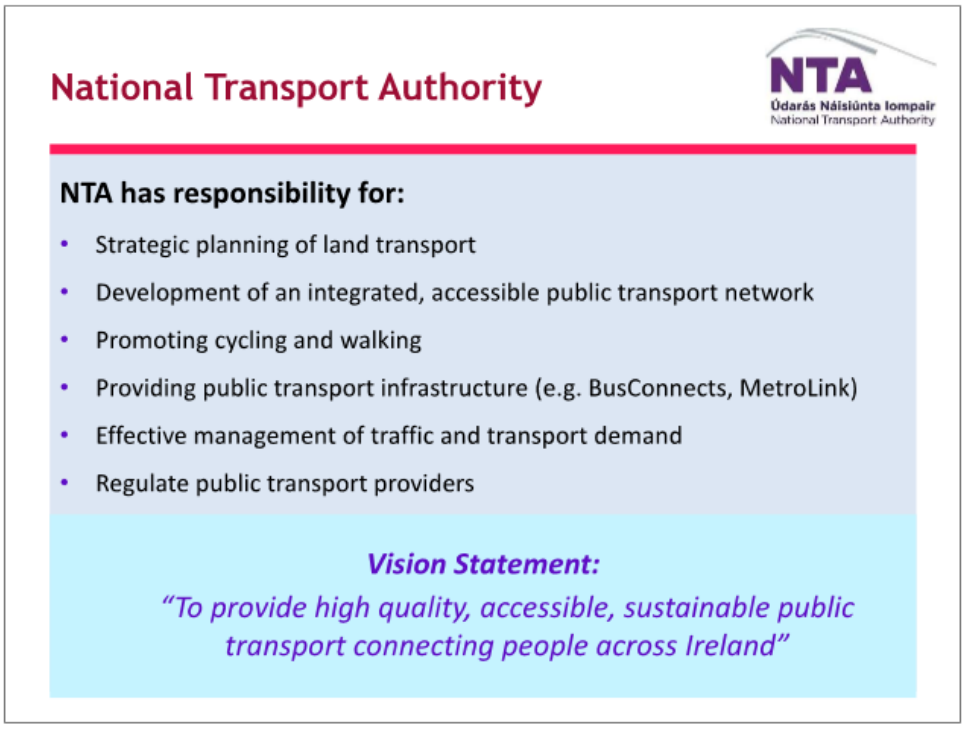
Next Steps

- The output from the flip charts will be captured and consolidated
- Report issued in the coming weeks that captures the discussion for the workshop and options for next steps and actions

- Create an internal team focused on MaaS:
  - Representation from all public agencies impacted by MaaS
  - Representatives from TNCs impacted by MaaS
  - Define the role and responsibility that local government wants to take
  - Present and engage with the MaaS Technology Providers


Thank you

Appendix E: NTA Presentation



Current Status

NTA Údarás Náisiúnta Iompair National Transport Authority

- DTTAS is currently conducting a '*Public Consultation on a Review of Sustainable Mobility Policy*'
- Discussions ongoing between NTA and DTTAS
- No formal policy position agreed at the present time
- NTA is considering whether an extension of the powers/legislation is required to supplement NTA's current remit (though this is not currently viewed as a blocker)
- NTA has an approach in mind but this is subject to approval
- MaaS can have some significant potential benefits for NTA - but NTA sees some challenges too
- For example, our remit is *public transport*, not private mobility

Current Thinking

NTA Údarás Náisiúnta Iompair National Transport Authority

- Unlikely to leave MaaS to the market
- NTA view is that "*No MaaS without Mass*" - public transport will be the core of a sustainable MaaS offering
- NTA is best placed to lead a MaaS implementation - NTA sets the prices for the services it funds. NTA is the regulator for all public bus passenger services. NTA is the licensing authority for all commercial bus operators and also regulates the taxi industry
- Any approach or solution must be applicable nationwide - not just in Dublin
- The approach will needs to complement and supplement, not supplant, sustainable transport
- The solution will be open to private organisations on a non-exclusive equal access, equal treatment basis (no 'walled gardens')

Benefits of MaaS - NTA View

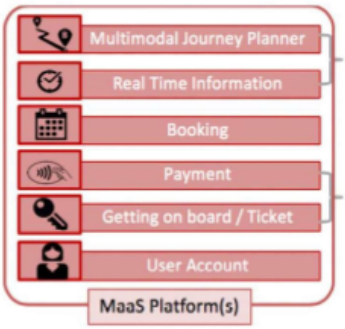
- Could provide good competition to the private car by becoming a viable alternative to the car's ability to be door-to-door, and therefore could be an effective tool to help shift away from private car use and potentially from car ownership
- It could align with 'on-demand' requirements, providing a simple, one-stop-shop for journey planning information in real-time, and payment
- It could reduce the effort required to access sustainable forms of mobility, particularly when journeys are multimodal and complex
- Its potential to shift away from car use and ownership could provide Ireland with an effective tool to reduce carbon emissions and improve air quality
- It has the potential to move away from fixed supply of services to be more reactive to demand, through a better understanding of users' travel needs, which could cost less to operate and provide a more targeted service.

Challenges with MaaS - NTA View

- Revenue sharing between public and private transport operators might be difficult, particularly for a subscription type services
- Agreeing the prices for some services (e.g. subscription basis), might be tricky where public and private operators combine
- Integration of multi-modal journey planning, real-time service information and purchasing/payments is complex (but not insurmountable!)
- A MaaS system would involve a lot of user data. Ensuring this is safe, secure, GDPR compliant and anonymised whilst being able to use this data to improve services, is vital for its success
- Governance and contractual agreements may not be straightforward
- To achieve user take-up there needs to be sufficient reasons why users would shift from existing and traditional methods to a MaaS service
- The costs of the integrated MaaS App needs to be less than the benefits (these may be social as well as financial), and this may only be possible after significant time and/or effort to drive up users.

Foundation Setting

NTA Údarás Náisiúnta Iompair National Transport Authority



Functions of a MaaS Platform (Source - UCL - MaaSLab)

- NTA is currently procuring a new *National Journey Planner*, and a '*Next Generation Ticketing*' system.
- NTA is also planning to procure a new *Automatic Vehicle Location System (AVL)* in the near future.
- These three elements are the fundamental basis of a future MaaS system: Journey Planning in real time (with new AVL system) and account based ticket purchasing / payments (with new ticketing)

Approach being considered

NTA Údarás Náisiúnta Iompair National Transport Authority

Possible Approach:

- Procurements for RTPI, AVL and next generation ticketing will be future proofed as far as possible – open and standardised APIs will be mandated
- NTA to engage with appropriate organisations to plan an Ireland MaaS solution – forum to be established?
- Likely first step is for scoping and requirements capture
- Next step would be the development and approval of a business case
- Subject to funding, NTA could lead the development of an Ireland-wide MaaS App, either through convergence of existing products and service providers, or by procuring a separate integrated MaaS App.
- Pilot to be considered at an early stage – could inform requirements and solution design, and may not have to wait for business case approval

Vision for a 'Total Mobility Solution'?

NTA Údarás Náisiúnta Iompair National Transport Authority

Across the Country using a Single Integrated Platform

NTA will open up opportunities for a consumer to get a tram or bus to the city centre, take a BleeperBike to the train station, take a train to a regional city and then complete their final leg using a Go Car, including paying for parking at the final destination all using a single MaaS App, with real-time updates as they travel and automated route recalculation if necessary, providing best value to the customer across both public and private transport providers.



EU Policy and Regulation Question

NTA Údarás Náisiúnta Iompair National Transport Authority

Do current arrangements support MaaS?

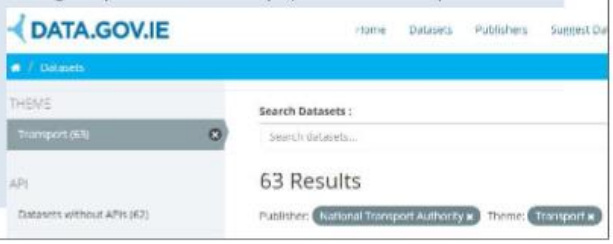
- Not aware of any national or EU frameworks specifically defining direction for MaaS -
  - Finland a front-runner
  - Dutch Dept. of Transport has started work in this area,
  - France working on legislation also (AFIMB)
- Some relevant EU legislation - multi-modal travel information services etc. (the "ITS Directive") but additional guidance may be necessary
- The introduction of defined national/EU policies and regulations should help – good governance around revenue allocation is critical (trust)
- Collaboration between government authorities and private agencies and technology partners would benefit from clear policies and regulations

Open Data

NTA Údarás Náisiúnta Iompair National Transport Authority

National Access Point: www.data.gov.ie

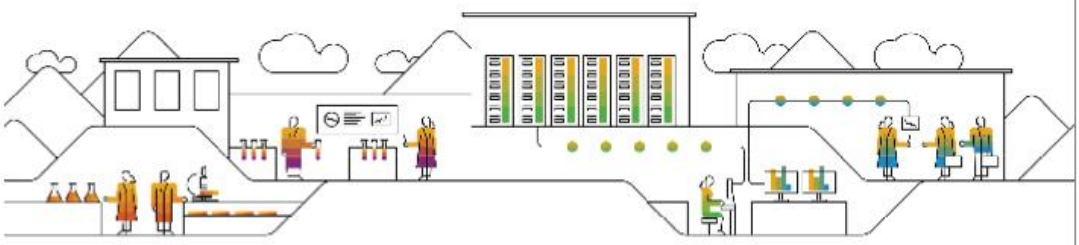
- NTA publishes GTFS-R data to both Apple & Google
- We are setting up an API Gateway for external consumption
- We aspire to also publish public transport schedules in the NeTEx format
- We have other data such as the PAT files. (Where every bus was every 5 seconds of the day + How long it spent at Bus Stops). We release portions of that on request.
- We also provide data modelling services (transport models, demand forecasting etc.)



Thank you for your time

NTA Údarás Náisiúnta Iompair National Transport Authority

Appendix F: SAP Presentation



SAP

James Crawford SAP - March 2020

THE BEST RUN SAP

SAP Labs Ireland

2,293 Workforce

2 Locations: Dublin & Galway

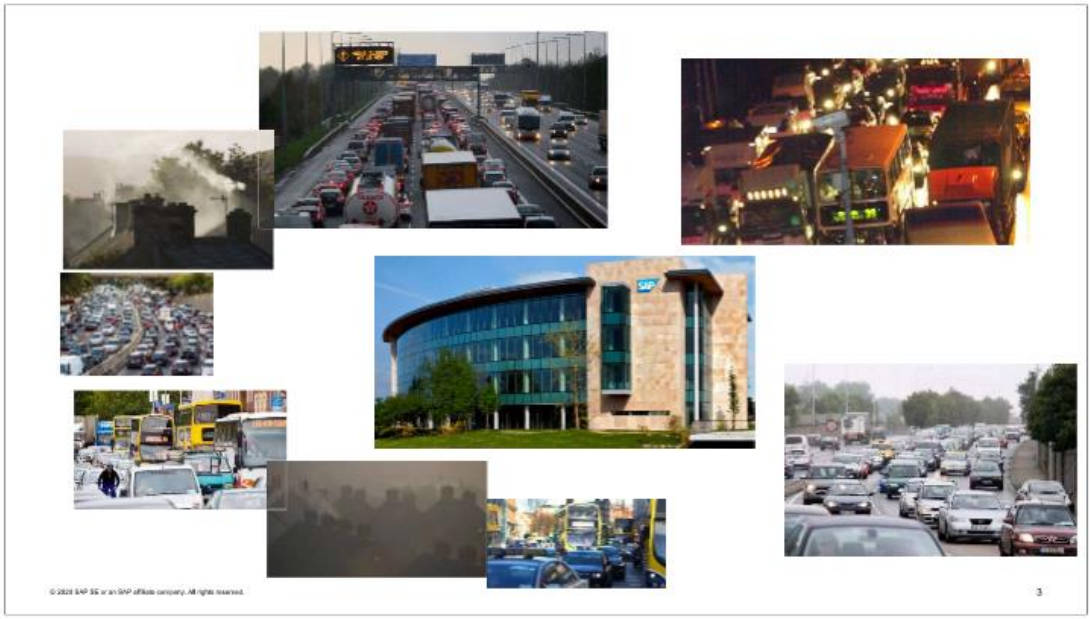
1,515 Dublin, 778 Galway

35% Females

63 Nationalities

36 Average Age

2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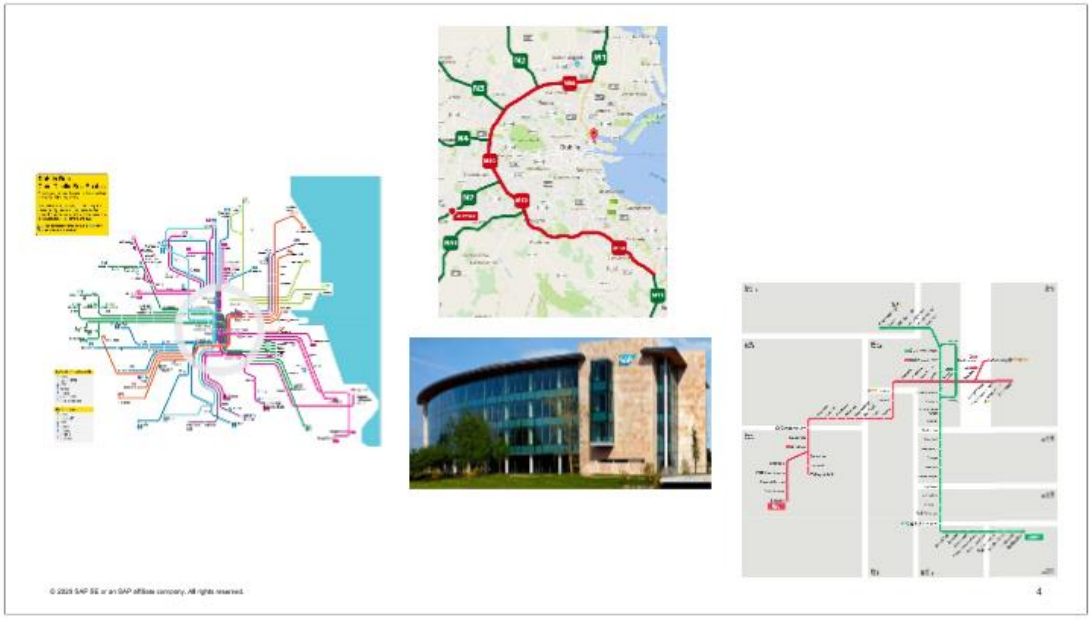
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START	ROUTE OPTION	🚲 HH:MM	🚲 KM	🚆 HH:MM	🚆 MODES	🚗 HH:MM	🚗 KM
PARK WEST C9KM	1	00:32	9.1	01:11	BWBW	00:12	8.8
	2	00:33	9.0	01:18	WBBBW	00:14	8.8
	3			01:09	WBWLW	00:15	9.1
	4			0:49	WBWBW		
NEWCASTLE C7KM	1	00:21	6.7	00:50	WBW	00:08	6.7
	2	00:21	6.4				
	3	00:25	7.5				
TERENURE C11KM	1	00:39	11.5	01:07	WBBW	00:18	11.6
	2	00:42	12.6	01:03	WBBW	00:18	14.1
	3	00:40	11.8	01:06	WBBW	00:24	11.2
	4			00:49	WBW		
CLONTARF C20KM	1	01:09	19.5	01:25	WBLW	00:30	33.4
	2	01:06	18.9	01:28	WBBBW	00:36	27.5
	3	01:10	19.1	01:30	WDWB	00:38	23.7
	4			01:34	WBBWLW		
NEWBRIDGE KILDARE C20KM	1	01:05	21.3	01:24	WBWBW	00:20	21.2
	2	01:13	21.5	01:55	WBWBBW	00:31	28.0
	3	01:31	28.6	01:53	WBLW		
	4			01:20	WBLW		

5

POP Survey

Typically WFH 2 days week

c500 parking spaces over c90% utilisation

Direct Bus cheap relatively fast

Direct Bus inflexible out/in 1 per day.

Launched Car Sharing APP TwoGO

TwoGO App didn't get sufficient traction

6

swoosh

1B
LIVES

7

Beyond just MaaS

Before

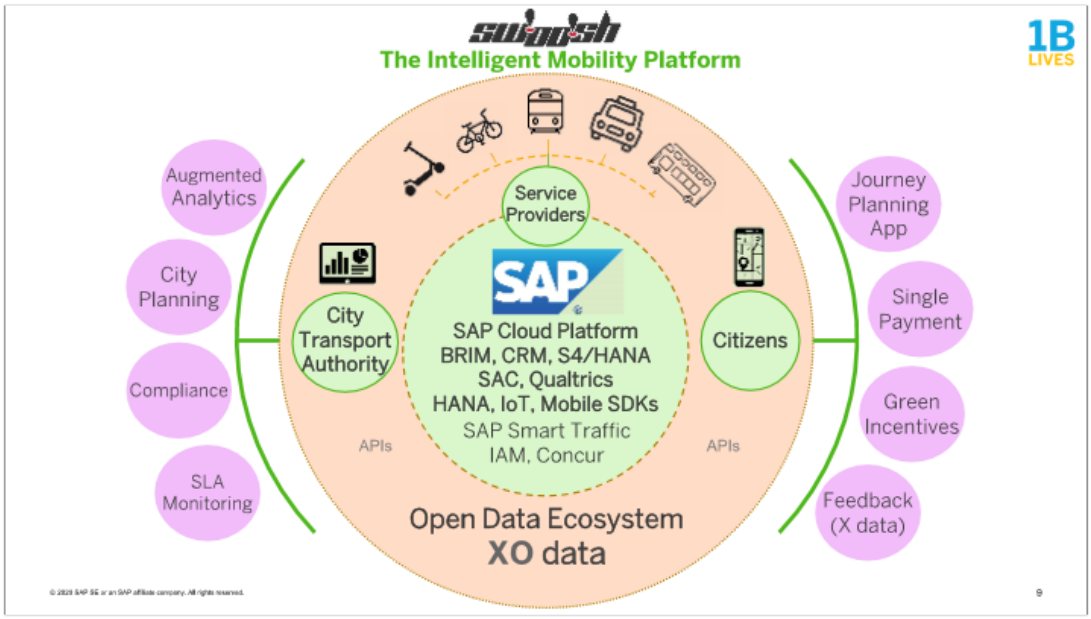
After: with swoosh

For Citizens
1 app, 1 payment, 1 Voice

For the City
Intelligent Mobility Platform

- Government Policy
- Governance + Compliance
- Planning
- Analytics

8


The Intelligent Mobility Platform
1B LIVES
Augmented Analytics
City Planning
Compliance
SLA Monitoring
Service Providers
City Transport Authority
SAP Cloud Platform
BRIM, CRM, S4/HANA
SAC, Qualtrics
HANA, IoT, Mobile SDKs
SAP Smart Traffic
IAM, Concur
APIs
APIs
Citizens
Open Data Ecosystem
XO data
Journey Planning App
Single Payment
Green Incentives
Feedback (X data)