Council of the European Union

Brussels, 10 October 2017
(OR. en)

13072/17

TRANS 400

COVER NOTE

From:	Secretary-General of the European Commission, signed by Mr Jordi AYET PUIGARNAU, Director
date of receipt:	26 September 2017
To:	Mr Jeppe TRANHOLM-MIKKELSEN, Secretary-General of the Council of the European Union
No. Cion doc.:	SWD(2017) 324 final
Subject:	COMMISSION STAFF WORKING DOCUMENT The provision of EU-wide Multimodal Travel Information Services - ITS Directive

Delegations will find attached document SWD(2017) 324 final.

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Encl.: SWD(2017) 324 final

EUROPEAN
COMMISSION

Brussels, 26.9.2017
SWD(2017) 324 final

COMMISSION STAFF WORKING DOCUMENT

The provision of EU-wide Multimodal Travel Information Services - ITS Directive

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1. POLICY CONTEXT

Digitalisation of transport plays an important role in bringing more efficiency to transport operations and the management of traffic flows. Efficiency gains have been highlighted in the context of the Digital Single Market Strategy where the free flow of data is seen as an enabler of growth, jobs and competitiveness for the EU. Furthermore, the role of digitalisation in supporting modal shift is also recognised within the Energy Union Strategy and recently adopted Strategy for Low-emission Mobility. Furthermore, digitalisation also brings numerous benefits to travellers themselves through the development of user-focused services.

The Delegated Regulation supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide multimodal travel information services is an enabler for increased modal shift and the promotion of sustainable modes of transport. A market already exists for the delivery of travel information services to end users, but a number of gaps and barriers are still present limiting the full potential of such services. This initiative expects to provide the necessary requirements to make EU-wide multimodal travel information services accurate and available across borders. It establishes the specifications necessary to ensure the accessibility, exchange and update of travel and traffic data and distributed journey planning for the provision of multimodal information services in the European Union. The Delegated Regulation intends to provide appropriate framework conditions enabling the co-operation of all the relevant stakeholders along the travel information value chain. The relevant stakeholders include transport authorities, transport operators, travel information service providers, infrastructure managers and transport on demand service providers etc. Such enabling conditions aim to support the interoperability, compatibility, and continuity of multimodal information services across Europe.

This document explains and clarifies the approach followed to develop the Delegated Regulation on the provision of Europe-wide multimodal travel information services adopted in accordance with Article 7 of Directive 2010/40/EU (ITS Directive) following the principles of the Better Regulation. The delegated regulation shall be interpreted and implemented in accordance with the EU rules on competition and specifically with the rules on the exchange of sensitive commercial information.

1.1. ITS Directive

The ITS Directive (2010/40/EU) represents a policy and legal framework to accelerate the deployment of innovative transport solutions across Europe to help support the development of a cleaner, safer and more efficient European transport system. The directive focuses on intelligent transport systems for road and its interface with other modes of transport.

This Directive is an important instrument for the coordinated implementation of ITS in Europe. It aims to establish interoperable and seamless ITS services while leaving Member States the freedom to decide which systems to invest in and where to deploy.

In accordance with ITS Directive, the Commission is empowered[1] to adopt Delegated Acts to define technical, functional and organisational specifications in relation to the six priority actions and an additional number of priority areas. The provision of 'EU-wide multimodal travel information services' is the first of these six priorities, also known as priority action (a). The Directive foresees these specifications to be binding and aims at ensuring the interoperability and continuity of services, where possible based on existing standards and technology, with a set of enabling conditions supporting the growth and operation of services. Such specifications encompass a common set of prescribed rules and provisions but in accordance with Article 5 of the ITS Directive only apply to Member States where the relevant ITS service already exists or will be deployed in the future.

The Directive empowers the Commission to determine the legal form of the delegated act. The present Act, adopted as a Delegated *Regulation*, constitutes the binding specifications for priority action (a) of the ITS Directive.

The scope of priority action (a), as outlined in the ITS Directive, concerns the fulfilment of the necessary requirements to make EU-wide multimodal travel information services accurate and available across borders to ITS users, based on in particular the accessibility and exchange of travel and traffic data and their relevant updates.

1.2. Relevant existing legal frameworks

1.2.1. EU Transport Policy Frameworks

On 16 December 2008, the European Commission adopted an Action Plan for the Deployment of Intelligent Transport Systems for road transport and its interfaces with other modes. The aim of this Action Plan was to accelerate and coordinate the deployment of ITS solutions. Action 1.1 of the Plan calls for the definition of procedures for the provision of EU-wide real-time traffic and travel information services.

On 28 March 2011 the European Commission adopted the White Paper on Transport. The White Paper defines a long-term vision for a transport sector that serves the needs of the economy and of the citizens while meeting future constraints: oil scarcity, growing congestion and the need to cut CO_2 emissions. The vision was to a substantial degree based on better multimodality of transport and new technologies that should lead to more optimised journeys.

In June 2014 the European Commission published a Commission Staff Working Document 'towards a roadmap for delivering EU-wide multimodal travel information, planning and

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[1]   Article 7 of the ITS Directive in accordance with Article 290 of the Treaty on the Functioning of the European Union (TFEU)

ticketing services'. The aim of this roadmap was to present and analyse the major challenges to be overcome in order to create the framework to support the emergence of more comprehensive services. While taking stock of relevant activities aimed at addressing issues in this area and describing the current state-of-play, it outlines short to medium options that can contribute to tapping the full potential and benefits of multimodal travel information services.

On the 12 June 2015 the European Parliament adopted a resolution on delivering multimodal integrated ticketing in Europe. The resolution calls for Member States to introduce by 2020 at the latest national timetable and fare information systems on the basis of open interfaces linking the travel data for regional and local urban public transport and by 2024 at the latest, on the basis of open interfaces, for the national timetable and fare information systems, with real-time information on local public transport operators' timetables, to be networked on a cross-border basis and made accessible to operators, to providers of journey planners and to consumers.

1.2.2. *Relevant Interoperability Frameworks*

Highly relevant for the current initiative is Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 which aims to create a European Union spatial data infrastructure to enable the sharing of and public access to spatial information (including information related to transport networks) across the Union with a view to supporting the Union's environmental policies, and policies or activities which may have an impact on the environment. The specifications for the provision of real-time traffic information and multimodal travel information services are compatible with the requirements established by this Directive.

On 5 May 2011 the European Commission formally adopted the Telematics Applications for Passenger Services Technical Specifications for Interoperability (TAP TSI). It entered into force on 13 May 2011 as the Commission Regulation (EU) No 454/2011. The purpose of the TAP TSI is to define European-wide procedures and interfaces between all types of railway industry actors (passengers, railway undertakings, infrastructure managers, station managers, public transport authorities, ticket vendors and tour operators). It will contribute 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 in a cost effective manner.

Regulation (EU) 1315/2013 of the European Parliament and the Council defines the transport infrastructure that is part of the trans-European transport network.

Under the framework of the ITS Directive the Commission already adopted the Delegated Regulation (EU) No 886/2013 of 15 May 2013 containing specifications for road safety related minimum universal traffic information services. This Regulation defines minimum requirements for the provision of road safety related traffic information. This would

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guarantee interoperability and continuity of the information services along the trans-European road network throughout Europe.

Under the framework of the ITS Directive the Commission already adopted the Delegated Regulation (EU) No 2015/962[2] containing specifications for real-time traffic information services. This Regulation defines minimum requirements for the provision of real-time traffic information. This would guarantee interoperability and continuity of the information services along the trans-European road network throughout Europe.

1.3. Importance of Multimodal Travel Information Services

The demand for cross-border travel information in the EU is extensive: every year over 300m cross border trips requiring at least one night stay are made by EU residents. A further 600m cross-border trips are made by international tourists.[3]

The internet has revolutionised the way journeys are planned; increasingly, it has replaced the traditional travel agency as a means to obtain information and book journeys. With the internet and smartphones leading to growth in highly personalised information and transportation services, information that combines different forms of transport is an important factor for smart and 'seamless door-to-door mobility'. This concept represents the ability to travel using different modes of transport in an easy and hassle free manner for the entire duration a trip. By incorporating real-time information, it also allows passengers to consider predicted delays into account and become better prepared in the event of major disruptions and congestion. Furthermore, they also play a key role in promoting more inclusive mobility by providing information tailored to the needs of special traveller groups such as people with disabilities and passengers with reduced mobility (e.g. by providing information about facilities or accessibility support available at transport interchanges). Moreover, they allow travellers to choose more sustainable ways of travelling to or through city centres and therefore make better use of existing infrastructure and also allow transport operators to manage and divert the flow of its passengers during disruptions and peak travel times through travel information. Such improvements in sustainable urban mobility will also help reduce air pollution, especially in urban areas, as highlighted in Sustainable Urban Mobility Plans.[4] In addition, multimodal travel information services can also benefit the wider economy because they offer new business opportunities for service providers and contribute to job creation in a very dynamic sector.

1.4. Step-wise approach

The provision of comprehensive, easily accessible and reliable information for travellers is seen by many as a first major step and logical consequence towards integrated ticketing. This concept represents a person making a journey that involves transfers within or between different transport modes with one ticket or as few as possible. With different

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[2]   OJ L 157, 23.6.2015, p. 21–31
[3]   EUROSTAT
[4]   Air Quality Directive 2008/50/EC; http://ec.europa.eu/transport/themes/urban/doc/ump/com(2013)913-annex_en.pdf

possible technical means available to support integrated ticketing (smart phones, contactless bank cards, ticker card), the aim is to encourage more people to use a combination of transport modes, by simplifying switching between them and by also increasing the efficiency of the transport services. Moreover, recent market developments and initiatives such as 'Mobility as a Service' will play a promising role to support integrated ticketing.

However, by following a step-wise approach, the scope of this delegated act is concerned with developing the appropriate enabling conditions to support the first step related to support travel information and planning. The first need of travellers can be seen as planning the journey and the subsequent step of executing the journey itself. A wide range of barriers already need to be addressed to support this first step and thus only the development of these enabling conditions shall be addressed. Only thereafter, it can be assessed if additional requirements are needed to support integrated ticketing and, if relevant, what action needs to be taken at an EU level.

2. CONSULTATIONS AND EXTERNAL ACTIVITIES

2.1. Working methodology to develop specifications for priority action 'a'

The development of set technical, functional and organisational specifications requires a thorough analysis and evaluation on a number of different aspects:

– Firstly, it needs to be understood how EU-wide multimodal travel information can be delivered including a comparative analysis of all possible approaches and the relevant pre-requisites;

– Secondly, an overview of the multimodal travel information services currently on offer and how the current level of service can support all types of user needs and, if relevant, how they can be improved;

– Finally, it needs to be understood if EU intervention is required and, if so, what shape and form such intervention should come in and how such measures affect both public and private stakeholders along the travel information value chain.

Building on top of the findings from a number of previous EC studies[5], a dedicated supporting study for priority action (a) of the ITS Directive was carried out for the Commission between March 2015 to April 2016 to conduct these tasks. A number of key deliverables were produced including a baseline interim report, a cost-benefit analysis and a final report summarising the overall findings.

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[5] http://ec.europa.eu/transport/themes/its/studies/doc/2011_09-multimodal-journey-planner.pdf

2.2. Meetings with experts nominated by Member States

EU intervention that prescribes rules and requirements to support the provision of EU-wide multimodal travel in services and in particular the interoperability between Member States requires close cooperation during the development phase of the specifications. Member States, plus the EEA countries and Switzerland, were invited to nominate an expert to attend a series of meetings in Brussels with the Commission services to help assist the development of the specifications. Eleven meetings took place between 18 November 2014 to 18 March 2016[6]. Invited experts from the European Parliament also participated in these meetings. Such meetings focused upon discussing the findings of the key deliverables of the supporting study and stakeholder consultation. In this context, the experts played a key role by assisting the consultant in developing the baseline narrative and providing input for the key deliverables and participating in the various stakeholder consultation activities. A number of topics were discussed in the expert meetings including: appropriate measures to access and exchange travel and traffic data, the scope of travel and traffic data, the roles of public and private actors along the travel information value chain, the geographical scope of the specifications, the conditions for data re-use and the role and suitability of distributed journey planning by linking travel information services and relevant terms and conditions between those service providers. Moreover, in addition, a number of bi-lateral meetings with Member States also took place.

2.3. Stakeholder Consultation

2.3.1. Public Consultation

The provision of EU-wide multimodal travel information services concerns the involvement of a number of different public and private stakeholders and those affected by laws understand better than anyone what impact they have, and can provide useful evidence to improve them. Therefore, an online public consultation on the provision of EU-wide multimodal travel information services ran for 14 weeks between September 2015 and December 2015.

The objective of the public consultation was to gather the opinions of all types of associated public and private stakeholders in the travel information service chain on the findings of the supporting study and the proposed policy measures of EU intervention.

The public consultation was split into three core categories concerned with:

– the use and current market of multimodal travel information services in the EU;

– understanding the barriers and policy enablers of the access and exchange of data and services, their quality levels and conditions for re-use;

– the impacts of improved multimodal travel information services and scope of EU intervention.

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[6] Register of experts E01941 Intelligent transport systems

In total, 175 people and organisations from a wide range of stakeholders along the travel information value chain representing 22 Member States completed the questionnaire. A dedicated public consultation report that details the full results can be found online.[7]

2.3.2. Stakeholder Workshop

On 4th November 2015 a workshop was organised in Brussels by the European Commission, which was attended by over 100 public and private stakeholders across the travel information value chain from many parts of Europe. Participants represented public authorities, transport operators, private organisations (including industry, data/service providers) and users associations and a number of expert speakers representing different roles along the travel information value chain participated in a number of thematic sessions. The objective of the workshop was to discuss the identified gaps and barriers and the associated potential policy measures to support the provision of EU-wide multimodal travel information services. This included the accessibility and exchange of travel and traffic data, services for distributed journey planning, the quality of travel and traffic data and services and the conditions of their re-use. A dedicated workshop report details the outcomes of the discussions on specific proposed policy measures and can be found online.[8]

2.3.3. Better Regulation Public Consultation

In accordance with the procedures defined under the Commission's Better Regulation Agenda[9], the draft delegated regulation was published online from 22/03/2017 -19/04/2017[10]. Within this period, four comments were received in total. The contributions were positive about the scope of the delegated regulation and provided a number of recommendations to improve the clarity and consistency in certain sections. As a result, the Commission revised some sections to reflect some of the points highlighted notably the definition of 'user' and 'end user', the use of national access points by cross-border operators, clarifying the optional requirement of dynamic data for Member States and that the same data should not use more than one standard. Some comments, notably the use of the DCAT metadata standard and the explicit reference to the CRS code of conduct and editorial suggestions were not addressed as they were deemed unnecessary or unsuitable.

2.3.4. European Data Protection Supervisor

The European Data Protection Supervisor (EDPS) was consulted during the development of the delegated regulation. The EDPS stressed the need to preserve individual rights to privacy and data protection within the scope of the delegated regulation. In relation to Recital 6 which concerns personal data, the EDPS stressed in particular that both technical **and** organisational measures allow to process pseudonymised data and to meet the obligations of privacy by design and privacy by default. Appropriate technical and organizational measures and procedures to ensure that the data subject's privacy is respected are important both at the time

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[7] http://ec.europa.eu/transport/themes/its/consultations/doc/2015-its-mmtips/consultation-report.pdf

[8] http://ec.europa.eu/transport/themes/its/events/2015-11-04-its-directive-mmtips-workshop_en.htm
[9] https://ec.europa.eu/info/law/law-making-process/better-regulation-why-and-how_en
[10] https://ec.europa.eu/info/law/better-regulation/share-your-views_en

of the determination of the means for processing and at the time of the processing. The design of data processing systems need be data protection friendly, i.e. taking data protection and cybersecurity aspects into account when planning the components (privacy by design) as well as designing the basic component settings accordingly (privacy by default).

2.3.5.   Other Consultations

The members of the European ITS Advisory Group, composed of high-level representatives from ITS service providers, associations of users, transport and facilities operators, manufacturing industry, social partners, professional associations, local authorities and other relevant fora, were consulted on the draft specifications (written consultation held in July 2016).

In addition, a number of dedicated meetings took place with different associations representing the rail, public transport, local and regional authorities, and air and travel information sectors. Those meetings served to discuss in detail the scope of the draft delegated regulation and the policy measures envisaged, and to receive dedicated input prior to the final rounds of meetings with experts nominated by Member States.

2.4.   European Parliament

On 16 February 2016, the Commission presented the objective and scope of the delegated act to the members of the Transport and Tourism Committee. The presentation was well received by the various Members of the Committee especially in view of how the delegated act supports many elements of the adopted resolution of the European Parliament on delivering multimodal integrated ticketing in Europe.

2.5.   Impact Assessment

An impact assessment was conducted[11] for the main legal instrument, the ITS Directive itself and for individual delegated acts it was therefore deemed suitable to conduct a cost-benefit analysis instead.[12]
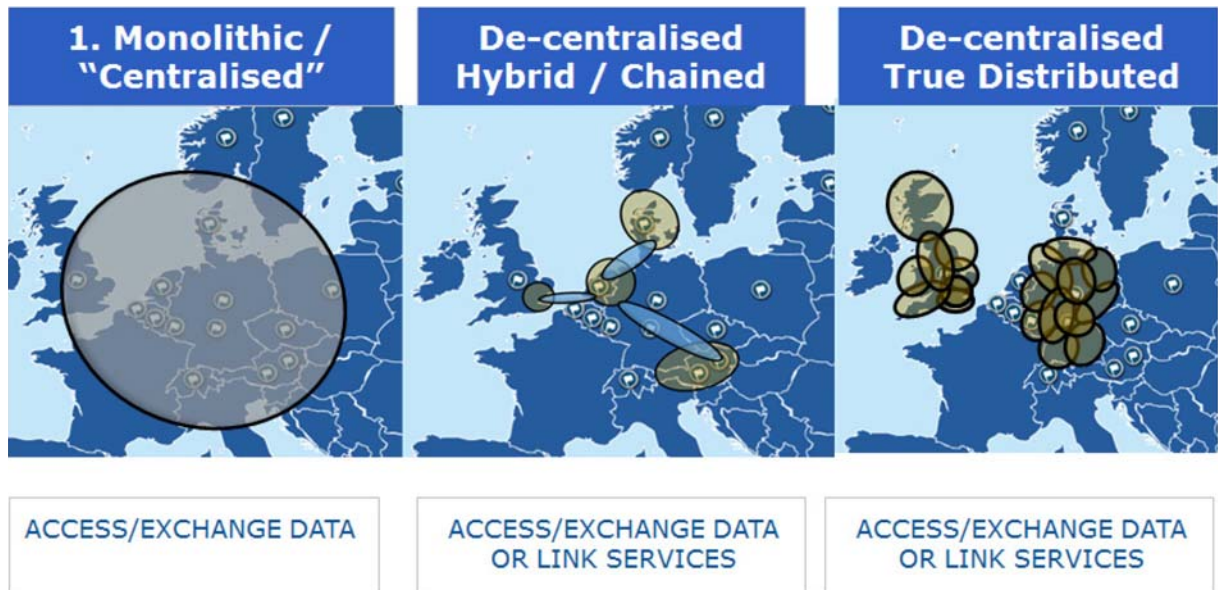
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[11]   http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52008SC3083&from=EN
[12]   https://ec.europa.eu/transport/themes/its/studies/its_en

3.   STATE OF EU-WIDE MULTIMODAL TRAVEL INFORMATION SERVICES

3.1.1.   EU-wide Multimodal Travel Information Services Approaches

1. Monolithic / "Centralised"	De-centralised Hybrid / Chained	De-centralised True Distributed
ACCESS/EXCHANGE DATA	ACCESS/EXCHANGE DATA OR LINK SERVICES	ACCESS/EXCHANGE DATA OR LINK SERVICES

EU-wide multimodal travel information services can be delivered in a variety of ways with 'no one size fits all'.[13]. As the image above demonstrates, two kinds of approaches known as 'centralised' and 'de-centralized' can be used.

In the first scenario, travel information services can provide multimodal travel information for large territories of Europe or entirely pan-European to end-users based on access to the required static and dynamic travel and traffic data from various transport operators, transport authorities, infrastructure managers and transport on demand service providers. End-users through one single website or application can then receive travel information and possible travel options for a wide range of destinations across Europe. Such services could be operated from a variety of sources including digital SMEs, start-ups or large internet service providers as examples. Known as a 'centralised architecture', the approach is support primarily by data access and exchange.

In the second and third scenarios, travel information services that exist at city, regional and/or national level and cover their own governing territory can also contribute to EU-wide multimodal travel information by connecting with neighbouring local, regional and national services to perform what is known as 'distributed journey planning'. In this way local, regional or national travel information services exchange the travel information for the section of the travel itinerary they are responsible for based on the data and information – this is known as a 'routing result'. End-users could then plan a cross-region or cross-border trip using their own local, regional and/or national travel information service. Such a service could be provided by the local/regional authority, transport authority, transport operator, national authority or even local digital SMEs and start-ups. This is technically

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[13] https://ec.europa.eu/transport/themes/its/studies/its_en

feasible due to the fact that behind the scenes the services are digitally connected via an interface and able to exchange travel information between their services directly. Moreover, local, regional and/or national travel information services can also provide the entire travel itinerary themselves by directly accessing and utilising the travel and traffic data of neighbouring services. Known as a 'de-centralised architecture', the approach is support by both data access and exchange and service access and exchange.

Both approaches are feasible and rather than determining which solution should be used, a framework that can support all possible solutions, and then let the market ultimately determine which solution will be the most successful, is needed.

3.1.2. *Current Market Provision of EU-Wide Multimodal Travel Information Services*

The supporting study provided an overview of the current status of multimodal travel information services in Europe and revealed that a total of 125 providers were found to be offering more than 160 services at local (that is a local city journey planner), regional, national and even pan-European level (i.e. those offering travel information to many destinations in Europe). Whilst the *amount* of services offered can be considered as substantial and demonstrates the market has grown in recent years, the level of service provided (that is the functionalities and options available to the end user) is still limited despite this growth over a number of years.

Across the board, the review demonstrated that travel information services are provided by both public and private actors. In many cases, the local authority or the transport operator is also the travel information service provider playing a double role. By definition, services provided by local authorities and transport operators are concentrated on a specific region but provide a more detailed and extensive travel information service than pan-European services, that is travel information covering the entire scope of the travellers journey rather than just information between transport interchanges.

The 'pan-European' services are primarily offered by private actors but were much less detailed and offered more simplified travel information. The local services offered travel information for more transport modes but in most case did not cover all possible travel options. This was even more limited at the pan-European level. In addition, several Member States have national multimodal travel information services (primarily across northern, southern and central Europe) which were provided by both private and public service providers. The level of modal coverage, however, varies from service to service.

In terms of the type of information provided, most services are still primarily based on static data (i.e. data that does not change on a regular basis). In contrast, dynamic data (i.e. data that does change on a regular basis) was generally found at local level. Therefore, the review showed that whilst the travel information market is thriving in terms of the number of services offered to the user, the level of service remains limited, especially concerning the 'door-to-door' element, that is travel information provided to the end user for the whole duration of their trip. As described in section 1.3, the need for comprehensive, accurate and

reliable multimodal travel information services is clear and enabling conditions to bring about such improvements is necessary.

The stakeholder consultation revealed that stakeholders across all categories agreed with the need to improve both the geographical coverage and modal coverage of travel information services and that current level of service was not satisfactory to fulfil users travel requirements fully benefit societies at large. Meetings with experts nominated by Member States further reinforced this point agreeing that the specifications would need to focus on provisions that support all possible approaches i.e. centralised and de-centralised architectures.

3.1.3. *Key Barriers*

3.1.3.1. Insufficient accessibility of travel and traffic data

Data is the pre-requisite and main enabler of comprehensive travel information services. Without access to full range of datasets across Europe from public and private sources, services will remain limited in scope, both in a geographical (all urban and inter-urban parts of Europe) and modal (all available transport modes) sense. At present, access to the full range of travel and traffic data is still limited and technically speaking there are no appropriate data sharing mechanisms widely available across the Member States. Findings from the stakeholder consultation activities (which involved the 12 week public consultation and dedicated meetings with stakeholder groups) revealed that whilst improvements have been made in improving the access to some data elements, access to data overall remains one of the key barriers for the provision of EU-wide multimodal travel information services. As an example, 75% of respondents of the public consultation in 2016 still regard lack of fair and equal access to data as an important or very important barrier.

Meetings with experts nominated by Member States further reinforced this view but also highlighted the current differences in the approaches to access public and private travel and traffic data and that of static (does not change on a regular basis) and dynamic (changes on a regular basis) data with the latter posing more problems due to the complexity and accuracy of the data itself.

3.1.3.2. Lack of travel and traffic data interoperability

To support the provision of EU-wide multimodal travel information services, the ability to easily exchange and integrate multiple sources of data of different transport modes is essential. However, at present there is no single data format for all modes: instead, a large variety of data formats and exchange protocols are used amongst the various transport modes making it increasingly costly and time consuming for travel information service providers to manage and integrate various data sources.

In this context, some transport modes already use standards or technical specifications based on other relevant legislation or are 'de-facto' standards due to industry activity. For

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the road sector, the DATEX standard is used, for rail it is the TAP-TSI technical specification and for air the IATA data standard is used. However, for what concerns other modes of transport, i.e. public transport and long-distance coaches, the standards for the data <u>exchange</u> protocol exist at an EU level (NeTEx and SIRI) but most Member States mainly use either national data exchange protocol standards based on the European data <u>model</u> standard Transmodel or Google's GTFS. This gap is seen as a key barrier in the provision of full door-to-door mobility and the inclusion of the "first and last mile" of travel information, that is information concerning how to reach the train station, airport etc. using local public transport.

Findings from the stakeholder consultation overwhelmingly revealed that interoperability is essential to support the provision of EU-wide multimodal travel information services and such interoperability has not been achieved yet in Europe. For example, the online public consultation revealed that, a maximum of only 12% across different stakeholders groups agreed that travel and traffic data was sufficiently interoperable. In particular, travel information services scored this as just 5%.

Meetings with experts by nominated by Member States further reinforced this view stating that whilst advancements had been made to improve interoperability at a national level with national standards, the next step is to enlarge this interoperability across Europe as a whole.

3.1.3.3. Lack of travel information service interoperability

Many travel information services exist at city, regional and national level and the advantage of such services in the provision of EU-wide multimodal travel information is the local knowledge and the level of detail they can provide for better route optimisation (i.e. the local knowledge of traffic congestion patterns, bottlenecks and other aspects that support the delivery of the most optimal travel itinerary for the end user that large pan-European services will not be able to provide). Furthermore, they can also support the link for the so called 'first and last mile' of journeys, that is the travel information for local public transport from the main transport interchange. However, the interoperability between such services to support the provision of distributed journey planning remains limited.

In recent years, efforts have been made by various Member States (notably the UK, France and Germany) to support the standardisation of distributed journey planning, but such efforts have been focused only at national level.

Findings from the stakeholder consultation revealed that interoperability of services is another key barrier to support the provision of EU-wide multimodal travel information services. When prompted to identify the most important reasons hampering distributed journey planning in Europe the most popular response was the lack of commonly accepted and standardised application programming interfaces (APIs). Experts nominated by

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Member States also highlighted the importance of including policy measures the support the continued use of local, regional and national services.

3.1.3.4. Insufficient travel and traffic data quality

The quality of travel and traffic data, in terms of being accurate, up to date and relevant updates given in a timely manner so they are useful for the end user (i.e. change of platform given before the train leaves) are fundamental for the widespread and uptake of multimodal travel information services. However, quality levels, especially those for real-time information, is varied across the EU and consistency of such data quality is essential.

In terms of the end user experience of such services, findings from the broad stakeholder consultation overwhelmingly revealed that lack of widespread and consistent data quality as another key barrier to support the provision of EU-wide multimodal travel information services. For example, the results of the public consultation revealed that 69% do not agree that the quality of multimodal travel information in Europe is currently sufficient.

In particular, the quality of data integrated by external service providers was also highlighted by stakeholders and experts nominated by Member States.

3.1.4. *Key Enablers*

3.1.4.1. Ensuring that users have access to the right scope of data and information with the appropriate data sharing mechanism

In order to support the provision of access to a wide range of travel and traffic data from public and private sources, an appropriate data sharing mechanism that allows users to know at least where to find all of the relevant travel and traffic data is essential. The provision of a national access point, the same data sharing mechanism already included within the other delegated regulations of the ITS Directive, was identified as a suitable solution so long as the same level of flexibility, that is the ability to determine the shape and form of the national access point, was also ensured for this delegated regulation.

The stakeholder consultation indicated a good level of support for the provision of a national access point and gave an overwhelming level of support for access to data enabling a full door-to-door geographical coverage that is data covering the widest possible area including cities and not restricted to a certain part of the network. For example, in the public consultation 78% of respondents declared support for the provision of an access point to support the provision of EU-wide multimodal travel information services. Meetings with experts nominated by Member States further reinforced this view and highlighted the point to distinguish between static and dynamic data (more difficult) and the ability to implement the national access point in a phased approach, both in terms in the scope of the data and the geographical coverage. Experts nominated by Member States highlighted the need to gradually build the national access point given the large volume of data and transport modes included compared to other delegated regulations, and that some datasets are more important and need to be implemented sooner than others i.e. the relative importance and availability of timetable data over payment method data.

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With regard to the associated costs of providing access to data it was widely recognised by both stakeholders and experts nominated by Member States for the need to support financial compensation to recover such costs associated.

The issues of liability and accuracy of data were key discussion points in the provision of access to data. It was strongly reinforced by both stakeholders and experts nominated by Member States that terms and conditions to access data should be defined in the relevant licence agreement of the data provider. Furthermore, the concept of travel option ranking and travel information neutrality was also widely acknowledged by both groups as an important consequence of access to a wider range of data and the need to ensure the transparency of how travel options are ranked and the neutrality of travel information given to the end user. The cyber-security of travel and traffic information systems and national access points may also be addressed including reviewing any relevant safeguards if deemed necessary.

3.1.4.2. Making travel and traffic data interoperable with a common set of data exchange standards

In order to support the provision of access to a wide range of travel and traffic data from public and private sources, the various datasets need to be easily understood by those service providers wanting to integrate various sources of data at the level of the national access point. For this to occur, interoperability is essential with a common set of data exchange protocol standards across the modes of transport at the level of the national access point for static and dynamic data.

The stakeholder consultation indicated a good level of support for the need of a common set of European standards and new requirements for those transport not already covered by regulation or de-facto industry activity, however the views on whether or not the new standard requirements should be recommended or mandated by the EU was split. Nevertheless, the role of the EU to support interoperability was strongly supported. As an example, between 65% - 90% of stakeholders across the different domains scored that common data standards would enhance the re-use and exchange of data. In particular, travel information service providers who would greatly benefit from data interoperability support this statement with 85%. Experts nominated by Member States stressed the need for standards to be mandated in order to fully optimise the use of the national access point and ensure widespread and full interoperability. However, such experts also reinforced the point that in order to be effective the use of standards needs to be stable, well supported by the stakeholder community and Member States should be given sufficient time to adjust. Moreover, the conversion to European standards was identified as an easy and inexpensive process.

3.1.4.3. Improving the interoperability of travel information services and supporting distributed journey planning

In order to support the provision of EU-wide multimodal travel information through distributed journey planning, the appropriate framework which encourages the linking of travel information services and measures to support their interoperability are fundamental.

The stakeholder consultation indicated a good level of support for such provisions to be tackled at EU level with a maximum of 10% across different stakeholder groups declaring that no intervention should take place at EU level. The consultation did however highlight

the fact that distributed journey planning is more appropriate between certain cities, regions and Member States with higher traffic flow than others with less demand and therefore any rules or provisions should reflect this. The stakeholder consultation also revealed the need for any provisions to include both public and private services which was reinforced with experts nominated by Member States in order to ensure a level playing field. In addition, the difficulty of clearly distinguishing between public and private services was also highlighted. As opposed with the data exchange interoperability requirements which are more mature and stable, it was widely recognised by stakeholders and experts nominated by Member States to that any relevant interface service standards should be referred to in the context of the specifications, given the level of maturity of the sector and to support further innovation in this field.

With regard to the associated costs of performing distributed journey planning, it was widely recognised for the need to support financial compensation to recover such costs associated with linking travel information services.

3.1.4.4. Improving the quality of multimodal travel information services with a basic data quality framework

In order to support the provision of EU-wide multimodal travel information it is necessary to ensure high quality travel and traffic data in a consistent manner across the EU. The stakeholder consultation indicated a good level of support for such provisions to be tackled at EU level with 67% stating that the quality of travel and traffic data should be consistent across the EU. However, the consultation also highlighted the fact that common minimum requirements could only be envisaged because the scope of data updates from different transport mode varies i.e. the frequency of data updates concerning local public transport and long distance coach. Furthermore, providers of travel information services would argue that it is in their interest to provide accurate and up to date travel information for the benefit of the end-user, however to ensure consistency across the EU a minimum data quality framework was regarded by both stakeholders and experts nominated by Member States as highly beneficial.

4.   POLICY OPTIONS

To support the provision of EU-wide multimodal travel information services a combination of different enabling conditions (in this context known as policy measures) are needed as detailed throughout this document. Such policy measures as aforementioned include national access points, standards for data exchange and distributed journey planning, quality requirements and provisions relating to the use and re-use of travel and traffic data and services. However, the scale and scope of each measure can vary, i.e. the policy measure could be mandated or simply recommended. Moreover, the measure itself could include more specific requirements (i.e. quantitative targets) or it could be a more flexible and high level approach (i.e. guiding principles).

The four core policy options that include different combinations of the policy measures were developed and assessed within a cost-benefit analysis. In addition, a description of what is predicted to happen without any further intervention, i.e. the baseline scenario, was also elaborated. This exercise helped determine which combination of policy measures would be the most effective in supporting the objectives of the delegated regulation and producing the

highest degree of benefits, but at the same time being balanced and providing flexibility where relevant. The policy options were scoped around the different approaches to support EU-wide multimodal travel information services: those focusing on requirements that support **data** access and exchange or **service** access and exchange for distributed journey planning or a balanced combination of both.

The four core policy options (in addition to the baseline scenario '0') were therefore:
(1) minimal intervention
(2) data access and exchange provisions
(3) service access and exchange provisions for distributed journey planning
(4) balanced combination of data and service access and exchange provisions.

Each option was then divided into 2 sub options (a) the specifications prescribed for the Comprehensive TEN-T network and (b) for the entire EU transport network. The full description of each policy option can be found below. The scope of the different policy options was discussed and agreed with experts nominated by Member States.

Policy Measure	Policy Option				
	0 – baseline scenario[14]	1 – Minimal Intervention	2 – Data Focus	3 – Linking Services Focused	4 – Comprehensive Approach
National Access Point (NAP)	NAP for other delegated acts of the ITS Directive would still be established but the data required for those other delegated acts would only concern a limited amount required for multimodal travel information services (i.e. geographical spatial data, road network data, tunnel closures etc.)	At least static data – dynamic optional	Static and dynamic data	At least static data – dynamic optional	At least static data – dynamic optional
		All forms of NAP allowed. [As with the other delegated acts of the ITS Directive, the NAP can come in different forms (with differences in cost) and it is up to the Member States to decide which is best suited for them. The basic NAP as a data register will be the minimum requirement for the delegated act; this is the form of NAP assessed here.]			
Data exchange[15]	Transport operators and authorities, infrastructure managers and transport on demand service providers will most likely continue using national data formats for public transport data and other scheduled modes (long-distance coach, waterborne etc.) or data formats with a smaller number overtime adopting the European standards.	Static public and private travel and traffic data in NAP shall be in a machine readable format	Static public and private travel and traffic data in NAP shall be in NeTEx and dynamic public and private travel and traffic data in NAP shall be in SIRI	Static public and private travel and traffic data in NAP shall be in a machine readable format	Static public and private travel and traffic data in NAP shall be in NeTEx any dynamic public transport data in NAP shall be in SIRI
		Other legislation with relevant standardisation requirements/industry activities shall apply [TAP TSI applicable for railways, INSPIRE applicable for spatial data, Priority action 'B' applicable for road, IATA applicable to aviation]			
Quality frame-work	The quality levels of travel and traffic data and the travel information services themselves would continue to be fragmented with some improvements made overtime.	Recommend basic elements. [Basic requirements include data accuracy, up to date and updates given in a timely manner. The metadata in the NAP describes the frequency of updates and the level of quality/ validation.]	Mandate detailed elements. [Detailed elements would also include requirements to make sure the information is accurate, complete, updated within a specified time period, and the metadata in the NAP defines the level of quality available]	Recommend basic elements [Basic requirements include data accuracy, up to date and updates given in a timely manner. The metadata in the NAP describes the frequency of updates and the level of quality/ validation.]	Mandate basic elements. [Basic requirements include data accuracy, up to date and updates given in a timely manner. The metadata in the NAP describes the frequency of updates and the level of quality/ validation.]
Linking services for distributed journey planning	Following the adoption and promotion of the CEN OPEN API standard – an additional number of travel information service providers would be engaged in distributed journey panning – notably through EU Spirit.[16]	**Requirement:** No requirements (but CEN open API standard recommended)		**Requirement:** Mandatory for all services to link	**Requirement:** Demand-based obligation for services to link
		Technology: CEN Open API standard recommended		**Technology:** CEN Open API standard mandated	**Technology:** CEN Open API standard recommended
Terms and Conditions[17]	Transport operators and authorities, infrastructure managers and transport on demand service providers that provide access to their travel and traffic data would develop their own licence agreements.	No requirements	Access to data subject to licence agreements including possibility of financial compensation. Presentation of travel options neutral.	Access to linking services subject to contractual agreements including possibility of financial compensation. Presentation of travel options neutral.	Access to data and linking services subject to licence agreements and contractual agreements including possibility of financial compensation. Neutral travel option display.

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[14]   This aspect was not included in the quantitative analysis of the cost-benefit analysis due to the possibility of quantifying the impact of no EU intervention

[15]   Standards already prescribed for the rail sector through TAP-TSI, road and traffic data through Priority Action 'B' of the ITS Directive and the technical formats adopted by the airline sector through IATA shall apply in all scenarios. The gap to fill in the specification and what is included in the policy options above concerns scheduled modes of transport (public transport, long distance coach, ferry etc.)

[16]   https://eu-spirit.eu/

[17]   This aspect was not included in the quantitative analysis of the cost-benefit analysis due to the possibility of quantifying such impacts

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5. POTENTIAL IMPACTS OF POLICY OPTIONS

A cost-benefit analysis was carried out by the supporting study based on four core policy options which were identified based on the different approaches to support EU-wide multimodal travel information: (1) minimal intervention, (2) data access and exchange provisions, (3) service access and exchange provisions (4) balanced combination of data and service access and exchange provisions. Each option was then divided into 2 sub options (a) the specifications prescribed for the comprehensive TEN-T network and (b) for the entire EU transport network.

The Cost Benefit Analysis (CBA) took account of the economic, social, environmental, and market impacts that a range of scenarios might have. It was conducted in line with the advice set out in the EC 'Better Regulation Guidelines'. The impacts are the changes which would not occur without the implementation of the policy; for example Member States which already have a National Access Point meeting the requirements of a particular policy option would not incur further costs or benefits as a result of that policy option being implemented. Thus the impacts included in the assessment are in comparison with this baseline or 'no intervention' option.

The Cost Benefit Analysis period was 15 years (i.e. 2016-2030), with implementation being phased in over varying timescales for different elements across the period of 2016-2023.

The Cost Benefit Analysis identified the implementation and operational costs, using the EC Standard cost model approach, associated with the key policy measures: creation and maintenance of the national access point, development of data standardisation at the level of the national access point, implementation and maintenance of a quality framework and the implementation and maintenance of distributed journey planning across the EU. The cost figures used can be detailed in the subsequent chapter.

The Cost Benefit Analysis identified the benefits of each scenario on the basis of:

- The number of journeys for which travellers would save time pre-trip when planning cross-border journeys by using one comprehensive multimodal journey planner instead of several.
- The number of rail journeys during which travellers would reduce the on-trip time spent during disrupted journeys by being able to change their plans during disrupted trips as a result of better access to real time information at all stages of their journey.
- The number of cross-border journeys where travellers switch modes for the 'last leg' of their outward journey and 'first leg' of their homeward journey from hire car or taxi to more sustainable modes as a result of easier access to journey planning information at their destination, resulting in primarily in reduced congestion but also benefits such as reduced emissions and improved air quality; (note that to avoid double counting with the assessment of Priority Action B, the impacts on car journeys were not assessed here).

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- Cost savings for MMTIPS providers through reduction in data discovery, data aggregation and interfaces.

The benefit figures used can be found in the subsequent chapter. These were the key benefits assessed. Other potential benefits were not assessed, but such benefits would not necessarily vary significantly between the various policy options, so would not contribute to the process of prioritising policy options and were therefore not included in the quantitative assessment. These include:

The benefits derived from each scenario varied depending on:

- Whether or not the scenario included a mandatory element (i.e. whether it would accelerate deployment compared with the baseline)
- Whether the scenario involved dynamic data (i.e. real time information) or only static data (such as timetables and bus stop locations)
- The geographic coverage of the scenario.

The data used in the model are presented in detail in the final report, but based on a broad range of sources coming directly from stakeholders along travel information, other studies and projects in the field and EU statistical officers. In most cases, the data used were from real-life cases (real life examples of setting up national access points and standardisation activities for other delegated regulations of the ITS directive, quality frameworks quantified by travel information service providers and quantified results of costs to perform distributed journey planning). Only in certain exceptions were data models created based on logical and relevant assumptions and predictions.

Overall, the consultants' estimates indicate a positive cost/benefit ratio of the Commission taking action in the field of multimodal information over a 15 year period with the 'comprehensive' policy option providing the highest overall cost-benefit ratio.

The following section provides a summary of the costs of each of the policy measures that is understandable for each individual affected stakeholder (i.e. the cost for each Member State to set up and operate a national access point, the cost for individual travel information service provider to perform distributed journey planning, etc.) The summary of the associated benefits of each policy option are then quantified as an overall EU total. Thereafter, a summary table that includes the overall results of the cost-benefit analysis is presented.

5.1. Cost estimations

5.1.1. National Access Point

Member States may re-use existing national access points for other delegated acts (Delegated Regulation (EU) No 2015/962 Real Time Traffic Information) for this delegated act but for the purpose of this cost-benefit analysis it is assumed that all Member States shall establish the minimum data portal version of the national access point as it cannot be assumed what proportion of Member States shall re-use existing infrastructure and what proportion will set up something new altogether.

The costs associated with setting up and managing a web portal version of the national access point has been calculated as follows in the cost benefit analysis:

– average one-off implementation cost **€49,000** per Member State

– average annual maintenance (checking links and hosting, maintaining, and updating the web site) costs **€25,000** per year per Member State

Costs may vary according to size of Member State and location in Europe).

For additional information, the Netherlands has estimated in the context of road safety related traffic information services specifications that a more centralised point of access with web links, metadata and data would cost **€151.000** a year.

5.1.2. Static Data Standardisation

Member States may determine how to comply with the new data standardisation requirements for what concerns static data of other scheduled modes i.e. public transport, long distance coach etc. Such options include converting the national standard into NeTEx by translation from the national format which involves developing a national translation tool to perform the data mapping from the national schema to NeTEx. A second method is to convert to NeTEx completely, which requires each operator/authority to change their data tools to support NeTEx at the back office level at least for export and no longer use the national format to submit data to the national access point which requires more effort and time and thus higher cost.

For the purpose of the cost-benefit analysis, it was assumed that for each Member State the first translation method would be adopted. The costs associated with performing such translation have been calculated as follows:

– average one-off cost of developing the national NeTEx profile and conversion tool **€50,000** per Member State (costs may vary according to size of Member State and location in Europe).

For additional information, the region of Grand Lyon has quantified the costs associated with complying with fully changing their dataset to NeTEx at the back office level as **€25.000**.

5.1.3. Dynamic Data Standardisation

Member States which choose to include dynamic data in the national access point must use the SIRI standard for what concerns public transport and long distance coach operators. The supporting study found that SIRI adoptions are widespread in Europe. For the purpose of the cost-benefit analysis it was calculated that 70% of coach and public transport operators have dynamic information already in the SIRI format and just 5% have dynamic information in a different format to SIRI and would require changes to confirm with new requirements. Just 25% of coach and public transport operators were assumed not have dynamic information at all. Given the relatively small proportion of operators that do not already comply with SIRI, it was assumed that all remaining operators would comply with the requirements. The costs associated with performing such conversion have been calculated as follows:

–   average implementation cost of converting data to SIRI **€50,000** per operator

–   average annual operational cost of **€5,000** for the first five years for an operator (after which it was assumed that this task would be part of normal operations with no additional cost)

Note that these costs are likely to vary between operators of different sizes and with different volumes of data to process.

5.1.4. Quality Framework

The delegated act includes general provisions that the relevant data in the National Access Point should be accurate, up to date and updated in a timely manner. However, regarding the quality of the data itself, some quality elements will already be addressed in the metadata found at the level of the national access point that would already define the quality level/ validation of the data. Provisions that are more specific could include specific periods for when data updates and changes must be delivered. However, within the scope of the delegated act only general provisions are included. Therefore, for the purpose of the cost-benefit analysis it was assumed that travel information service providers would only provide additional costs to monitor such general provisions. The costs associated with performing such task have been calculated as follows:

–   average implementation cost of **€2,000** per travel information service provider

For additional information regarding more specific quality criteria that are not included within the delegated act by Member States may wish to implement themselves, a case study from the UK provides relevant information on what the total cost could potentially be if a more thorough and detailed was prescribed. The Data Improvement Group of Transport Direct (UK) calculated that detailed quality and validation checks when setting their service for the first time and integrating various datasets at the beginning (checking that has the data been updated within the specified time period; checking it conforms to the schema and national

profile; checking the data references are correct; checking it can be pre-integrated without issues; de-duplication, as well as a cost to resolve a certain number of issues with the suppliers) would incur an initial cost of **€4.2m** and **€52,000** per year after the data quality had improved per Member State. Such costs at a UK level are most likely higher than other parts of the EU.

5.1.5. *Performing distributed journey planning by linking travel information services*

The delegated act includes provisions to link different travel information services across the European transport network on demand, which would incur implementation and running costs in the exchange of routing results between travel information services when performing distributed journey. For the purpose of the cost-benefit analysis, the calculation of the demand-based approach of linking services was based along the number of urban nodes along the transport network (100 journey planning services on the Comprehensive TEN-T network and 200 on the EU-wide network). It is important to highlight that in implementation of the delegated act a much lower figure is expected to perform distributed journey planning. The costs associated with performing distributed journey planning have been calculated as follows:

–   average implementation cost **€75,000** per travel information service provider

–   average annual running cost **€30,000** per travel information service provider

5.1.6. *Impact on national budgets, businesses, SMEs and micro-enterprises*

As the cost examples of each policy measure above have demonstrated, the overall impact on national budgets is expected to be limited, especially taking into account that Member States may choose to re-use the instruments set up for other specifications of the ITS Directive for this priority action (i.e. the national access point) to reduce costs.

For the stakeholders that will need to comply with the various policy measures and requirements included in the delegated act, the impact is also expected to be limited due to the nature of the actions envisaged which are relatively limited in cost and are consistent with provisions included in other delegated acts of the ITS Directive.

Furthermore, due to the fact that the delegated regulation does not concern the creation of new digital data and/or travel information services, the impact on small and micro transport operators that have relevant travel and traffic data and need to give access via the national access point is expected to be limited. In many cases, micro transport operators still provide travel information via traditional and non-digital methods i.e. paper timetables at public transport stops. This is mainly due to the fact that in order to develop travel information services and/or create digital travel and traffic data a series of investments are needed (mainly hiring technical expertise and technical IT developments) and therefore with limited resources and/or limited business cases, such operators would continue to use traditional means and would be therefore not affected by the delegated regulation. However, it should be noted that if small and micro transport operators host digital travel and traffic data, or plan to do so in

the future, they will also be required to comply with the requirements of the delegated regulation in including providing access to data via the national access point and complying with the data standardisation requirements. But, the provision of financial compensation and the use of licence agreements for such access of course apply to all stakeholders including small and micro operators.

In addition, for what concerns travel information service providers which are SMEs and/or micro-enterprises, the proposed policy measures that enable the easier access of travel and traffic data will help improve the efficiency of their day to day operations and support the growth of their operations and therefore should result in overall positive effect. Moreover, as aforementioned the delegated regulation should also positively support the creation of new SMEs and micro-enterprises in the European digital economy. SME travel information service providers would have to comply with different proposed policy measures including on-demand distributed journey planning if relevant (please see section 5.3.5 for further explanation) and ensuring that the quality provisions are complied with i.e. making sure data updates are accurate and conducted in a timely manner. Even in this regard, the impact expected to be limited as no additional investments should be required to conduct this task.

5.2. Benefit Estimations

5.2.1. Time Savings

<u>Two types of time savings can be distinguished (1) pre-trip</u> **time savings** of **travellers** planning cross-border journeys in the EU using fewer and more comprehensive services, (ii) and <u>on-trip</u> **time savings** of **travellers** through better information in the event of disruptions and congestion

To plan a cross-border door to door trip in Europe, travellers may have to use multiple sources to compare travel options or simply combine the travel information of different legs of the journey. The value of time in 2016 was assumed to be **€16.89/ hour** for air passengers and **€8.14/ hour** for rail, bus, coach and waterway passengers, according to HEATCO[18] demonstrating the high value of saving travellers time by simplifying the process to plan a journey. In addition, in the event of travel disruptions or congestion taking an alternative journey through better information also has the potential to save valuable time for European travellers. In 2013 there were **300 million cross border journeys** made by EU-citizens requiring at least one-night stay. Even if just 10 minutes were saved for 200 million of those journeys the monetary value of time saved would be **€563 million** on the EU-wide transport network.

EU-wide journey planning services with real time information would enable people travelling across borders to save time during disrupted trips as in some cases it is possible to revise the journey plan to reduce the impact of disruption. On the basis of statistics on rail service delays for a selection of cross-border and long distance routes and operators, 3% of rail trips were estimated to be disrupted, 20% of these were assumed to be re-planned, with a 30-minute time saving assumed per re-planned trip which represents a monetary value of **€13 million** on the EU-wide transport network. It was assumed that air

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[18]   http://heatco.ier.uni-stuttgart.de/

passengers would not be in a position to revise their journey plans during disrupted trips and that passengers using other modes would not be in a position to save time in the case of delays of less than 30 minutes. Moreover, it was assumed that improved access to real-time passenger information would result in a 5-minute journey time saving for some delayed 'infrequent' local public transport services. It was assumed that 20% of public transport trips were on infrequent services and that 30% of these were equipped with real-time information. Data from UITP stated that annually there are 56.8 billion public transport trips in the EU and on the basis of data from transport operators[19] 3% of these trips are subject to substantial delay. This suggested that there are 102.2 million trips per year in the EU on local infrequent buses with real-time information that are delayed. As such, the 5-minute journey time saving was assumed to be applied to 1% of these trips which brings an additional benefit of **€444 million** on the EU-wide transport network.

5.2.2. *Environmental Impact*

Environmental impact in **urban areas** would primarily take effect through increased use of sustainable modes of transport and a modal shift as a result of more comprehensive services

There is a huge travel demand for cross-border journeys within the EU. In 2013 there were **300 million cross border journeys** made by EU-citizens requiring at least one night stay. If also including those trips made by tourists within the EU each year **(600 million)** and single day return trips, the overall figure would be even higher. It is estimated that **214 million** cross-border trips are made into either train stations or airports every year by EU residents with around 50% of the last mile made by taxi or private car. If, through more comprehensive multimodal travel information, an estimated **5%** of those last mile trips from airports and **12%** from train stations were shifted to sustainable modes, this would reduce the distance travelled by car by **163 million km.** Such changes to more sustainable modes would result primarily in reduced congestion but also in other benefits such as reduced emissions and improved air quality. The value was estimated using the marginal external cost of congestion, which is €0.18 per km on an average weekday morning, which is largely the cost of vehicle delays but also includes costs associated with safety, emissions, noise and infrastructure. Along the EU-wide transport network, this is worth **€309 million.**

5.2.3. *Reduced operational costs*

Reduced **operational costs** of **multimodal travel information service providers** would be achieved through easier access to travel and traffic data across the EU and easier integration and management of a wide range of data sources across different transport modes.

There would be cost savings to **125 service providers**, with a one-off cost saving in reduced data discovery costs of **€50,000,** as well as an ongoing cost saving in reduced

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[19]   UITP 2014. Local public transport trends in the European Union, Statistics Brief, June 2014, UITP, Belgium.

aggregation costs and a reduction in interfaces required of **€100,000** annually which brings total savings of **€202 million** if implemented on the EU-wide transport network.

Moreover, the cost-benefit analysis carried out by the consultants shows better cost-benefit ratios for deployment options on the comprehensive TEN-T network as compared to the deployment options on the core TEN-T network. This is due to the extent of the comprehensive network as compared to the core network, i.e. the larger the network, the larger the benefits, whereas costs remain reasonable since additional data collection is not required, and data portals already exist in several Member States.

5.2.4. Cost-Benefit Ratio[20]

	1		2		3		4	
	1A	1B	2A	2B	3A	3B	4A	4B
Accrued benefits 2016 - 2030 (EU-28)								
i. Time saving of journey planning (static information)	€11,278,181	€22,556,362	€112,781,809	€225,563,619	€281,954,523	€563,909,046	€281,954,523	€563,909,046
ii. Time saving due to better information on disrupted journeys (dynamic info)	€264,596	€529,192	€2,645,958	€5,291,916	€3,307,448	€6,614,895	€6,614,895	€13,229,791
iii. Benefits of modal shift to more sustainable modes	€6,186,951	€12,373,903	€61,869,515	€123,739,030	€77,336,894	€154,673,787	€154,673,787	€309,347,575
iv. Cost savings to MMTIPS service providers	€0	€0	€127,080,541	€201,785,928	€0	€0	€127,080,541	€201,785,928
Total benefits (EU-28)	€17,729,728	€35,459,456	€304,377,823	€556,380,493	€362,598,864	€725,197,729	€570,323,747	€1,088,272,340
Accrued costs 2016 - 2030 (EU-28)								
i. NAPs	€8,043,949	€8,043,949	€8,043,949	€8,043,949	€8,043,949	€8,043,949	€8,043,949	€8,043,949
ii. Data exchange - meeting standards NeTEx and SIRI	€0	€0	€1,519,393	€25,661,266	€0	€0	€1,519,393	€25,661,266
iii-a. Data quality - Mandate basic elements	€0	€0	€226,868	€226,868	€0	€0	€226,868	€226,868
iii-b. Data quality - Mandate detailed elements	€0	€0	€120,028,625	€120,028,625	€0	€0	€0	€0
iv-a. Linking - Demand-based obligation for services to link	€0	€0	€0	€0	€0	€0	€35,944,173	€71,888,345
iv-b. Linking - Mandatory for all services to link	€0	€0	€0	€0	€71,888,345	€143,776,691	€0	€0
Total costs (EU-28)	€8,043,949	€8,043,949	€129,818,835	€153,960,708	€79,932,294	€151,820,639	€45,734,383	€105,820,428
Cost-Benefit Ratio (CBR)	2.2	4.4	2.3	3.6	4.5	4.8	12.5	10.3

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[20] (1) minimal intervention, (2) data access and exchange provisions, (3) service access and exchange provisions (4) balanced combination of data and service access and exchange provisions. Each option was then divided into 2 sub options (a) the specifications prescribed for the comprehensive TEN-T network and (b) for the entire EU transport network.

5.2.5. Cost-Benefit Analysis against the principles of the ITS Directive[21]

Objectives	0	1A	1B	2A	2B	3A	3B	4A	4B
The availability and accessibility of existing and accurate road and real-time traffic data used for multimodal travel information to ITS service providers without prejudice to safety and transport management constraints		+	++	+++	+++	+	++	+++	+++
The facilitation of the electronic data exchange between the relevant public authorities and stakeholders and the relevant ITS service providers, across borders				+++	+++			++	+++
The timely updating of available road and traffic data used for multimodal travel information by the relevant public authorities and stakeholders		+	+	+++	+++	+	+	++	++
The timely updating of multimodal travel information by the ITS service providers				+++	+++	+++	+++	++	++
The facilitation of the electronic data exchange between the relevant public authorities and stakeholders and the private digital map producers and service providers		+	++	++	+++	+	++	++	+++
The timely updating of the digital maps by the digital map producers and service providers				+++	+++			++	++
Overall	0	0	+	+++	+++	+	+	++	++
Overall objective: the definition of the necessary requirements to make EU-wide multimodal travel information services and accurate and available across borders DG MOVE Assessment	0	+	+	++	++	++	++	+++	+++

[21] As detailed in Annex I of the ITS Directive, a set of specific sub-objectives are defined and the supporting study analysed the difference policy options against this set. Three of these objectives concerned the updates of travel and traffic data and as the policy options above indicate, the data focus option (2A and 2B) included specific data updates and thus received a higher scoring. However, the costs incurred to support such data quality control mechanisms and assessment compliance as demonstrated in the cost-benefit analysis did not produce the highest cost-benefit ratio. Furthermore, when considering that the overall objective of the priority action is to make EU-wide multimodal travel information services and accurate and available across borders, the comprehensive option that supports both distributed journey planning and data access/exchange fulfils this objective to a larger degree.

5.3.   Comparison of Policy Options and Need for EU intervention

5.3.1.   Policy Option 0: Baseline Scenario

In terms of how effective this policy option would be in closing the aforementioned barriers and gaps and supporting the general objective of EU-wide multimodal travel information, the impact of the baseline scenario is expected to be limited and insufficient due to a number of factors. National Access Points would still be established and set-up as prescribed from other delegated regulations of the ITS Directive (real-time traffic information, safety related information). However although some of the data required for those delegated regulations will be available for multimodal travel information services (i.e. geographical spatial data, tunnel closures, road infrastructure, etc.) the core set of travel and traffic data across all transport modes for would be missing. Without EU intervention the barriers of limited access to travel and traffic data which have existed for a number of years would continue to apply to a large extent. Some improvements within the sector can be expected overtime but not in a consistent manner in the EU across public and private bodies with divergent progress from different transport modes. The interoperability of the data itself is expected to be sufficient in those sectors that are already regulated (road/traffic, rail) or led by strong industry activity (aviation). However, for those sectors which have gaps in interoperability capacity and without legal frameworks in place (other scheduled modes – public transport, long distance coach etc.) it can be predicted that transport operators and authorities will most likely continue using the relevant national data formats. However, there are also industry specific formats like GTFS which operators and authorities may choose to use and some may voluntarily adopt the European standards overtime. For the market of distributed journey planning it can be expected that following the adoption and promotion of the European OPEN API standard, an additional number of travel information service providers would be engaged in distributed journey panning, notably through the EU Spirit network.

The provision of EU-wide multimodal travel information cannot be satisfactorily achieved by Member States alone and a coordinated approach at an EU level is needed due to the scale and the nature of the problem. Stand-alone policies at MS level or common activities by groups of Member States (i.e. neighbouring Member States or those active in the field of ITS) would not solve the pre-identified barriers and obstacles. Overall European travellers would continue to have insufficient access to comprehensive and accurate travel information across the EU.

5.3.2.   Policy Option 1: Minimal Intervention

The effectiveness of this policy option in terms of how far it could close the aforementioned barriers and gaps and support the general objective of EU-wide multimodal travel information is expected to be inadequate. While the national access point would be required for at least static travel and traffic data, it's full use would be limited without any interoperability requirements. One of the key findings from the stakeholder consultation and meetings with experts nominated by Member States showed that making data accessible without interoperability requirements severely hampers the effectiveness of the national access point. The travel and traffic data may be accessible, however, if it is still complex, costly and time consuming the use the data the overall effect will be limited. Therefore, the need for standardisation and interoperability is essential. With only recommendations for distributed journey planning provisions the overall impact is expected to be limited with an additional number of travel information service providers engaging in distributed journey panning, most likely through pre-existing activities such as the EU Spirit network. In terms of the quality of

travel and traffic data, recommended actions that only support for general provisions would only bring limited impact. Improvements would not be comprehensive and consistent enough across the EU with some stakeholders voluntarily supporting the provisions and other stakeholders not engaging.

In terms of potential technological risk associated with this policy option, the level of risk is expected to be limited. This is due to the fact that the enabling conditions and the technical is not pre-defined to specific technologies that may become outdated or obsolete.

In terms of the financial impact and administrative costs of this policy option, the results of the cost-benefit analysis clearly indicate the cost-benefit ratio is low. Costs would be limited to the national access point, but without interoperability requirements the use of the national access point would be restricted. As a result, the timesaving's of travellers, improved efficiency of operations for service providers and environmental improvements for societies overall would also be limited.

5.3.3. *Policy Option 2: Data Focused*

It can be argued that this policy option would be effective in closing the aforementioned barriers and gaps concerned with travel and traffic data access and exchange, but it would only partially support the general objective of EU-wide multimodal travel information. This is because it only focuses on mechanisms that support data access, exchange and their quality for static and dynamic data and the related interoperability and data quality requirements. The national access would provide access to both static and dynamic data which would mean that Member States and affected stakeholders would have to ensure that the national access point can support both types of data and incur an additional effort. Concerning the use of travel and traffic data by other travel information service providers, the inclusion of individual licence agreements[22] is an important safeguard for transport operators, transport authorities, infrastructure managers and transport on demand service providers when providing access to their data. Moreover, ensuring that the travel information must be presented to end-users in a neutral manner is an important ensure safeguard to ensure end-users are not misled. However, such measures overall would disproportionately favour architectures of EU-wide multimodal travel information services that are most suited to this approach (i.e. centralised EU-wide travel information services). This in turn could bring an undesired effect of pre-determining market developments. With only recommended EU actions for distributed journey planning, the overall impact is expected to be limited. Only an additional number of travel information service providers are expected to engage in distributed journey panning, most likely through pre-existing activities such as the EU Spirit network.

In terms of potential technological risk associated with this policy option, the level of risk is expected to be moderate due to the fact that the enabling conditions and the technical approach of how travel and traffic data is stored and access is pre-defined to specific technologies but have less risk of becoming outdated or obsolete. Standards and specifications for data formats are included, however improvements and changes are predominately stable and made over a longer period of time reducing the risk of fast paced technological change.

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[22] Including possible financial compensation that is fair and proportionate to the costs incurred to make data accessible

In terms of the financial impact and administrative costs of this policy option, the results of the cost-benefit analysis also demonstrate that whilst this policy option would bring benefits to end users, travel information services and societies at large, the cost of implementing such a policy measure for the affected stakeholders would be disproportionality high. This would be a result of dynamic data being included, which is more costly to integrate and operate and the quality control involves an extensive amount of work to be conducted.

5.3.4. Policy Option 3: Service Focused (Distributed Journey Planning)

It can be argued that this policy option would be effective in closing the aforementioned barriers and gaps concerned with distributed journey planning, but it would only partially support the general objective of EU-wide multimodal travel information. This is because it mainly focuses on mechanisms that support distributed journey planning. It includes the mandatory use of a standardised interface to link travel information services and the requirement that all local, regional and national travel information services need to perform distributed journey planning with neighbouring local, regional and national travel information services. However, similarly as in option 2, such measures overall would disproportionately favour architectures of EU-wide multimodal travel information services that are most suited to this approach (i.e. de-centralised EU-wide travel information services and discourage growth and innovation at a pan-European level for new services). This in turn could bring an undesired effect of pre-determining market developments. However, for the services directly involved, this obligation would not negatively influence them as they predominately include local, regional or national travel information that can work together in a complementary manner and are not in competition with each other. This is because their primary focus is to provide travel information for their governing territory. In addition, sensitive commercial information would not be exchanged as the primary focus relates to the travel planning information and not dynamic fare information or the ability to purchase tickets. However, one of the key findings of the stakeholder consultation revealed that the optimal use of distributed journey planning is when there are high travel demands for specific regions of Europe with higher traffic flows. Therefore, the requirement that all local, regional and national travel information services must link with neighbouring services may enable an undesired effect of unproportioned activities and costs related to the optimal use cases. This could include distributed journey planning where the business case is less strong. The use of contractual agreements can also be an important instrument and safeguard that allows different travel information service providers the opportunity to develop the most optimal partnership and take into account particular contexts that may affect the operation of service providers.

In terms of the potential technological risks associated with this policy option, the level of risk is expected to be higher because the mandated standardised interface for distributed journey planning has only been recently developed. It has been built on the most promising standards at national level, but it may become more susceptible to changes and updates in comparison to the data format standards which are more stable and developed over a longer period of time.

In terms of the financial impact and administrative costs of this policy option, the results of the cost-benefit analysis also demonstrated that this policy option would bring a smaller-cost benefit ratio. The smaller cost-benefit ratio stems from higher costs to implement the policy measures (mainly concerning the distributed planning costs for all services to link) and smaller amounts of benefits to end users, travel information services and societies at large because only a relatively smaller portion of the market would fully benefit from the policy measures (local, regional and national services)

A review of the current market of travel information services at local, regional, national and pan-European levels revealed that private start-ups and SMEs provide travel information services at a pan-European level and public services provide travel information at local, regional and national levels. Therefore, private SMEs and start-up travel information service providers are not expected to be affected by the distributed journey planning provisions. The review did not provide evidence that SMEs/start up travel information service providers are involved in distributed journey planning and it is not expected that this will change in the future.

5.3.5.   *Policy Option 4: Comprehensive Approach*

Based on the results of the stakeholder consultation and the results of the cost-benefit analysis it can be argued that this policy option would be the most effective in closing the aforementioned barriers and gaps and supporting the general objective of EU-wide multimodal travel information. Firstly, rather than determining which EU-wide multimodal travel information service architectures should be used, this policy option allows all possible solutions to be supported and to benefit from the various enabling conditions included. This was a key point agreed by experts nominated by Member States who argued that the delegated regulation should not determine which architecture should be used. Moreover, the results of the public consultation also reflected the support for provisions that support both data access and exchange and those for distributed journey planning, the results did not indicate a clear lack of support for one option over the other. Both data access and interoperability and distributed journey planning were indicated as important enablers for EU-wide multimodal travel information services. Throughout the entire stakeholder consultation no feedback was reported that the delegated regulation should focus only on data access and exchange or only distributed journey planning. However, in order to support both approaches it would not be feasible to simply combine all of the policy measures included in policy option 2 and 3 as the cost would substantially higher. Instead a trade-off between the most important and more effective policy measures within each should be combined together to make a balanced and comprehensive approach. Therefore, by focusing on static travel and traffic data in the national access point, combined with standardisation requirements and not mandating the use of dynamic data and specific data update requirements[23] the data access and exchange can be substantially addressed without putting too much burden on the affected stakeholders and Member States. Concerning the use of licence agreements for data access and neutral travel information display, there are no differences between this policy option and the data focus option.

In order to support distributed journey planning, a demand-based approach rather than requiring all travel information services to link was seemed the most suitable and effective trade-off. However, it has to be noted that the proposal still does introduce a binding obligation to link, subject to demand expressed by others who would seek such an access. As highlighted by different stakeholders and Member States, distributed journey planning has the strongest added value where there is a specific travel demand and where there are higher traffic density flows. As a result, the proposal of linking services on demand rather when there is a stronger business case rather than requiring all services to link[24] aims to bring a positive added value to the market of existing local, regional and national travel information

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[23] i.e. no specific deadline dates and only general provisions of data accuracy and timeliness etc.
[24] As supported by different stakeholders and Member States in bi-lateral discussions/consultation exercises

services. It is also expected to incur limited costs as demonstrated in the cost-benefit analysis. This demand-driven binding obligation is not expected to negatively influence market players, as the relevant services that would participate include only local, regional or national travel information. This is because they are not in competition with each other as they provide travel information for their governing territory and therefore work together in a complementary network manner to support cross-border or inter-region travel information. Travel information services that are in competition with other would be services that cover the same territory and would provide an overlapping service. This is not the business case of distributed journey planning and therefore no negative market developments are expected. In addition, sensitive commercial information would not be exchanged, as the delegated regulation specifies which type of information should be exchanged. It relates to the travel planning information and not dynamic fare information or the ability to purchase tickets etc.

Regarding the impact on private SMEs/start-ups to conduct distributed journey planning, there are no differences between this policy option and the former. In addition, the recommended use of the European standardised interface to perform distributed journey planning, rather than the mandatory use, is an important trade-off. It provides direction and guidance to the affected stakeholders while at the same time enabling more flexibility. In the event that the recently adopted standard changes or new technologies to perform distributed journey planning emerge, stakeholders can adapt easily. Concerning the use of contractual agreements, there are no differences between this policy option and the link services focused option. As argued above, only through the demand-based obligation and technology neutral approach one can best ensure achieving the objectives of making travel information services available and accurate across borders in a manner which is balanced and effective for public and private stakeholders.

In terms of the geographical scope of the policy option, the results of the cost-benefit analysis and the feedback from experts nominated by Member States strongly indicated the benefit of covering the entire EU transport network and not restricting the requirements of the delegated regulation to the comprehensive TEN-T network only. The primary argument is that the full benefit of multimodal travel information can only be realised with the full 'door-to-door' coverage i.e. needing travelling information for your entire journey from your starting point to your final destination. In addition, restricting the geographical scope of the delegated regulation also means the full benefits would not be realised by all travellers. As a trade-off to support the full network coverage of the requirements, a phased approach that allows Member States and affected stakeholders the opportunity to build up the national access point over time is proposed. It would start with the data that covers the comprehensive TEN-T in a first stage and the entire EU transport network in a second stage. Such a trade-off is an important mechanism to realise the full geographical coverage and benefit of the delegated regulation and to ease the costs and efforts of implementation over a sufficient period of time for stakeholders.

In terms of the potential technological risks, as aforementioned in the earlier policy options, the level of risk is expected to be moderate due to the fact that data standards will be required but the technical interface for distributed planning will not be mandatory.

Regarding the financial impact and administrative costs of this policy option, the results of the cost-benefit analysis also demonstrate that this policy option would bring the highest cost-

benefit ratio, while ensuring key benefits to end users, travel information services and societies at large.

This policy option does not go beyond what is necessary to achieve the objectives of the initiative as it combines the best trade-off between provisions that support all possible architectures of EU-wide multimodal travel information services. To support the provision of EU-wide multimodal travel information services, there needs to be a common and harmonised framework at an EU level that sets out common rules and requirements to start triggering the implementation process. Therefore, the objectives of the proposed action can be better achieved at the Union level due to the effectiveness and efficiency of a common and harmonised framework.

Feedback from Member States and stakeholders across the value chain have also shown support for this policy option as the preferred option. Firstly, as mentioned previously it was agreed with experts nominated by Member States to focus on both approaches. In addition, the results of the public consultation did not demonstrate that the enabling conditions should focus on one option over another but rather both approaches were supported.

There were also some concerns raised by stakeholders, which have been addressed in the preferred option. Whilst 75% of respondents agreed that travel and traffic data needs to be interoperable across the EU (and only 10% stating that sufficient levels of interoperability have been achieved) a relatively slim majority for mandated EU standards was noted in the public consultation. However, only 10% of respondents in all stakeholder categories were against the use of standards and large proportion of those groups were undecided. In particular, the stakeholder groups which were most critical of the use of data standards (railway operators) are those groups unaffected by the requirements as they concern other scheduled modes of transport including public transport. Subsequent bi-lateral meetings with the CER Ticketing Group clarified this topic as it was deemed that the questions in the public consultation were not clear enough. Furthermore, regarding the issue of dynamic fare data which stakeholders expressed concern in sharing, bi-lateral meetings with various stakeholder groups that were most concerned with this topic (railway operators) were also used to provide clarity on the topic as the objective of the delegated act is not to provide access to this kind of data.

Stakeholders welcomed in particular the flexible approach of implementing the national access point (Member States choosing the technical form of the NAP to suit their national context, the optional inclusion of dynamic data, the phased approach of building up the NAP with the relevant data), the inclusion of the licence agreement for data access and contractual agreements/recommended use of the standardised interface for distributed journey planning.

Whilst the results may show a limited overall support for legislation (55% of total respondents) what is important to highlight is that the other types of EU actions did not receive considerably higher scores. Funding, the highest scoring option, only receiving 62% of total respondents. Looking at the results in detail, respondents were able to choose a combination of different measures but only 23% of respondents did not include legislation at all as an option in their selection. In addition, where respondents only chose one measure on its own to enable the provision of EU-wide multimodal travel information services, legislation was the highest scoring option out of all.

Concerning the use of legislation as opposed to purely soft-law measures (such as recommendations, guidelines, exchange of best practises) legislation ensures that developments and progress are made in a consistent and harmonized manner by all actors across the value chain. In comparison soft-law provisions do not ensure a harmonised level of uptake and consistency. In a multimodal context where travel information demand is spread across all of Europe and all modes are relevant it is therefore essential that all developments are conducted in a consistent and harmonized manner to avoid fragmentation and gaps in the market (certain transport modes more developed than others, certain Member States more developed than others).

The need to include both public and private actors is justified on the ground that multimodal travel information is based on both public and private sources and provisions for only public actors would lead to further fragmentation. Improvements would only be achieved with one half of stakeholders and therefore limited progress in the other. As a result, travellers would continue to receive insufficient pan-European travel information. To support the development of comprehensive and accurate multimodal travel information services the same provisions need to be set for both public and private actors.

In terms of timing, the relevant initiatives that first called for action to realise seamless door-to-door multimodal travel information began as early as 2008, yet the availability of such travel information does still not exist in 2016. Therefore, the timing of this EU intervention can be seen as appropriate and justified. Moreover, when comparing the results of the public consultations from 2013 and 2015, the same barriers are highlighted further reinforcing the view for EU intervention.[25] The results of the 2016 public consultation also highlighted that both the providers and users of travel and traffic data and services hold the belief that a combination of measures including both legislation, funding and stakeholder coordinated are required to support the provision of EU-wide multimodal travel information services.

6.   IMPLEMENTATION

The implementation of the preferred option will undoubtedly require strong stakeholder coordination across different transport modes and different roles along the value chain. Firstly, the implementation of the delegated regulation will need to be closely coordinated with both the public and private stakeholders that will 'fulfil' the various requirements (i.e. transport operators, transport authorities etc.) and those that will 'use' the specifications within their own services (i.e. travel information service providers and cross-sector digital services). Efforts will need to be focused upon how to effectively and efficiently fulfil the various requirements of the delegated regulation and the exchange of best practice. Furthermore, where relevant, support activities should also place emphasis on helping SMEs and micro-operators. It is also essential that the delegated regulation is promoted outside of the traditional ITS/EU transport events to maximise awareness amongst the wider digital community. In addition, the implementation of the delegated regulation will need to be closely coordinated with the other delegated regulations of the ITS Directive especially for what concerns data standardisation, the National Access Point and the quality framework which are all common features of all delegated regulations. Furthermore, as the digitalisation

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[25] http://ec.europa.eu/transport/media/consultations/doc/2013-accesstraveldata/report.pdf

sector continues to evolve, good understanding will be necessary on how the delegated regulation can help support other initiatives including Mobility as a Service and Smart Cities should be explored. To conduct the aforementioned tasks, the European Commission services may host, where relevant, events and working meetings with stakeholders across the value chain and liaise with relevant groups and initiatives.[26]

In parallel, the Commission services will continue to monitor the technical developments of the sector in line with the policy measures of the delegated regulations to ensure they are fit for purpose and evaluate internally whether or not they continue to be fit for purpose in line with Better Regulation requirements.

7.   CONCLUSION

Digitalisation of transport has convincingly proven that it can play an important role in bringing more efficiency to the transport network and supporting a diverse set of traveller's needs. Whilst a market of multimodal travel information services exists in Europe, a key number of barriers still restrict their full potential. In this context, EU intervention to build a framework that can provide for a number of enabling conditions making it easier to access and exchange travel and traffic data and services from both the public and private is needed. In turn, this can support the growth of comprehensive, accurate and reliable multimodal travel information services contributing to a connected Digital Single Market, Climate Action and Energy Union and boosting Jobs, Growth and Investment.

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[26] https://eip.its-platform.eu/

Annex I

Problem tree representing the problems and problem drivers associated with the provision of EU-wide multimodal travel information services

Fragmented development of MMTIPS in the EU

Quality of data is insufficient
- Lack of data currency and versioning
- Lack of compliance
- Lack of timeliness of updates
- Lack of veracity ('truthfulness')
- Lack of coherence
- Lack of completeness
  - Lack of defined processes for data correction
  - Lack of enforcement measures
  - Lack of availability of data quality validation tools

Availability of data is insufficient
- Lack of infrastructure data
- Lack of real-time data
  - Lack of deployed systems generating the raw data
- Lack of static data (timetables, fares etc)
  - High labour costs associated with data collection
  - Lack of cost effective data collection tools for smaller operators

Access to data is insufficient
- Divergent rules for accessing the data (across countries public and private sector)
  - Commercial confidentiality over certain data (e.g. seat availability)
  - Significant variations between Member States in roles of public and private bodies in information chain
- Limited access to data in the desired form (raw vs. processed)
  - Costs of scaling up server capacity and resilience to respond to levels of demand
  - High costs of data aggregation
- Current arrangements do not ensure fair and equal access to data
  - Lack of transparency on service levels
  - Costs of opening access
  - Difficulties in ensuring data is used for providing non-discriminatory information
  - Lack of confidence on the expected continuity of service

Lack of clear terms and conditions for data re-use (incl. liability and privacy)
- Non-compatible licensing regimes for data re-use

Systems and services lack interoperability
- Data formats and exchange protocols are not fully interoperable
  - Regularity of review and refinement of common data standards is insufficient
  - Existing data formats do not give full coverage of data needs
  - Lack of adoption by suppliers and data providers of common data formats
- Proper interfaces between services are missing
  - European CEN standard for distributed journey planning still at development phase
  - Lack of common referencing on interchange points

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