Transport Research Laboratory
Creating the future of transport

COWI

TRL

ttr
Transport & Travel Research Ltd.

ARUP

CLIENT PROJECT REPORT CPR2149

Study on ITS Directive, Priority Action A: The Provision of EU-wide Multimodal Travel Information Services

D2.2 Report on Stakeholder Consultation

Author: M. Fell (TTR)

Disclaimer

This report has been produced by the TRL Limited under a contract between COWI and the European Commission. The information and views set out in this report are those of the authors and do not necessarily reflect the official opinion of the Commission. The Commission does not guarantee the accuracy of the data included in this study. Neither the Commission nor any person acting on the Commission's behalf may be held responsible for the use which may be made of the information contained therein. Whilst every effort has been made to ensure that the matter presented in this report is relevant, accurate and up-to-date, TRL Limited cannot accept any liability for any error or omission, or reliance on part or all of the content in another context.

Contents amendment record

This report has been amended and issued as follows:

Version	Date	Description	Editor	Technical Referee	Quality Review
V1.0	13/01/2016	Final draft for client approval	MF	NK	CB
V1.1	08/02/2016	Revision to reflect client feedback	MF	NK	CB

Table of Contents

1 Executive Summary

In Priority Action A of the ITS Directive the European Commission specified the requirements for making "EU-wide multimodal travel information services accurate and available across borders to ITS users". These are in terms of availability of information and data, facilitating electronic data exchange between stakeholders across borders, and timely updating of information as well as the need for equitable rights to access, use and publish data.

This report is the third deliverable in a study to develop a set of evidence based policy recommendations to support the implementation of Priority Action A. It provides a distillation and analysis of the views provided by stakeholders on the current barriers and potential enablers for addressing the identified requirements – in particular improvements with the data needed to underpin such systems.

Stakeholder engagement was carried out through two channels. A workshop with one hundred expert participants held in Brussels on 4th November 2015 which involved dialogue between participants exploring views on three thematic areas (i) Travel data interoperability and quality; (ii) Points of access and linking of travel information services; and (iii) Terms & Conditions of re-use.

A 14-week online public consultation was also conducted which received 165 responses, primarily from organisations with roles in the travel information chain or who can be considered experts in the field.

The majority of respondents (two-thirds) do not feel that existing services provide sufficient geographic or multimodal coverage for their travel information needs. Travel information for cross-border and within other EU countries is particularly difficult due to availability and access to appropriate services – this may be a result of awareness of local services or lack of multi-lingual services.

Travellers predominantly seek information through online channels. This is from a mix of operator and independent sources. The former is currently more popular but not substantially so – it could be envisaged that this will change in the favour of independent sources in the coming years as the pace of innovation and technology further develops.

There is a high level of willingness to change modes amongst respondents if a greater level of multimodality was included within travel information services for comparison. These also include low-carbon modes such as cycling, rail and public transport.

Broadly, the views of various stakeholders and Member States on current barriers and potential enablers were aligned, with variation based on the approach to intervention rather than objections to it. However, the sector with consistent views against possible forms of intervention was the rail industry, with a desired preference for retaining the current status quo.

Policy options will be examined in detail with both a cost-benefit and risk analysis in the next study task. These will be considered against the principles of the ITS Directive. Options will be compared with a preferred approach selected on an evidence-led basis. The European Commission will develop the preferred approach into supporting specifications for Priority Action A.

2 Introduction

2.1 Scope and project objectives

Seamless travel across Europe is one of the European Commission's goals set out in the 2011 Transport White Paper to "by 2020, establish the framework for a European multimodal transport information, management and payment system" (EC 2011). Multimodal travel information for people wishing to travel across European borders is one of the pre-requisites of seamless travel, ideally using a single point of access to information about services using any mode and operating in any European country.

Priority Action A of the ITS Directive the European Commission has specified the requirements for making "EU-wide multimodal travel information services accurate and available across borders to ITS users" in terms of availability of information and data, facilitating electronic data exchange between stakeholders across borders, and timely updating of information as well as the need for equitable rights to access, use and present data.

The European Commission has initiated a number of activities which are aimed at encouraging EU-wide multimodal travel information services. It has already generated discussions with stakeholders and funded work on the impacts of, and future requirements for, further standardisation. Work on the provision of EU-wide real time traffic information services is also progressing – a study with similar objectives to this one has already been completed for real time traffic information services.

This report is part of a study which aims to build on what has already been achieved, in order to support the European Commission in developing specifications for the measures that are needed to overcome the remaining obstacles to realising EU-wide multimodal travel information services, and are consistent with those developed for real time traffic information services. The European Commission's role is an enabler, not a provider of services. The consultations which have already been carried out have identified that activities such as establishing a legal framework and promoting standardisation are seen by stakeholders as key roles for the European Commission.

The focus of the study is on assessing policy options from the point of view of the various stakeholders and then identifying ways of stimulating the market and enabling appropriate business models to emerge that will support the most beneficial policy option(s).

Effective travel information systems have an obvious and very significant role for both travellers and operators. Such systems make it easy for travellers to find and use the best means of transport available (even, or perhaps especially during disruptions). In addition, they help operators to run their systems and reduce the costs involved when interacting with travellers (again especially during disruptions). The rapid evolution of delivery systems and personal devices has greatly increased the availability and usefulness of such services to travellers. In a congested, carbon-conscious Europe, multimodal travel information services will be important for encouraging the use of sustainable transport and for making an efficient use of the road system in future - as reflected in Goal 9 of the EC 2011 White Paper on Transport, to "by 2020, establish the framework for a European multimodal transport information, management and payment system."

2.2   Previous activity within the study

The first task of the project was to establish the current baseline situation as part of the wider study objectives contributing to an evidence-based specification to meet these policy objectives. That report (D1) provides an overview of the current state of play of multimodal travel information services in Europe, a summary of identified barriers and gaps in the provision of EU-wide multimodal travel information services and analysis of the identified solutions and measures to address these problems and policy options available to the European Commission.

The availability and accessibility of travel and traffic data, the interoperability of systems and services, the level of quality and common provisions for the re-use of data are key barriers. The D1 report identifies that problems of data availability and accessibility (in terms of stakeholders granting full access to their data) are not within the scope of the specifications as defined by the ITS Directive.

The D1 report identifies the full data needs for comprehensive multimodal travel information services based on use cases and a set of possible system functions. These functions are classified into three levels (i) minimum expected (reflecting functionality which the majority of systems already provide); (ii) additional (those functions which are increasingly common in systems in response to user needs); and (iii) nice-to have (those functions which only a few systems are starting to exploit but for which there would be benefits to the end traveller to be able to use).

The report additionally developed a glossary to ensure consistent terminology through the study and the resulting policy specifications. A revised version of this is included within Appendix A of this report.

To enable the provision of EU-wide multimodal travel information services, three service provider system architectures can be envisaged:

(1) **In a centralized or monolithic** approach, all the data - stops, routes, interchanges, journeys etc. are loaded into a single engine and queries run against it. The algorithm used to find the best possible path is able to operate within a single shared memory space and so carry out a very large number of comparisons very quickly. In a densely connected network an engine will compute a large number of possible routes for the given time of travel and then select a shortlist of the "best" for presentation to the user. Ancillary

Figure 1 Geographic coverage provided through a monolithic planner approach
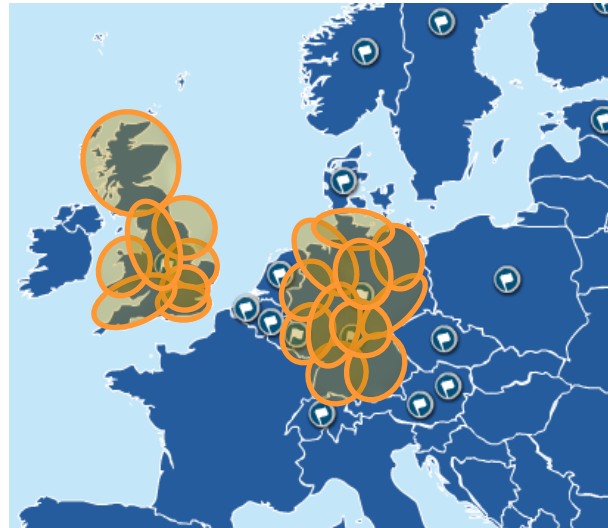
information, for example messages about planned and unplanned disruptions, vehicle types, fare types, facilities etc. may be kept in a database or fetched by a data service and be used to annotate the results of the basic trip query. A monolithic engine will typically comprise a cluster of servers and might cover a region, many regions combined, or even the whole or Europe.
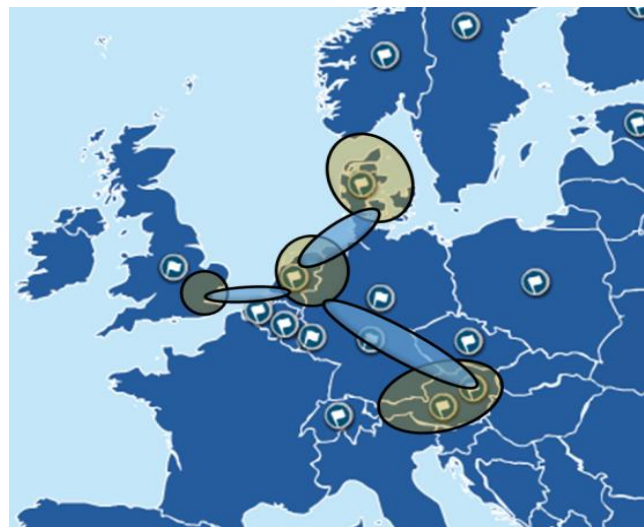
(2) In a **decentralized or distributed journey planning approach**, a network of journey planners collaborate to compute journeys over a wide area; a first planner computes the journeys from the origin to a number of handover points (also called handover points, transition points, exchange points or ring points) and then asks a second journey planner to compute journeys on from those handover points to the destination point. The results, as possible journey legs to and from the handover points, are combined and integrated as a whole and then ranked for presentation. In order to collaborate, the journey planners must have a

Figure 2 Geographic coverage provided by a distributed journey planning model

shared data set of handover points, and furthermore know to which additional planner they should go for journeys covering a particular area (using a shared API). The API itself will also be more complex, requiring the sharing of some additional state about the calculations being made (e.g. the number of changes so far) in order to be at all efficient. The approach has the advantage that the full network and timetable data does not have to be shared, so each region manages and builds its own data set; further scale can be achieved flexibly just by linking to more engines. However it is slower, and requires all participants to operate to a sufficient quality of service together.

(3) In a **chained (or 'hybrid') journey planning approach** a first journey planner allows a user to plan between trunk destinations such as stations, airports or town centres, and then provides access to a further local journey planner, able to provide a detailed routing from the trunk destination to a final destination. The access may either be transparent, querying the second planner in the background to present a composite journey, or in a more simple manifestation, explicit, by a "deep link" landing on the onward planner with relevant details such as the stop and start time already filled out (in effect guiding the user to the correct

Figure 3 Geographic coverage provided through a chained/hybrid journey planning approach

planner for an unfamiliar place). Only a limited sharing of information is needed to link up the systems in this way: the first planner needs to know how to call the second planner and which local areas are covered by it, but not the timetable data for the other region. It gives only a superficial joining of the journey planning, in

effect at the application or user interface level rather than in the engines, which remain distinct.

To support both the centralised or de-centralised approach (when data access is more suitable than linking services due to poor results), direct access and exchange of data can be used to support this functionality. Therefore single points of access to either locate or directly access the relevant data and interoperable data formats and exchange protocols are essential. Generally speaking, data access points can be at a regional, national or European level. There are several different types of access points, including: databases/data portals; data warehouses; data marketplaces; registers/lists. Each Member State is required to set up a national access point for access to road and traffic data for Priority Action B and a variety of approaches in different countries have been used to meet these requirements. Increasingly across Europe, more public transport operators are making their data openly accessible. In the context of public transport, the type of information stored within access points falls into three categories: i) data-related access points, i.e. raw data sources such as timetables; ii) data service-related access points providing feeds of real-time and other data, iii) application service-related access points, e.g. journey planning services. Although open access is a key enabler for multimodal travel information services, this must be accompanied by a coordinated approach to access points across transport operators. For the implementation of Priority Action A, in some cases it may be appropriate to adopt the same national access point that has been nominated for Priority Action B; however, in other situations a new national access point or several regional access points within a country may be a more suitable approach.

There is a core set of standards in place to cover the minimum expected functionality, namely GDF for GIS, NeTEx and SIRI for public transport - along with Transmodel as a unifying conceptual model, TAP-TSI for rail, IATA SSIM for aviation and DATEX II for road. There are a number of gaps in specific standards that should be addressed; in other cases, new standards are available to describe data but no substantial data has yet been collected (e.g. multimodal fares). However, even with comprehensive data standards, some types of existing data are unlikely to be made available on an even footing to an open market without some regulatory mechanisms. Software tools for capturing and managing data are key enablers and policy measures which encourage existing suppliers and promote new participants, including those based on open source, are of particular importance for enabling the market.

In the second and third scenarios, linking of services over several years has been shown to be possible, though presenting certain performance challenges to scale. As highlighted within the D1 Interim Report, the suitability of linking information services, in terms of producing good or bad routing results, is dependent upon the local context. When the linking of services provides good results this architecture is more suitable, however when the linking of services is likely to produce poor results it is more suitable to directly exchange data. There have been different examples, notably EU Spirit, JourneyWeb and Delfi. The development of a European Open Journey Planning (OJP) common standard for this (through CEN), is in its latter stages and builds on these previous national and regional standards to define a common interface. The report has identified that the future adoption of the CEN OJP standard could be a policy option for the European Commission.

A multimodal journey planning engine needs to have a reasonably complete set of good quality data for the services in its coverage area and target modes; otherwise it will fail

to provide information on the optimal journeys. An ISO 21707 technical report 'ITS – integrated transport information, management and control – data quality in ITS systems' identified quality provisions that could be applicable at both a data and service level: (i) Veracity; (ii) Completeness; (iii) Timeliness; (iv) Coherence; (v) Compliance; and (vi) Data currency and versioning. A quality framework for raw data and for multimodal travel information services could be developed and implemented to provide a structure for improving the overall quality of data and services.

Regarding the geographical scope of the specifications, from an EU-wide perspective, multimodal travel information services need to include coverage of the extended transport network to deliver an effective door-to-door solution. However, if there is no available data at that granularity or no existing information service in a region, then there is value in building up a level of service on an incremental basis by covering less detailed network levels first (e.g. urban zones and the TEN-T Network).

In a step-wise approach, the overall policy options proposed to the European Commission are (overleaf):

Table 1 Proposed policy options

0 – Baseline Scenario	1 – Minimal Intervention	2 – Data Focus	3 – Linking Services Focused	4 –Comprehensive Approach
No further EU action. Analyse how the market for multimodal travel information services would evolve if no further action was taken at the EU level, including if the specifications for priority action (a) were not adopted (but taking into account the adoption of specifications for priority action (b) the provision of EU-wide real-time traffic information services.	**National Access Point (NAP)** At least static data – dynamic optional. All forms of NAP allowed (data register, database etc.)	**National Access Point (NAP)** Static and dynamic data. All forms of NAP allowed (data register, database etc.)	**National Access Point (NAP)** At least static data – dynamic optional. All forms of NAP allowed (data register, database etc.)	**National Access Point (NAP)** At least static data – dynamic optional. All forms of NAP allowed (data register, database etc.)
	Data exchange Static public transport data in NAP shall be in a *machine readable format* – other legislation with relevant standardisation requirements/industry activities shall apply.	**Data exchange** Static public transport data in NAP shall be in NeTEx and IFOPT, dynamic public transport data in NAP shall be in SIRI (exceptions for SMEs) - other legislation with relevant standardisation requirements/industry activities shall apply.	**Data exchange** Static and dynamic public transport data in NAP shall be in a *machine readable format* – other legislation with relevant standardisation requirements/industry activities shall apply.	**Data exchange** Static public transport data in NAP shall be in NeTEx and IFOPT, dynamic public transport data in NAP shall be in SIRI (exceptions for SMEs) - other legislation with relevant standardisation requirements/industry activities shall apply.
	Quality framework Recommend basic elements.	**Quality framework** Mandate detailed elements.	**Quality framework** Recommend basic elements.	**Quality framework** Mandate basic elements.
	Linking services No requirements but CEN OPEN API standard recommended.	**Linking services** No requirements but CEN OPEN API standard recommended.	**Linking services** CEN OPEN API standard mandated. Mandatory for all services to link.	**Linking services** CEN OPEN API standard recommended. Demand-based obligation for services to link.
	Sub options – geographical scope 1A – Comprehensive TEN-T network 1B – EU-wide transport network	**Sub options – geographical scope** 2A – Comprehensive TEN-T network 2B – EU-wide transport network	**Sub options – geographical scope** 3A – Comprehensive TEN-T network 3B – EU-wide transport network	**Sub options – geographical scope** 4A – Comprehensive TEN-T network 4B – EU-wide transport network

2.3   Stakeholder workshop

A workshop for 100 representatives of identified stakeholders in the information chain was held on 4th November 2015 (10.00 – 17.00) in Brussels.

The purpose of this workshop was to discuss the findings of the study so far and explore in more detail the refined policy options and their implications, data provision business models, and liability issues and mechanisms for addressing this. It was important to identify any strong differences of view, or previously unidentified options from the diverse set of organisations present.

The content and outcomes of the workshop were documented in study deliverable D2.1. The overall findings of the workshop are explored within this report as a point of comparison with the results of the parallel public consultation.

2.4   Public consultation

An online questionnaire was developed and published on the European Commission's website on 2nd September 2015. This was originally intended to be open for responses for a twelve week period though this was subsequently extended by a further two weeks in response to requests from potential participants. Alongside the online questionnaire an offline version was available for respondents to complete and submit.

The consultation featured a common section on the use of multimodal travel information systems open to both citizens and stakeholder organisations to respond. Further sections were designed to explore in more detail the nuances of the current situation and potential policy options with experts from the latter group.

Associations representing key stakeholder groups in the information chain were approached to promote the consultation to their members. Further promotion was carried out through social media within appropriate and targeted channels.

The public consultation closed at 23:59 (CET) on 8th December 2015. An overview of the respondents can be found in Section 3 of this report. Sections 4-5 analyses the 165 unique responses received.

3 Analysis of consultation responses

3.1 Introduction

This section comprises an overview of the respondents to the public consultation.

Of the 165 respondents, 16% were completing as a citizen/traveller only and 84% on behalf of an organisation or authority in the travel information stakeholder chain.

This represents a good response rate for a consultation in this thematic area and covers a wide range of stakeholder types and geographies. However this is not a sufficiently sized sample from which a fully representative and accurate set of findings can be drawn. Therefore results from this consultation provide only a useful indication of stakeholder views.

Error! Reference source not found. contains a full list of the organisations that provided a esponse. Please note that a number of those respondents requested anonymity so this must remain restricted information not for public consumption.

3.2 Citizens & travellers

The 16% of respondents who identified themselves as citizens were asked to identify their nationality. In addition, a small number of stakeholder representatives chose to select their personal nationality. These are both represented in the chart within Figure 4.

Figure 4 Nationality of citizens/travellers responding to public consultation
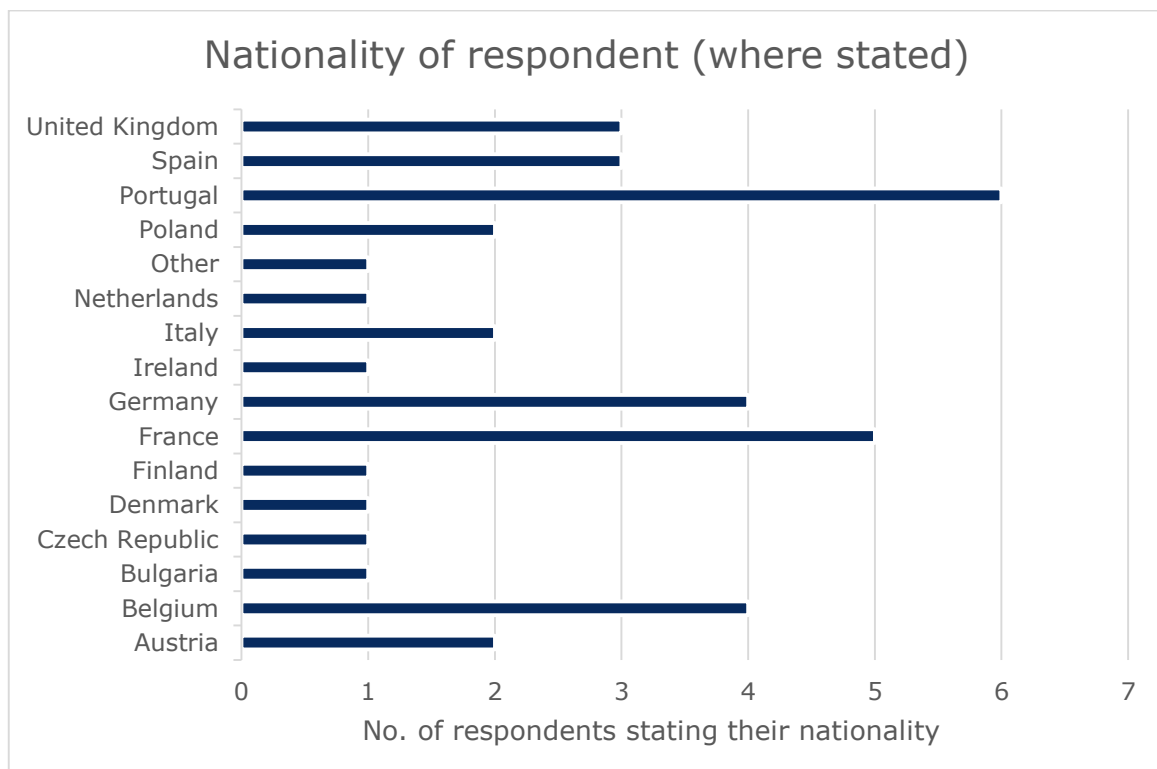
It can be noted from this that there was a disproportionate level of representation from the Western and Scandinavian regions of Europe which may reflect that opinions and views on MMTIPS bears a relation to the maturity of the existing multimodal travel information offerings in those regions. It is also the case that some independent experts

in the field classified themselves as citizens rather than organisations – these experts currently tend to be based in those same regions.

The Member States with the most responses were France (which is understandable given the size of population), Portugal (more unusual given a relatively smaller population), Germany and Belgium.

3.3 Stakeholder organisations

3.3.1 Countries of operation

Respondent organisations were asked to detail the countries in which they operate. Figure 5 shows these responses which are broadly in line with the population sizes of each Member State (and non-Member State). There are a disproportionately high number of responses from Portugal (almost the same number as Germany) which is not a particularly advanced Member State in this field (as identified in the D1 Baseline Report).

There were a number of responses from organisations with operations in Eastern Europe however the majority were from Western, Central, Scandinavian and Mediterranean Europe. Organisations could also identify themselves as operating EU-Wide or globally, the former of these was the most common response. There were no specific responses from organisations based in Member States Estonia, Lithuania, Malta, Romania, Slovenia, Slovakia (notably all accession countries in 2004 or 2007, many of which also having relatively small populations).

**Figure 5 Country of operation of responding organisations**
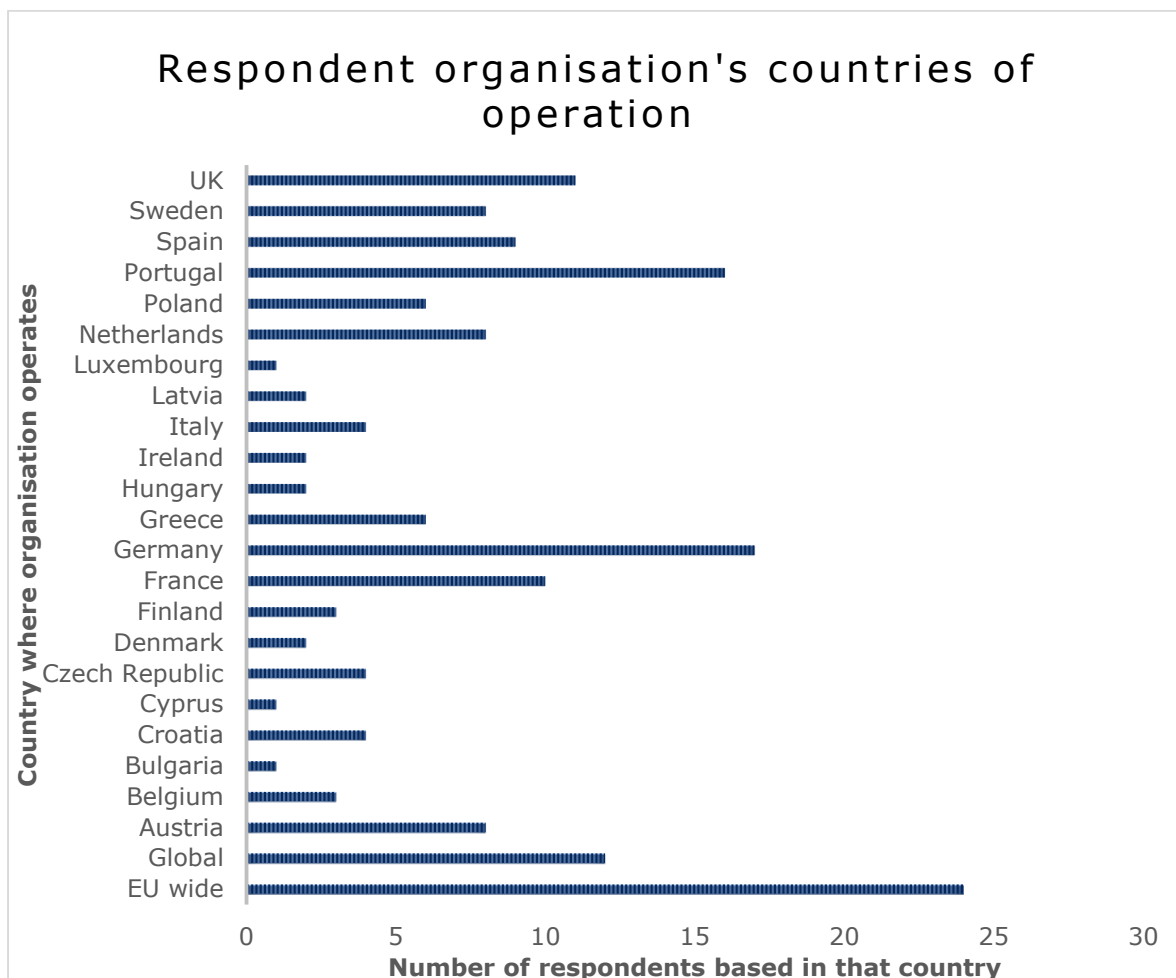
3.3.2 Organisation categorisation

Organisations were asked to categorise themselves in two ways, in both approaches they could select multiple descriptors. The first was their general organisation type from a long list of options. The second was their role within the travel information chain.

Figure 6 below details the breakdown of responses to the first categorisation. 36% of respondents indicated that they were transport operators, transport authorities or both. These represent the traditional organisations within the MMTIPS arena that would be involved in producing data and likely to have had some direct involvement in the provision of a travel information service. 23% of respondents consider themselves providers of travel information services.

The respondents represent a good reflection of the stakeholders in this area – significant representation from public/transport authorities, transport operators, service providers, data providers with expertise and insights drawn from academia, consultancies industry associations, standards bodies and passenger/consumer bodies.

Figure 6 Respondent organisations categorised by type

General organisation classification
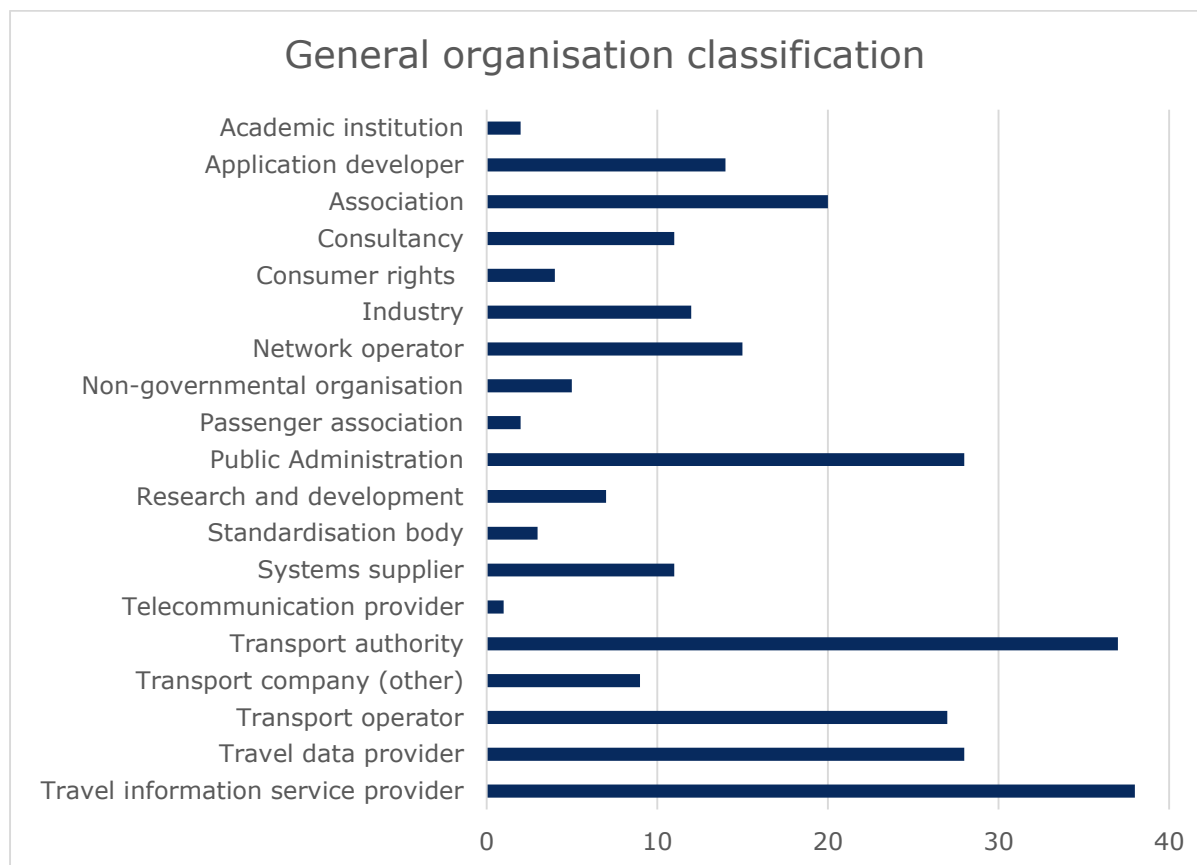
Respondents were also asked to categorise themselves in the travel information chain which was a shorter list of seven options (Figure 7 below). These categorisations have been used in this report to analyse variations in response to other questions in the consultation between different stakeholder groups.

Just under 20% of respondents categorised themselves as transport operators with 42% describing themselves as existing travel information service providers (an interesting variation in response from the previous question, likely to be a result of reconsidering their role against a shorter list of options in the context of the information chain). The difference between the traditional providers of travel information (operators and authorities) and those now describing themselves as such can be explained by the emerging third party commercial (or public-private) travel information service providers.

Figure 7 Respondent organisations categorised by role within travel information service chain (multiple categories allowed)
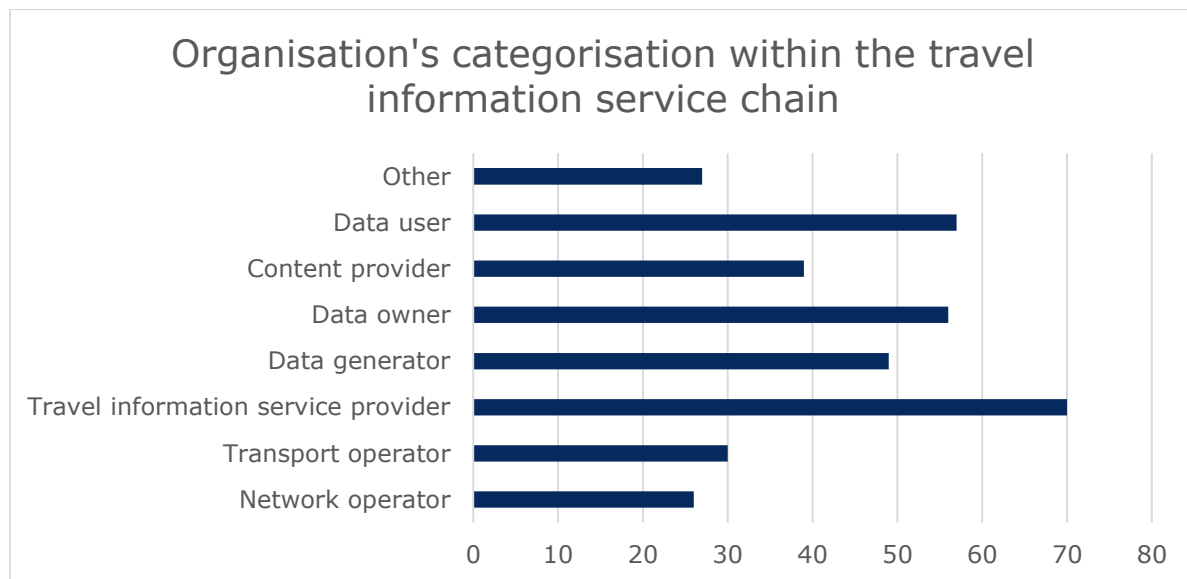
Respondents who had described themselves as 'other' included planning department, local regulator, ITS designer, national governments, service conceptualization, development and evaluation, ITS or passenger associations, partner organisation within sub-region for the use of data and management, software provider and broadcast Experts responsible for developing transportation planning. These are effectively organisations with expertise relevant to MMTIPS but who sit outside the information chain itself in an advisory and supporting capacity.

Respondents were not asked which modes of transport they represented (if any) however a brief analysis of the organisation names shows a number of responses from the following sectors:

- Rail

- Urban public transport (e.g. local bus, metro, tram etc.)

- New mobility modes (e.g. car sharing)

3.4   Summary

In summary the coverage of respondents is strong across the different stakeholder elements within the travel information chain which provides opportunity for assessing variances in responses based on that categorisation. The geographic coverage provided by respondents is also good with a small amount of over representation (e.g. Portugal) and low or zero representation from some of the more recent EU accession states. Analysis for certain questions in the following sections has therefore been conducted using a regional geographic categorisation as this is more meaningful – but specific variations for Member States will be drawn out where relevant.

# 4 Analysis of existing use of multimodal travel information services

4.1 Perspective as a traveller

151 of the respondents completed Part 2 of the consultation which explored the existing use and need for multimodal travel information services from the perspective of a traveller (i.e. an independent individual rather than organisational perspective). The following subsections review these responses, presenting a summary of the results with analysis of what this means.

4.1.1 Use of multimodal travel information services

The initial questions explored the current mix of journeys which respondents undertake. Not unexpectedly, as shown in Figure 8 these include a high proportion of regular weekly journeys within the local city or region with other journeys decreasing in frequency as they become longer. Of interest is that nearly ¾ of respondents stated that they made a cross-border journey between Member States on at least a quarterly basis. It should be noted that this does not claim to be a representative picture of the typical European citizen but is still nonetheless a useful illustration of the travel habits of professionals working within Europe.

Figure 8 Frequency of different journey types typically made by respondents
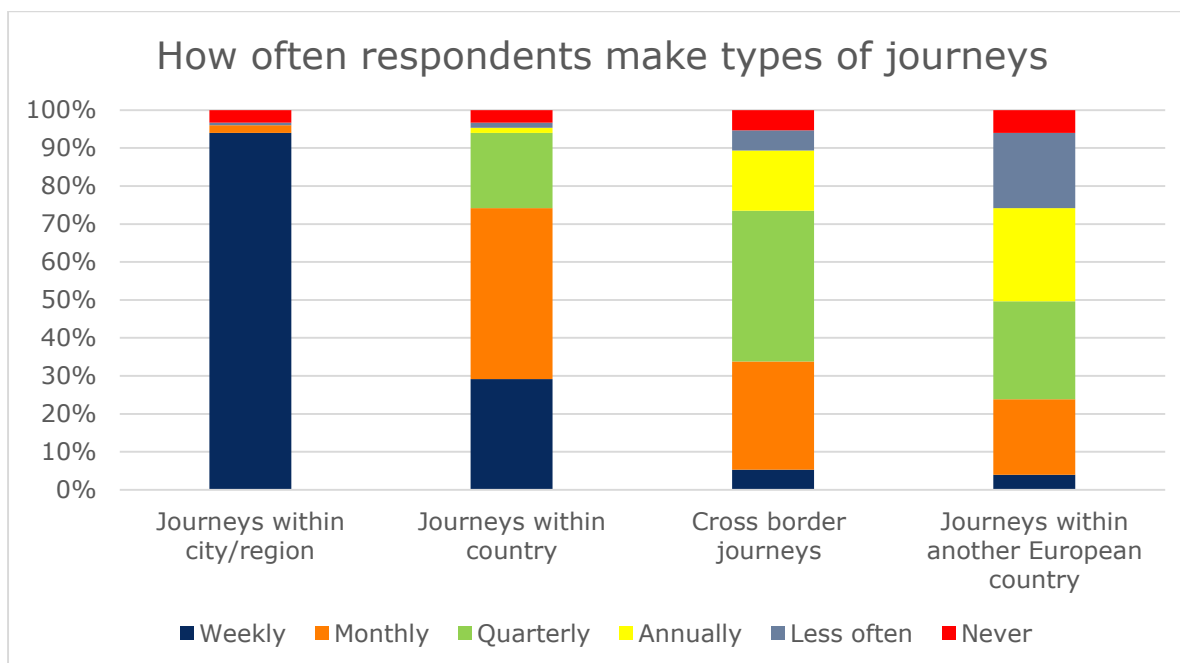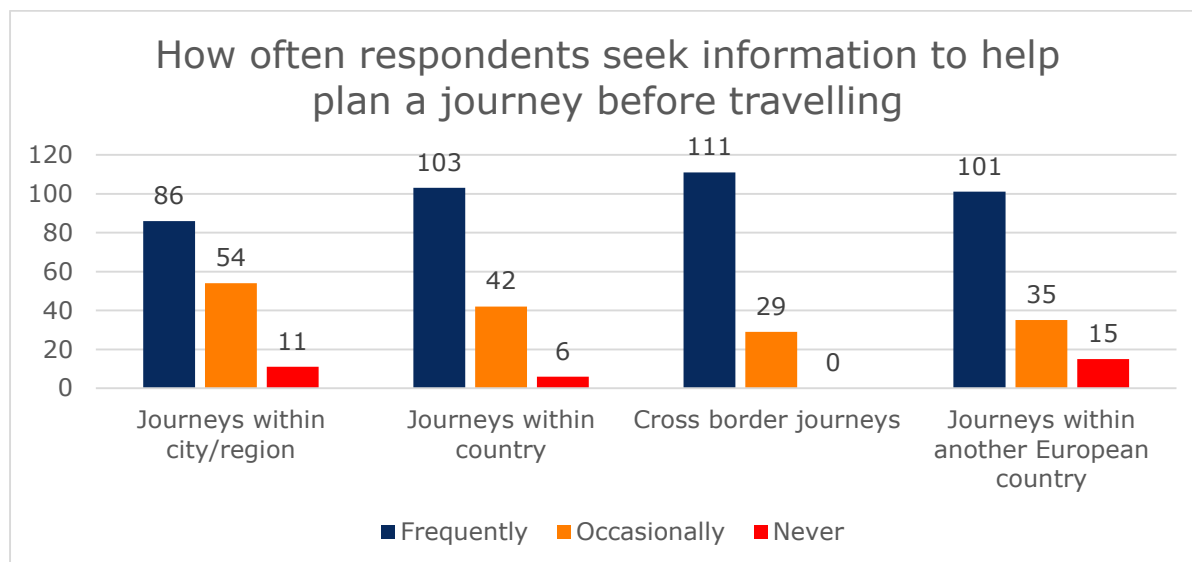

Respondents were then asked to identify for which journeys they sought out information prior to travelling (**Figure 9**) and whilst travelling (**Figure 10**). The results show that this is much more common in the case of pre-journey information than in-journey but for local journeys the difference is not small and can probably be explained by the greater availability of pre-journey information than in-journey services.

Certainly, when in another European country the respondents are much more likely to seek travel information in advance, almost certainly due to lack of familiarity with the

transport network. However a significantly smaller proportion would then seek real time status information during that journey compared to other types of journey they would undertake. This suggests that real time information is either more important when on a familiar network, perhaps making regular journeys than when travelling in a stranger environment when pre-planning is the priority. It may also be explained by the greater difficulty in locating sources of real time information on a journey compared to being in an environment where language, word-of-mouth, media/press etc. may mean these sources are more easily identified.

Figure 9 For which types of journeys do respondents seek information <u>before</u> travelling?

Figure 10 For which types of journeys do respondents seek information <u>during</u> a journey (i.e. real time status)?
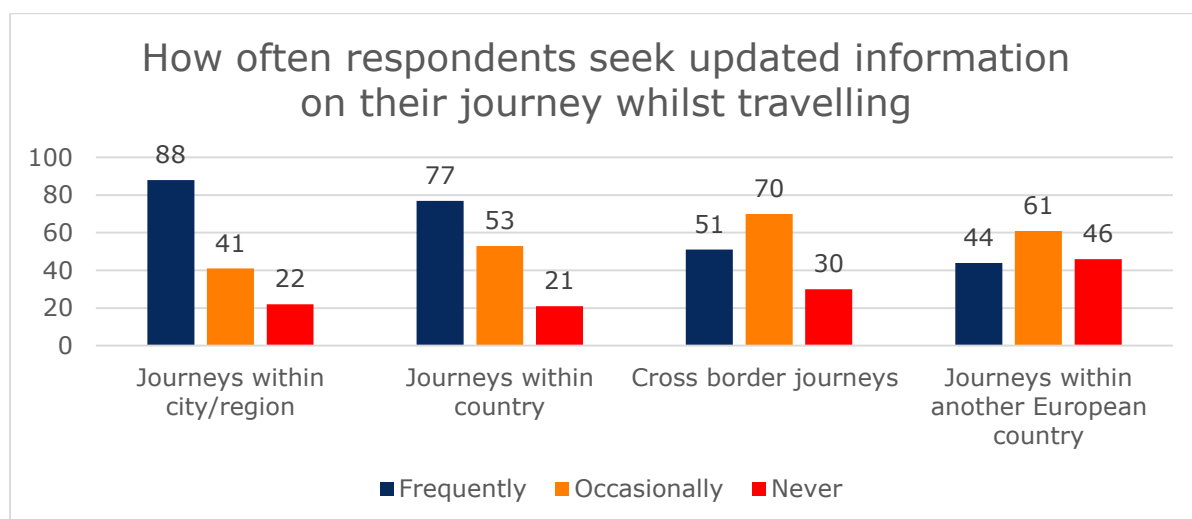
Travellers were then asked to consider how they access travel information. A short list of common channels was provided as well as the option of listing others. As Figure 11 indicates, the most popular are the websites and phone applications ("apps") provided by transport operators directly. However, non-operator independent sources are also high in popularity. There is also a variation across cities, regions and Member States as

to the availability of different channels which should be considered in interpreting these results.

The rise of online sources of information followed by the growth of phone applications in the last 6-7 years means that this picture is surely changing on a near-annual basis. As recently as 15 years ago it seems likely that the most popular response would have been telephone services yet only four respondents reported using this channel now. This highlights the fast pace of change in this sector which, as we will see, is a recurring theme in the views of many of the respondents.

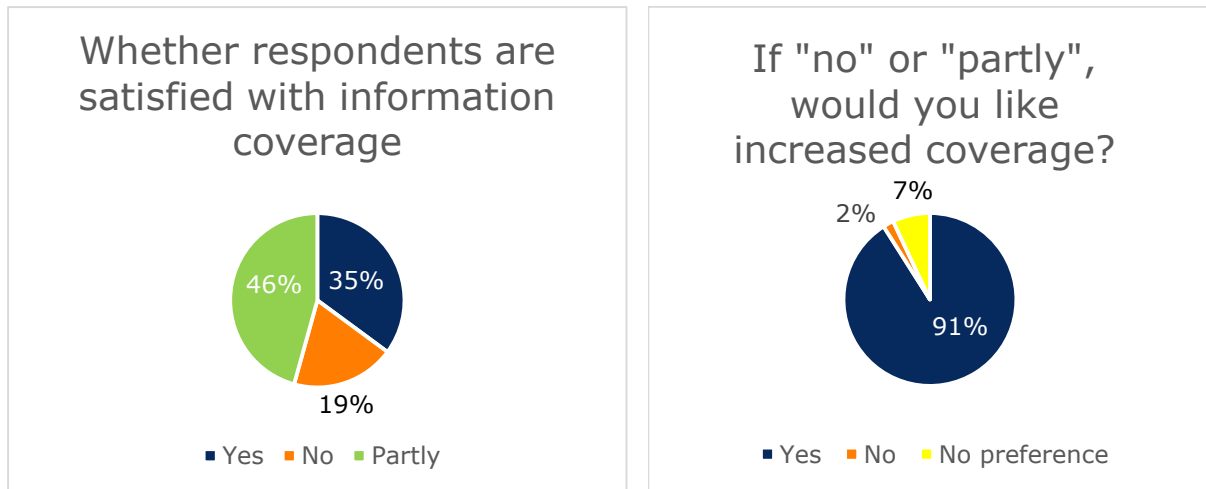**Figure 11 How do respondents access travel information?**
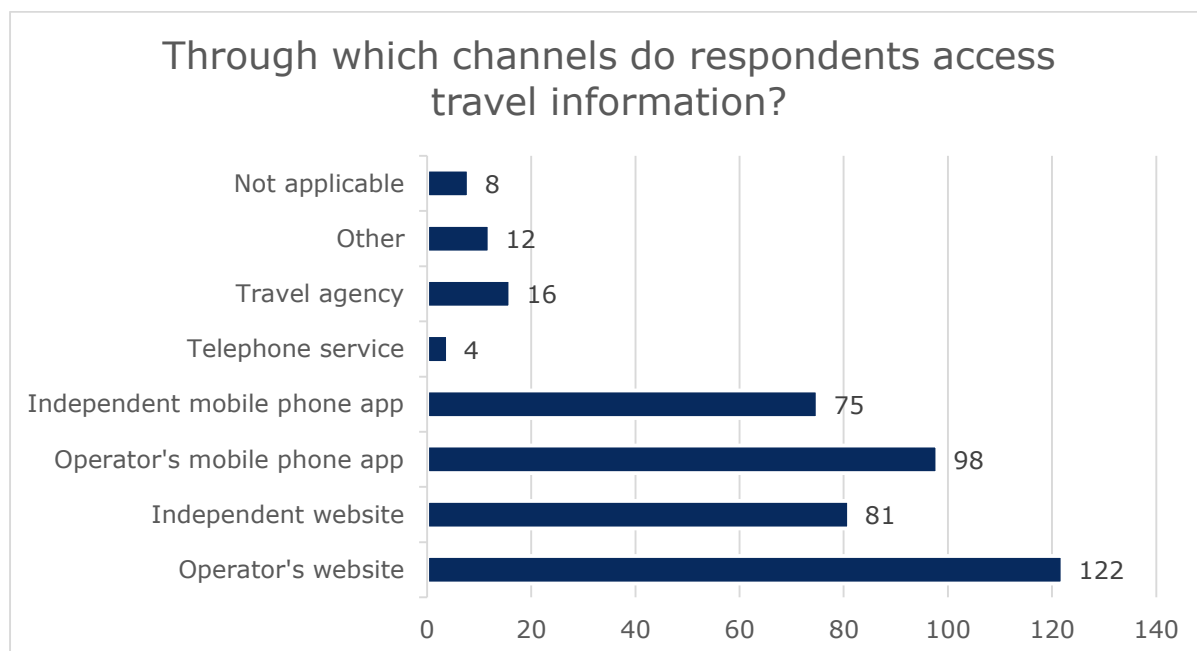
Other examples given included satellite navigation devices; subscriptions to 'push' email or SMS alert notifications; traditional printed timetables or non-electronic information boards; real time departure information screens; and radio.

4.1.2 Geographic coverage of information

An important element for the policy specifications to consider is the geographic coverage that may be applied. To support the understanding of where current issues are, respondents were asked to provide their view on whether or not they are satisfied with the level of geographic coverage provided by travel information services.

The pair of graphs within Figure 12 show that 35% are already satisfied with geographic coverage with a further 46% partly satisfied. We consider that these results appear more positive than they might otherwise be due to the geographic representation of those who have responded to the survey. Nonetheless it does suggest that geographic coverage, whilst needing improvement is close to being at a reasonable level. Unsurprisingly, of those who had stated No (i.e. unsatisfied), 91% of them would like to see an increased level of coverage.

Figure 12 Respondents view on geographic coverage of existing information services
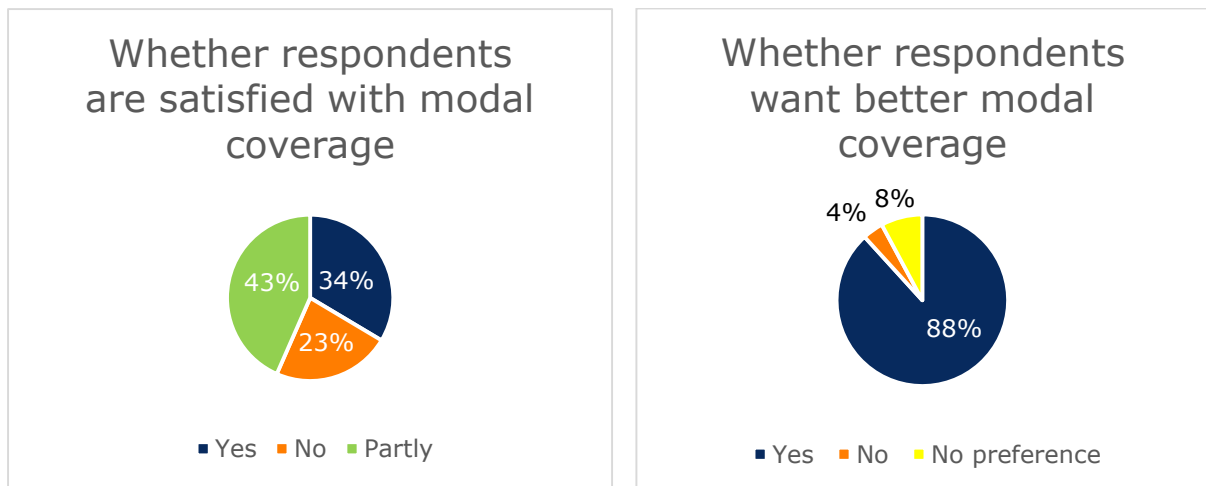
Whether respondents are satisfied with information coverage

35%
19%
46%

■ Yes ■ No ■ Partly

If "no" or "partly", would you like increased coverage?

7%
2%
91%

■ Yes ■ No ■ No preference

4.1.3 Multimodality of information

With the same considerations in mind to the previous question on geographic coverage, the views on modal coverage were also sought.

Figure 13 shows, the overall satisfaction rate is approximately the same as with geographic coverage, however the dissatisfaction levels are higher with close to a quarter of participants unhappy with the level of multimodality. Of these, 88% would seek to have better modal coverage.

Figure 13 Respondents view on modal coverage of existing information services

Whether respondents are satisfied with modal coverage

34%
23%
43%

■ Yes ■ No ■ Partly

Whether respondents want better modal coverage

8%
4%
88%

■ Yes ■ No ■ No preference

The subsequent question sought to explore this issue of multimodality in more detail. Specifically, respondents were asked to share their views on how multimodal their information sources were for the four different journey types they had previously described their frequency of taking.

Figure 14 shows that the concerns of multimodality relate to longer distance journeys or journeys within another European country. In fact the type of journey where existing services used were most frequently cited as only partially or not able to meet needs was for cross-border journeys – this was the view of almost two-thirds of all respondents.

An interesting finding is that the high level of access to multimodal services that respondents found in their home city was felt to be much less when travelling in another European country. Again, this may simply be due to awareness of what multimodal services are on offer (perhaps defaulting to a local operator's single modal information source), multi-lingual limitations or recalling 'worst case' recent experiences.

Figure 14 Respondents views on whether existing level of access to online multimodal travel information services is sufficient (for different types of journey)
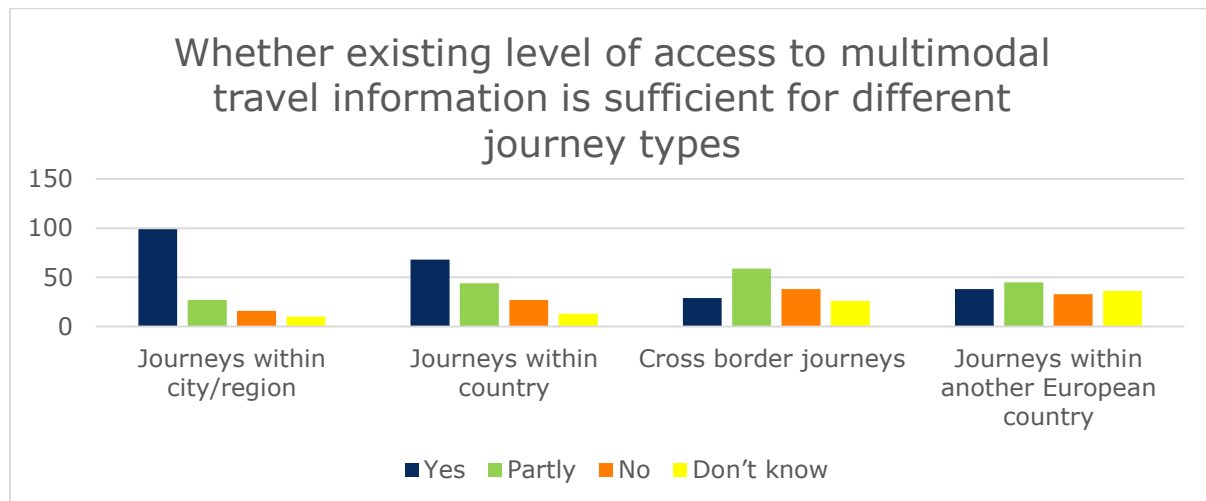

To understand which modes were important to travellers in the context of multimodality respondents were asked which modes (from a list) they would consider using for an appropriate journey.

Responses, detailed in Figure 15, must be considered in the context of the career choices of the respondents – many of whom are transport professionals and therefore are not a representative data set. However the responses are still useful and interesting, with local public transport, rail and walking the three most popular choices – with approx. ¾ of respondents citing the former two. Walking is almost certainly rated highly as respondents recognise the importance of this for the first or last leg of a journey using a non-private mode.

Interestingly, cycling comes in close behind use of a private car as an option. This may suggest the untapped potential for greater levels of cycling should sufficient travel information services be available to support this need. However cycling information (except for cycle hire or rental) has a more difficult business model than many other modes as there is no ticket transaction where revenue can be generated. Instead the benefits are social in nature (improved health, reduced congestion etc.).

Figure 15 Transport modes which respondents would consider using for appropriate journeys
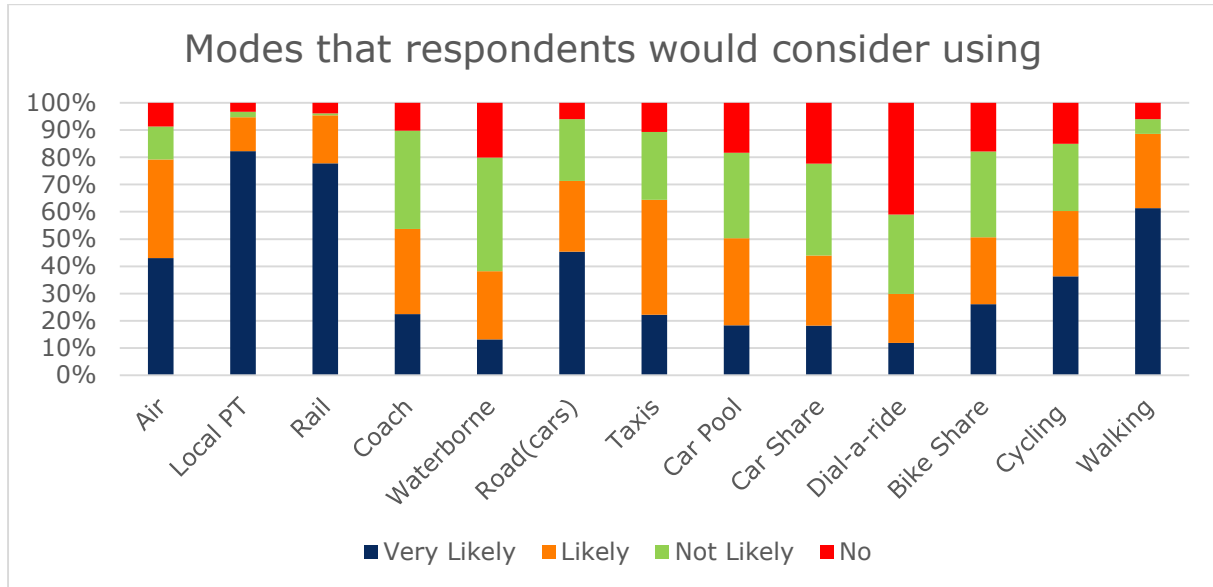
The final modal question explored likely willingness to change to alternative modes of transport if sufficient travel information was available to inform that decision. The overall variations in responses (Figure 16) are slight, with the cross-border journeys being the type where the willingness to change reduced from mid-thirties to low twenties (in terms of percentages). This may be due to reduced options for many cross-border journeys mean that respondents have a clear preference for how to make such journeys. However only a small minority (21%) felt they would rule out the likelihood completely so even in this instance there is a high potential for change if the supporting multimodal travel information services were in place.

Figure 16 Willingness of respondents to consider changing to alternate modes if sufficient travel information was available
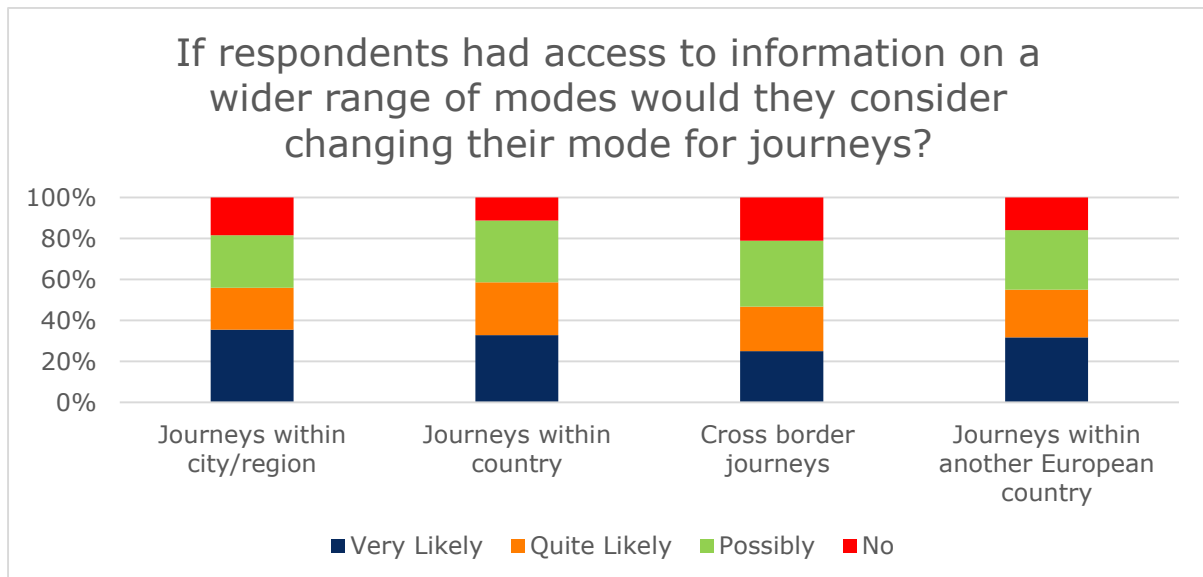
4.1.4   Quality of information

The next set of questions put to respondents concerned the quality of information which they would expect to receive – i.e. what quality criteria is most important to them.

Figure 17 shows how respondents rated nine pre-identified forms of quality criteria as well as an optional tenth option of 'Others'.

Geographical and time accuracy, reliability and timeliness of information are the four areas highlighted as being of greatest importance with usefulness and completeness close behind. It is understandable that travellers would seek geographic and time accuracy as very important given the potential repercussions of being in the wrong place and/or at the wrong time might be a failed journey. Interestingly whilst rated highly, reliability is not seen as important as time accuracy. This may be because information if unreliable can be valued on those terms (perhaps prompting further research or local knowledge to supplement information) whilst inaccurate information only has an impact once a journey has failed (or needs to be re-planned).

Overall there are no unexpected surprises in the responses to this question, at least two-thirds of respondents rate every category (except the optional 'Other') as being 'Very Important' or 'Important'.

A small but notable minority of responses expressed a view that completeness, consistency and inclusiveness were of less or no importance. This reflects the view of some of the stakeholders in later responses that it is more important to have a travel information service in place which has gaps that can be filled and improved on than having no service at all.

Figure 17 Aspects of information quality which are most important to respondents
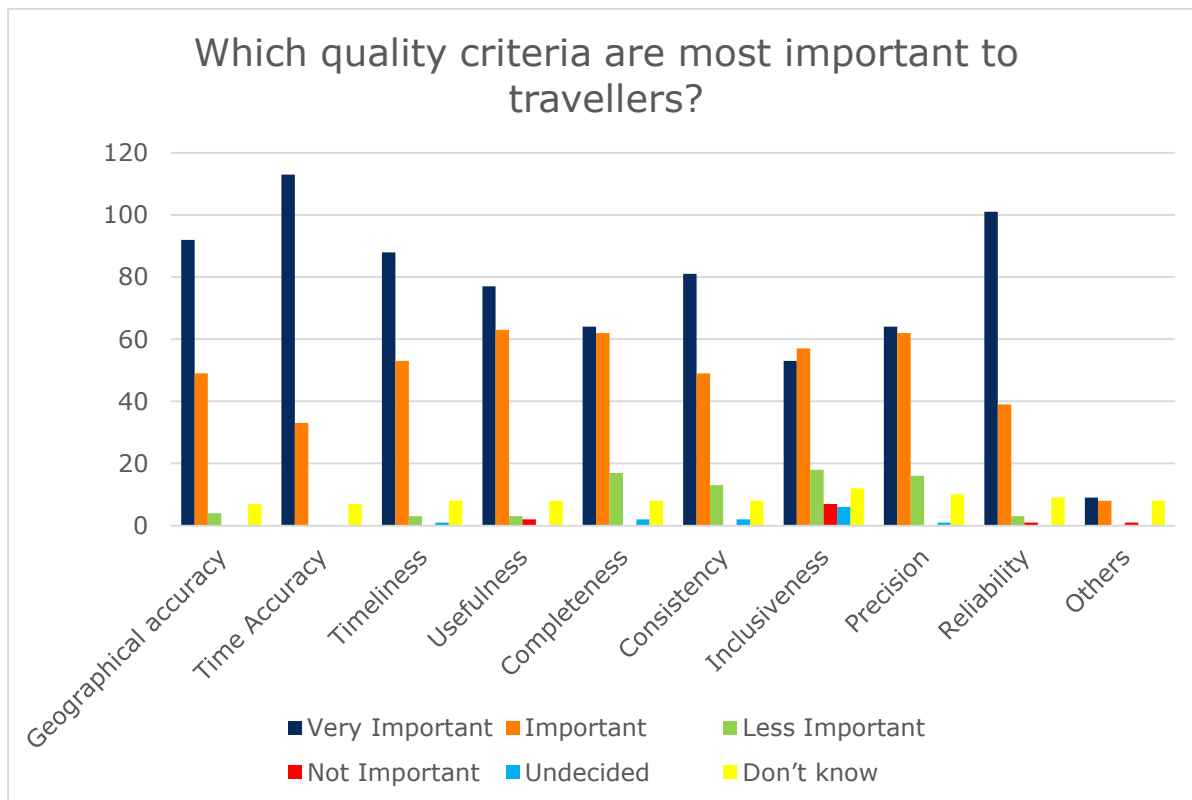
Others included a range of additional responses of which usability and breadth of functionality are the most relevant additions to those preselected criteria shown in Figure

17. Additional responses within the 'Other' category referred mainly to system functionality which is explored within the next subsection.

4.1.5   *Functionality of travel information services*

Travel information services can comprise a wide range of different functionalities. In the context of identifying the gaps in service provision which require a European approach to addressing, it is first essential to identify what forms of service functionality are of most importance to travellers.

Figure 18 shows the relative importance attributed to 17 predefined types of functionality along with an 'Other' option which respondents could self-define.

It is interesting that there is only a small variation between expectations on the coverage that such systems should have station-to-station journey searches being only marginally of more importance than door-to-door planning. This indicates that a high majority of travellers would now expect door-to-door planning as a minimum level of service.

This data is useful in comparing the classifications developed within the D1 Baseline Report on the (i) Minimum expected; (ii) Additional desirable; and (iii) Nice to have functionality. These results would indicate that the following items from that report should be reclassified to reflect traveller expectations:

- Real time information (e.g. predicted arrival times based on real world status) should be a Minimum requirement (*previously classified as Additional desirable*).

- Interchange facilities (e.g. Status of access node features (including dynamic platform information, catering, operational lifts/escalators, closed entrances and exit locations) should be an Additional desirable requirement (previously classified as Nice to have)

Figure 18 Respondent views on the relative important of different functions within travel information services
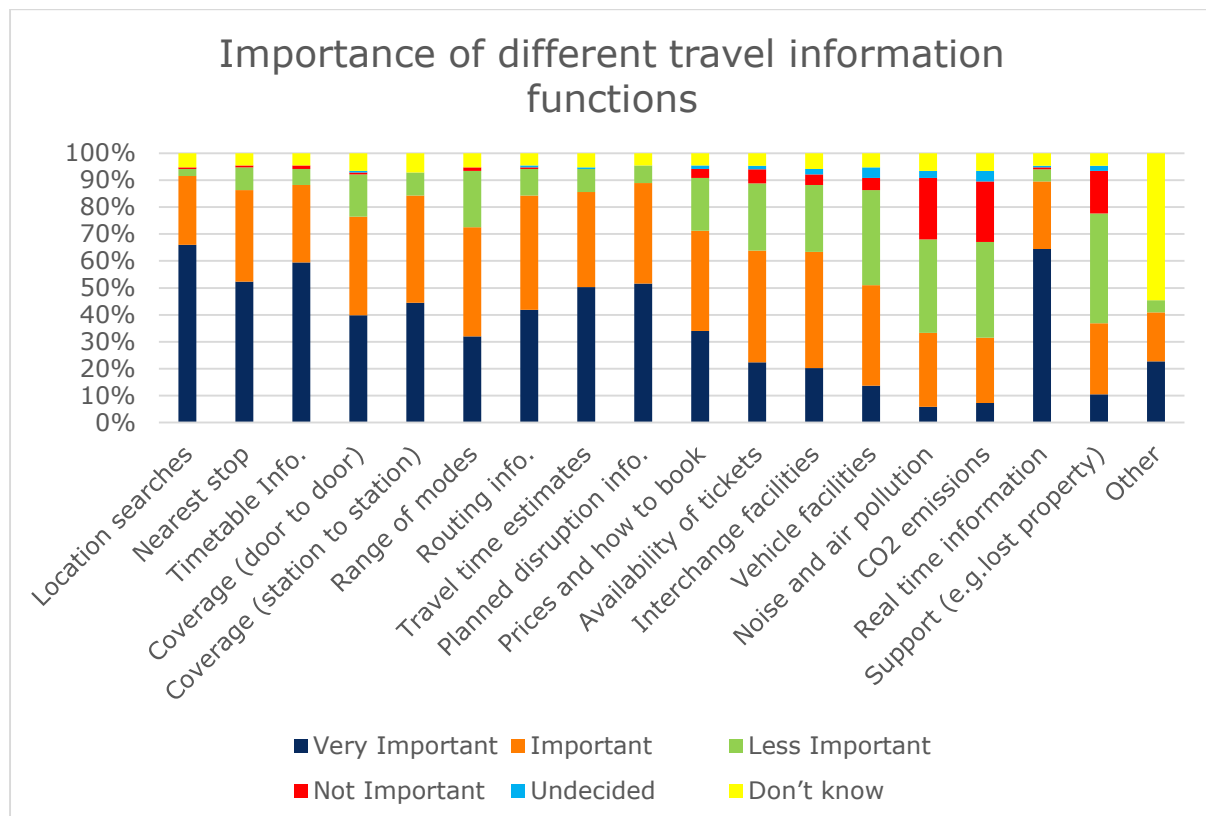
The following issues were raised under the category of 'Other'. The most important of which would be the considerations for PRM travellers raised in the first bullet point:

- Support for blind and low vision travellers e.g. in clear print, audio or braille output and in a predictable manner. There should be a range preferences such as print and background colour, font size and style, and, if on screen (particularly on a smartphone), minimal clutter.

- An integrated ticketing experience (recognising that this is beyond the scope of Priority Action A).

- A feedback loop for users of the service

- Comfort information relating to the journey and vehicles (e.g. 'quiet' coaches, toilets, baby-changing facilities, wi-fi, refreshments)

- Whether or not the information service is accessible through an open-API

4.1.6 Benefits of travel information services

From the perspective of a traveller, participants were asked to identify with an open response, the most important benefits to them of using MMTIPS.

These responses can be summarised into the eight key benefits described within Table 2. These could be further refined into a list of benefits to the individual (time saved, better informed, quicker) and those which are societal benefits (reduced pollution, congestion etc.).

Table 2 The eight key benefits identified in the consultation responses

Increased **behaviour change** to less polluting modes	**More personal time** for the traveller (on the journey)	A **better informed** journey with seamless travel	Identification of **quicker** or more **cost effective** journey options
A more **quickly organised** journey	**Reduction in traffic congestion**	**Liquidity** - Disposal of personal capital assets (i.e. car ownership)	A more **accessible** transport network

In addition, supporting the case for MMTIPS as a tool for delivering modal shift, a study provided by one respondent (Eurobarometer 2011) showed that 49% of surveyed Europeans car drivers said that the lack of information about schedules of other forms of transport was a problem preventing their consideration as an alternative modal option.

The Austrian research project SMILE[1] which piloted a multimodal travel information tool which combined new mobility modes with traditional forms of transport identified behaviour change amongst its users, including: 48% respondents increased usage of public transportation (urban PT 26%, regional PT 22%). 10% increased the use of bike sharing offers while 4% increased the usage of e-car sharing as well as another 4% increased the usage of e-bike/pedelec. 21% of the surveyed pilot users stated to have reduced the usage of their private car.
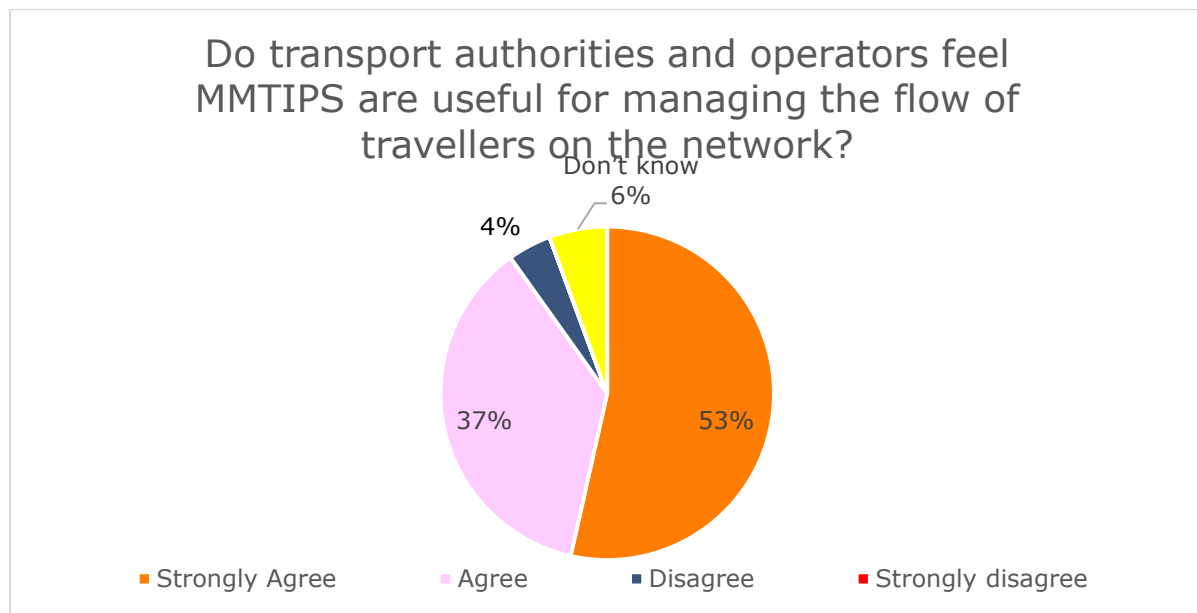
4.1.7 Use of travel information services by transport authorities and operators

An additional short set of questions was asked of these specific stakeholders, as to whether MMTIPS were used effectively for coordinating and managing the flow of travellers across the transport network i.e. as a tool to provide greater network resilience. This is an interesting area that utilises MMTIPS as operational tools for optimising use of the available network rather than simply aiding passenger decision making (and seeking increased ticket sales).

---

[1] http://smile-einfachmobil.at

Figure 19 Are travel information services useful for coordination and flow management of travellers across the transport network?

Do transport authorities and operators feel MMTIPS are useful for managing the flow of travellers on the network?

- Don't know 6%
- 4%
- 37%
- 53%

■ Strongly Agree ■ Agree ■ Disagree ■ Strongly disagree

Further to this, 59% of the respondents stated that they <u>currently</u> do use multimodal travel information services to help coordinate and manage the flow of travellers across their transport network. This can work through weighting journey plan responses away from network congestion hot spots or by pushing out updates via social media and to pre-registered travellers (via text message, app alerts or emails) to avoid certain modes, routes or locations at particular times.

4.2   Summary

4.2.1   Summary of consultation responses

Whilst recognising that a sample size of 151 self-selecting respondents, mainly consisting of degree-educated professionals, cannot be used as a representation of Europe's 503 million population, the results here do reinforce the position identified within the ITS Directive that there is scope and demand for an enhanced multimodal travel information systems offering to citizens within the EU.

The majority of respondents (two-thirds) do not feel that existing services provide sufficient geographic or multimodal coverage for their travel information needs. Travel information for cross-border and within other EU countries is difficult due to availability and access to appropriate services – this may be a result of awareness of local services or lack of multi-lingual services.

Travellers predominantly seek information through online channels. This is from a mix of operator and independent sources. The former is currently more popular but not substantially so – it could be envisaged that this will change in the favour of independent sources in the coming years as the pace of innovation and technology further develops.

There is a high level of willingness to change modes amongst respondents if a greater level of multimodality was included within travel information services for comparison. These also include low-carbon modes such as cycling, rail and public transport. Modes

such as air and private car were rated as being of lower consideration than might be expected.

Travel information service accuracy of geographic and timing information is seen as essential quality criteria (with others). Some travellers seem to be willing to trade off access to complete data rather than having no information at all.

Previously unidentified quality criteria, usability and breadth of functionality are important characteristics to users of travel information services. Both of these would be considered by advocates of open-data and market led approaches to be rated by the end users rather than being elements that would need consideration by the European Commission.

Finally, there are eight key benefits which travellers identify that they derive from good multimodal travel information services. These include both direct benefits to the individual and wider social positives.

4.2.2   Summary of travellers perspective from further sources

Through the consultation phase a number of further studies and position papers from consumer and passenger associations were provided. These have been reviewed to add further understanding to the traveller's perspective.

It is clear from these further reports that there is significant support to the view that action on improving the availability and coverage of MMTIPS is required:

- Consumer association BEUC[2] (2014) are clear that "a **European vision** for a door-to-door intermodal passenger transport information must be developed".

- The European Disability Federation (EDF) states that they "fully support the move towards integrated and comprehensive multi-modal travel information and planning services (MMTIPs) as it makes traveling between different Member States easier for all passengers." (EDF, 2015)

---

[2] Bureau Européen des Unions de Consommateurs (translation: The European Consumer Organisation)

5 Main Findings

This section draws together the main findings from stakeholders who responded to the public consultation as well as from the workshop. In addition, relevant views and findings in papers or studies which have been submitted during the consultation process have been extracted for analysis here.

5.1 Understanding barriers

As explored within the D1 Baseline Report there are a wide range of barriers limiting the further growth and availability of MMTIPS. This section explores stakeholder views on these barriers and their relative importance.

5.1.1 Economic, legal and technical barriers

Firstly, stakeholders were asked to consider financial and economic barriers to wider MMTIPS uptake. A predefined set of options were provided for respondents to rate on a scale of 'Very Important' through to 'Not Important'. The option of providing additional economic barriers was also included. The results are summarised in Figure 20.

Figure 20 Perceived severity of current economic related barriers to the wider deployment of MMTIPS
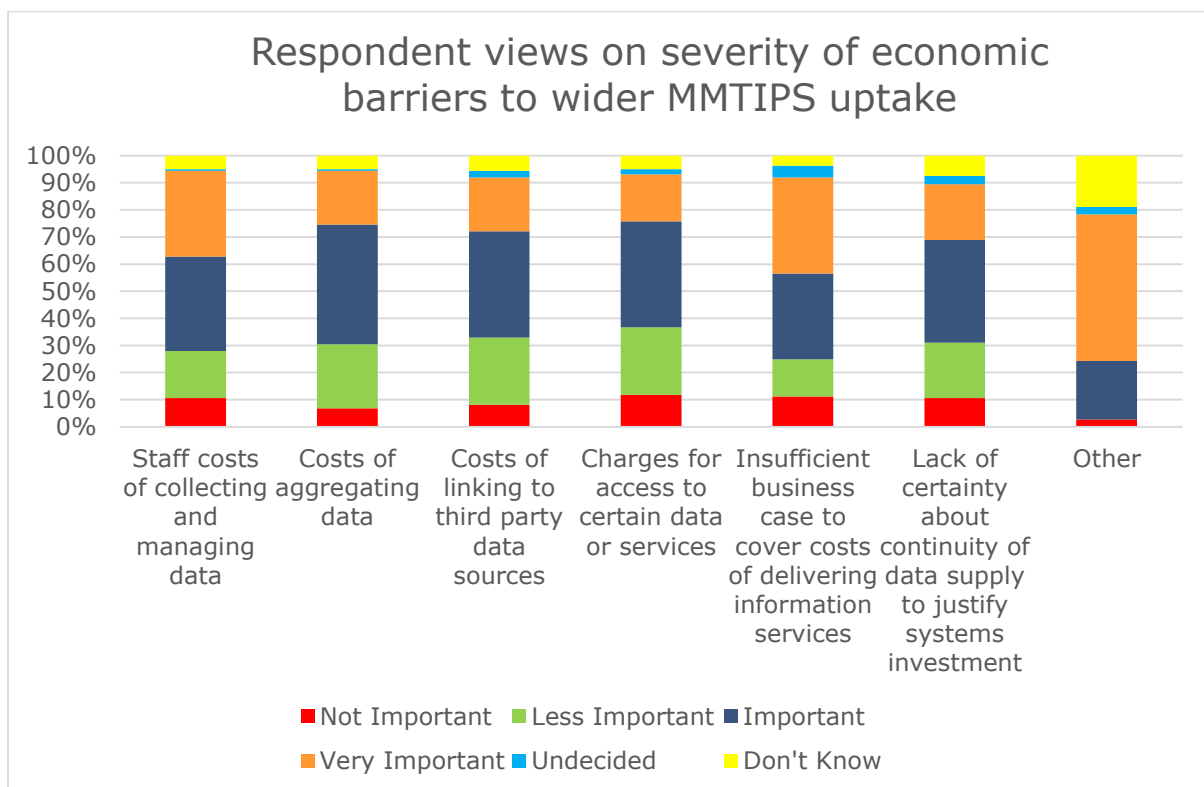
The most significant perceived economic barrier was that of an insufficient business case to cover the costs of delivering information services. This is a recurring theme in responses particularly in relation to the costs involved in meeting potential mandatory requirements which may arise from the EC policy specifications. Feedback through the consultation focuses on four key points in relation to this:

(1) Ability to extract value from the end user: the difficulty is that this is not the case in the short term because of citizen unwillingness to pay directly for a service (All Ways Travelling, 2014). The primary business case for travel information relates to ticket sales therefore it is challenging (from a business cost perspective) to consider these independently.

(2) The business case lies with the transport operator typically (though not exclusively) but costs in many cases to improve services (or the data behind them) lie with public authorities.

(3) The costs involved in improving services may not be recoverable, i.e. there is not a business case without considering the social benefits.

(4) Judging the balance between reliability and quality of information that can be provided against the investment required to meet those expectations.

An area for potential further research which may address one or more of these concerns might be into viable business models behind the provisions of good quality multimodal travel information.

All other stated economic barriers had a majority response stating their significance (Very Important or Important) which highlights that they each need to be considered in the range of potential solutions.

Within the Other category a range of further suggestions or observations were made:

- **Affordability of 'big data'**: for example, mobile phone data from operators has previously proven to be highly expensive but if it was affordable it could be used in an anonymised format to better understand the movements of vehicles and people across the transport network.
- **Handling proprietary data and formats** resulting in restriction to market which might otherwise lower costs. In conjunction with this is the cost issue of needing to handle a large number of data formats through conversion tools (software development and skills retention costs – as also highlighted in Floristean et al (2014).
- Fear of losing **competitive advantage** of exclusive control of own data.
- **IT infrastructure costs** including servers, security and bandwidth for supporting APIs

Five pre-identified legal barriers were presented for respondents to rate in the same way. These results can be seen in Figure 21 which shows that the top concern is with the Lack of Fair and Equal Access to Data. This is rated as the most significant of all barriers explored in this section (jointly with the two technical barriers: 'lack of data available in common formats' and 'low quality of available data').

It is noted that the perceived legal barriers vary slightly depending on mode, country and form of data. Specifically, there were significantly more comments provided on the restricted access to fares and seat availability data than timetable data in many Member States. This is likely to be due to the good availability of open data in several of the Member States best represented in the responses – the limitations to the available data in many countries remains fares information due to its commercial sensitivities (and perhaps due to limitations as to how well it is handled electronically).

Figure 21 Perceived severity of current legal related barriers to the wider deployment of MMTIPS
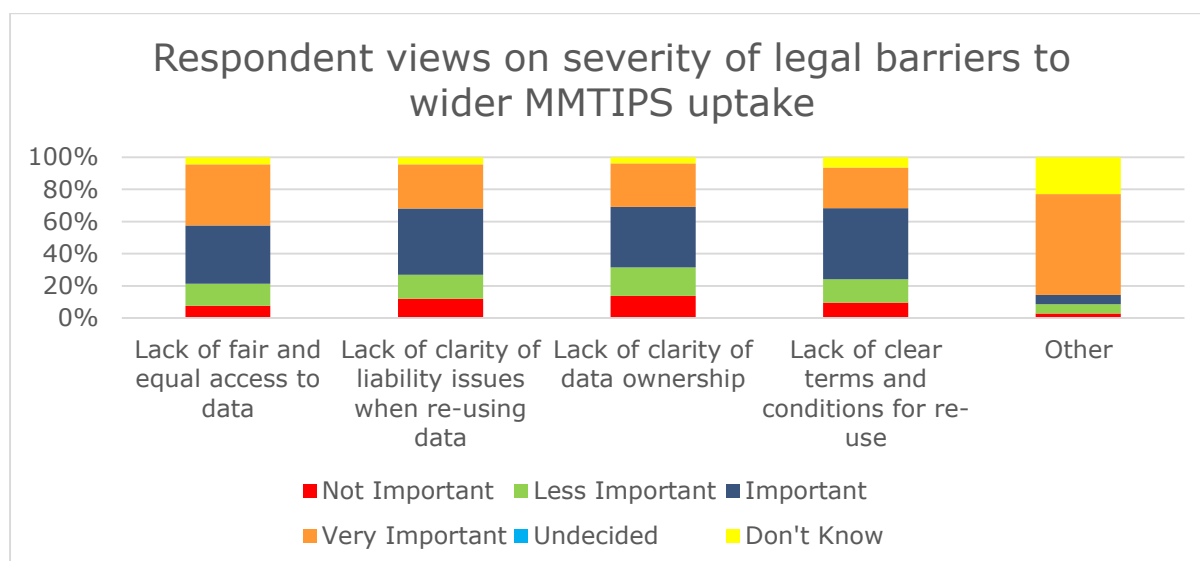
An analysis of those respondents who rated these barriers as 'Not Important' shows that they all belong to the rail industry (the majority are rail operators). However those who used the rating 'Less Important' are more broadly representative of wider stakeholders. A recurring theme within the responses is this difference of opinion from rail operators which seems to reflect a resistance to change, perhaps due to concerns over retaining competitiveness of their large businesses and a desire to retain strong control of their data. It may also be due to there being no barriers within the rail industry – *"in the rail sector, the technical and organisational aspects of data provision are good. Other modes may have more of a problem".* However that view is not particularly reflected by data users.

Further responses received within the 'Other' category can be summarised as:

- Barriers relating to competition law
- Procurement laws
- Variations in open data legislation and guidance between Member States
- Intellectual property associated with data ownership
- Views that different rules should apply for public and private sector elements of the transport network (e.g. with open data)
- Fear of legal issues
  - Lack of clarity on what may be personal data
  - Lack of clarity of responsibility for misrepresentation of an operator's data
- Lack of clarity on the rules for data update, accuracy, reliability, responsibility for data refreshment.

All the responses to the same question on technical and organisational barriers receive majority support identifying these as Very Important / Important (Figure 22). The one exception is the lack of multilingual data which still has support from a significant minority.

The two barriers with greatest support are 'lack of data available in common formats' and 'low quality of data'. The latter is reinforced by some survey respondents and workshop participants who invest in further work to enhance and improve data to get it

to a level which they deem sufficient for use in their systems. These two themes are drawn out further within sections 5.1.2 (data scope and exchange) and 5.1.5 (quality).

Figure 22 Perceived severity of current technical and organisational barriers to the wider deployment of MMTIPS
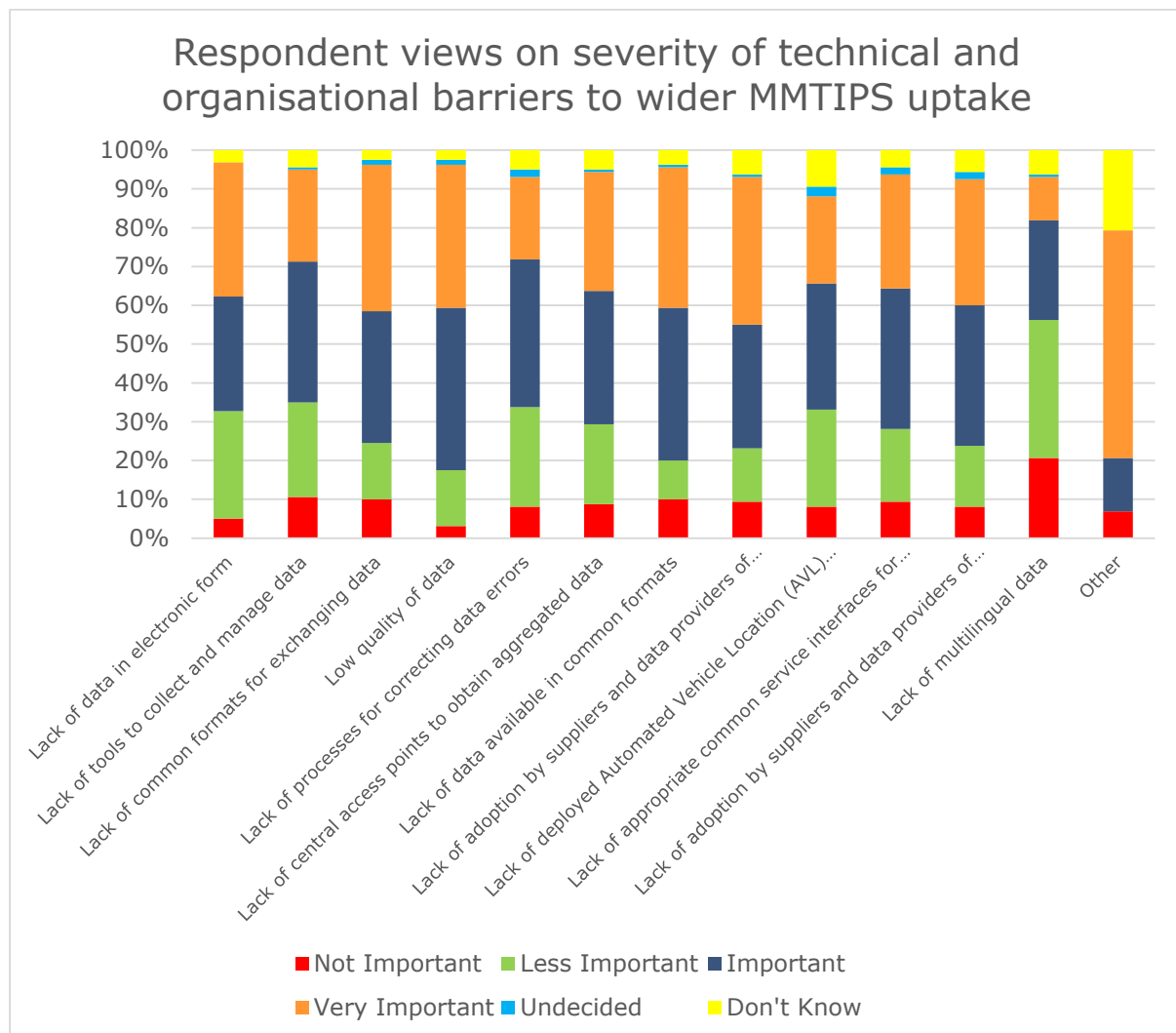
'Other' responses, which also included justifications for certain viewpoints included:

- The lack of access to "raw" transport data (highlighting that for some data users it is access to any data which is more important than access to data in common formats).
- Co-existence of multiple local, regional and national public administrations involved which need coordination – this would impact on service providers who are drawing together data for a wider modal or geographic area of coverage.
- Inconsistent or non-consistent use of metadata which makes data discovery and use challenging.
- Lack of protocols for sharing data between geographically neighbouring systems
- The importance of non-electronic information as there is a risk of only relying on electronic data which would not meet the needs of all users or provide a fall back when electronic systems fail.

The responses within this section clearly demonstrate a strong majority view that the pre-identified economic, legal, technical and organisational barriers are all significant and need to be addressed to improve the uptake of MMTIPS.

### 5.1.2 Data formats and exchange protocols

The next section of the consultation explored views on the harmonisation of common data formats across the EU, forms of static and dynamic data and what can be considered a useful frequency of data update.

The initial question asked whether traffic and travel data should be interoperable across the EU. The responses (Figure 23) are useful to view as a comparison between different stakeholder types in the travel information chain.

At least ¾ of respondents from each group say yes except for transport operators where it is only a small majority who share that view. To some extent this might be informed by previous steps towards data standardisation within transport operations which has proven to be an expensive process that has often required the recruitment of new specific expertise. From some of the other responses it appears that this statement has been interpreted in two ways: (i) to replace existing standards with common European ones (which is not the intention); and (ii) to use converter/export tools to transform existing data formats into common standard formatted data (which is the actual approach being explored). Some of the transport operator concerns may be due to considering the former approach rather than the latter.

Note that the travel information service providers and data users are overwhelmingly in support of the view that these should be interoperable. This is probably explained by the benefits to them of dealing with a reduced number of potential data standards – whilst there might be an initial cost in adaptation there will be cost and risk reductions over time.

Figure 23 Views on whether data should be interoperable across the EU - by stakeholder type
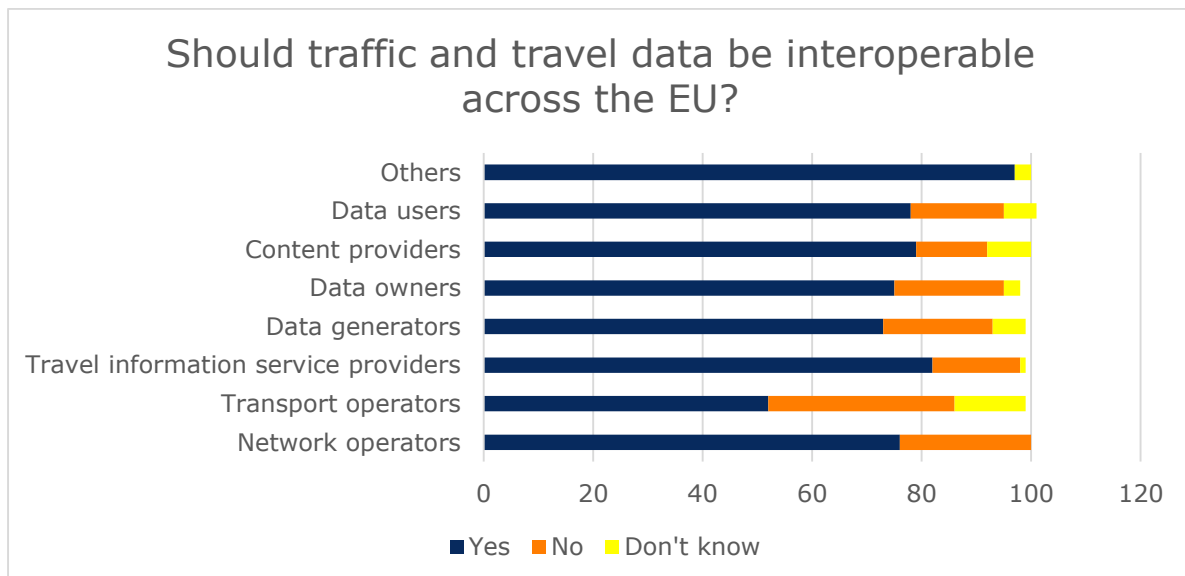
The next question asked for views on the current situation regarding data interoperability. The responses to this were more varied (see Figure 24). Whilst the transport operators held the most optimistic view (16%) that standards were sufficiently interoperable, it is useful to consider that most operators with have a mono-modal view in comparison to data users, travel information service providers and others (the miscellaneous experts). This is likely to skew views to focus on the use of data standards within a particular modal sector rather than across the full multimodal traffic and travel data space.

Interestingly, many respondents of all categories opted for 'partly' as their response. This suggests that there is a good baseline of standards for interoperability but there are issues with the availability, uptake and use of these which needs action to progress.

Figure 24 Views on whether data is currently sufficiently interoperable across the EU - by stakeholder type
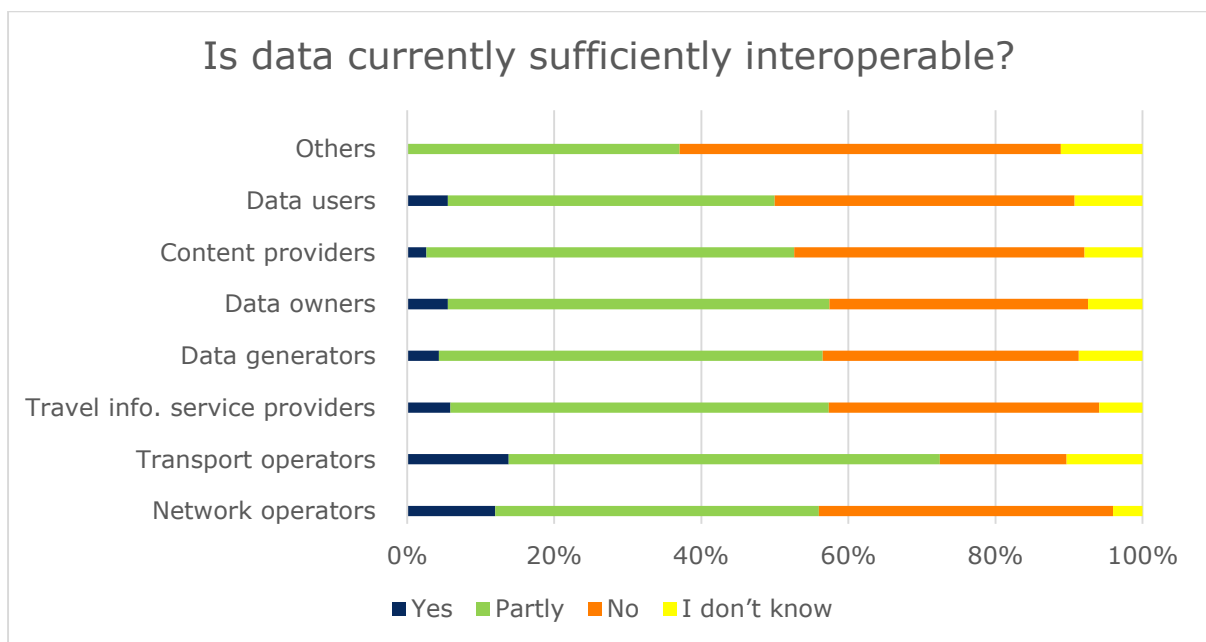

Views were then sought on whether the use of common data standards can help enhance the consistency, re-use and exchange of travel and traffic data across the EU – in effect, is this an approach to aid the reduction of those major barriers identified by stakeholders in the previous section?

Figure 25 shows that again there is broad majority support for this view across all stakeholders including transport operators, however the latter is again the segment of respondents who have a less consistent view than others.

15% of data users stated No which is worthy of further investigation. Interestingly all those data users who put a negative view again belonged to the rail sector (eight respondents).

Figure 25 Views on whether the use of common data standards can help enhance the consistency, re-use and exchange of travel and traffic data across the EU
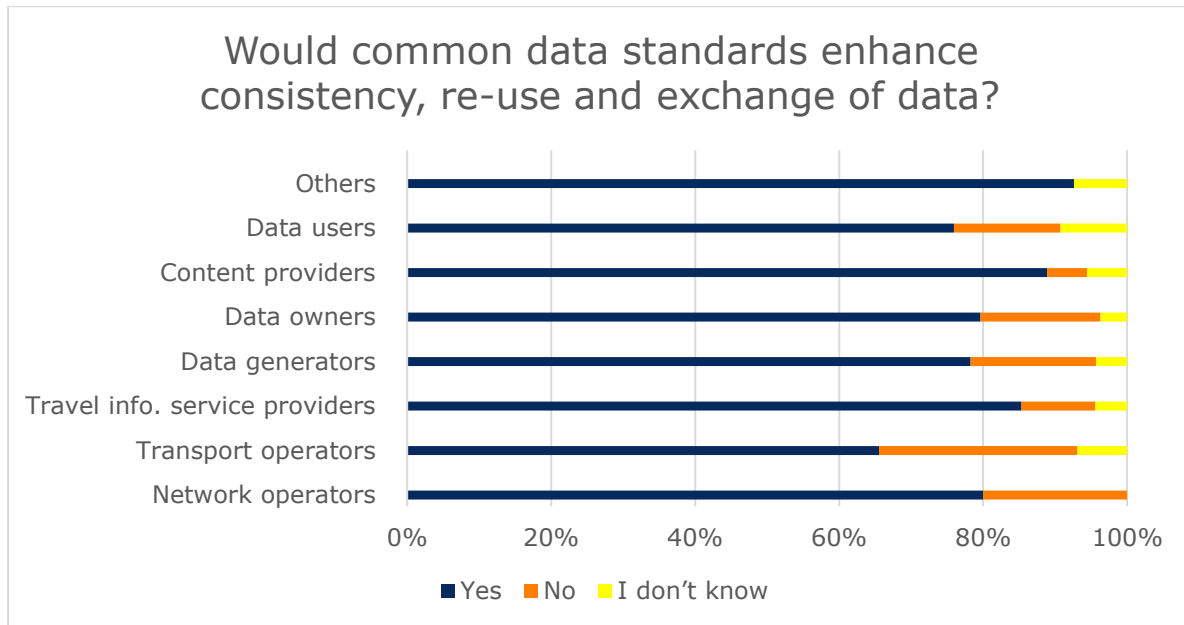
The next question more specifically asks respondents on whether data formats and exchange protocols should be harmonised across the EU.

Again, all stakeholder groups responded with majority views positively to this however amongst transport operators this dropped down to just 52%. All groups but particularly data generators and data users were less supportive compared to the previous question which asked whether common standards would improve consistency, re-use and exchange. It is likely that the slight change in question caused respondents to consider the impact on their organisation in greater detail and factoring in changes in processes and associated costs resulted in more conservative responses.

Figure 26 Views on whether data formats and exchange protocols should be harmonised across the EU - by stakeholder type
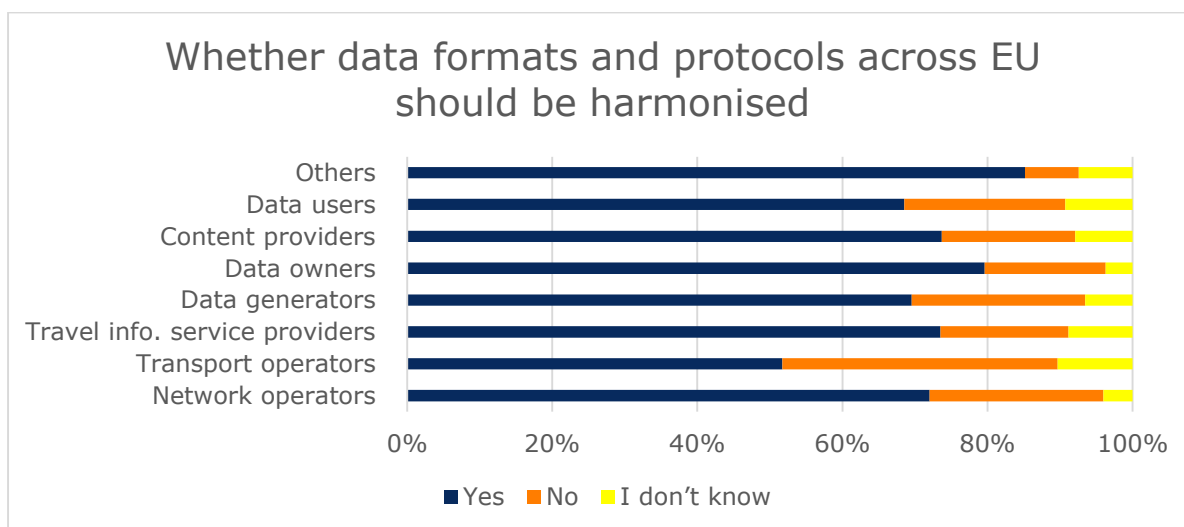
The D1 Baseline Report identified a set of existing common or de facto European standards. Respondents were asked to assess, in their expert opinion, which of these should be harmonised across the EU.

Many respondents highlighted that they either have no experience in the common standards proposed or only with those most directly relevant to their area of work hence a significant proportion of 'don't know' responses in the results within Figure 27.

The only standard with majority support was for DATEX II which really reflects its existing inclusion within Priority Action B and its subsequent higher level of visibility and understanding by stakeholders – as highlighted by TISA[3] (2015) *"DATEX II now represents a widely accepted and used standard for content encoding of Road Traffic Information"*.

Figure 27 Respondent's view on which data standards should be harmonised?
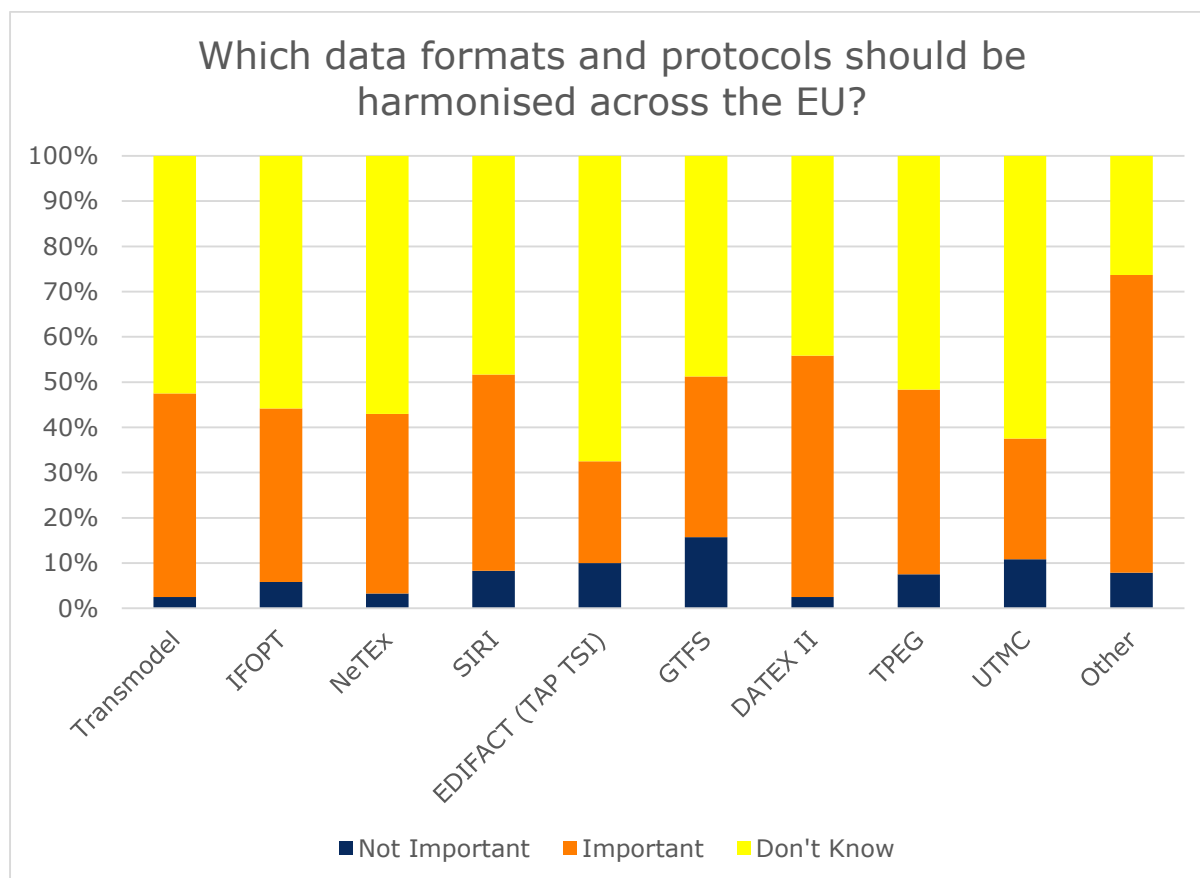
GTFS, EDIFACT (TAP TSI) and UTMC had the most significant 'Not Important' figures although these were still in the minority. The feedback on these can be summarised as:

- **GTFS** – concerns over recommending a non-open data standard as a common European standard as well as an impression that it best fits urban transport systems and not some of the wider variants in operational behaviour seen within rural areas. However a few data user respondents commented that GTFS (and GTFS-realtime) was much easier to understand and use than many of the more

---

[3] Traveller Information Services Association

detailed common European formats – this is not surprising since it covers a much smaller functional area than Transmodel/NeTEx.

- **EDIFACT (TAP TSI)** – concerns from respondents that the underlying technology is outdated and not sufficient for meeting meta-data data discovery needs of third party users. A few rail industry respondents proposed RailML or XML (TAP TSI) as a more suitable alternative. An alternate view is that the travel information community would be sufficiently well served by use of NeTEx for rail information.

- **UTMC** – considered to be more of an operational standard than one appropriate for traveller information.

Other standards proposed by respondents for harmonisation included GDF (three respondents), an opposing view which agreed that a GIS format should be recommended but that it should be based on outputs from the Open Geospatial Consortium specification and not GDF. The upcoming CEN TC278 Open Distributed Journey Planning standard was highlighted as were a number of different national or regional standards (including DELFI, NOPTIS and VDV452).

The other future standard highlighted in one response was TISA's development of TPEG2-SPT (Shared Passenger Transport), which will be the first of a modular and scalable set of TISA applications for multimodal travel information. This would aim to cover multimodal real time information requirements. However it is noted that a previous multimodal standard by TISA (Public Transport Application TPEG1-PTI), was too complex to find its way into practical applications (TISA, 2015).

The responses of many participants were supportive of the EC recommending common standards rather than mandating them. This view is summarised within the response: *"Different formats are used for different purposes and are often tailored to specific modes and coexist without difficulties today and market actors know how to use them and combine them".* Concerns over the mandating of European common standards related to constraints on the development of local and regional markets

An important point was made about the need to continue international engagement to ensure alignment with future global standards (TISA, 2015), this is an area which would be valuable for the EC to retain involvement.

Respondents were then asked their views on whether the use of common data formats and exchange protocols should be addressed at an EU level. Figure 28 shows responses by region whilst Figure 29 shows the same responses by stakeholder type.

The views on the three policy options (mandating public sector use; mandating public sector and recommending to private sector; and recommending to both) vary across Europe, however there is strong support for action with little dissent to the view that at the least there should be recommendations in the use of common data standards.

The region with greatest support for mandating standards is Eastern Europe with almost 70% of respondents there in favour of requiring either public sector or both public and private sector to use common standards when making data available.

Western Europe was the most split with no particular approach gaining more than 30% support. This appears to be due to the wider variety of stakeholders in this region with a greater mix of public and private respondents, operators and independent third party data users.

Figure 28 Views on whether there should be action at an EU level to ensure use of common and harmonised data formats – split by geographic region
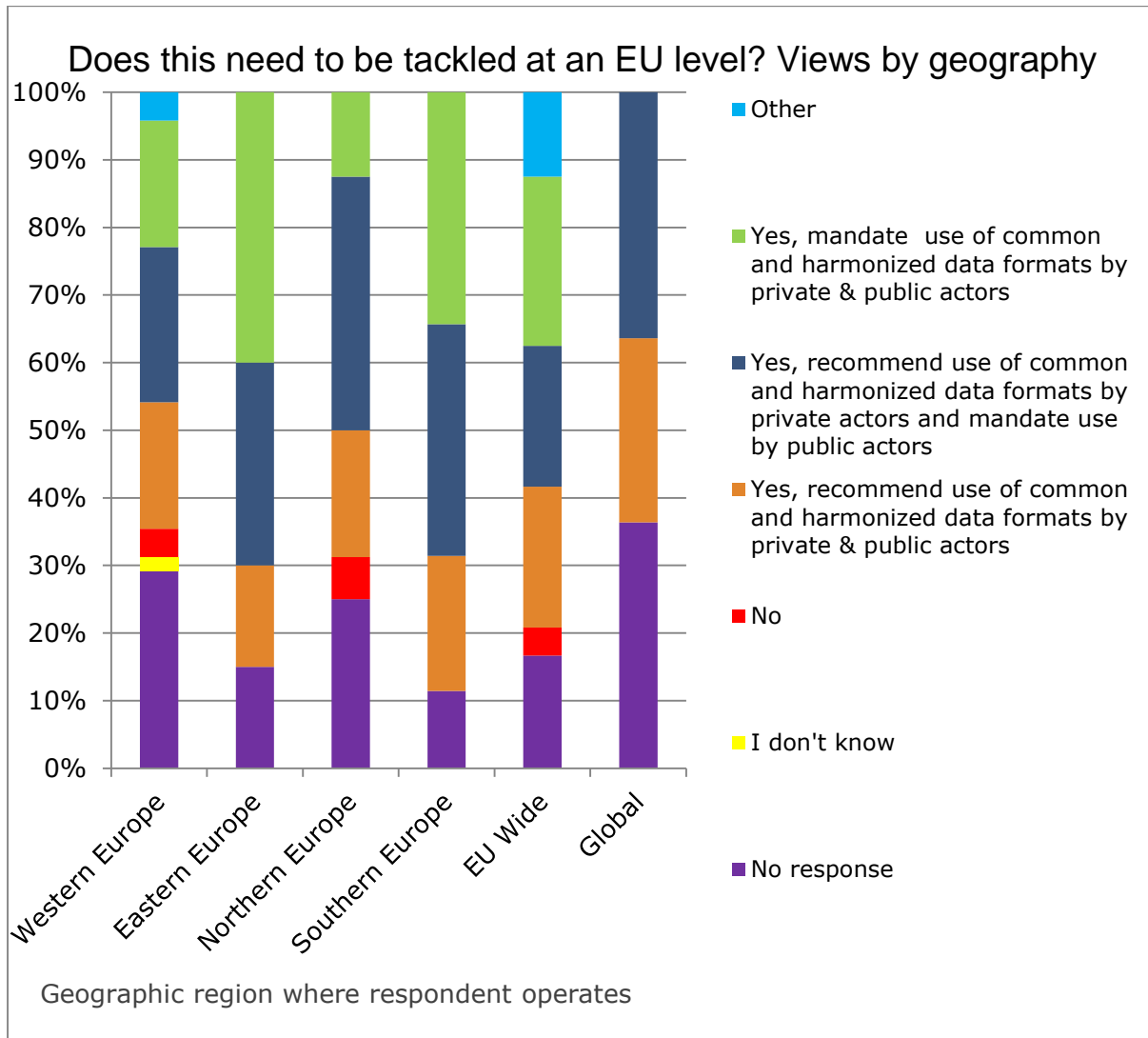

Analysing those who stated 'No' in more detail, these are more varied than in previous question responses and include a local technology cluster, a city region, a global travel information provider and technology company, a rail operator and a rail association. This is an intriguing mix from which it is difficult to draw particular conclusions from except that nearly all of these will have a multinational perspective.

One of these cited the view that no intervention should be made on this topic as CEN's[4] management of standards (for public transport) is sufficient and there is no need for further action from the Commission within the public transport (sic) sector.

---

[4] The European Committee for Standardisation

Figure 29 Views on whether there should be action at an EU level to ensure use of common and harmonised data formats – split by stakeholder type
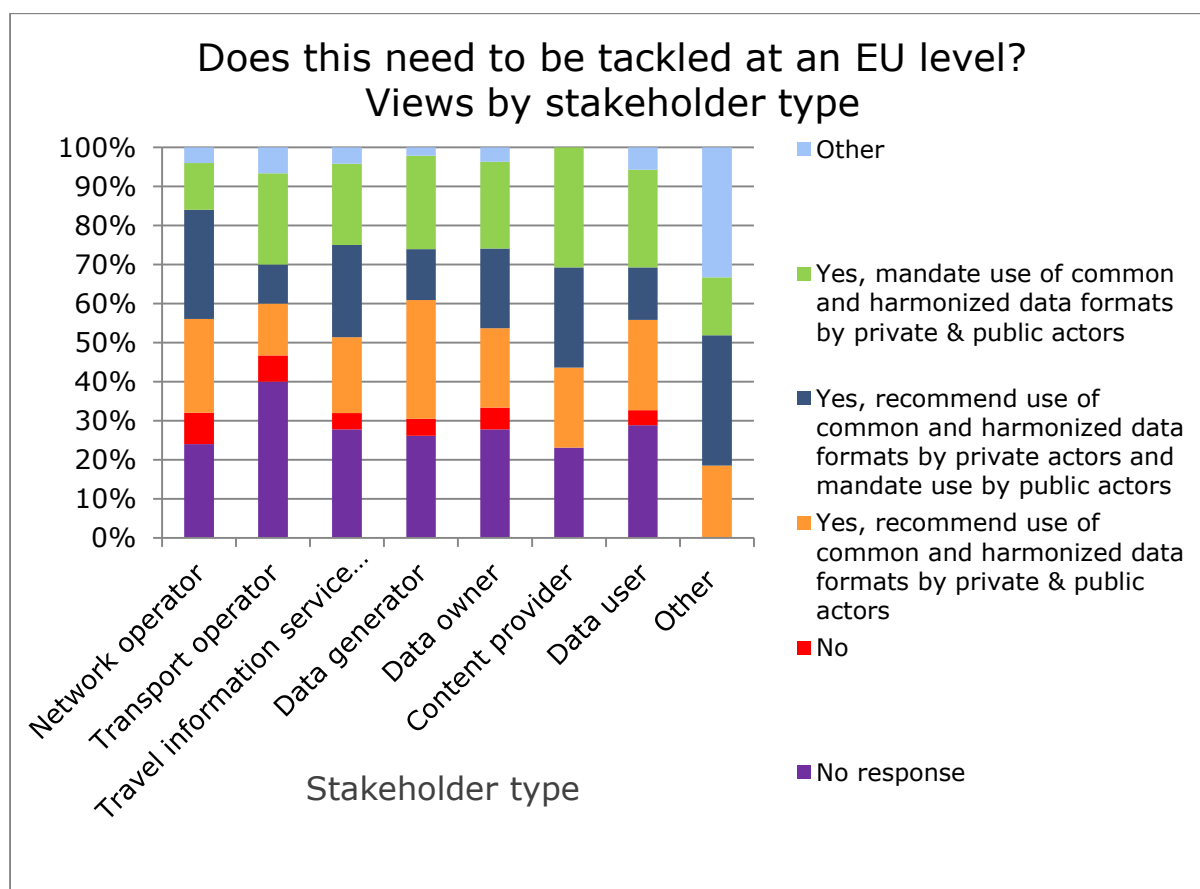

A small number of respondents (eight) provided commentary to support their view that 'Other' action was required. These points can be summarised as:

- Specific concerns relating to the need to ensure rail sector compliance

- Standards, after publication have to be maintained and users guided. Financial support for those who are standards-compliant would encourage users (as in USA)

- Support to users should be provided: user groups supported, training courses etc.

- The EU should delegate responsibility to TISA to develop mandatory common data standards for multimodal travel information.

Figure 30 provides a third view of the responses, with the focus on those organisations self-identified as transport authorities and transport operators. Just over half of the authorities are supportive of public actors being mandated to adopt common data standards which is broadly in line with the 'Other' respondents. Transport operators would prefer data formats and exchange protocols were recommended only (however close to half of all operators participating were not in a position to offer a view in response to this question).

Figure 30 Views on whether there should be action at an EU level to ensure use of common and harmonised data formats – focus on transport authorities and operators
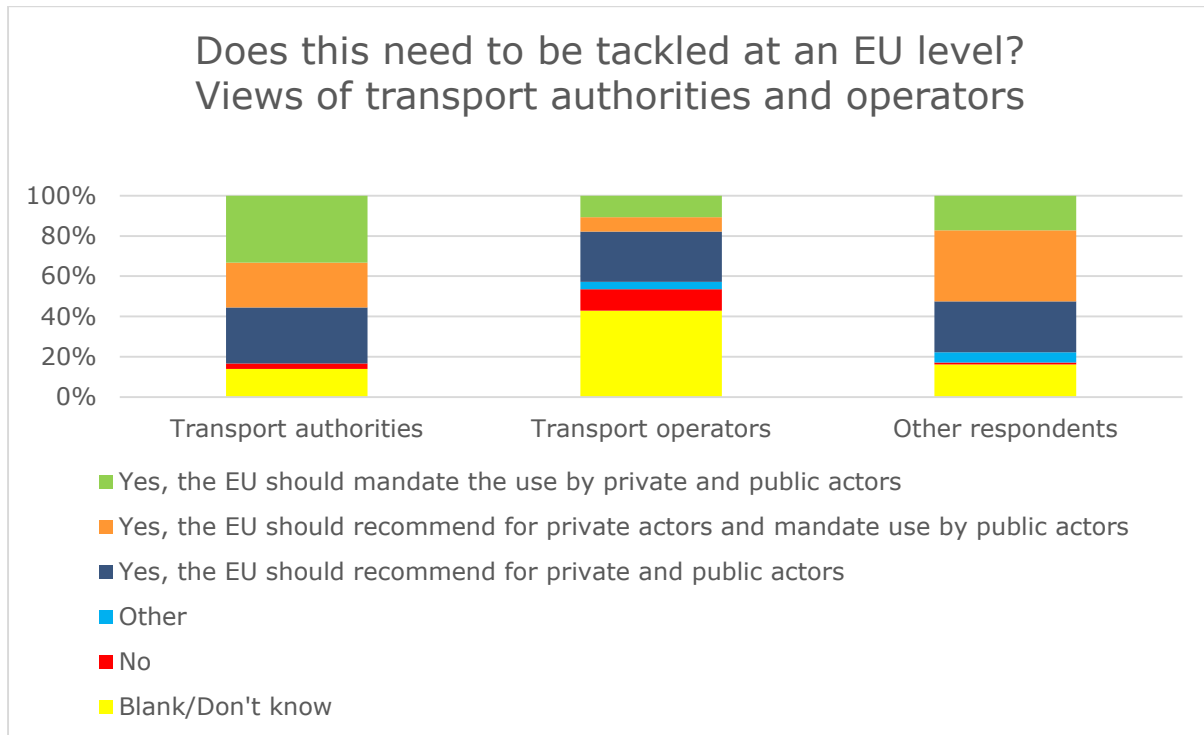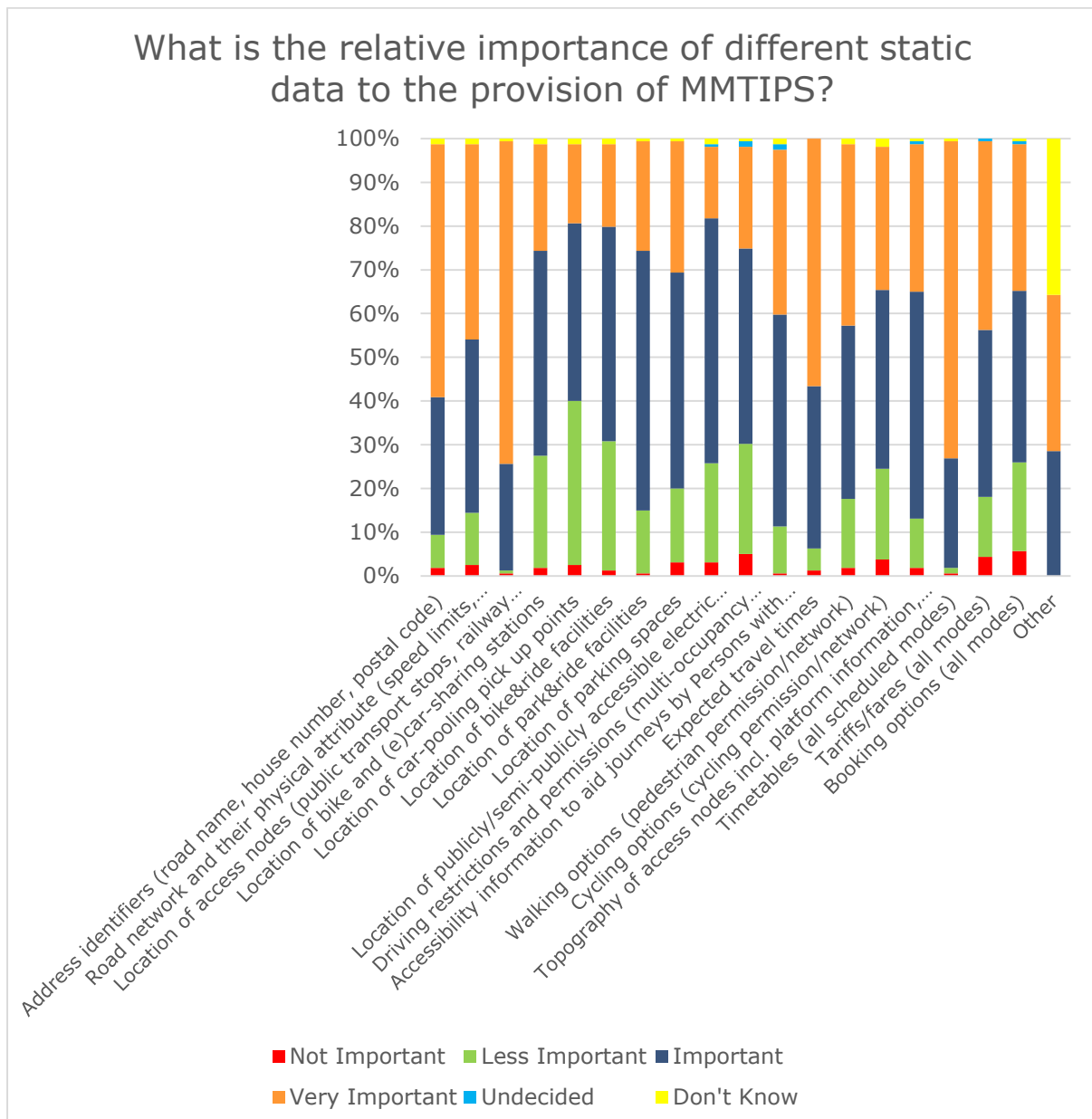

Respondents were then asked to consider the relative importance of different forms of static and dynamic data in the provision of travel information services.

Firstly, within Figure 31 at least 60% of responses to each category of data have assessed them as being 'Very Important' or 'Important' in nature. The categories which are rated as being of less importance than others are all emerging new mobility modes – car pooling, bike & ride, electric vehicle charging points etc. In this assessment it should be considered that these are the modes where respondents and organisations are likely to have least experience (e.g. most citizens will have experience of bus travel but relatively few of driving and charging an electric vehicle).

The most highly rated elements are (i) location of transport access nodes (e.g. stations, stops); (ii) expected travel times; and (iii) timetables. This is not unexpected as these are the core functions at the heart of most multimodal travel information systems.

Figure 31 Respondent views on the importance of different forms of static data

What is the relative importance of different static data to the provision of MMTIPS?

Legend: Not Important, Less Important, Important, Very Important, Undecided, Don't Know

A significantly sized dissenting group rated fares/ticketing and booking information as 'Not Important' or 'Less Important'. A review of those respondents who proffered this shows them to be primarily rail industry organisations (mostly operators) but also some technology companies (providers of MMTIPS systems to service providers) and a few cities. The technology companies' view may be informed by particular market insight into system users or their customers (cities, transport operators) or perhaps by the relative added complexity of including fares information within a multimodal dataset.

A number of respondents (primarily transport operators, particularly rail) stated within their supporting comments they strongly believed that ticket booking should not be considered a user need within MMTIPS. The opposite view was promoted by the consumer organisations who responded that they feel this is a key requirement for travellers – a view also iterated strongly in the stakeholder workshop. As ticketing/booking is beyond the scope of Priority Action A, that difference of opinion needs only noting at this stage. However there are some implications which relate to

the provision of fares information through third party services which several transport operators also objected to due to the inability to confirm the accuracy of figures being provided to travellers by third parties and the intrinsic commercial confidentiality of their fare structures.

Respondents also provided additional user requirements which had not been captured within the predefined list. These can be summarised as:

- Links to transport operators/providers concerned.
- Demand responsive bus, ferry, taxi or private hire services operating in an area.
- Personalized advice, according to the traveller's profile (age, family, participation to a congress, a cultural event or sport event) needs to be available.
- Customer services; where and how to complain if anything didn't go well (delays, cancellations, etc.); passengers rights.
- On-vehicle facilities (wifi, tables, cinema, catering, luggage provisions).
- Probabilities that journey interchanges succeed – a function which appears in some Scandinavian services but rare elsewhere.

It can be noted that most of the above can be represented in the NeTEx format, but data is typically available only for certain aspects such as on-board facilities. The provision of personalised preferences is a task for the end user applications rather than for upstream systems managing transport data.

Data on accessibility for Persons with Reduced Mobility (PRM)
It is essential that MMTIPs solutions proposed are accessible to all passengers, including persons with reduced mobility. Accessibility means in this case not only the technical access but also the type of information provided and how it is presented. (EDF, 2015)

Barriers experienced which can be overcome through the availability and incorporation of the right data include:

1. Websites of transport operators are not always accessible so it is difficult to find information in the first place.
2. Existing travel information services do not always take into account accessibility in their travel planners by e.g. calculating longer transfer times or transfers only at stations that are accessible.
3. Even if information is available in different accessible formats, unfortunately it is not always specified what those are.
4. Information about the right to travel with a personal assistant should be made easily available for all transport modes in the travel chain.
5. To ensure inclusivity and accessibility when developing new MMTIPs, representative organisations of persons with disabilities should be consulted systematically.

If the provision of data is to be recommended or mandated within the policy specifications then it will be important to provide a timescale to these to avoid leaving a loophole which disinterested organisations could exploit. On that basis, respondents were asked to consider what a reasonable frequency for updating static data and making it available would be?

The twin graphs in Figure 32 capture the responses to this topic. Nearly half of respondents feel that static data should be made available when changes occur with a similar proportion believing that this data should be made available within three days.

The level of dissenting voices to this timetable would make it difficult to suggest as a mandated approach but it would be reasonable to recommend this. It might be not be unreasonable to mandate data providers to commit to a minimum level of data refresh (which might vary depending on the type of data involved).

Figure 32 Respondent views on how frequently static data should be updated and made available for re-use
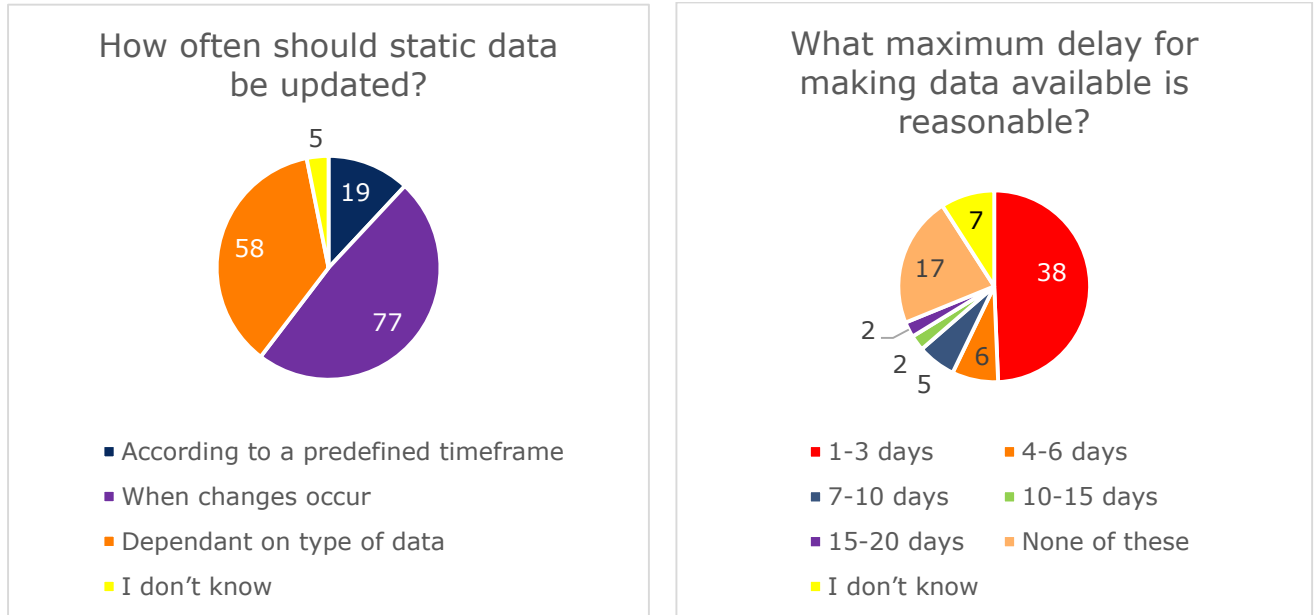

How often should static data be updated?

- According to a predefined timeframe
- When changes occur
- Dependant on type of data
- I don't know

What maximum delay for making data available is reasonable?

- 1-3 days
- 4-6 days
- 7-10 days
- 10-15 days
- 15-20 days
- None of these
- I don't know

Figure 33 shows the views on the relative importance of forms of dynamic data. These have a greater range of response than those on static data, reflecting that many of these are newer sources of information that have become available (or more common) recently.

The two elements with over 90% positive support are (i) the timeliness updates / delays to scheduled times; and (ii) known and expected disruption information on journeys. These are key elements that affect the pre-planning and during-journey re-planning of all forms of journey hence their near universal support.

With such high levels of support it is interesting again to review who the dissenting voices were. Real time delay information was objected to by three operators (covering rail and bus modes), an operator's association and one third party travel information service provider. The latter is unusual as this is a feature they provide in their system so may be an error in their response. The operator's may be concerned by the costs of providing such information or the reputation risks associated with publishing information on their adherence to schedules.

A wider range of organisations rated the publication of known and expected disruption information as unimportant. These included two operators (one bus, one rail), an operator's association, an automobile association, a German city and three travellers.

The least supported elements were those around 'park & ride' and 'bike & ride' space availability and space reservations. These may be considered rarer features than others and might also indicate that space availability is less of an issue for many of these types of facility. General parking space reservations and time predictions for locating parking spaces were also rated less favourably. This is likely to be due to the limited existing

deployment of technology solutions in the field currently that can provide the information on these.

Figure 33 Respondent views on the importance of different forms of dynamic data
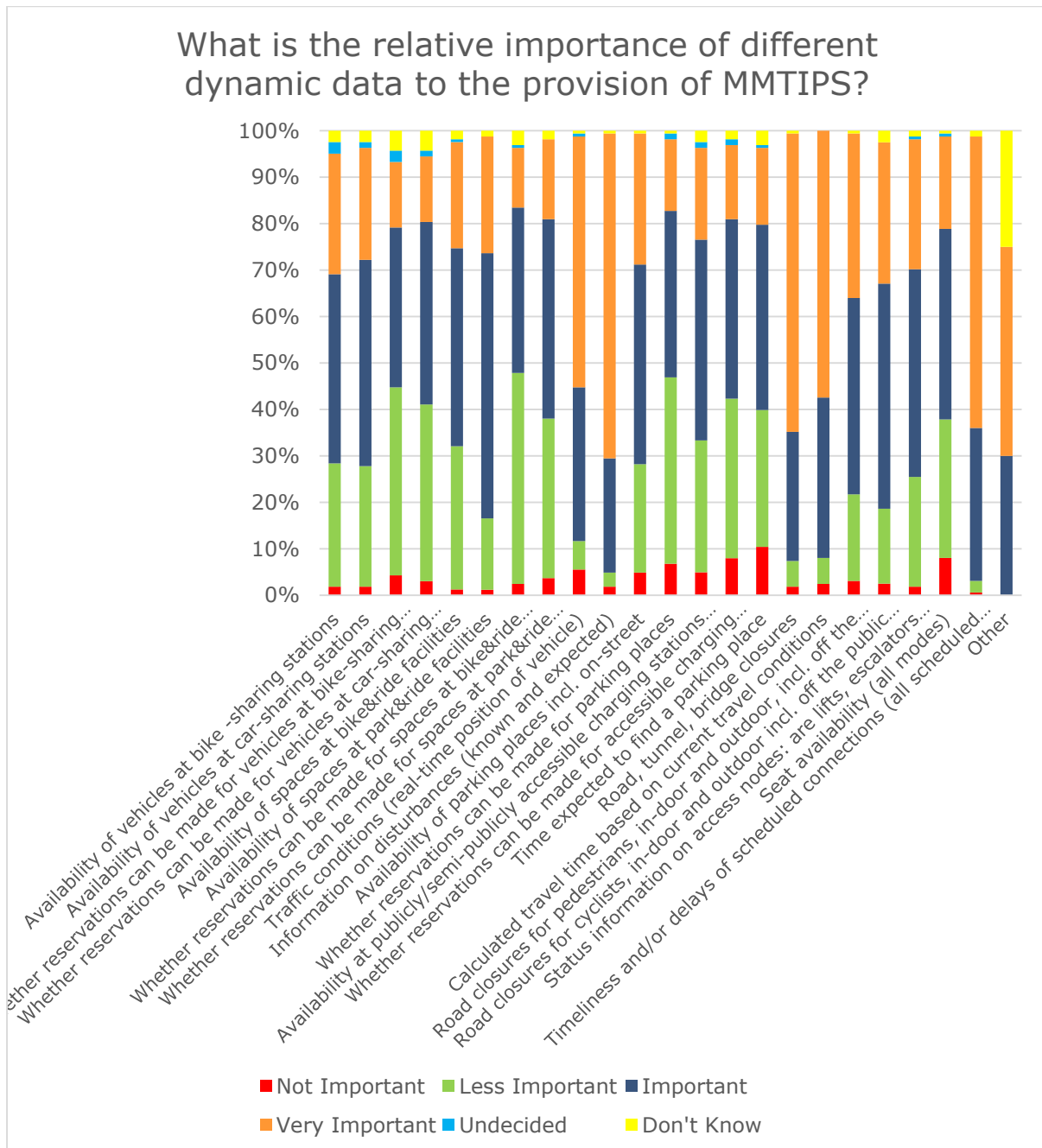
In addition to expressing views on the predefined list of options, they were also able to provide additional dynamic data requirements. These can be summarised as:

- **Passenger transport**
  - Dynamic fares information (i.e. yield based) should be included – although the opposing view is also strongly expressed by operators (CER, 2015).
  - Boarding / alighting platform information for trains, though it is noted that, when known in advance this is not always provided as public

> information in order to safely manage the movement of passengers within the station environment (i.e. avoiding overcrowding at the platform edge).
> - Current distribution of passengers on board a service to allow new customers to board in less busy zones (note that this data is not widely collected currently and may also be unattractive to provide on security grounds).
> - Level of network performance during strike conditions.

- **Traffic & road network**
  - Official diversion routes during planned roadworks/closures.
  - Real-time traffic light states and schedules of when temporary lights are in operation.
  - Known accident safety hotspots (e.g. historic data) for cycle route planning amongst other uses.
- **General**
  - Exceptional weather and its relationship to the network.
  - Real-time prediction on the success probability of the current journey. Alternatives if the success probability drops too low.

Seat availability is considered too closely tied to yield information many operators particularly within the rail and long distance coach sectors that it is therefore commercially confidential information that competing companies (within and between modes) would benefit from accessing.

A few respondents raised concerns about the security implications of providing real time location information on vehicles as dynamic data feeds and that only real time delay information relative to their scheduled arrivals should be provided. It is noted that the latter should provide sufficient information and in any case the former has been approximately derived from the latter by enterprising developers in some locations.

In summary of other comments made in response to this topic, challenges of dynamic data are with (i) availability (e.g. data generation) and (ii) aggregation of dynamic data feeds is a time intensive activity which could be overcome through the deployment of a coordination function required to establish Access Points.

5.1.3 Data sharing and access

The following section looks at stakeholder views on how data should be shared and how to provide third party users with effective access.

Respondents were initially asked whether they felt that there needed to be an EU approach to making traffic and travel data consistently accessible. The results showed 86% in favour and 9% against (5% responded 'don't know').

The dissenters to this view were nearly all transport operators and transport operator associations – covering various passenger transport modes. It should be noted that the majority of transport operators in the consultation did respond positively to this question.

Respondents were then asked whether points of access where the data is either stored (database, data warehouse, data marketplace) or signposted/indicated to where the data is can be found (registry) would help ensure consistency in the sharing of data.

78% of respondents stated 'Yes' with 9% stating 'No' (13% indicated 'don't know'). The decrease in those stating 'Yes' compared to the previous question is due to them opting for 'don't know' to this more specific line of enquiry.
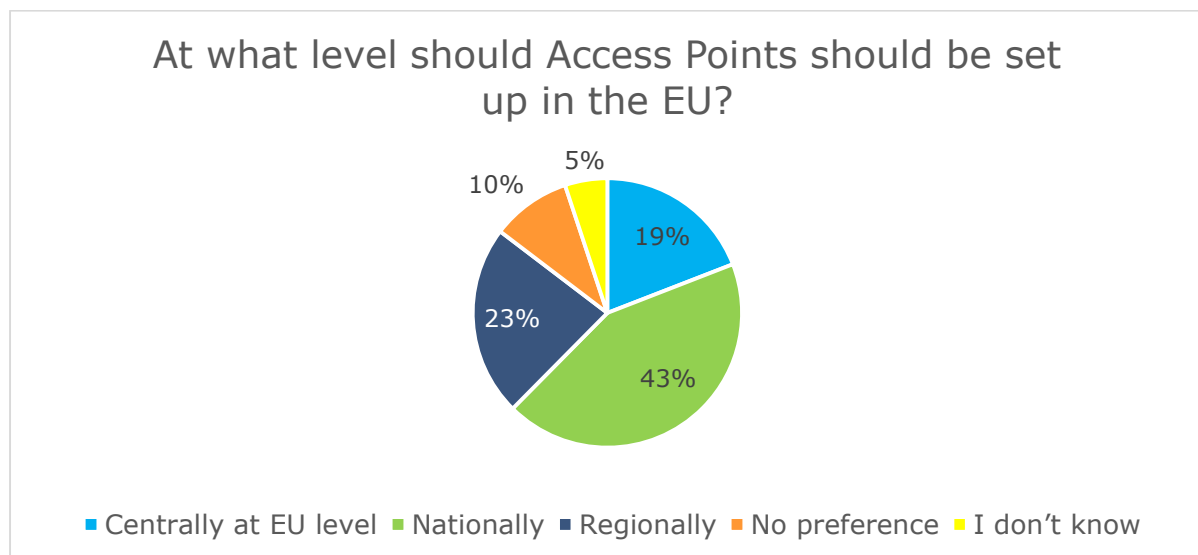
Those respondents who answered 'No' were asked to provide commentary on the reasons for their response, these included:

- A preference for flexibility for local decision makers to deploy an approach that best fits their circumstances (e.g. no mandating of an Access Point approach).

- A preference for supporting distributed rather than centralised forms of data Access Points.

- Concerns that centralised Access Points (on an EU or national level) are too risky from a single point of failure and a security perspective.

- A preference for API services for all data access rather than any sharing of static datasets.

- A specific viewpoint from a rail operator that the results of the Shift2Rail project will provide further evidence on what would be the best approach.

A review of the responses show common objections from the rail sector which in particular appears to be resistant to a single European Access Point being established. Responses from other sectors recognise that Access Points, if recommended, are more likely to be at a Member State or regional level.

Figure 34 shows the responses to the question on what administrative level should Access Points be established. The largest response was for national Access Points which is in line with the Priority Action B specifications which a significant number of respondents will be familiar with. It was certainly remarked upon that it would be more cost effective for Member States to expand the scope of existing Access Points than deliver something new at a different administrative level.

Figure 34 Preferred administrative level of Access Points

At what level should Access Points should be set up in the EU?

Legend: Centrally at EU level (19%), Nationally (43%), Regionally (23%), No preference (10%), I don't know (5%)

The position paper from TISA supports the concept of national Access Points and recommends they are implemented as cross-referenced registries. A single European Access Point is seen as unlikely to work, as implementation has to happen step-by-step at regional and national levels first (TISA, 2015).

It is worth noting that some respondents recommended multiple administrative levels in their responses. This may be to provide different types of data at the administrative level most appropriate. These could then be linked through a registry function within each Access Point to ensure data discovery remained as simple as possible.

The next question specifically asked stakeholders if the EU should mandate that Access Points are established within the Priority Action A priority specifications.

Responses to this question are separated into stakeholder type within Figure 35. Excluding the 'don't knows' this is seen positively by data owners, data users, data generators and content providers on balance. However the majority of transport and network operators are not in favour. Travel information service providers are evenly split.

Figure 35 Do participants think that the EU should intervene and mandate points of access to be set up in the frame of the policy specifications?
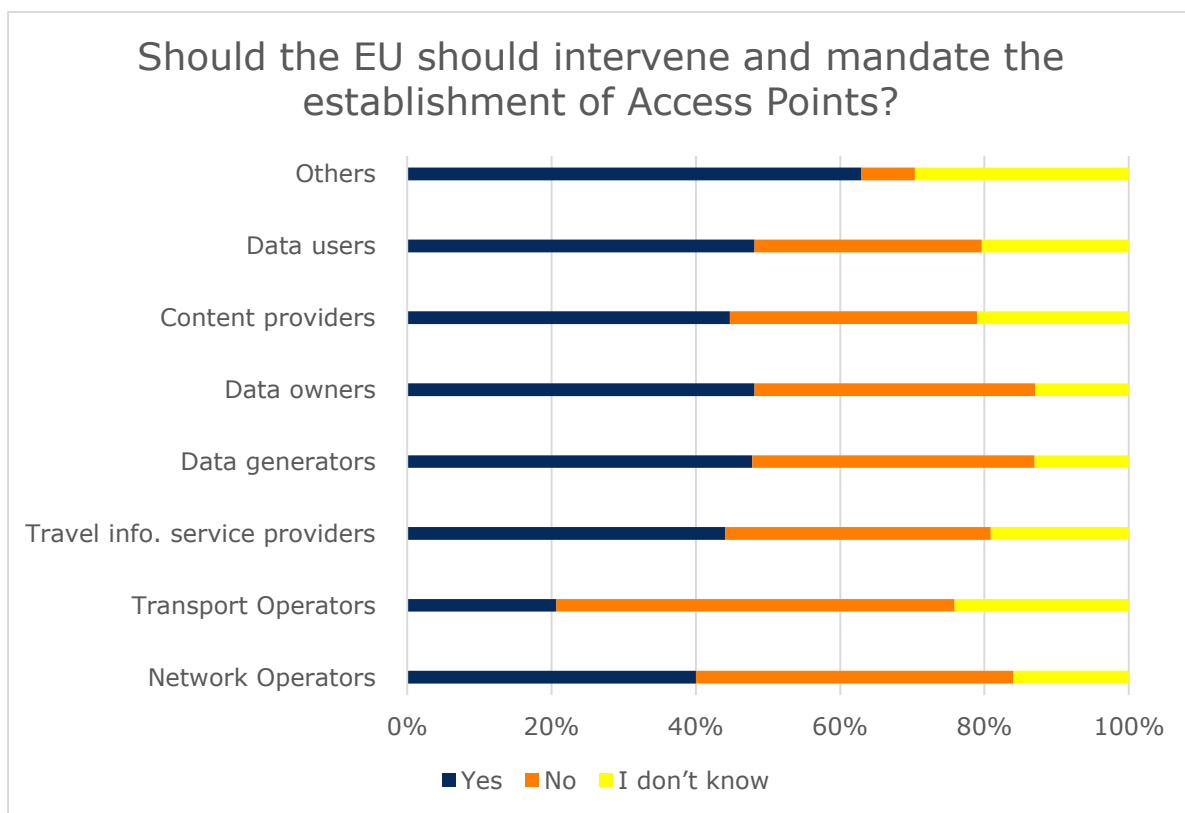
In the supporting commentary from respondents views are split into three similarly sized groups:

- Those who welcome a mandatory approach to Access Points, preferably at a Member State level and see this as a real potential benefit in improving access and reducing time required to find data.

- Those who cautiously support the idea but have concerns about a mandatory requirement, either on cost grounds; because the private sector may wish to provide this function; or because they would prefer a greater degree of flexibility in how this was deployed. This group includes city transport authorities that have already invested in local access points that they are keen not to drive demand away from to sites where they have less control.

- Those who disagree that these should be implemented and that the market should be allowed to find its own natural level. It is primarily transport operators proposing this view.

Several respondents highlighted that whilst the optimal solution might be Access Points at Member State level there would be a benefit in having a European registry of access points to aid with data discovery. One response suggested that this also allowed data users to rate/score each Access Point as a guide to others (and to motivate poorly rated Access Points to improve).

51% of total respondents supported this approach but there is a significant minority against (24.5%) with 'don't knows' also 24.5%. Therefore there would be stakeholder management required to support the introduction of a policy which mandated the introduction of Access Points.

5.1.4   Linking travel information services

The stakeholder workshop saw broad support for the use of linking travel information systems through open APIs to deliver MMTIPS with wider geographic and modal coverage. A further benefit of this approach is that the local data source / travel information service provider retains direct management of the data so that improvements in quality immediately flow through to downstream users.

Examples of where this would be particularly suitable were quoted by respondents to the consultation. These are locations where they believe there to be good demand from regular cross-border travellers and included adjacent regions to Luxembourg; Malmo-Copenhagen-Hamburg; the Upper-Rhine region; Vienna metropolitan urban area and north-east France-Belgium.

Within the consultation, respondents were initially asked whether they also supported this principle of linking travel information services for increasing modal and geographic coverage. As can be seen in Figure 36 this was supported by two-thirds of respondents for the former and 73% for the latter. This difference is likely to reflect that geography has been the primary reason for existing examples of services being linked.

Only a small proportion of respondents stated 'No' (16% and 15% respectively). A review of who these were shows that half were rail industry operators who offer the view that the market will resolve this challenge if there is user demand for it.

The other dissenters were a range of stakeholders including a systems supplier who provides the journey planning engine for a number of European cities/regions and beyond who has previously remarked that they have performance concerns over linked journey planning solutions (with a preference for a monolithic architecture) as results can be suboptimal in either speed or optimisation of route (depending on the topography of the network). Another dissenter is a recently emerged private sector travel information service provider operating in multiple Member States. It is interesting to consider that these two organisations are ones who might be expected to make significant use of the ability to link services but it seems from their responses that this would be unlikely.

Another organisation shared the belief that there is insufficient market research which identifies cross border travel as an area of user demand.

Figure 36 Views from respondents on whether they support the principle of linking of travel information services to increase coverage?
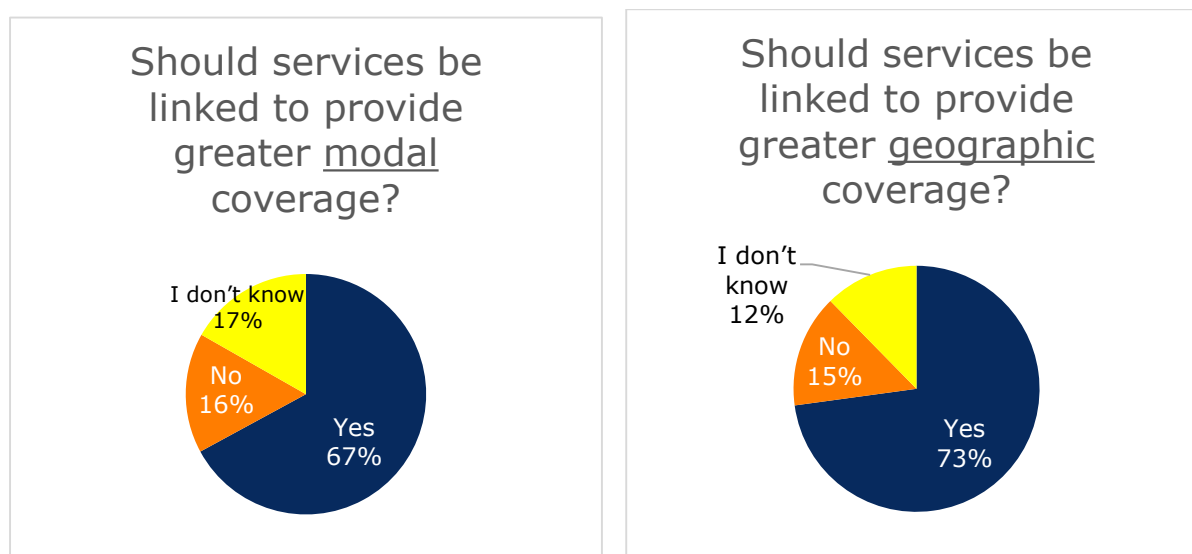
Another initially dissenting view was offered by TISA which considers the Linking Services model to be a complex solution particularly for Cross-border Travel. Their position paper (TISA, 2015) highlights concerns in getting the right balance on handover points which may need to be very high, or if the number of handover points is chosen too small, the resulting routing may be suboptimal. However, they concur with the general view that this model may serve some local and long-distance travel well and state that their preferred approach is that of distributed route planners using data retrieved from Access Points via Service Providers. These can then evolve over time, where existing standards and services are expanded to step-by-step to cover more transport modes, geographical areas and changing requirements of travellers.

The Community of European Railway and Infrastructure Companies identifies that current technologies require a fundamental shift away from the conventional mechanism of making data available to the concept of open distributed system architecture. Efforts should now be focused on IT architectures and on semantics, rather than data format: data should be designed for an open environment, rather than reformatted to be shared. *"The result should be 'linked data', related in a flexible manner through standardised interfaces, without the need for system re-design or centralisation of data"* (CER, 2015).

Respondents were asked if there are any technical barriers or circumstances preventing different (multimodal) travel information services effectively linking:

- No commonly accepted standard API protocol leading to multiple current APIs in use

- Implementation effort of a new or existing API within more services

- Challenge in dealing with multiple public and private third parties to agree ability to link

- Business case is usually for the third party service not for the source systems which they wish to access

- Cost of implementation

- Data mapping issues (coding of handover/transition points; transport nodes etc.)

- Lack of a coordinating body who can provide technical support or arbitrate over issues

- Data ownership issues

- Language issues

- Confidence in data quality within third party systems

Several respondents highlighted that there have been a number of existing implementations of this approach thus the only issues are non-technical in nature, e.g. organisational, political and commercial.

Respondents were then asked if they thought there were measures which could be implemented to help improve the linking of travel information services.

Figure 37 Views on whether there are any measures that can be implemented to help improve the linking of different travel information services

Are there any measures that can be implemented to help improve the linking of different travel information services?

■ Yes ■ No ■ I Don't know
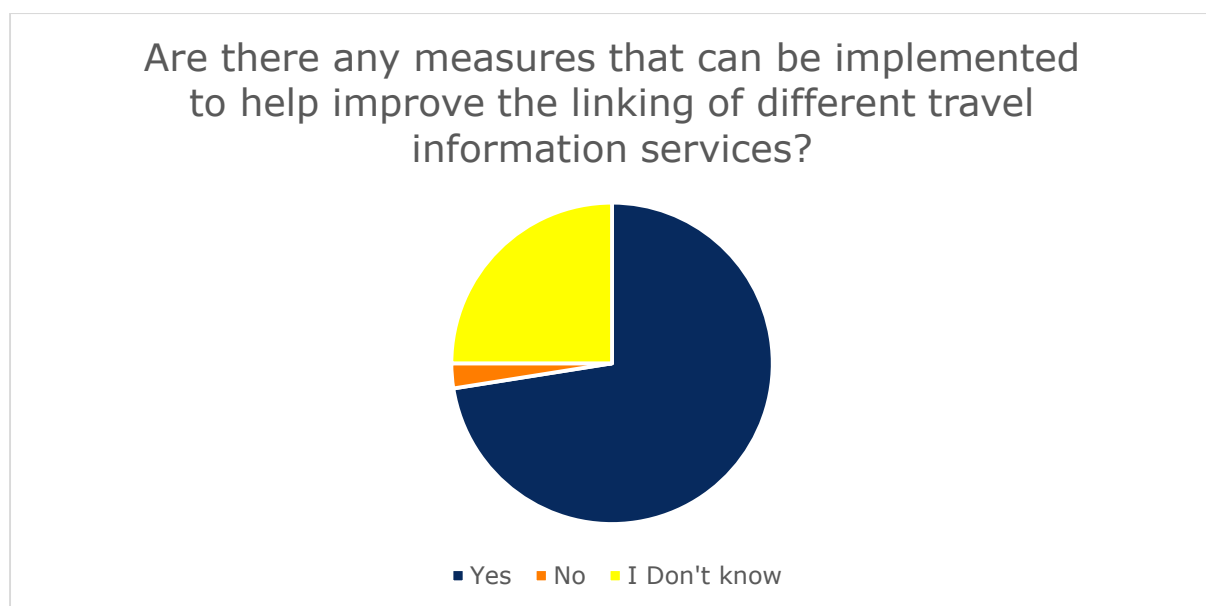
Just over half the respondents then provided suggestions on approaches which could be taken to support their response. These can be summarised as:

- A central EU-wide planner which provides trunk route journey information which local services can link into

- A European directory of traveller information services with APIs

- Bilateral access agreements for linking journey planners

- Common data interfaces and exchange protocols such as the upcoming CEN Open Distributed Journey Planning API specification

- Common European data gazetteers (localities, transport nodes)

- Definition of an EU roadmap for passenger multimodality funding research to provide empirical data and relevant information for service linkage to be realised. This roadmap would identify key European multimodal passenger corridors to bring together public and private resources, and align existing initiatives.

- Enable open-APIs on commercial terms

- Facilitate all Member States reaching an equivalent basic level as regards the existence of systems and geographical coverage. Recommendations and financial help for the less covered countries is necessary at the first place. Once in place then a link across the border becomes useful

- Financial support for enhancing existing geographic coverage of current 'linking' initiatives (e.g. EU-Spirit, Shift2Rail, FSM and CEN/TC 278 Open Distributed Journey Planning)

- Help and advice from experts with experience in implementing linked services

- Mandate that any public funded service must provide an open-API

- More frequent data refreshes in linked journey planners to aid in confidence of use

- Standardisation of metadata and data semantics with the provision of central "meta" services, i.e. a register of available journey planning services and a register of handover points.

- Targeted engagement programme with transport operators across modes

Participants were then asked to identify whether the EU should intervene in the area of linking travel information services and the extent to which that intervention should take place.

The responses to this question are presented both in categorisation by geographic region (Figure 38) and by stakeholder role in the travel information chain (Figure 39).

There is a variance in response across the EU, with no dissenting voices against action from Southern Europe but a split view on whether action should be recommended or mandated – weighted towards the latter with a focus on improving geographic coverage. This is interesting as Southern Europe is one of the two main regions where the provision of systems is low beyond the major cities – this has perhaps resulted in a situation where stakeholders seek mandation in order to make a more significant step forward.

Northern Europe has a much stronger preference (over 65%) for recommended measures with less than 15% seeking a mandated approach. This is likely to be due to the significant participation level within linked service already in place through EU-Spirit.

Eastern Europe has a much higher share interested in focussing solely on modal share. This would probably reflect that many of the existing systems in place within that region (identified in D1) are monomodal.

Figure 38 Views on whether the linking of travel information services needs to be tackled at an EU level – by organisations' region of operation
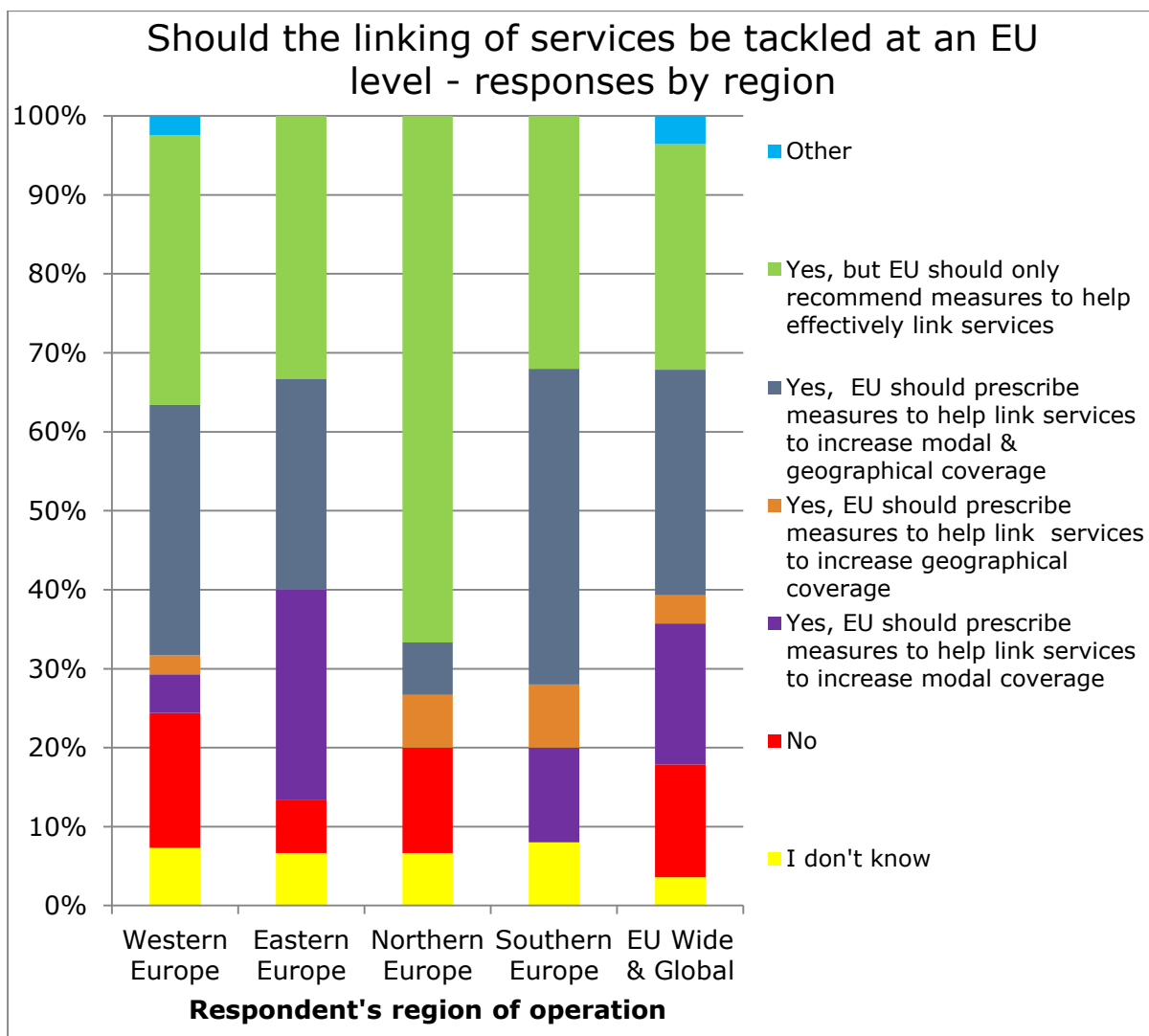
Looking at the split between stakeholder responses, we specifically separate out the network and transport operator views to compare them with others in the information chain. From this we can see that there is a significant minority (over a quarter) of the former who seek no intervention from the EU. Amongst the other views expressed it is clear that there is much more interest in linking services to provide multimodal information rather than for expanding geographic coverage. This is interesting and perhaps reflects on many operators being at greater ease with the idea of being integrated into a wider transport network with other modes than appearing within an information service that may include more of their same-mode competitors. It may also reflect that the significant number of rail respondents within the operator segment are comfortable that the inter-mode geographic provision is at a sufficient standard and that the challenge is on how to link in with other modes.

Figure 39 Views on whether the linking of travel information services needs to be tackled at an EU level – by stakeholder type
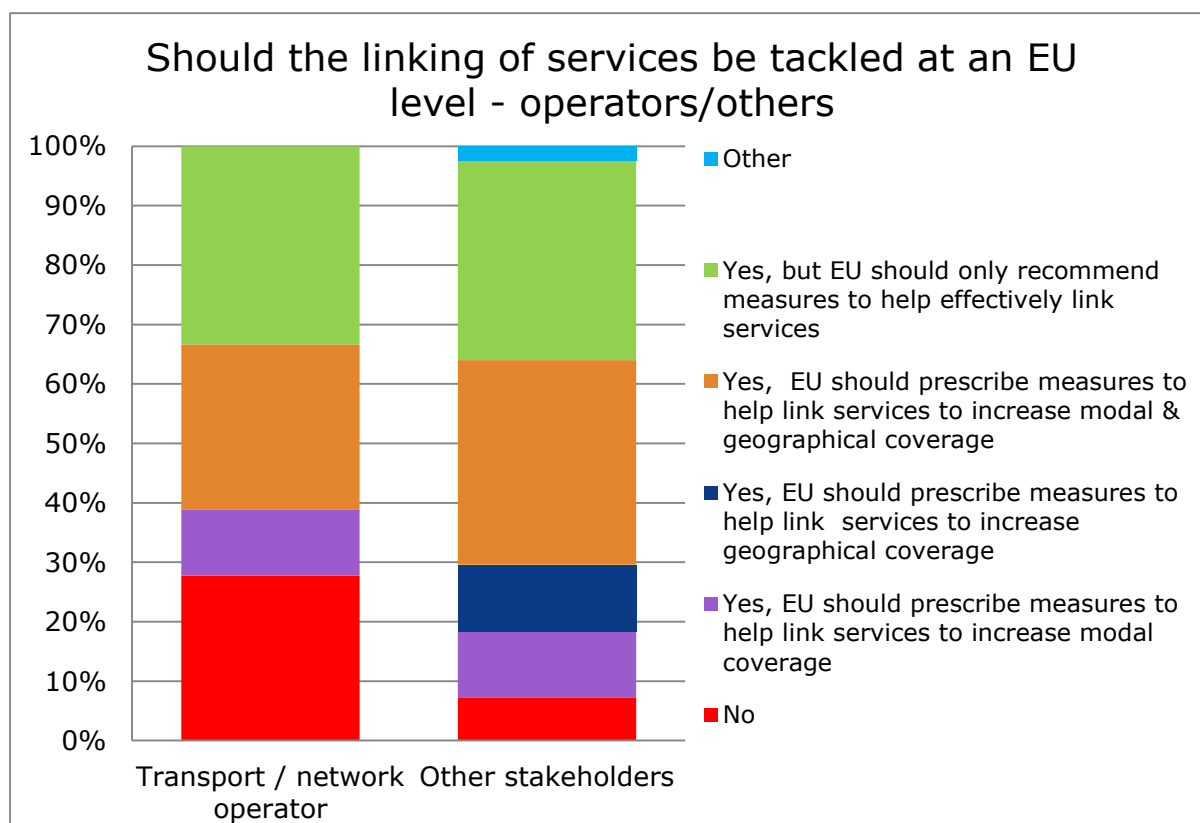
Several of the respondents supportive of prescribing measures felt that without guidance from the Commission, transport authorities and/or operators will be highly reluctant to provide APIs for linking services.

Of those respondents who answered 'No' on whether the linking of services should be tackled at an EU level the concerns can be summarised as:

- Concerns that a linked region-specific services approach would result in organisations having a controlling monopoly on the scope of information provision in their regions, if the source data is not also open and available.

- The rapid pace of technology development makes it hard for legislation to keep apace in a meaningful way.

- Financial costs concerned could be substantial and not deliver sufficient economic benefits to justify the expenditure.

- The view that this topic should be left to market players and standardisation bodies without legislative intervention.

Approaches suggested by respondents for the implementation of policy measures to link travel information services included:

- Encouraging operators to conclude their own collective arrangements in the first instance, backed by a 'safety net' reserve power to mandate this if operators do not deliver.

- Focus initially on single transport modes and delivering those at a pan-European level and then move onto multi-modal information systems afterwards.

- Set recommendations that provide local decision makers with flexibility in how they meet them.

- Prescribe approaches to linking services but not mandate that services have to adopt and join. This will attract those that see this as a lucrative and worthwhile market but allow those that see regional or national provision as a priority to maintain their existing service offerings.

- Address the linking of travel information systems should be a future step after improvements have been made in the availability of data and the impact of that can be judged.

In summary a large majority of respondents are in favour of some form of intervention however the level of support for mandating measures is probably not sufficient across Member States and stakeholder types.

5.1.5   Quality levels

Responding to the concerns which travel information service users have about the quality (of information and the source data) as explored in Section 4.1.4, this subsection explores the stakeholder views on the scale of this issue and the potential for EC intervention.

Respondents were initially asked if they felt that the current quality of multimodal travel information services in the EU was sufficient. 69% stated No, with just 14% stating 'Yes' and 17% answering 'don't know'.

Those who answered 'Yes' were primarily rail operators and highways/motorway operators. From supporting comments it appears that both sectors are responding with a monomodal view that they are comfortable with the quality of information for their modes.

The majority of respondents provided further information in support of their view on quality. These are summarised here:

- **User experience**
    o Building user trust – no way for users to have knowledge on which information services are good quality – apart from 'app' store ratings
    o Seamless planning and booking not possible in most cases.
    o Need to ensure services meet the requirements of blind, low vision and print impaired citizens, including seniors who cannot cope with advanced technology.
    o Lack of consistent multi-lingual support in systems (including those which claim to be).
    o Market Darwinism: A multitude of competitors offering high quality services, will have the effect of pushing all services towards excellence. Poor quality services will disappear when users abandon them for better alternatives.

- **Geographic and modal specific concerns**
    o There are significant gaps in data coverage in a number of countries. Smaller areas and regions with fewer resources may be less well served with information.
    o Intermodal information is difficult to acquire.

- o   Poor quality of cross-border travel information in Europe. *"It is impossible to plan door-to-door multimodal travels between EU countries".* One respondent also drew attention to the importance of transport links with non-EU countries to many citizens (e.g. Switzerland, Serbia etc.).
  - o   Poor quality of rural data and information.
  - o   Significant lack of data on walking & cycling routes.

- **Presenting a true picture**
  - o   Timetables are often not up-to-date.
  - o   Real time incident information is missing.
  - o   Variances in result based on underlying architecture approach.
  - o   Many multimodal travel planners only show the selective content that transport operators have provided them with.

- **Quality improvement cycle**
  - o   Could be better but is it sufficient already in many places?
  - o   This quality is currently sufficient, but can of course always be improved.
  - o   Data and information is continually improving.
  - o   This is a highly complex area of software development and it will never be perfect. The goal should be to continuously improve the quality of the data.

- **Data management/aggregation issues**
  - o   Challenges of integrating data of varying degrees of quality.
  - o   Lack of detail in data (e.g. how does the traveller interchange between two services in a result).

Views were then sought on whether multimodal travel information should be consistent across the EU or if variation in information quality was a reasonable feature of the transport landscape. 67% answered 'Yes', it should be consistent. 24% stated 'No' with 9% answering 'Don't know'. These answers are very close to the earlier question 'is it sufficient' as would be expected with a small number of respondents of the view that it isn't currently sufficient but it needn't be consistent across the EU either.

Stakeholders were then further asked if the EC should intervene to prescribe or recommend measures to improve the quality of data and information (results by region - Figure 40; and by stakeholder type - Figure 41).

There is broad support for the EU to recommend measures to improve quality, however that support varies across regions. The Western region and those organisations who identified themselves as EU-wide or Global each included a significant minority (approx. 17% for the former and 14% for the latter) who expressed the view that no action should be taken. This is explicable from the high number of operators present within the Western region and the higher level of quality present in many services (likely to be due to the longevity of existence and maturity of national data standards).

The Southern region was much more in favour of a prescribed approach, again perhaps reflecting a desire for firmer action to move forward the sector more substantially than is needed in most other regions.

Within the stakeholder split, the biggest difference is with the network and transport operators where a quarter are against any intervention compared to just 6% of the other information chain stakeholders.

Figure 40 Views on whether the improvement of quality levels of multimodal travel information services should be tackled at an EU level - comparison of responses by region
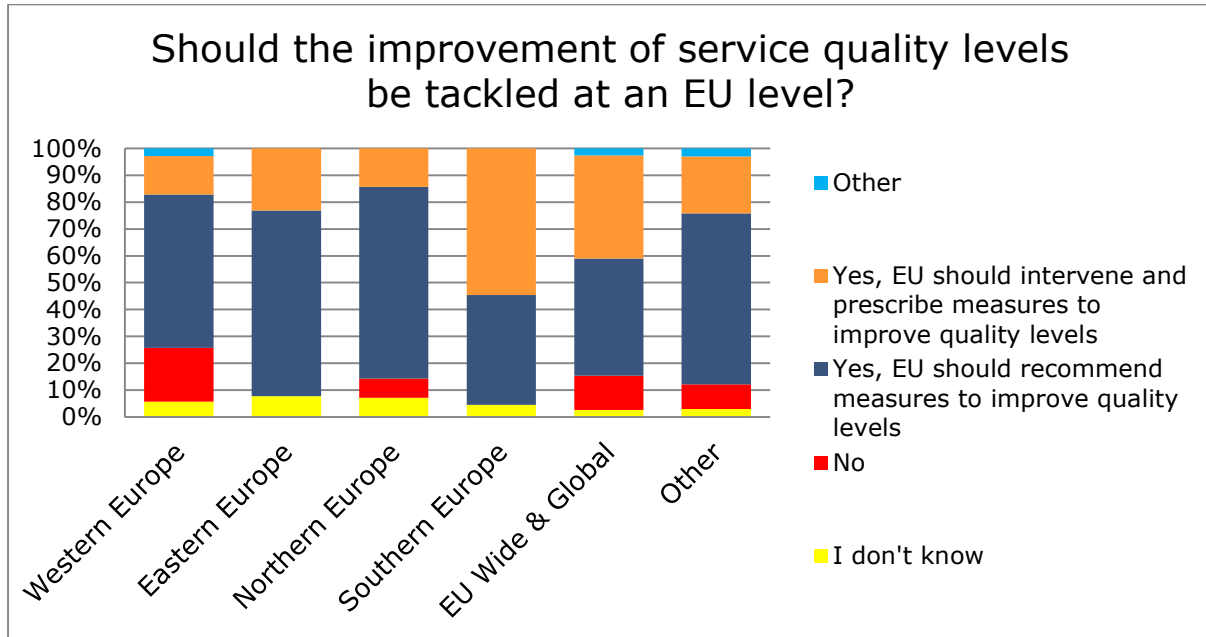
Figure 41 Views on whether the improvement of quality levels of multimodal travel information services should be tackled at an EU level - comparison of operator and non-operator responses
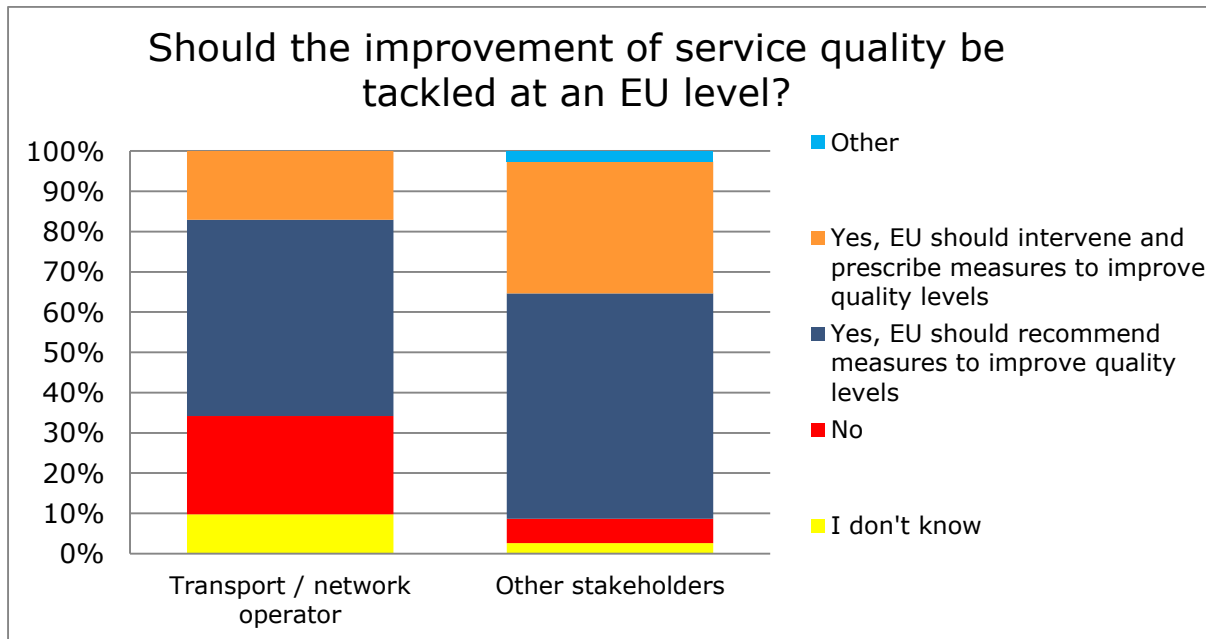
Respondents were asked to provide further comments to support their responses and advise on their preferred approaches for any EU intervention. These can be summarised as:

- Clear feedback mechanisms:
  - Ensuring clear ultimate ownership defined for each element of data with mandated feedback loops to ensure data is corrected at source (and within a fixed time).

- o Enablement of operator led quality improvement activities to correct data at source.

- Guidelines:

  - o Establish minimum acceptable and recommended standards for data quality.
  - o Provision of common quality assessment guidelines.

- Labelling:

  - o Recognition of good quality services (e.g. labelling or inclusion within a registry).

  - o Labelling on the quality of data so users can judge its reliability - i.e. definition of a common European traffic and travel data classification system.

- Funding for improved data management:

  - o Provision of funds to support data quality improvement actions.

  - o Mandate and/or fund data management work to complete gaps in the European network.

  - o Funding of open-source data quality checking tools.

- Exchange of best practice.

- Data formats and access:

  - o Open all transport data to prevent any selective choice by operators on what they choose to release.

  - o Improve uptake of data standards that inherently raise the overall quality of data.

  - o Implementation of common metadata to aid data discovery and understanding.

However, a few words of caution were also raised within these responses:

- A preference for allowing market actors to define the terms and conditions for use and re-use of their data according to their needs and preferences. Consumer demand will then help regulate the quality of the services in market-driven manner. A top-down quality approach mandating quality levels may not add value in this context

- Flexibility in the specification policies to reflect size of local populations and transport networks

- Ensure distinction between requirements on public and private sector data owners and travel information service providers

5.1.6   Terms and conditions of data re-use

The final set of barriers explored with stakeholders was with the legal terms and conditions of data re-use by third parties. This is an area where differentiation between

public and private sources of data needed particular investigation to identify any variances in view that may need to be considered within the policy specifications.

Figure 42 details the responses from participants to the question of whether public sector traffic and travel data should be made accessible to third parties for re-use in a fair and equal way. 92% of responses gave positive responses to this question.

The responses very much reflect the current status of data availability and particularly the 'open data' agenda in different parts of Europe. For example, the views from Northern Europe where most Member States have a significantly mature data availability agenda over 85% of respondents 'Strongly Agree'. In Eastern Europe however the same agenda is very much in its infancy, as a result the views from that region, whilst still positive, are less enthusiastic with 'Agree' being the majority response.

Only a small proportion of total respondents stated that they 'Disagreed' or 'Strongly Disagreed' (3%). These organisations are a French rail operator; a German city, a Central European travel information service provider; and the German operation of a multinational systems and consultancy company.

Figure 42 Views on whether data across different modes of transport from the <u>public</u> sector should be made available for re-use to service providers in a fair and equal way (including possible financial compensation) – comparison by region and between operators and non-operators
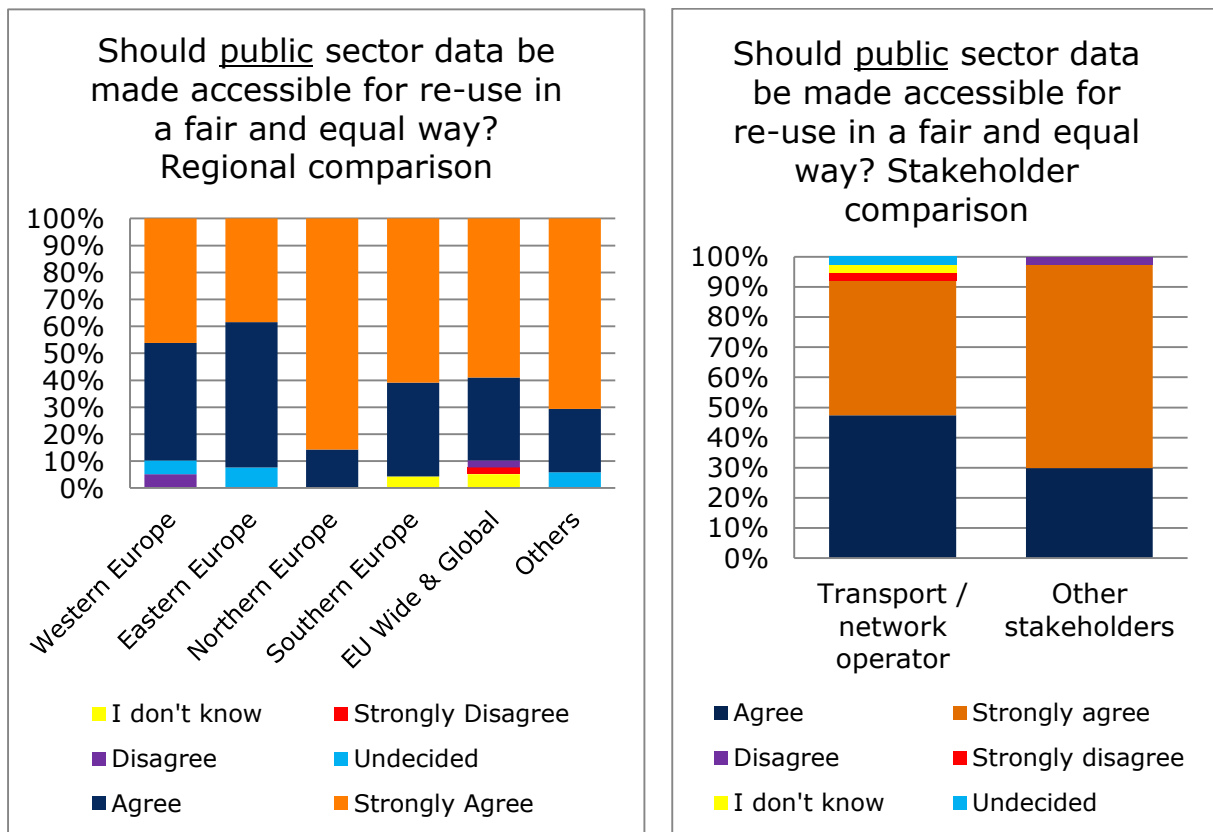
Transport operators had a high level of agreement with the statement, though, like the Eastern European responses, this was not as strongly felt as by the other stakeholders – however it was still very positive compared to similar questions on other themes. This is likely to be because operators seek this as an opportunity to ensure good and common legal protection for their data, and with helping to get data from other modes to extend

their own systems – a benefit to them rather than a cost which seems to be how the other areas explored were often perceived.

On 'fair and equal access to data', Floristean et al (2014) highlighted in their findings into the access and availability of multimodal travel information that there are concerns from MMTIPS providers that some transport operators and authorities are selecting which private sector information providers they share data with, thereby putting others at a competitive disadvantage. There may be reasonable justifications for this, such as concerns over misuse, but the view is reinforced in the consultation responses and supporting submissions from some transport operators (and associations) who are keen to be able to select different commercial terms for different data users.

The same question was asked but this time focusing on data from the private sector. Figure 43 shows the results as a regional comparison.

Interestingly there is very little deviation from the question on public sector data in terms of the overall positivity. One small shift is that there is closer alignment between responses from stakeholder types so this is not included as a graph for brevity. The number of negative responses has increased from 4 to 5. Some of the respondents have also changed their perspective here with another large multinational technology company objecting – this is likely to be over concerns regarding their own intellectual property.

The most substantial shift are the views switching from Strongly Agree for public data to Agree for private data. This is most visible in the responses from Northern Europe where the strength of feeling has shifted from 44% Agree / 46% Strongly Agree (public) to 64% Agree / 28% Strongly Agree (Private). This is likely to be a reduction in confidence that what has proven to work well for the public sector would also be reasonable for the private sector.

Figure 43 Views on whether data across different modes of transport from the private sector should be made available for re-use to service providers in a fair and equal way (including possible financial compensation) – comparison of regional responses
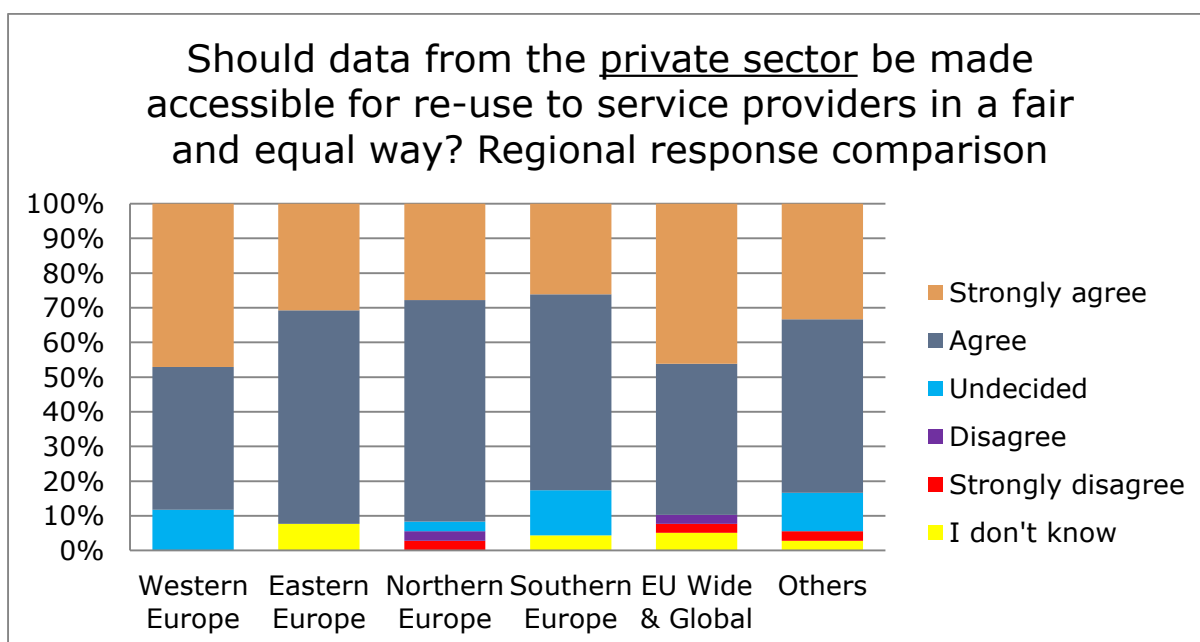
Floristean et al (2014) research with stakeholders in the travel information chain identified that whilst most were satisfied that current arrangements were "fair and non-

discriminatory" the view of MMTIPS providers as downstream data users was less positive. The research also identified that there were varying interpretations of the two terms which part-explained the difference in views between stakeholders – therefore a clear common definition of these terms is important.

The next subtopic explored was whether or not there should be any transfer of ownership of data as third parties amend and add value to data they have been provided with from others. Figure 44 and Figure 45 shows the responses to the specific statement "the re-use of travel and traffic data should not include any transfer of ownership of data".

The responses are much more divisive to this question, there is a large majority of support for this from Western and Northern European respondents. This reflects that this is broadly the approach already being taken and is also a condition which transport operators seem to be much more comfortable with as it protects their intellectual property rights (only 6% disagree with the statement). However a quarter of respondents in Eastern and Southern Europe, a significant minority disagree with this approach, instead preferring to keep some flexibility regarding changes in data ownership. The reasons for this are not fully clear, and do not appear within the supporting comments to this section provided by respondents. It may be that there is a different commercial perspective regarding the promotion of innovation by rewarding innovators who add value to data with commercial benefits for that investment.

In total it is 10% of respondents who responded negatively to this statement. Operators were more likely to respond positively than technology companies. However there is a very high level of support amongst all groups for this exclusion.

Figure 44 Views on whether the re-use of travel and traffic data should exclude any transfer of data ownership – regional responses compared
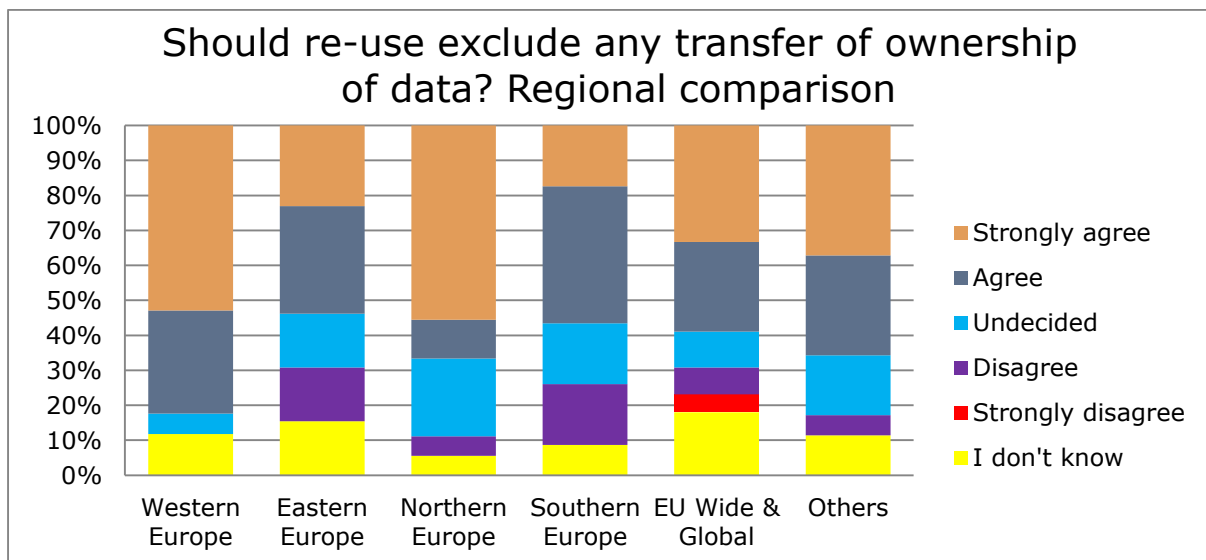
Figure 45 Views on whether the re-use of travel and traffic data should exclude any transfer of data ownership – operator and non-operator responses compared
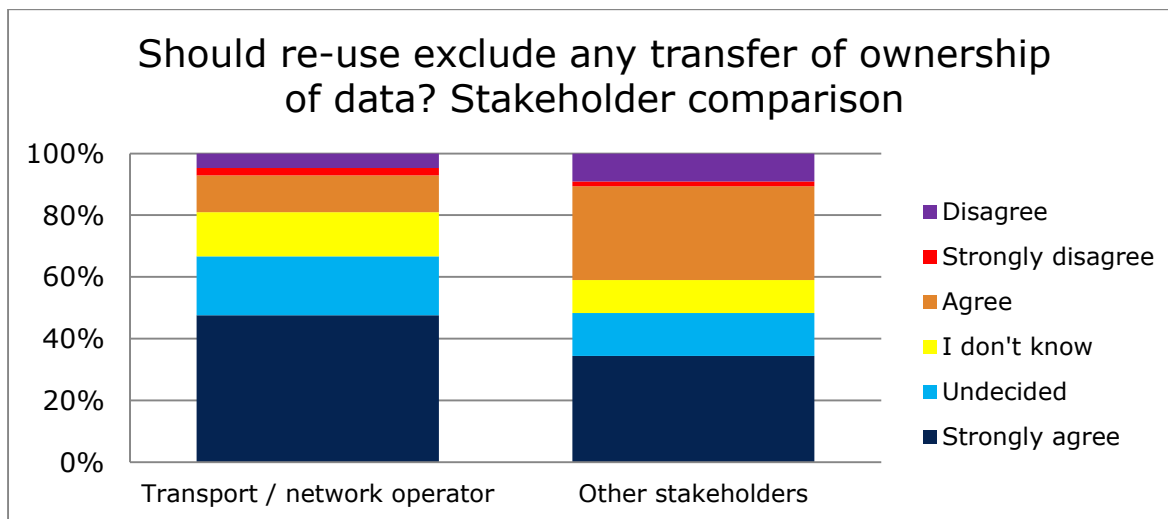

A repeatedly stated concern by many data provider stakeholders was that they should not incur charges for providing data which benefit others without some form of recompense. The next question explored how this could be done in a fair and transparent way with all consultation respondents

The results in Figure 46 indicate that a large majority of respondents agree with the principle of a transparent calculation cost (basis and factors) for any charges associated with data.

The minority of respondents (16%) who disagreed (or strongly disagreed) with this view were rail operators and motorway/highway network operators. The direct evidence provided in the responses doesn't provide a supporting explanation for this view but it is likely to relate to commercial sensitivities relating to the costs associated with the calculations.

Figure 46 Views on when the data owner should indicate the calculation basis for the applicable published charges and indicate which factors were taken into account in the calculation of the charge
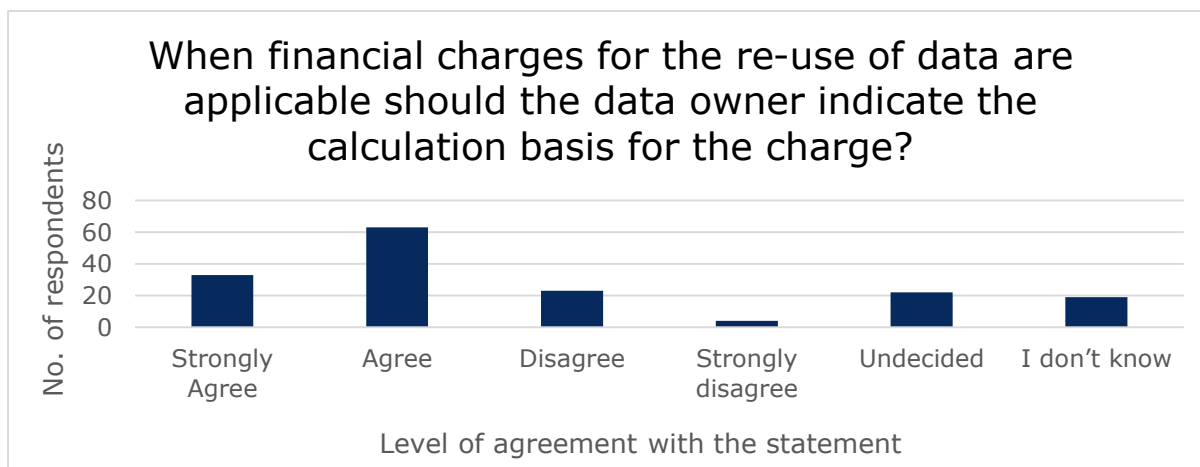
More information is available in some of the supporting evidence submitted however. The rail industry association (amongst other data owners) highlights that *"data generation and processing have a very tangible cost"*. The view expressed by these

respondents is that the financial burden should be placed (or at least shared) with data users (in particular private sector data users) and operators should retain the right to charge them to cover the cost of data sharing. CER also seeks the non-exclusive right for its members to retain the right to adapt their data charging policies to fit their specific constraints, or to offer incentives to newcomers or smaller players in the field of information provision (CER, 2015). This would need to be carefully handled as it might also allow data owners to pick or exclude certain companies from using their data (which could be an anti-competition activity).

The previous EC commissioned study on access and availability of data (Floristean et al, 2014) highlighted a range of existing pricing schemes for data being used, including 'freemium' models, packaged or volume charging and also commission charging. The results in Figure 46 however, suggest that the majority of stakeholders are now in favour of a transparently calculated cross charge.

A stated concern from some data providers regarding providing greater access to their data to third parties is that the data may be misused or may be unfairly represented as an option to travellers, e.g. a rail operator provides data but despite providing a fast and cheap solution it appears in the results ranked lower than some of their competitors. To provide greater confidence to data owners it would be possible to require data users to be neutral in the way that information is presented and transparent regarding the approach taken to ranking options (e.g. sorted by timeliest journey with a clear definition of what that means).

There were only five objections to this point, two of which were from the Swedish traffic and highways sector, a German ITS Cluster, a German regional government and a UK-based international travel information systems provider. A reasonable objection that might be used draws on the views shared within Section 4.1.7 which explored the use of MMTIPS and operational tools for managing flows of travellers around the network. If all presentation of journey options needed to be neutral that might that limit the ability to promote subtle behaviour change to more sustainable or less congested routes – especially if those options were not quicker but would provide a greater network resilience and a wider social benefit. Such approaches could be explained within the criteria used to rank travel options but might still be challenged by a transport operator as not being neutral.

Figure 47 Views on whether there should be transparency in the criteria used to rank travel options and neutrality in the way information is provided to the user
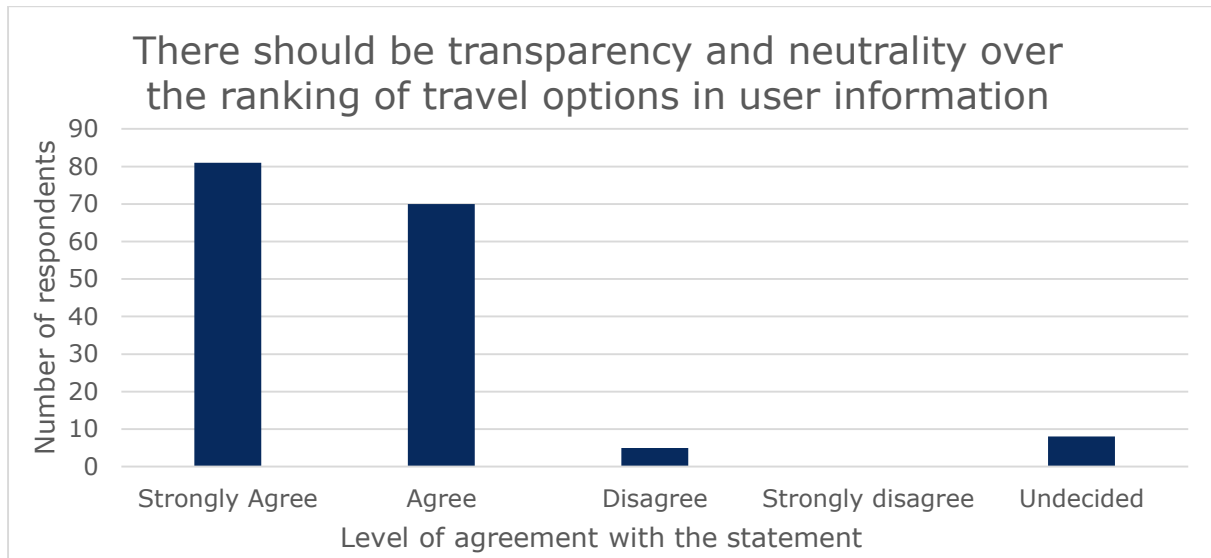
Supporting position papers provided by stakeholders were very supportive of the view that neutrality was essential: The rail industry view is that *"a strong emphasis should be placed on guaranteeing a neutral and accurate display of the information by third parties. Strict framework conditions should be in place to guarantee the quality of the data displayed. Who is responsible for the display of information and where a complaint can be made in case of erroneous displays"* (CER, 2014). This was also supported in the French government response: *"Platforms (e.g. third party data users) must especially make clear the existence or not of a contractual relationship…re-use should not mislead third parties with regard to the information content and the date of update"* (NAF 15-185).

To further consider ways to address data owner concerns regarding their rights if a third party misuses their data in some way, we explored the views of stakeholders on whether safeguards should be in place for the reputation of the data owner.

Figure 48 shows the high level of support for the inclusion of safeguards, although the level of support is less than for the previous question on neutrality of information.

There were twelve objections, of which seven were from local or national administrations. Nearly all of these specific administrations are known to have an open data strategy for transport. An important principle of open data is for authorities to relax terms and conditions on data re-use, therefore it may be that the imposition of safeguards is felt to have the potential for restricting innovation in the uses of that data.

Figure 48 Views on whether the re-use of travel and traffic data should include safeguards for the reputation of the data owner

The re-use of data should include safeguards

No. of respondents (y-axis, 0 to 70)

- Strongly Agree: 56
- Agree: 66
- Disagree: 8
- Strongly disagree: 4
- Undecided: 20

Level of agreement with the statement

Again, the rail sector has a clearly defined view that *"data users should have an obligation to remedy the issue in a prompt manner, and failure to do so should result in a suspension of the access rights. Data owners should also retain the right to conduct quality audits and to terminate a given collaboration in case of data mismanagement"* (CER, 2015).

Regarding the overall objective of improving the availability of multimodal information systems it was important to identify if there was any specific resistance or objections to the sharing of data on a cross-sector basis. This may equally relate to concerns with sharing data with technology companies who may be perceived as not having sufficient knowledge to interpret and understand operationally derived data. Further levels of innovation in systems using transport data may take place by third party users in an alternative sector such as health or education which again may be objected to by some actors.

However the results in Figure 49 shows a high level of support for data to also be open on a cross-sector basis. Only seven respondents had a negative view and whilst these are cross sector, they tend to focus on downstream users rather than operators – e.g. service providers, data users etc. Interestingly four of the dissenters are German organisations. It is not clear why that might be the case though perhaps the term 'cross-sector' has a particularly nuanced use in Germany – it may be a particular preference to focus innovation within a sector and concerns about eliminating market barriers than may introduce new market players from other sectors. It may also be a coincidence that most responses came from one Member State.

The low levels of objections indicates that this is not a viewpoint which the Commission needs to be concerned about (the majority of objections are also rated at the lower grade of Disagree rather than Strongly Disagree).

Figure 49 Views on whether the re-use of travel and traffic data should also be open to cross-sectorial use
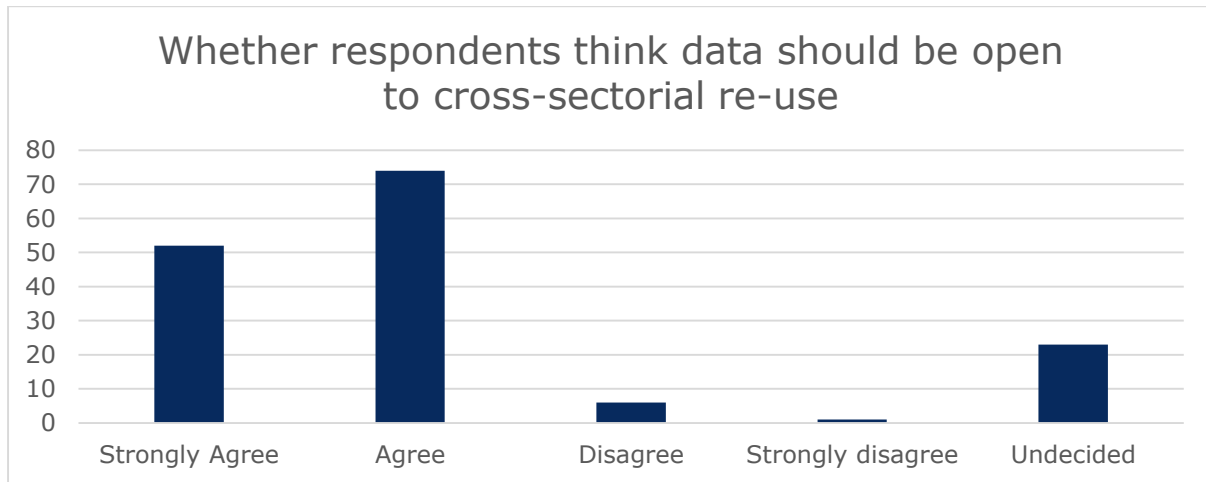
Respondents were asked if the establishment of terms and conditions for the re-use of traffic and travel data should be tackled at an EU level. The options provided to the respondents varied between the online and the offline consultation surveys so both sets of result are provided here (Figure 49 and Figure 50 respectively).

In the first form of the question, there was a very high level of support from Eastern Europe (85%) with no dissenters, close to this is the level of support from Southern Europe – both a further indication that these regions see this as a high priority for action to help close the gap in multimodal information provision. The more mature markets of Western and Northern (Scandinavian) Europe, along with EU-wide and global organisations were still broadly supportive but at a lower level (with approximately two-thirds in support). Non-EU based organisations were less supportive of EU intervention, but this feels likely to be as a concern of being disadvantaged in comparison to those organisations within the EU.

In the second form of the question which close to a third of total respondents used, there was a strong preference for measures which recommended approaches rather than prescription. The overall level of support was higher from these respondents.

Figure 50 Views on whether the establishment of terms and conditions for the re-use of data should be tackled at an EU level - online responses (116) categorised by region of response
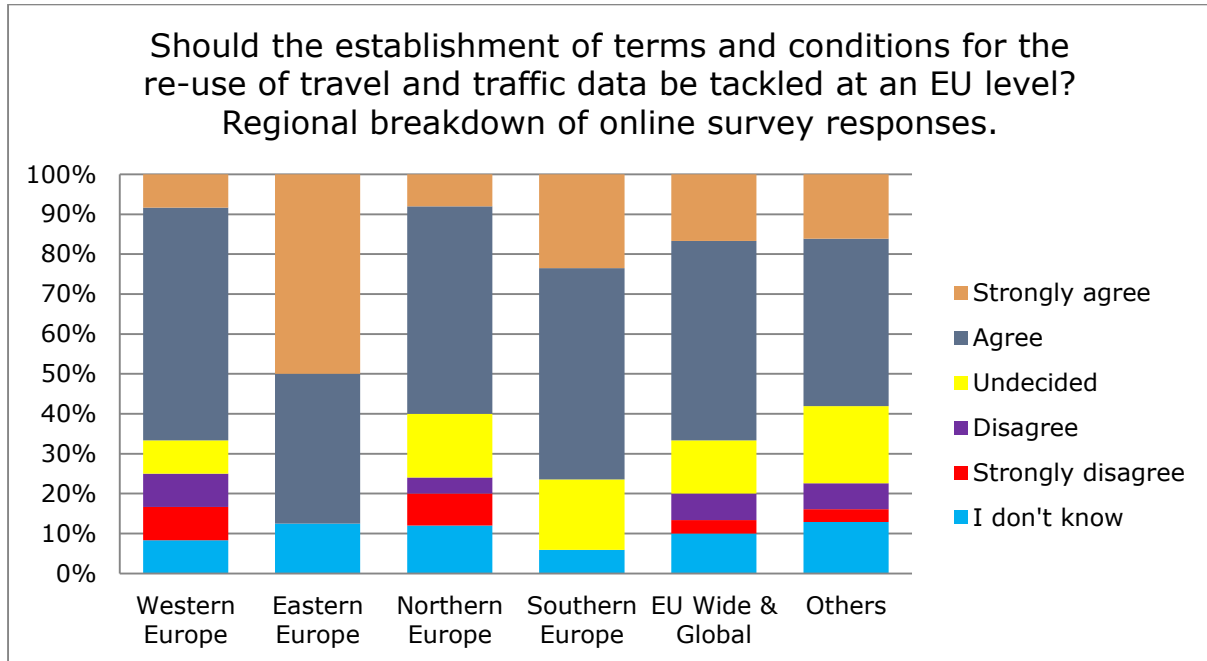
Figure 51 Views on whether the establishment of terms and conditions for the re-use of data should be tackled at an EU level - offline responses (49) categorised by region of response
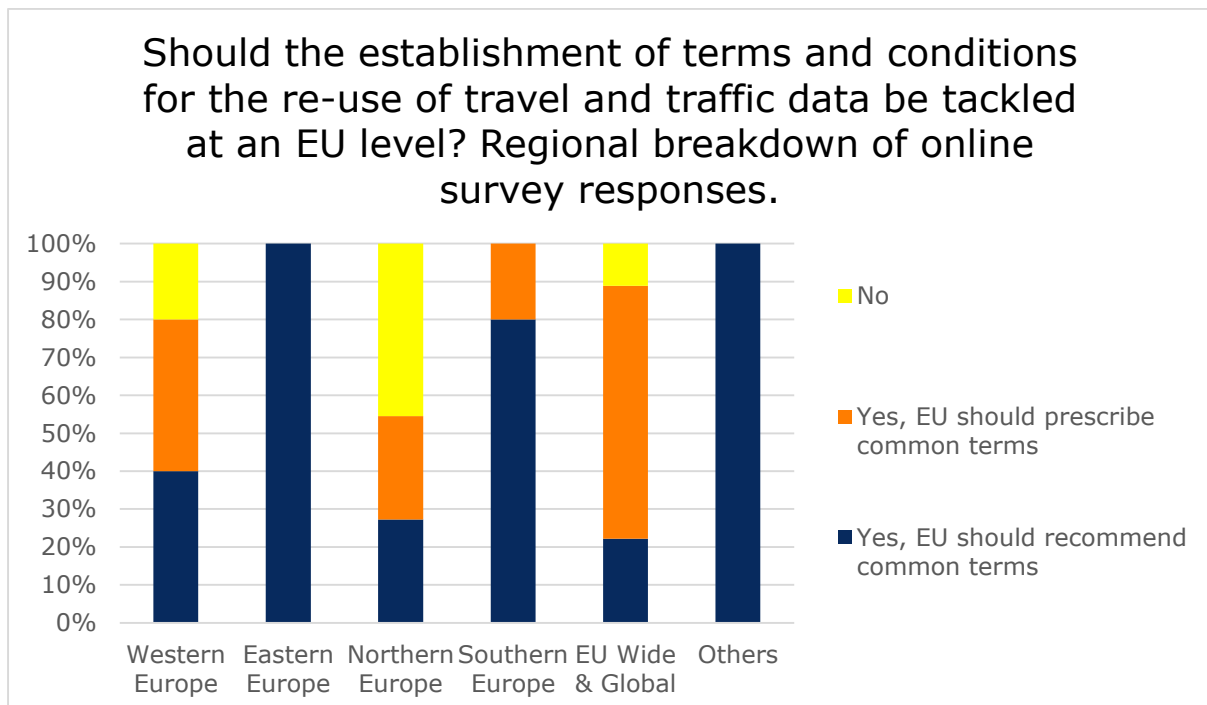
The dissenting views to the two versions of this question were predominantly from the rail sector in Western and Northern Europe. As has been seen in the CER position paper this is due to the rail industry keen to be able to be more selective in whom uses and how it is used by third parties. There were only three other organisations who shared this view who were not from that mode – two German cities and one national technology association (UK), both of these are mature markets for travel information and data who

have handled such issues on a local basis thereby are less likely to perceive the need for action.

5.2 Need for European Union intervention

There is a high level of support for EU intervention across stakeholders to improve the uptake and coverage of MMTIPS, particularly for cross-border journey information. However this support varies depending on the particular barriers involved.

BEUC (2014) states that from a consumer perspective, *"European legislation should be developed to ensure that travel planning information, produced by transport operators, must be made accessible in a standardised way"*.

The one group with consistent reservations within the consultation has been transport operators and more specifically the rail operators – the one area where they were more supportive was for improved terms and conditions for data re-use (for terms which empower the data owner) where it is likely they see more of a direct commercial benefit.

The paper put forward by the House of Representatives of the States General (Netherlands) raised a concern echoed by others in the both the workshop and the public consultation responses. This is the risk of over regulation through setting mandatory requirements which might *"constitute an obstacle to multimodal interoperable travel information. After all, developments in this area — primarily market-driven — are moving fast.*

The official French response expressed a desire for the delegated regulation to specify common standards for data formats, exchange protocols and the main rules for access to data and the connection information (NAF 15-185, 2015).

In summary these views reflect a desired for a formal European position on preferred approaches (i.e. recommendations) but with some concerns over negative impacts on innovation and costs which might arise from mandated provisions.

Table 3 below provides a summary of the percentage positive and negative perspectives views, sorted with preference by actors for EC action.

Table 3 Summary of views on whether the European Commission should intervene

Theme	% Positive support for intervention	% Against intervention	Preferred approach to intervention
Quality improvement	82%	10%	Recommend measures to improve quality levels.
Linking of services	79%	12%	Recommend approaches to linking travel information services.
Data scope and exchange	70%	4%	Small majority for mandating standards to public bodies and recommending standards to private sector. Therefore would be preferable to recommend to both (greater support).
Terms and conditions of data re-use	70%	10%	Recommend common terms and conditions.
Data access	50%	24%	Mandate Access Points.

This prioritisation by stakeholders is interesting. Quality improvement is put as the highest collective priority yet many of the approaches to achieving this involve implementing the measures within the other categories. It is quite likely that stakeholders such as transport operators which are more resistant to harder measures feel comfortable with softer measures and objectives as it provides more scope for local interpretation and investment decisions – it might also be seen as a problem which happens elsewhere not with their own data therefore it becomes a little or no cost measure to them. It might be reasonable to assume that a number of respondents also saw this as an area which may come with additional funding from public administrations.

The linking of travel information services is also broadly supported. This is likely because it only affects a smaller proportion of respondents and a significant proportion of them have already undertaken some works in this area. The formal recommendation of a common European approach would be broadly welcomed by many who are otherwise concerned about investing in the 'wrong' approach.

The recommendation of common European data standards is ranked lower on positive preferences but actually had the least number of objections of any of the themes. The higher number of 'don't knows' is reflective on the status of this as a more technical topic beyond the interests of respondents with more of a commercial or monomodal perspective.

Terms and conditions for data re-use are also well supported. An interesting aspect of this one is the strong support from transport operators and the variation in the different stakeholders who had objections to specific points. There is an underlying concern from a minority of respondents that any proposed common terms and conditions should not inhibit the potential commercial benefits of innovation.

Support for improving data access was much smaller with only half of respondents positive on action in this area. It should be noted that this was an area where actors could not select between 'recommend' or 'prescribe' as alternate options so may have

voted against rather than for the mandating option. However it is also likely that public administrations were dissuaded from this option by concerns over additional costs which would need to be borne to establish and maintain Access Points.

Stakeholders were also asked to identify (multiple choice) their preferred forms of EU intervention: (i) Legislation; (ii) Exchange of best practice; (iii) Funding; and (iv) Promotion of sector cooperation.

The results of these are shown in the two graphs below - Figure 52 (geographic regional response comparison) and Figure 53 (Transport and Network operators compared to all others).

The sharing of best practice (71%) was the preferred form of intervention with legislation least preferred (55%). Funding received (66%) support and the promotion of sector collaboration (58%). Operators had a slightly stronger preference than other stakeholders for funding. Respondents within EU Member States also had a slightly higher preference for funding, whereas non-EU organisations (or uncategorised ones) preferred the exchange of best practice.

Figure 52 Preferred form of EU intervention by geographic region
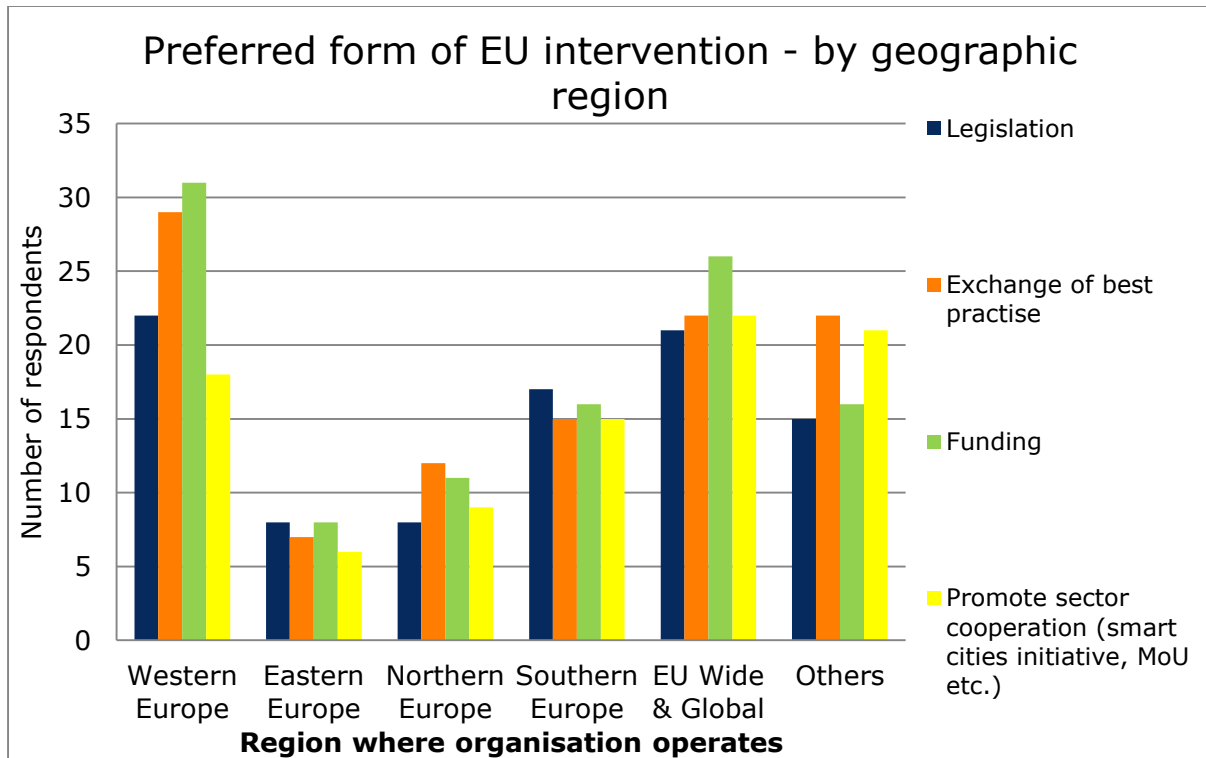
Figure 53 Views on the preferred form of EU intervention – operator responses compared with non-operators
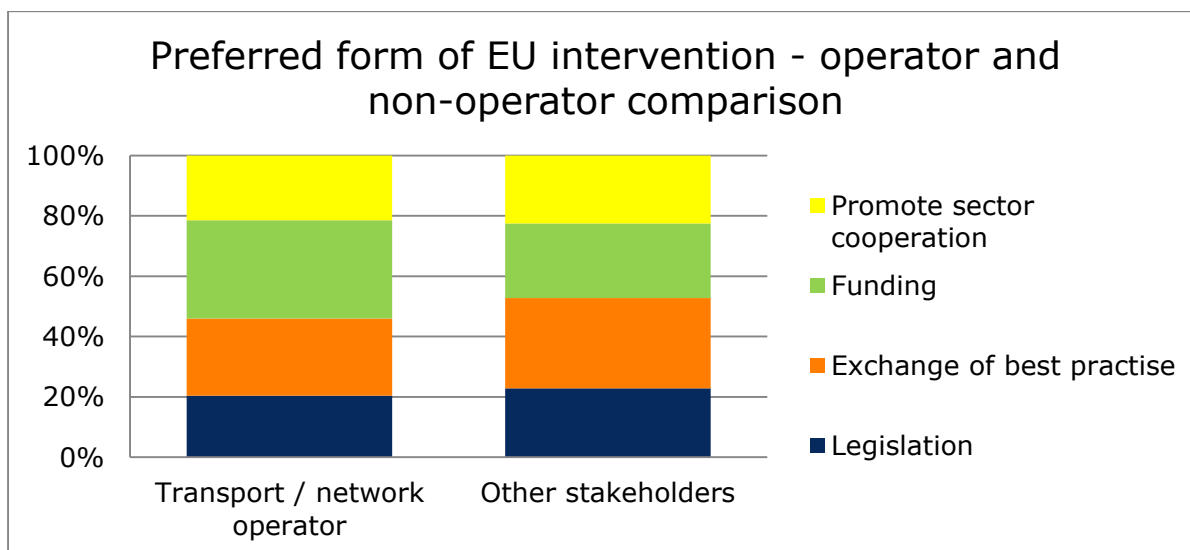
Table 4 summarises the views from stakeholders as to what specific measures might be considered by the EC under each of those categories as well as the percentage of respondents who preferred particular forms of action.

Table 4 Summary of respondent views on best forms of EU intervention

Intervention category	In favour	Intervention approaches and commentary
General	N/A	• Phased interventions, initially sharing of best practice supported by funding and promotion of cooperation before legislation is introduced at a later date to address any remaining issues. • The approach may depend on the mode. For example, PT funding isn't necessary, but legislation could help to ensure compliance. For other modes, where there is no mature business case yet funding may be more important (e.g. cycling, emerging modes) • The financial responsibility for introducing new terms and conditions should not rest solely on transport operators • Preference for voluntary agreements - mandatory as the last resort. • Development of an EU MMTIPS Research Roadmap to provide supporting evidence of demand, business models and set geographic priorities of focus (e.g. specific borders)
Legislation	55%	• Legislation should have clear and simple wording and not attempt to define any specific technical standards. • *In contrast:* Legislation should set common standardisation for data formats/interfaces and rules for minimum data quality level and ownership of data. • Concerns with the ability of helpful legislation to keep pace with technological change. • Focus on improving the availability of open data in common formats by authorities and operators. • Given the maturity of the market and the closeness of this to commercial activity (i.e. ticket selling) legislation mandating actions may be difficult.

Intervention category	In favour	Intervention approaches and commentary
Exchange of best practice	71%	• Exchange of best practices across Member States and modes (within EU and internationally). • Establishing best practice guidance.
Funding	66%	• Support actions which would include a best practice community; an open directory of data and APIs which include information about the current quality level (e.g. conformance to standards, or to a series of tests). • Cooperative research actions which would include development of test suites; open source tools for checking quality (i.e. implementing the tests), viewing and converting data of various types; "plug fests" for improving interoperability between APIs (like the EU funded FOT-net cooperative ITS support action). • Complete gaps in regional or national multimodal journey planners that will form the foundation for linking services. • Support for new and existing standardisation activities and piloting of these. • Training and support for users of standards.
Promote sector cooperation	58%	• Mentoring the technology sector into the complexities of delivering accurate transport information and the transport sector in keeping things simple. • Cooperative research actions (as above). • Collaborative platforms and forums crossing modal and organisational types, particularly public and private sector. • Involvement of local level actors as well as transnational organisations.

The final area for consideration within the Priority Action A policy specifications which views were sought on was on the geographic scope which measures, particularly mandatory ones, might apply to. Figure 54 shows that across each European region there is support for applying measures at the door-to-door level (40-50% of respondents depending on region) with a large minority supporting the less complex scope of the comprehensive European transport network (except in Western Europe where many systems are already 'door-to-door').

It would be reasonable from this to extrapolate that there is strong support for policy specifications to be set at the comprehensive European transport network level where trunk routes and urban networks are included (thereby supporting the majority of the population) with flexibility for Member States to extend provisions to the full door-to-door network.

Figure 54 Views on what the geographic scope should be for any EU action - regional comparison of responses
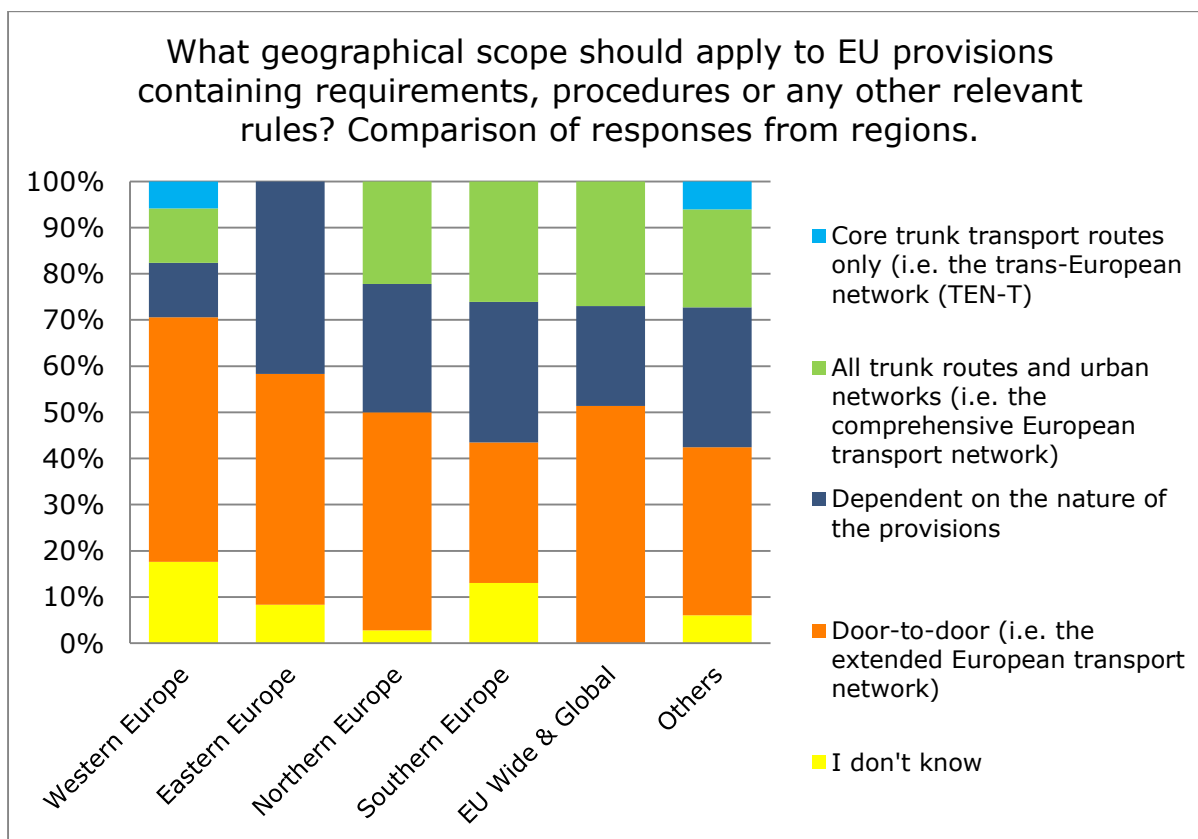
5.3 Overall perceptions

5.3.1 Perceptions by stakeholder group

There was, for the majority of topics explored, a strong consensus across different stakeholder groups. However, rail sector respondents were consistently against legislation mandating behaviour in this sphere, however they would welcome additional funding for research, knowledge transfer and collaborative actions to further the ITS Directive objectives for Priority Action A. They are keenest on common terms and conditions which provide protection to the data owner but are less keen on terms which empower the third party data user.

From a railway operator viewpoint, "*The Commission should continue supporting positive business and technological developments through EU funding for research and innovation, and act as an innovation enabler*". (CER, 2015). Whilst this is appealing for an 'Influencer' role from the Commission rather than a regulatory one, the same position paper seeks that local bus operations across the EU are required by legislation to abide by the same rules as the rail sector as to the sharing of transport data and information. However, "*this obligation should be placed on **data owners**, rather than operators, since for services under PSO (Public Service Obligation), data owners are often the contracting authorities rather than the operator*".

Conversely one of the notable themes amongst other stakeholders was wariness towards the rail sector with concerns that incomplete data was being made available and that

attitudes to data availability and information provision were more conservative than in other transport modes.[5]

It was also noted that many of the rail operator/associations who responded had prepared joint responses as the same wording appeared in a number of their qualitative answers.

Two large multinational technology companies were amongst the small number of dissenting views on terms and conditions for data re-use. This appears likely to be over concerns relating to their own intellectual property in this field.

5.3.2   Perceptions across Member States

It is interesting to observe that the two travel information markets which are most mature – Western and Northern Europe, were more considered in their responses. Whilst broadly in favour of EU intervention, the enthusiasm of responses was less than in other regions and certainly favoured a preference towards recommendations from the European Commission rather than prescribed approaches. This is likely to reflect a desire for flexibility to avoid the need to revisit approaches taken and also that there are fewer gaps with information provision in these regions.

It was noted that a few of the Swedish authorities who responded had prepared joint responses as the same wording appeared in a number of their answers. The Scandinavian responses were also often aligned with the principles of 'Open Data' and therefore were focused on empowering the data user rather than the data owner.

Organisations from Eastern Europe are more in favour of EU action than elsewhere, though there is typically a preference for measures which recommend approaches to be taken rather than prescribed actions. There are likely to be two reasons for this, first the less mature multimodal transport information market in these countries and secondly the smaller proportion of transport operators (particularly from the rail sector) in the responses from this region who were typically the dissenting voices.

Southern Europe, a region where many larger cities have a multimodal information service in place but where there are few services covering wider geographic areas was much keener on mandatory measures rather than recommendations. This suggests that a more significant intervention is seen as desirable here to move the sector forward. This is likely due to a legacy where travel information policy has been consistently set at a local level rather than at national or regional level as has been the case in many Western/Northern/Central Member States (even if only intermittently).

It was also clear that, for the majority of respondents their frame of reference was considering the current status and aspirations within their own Member States rather than a transnational viewpoint. The exception to this are the associations, transnational operators, systems providers and multinational service providers.

Those respondents in Central Europe often had the most practical insight as to the challenges and preferable measures to address barriers in cross border information service provision. This is a result of there being several mature larger scale information

---

[5] Similar views appearing within additional evidence submitted (Transport Focus, 2014), (BEUC, 2014), (Floristean et al, 2014)

services, smaller member states sharing multiple land borders and urban areas spanning some of those borders.

Finally, CEDR (the association for national road authorities) highlighted that views from their membership on the functionality and data needs for MMTIPS were not of a unanimous opinion across Member States.

5.3.3 *Perceived benefits and costs of improved MMTIPS*

Across the four policy areas of (i) harmonised data formats and exchange protocols; (ii) Access Points; (iii) quality; and (iv) common terms and conditions; stakeholders were asked to provide insight as to the perceived costs and benefits for their organisation should action be taken in those areas.

A fuller list of these is included Appendix B along with quantitative examples but the table below provides a useful summary of these views.

Table 5 Perceived benefits and costs of policy options

Policy area	Perceived potential benefits	Perceived potential costs
Harmonised data formats and exchange protocols	- Handling of fewer data formats - Ability to provide services on a larger and more cost effective scale - Procurement benefits (particularly public sector) - Lowered barriers to market entry - Stability and confidence for third party data providers - More cost effective data quality checking regimes	- Potential limitations on market responsiveness - Investment required to migrate or adopt new standards - Implementation of APIs - Increased barriers to market entry - Supporting European or national governance infrastructure/administration
Access Points	- Reduced data discovery and aggregation costs - Savings from reducing number of access points - Lowered barriers to market entry - Improved consistency and accountability of data providers	- Technical and resource costs for establishing and maintaining Access Points (lead body) - Resource costs for synchronising data with Access Points (data owners) - Implementation of APIs
Quality	- Improved customer experience of travel information services - Improved customer journey experience - Reduced need for in-person customer support (i.e. less complaint handling) - Reduced data rework	- New quality checking tools - Staff time for conducting quality monitoring - Additional lead times, impacting speed of data availability, to conduct further quality checks

Policy area	Perceived potential benefits	Perceived potential costs
Common terms and conditions	• Reducing administrative and legal costs • Reduced liability and data protection risks • Reducing market barriers	• Implementation of the common terms • Addressing issues of data misuse
General	• Ability to cut public funded services as sufficient provision from private sector is achieved • Greater range of choice of service	• Benefits may turn to costs if regulated practices fall behind the pace of change in the market.

The VDV Position Paper reflected concerns shared by many other respondents that it is important not to introduce unnecessary additional costs into the travel information chain which have to be borne by either the tax payer or the ticket buying passenger. Therefore it is important to allow flexibility for common approaches to be implemented when appropriate rather than in all cases.

Overall there are perceived to be a significant range of tangible and intangible positive benefits which can be derived from the introduction of new policy measures for enhancing the uptake and scope of MMTIPS. These need to be weighed against the costs involved – as will be explored further in Task 3 of this study.

5.3.4   *Perceived impacts of improved MMTIPS*

Respondents were asked to identify the impacts, such as social benefits/costs as well as the operational costs/benefits focussed on elsewhere in this study.

Figure 55 Views on the potential impacts associated with increased usage of MMTIPS

Respondent views on the relative potential impacts of Priority Action A
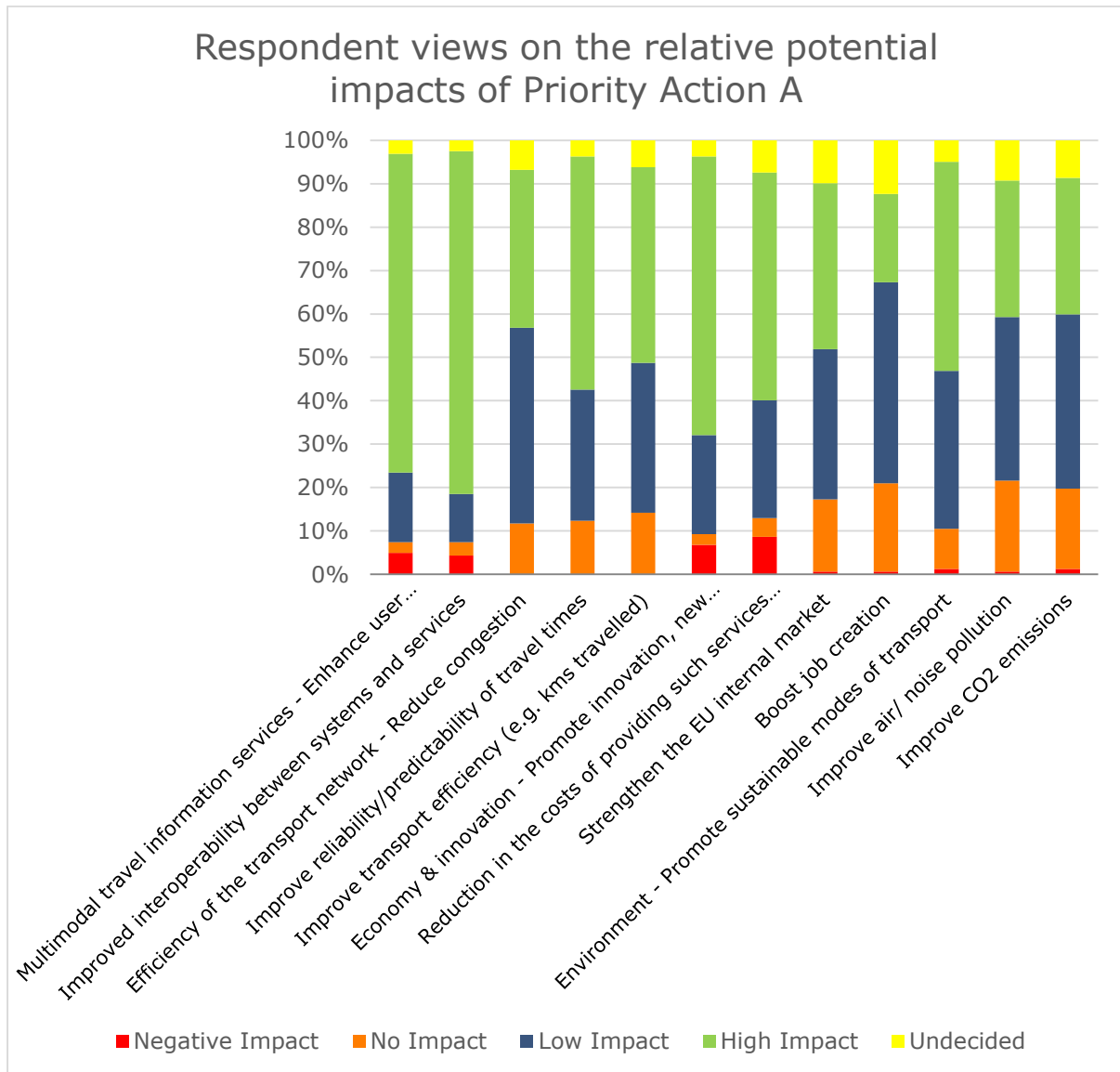
In conjunction with these responses stakeholders were asked to provide evidence to support their views (e.g. published studies). A common view was that it was difficult to evidence the specific benefits of MMTIPS when considering wider social impacts as it is one factor of several which influences modal choice and travel behaviour.

A number of respondents highlighted the number of technology start-ups using transport information data from 'open data' champion cities such as London and Helsinki as evidence of a thriving and innovative market sector.

Of the evidence submitted on quantifiable impact of MMTIPS, the most useful was from the final report of the All Ways Travelling consortium (2014):

"[MMTIPS have] the potential to achieve significant improvements for safety, mobility and environment. Survey results indicate that the effect ... is at least a 21% increase in the willingness to shift transport mode from private cars. In addition to the annual 651 million EUR savings of emission costs at this level of modal shift from private cars, the additional estimated costs savings are:

- *10,091 million EUR time cost savings per year*

- *456 million EUR accident cost savings per year*
- *2,018 million EUR vehicle operating cost savings per year for a total of 13.22 billion EUR per annum.*

A more positive assumption of modal shift of +41% to just above 4 percentage points provides an estimated total cost saving of 17.5 billion EUR per year."

A further interesting observation is that electromobility, currently on the verge of becoming mainstream will benefit more substantially than other transport modes from the availability of related information within MMTIPS. This is partly due to responding to potential user concerns on charging locations but also 'normalises' these modes alongside traditional forms of transport and links with electric versions of car or bike sharing schemes enabling potential users to gain initial experience with these modes.

5.3.5 Variations between the workshop and public consultations

There was a significant overlap between the 100 participants in the workshop and the 165 respondents to the consultation. Broadly views expressed through these two channels were similar but the nature of the two engagement approaches did result in drawing out useful viewpoints that would not have occurred using a single method.

The workshop provided debate that allowed views to be tested for robustness and identified certain areas which may be more contentious than others. For example, recommended approaches to harmonising common data standards and exchange protocols, linking travel information services and common terms and conditions for data re-use were preferable to being mandated policy measures. The consultation responses gave more weight to the separation of considerations for public and private entities than was evident in the views shared within the workshop – it was also evident that certain stakeholders – notably rail operators, were much more willing to put across a dissenting view to the general discussions within the public consultation format compared to the workshop.

In addition, workshop participants were generally representing traditional transport modes, which whilst still forming a near majority of journey types are being joined in the mainstream of transport by new mobility modes such as vehicle sharing and short notice vehicle hire. A pertinent remark was made by an organisation representing a new mode:

"By protecting, and extending the life of existing city journey planners [through linked journey planning], *and their software suppliers and system integration providers, innovation will be discouraged. Existing journey planners are typically associated with 'traditional' modes of transit and these will be slower to incorporate evolving sustainable alternatives such as Car share, Ride share, Taxi etc."*

BEUC (2014) also supports the view that new mobility solutions must be better combined with public transportation systems, with due attention given in the development of public policy.

A final variation between the two formats was the presence within the consultation of new and emerging independent commercial travel information businesses that are an important voice for gathering viewpoints from – interestingly feedback from two technology players in this field was more dissenting on the benefits of linking travel information systems than those present within the workshops.

5.4   Summary of findings

The findings from the stakeholder consultation are summarised here within updated versions of the findings from D1 Baseline Study.

5.4.1   Findings against the research questions

At the outset to the study we identified twelve key research questions. Interim findings against these were reported within the D1 Baseline Study. Here these findings are further revised to take into account the consultation activities undertaken in Task 2.

1. What are the **functions** which the MMTIPS services should provide? Which of these should be provided as a **minimum** to meet implied traveller expectations/needs, as well as those which are **desirable** and those which are **nice to have**, and what criteria should be used to determine whether functions are minimum, desirable or nice to have?
D1 set out the expected functions, organised by functional domains, into the three levels of 'need'. This initial organisation was based upon experience of the project team, external experts, long standing and emerging systems' levels of functionality and previous studies. The further insights gathered during Task 2 have tested our original assumptions and have resulted in the following amendments: • Real time information (e.g. predicted arrival times based on real world status) should be a 'minimum' requirement (previously classified as 'additional desirable'). • Interchange facilities (e.g. Status of access node features (including dynamic platform information, catering, operational lifts/escalators, closed entrances and exit locations) should be an 'additional desirable' requirement (previously classified as 'nice to have').
2. **What datasets are required** to provide these levels of service?
D1 set out the datasets which are required to meet the defined functional system features. This view did not change as a result of the consultation which agreed that nice-to-have functions regarding the real-time availability of park & ride, bike & ride, vehicle charging points, parking place reservations etc. were of less importance than those data sets previously identified for providing a minimum or desirable level of service.
3. What are the **preferred data formats and exchange protocols** for these datasets in order to provide MMTIPS services? What criteria should be used to determine this preference?
D1 analysed the existing common European standards against the defined list of required datasets and identified the preferred formats and exchange protocols. Key criteria include compliance with Transmodel (as the conceptual standard) for consistency and whether they are European standards (national standards, even if technically sufficient are deemed to be unlikely to be acceptable to a full range of Member States). Fundamentally if they are technically viable, then good existing uptake and adoption levels by suppliers and systems in the data management and MMTIPS markets provide a strong case for their preference. There is a core set of standards in place to cover the minimum expected functions, namely GDF, NeTEx, SIRI, Transmodel, TPEG, DATEX II, and SSIM (air industry). This has been revised to remove UTMC from the D1 list. Additionally, XML TAP/TSI as an industry format that can be interoperable and that provides rail fare requirements but in the long term could be better replaced by a subset of NeTEx Part 3. GTFS remains popular amongst some transport authorities (particularly in Scandinavia) and with data users for its relative simplicity. However its scope is limited to distributing

basic timetable information and it does not support all the required functions. It is also recognised that as a non-open standard it would not be suitable for recommendation as a harmonised European standard but it provides an indicator that a useful development would be a travel information profile of NeTEx that can be used for data exchange which simply consisted of basic stop and timetable data.

4. What issues with data formats and exchange protocols prevent the provision of MMTIPS services?

D1 explored many of the issues relating to data formats and exchange protocols. One of the main challenges, reaffirmed through the consultation is that there is no current direction at a European level, outside of CEN, on which data formats and protocols are the ones to invest in. Instead many local data or MMTIPS providers resort to national standards in their place – some stakeholders even highlighted that they had delayed investment for several years for fear of outlaying funds in the wrong technologies.

A small number of respondents raised concerns that for non-transport-industry third party data users, many of the national and European data standards were overly complex for their needs. Therefore it will be important to develop simplified 'travel information' profiles for NeTEx to meet this requirement.

Consistency and quality of data is a significant challenge, however this can also be partly addressed, and more cost effectively overcome, by linking existing travel information services rather than being reliant on bringing all raw data up to a common high standard.

5. What are the **approaches and implications for linking services** in order to provide wider access to data?

As D1 and the consultation workshop explored, once the concept of having single monolithic journey planners for pan-European services has been set aside, there are two main approaches to linking existing travel information services – which is more suitable depends on the information available in the different source MMTIPS. The first is to have a **distributed journey planning system** where separate servers hold information for specific geographic areas and solutions are produced by knitting together two halves of a journey through an agreed set of 'Exchange Points' that provide the linking points between systems. The second is to **chain journey planners together**. The usefulness of chained/hybrid journey planners depends on the specific topology of the networks being covered. It is likely to give good results (and be cost effective) for the straightforward use case of for example adding a final leg to plane or long distance train journeys. It is likely to give poorer results for trip planning between adjacent regions with richly linked networks – as these effectively constitute a single conurbation either side of an administrative or national border.

Therefore from a computer science perspective and from the stakeholder expert responses it is clear that flexibility needs to be provided to service providers to select the approach that best suits the topography involved. To enable this choice there needs to be consistent availability of data, willingness of existing services to open up their systems and common interfaces for linking these services.

6. What **interoperable systems interfaces** are needed to provide MMTIPS services? How should such interoperability occur?

As D1 explored, a European standard has been needed to support distributed journey planning which has, EU-SPIRIT aside, been largely confined to national usage only. The draft CEN OJP Technical Specification currently being prepared will provide that common European standard (certain limitations aside such as the lack of support for fares information) but this will need to be piloted and uptake promoted.

The stakeholder consultation has highlighted that many actors would prefer a degree of flexibility to be applied to ensure existing fit-for-purpose local arrangements do not need to be replaced. At the same time there is a desire for direction to be given on

which common API to invest in for new links between travel information services.

Therefore it would be appropriate for the European Commission to recommend the use of the CEN OJP Technical Specification once finalised and support measures to pilot and promote this.

Travel information services should also only be linked when there is a business case or sufficient user demand for doing so.

7. What are the **technical barriers** to, and **enablers** of, provision of sufficient data and interfaces to assist in the emergence of comprehensive and interoperable EU-wide multimodal travel information and planning services?

D1 explored and summarised the barriers and issues associated with the current provision of data for MMTIPS. It also highlighted a series of potential enablers and opportunities which could be taken to address these barriers.

The stakeholder consultation however was able to further prioritise these barriers in relative importance. The five most significantly identified are *(in decreasing order of scale):*

- Low quality of data

- Lack of data available in common formats

- Lack of adoption of existing common data formats

- Lack of adoption of existing common interfaces

- Lack of common interfaces for the dynamic linking of travel information services

The consultation responses suggest that recommendations to actors in the travel information chain on preferred common data formats, data interfaces and interfaces for the dynamic linking of services would all be beneficial. Similarly, a focus on improving the ability for third parties to identify and use data would be welcomed – e.g. data access points and common use of metadata to aid discovery.

8. What are the **legal implications** for providing access to data to the wider information chain? Where does **liability** belong and what should be the terms and conditions for reusing data?

As D1 identified, the most significant legal implication of providing wider access to data is that the costs of developing and agreeing case-by-case legal terms is expensive and will reduce the likely involvement of some stakeholders.

Common terms for the re-use of data would provide clarity and allow organizations to invest with confidence. The use of ready-made terms (e.g. open Creative Commons (CC) licences would help to reduce the costs of data management.

The consistently expressed view of liability from external experts is that, unless the MMTIPS are being provided directly by the transport operator concerned, then other travel information services are providing an independent guide to prospective or current transport information where terms and conditions of use can clearly express that no warranty applies. However, should such services provide ticketing transactions then that liability may change (this is of course beyond the scope of the current objective).

Stakeholders are broadly supportive of the following terms and conditions for re-use of data:

- Provision of data in a fair and equal way (note that the rail sector dissents from this view).

- Exclude any transfer of ownership of data (note that some private sector technology companies disagree with this view).

- Transparency of the calculation basis for any financial charge associated with

providing data.

- Transparency in the criteria used to rank travel options and neutrality in the way that information is provided to the user.

- Safeguards for the reputation of the data owner (the strength of these terms vary amongst stakeholders with the rail sector keen on provisions which include the ability to audit third party data users).

- Access to data on a cross-sector basis.

9. How would the specification fit within the **context of the existing legislative framework** e.g. TAP/TSI and INSPIRE?

As D1 explored, gaps in the current legislative framework exist in the coverage of non-geographic static and dynamic data from modes beyond rail and private car/traffic. This was further illustrated by as many of the correspondents to the public consultation were involved in local public transport – either in local policy, operations or information provision.

A further gap in existing legislation is with data arising from organisations which are not in the public sector – which in many Member State regions will include the transport operators themselves.

Specifications for Priority Action A would aid in completing a legislative gap on data for multimodal transport information from a modal and private sector consideration.

10. What is the most appropriate **geographic coverage** for MMTIPS services and what criteria should be used to determine this?

As D1 explored, the criteria for selecting appropriate geographic coverage of MMTIPS and data related policies are straightforward. The guiding factor needs to be the requirements of the end-user. For trunk services they require the comprehensive network level of coverage but for full door-to-door journey planning incorporating local transport services they require the extended transport network. With that requirement in mind we must also consider the best phased approach to the consistent provision of MMTIPS across the EU – with the responses from the stakeholder consultation taken into consideration it would be to adopt the comprehensive European transport network (i.e. trunk routes and urban networks) in the first instance but with flexibility, and encouragement to deliver MMTIPS at the extended European transport network level (i.e. door-to-door) in the future.

11. What are the **basic data requirements** necessary for ensuring **service quality** and how should service quality be defined?

As outlined in D1 the basic data requirement for ensuring service quality can be defined as (i) Veracity; (ii) Completeness; (iii) Timeliness; (iv) Coherence and (v) Compliance. A quality framework for raw data and for MMTIPS could be developed and implemented to provide a structure for improving the overall quality of data and services.

Stakeholder responses suggest that the disciplines instilled through use of ensuring data compliance with standards would make a positive improvement to overall quality as would the availability of system tools for checking data integrity, conformance and running automated test routines. Improved transparency on known issues and service levels with feedback loops for correcting identified issues would all make further positive improvements to data quality.

A number of stakeholders share the view that the market will drive improvements in information quality, particularly with private sector provided services which will need to retain users.

12. What are the potential options for ensuring services are non-discriminatory in the way that they use data?
The D1 report identified that some data providers, particularly private sector transport operators are concerned about losing direct control of their data. This view was reflected to an extent within the stakeholder consultation though primarily for the rail industry. One of the drivers behind this is an identified risk to their businesses of their transport services being inaccurately represented by third party MMTIPS. There are four different options to addressing this: (i) regulatory: requiring MMTIPS to be non-discriminatory; (ii) accreditation: provide independent accreditation of 'trusted' MMTIPS providers; (iii) establish within the terms and conditions of data re-use that services must be non-discriminatory (as per the answer to Question 8 above); and (iv) 'do nothing' on the basis that only MMTIPS providers that can be trusted by operators to be provided with data will thrive. This latter option comes with the risk that some businesses will be disadvantaged which could impede innovation.

5.4.2   Revised Problem Tree

The Problem Tree from D1 has been further developed (Figure 56) to include three new issues identified through the stakeholder consultation phase.

These issues are:

- **Commercial confidentiality over certain data (e.g. seat availability)**: In those sectors where ticket pricing is connected to yield management (mainly trunk route modes) there is a stated concern that they would be placed at a commercial disadvantage by releasing data on space availability.

- **Significant variations between Member States in roles of public and private bodies in information chain**: The variations in public and private sector ownership between Member States is significant and not just with operators as several of the national travel information service providers are private or public-private partnerships. Further to this, some sectors such as bus and rail perceive a difference between publicly subsidised operations and solely commercially operated routes. Therefore existing European and national legislation which requires transport data to be released has varying levels of impact dependent on each Member State.

- **Regularity of review and refinement of common data standards is insufficient**: Concerns were raised by experts involved in standardisation activities that the current timetable for reviewing and revising data standards though CEN is probably insufficient given the pace of change within the transport sector. As a result they advise it would not be appropriate to mandate the use of common standards as without flexibility this is likely to cause issues.

Figure 56 - Revised MMTIPS Problem Tree at the end of Task 2 (dark blue indicates additions from Task 1; green indicates from Task 2)
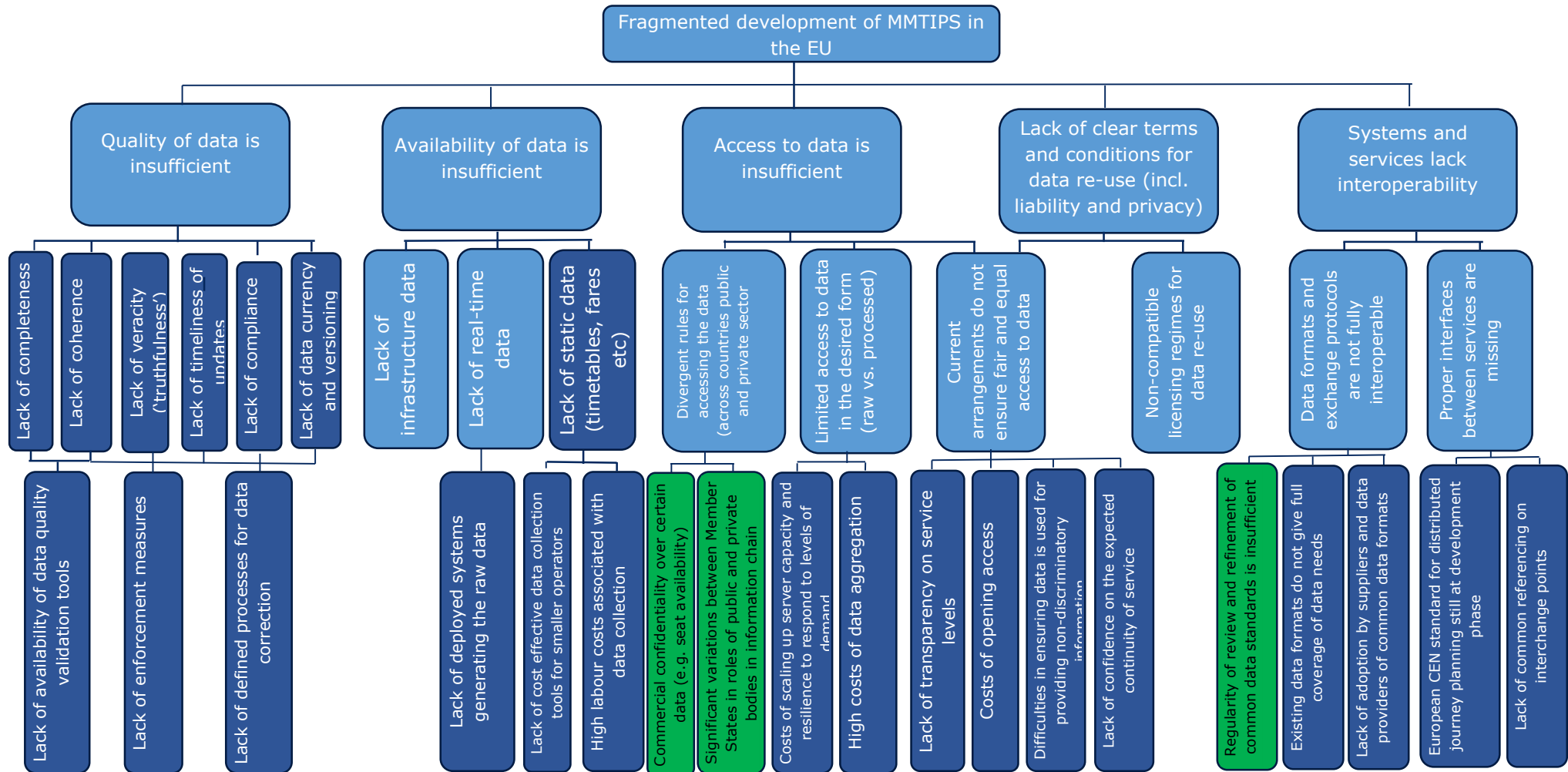
6 Next steps

Concurrently, the study is examining the policy options in greater detail with both a cost-benefit and risk analysis. These will be considered against the principles of the ITS Directive. A set of key performance indicators will be established for monitoring and evaluating the policy options. Options will be compared with a preferred approach selected on an evidence-led basis. The preferred approach will be developed by the European Commission into supporting specifications for Priority Action A.

Appendix A Glossary of terms

This Glossary of Terms will continue to be added to and developed during the course of the project.

Access to data	The extent to which a data user can obtain suitable data at the time it is needed. Elements to be assessed in this study are arrangements for allowing access to data, including time frames, charging, conditions of use, validity of data, continuity of service etc.
Access Point (for data)	A digital interface where data together with its corresponding metadata are made accessible to users, either from a local store, or by redirection to other external sources. Access points may provide protocols to access both static and dynamic data.
Accessibility	The properties of accessibility of a site or vehicle for users with special needs, such as PRMs, travellers with baggage, etc.
Address	A traditional locating system using relative positions on road network features to pinpoint spatial positions. May be augmented by Postcodes as a concise approximation.
Adjacent-region	A federated region of a distributed journey planning system which is physically contiguous to the local region.
Administrative zone (for data)	Under a distributed system for managing data, stakeholders in different localities are responsible for collecting and aggregating the data from their area. To coordinate this activity regions will be split into distinct administrative areas, each responsible for data of certain types within their jurisdiction and designated responsibilities.
ALERTC	TPEG and DATEX include a locating standard, ALERTC, that allows the location of incidents affecting road travel to be expressed in terms of the road network rather than a simple geospatial position, e.g. a particular lane or direction or stretch of road rather than a point on a map.
API	Application Program Interface. A set of functions and procedures that allow the creation of applications which access the features or data of an operating system, application, or other service.
Architecture	The conceptual design that defines the structure, behaviour and integration of a given system in its surrounding context.
Availability of service (for data)	A Quality of Service measure prescribing requirements for the continuous availability and resilience of a data service. For example, to ensure that real-time arrival information is available for all bus services for nearly all of the time rather than on an intermittent basis. Can be quantified with metrics such as percentage uptime.
AVMS	Automatic Vehicle Management Systems which provide the source for real-time positional data for passenger transport vehicles. Also known by the briefer term AVL (Automatic Vehicle Location).
Backwards compatibility	Property of a data format or protocol such that a system capable of processing a new version of the format may still also process older versions of the format. Highly desirable for widely used data standards as it allows for an incremental rollout of upgrades, with systems that are at different version levels nonetheless being interoperable.
Baseline (ITS action)	The naturally evolving situation that would happen without any further intervention from the European Commission.
Car pool	Multiple travellers pooling together to travel in a private vehicle for a similar journey. Also known as ride sharing or lift sharing.
Car share or car club	Model of car use where travellers book the use of a car for a fixed period for an agreed cost rather than having direct ownership.

CEN	The European Committee for Standardisation. CEN is a platform for the development of European Standards and other technical documents in relation to various kinds of products, materials, services and processes. CEN issues both European Standards (EN), definitive European standards for adoption across Europe and Technical Standards (TS) suggested standards with a more tentative status.
Chained journey planning	A hybrid architecture for linking journey planners that uses a monolithic journey planner covering trunk modes (long distance rail, air etc) for the main route, and separate local journey planners (or simple deep linking) to plan the local route from the trunk stops to the end. The termini found by the trunk planner are used as the handover points for linking the systems.
Coherence (of data)	The property of consistency of a data set such that all the elements belong to compatible versions that may be used together, resulting in accurate information. For example, a set of summer timetables and stops that are operated in the summer.
Compatibility	The general ability of a device or system to work with another device or system without modification.
Completeness (of data)	The property of correctness of a data set such that all the elements corresponding to all the relevant real world entities are present. (e.g. all timetables for all modes for a region are present in a dataset)
Compliance (of data)	The property of correctness of a data set such that all the elements are encoded according to the rules of the format in which the data is exchanged (e.g. the right tags are used in the right order, all mandatory elements are present, values are punctuated as required, etc).
Connection link (PT)	A designated place in the transport network suitable for interchanging between stops of the same or different modes. May have associated timing and accessibility properties relevant for journey planning.
Connecting services (PT)	Transport services that are intended to connect through a planned or guaranteed interchange at a designated connection link.
Continuity of Service	Commitment to provide a service or to support a format for at least an agreed period, necessary to justify investment by data users.
Control actions	Control decisions as to the operation of the transport system, such as cancellations, diversions or short running of trains that materially affect the real-time running of the system. These can be given a structured representations in a data format and constitute a distinct type of real-time data (coming from a control room source rather than tracking systems) that is especially important for making accurate and timely real-time predictions.
Coverage (of data)	The extent to which data of a given type is available for a given mode and region.
Creative Commons license	A Creative Commons (CC) license is a public copyright license enabling the free distribution of an otherwise copyrighted work. A CC license is used when an author wants to give people the right to share, use, and build upon a work that they have created. CC provides flexibility (for example, allowing only non-commercial uses of data) and protects users from concerns of copyright infringement as long as they abide by the conditions that are specified in the license.
Crowd sourcing	The use of mass internet based tools and processes to enable volunteers acting in the public interest to collect large distributed data sets, such as GIS data, accessibility data, stop data or timetables.
Currency of data	That property of correctness of a data set such that all the data is applicable within a given period, i.e. not yet superseded by a later state.
Cycle hire / bike share	A formal bicycle hire scheme, usually implemented on a city/town basis often with multiple cycle hire stations for collecting and returning cycles.

Data aggregation	The process of collecting together data of one or more types from multiple distributed sources and stakeholders to a single access point. Aggregation does not necessarily imply integration, which may require further normalization and validation of the data to create a consistent dataset that is ready to use.
Data availability	The existence of relevant data elements in an electronic or equivalent (i.e. machine readable format). Availability can be assessed by different criteria, for example, by category of data, transport modes, data format, quality of data, data holder, restrictions on use, etc.
Data attribution	The explicit public identification of information as being originated or supplied by a named stakeholder, for example that real-time data is supplied by Deutsch Bahn. Attribution may have implications as to authoritativeness (for the data user) and to reputation (for the data supplier); therefore the rights or requirements to attribute data may feature in terms of use or be a consideration in characterising non-discriminatory access.
Database	A single organised collection of data held on a common media/set of server, i.e. the data is held within one conceptual location.
Data exchange protocols	A set of rules governing the exchange or transmission of data between devices, done using an API or other transmission method.
Data discrimination	The favouring of certain data users, (including possibly the data owner or supplier as a data user) by limiting access to data or by giving privileged access to a higher quality of data (e.g. more accurate, more timely, more complete); or a higher quality service (e.g. a faster or more robust real-time feed).
Data, dynamic	Data which changes very frequently and typically represents a state at a precise moment in time. For example, availability of seating on a plan journey or real-time predicted arrival of a bus at a stop, or unplanned disruptions. Such data requires a live data service to be kept up to date; either a push service or an API to fetch it as needed.
Data identity	The means of uniquely distinguishing a specific data element within a specific context (regional, national, European etc) in a persistent manner that allows for repeated update of data sets – and also the detection of duplicate instances. Necessary for the integration of aggregated data to be possible.
Data integration	The process of taking heterogeneous data from many different sources and validating and normalizing it so that it can be computed over as a whole. May involve resolving clashes of identity, removing duplicate instances of elements, normalising names, classifications and other corrections.
Data marketplace	A platform for connecting data providers and data consumers. This involves advertising and search functions, as well as a brokerage function for data exchange once two interested parties are identified. A data marketplace collects references (catalogues) to a range of services that may be accessed either in co-location or remotely.
Data ownership	Possession of legal rights as to the use and control over data and any commercial exploitation as governed by Terms of Use.
Data, processed	Data which has been collection and manipulated to produce meaningful information.
Data provider	The stakeholder who collects data in an electronic format and provides it to data users.
Data, raw	A term for data collected from a source. Raw data, also referred to as primary data, requires processing or transforming in some way in order to turn it into a useful output. For example, vehicle positions are raw data for computing arrival times. Raw feed types exist for both static and dynamic data.

Data register	A register is a website that centrally lists different data services with links to where they can be accessed.
Data, static	Non-volatile data which changes relatively infrequently and so may be exchange by periodic updates rather than continuously. For example, stop data. Some types of data may need to be treated as static for some applications, and as dynamic for others. For example, a real-time journey planner requires a dynamic timetable feed while a simple journey planner may treat the timetable as essentially static.
Data user	A stakeholder who uses available data for further purposes such as provision of information to end users.
Data warehouse	A data warehouse is a virtually co-located set of databases; the data held in each database may be distinct and with no interconnection other than a directory service provided by the warehouse as a whole. The import services of a data warehouse will typically perform clean up and some integration services, actively ensure the data set is current and will have an error resolution process in place.
DATEX II	DATEX II is a CEN Technical standard (CEN TS 16157) developed for information exchange between traffic management centres, traffic information centres and service providers. It provides an XML protocol to distribute a number of different types of data, including traffic flows, planned works, disruptions, VMS, parking data etc, and is supported by a conceptual model and documentation.
Day Type	A way of categorizing days by their characteristic activity, such as being a particular day of the week, holiday, season, market day, match day etc so that accurate conditions of operation and / or predictions of travel time can be made. Fundamental to the standardisation of temporal conditions for both road and PT data; such conditions can be complicated so- a consistency of approach is needed in order to be able to integrate different data sets.
Deduplication	The process of removing duplicate instances of data when data being integrated has come from multiple sources. For example, the timetable data sets for two adjacent regions may both include the journeys that run between the regions, or a timetable for the same region for two different period may have some journeys that run in both periods. The process can be made more accurate and more efficient by establishing globally unique identifiers for stops and operators and by standardising the way temporal conditions are expressed.
Demand Responsive Transport (DRT)	DRT or flexible services are PT Services which run within a defined geographical scope (which may be defined as general pickup areas, road sections, stops or any combination) but vary their routing and / or timing to meet user demand. Their "timetable" denotes the areas served and times of operation, with a method of requesting services, but does not necessarily include specific departure times.
Demand Competitive Transport Information	Some modes of transport involve resources (taxis, bicycle hire schemes, electric vehicle charging points, etc) for which the demand may outstrip local supply during busy periods. Real time information on the availability of the resources (e.g. cycles, slots to return cycles, empty charging points, etc) can be made available as a dynamic feed – complementing a static data set as to the location and capacity of the resource points.
Discovery services	Automated services allowing for the search for sources of particular types of data, typically making use of metadata associated with the data. Discovery services are relevant both for computer systems (e.g. to find servers providing a particular type of feed) and for human interfaces (e.g. in web browser search engines to find a type of website such as a journey planner or stop departure board covering a particular area.

Disruptions	Disruptions cover a range of network impacts that deteriorate the levels of service of the transport network. This can include road blockages, lane closures, weather related impacts, poor driving conditions, events, activities, etc as well as vehicle related causes such as breakdowns.
Distributed journey planning	An architecture for journey planners that splits the computation of the trip legs up among multiple engines, each covering a separate region. The engines each compute trip legs between agreed handover (or "transition") points, which are then combined to create a single set of end-to-end trips for the user. The determination of the effective set of handover points typically requires pre-computation over the whole data set and further tuning to accommodate the specific topology of the joint networks and available modes. The distributed journey planners may nonetheless be "centralized" that is, all be placed in the same physical location in order to reduce communication times.
Door-to-door journey	A journey that takes the user from a starting position to a destination, as specified by an address, postcode, point of interest or map location, (rather than just from a PT stop to a PT stop).
End point	The destination point of the journey.
End user	A passenger or other person who uses an information service to plan or manage their travel.
Environmental impact factors	Data and heuristics used to compute the environmental impact of travel by a given mode. For example carbon usage per passenger mile on a given vehicle type at a given level of occupancy.
ETM	Electronic Ticket Machines
Exchange Points	Pre-identified locations used in a decentralised journey planner approach to join up journeys from multiple systems – these are typically, but not exclusively, trunk modal nodes.
Facilities	The amenities available to travellers at stop and onboard vehicles such as restaurants, toilets, wi-fi, etc. Access to some facilities may depend on fare class.
Fare data	Data describing the tariff structures of a network, including fare structures, fare products conditions of purchase and of use, user types, and prices of a transport system. The fare structure describes the basis and scope (origin destination pairs, zones, etc) and access rights (single, multiple travel, class of use etc) the far products assemble these as permitted combinations with specific usage and commercial conditions attached; fare prices assign a monetary cost. Fare distribution channels and payment methods may also be described. Some aspects, such as prices or availability of seats, may be dynamic. Others such as the zones and routes, classes of use, available fare products, etc may be static.
Fare distribution channel information	A specific aspect of fare data describing where fares of different sorts may be purchased, and how they may be paid for, important for passengers using a network with which they are unfamiliar.
Fare Query	A type of trip plan optimized to find the cheapest fares, rather than the fasters or most convenient routes.
Floating car data	Road real-time data generated by the GPS tracking of vehicles, either with dedicated devices, or by processing of generic mobile phone data to identify moving vehicles.
Format	The organization of information according to a pre-defined specification that dictates the precise presence, syntax and content of data elements.
FSM (Full Service	UIC led project to develop rail data exchange standards covering the end-

Model)	to-end traveller process for rail in Europe.
Fundamental rights	The implied rights of a customer for example to protect personal data, equality and non-discriminatory treatment.
Gazetteer	A geo-located database of named places for regions, cities, towns, villages, etc that provides a topographical context. A public transport gazetteer for use in journey planners is used to associate places with designated stops for access. It may include information that cannot be decided just by the geospatial boundaries of the place (for example the airports of a city outside its boundaries, or the best train station for a town without a station, or which stop to treat as the city centre).
GDF	Geographic Data Files or GDF is an interchange file format for geographic data. It is an international standard that is used to model, describe and transfer road networks and other geographic data. (CEN GDF 5.0, or ENV14825:2011).
GIP	Austrian national data standard specification (Graphs Integration Platform)
GIS data	A data set of geographical data describing the topographical features and buildings and their spatial relationships that is used to create maps and spatially located applications. Such data sets are needed for point-to-point journey planners –and (See INSPIRE) exist in a number of coordinate systems and formats under different business models; both public (e.g. Ordnance Survey); commercial (e.g. Navteq) and crowd sourced (e.g. Open Street map). Common location reference systems are needed in order to integrate different GIs sets and the PT transport data sets
Headway	The distance or time between consecutive trains, buses, etc, on the same route. This is sometimes used within schedules instead of a timetable particularly in dense urban areas.
Historic data	Data generated by recording the real-time operation of the transport system such as arrival times at stops, travel times over road links, etc. Such data is relevant for improving predictions for future services (for example to establish average travel times on road links at particular types and times of day) and for informing passengers about operators' schedule adherence.
IFOPT	IFOPT (Identification of Fixed Objects in Public Transport) is a CEN Technical Specification that provides a Reference Data Model for describing the main fixed objects required for public access to Public transport, that is to say Transportation hubs (such as airports, stations, bus stops, ports, and other destination places and points of interest, as well as their entrances, platforms, concourses, internal spaces, equipment, facilities, accessibility etc.).
Inclusive mobility	Mobility/transport systems that are accessible for everyone including the elderly, parent+child, visually impaired, disabled etc.
Information chain (also known as the value chain)	The chain of stakeholders involved in delivering information, beginning with the transport operator and finishing with the traveller.
INSPIRE directive	The INSPIRE directive (2007) aims to create a European Union spatial data infrastructure. This will enable the sharing of environmental spatial information among public sector organisations and better facilitate public access to spatial information across Europe.
Internationalised (data)	A property of data formats such that they can be used without modification to support different national languages and presentation conventions (such as date and time formats), and also have parameterised those aspects which may vary between regions such as currencies and time zones.
Interoperability	Capacity of systems and the underlying business processes to exchange data and to share information and knowledge.
Inter-modality	Use of more than one mode of transport to make a trip.

Interface	The point where two systems interact. Also the formal specification of the protocols and APIs to be used for the interaction by machine.
Inter-regional	Across two or more Member States or between different regions (with different service providers) within one Member State.
Journey plan (Trip Plan)	An optimised route for a passenger to take for a specific trip, potentially involving several modes of transport from a journey start point to a journey end point on a particular date and time, made up of one or more trip legs.
Journey planner	An application that computes a trip plan from a start point to an end point.
Journey planning API	An interface for requesting a trip plan from a journey planner. It may also support additional queries such as to find origin and destination points (by name, place, POI, map reference etc) or to supply real-time departure times for a given stop. A distributed journey planning API exposes additional elements to manage the distributed processing.
KPI	Key Performance Indicator. A qualitative measure use to monitor conformance to quality criteria.
Location reference system	A coordinate system such as WGS84 or Lambert used to spatially locate data, in particular map features and the nodes and links of road and PT networks.
Linked journey planning services	Any architecture for combining separate journey planners so as to cover a wider area or additional modes - in contrast to a centralized or monolithic architecture which uses a single planner over a single integrated data set. Possible linked architectures include either distributed or chained/hybrid planners.
Local network	The extensive network of minor transport links that is peripheral to the main Trans-European Transport Networks (TEN-T).
Local region	The territory for which a journey planner can plan journeys without information from other federated systems.
MaaS	Mobility as a Service - a mobility distribution model in which a customer's major transportation needs are met over one interface and are offered by a service provider acting as a broker.
Metadata	A structured description of the structure and content of data facilitating the discovery and use of this data.
Micro Journey Planner	A journey planner that provides detailed information on pedestrian routing within a limited area, for example path ways through a large interchange between entrances, platforms etc, normally including in particular accessibility options for PRMs.
MMTIPS	Multi Modal Traveller Information and Planning systems and Services.
Monolithic (Centralized) journey planner	A centralized (and classical) architecture for journey planners that integrates all the data into a central data store covering all represented regions so that an engine may compute the entire journey plan within a single memory space.
MS	Member State.
Multi Modal	Consisting of two or more modes of transport.
NeTEx	A CEN Technical standard for the exchange of public transport data. It defines an XML schema based on Transmodel concepts and is divided into three parts; Part 1 Covers the core concepts and the description of the PT transport network. Part 2 covers timetables, Part 3 covers fares.
OJP	Open API for Distributed Journey Panning. A CEN standard API for Journey Planning being developed by TC278W G10
Open data	A policy that data should be made available to third parties for any arbitrary legitimate use. Open data does not preclude charging for data or

	the setting of reasonable conditions of use, but data must be accessible on a non-discriminatory basis to all data users.
Open data licence	A free legal IPR licence governing use of data that grants well defined rights to data users.
Operator Identifier	A code that uniquely identifies an operator within a given region; may be used to establish uniqueness of journeys, vehicles and other elements within a region, especially when integrating data from multiple sources.
Operational Calendar	Temporal conditions for Timetables are often expressed in terms of day types, e.g. "Service runs Monday to Friday year round, but not on holidays". In order to resolve a general timetable into a specific operational timetable for a specific day of travel, an operational calendar is used that will indicate the day type of a particular day. E.g. "the 10 April 2015 is a Public Holiday in Ruritania".
Passing time	The time at which a vehicle arrives or departs a stop.
Planned disruption	A disruption to normal transport operations which is scheduled in advance and will be in effect for a fixed period of time, for example engineering works, street carnival etc.
Point of Interest (POI)	A named place that is a commonly desired destination of travel such as a cultural attraction, sports venue, park, shopping precinct, prison, town hall, church etc, and may be sought in a journey planner. Geocoded POI data for journey planners may be specifically associated with designated stops for access, describe the accessibility, and also be categorised by type of POI.
Pre-journey information	Information required by a traveller before they begin a journey, for example arrival and departure times, interchange locations, ticket costs and purchase methods.
Private transport	A transportation service which is not available for use by the general public, for example privately owned cycles, cars, boats and airplanes.
Profile	A set of metadata specifying how a generalised standard such as NeTEx or SIRI should be used in a specific implementation context. The profile may cover which elements should or should not be present, choice of aggregation granularity, packaging options, code spaces, national languages, timezones, default values etc. It may also prescribe workflow processes and data quality criteria such as timeliness.
PRM	Persons with reduced mobility (including visually or hearing impaired citizens).
PSI Directive	EC Directive on the re-use of public sector information.
PT Network Link	A link between two stops in the scheduled transport network connected by a scheduled service. The PT network representation is a separate information layer from the GIS representation, omitting low level detail and adding in additional concepts such as directionality. A representation of the topology is not needed as a distinct data set for journey planning as the link are implicit in the stop sequence of the timetable, but is useful for creating maps and schematic presentations.
Public transport	Passenger transport services of general economic interest provided to the public on a non-discriminatory and continuous basis (EC regulation 1370/2007/EG). Passenger transport modes including bus, coach, rail, tram. trolleybus and metro/subway/underground *(as opposed to private transport – car, bike).*
Pull service (data)	A dynamic data service that works by a client application requesting current data on demand from a data server when it requires it.
Push service (data)	A dynamic data service that works by a data publisher distributing new changes to all subscribers whenever a change of state occurs. Depending on the application and the pattern of data exchange this may be more or

	less efficient than a pull service.
Quality of Service (QoS)	The measures characterising the quality of a data service as to resilience, speed of response, bandwidth, etc.; used to define performance criteria on a data supplier necessary for supporting a commercially viable service.
RailML	An XML standard for railway operations including detailed track topology, signal systems, assets, rolling stock, crew rostering etc.
Real-time information	Data generated continuously by changes of state of the real-world objects of the transport system. For example vehicle positions, vehicle arrival times, availability of car club vehicles, or incident information. Real-time data needs to be exchanged using a dynamic service and may also be recorded to create historic data.
Remote-region	A federated region of a distributed journey planning system which is not adjacent to the local region.
Responsibility	The right and obligation to act in a particular role in managing a transport network or data. Data responsibility may be separate from data ownership (for example a data owner may contract another party to manage their data). Data responsibilities for a given data set may be partitioned between different administrative jurisdictions. A number of different roles may be identified and the different data responsibilities for the same data elements (e.g. collection, aggregation, validation, integration, supply) may be split among multiple stakeholders depending on organizational boundaries.
Road link	An identified link between two nodes in the road network which may be associated with speed limits, vehicle restrictions and historic and real-time travel times. Such links, together with their equivalents for pedestrian and cycle paths, provide the basis both for collecting road real-time data, and for road journey planning.
RTTI	Real-time Traffic Information, comprising the different types of road travel data (real-time road link travel times, incidents, queue lengths etc) available through dynamic services.
Schedule adherence	The measurement of an operator's performance in running services to the timetable. Can be computed from historic real-time data. Relevant to passengers for assessing their journey options, and in some circumstances for claiming compensation.
Semantic interoperability	The ability to automatically and accurately interpret the information exchanged between two systems in order to produce useful results as defined by the end users of both systems.
Sharing economy	A socioeconomic system built around the sharing of resources on a demand basis. A mobility related example of this is the sharing of cars rather than sole use direct ownership.
SIRI	Server Interface for Real Time Information. A CEN Standard protocol for exchanging Public Transport real-time data. It comprises a common reusable framework and a number of specific functional services, such as SIRI-SM (Stop Monitoring) for exchanging real-time bus arrivals and departures; SIRI-VM (Vehicle Monitoring) for exchanging real-time bus positions; SIRI-ET (Estimated Timetable) for exchanging real-time timetables; SIRI-CM (Connection Management) managing dynamic connections; and SIRI-SX (Situation Exchange) for exchanging incident messages. Additional functional services can be added, for example to exchange NeTEx data.
Situation data	Structured incident data used to describe events and planned and unplanned disruptions to the network and their likely consequences for passengers. Computer readable data must be in a tagged format with quantitative measures that can be processed automatically (for example, to provide as annotations on journey plans of likely delays) and also be rendered into a human readable form. Several standards such as TIS

	(TPEG), DATEX II and SIRI-SX describe formats for situation data.
Specifications (ITSD)	Within the ITS Directive context, binding measures laying down provisions for requirements, procedures or rules. For Priority Action A binding measures laying down provisions for requirements, procedures or rules for the interoperability of data access and continuity of services for MMTIPS
SSIM	Standard Schedules Information Manual. The IATA aggregated dataset (and format) for sharing static scheduled flight information.
Stakeholder groups	Parties with an interest in the creation and dissemination of passenger data; in particular, Passenger representative bodies; Member States; cities/regions; transport operators; system providers; industry associations, and third party information service providers.
Standards	A defined procedure for the provision of information in the field of technical standards and regulations. A data standard has a machine readable embodiment in a software interface or format (standards may also apply to physical objects or "soft" such as quality measures, workflow processes, or aspects of Human Machine Interfaces).
Standard Fares	A core set of fare products offered by a transport operator (often at regulated prices) that is available to all the main classes of user at all times, (as distinct from special offers, season passes, or niche fare products subject to additional conditions). These standard fares typically comprise a static data set that gives an indicative price for comparing the costs of different transport modes for occasional users but often will not be the cheapest option.
Start point	The origin point of the journey e.g. a postal address, map coordinate or stop.
Static information	Information which does not change on a dynamic basis.
Stop	A node on the transport network – e.g. bus stop, station, airport, ferry landing etc.
Stop Event	A real-time arrival or departure at a stop, with an associated passing time.
Stop-to-stop	A journey from one public transport stop to another stop.
Subsidiarity (EC)	The principle that the Commission should have a subsidiary function, performing only those tasks which cannot be performed at a more local level in Member States.
Syntactic interoperability	The capability of two or more systems to communicate and exchange data through specified data formats, communication protocols.
TAP/TSI	Telematics Applications for Passenger Services Technical Specifications for Interoperability. The purpose of TAP/TSI is to define European-wide procedures and interfaces between all types of railway industry actors. It contributes to an interoperable and cost-efficient information exchange system for Europe that enables the provision of high quality journey information and ticket issuing to passengers.
Temporal condition	A time-dependent validity rule as to when a transport service or stop is operational or a fare is available.
TEN-T core network	The Trans-European Transport Networks (TEN-T) are a designated set of road, rail, air and water transport networks covering Europe. The core network has strategic importance for major European and global transport flows, and has extensive real-time data coverage of many of its links.
TEN-T comprehensive network	A multi-modal network of relatively high density that is important for the economic, social and territorial development of the European regions (including peripheral and outermost regions) as well as for the mobility of their citizens.
Terms of use (of	Legal conditions granted by a data owner as to the access, use and

data)	onwards distribution of data by data users. May include disclaimers as to liability for inaccuracies, attribution and credit etc.
Timeliness (of data)	The property of correctness in a data set such that data is available in sufficient time to be useful. For example, changes to a timetable need to be made available in time to incorporate them in journey planners ahead of users planning trips, or real-time predictions need to arrive before the vehicle.
Timetable	A fixed schedule of daily operation with arrival and departure times defined (or for frequency based services, a target frequency within a particular time band).
Transmodel	The European Reference Model for Public Transport. A CEN standard that provides a systematic conceptual model for all the data entities found in public transport information systems. It is used to analyse and compare different systems and to design interoperable standards.
TRIAS	The German 'Travellers' Real-time Information and Advisory Standard' for enabling access to journey planning systems using standardized and manufacturer-independent client systems ("apps").
Trip plan (or 'journey plan'	An optimised route for a passenger to take from a journey start point to a journey end point on a particular date and time, and potentially involving one or more trip legs on various modes of transport.
Trunk leg	The greater part of a non-local journey – typically provided by a fast long distance mode such as rail, coach, air, ferry or private car, and possibly connecting to local legs on other modes at either end.
Unplanned disruption	A disruption to the transport network which is not planned in advance. For example: an accident, equipment failure, or weather related impact on the network causing diversions, delays or cancellations to service.
UTMC	Urban Traffic Management Control specification; a UK ITS standard for exchanging traffic data. It provides a uniform model for the efficient exchange of both the reference and real-time data for road link speeds, journey times, measurement devices, queues, flows, traffic signals, events, incidents, VMS, CCTV, parking, air quality, weather, etc.
Validation (of data)	The process of checking that data supposedly in a given data format actually conforms to the format and is correct as to identity, completeness, accuracy, consistency, etc, of data elements.
Vehicle journey	A journey made by a PT vehicle following an operational timetable (as opposed to a trip made by a passenger with one or more legs serviced by vehicle journeys.
Vehicle type	The characteristics of the vehicle used to deliver a particular vehicle journey; such properties, e.g. number of wheel-chair places, steps, hoists, etc, may be important for accessibility. Also used to calculate environmental impact.
Veracity (of data)	The property of correctness of a data set such that all the elements in the data set exactly correspond to the real world entities they represent. (For example, that stops are located where their coordinates indicate they are and are identified by the names or labels given; or that a timetable includes only vehicle journeys that will actually be made on the indicated days, and that the departure times are true.) Completeness of data is a further specific aspect of accuracy.
Version	The mechanism of assigning a simple signature to indicate and manage the compatibility and interoperability of different successive evolutions of data, data formats or data services.

Appendix B   Further cost/benefit examples

This section draws on responses from stakeholders with further quantified and qualitative examples of the costs and benefits associated with different policy measures which could be deployed to further uptake of MMTIPS across the EU.

Few responses provided were quantitative in nature but the summary below identifies costs and benefits reported by respondents.

Approximately two-thirds of respondents provided some feedback to these questions. A small proportion of those respondents highlighted that they did not believe there would be a costs or benefits associated with the described policy approaches.

These are in addition to those figures identified within D1.

B.1 Quantitative examples

B.1.1 Costs[6]

- Data collection and digitisation:
    - With respect to collecting data on the **fares and actual routing of buses** on the road network, a journey planner with a national coverage reported spending EUR 5,000 per month for manually gathering data on the stop coordinates and contacting operators regarding their fares, discounts, etc.

    - A small-sized service provider operating an MMTIPS with national coverage reported that yearly expenses for gathering the data on **public transport stops** amount to over EUR 250,000, compiling a **database on car parks** is estimated to cost EUR 125,000 annually while the **database on inter-urban coach transport**, incurred a cost of EUR 44,000.

    - When information is available in a non-electronic format, costs of digitalisation have been reported as being non-negligible: one MMTIPS provider reported spending EUR 360,000 per year to digitalise **timetables for ferries for an entire country**.

    - An MMTIPS provider explained that they have spent EUR 700,000 in 2013 for generating specific data for the entire EU. In addition to those costs which were related to generating data by own means, the service provider reported spending 6,930 man/hours on **sourcing public transport data**.

    - In order to digitally integrate the exact **routing of urban public buses**, the provider reported gathering the data by following the routes in person or via street view on the internet at a cost of around EUR 60,000 per year.

---

[6] Drawn from Study on access and availability of MMTTI, Floristean et al 2014

- Establishing Access Points

    - A number of respondents highlighted that given existing National Access Points (from Priority B) or City Access Point availability there would not be as high a cost for many member states to adopt this.

- Accessing third party data sources:

    - An MMTIPS provider operating a national service with real time information reported spending between EUR 12,000 and EUR 40,000 per year for accessing datasets **on air schedules, taxi information** as well as a daily feed on **rail data** and mapping of road restrictions in addition to more than EUR 270,000 per annum for **traffic alerts and information on road works**.

- Opening systems for access to third parties:
    - The network manager of a 3 million population European City, reported its current costs of for ensuring availability, highlighted that the adaptation of the **IT architecture** (systems, software) and **human capital** to improve availability, accessibility and interoperability (taken together) can be estimated to be of EUR 150 000 per year.

- Implementation of common standards
    - Some system suppliers are charging a high price for the **implementation and maintenance of common standards**. (E.g. experience of a SIRI interface costing more than EUR 50,000 plus an annual maintenance fee for each instance of implementation.) (Source: Verband Deutscher Verkehrsunternehmen).

- Common terms and conditions
    - For costs of implementing **common terms** around half the respondents which provided an answer to this stated "none, "minimal" or equivalent.

B.1.2 Benefits

Many of the costs listed above could become cost savings if data access, quality and use of common standards were improved so that there was no duplication in data collection and management activities.

- Savings in no longer handling multiple data formats (aggregation) - One MMTIPS provider operating at a national level reported investing between EUR six million and EUR twelve million over a ten year period for **dealing with multiple formats**, while another comparable MMTIPS provider claimed that the **issue of interoperability** entailed total costs of EUR 10,000 in the last two to three years. The discrepancy can be explained by the fact that in the former case a set of new standards was developed: after sinking this initial costs, the annual figure for ensuring interoperability has lowered to approx. EUR 24,000.

- Savings from data becoming available in a **common electronic format**: One MMTIPS provider reported that, as a result of the fact that certain data elements were not made accessible by the data owner/holder in an electronic and machine-

readable format, she had to invest EUR 700,000 to overcome this barrier by collecting the necessary data elements.

- **Economic generation**: Helsinki has seen new companies and organizations, such as Busfaster Inc., develop as a result of opening data. The recent Open Finland Challenge 2015 competition had over 60 competitors in the category of Mobility and Tourism.

- TfL, UK London reduced cost: from £15m to £58m of **reduced annual cost in passenger time** from finding optimal mode/route for journey. (Source: STIB-MIVB response)

- Terms and conditions for re-use:
  - Belgium: EUR 180 Million of Open Data benefits (not only for public transport but for the **global Open Data benefits**) mentioned by Agoria. (from STIB-MIVB response)
  - Open data [terms and conditions] would greatly simplify the setting up of mobility observatories and models, which are developed at metropolitan or regional levels and associate several partners; - time savings could be in the Millions of € nationally in France (Source: Cerema).

- **Scale of demand of cross border information**. Between Malmö - Copenhagen there are 10 million yearly trips (Source: Skånetrafiken).

- A significant part of the €1M budget of Digitransit has gone to work that would have been eased by an **Access Point** with a catalogue of quality-tested data (Source: Helsinki Region Transport).

- The available of transport and traffic data would greatly facilitate national or European level studies, such as comparing congestion between cities, or comparing PT or multimodal accessibility, or even make these studies feasible where today they are conducted because it would be too costly (e.g. multi-€100ks needed to collect data) (Source: Cerema)

- **Improved quality**
  - In many transport studies, data collection and correction is a significant part of the budget ; - at Cerema, several M€ of transport and mobility studies are undertaken every year, so if quality is significantly improved 10% of this could be saved.
  - We would have return of investment within 6 months if we had to pay for such a[n approach within a] multimodal travel information service (Source: ITS Norway)

B.2 Qualitative examples

Respondents also provided qualitative example of costs and benefits to their organisation for policy changes in four distinct areas which are included here for completeness.

B.2.1 Costs and benefits if harmonised data formats and exchange protocols were to be prescribed

B.2.1.1 Benefits

- Cost reductions from **handling fewer data formats** than currently. This needs to recognise however that some member states are already adopting some of the proposed common standards (or close equivalents) so there would not be an additional benefit to them:
  - Potential benefit of using common standardised tools that were more cost effective (e.g. open-source).

- Costs benefits from **providing travel information solutions on a larger scale** (e.g. geographic coverage across member states).

- **Procurement benefits**: Cost reductions to operators/authorities from not being 'locked-in' to system vendor bespoke data formats.
  - More cost effective market for systems.
  - Reduced exposure to costs associated with systems using bespoke formats/interfaces.

- **Lowered barriers to market entry**: enabling a market for products and services that otherwise would be prohibitively expensive to enter.
  - Reduced costs for deployment.
  - Reduced time to deployment.
  - Increased availability of data.
  - Enabling new value-added services or market disruptors whose benefits cannot yet be known.

- Cost reductions to transport authorities and operators in **no longer having to provide their own travel information service** (paper, phone, web, mobile etc), nor to keep developing new applications for new devices.

- **Stability and continuity** (economic confidence).

- **Benefits to citizens.**
  - Of freer cross border movement and modal choice.
  - In choice of information products and sources, developed more rapidly by competition from innovative companies in an open market rather than only by transport operators.
  - In ability to select a 'single source' for aggregated modal information (time savings in decision making).
  - In identifying cheaper journey options.

- Benefit in implementing **more cost effective quality checking** regimes when common data formats are in use.

B.2.1.2 Costs

- Limitations on **market responsiveness**:
  - o Prescription of formats and protocols may impede the agility of the services to respond to market needs
  - o Opportunity costs of focusing on compliance with requirement rather than innovating the current service offering
- **Investment required to migrate** from existing formats/protocols, e.g. handling variations in interpretation of common standards
  - o Implementation costs (software development or licensed modules)
  - o Recurring additional maintenance costs
  - o Procurement costs (of software development or new support systems)
  - o Completing gaps in data to ensure compliance with a data standard
  - o Training/learning of staff to understand the prescribed common data standards
- **Increased barriers to market entry** for new service providers resulting from increased data complexity associated with some common data standards
- A **European\National governance infrastructure** to support such a prescription in terms of enforcement, migration support, maintenance and evolution of standards

B.2.2 Costs and benefits if the use of Access Points was prescribed?

As a summarising comment, the vast proportion (though not all) of responses were positive that introducing (or expanding) use of Access Points would bring more benefits than costs.

B.2.2.1 Benefits

- **Reduced data discovery and aggregation costs** (e.g. less time spent in identifying sources of data)
- Potential savings from **reduction in number of access points** would be possible
- **Lowered barriers to market entry**: enabling a market for products and services that otherwise would be prohibitively expensive to enter.
  - o Increased availability of data
  - o Enabling new value-added services or market disruptors whose benefits cannot yet be known
- Cost reductions to transport authorities and operators in **no longer having to provide their own travel information service** (paper, phone, web, mobile etc).
- Likely **to improve consistency, quality, reliability, accountability, convenience**

B.2.2.2 Costs

- Technical and resource costs of **establishing and maintaining Access Points**
    - Hardware and hosting
    - Implementation (procurement, management, coordination, engagement with multiple data sources)
    - Maintenance (e.g. ongoing coordination)
    - Managing a user/customer feedback/support function
    - Metadata definition
    - Any multi-lingual support required
    - Increased data security costs (to prevent 'denial of service' etc) – particularly for national level Access Points
- Costs to operators and authorities of **synchronising data** with a National Access Point (ranging from negligible to recurring small staff time costs) – this is dependent on approach taken (e.g. not applicable to a registry)
- Benefits may turn to costs if regulated practices fall behind the pace of change in the market.
- **Implementation of APIs** for incorporation within Access Points *(same costs as in previous section)*

B.2.3 Costs and benefits if data quality levels were improved?

B.2.3.1 Benefits

- **Improved customer experience of travel information services**
    - Uplift in user demand or slowing of decline in user numbers
- **Improved customer experience of transport** modes/journeys
    - Cheaper journeys identified
    - Faster journeys identified
    - Accurate journeys identified
    - Behaviour change in favour of operator's mode- e.g. increased ticket sales
- Enables **more third party services** to be provided for a city/region (i.e. choice)
- **Reduced need for in-person support** (e.g. telephone, travel centres) and customer complaint handling costs
- **Reduction in costs associated with reworking data** to make it fit for purpose – e.g. accurate at source

B.2.3.2 Costs

- Costs of new **quality checking tools**
- Costs of **staff time to conduct quality monitoring** processes and data correction

- **Administrative costs** for implementing a user feedback quality loop process

- **Lead times of additional quality checks** (e.g. potentially resulting in delays in making data available)

B.2.4 Costs and benefits if common terms and conditions for the re-use of travel and traffic data were established at an EU level

There were few responses to this question, partly due to the likely responses being similar to the earlier questions, partly due to the difficulty in identifying the immediate costs/benefits and also because the answer very much depends on what the common terms and conditions would state.

B.2.4.1 Benefits

- Reduced administrative and legal costs associated with developing and agreeing separate terms and conditions

- Reduced liability and data protection risks

- Reduces barriers to accessing data enabling a market for products and services that otherwise might be prohibitively expensive to enter.

  - Non-discriminatory access to all

  - Service levels for continuity of access

B.2.4.2 Costs

- Costs of **implementing common terms.** Note that about half the respondents which provided an answer to this stated "none, "minimal" or equivalent.

- Costs of **addressing issues of data misuse**.

Appendix C   References

All Ways Travelling Consortium (2014), 'To develop and validate a European passenger transport information and booking system across transport modes', 17-6-2014
Retrieved from:
http://ec.europa.eu/transport/themes/its/studies/doc/20140812-july9thversion-awtfinalreport.pdf

BEUC Vision Paper on Sustainable Mobility (2014) pp13-17. Retrieved from:
http://www.beuc.eu/publications/beuc-x-2014-056_cca_beuc_vision_on_mobility_long_version.pdf

CEN TC 278 WG3 SG9, 'Proposal and requirements for a NeTEx & SIRI support organization'

CER POSITION PAPER, 'Access to transportation data', May 2015

EFA 'Fahrplanauskunft für Oberrhein-Gebiet' presentation – 24-11-2014

Flash Eurobarometer 312, 'Future of transport – analytical report' (2011). Retrieved from: http://ec.europa.eu/public_opinion/flash/fl_312_en.pdf

European Disability Forum, 'Reply to the consultation on EU-wide multimodal travel information services under the ITS Directive 2010/40/EU', November 2015

Floristean A., Bundgaard Rohde H., Poulsen J., Nyberg J., Iseppi L., Lessmann F., Blagoeva T. 'Study on access and availability of multimodal travel and traffic data in the EU' (2014), pp 77-79, 141-142, 228

I& E Committee, House of Representatives of the States General, The Hague, 'Letter in the framework of the political dialogue regarding the provision of EU-wide multimodal travel information services under the ITS Directive 2010/40/EU' , 23-11-2015

Lantelme I. IN&AP 'E-multi-modal Travel Planning and Information Services-Ed 2p1', 8/12/2015

NAF 15-815 French authorities' position paper response to the Commission's questionnaire (13/11/2015), *Translated*

SMILE project findings, http://smile-einfachmobil.at/ (2015)

Stienen A. (VDV), 'Anmerkungen des VDV (Verband Deutscher Verkehrsunternehmen) zu multimodalen Reiseinformations- und Ticketingsystemen' (22/11/2015), *Translated*

TISA Position Paper concerning a public consultation of the European Commission on the

Provision of EU-wide multimodal travel information services (Priority Action A), 18-12-2015

Transport Focus, 'Future development of apps (Rail Passengers)' 8-9-2014

Retrieved from:
http://www.transportfocus.org.uk/media/c975c22da6e0285d2b56e02cbf5fd532c5189c72/Rail%20passengers%20and%20apps%20what%20next%20-%20full%20slide%20pack.pdf

Appendix D   Public Consultation Questionnaire

Public Consultation
on the provision of EU-wide multimodal travel information services
under the ITS Directive 2010/40/EU

Objective of the consultation

The objective of this public consultation is to collect the opinions of stakeholders and interested parties including EU citizens and private and public organisations and gain (quantitative) evidence on the issues related to the provision of EU-wide multimodal travel information services. The replies submitted to this public consultation will be taken into consideration for the development of the relevant specifications within the frame of the ITS Directive.

Intelligent Transport Systems (ITS) can significantly contribute to a more sustainable, safer and efficient transport system and the ITS Directive was adopted to accelerate the deployment of these innovative transport technologies across Europe. The ITS Directive[7] provides for the adoption of functional, technical and organisational specifications in the form of a delegated act to ensure the compatibility, interoperability and continuity for the deployment and operational use of EU-wide multimodal travel information services (Priority Action "A" of the ITS Directive). This delegated act will be a binding policy measure laying down provisions containing requirements or any other relevant rules to be followed in the case of deployment.

These specifications will be aimed at ensuring interoperable travel data and services, where possible based on existing standards and technology. At present, multimodal information services across Europe lack interoperability and are fragmented in terms of what they offer including modal and geographical coverage, real-time information and quality levels. This initiative is expected to contribute to EU-wide continuity and harmonised delivery of multimodal travel information services. This in turn is expected to encourage a positive modal shift to sustainable modes of transport and therefore improve the efficiency of Europe's transport network management.

The scope of these specifications does not include integrated multimodal ticketing, however this remains a long term vision of the Commission.

What are multimodal travel information services?

Multimodal travel information and planning services (MMTIPs) allow travellers to plan their journey from A to B comparing different travel options combing different variations of transport modes. MMTIPs may include a combination of two or more of the following transport modes which might be used by a traveller: air, rail, waterborne, coach, public

---

[7] Directive 2010/40/EU http://ec.europa.eu/transport/themes/its/road/action_plan/

transport, demand responsive transport, walking and cycling. Such services can allow the traveller to receive personalised routing results according to their specific travel preferences or needs including the fastest route, the cheapest route, the fewest connections, the most environmentally friendly, the most accessible for persons with reduced mobility etc. or simply a routing result based on the transport mode(s) they wish to use (i.e. cycling or public transport).

Who are the users of multimodal travel information?

The users of multimodal travel information are primarily citizens travelling on journeys which can be new, infrequent or regular/daily. Travellers may require information to help select the most cost effective, quickest or time appropriate mode of transport for a given journey. Moreover, travellers may want to be aware of any changes to a journey which they are undertaking, whether it be disruptions, routing changes, or expected travel time. Users may require information for short local journeys or longer trips including those journeys which require cross-border travel.

However, the users of multimodal travel information services are not just limited to the travellers themselves, but increasingly transport operators and transport authorities also use MMTIPs to maximise the efficiency of their management of the transport network by using real-time information about travel disturbances and incidents to smoothly re-direct traffic flow across their network. Moreover, logistic firms and freight companies also use this real-time information to support their daily activities by making well informed decisions regarding choosing the best route to efficiently conduct their operations avoiding travel disturbances and incidents.

How is information delivered to users?

Multimodal travel information services can be delivered to users through a variety of channels. Whilst there remains a portion of users who prefer to access information through staffed-services such as telephone advice lines or walk-in travel centres, the majority of these services are now provided online via browsers and also mobile phone applications. Information is provided by a range of organisation types including transport operators, transport authorities, public sector initiatives and private sector technology companies.

Instructions for filling in the questionnaire

Please note that the questionnaire consists of three parts.

- Part I asks information about the respondent and all the questions in Part I are mandatory to all respondents.

- Part II focuses on the use of multimodal travel information services and therefore these questions can be filled in by all respondents in their role as MMTIPS users, but questions 12.a-12.b are only applicable to transport operators and transport authorities.

- The questions in Part III and IV are primarily directed at organisations filling in the questionnaire; however citizens responding to the consultation may also answer questions in Part III and IV if they wish to do so.

Disclaimer

Please note that this document has been drafted for information and consultation purposes only. It has not been adopted or in any way approved by the European Commission and should not be regarded as representing the views of the Commission. It does not prejudge, or constitute the announcement of any position on the part of the Commission on the issues covered. The European Commission does not guarantee the accuracy of the information provided, nor does it accept responsibility for any use made thereof.

Part I: Information about the participant

[all the questions of Part I are mandatory]

Please provide information to help us build your profile as a respondent. In accordance with Regulation 45/2001, all personal data collected through this survey will be kept securely and will ultimately be destroyed.

Please note that the questionnaire will only use your full contribution if your name, organisation (if you answer on behalf of an organisation or institution) and contact details are provided. If you choose to not provide your name, organisation and contact details, you have the option of submitting a general comment only.

If you do choose to provide us with your name, organisation and contact details, you can still opt for your answers to remain anonymous when results are published.

☐Yes, I will provide my name and contact details

☐No, I prefer to provide a general comment only

General comment:

Please provide your name (first name and surname e.g. *John Smith*)

Please provide your email address

A notification of receipt will be sent to this email address. Please note that if the email address is not valid, your contribution will not be taken into account.

In what capacity are you completing this questionnaire? *[tick one answer]*

☐As a citizen/traveller

☐On behalf of an organisation or authority

If you are answering <u>as a citizen</u>, please provide your country of residence. *[tick one answer]*

☐Not applicable

☐Austria

☐Belgium

☐Bulgaria

☐Croatia

☐Cyprus

☐Czech Republic

☐Denmark

☐Estonia

☐Finland

☐France

☐Germany

☐Greece

☐Hungary

☐Ireland

☐Italy

☐Latvia

☐Lithuania

☐Luxembourg

☐Malta

☐Netherlands

☐Poland

☐Portugal

☐Romania

☐Slovenia

☐Spain

☐Sweden

☐Slovakia

☐United Kingdom

☐Other, non-EU Member State (please specify below)

Please specify the name of non-EU Member State if applicable

If you are answering on behalf of a company/organisation/authority/association please indicate the relevant country or countries of operation [multiple choice].

☐EU-wide

☐Global

☐Austria

☐Belgium

☐Bulgaria

☐Croatia

☐Cyprus

☐Czech Republic

☐Denmark

☐Estonia

☐Finland

☐France

☐Germany

☐Greece

☐Hungary

☐Ireland

☐Italy

☐Latvia

☐Lithuania

☐Luxembourg

☐Malta

☐Netherlands

☐Poland

☐Portugal

☐Romania

☐Slovenia

☐Spain

☐Sweden

☐Slovakia

☐United Kingdom

☐Other, non-EU Member State (please specify below)

Please specify the name of non-EU Member State if applicable

What is the name of your organisation or authority?

What is your function within this organisation or authority?

Please indicate the approximate number of members your organisation represents.

Please categorise your organisation as appropriate [tick]

You may tick more than one answer

☐Academic institution

☐Application developer

☐Association

☐Consultancy

☐Consumer rights organisation

☐Industry

☐Insurance company

☐Non-governmental organisation (NGO)

☐Network operator

☐Passenger association

☐Public administration

☐Research and development institute

☐Standardisation organisation

☐Systems supplier

☐Telecommunication service provider

☐Transport authority

☐Transport operator

☐Transport company (other)

☐Travel information service provider

☐Travel data provider

☐Other – *please specify*

Please categorise your organisation within the travel information service chain as appropriate [tick] *You may tick more than one answer*

☐Network operator

☐Transport operator

☐Travel information service provider

☐Data generator

☐Data owner

☐Content provider

☐Data user

☐Other

Is your organisation registered in the Transparency Register of the European Commission? [tick]

☐Yes

☐No

If yes, please indicate the identification number

The Transparency Register of the European Commission is accessible on:

http://europa.eu/transparency-register/index_en.htm

Please note that received contributions, together with the identity of the contributor, may be published on the Internet, unless the contributor objects to publication of the personal data on the grounds that such publication would harm his or her legitimate interests. In this case the contribution may be published in anonymous form.

Please indicate your preference as regard publication of your contribution: [tick]

☐My contribution can be published including my personal information / name of my organisation

☐My contribution can be published anonymously

☐My contribution cannot be published

Explanations about the Protection of Personal Data are available on:

http://ec.europa.eu/geninfo/legal_notices_en.htm#personaldata

The policy on "protection of individuals with regard to the processing of personal data by the Community institutions" is based on Regulation (EC) N° 45/2001 of the European Parliament and of the Council of 18 December 2000.

Part II. Use of multimodal travel information services

[Part II is applicable to people who travel for personal and/or business reasons]

1) **How often** do you make the following types of journey? [multiple choice - tick all that apply]

	Weekly	Monthly	Quarterly	Annually	Less often	Never
Journeys within your city or local region	☐	☐	☐	☐	☐	☐
Journeys within your country	☐	☐	☐	☐	☐	☐
Cross border journeys to another European country	☐	☐	☐	☐	☐	☐
Journeys within another European country	☐	☐	☐	☐	☐	☐

2) Typically do you seek information to help you **plan** your journeys **before** you travel? *[multiple choice - tick all that apply]*

	Frequently	Occasionally	Never
Journeys within your city or local region	☐	☐	☐
Journeys within your country	☐	☐	☐
Journeys to another European country	☐	☐	☐
Journeys within another European country	☐	☐	☐

3) Typically do you seek **real-time information** about your journey **while** you are travelling? (e.g. disruption information, delays, alternative routes) *[multiple choice - tick all that apply]*

	Frequently	Occasionally	Never
Journeys within your city or local region	☐	☐	☐
Journeys within your country	☐	☐	☐

Journeys to another European country	☐	☐	☐
Journeys within another European country	☐	☐	☐

4) Normally, **how** do you access this travel information? (i.e. from which sources) *If you selected 'never' for all of the responses in Q2-3 please select not applicable [tick all that apply]*

☐An operator's website

☐An independent website (i.e. non-transport operator provided)

☐An operator's mobile phone application

☐An independent mobile phone application (i.e. non-transport operator)

☐Telephone service (i.e. voice based)

☐Travel agency \ in-person service

☐Other

☐Not applicable

If you indicated 'other' please describe:

5) Considering your experiences as a traveller, are you satisfied with the **geographical coverage** of travel information that is available to you (i.e. the cities, urban, regional areas covered, countries available to you etc.) *[tick]*

☐Yes

☐No

☐Partly

5.a) If you answered no or partly, would you like the geographical coverage of travel information available to you to be **enlarged**? (i.e. the possibility to plan your journey to more places in Europe?) *[tick]*

☐Yes

☐No

☐No preference

If relevant, please provide further details to support your response. *[optional]*

6) Are you satisfied with the number of **different transport modes** (bus, rail air, cycling etc) **typically** included in the travel information that is available to you? *[tick]*

☐Yes

☐No

☐Partly

6.a) If you answered no or partly, would you like the modal coverage of your travel information to be **enhanced** (i.e. more travel options display showing more modes of transport?) *[tick]*

☐Yes

☐No

☐No preference

7) Do you typically have access to some form of **multimodal** travel information services (e.g. an online journey planner providing various travel options including two or more transport modes) when considering the following types of journey? *[multiple choice - tick all that apply]*

	Yes	Partly	No	Don't know
Journeys within your city or local region	☐	☐	☐	☐
Journeys around your country	☐	☐	☐	☐
Journeys to another European country	☐	☐	☐	☐
Journeys within another European country	☐	☐	☐	☐

8) Specifically thinking about the range of journeys you undertake, which of the following modes of transport/travel options would you **like** to be able to consider? *[multiple choice - tick all that apply]*

	Very likely	Likely	Not likely	No
Air	☐	☐	☐	☐
Local public transport (bus, tram, metro etc)	☐	☐	☐	☐
Rail	☐	☐	☐	☐
Long distance coach	☐	☐	☐	☐
Waterborne	☐	☐	☐	☐
Road (passenger cars)	☐	☐	☐	☐
Taxis	☐	☐	☐	☐
Car-pooling (e.g. ride sharing)	☐	☐	☐	☐
Car-sharing (e.g. car clubs)	☐	☐	☐	☐
Dial-a-ride services (for persons with reduced mobility)	☐	☐	☐	☐
Bike-sharing	☐	☐	☐	☐
Cycling	☐	☐	☐	☐
Walking	☐	☐	☐	☐

9) Considering those modes of transport you normally choose for your journeys, if you had access to a **wider range of travel options by different modes**, how likely do you think that might **change** your travel choice? (e.g. using local bus services rather than a taxi; rail rather than air; long distance coach rather than private car etc.) *[multiple choice - tick all that apply]*

	Very likely	Quite likely	Possibly	No
Journeys within your city or local region	☐	☐	☐	☐
Journeys around your country	☐	☐	☐	☐
Journeys to another European country	☐	☐	☐	☐
Journeys within another European country	☐	☐	☐	☐

10) Which **quality criteria** do you consider as the most important for multimodal travel information services? *[multiple choice - please rank criteria]*

	Very Important	*Important*	*Less important*	*Not important*	*Undecided*	*Don't know*
Geographical accuracy (i.e. is walking information or interchange locations accurate?)	☐	☐	☐	☐	☐	☐
Time accuracy / up-to-date (i.e. does the information provided accurately reflect reality?)	☐	☐	☐	☐	☐	☐
Timeliness (i.e. is new information provided when needed? This might include information on planned disruptions to service, service changes etc.)	☐	☐	☐	☐	☐	☐
Usefulness (i.e. does the information given provide the answer needed?)	☐	☐	☐	☐	☐	☐
Completeness (i.e. is all the service	☐	☐	☐	☐	☐	☐

information available?)						
Consistency (i.e. information is consistent between different sources?)	☐	☐	☐	☐	☐	☐
Inclusiveness (i.e. information sufficient to support the needs of persons with reduced mobility)	☐	☐	☐	☐	☐	☐
Precision	☐	☐	☐	☐	☐	☐
Reliability	☐	☐	☐	☐	☐	☐
Others (please specify)	☐	☐	☐	☐	☐	☐

Please specify other quality criteria if appropriate [OPTIONAL]

11) Please rate the following functions according to how important they are to you for multimodal travel information services? *[multiple choice - please rank criteria]*

	Very Important	Important	Less important	Not important	Undecided	Don't know
Location searches (addresses, points of interest, stations/stops etc)	☐	☐	☐	☐	☐	☐
Nearest stop/interchange	☐	☐	☐	☐	☐	☐
Timetable information	☐	☐	☐	☐	☐	☐
Coverage (door-to-door queries)	☐	☐	☐	☐	☐	☐
Coverage (station-to-station queries)	☐	☐	☐	☐	☐	☐
Range of transport modes available	☐	☐	☐	☐	☐	☐
Routing information (walk, cycle, drive)	☐	☐	☐	☐	☐	☐

Travel time estimates	☐	☐	☐	☐	☐	☐
Planned disruption information	☐	☐	☐	☐	☐	☐
Prices, tariffs and how to book tickets	☐	☐	☐	☐	☐	☐
Availability of seats / tickets	☐	☐	☐	☐	☐	☐
Interchange facilities (including accessibility)	☐	☐	☐	☐	☐	☐
Vehicle facilities (including accessibility)	☐	☐	☐	☐	☐	☐
Noise and Air pollution	☐	☐	☐	☐	☐	☐
C02 emissions	☐	☐	☐	☐	☐	☐
Real time information (arrival/departure times; unplanned disruption information)	☐	☐	☐	☐	☐	☐
Supporting information (lost property; making a complaint etc)	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐

If you indicated 'other' please specify

12) What are the most important benefits you see from using comprehensive multimodal travel information services? (i.e. better use of time avoiding delays/congestion, health benefits from active travel, reduced pollution from using sustainable modes etc.) *[OPTIONAL]*

The following questions are only applicable to transport operators and transport authorities

12.a) Do you agree that multimodal travel information services (**real-time information**) are **helpful** for transport operators and transport authorities to effectively coordinate and manage the flow of travellers across the transport network? **[tick]**

☐Strongly agree

☐Agree

☐Disagree

☐Strongly disagree

☐Undecided

☐I don't know

If relevant, please provider further information to support your response *[OPTIONAL]*

12.b) If available, do you currently **use** multimodal travel information services **(real-time information)** to help coordinate and manage the flow of travellers across your transport network? *[tick]*

☐Yes

☐No

If relevant, please provider further information to support your response *[OPTIONAL]*

Part III: Understanding barriers and policy enablers

[Part III is mandatory to complete by organisations filling in the questionnaire. Citizens/travellers can also answer Questions in Part III]

Barriers – economic, legal and technical

13) Please rate the severity of the following current **economic** related barriers to the provision of multimodal travel information services in your view. *[multiple choice – please rank criteria]*

	Very Important	Important	Less important	Not important	Undecided	Don't know
Staff costs of collecting and managing data	☐	☐	☐	☐	☐	☐
Costs of aggregating data	☐	☐	☐	☐	☐	☐
Costs of linking to third party data sources	☐	☐	☐	☐	☐	☐
Charges for access to certain data or services	☐	☐	☐	☐	☐	☐
Insufficient business case to cover costs of delivering information services	☐	☐	☐	☐	☐	☐
Lack of certainty about continuity of data supply to justify systems investment	☐	☐	☐	☐	☐	☐
Other– *please specify below*	☐	☐	☐	☐	☐	☐

If you indicated 'other' please specify

If you have other economic related barriers to the provision of multimodal traveller information services not mentioned below please detail below

[OPTIONAL]

14) Please rate the severity of the following current **legal** related barriers to the provision of multimodal traveller information services in your view. *[multiple choice – please rank criteria]*

	Very Important	Important	Less important	Not important	Undecided	Don't know
Lack of fair and equal access to data	☐	☐	☐	☐	☐	☐
Lack of clarity of liability issues when re-using data	☐	☐	☐	☐	☐	☐

Lack of clarity of data ownership	☐	☐	☐	☐	☐	☐
Lack of clear terms and conditions for re-use	☐	☐	☐	☐	☐	☐
Other – *please specify below*	☐	☐	☐	☐	☐	☐

If you indicated 'other' please specify

Please specify other legal related barriers to the provision of multimodal traveller information services [OPTIONAL]

15) Please rate the severity of the following current **technical and organisational** related barriers to the provision of multimodal traveller information services in your view. *[multiple choice – please rank criteria]*

	Very Important	*Important*	*Less important*	*Not important*	*Undecided*	*Don't know*
Lack of data in electronic form	☐	☐	☐	☐	☐	☐
Lack of tools to collect and manage data	☐	☐	☐	☐	☐	☐
Lack of common formats for exchanging data	☐	☐	☐	☐	☐	☐
Low quality of data	☐	☐	☐	☐	☐	☐
Lack of processes for correcting data errors	☐	☐	☐	☐	☐	☐
Lack of central access points to obtain aggregated data	☐	☐	☐	☐	☐	☐
Lack of data available in common formats	☐	☐	☐	☐	☐	☐
Lack of adoption by suppliers and data providers of existing common data formats	☐	☐	☐	☐	☐	☐
Lack of deployed Automated Vehicle Location (AVL) systems to create real-time data	☐	☐	☐	☐	☐	☐
Lack of appropriate common service interfaces for linking systems dynamically	☐	☐	☐	☐	☐	☐
Lack of adoption by suppliers and data providers of existing common interfaces	☐	☐	☐	☐	☐	☐

| Lack of multilingual data | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Other – *please specify below* | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

If you indicated 'other' please specify

If you have other technical and organisational related barriers to the provision of multimodal traveller information services not mentioned below please detail below

[OPTIONAL]

Data formats/exchange protocols

16) Do you think that travel and traffic data **should** be **interoperable** across the EU? *[tick]*

☐Yes
☐No
☐I don't know

17) Do you think that travel and traffic data at present **is sufficiently** interoperable across the EU? *[tick]*

☐Yes
☐Partly
☐No
☐I don't know

18) Do you think that the use of common data standards can help enhance the **consistency, re-use and exchange** of travel and traffic data across the EU? *[tick]*

☐Yes
☐No
☐I don't know

19) Do you think that data formats and exchange protocols used across the EU in all Member States should be harmonized? *[tick]*

☐Yes
☐No
☐I don't know

19.a) If yes, which formats and protocols do you think should be harmonized across the EU? *[multiple choice – please rank criteria]*

	Important	*Not important*	*Don't know*
Transmodel	☐	☐	☐
IFOPT	☐	☐	☐
NeTEx	☐	☐	☐
SIRI	☐	☐	☐
EDIFACT (TAP TSI)	☐	☐	☐
GTFS	☐	☐	☐
DATEX II	☐	☐	☐
TPEG	☐	☐	☐
UTMC	☐	☐	☐
GDF	☐	☐	☐
Other	☐	☐	☐

If you indicated 'other' please specify

19.b) If yes, do you think that this needs to be tackled at an EU level? *[tick]*

☐Yes, the EU should **mandate** the use of common and harmonized data formats by **private and public** actors
☐Yes, the EU should **recommend** the use of common and harmonized data formats by **private actors and mandate their use by public** actors
☐Yes, the EU should **recommend** the use of common and harmonized data formats by **private and public** actors
☐No
☐Other
☐I don't know

If you indicated 'other' please specify

19.c) If you indicated 'not important' to any of the above, please provide further information to support your answer *[OPTIONAL]*

20) What would be the **main benefits** in your view if harmonized data formats and exchange protocols were prescribed? E.g. reduced costs from no longer needing to support numerous data formats; reduced barriers to entering new European markets. If possible, please include **quantifiable examples.** *[OPTIONAL]*

21) What would be the **main costs and burdens** in your view if harmonized data formats and exchange protocols were prescribed? E.g. implementing a data format not currently supported etc. If possible, please include **quantifiable examples.** *[OPTIONAL]*

Datasets

22) How important do you consider the following types of static data (i.e. with a low frequency of change) to generate and provide multimodal travel information services? *[multiple choice – please rank criteria]*

	Very Important	*Important*	*Less important*	*Not important*	*Undecided*	*Don't know*
Address identifiers (road name, house number, postal code)	☐	☐	☐	☐	☐	☐
Road network and their physical attribute (speed	☐	☐	☐	☐	☐	☐

limits, directional information etc)						
Location of access nodes (public transport stops, railway stations, airport terminals, ferry terminals etc.) for different transport modes	☐	☐	☐	☐	☐	☐
Location of bike and (e)car-sharing stations	☐	☐	☐	☐	☐	☐
Location of car-pooling pick up points	☐	☐	☐	☐	☐	☐
Location of bike&ride facilities	☐	☐	☐	☐	☐	☐
Location of park&ride facilities	☐	☐	☐	☐	☐	☐
Location of parking spaces	☐	☐	☐	☐	☐	☐
Location of publicly/semi-publicly accessible electric vehicle charging stations	☐	☐	☐	☐	☐	☐
Driving restrictions and permissions (multi-occupancy lanes, height limits etc)	☐	☐	☐	☐	☐	☐
Accessibility information to aid journeys by Persons with Reduced Mobility (PRM)	☐	☐	☐	☐	☐	☐
Expected travel times	☐	☐	☐	☐	☐	☐
Walking options (pedestrian permission/network)	☐	☐	☐	☐	☐	☐
Cycling options (cycling permission/network)	☐	☐	☐	☐	☐	☐

Topography of access nodes incl. platform information, traveller information points, walking time between platforms, terminals, availability of lifts/escalators/entrances/exits	☐	☐	☐	☐	☐	☐
Timetables (all scheduled modes)	☐	☐	☐	☐	☐	☐
Tariffs/fares (all modes)	☐	☐	☐	☐	☐	☐
Booking options (all modes)	☐	☐	☐	☐	☐	☐
Other – *please specify*	☐	☐	☐	☐	☐	☐

Please specify which other type of static multimodal travel data would be relevant for generating and providing multimodal travel information services *[OPTIONAL]*

23) **How often** do you think that **static** travel and traffic data should minimally be **updated**? *[tick]*

☐According to a pre-defined timeframe (e.g. weekly, monthly, annually etc)
☐When changes occur
☐Dependent on the type of data
☐Never
☐I don't know

23.a) If your answer to Q23 was when changes occur, what timeframe do you think is an **appropriate maximum delay** for that updated data to be made accessible? *[tick]*

☐1-3 days

☐4-6 days

☐7-10 days

☐10-15 days

☐15-20 days

☐None of these

☐I don't know

If relevant, please provider further information to support your response
[OPTIONAL]

24) How important do you consider the following types of dynamic data (i.e. with a higher frequency of change) to generate and provide multimodal information services to users? *[multiple choice – please rank criteria]*

	Very Important	Important	Less important	Not important	Undecided	Don't know
Availability of vehicles at bike -sharing stations	☐	☐	☐	☐	☐	☐
Availability of vehicles at car-sharing stations	☐	☐	☐	☐	☐	☐
Whether reservations can be made for vehicles at bike-sharing stations	☐	☐	☐	☐	☐	☐
Whether reservations can be made for vehicles at car-sharing stations	☐	☐	☐	☐	☐	☐
Availability of spaces at bike&ride facilities	☐	☐	☐	☐	☐	☐
Availability of spaces at park&ride facilities	☐	☐	☐	☐	☐	☐

Whether reservations can be made for spaces at bike&ride facilities	☐	☐	☐	☐	☐	☐
Whether reservations can be made for spaces at park&ride facilities	☐	☐	☐	☐	☐	☐
Traffic conditions (real-time position of vehicle)	☐	☐	☐	☐	☐	☐
Information on disturbances (known and expected)	☐	☐	☐	☐	☐	☐
Availability of parking places incl. on-street	☐	☐	☐	☐	☐	☐
Whether reservations can be made for parking places	☐	☐	☐	☐	☐	☐
Availability at publicly/semi-publicly accessible charging stations for electric vehicles	☐	☐	☐	☐	☐	☐
Whether reservations can be made for accessible charging stations for electric vehicles	☐	☐	☐	☐	☐	☐
Time expected to find a parking place	☐	☐	☐	☐	☐	☐
Road, tunnel, bridge closures	☐	☐	☐	☐	☐	☐
Calculated travel time based on current travel conditions	☐	☐	☐	☐	☐	☐
Road closures for pedestrians, in-door and outdoor, incl. off the public road network	☐	☐	☐	☐	☐	☐

Road closures for cyclists, in-door and outdoor incl. off the public road network	☐	☐	☐	☐	☐	☐
Status information on access nodes: are lifts, escalators operational, closure of entrances/exists	☐	☐	☐	☐	☐	☐
Seat availability (all modes)	☐	☐	☐	☐	☐	☐
Timeliness and/or delays of scheduled connections (all scheduled modes)	☐	☐	☐	☐	☐	☐
Other – *please specify*	☐	☐	☐	☐	☐	☐

Please specify which other type of dynamic multimodal travel information that should be provided to users *[OPTIONAL]*

Data sharing/access point

25) Do you think that to support the provision of EU-wide multimodal travel information services travel and traffic data should be made consistently **accessible**? *[tick]*

☐Yes

☐No

☐I don't know

26) Do you think that **points of access** where the data is either stored (database, data warehouse, data marketplace) or signposted/indicated to where the data is can be found (registry) would help ensure consistency in the sharing of travel and traffic data? *[tick]*

☐Yes

☐No

☐I don't know

If no, please provide information to support your response including possible alternative approaches *[OPTIONAL]*

26.a) If yes, where should the **access point(s)** be set up in the EU? *[tick]*

☐Centrally at EU-level

☐Nationally

☐Regionally

☐No preference

☐I don't know

27) Do you think that the **EU** should intervene and **mandate** points of access to be set up across the EU in the frame of the specifications? *[tick]*

☐Yes

☐No

☐I don't know

Please provide information to explain your response: *[OPTIONAL]*

28) What would be the **main benefits** to your organisation if the use of an access point(s) was prescribed? (e.g. reduced costs for identifying and monitoring availability of data; ability to expand coverage of existing services etc.) If possible, please include **quantifiable examples.** *[OPTIONAL]*

29) What would be the **main costs and burdens** to your organisation if the use of an access point(s) was prescribed? (e.g. costs of processing/updating data or links of data within the access point). If possible, please include **quantifiable examples.** *[OPTIONAL]*

Linking travel information services

The following questions include references to the **linking of travel information services**. This is the use of interfaces to link existing information systems to provide more information than what is available in a single system. For example, one approach to this is 'distributed journey planning' with an architecture that splits the computation of trip legs amongst multiple engines, each covering a separate region. The engines each compute trip legs between agreed boundary (or "transition") points, which are then combined to create a single set of end-to-end trips for the user. Another approach is the 'chaining of journey planners' where simple deep linking between systems is used to generate an end-to-end journey solution.

30) Do you think that different journey planning services covering specific transport modes that **operate within the same city, region, country** should be linked directly (known as meta-planning) in order to improve the **modal coverage?** *[tick]*

☐Yes

☐No

☐I don't know

31) Do you think that **different local, regional and national** multimodal travel information services should be **linked directly** (known as distributed or chained journey planning) in order to improve the **geographical coverage**? *[tick]*

☐Yes

☐No

☐I don't know

32) In your view, are there any **technical barriers or circumstances** (e.g. across borders) preventing different (multimodal) travel information services effectively linking? Please detail below *[OPTIONAL]*

---

33) In your view, are there any measures that can be implemented to **help improve** the linking of different travel information services? (i.e. a common interface) [tick]

☐ Yes

☐ No

☐ I don't know

Please provide information to support your response: *[OPTIONAL]*

---

34) Do you think linking of services needs to be tackled at an EU level? *[tick]*

☐ Yes, the EU should intervene and prescribe measures to help effectively link travel information services to increase **modal** coverage

☐ Yes, the EU should intervene and prescribe measures to help effectively link travel information services to increase **geographical** coverage

☐ Yes, the EU should intervene and prescribe measures to help effectively link travel information services to increase **modal & geographical** coverage

☐ Yes, but the EU should **only recommend** measures to help effectively link travel information services

☐ No

☐ Other

☐ I don't know

Please provide information to support your response:

---

35) What would be the **main benefits** to your organisation if travel information services were more commonly and effectively linked? (e.g. able to provide services at lower costs; able to provide wider coverage service; able to procure

cheaper systems). If possible, please include **quantifiable examples.** *[OPTIONAL]*

36) What would be the **main costs and burdens** to your organisation if travel information services were more commonly and effectively linked? (e.g. increased hosting costs from extra demand; costs of implementing common interfaces etc) If possible, please include **quantifiable examples.** *[OPTIONAL]*

Quality levels

37) Do you think that the **current quality** of multimodal travel information services across the EU is sufficient (concrete examples listed in question **10**)? *[tick]*

☐ Yes

☐ No

☐ I don't know

Please explain your response: *[OPTIONAL]*

38) Do you think that the quality of multimodal travel information services should be **consistent** across the EU? *[tick]*

☐Yes

☐No

☐I don't know

39) Do you think that the improvement of quality levels of multimodal travel information services should be tackled at an **EU level**? *[tick]*

☐Yes, EU should intervene and **prescribe measures** to improve quality levels

☐Yes, EU should **recommend** measures to improve quality levels

☐Other

☐No

☐I don't know

If appropriate, please provide information on which measures you feel the EU should prescribe/recommend *[OPTIONAL]*

```



```

40) What would be the main **benefits** to your organisation if data quality levels of multimodal travel information services were improved? (e.g. cost savings from reduced complaint handling; reduced costs in reworking data etc) If possible, please include **quantifiable examples.** *[OPTIONAL]*

```

```

41) What would be the main **costs** and burdens to your organisation to improve data quality levels for multimodal travel information services? (e.g. additional data collection costs; cost of new or upgraded tools; additional data verification costs etc) If possible, please include **quantifiable examples**. *[OPTIONAL]*

```

```

Terms and Conditions for access and re-use of data

42) Do you think that travel data across different modes of transport from the **public sector** should be made accessible for re-use **to service providers in a fair and equal way** (including possible financial compensation)? *[tick]*

☐Strongly agree

☐Agree

☐Disagree

☐Strongly disagree

☐Undecided

☐I don't know

43) Do you think that travel data across different modes of transport from the **private sector** should be made accessible for re-use **to service providers in a fair and equal way** (including possible financial compensation)? *[tick]*

☐Strongly agree

☐Agree

☐Disagree

☐Strongly disagree

☐Undecided

☐I don't know

44) Do you think that the re-use of travel and traffic should **<u>not</u>** include any **transfer of ownership** of data? *[tick]*

☐Strongly agree

☐Agree

☐Disagree

☐Strongly disagree

☐Undecided

☐I don't know

45) Do you think that on request, when **financial charges** for the re-use of data are applicable, the data owner/provider should **indicate the calculation basis** for the published charge and indicate which factors were taken into account in the calculation of the charge? *[tick]*

☐Strongly agree

☐Agree

☐Disagree

☐Strongly disagree

☐Undecided

☐I don't know

46) Do you think that there should be **transparency** in the <u>criteria </u>used to rank travel options and **neutrality** in the way information is provided to the user?[tick]

☐Strongly agree

☐Agree

☐Disagree

☐Strongly disagree

☐Undecided

47) Do you think that the re-use of travel and traffic data should include safeguards for the **reputation** of the data owner? [tick]

☐Strongly agree

☐Agree

☐Disagree

☐Strongly disagree

☐Undecided

48) Do you think that the re-use of travel and traffic data should also be **open to cross-sectorial use**? [tick]

☐Strongly agree

☐Agree

☐Disagree

☐Strongly disagree

☐Undecided

49) Do you think that the establishment of terms and conditions for the re-use of travel and traffic data should be tackled at an EU level?

☐Yes, EU should prescribe common terms and conditions for access and re-use of data

☐Yes, EU should recommend common terms and conditions for access and re-use of data

☐Other

☐No

☐I don't know

50) What would be the main **benefits** to your organisation if the terms and conditions for access and re-use of data were improved? If possible, please include **quantifiable examples.** *[OPTIONAL]*

51) What would be the main **costs** and burdens to your organisation if the terms and conditions for access and re-use of data were improved? If possible, please include **quantifiable examples.** *[OPTIONAL]*

Part IV: Impacts of improved multimodal travel information services/legitimacy for EU intervention

52) As highlighted throughout the questionnaire, there are different areas of EU intervention to improve the access, use, re-use and update of travel and traffic data (data formats/exchange protocols, linking services, points of access, quality levels, T&C). Within such a common **EU framework,** how do you see the **best form of EU intervention**? *Multiple options are feasible. [tick]*

☐Legislation

☐Exchange of best practice

☐Funding

☐Promote sector cooperation (smart cities initiative, MoU etc.)

 If appropriate, please provide further information [OPTIONAL]

53) In your opinion, what **level of impact** do you think such a common EU framework could have in the following domains? [multiple choice – please rank criteria]

	High impact	*Low impact*	*No Impact*	*Negative impact*	*Undecided*

Multimodal travel information services					
Enhance user satisfaction through better information	☐	☐	☐	☐	☐
Improved interoperability between systems and services	☐	☐	☐	☐	☐
Efficiency of the transport network					
Reduce congestion	☐	☐	☐	☐	☐
Improve reliability/predictability of travel times	☐	☐	☐	☐	☐
Improve transport efficiency (e.g. kms travelled)	☐	☐	☐	☐	☐
Economy & innovation					
Promote innovation, new technologies and services	☐	☐	☐	☐	☐
Reduction in the costs of providing such services (through increase in supply and demand etc.)	☐	☐	☐	☐	☐
Strengthen the EU internal market	☐	☐	☐	☐	☐
Boost job creation	☐	☐	☐	☐	☐
Environment					
Promote sustainable modes of transport	☐	☐	☐	☐	☐
Improve air/ noise pollution	☐	☐	☐	☐	☐
Improve C02 emissions	☐	☐	☐	☐	☐

Please provide quantitative evidence if available (including reference to documents, websites…)

54) Do you expect any other impact due to the provision of multimodal information services? *Please specify and provide quantitative evidence if available (including reference to documents, websites…) [OPTIONAL]*

55) In the frame of EU-action, what geographical scope do you think the provisions containing requirements, procedures or any other relevant rules should apply? *[tick]*

☐Core trunk transport routes only (i.e. the trans-European network (TEN-T)

☐All trunk routes and urban networks (i.e. the comprehensive European transport network)

☐Door-to-door (i.e. the extended European transport network)

☐Dependent on the nature of the provisions

☐I don't know

Other questions

Please give reference to any studies or documents that you think are of relevance for this consultation, with links for online download where possible. [OPTIONAL]

THANK YOU FOR RESPONDING TO THIS PUBLIC CONSULTATION