

# MIMP

MULTIMODAL TRANSPORT INFORMATION,  
MANAGEMENT AND PAYMENT SYSTEMS

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# ROADMAP



This project is  
co-funded by  
the European Union



ROADMAP towards goal 8 of the White Paper on Transport:  
“By 2020, establish the framework for a European multimodal transport  
information, management and payment system.”

The TRANSFORuM Project was coordinated by



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## THE CONVERSATION DOES NOT STOP ON 8 DECEMBER 2014!

The comments we receive at the conference on 8 December 2014 will still be considered in the condensed version of the TRANSFORuM Roadmaps and for the Strategic Outlook document. We will also compile the essence of the Brussels discussions on our project website.

The conversation about the revision of the White Paper and the best ways to implement its goals will also continue on the TRANSFORuM website, where we provide an online forum for all your thoughts, comments, criticisms and suggestions. Keep the discussion alive.

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### THE WHITE PAPER GOAL

"By 2020, establish the framework for a European multimodal transport information, management and payment system."

### WHAT DO YOU THINK?

- | "There are no technical problems, but a lot of institutional issues."
  - | "If everything is left to the market, it could lead to proprietary systems"
  - | "Standardisation could hamper innovation."
  - | "The influence of EU policy is limited."
  - | "A common understanding and vision is missing of what a European multimodal transport information, management and payment system should do."
  - | "Technological development is faster than EU regulations."
-



## GENERAL INFORMATION

The present document is the Roadmap 2.0 on Multimodal Transport Information, Management and Payment Systems of the FP7 project TRANSFORUM. This roadmap is one element of the formal Deliverable 6.2 "Consolidated roadmaps and recommendations to reach selected EC 2011 WP goals".

More information about the project can be found at [www.transforum-project.eu](http://www.transforum-project.eu)

Project details	
Project title	TRANSFORUM - Transforming European Transport through an Active Actors Forum
Grant Agreement No.	MOVE/FP7/321565/TRANSFORUM
Project Start Date	01 February 2013
Duration	24 months

Document details	
Deliverable no.	D6.2 "Consolidated roadmaps and recommendations to reach selected EC 2011 WP goals" (this document together with three other thematic roadmaps and recommendations on joint actions)
Dissemination level	Public
Work Package	WP6 "Implementation roadmaps, concrete recommendations and a detailed strategic outlook"
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Status	Final



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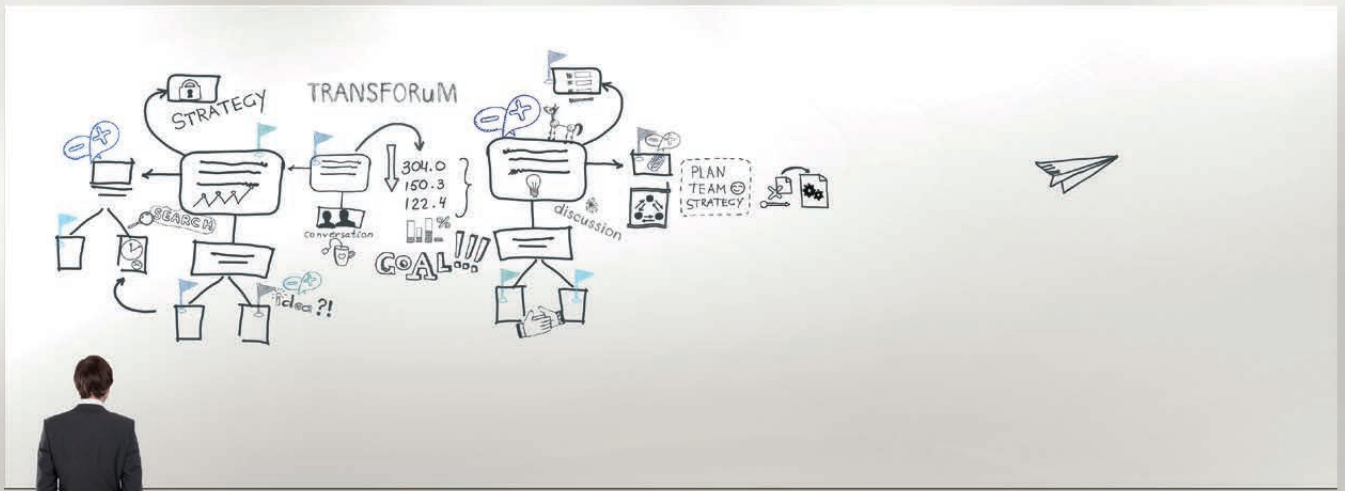
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## LIST OF ACRONYMS

EETS	European Electronic Toll Service
ERTMS	European Rail Traffic Management System
ETCS	European Train Control System
GHG	Greenhouse gas
GPS	Global Positioning System
GSM-R	Global System for Mobile Communications – Railway
ICT	Information and communication technology
ITS	Intelligent Transport Systems
MIMP	Multimodal information, management and payment
NFC	Near-field communication
PSI	Public sector information
RFID	Radio-frequency identification
RTPI	Real time passenger information
SBB	Swiss Federal Railway
STA	Smart Ticketing Alliance
SUMP	Sustainable urban mobility plan
TEN-T	Trans-European Transport Networks
UTMC	Universal Traffic Management Control
VAO	Traffic Information Austria



## 1 Information about the TRANSFORuM project

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Generally speaking, the FP7 project TRANSFORuM contributes to the transformation of the European transport system towards more competitiveness and resource efficiency. It has done so by engaging key stakeholders in carefully moderated forum activities and through other consultation measures in order to identify their views about the related challenges, barriers, trends, opportunities and win-win potentials. TRANSFORuM thus facilitated a discussion forum of relevant actors and stakeholders about the best ways to reach four key goals of the 2011 European White Paper on Transport:

- | Clean Urban Transport and CO<sub>2</sub>-free city logistics (goal 1)
- | Shift of road freight to rail and waterborne transport (goal 3)
- | Complete and maintain the European high-speed rail network (goal 4)
- | **European multimodal transport information, management and payment (MIMP) system (goal 8)**

TRANSFORuM's underlying assumption was that policy making should be based on an in-depth understanding of all stakeholders' positions and that coordinated action among them is more effective than any solo attempts. The TRANSFORuM consultation process was therefore designed to elicit these views and to facilitate the emergence of synergy ideas.

The concrete conversations with and among stakeholders were conducted through many direct interviews, 130 responses to our online survey, via various social media channels and the feedback function of our project website. Most importantly, though, TRANSFORuM organised 10 face-to-face workshops in 10 different European countries – at four of which MIMP systems were addressed (see below).

We paid careful attention to ensure a balanced representation of all types of stakeholders: Men and women, established large companies and innovative start-ups, representatives from all corners of Europe, suppliers and users, hardware and software companies etc. This selection process was based on TRANSFORuM's first official deliverable ("Shaping the TRANSFORuM Network" – available on our website), which spells out the criteria that guides our stakehold-

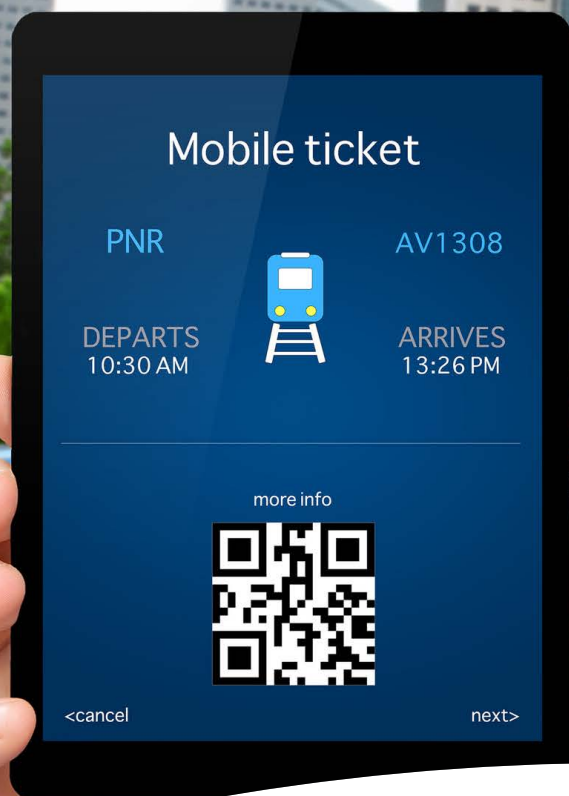


er selection. To ensure the complete transparency of this process we made the list of attendees of our events always publicly available on our website. Our participants included representatives of city administrations, transport operators and mobility service providers, businesses, representatives of passenger organisations and other NGOs and members of national and European programmes and platforms.

This roadmap is primarily based on the stakeholder debates at the following TRANSFORuM workshops (similar workshops were conducted for the other three goals):

- A two-day workshop in Gdansk, Poland, in June 2013, which provided basic identification of key policies, actors, funding mechanisms and trends with regard to MIMP, as well as an identification of barriers, challenges, and ways to overcome them;
- A two-day workshop on good practice lessons and learning processes in Reading, UK, in November 2013, including presentations about and a visit to London's integrated ticketing scheme (Oyster);
- A two-day workshop in Vienna, Austria, in January 2014 with a particular focus on cross-cutting issues between TRANSFORuM's four White Paper goals and a discussion of the preliminary roadmaps;
- A two-day workshop to discuss the draft roadmap 2.0 on MIMP in Tallinn, in May 2014. This event also included a presentation of the city's public transport system, which is free for residents and uses smart technology for ticketing.

The roadmap was carefully reviewed by two external experts ensuring a consistency and quality check and allowing for some further improvements.



## 2 The White Paper goal on Multimodal Transport Information, Management and Payment

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TRANSFORuM's Thematic Group on **MIMP deals with goal no. 8 from the European Commission's 2011 Transport White Paper:**

**By 2020, establish the framework for a European multimodal transport information, management and payment system.**

Establishing a common European multimodal transport information, management and payment system has the potential to ensure that any kind of transport is carried out in the most efficient manner, while taking into account various mode-specific features and limitations (e.g. comfort, price, speed, flexibility, reliability, etc.). Such systems should allow users to optimise their choice of transport mode(s) depending on their different selection criteria (e.g. cost minimization, speed of delivery, emissions, time schedule, and ease of use). This way it is possible to make efficient use of existing infrastructure resources and at the same time ensure cost efficiency and minimal environmental impact while meeting user needs and thus helping to achieve the overall emission reduction target.

### 2.1 The TRANSFORuM process

The White Paper goal on MIMP has a special character, as it does not define concrete targets but envisages a more vague policy framework, complicating any discussion that takes the White Paper goal as a starting point. This corresponds to the wide variety of other existing initiatives and activities (which are often uncoordinated or touch upon each other in a minimal way) as well as to the many stakeholders involved (see sections 4.2 and 8). The discussions in the field are at a stage where there is still a need to discuss conceptual issues and the potential general outline of a MIMP framework further, compared to TRANSFORuM's other thematic areas where there is generally more agreement on the challenge of the White Paper goal itself – which means that the other Thematic Groups could already focus on more concrete policy measures.

The complexity of the topic corresponds with the course of TRANSFORuM's stakeholder involvement activities. During the various workshops, it proved more difficult than in the other groups to find a common starting point for the discussion and agree on an understanding of the White Paper goal and the respec-

tive policy challenge. Significant efforts and time were required to create such a common understanding or at least a common ground for further debates about how to actually achieve the goal. Therefore, less time – compared to TRANSFORuM's other Thematic Groups – was left to discuss these concrete steps of “who should be doing what by when?” in order to move towards the goal. However, it was the general spirit of the TRANSFORuM project that the discussion process should be stakeholder-driven wherever possible, with the project team mainly being there to assist and guide the process, moderate the workshops and distil the stakeholder views into the present roadmaps. It was therefore deliberate that the project team did not face the difficulties of the topic by just sketching its own vision of concrete steps towards the MIMP goal. This would have been against the TRANSFORuM spirit and was not the mission of the project.

Looking at what is presented here as the roadmap towards the MIMP goal, one may see that there are still many open ended issues left in the text where TRANSFORuM and its involved stakeholders have raised important questions about the future of MIMP. Challenges have been identified on a broad basis, but for many of them it proved very difficult to achieve a consensus and propose a concrete way forward. In respecting the difficulties experienced during the TRANSFORuM stakeholder involvement activities outlined above, this broad ‘catalogue’ of challenges and open issues may well be seen as an achievement in itself, delivering a useful contribution to the discussions – even if more concrete steps towards overcoming these challenges could only be identified in illustrative ways. As a kind of ‘state-of-the-art’ report of current stakeholder perceptions and views in the field, the present roadmap should be read in this sense, always keeping the special character of the MIMP theme in mind.





### 3 Understanding the White Paper goal

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TRANSFORuM understands the term ‘framework’ in the wording of the White Paper goal in the sense that it only provides necessary preconditions for MIMP systems to be implemented on a national and, ultimately, a European scale. The framework considers general conditions and includes actors who need to be involved, but does not in itself encompass the actual corresponding technical systems. Instead, it must ensure a common legal and technical basis to lower the access barriers for passengers and at the same time guarantee efficient and fair participation in the market for the different operators and service providers involved. In reality we may be looking at a framework made up of different parts, one for information, one for management and one for payment and ticketing. This would allow it to take into account the different requirements posed by, the different levels of implementation already in place, and the different challenges involved, in each of them. It would be one of the important tasks of the overall framework to ensure that the respective parts do not conflict, but in fact complement, each other and support integration and harmonisation where it is needed and beneficial.

The whole White Paper carries a principle that is generally in favour of a modal shift towards public

transport and other more environmentally-friendly modes of transport. Yet, the MIMP goal is an exception in that its wording does not relate to a physical transport policy goal or concrete targets – instead it points to a neutral fact on the future existence of a framework. Therefore the MIMP goal is not an end, but rather a means to support reaching other White Paper goals. At the moment, no clear vision of what a European MIMP system should look like exists and it is still a matter for interpretation and discussion. By outlining different policy options and possible steps (see section 5) towards a European MIMP system and at the same time refraining from assuming completion, TRANSFORuM tries to do justice to these ongoing discussions. While section 4 also highlights many of the issues under discussion, section 8 presents another reflection on TRANSFORuM’s relationship to the ongoing process towards a more comprehensive vision.

#### 3.1 Political motivation behind the goal

As discussed in the White Paper, mobility and transport are considered vital to the future economy and society, while fossil fuels will become scarcer and the

EU wants to reduce at least 60 % of greenhouse gas (GHG) emissions caused by the transport sector by 2050 on 190 levels. At the same time, demand for transport is expected to grow and curbing mobility is not considered an option, although factors including more telecommunication and home offices may have a dampening effect in the future. New transport patterns must emerge which can carry larger volumes of freight and greater numbers of travellers to their destination by the most efficient (combination of) modes. Individual transport should preferably be kept for the final miles of the journey and performed with so-called clean vehicles. Information technology must ensure simple and reliable transfers between modes. Improved traffic management and information streams can help make the use of transport and infrastructure more efficient.

Better modal choices will come from a better integration of the entire network: airports, ports, railway, metro and bus stations should increasingly be linked and transformed into multimodal connection platforms for passengers. Online information and electronic booking and payment systems integrating all means of transport should facilitate multimodal travel.

The availability of information about travel time and routing alternatives is considered equally relevant to ensure seamless door-to-door mobility, both for passengers and for freight. In order to promote public transport and increase its attractiveness, factors such as accessibility and reliability of services will become more and more important as well as frequency, comfort and intermodal integration.

Innovation and deployment need to be stimulated and supported by regulatory framework conditions through providing appropriate governance and financing instruments. Protection of privacy and personal data will have to be developed in parallel with the wider use of information technology tools. Standardisation and interoperability requirements can help to avoid technological fragmentation.

Smart intermodal ticketing with common EU standards that respect EU competition rules is vital. This relates not only to passenger transport but also freight, where better electronic route planning across modes, an adapted legal environment (intermodal freight documentation, insurance, liability) and real

time delivery information for smaller consignments is also needed. Information and communication technology (ICT) also has the potential to satisfy certain accessibility needs without needing to satisfy additional mobility needs.

While the overall motivation to use MIMP systems to improve the efficiency of the transport system is clear, no statement is being made on the expected impact and where an emphasis should be placed. Part of the development of the framework will be to clarify these points.

### 3.2 Stakeholder perceptions of the goal

The stakeholders at TRANSFORuM's first Joint Forum Meeting in Gdansk, Poland, agreed that the White Paper goal centres on a European-wide integration of multimodal traveller information systems. They noticed that the problem of data access for these systems is not sufficiently highlighted in the debate about a European framework. There is a significant demand for an open data access strategy. Today even within individual Member States most metropolitan regions have proprietary systems. Harmonisation and cross-regional coordination among these systems is crucial. It was stated that transport operators often resist a harmonised approach for reasons of data ownership. Additional emphasis was put on data and cyber security at national levels. Stakeholders signalled significant demand for a European "code of conduct" regarding the organisation of open data access. At the same time data ownership of the private sector must be respected and data provision can only be on a voluntary basis.

Results of a survey conducted alongside the first thematic workshop in Reading, UK, show that not all experts and stakeholders in the field of MIMP are aware of the White Paper goal. It is also perceived as being only partially relevant to their daily work. Still, there was some confidence that the goal is achievable, although most participants believe the goal is challenging and therefore only partially achievable.

The survey feedback clearly underlines that the challenge of delivering against the MIMP goal is only partly technical. The main challenge actually relates to the necessary involvement of a multitude of actors



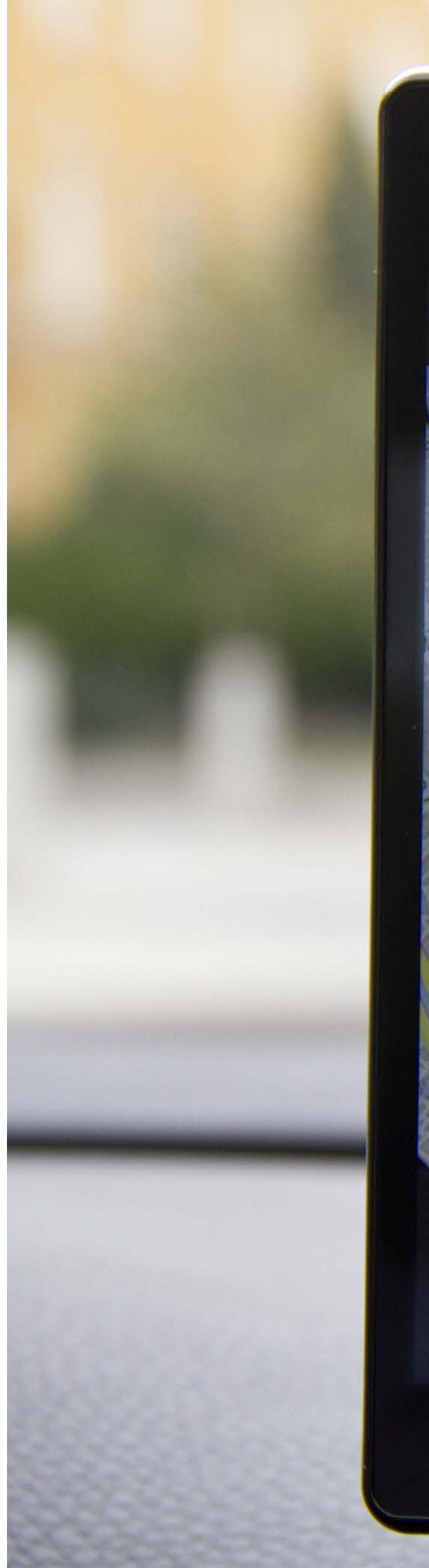
– manufacturers, service providers, users, authorities etc. – that need to find common standards or acceptable regulations and have to align their diverging interests. To achieve seamless travel, it is important that all these actors in the transport chain work together efficiently, with effective coordination between public and private partners. ‘Spreading the word’ about good practices and potential developments is also important and market stimulation e. g. via social media could also be useful. Stakeholders also underlined that a MIMP system is a very efficient way to improve the overall efficiency of the transport system, being much less costly than building new physical infrastructures, for example.

It was unclear for stakeholders whether the developed MIMP system should be operated by public or private actors. Despite several arguments for and against, stakeholders agreed that EU policy should define minimum service standards, i.e. data requirements etc., which have to be provided by operators in the transport system and made available for use and processing in MIMP systems.

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At the second thematic workshop in Tallinn, Estonia, participants were asked separately about their attitudes towards the different topics of information, management and payment. It became evident that a multimodal information system is more desirable than multimodal management and payment systems. The same applies to the achievability of the goal for the three topics. There is no clear preference as to whether the systems should be fully integrated or rather be a combination of separate regional and national systems, communicating via defined interfaces and protocols. Participants were, however, more optimistic that full integration could be at least be feasible.

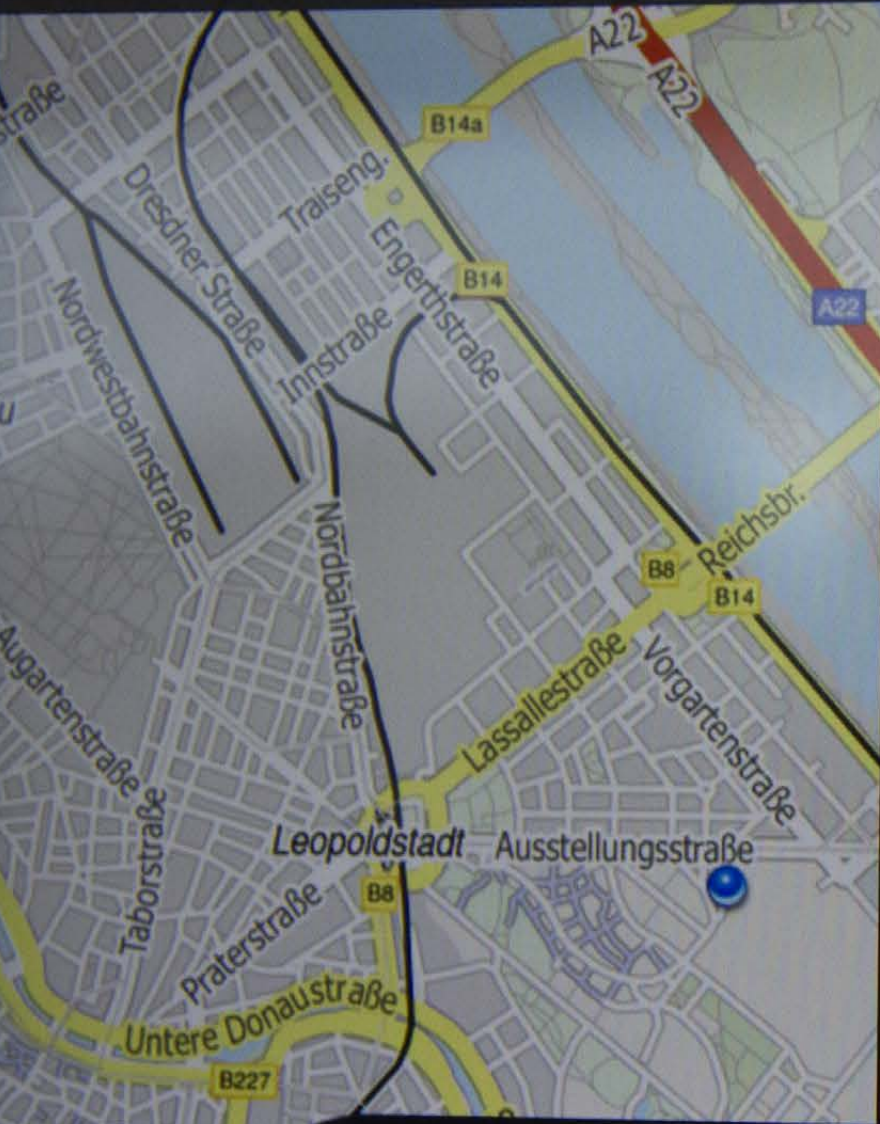
In addition to the stakeholders who participated in TRANSFORuM’s workshops, another survey was distributed more widely online. The results are not representative, mainly due to the self-selection of participants. However, in this survey the vast majority agreed that the availability of comprehensive MIMP systems would be beneficial for the use of public transportation and that the main barriers are institutional and not technical. It was less clear who should provide the necessary data and implement the system, and if there is actually political progress towards providing the legal basis. Less than a third of the respondents agreed that policies towards MIMP have a high priority in their respective regions and countries.





97% 9:51

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## 4 Background, trends and barriers

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### 4.1 Brief mapping of the field

In order to make the whole transport system greener, more sustainable and more efficient, the provision of seamless multimodal door-to-door mobility is crucial. A MIMP system will play an important role to support several other targets in the White Paper. On closer examination, this system actually consists of three different systems – information, management and ticketing and payment – where each adds an additional layer of complexity. The ‘information’ part is more integrated than the other elements like payment or ticketing. If an integrated system includes ticketing and payment functions, higher demands must be met, especially with regard to privacy, liability and security. To ensure efficient management, reliable real time information is one of the basic prerequisites. A lot of different players from different modes with different (commercial) interests and business models are involved. Each system on its own can contribute to the overall efficiency of the transport system, but they must be seen in combination in order to get the optimal benefits. For example, better information on availability increases the likelihood that a transport option will be used. On the other hand, even the best information will not be sufficient if booking options

are unclear or not easily accessible (e.g. due to the need to change between different portals). How far this integration must go is of course a matter of debate and eventually it must be a trade-off between costs and benefits. So ultimately, it is not necessarily one single MIMP system but rather a combination of systems that are linked to each other that will offer the necessary services and support multimodal transport.

Currently numerous individual solutions exist at local, regional or national levels. It is a very dynamic field, but systems usually only cover certain geographic areas and data availability is often limited due to proprietary solutions by established operators. The limitations of existing legislation would need to be overcome, with clear terms and conditions for the use and re-use of data. Legislative measures at the EU level may support data sharing, and thus encourage industry to devise different solutions. A step-by-step approach and process is necessary, as the field can develop in different directions with different advantages and disadvantages. The potential benefits, in both monetary and non-monetary terms, of having integrated transport has been shown in different studies (see Preston, 2012 for example). However, the key challenges towards achieving a more integrated



European system, are not primarily of a technical nature but rather relate to 'soft' areas like having a clear vision of the future of the European transport system, and the willingness of all actors to cooperate in a competitive market and agree on a level-of-service quality which is necessary to ensure efficient and seamless mobility. This requires the commitment of all relevant actors and stakeholders as well as funding to support the initial decision-making process.

Still, it must not be forgotten that MIMP services are only one element of a strategy towards more sustainable mobility. While a wide range of individual and group-dependent benefits are expected for customers (travellers), operators and other actors involved, the actual contribution of such MIMP services to e.g. modal shift and better environmental performance of the transport sector (Puhe, Edelmann, & Reichenbach, 2014) is uncertain. However, first assessments are already available, e.g. a study within the city of Lyon investigated the different costs of several measures to reduce CO<sub>2</sub> emissions. They found out that for Lyon the cost of measures for multimodal information has a cost ratio of €10 per tonne CO<sub>2</sub> saved (European Commission, 2014k). Moreover, several projects, such as AMITRAN (2014), and studies, including Sloman et al. (2010), have already investigated certain parts of these issues.

As reflected on by the other thematic roadmaps of the TRANSFORuM project and the "Recommendations on Joint Actions across Actor Groups", real progress towards the overall aim of the White Paper requires harmonised efforts that also include improvements of the physical infrastructure, for example.

## 4.2 Existing policies and strategies

To help reach the White Paper goal on MIMP a number of European policy initiatives, measures and funding mechanisms already exist:

### ■ Intelligent Transport Systems (ITS) Directive and ITS Action Plan

In 2008 the ITS Action Plan was adopted to accelerate deployment and use of ITS in road transport (as well as interfaces to other modes) which provided targeted measures (including the proposal for the ITS Directive). The ITS Directive (Directive 2010/40/

EU) was adopted in 2010 to support and speed up the deployment of innovative transport technologies and coordinate implementation of interoperable and seamless ITS schemes across Europe, while giving the Member States the opportunity to decide which systems to invest in. Therefore the EC has to adopt specifications (i.e. functional, technical, organisational or service provisions) within seven years, with travel information, the eCall emergency system and information services for secure truck parking as first priorities. The most relevant priority actions for a MIMP system are (a) the provision of EU-wide multimodal travel information services; (b) the provision of EU-wide real time traffic information services; and (c) data and procedures for the provision, where possible, of road safety related minimum universal traffic information free of charge to users. In 2011 (DG MOVE, 2011), a study ("Towards a European Multimodal Journey Planner") within the policy framework of the ITS Action Plan was carried out to help the European Commission's work towards a European multimodal journey planner (European Commission, 2014h).

### ■ Public Sector Information (PSI) Directive

The Directive 2003/98/EC (PSI Directive) provides a common legal legislative framework on the re-use of public sector information that encourages EU Member States to make as much public sector information available for re-use as possible. The Directive was adopted on the 17th November 2003 and entered into force at the end of December 2003. In May 2008 the Directive was fully implemented in all 27 Member States. (European Commission, 2014b). A revision of the PSI Directive was adopted in 2013 which introduces a genuine right to re-use all content that can be accessed under national access to documents laws, among other things (limits the charges applied to marginal costs, extends the application area of the Directive to certain cultural institutions (libraries, museums, archives) etc.). Member States have two years to transpose the provisions into national law (European Commission, 2014e).

### ■ INSPIRE

The INSPIRE Directive (2007/2/EC) came into force in May 2007 and deals with, amongst other topics, the collection and publication of geographical

information on the transport network by public authorities. It will be implemented in several stages, and the full implementation needs to be finished by 2019. The goal is to develop a European Union spatial data infrastructure which will help in cross-border policymaking, encourage sharing of environmental spatial information between public sector organisations and support public access to spatial information across Europe (European Commission, 2014g).

- **New Trans-European Transport Networks (TEN-T) Guidelines (Regulation (EU) No 1315/2013)**

The new TEN-T development guidelines were adopted at the end of 2013. Within the transport infrastructure requirements it is defined that freight terminals, logistics platforms, inland and maritime ports and airports handling cargo shall be able to provide information (e. g. real time information on available capacity, traffic flows and positioning, tracking and tracing) within the infrastructure and between the modes to guarantee security as well as safety for multimodal journeys (European Commission, 2014f).

- **Roaming (Connected Continent Legislative Package)**

In 2007, EU roaming rules addressed roaming prices. The “Eurotarif” set maximum prices for phone calls (made and received), texts and downloading data while abroad, which apply to all consumers (unless they opt for special packages). These rules are periodically reviewed and reformed, with further reductions in maximum permissible prices and automatic protections against excessive roaming charges (European Commission, 2014c). In April 2014 the European Parliament voted to end roaming charges by the end of 2015, which supports the regulation “Connected Continent” proposed by the EC in September 2013 that aims to achieve a single telecoms market by eliminating roaming charges, guaranteeing an open internet for all, enhancing transparency for customers in their contracts, and easing the switch of providers (European Commission, 2014a; 2014d).

- **Privacy and security (General Data Protection Regulation and the Data Protection Directive)**

In March 2014, the European Parliament voted in favour of the EC’s data protection reform proposals

in both the General Data Protection Regulation and the Data Protection Directive. The reform should help restore trust by strengthening citizens’ rights, putting people back in control over their personal data, creating more confidence about how personal data is treated (particularly online), ensuring privacy-friendly default settings and establishing a right to be forgotten, but also provide facilities for businesses to operate and innovate in the EU’s Single Market (European Commission, 2014i).

- **Action Plan Urban Mobility 2009**

In September 2009 the Action Plan on urban mobility was adopted by the EC, which proposes 20 measures that should support local, regional and national authorities in reaching their sustainable urban mobility goals. Action 6 deals with “Improving travel information”, in particular the provision of travel information via different media, support of the development of national and regional multimodal journey planners, and establishment of links between the existing ones. The overall aim is to provide a public portal for public transport information at the EU level with a focus on the main nodes of the TEN-T network and their local and regional connections (European Commission, 2012).

- **Sustainable Urban Mobility Plans (SUMPs)**

SUMPs are planning tools which define a set of interrelated measures, addressing all modes of transport in the urban area to meet the mobility needs of people and businesses today and in the future. The purpose is to create a sustainable urban transport system by ensuring accessibility for all to the transport system, improving safety and security, reducing noise, pollution, GHG emissions etc., enhancing efficiency and cost-effectiveness of the transportation of people and goods, improving attractiveness and quality of the urban environment. Examples of SUMPs exist in Brussels, London, Munich, Paris, amongst other locations (Sustainable Urban Mobility Plans, 2014).

- **European Electronic Toll Service (EETS)**

Directive 2004/52/EC (interoperability of electronic road toll systems) and Decision 2009/750/EC (definition of the European Electronic Toll Service and its technical elements) aim to achieve interoperability of all European electronic road toll systems and state that a European Electronic Toll Service

shall be set up. It shall allow any road user to pay the toll incurred on any European Union infrastructure with a single contract and on-board equipment (European Commission, 2011).

#### ■ **European Rail Traffic Management System (ERTMS)**

ERTMS aims at providing a common rail standard across borders in Europe and consists of two basic components European Train Control System (ETCS) and Global System for Mobile Communications – Railway (GSM-R). The modified ETCS specifications from 2008 ensure that all trains equipped with ETCS can run on ETCS-equipped lines. To guarantee progressive deployment of ERTMS for the most relevant European rail lines, the European Deployment Plan for ERTMS was adopted in 2009 (European Commission, 2014j).

#### ■ **EasyWay Deployment Guidelines**

These guidelines were developed as part of the EasyWay project by EasyWay experts and practitioners, peer-reviewed by international domain experts and validated by the participating Member States partners of EasyWay. They are not legally binding, but since a certain level of strictness in compliance is required to reach the target of the EasyWay Deployment Guidelines – which is harmonisation and interoperability of ITS deployment in Europe – criteria were defined that have to be fulfilled in order to comply with the guideline. The deployment guidelines cover the areas of Traveller Information Services, Traffic Management Services, Freight and Logistic Services, while the supporting guidelines deal with Operating Environments, Variable Message Signs harmonisation and Data Exchanges – DATEX II (EasyWay, 2014).

#### ■ **Smart Ticketing Alliance (STA)**

The STA was officially launched in June 2014. The founding members are ITSO Ltd., VDV-KA-KG, CNA, AFIMB and UITP. It aims to establish global ticketing interoperability for the public transport sector. The major goals are to foster cooperation between national and regional Smart Ticketing schemes, to establish interoperable Smart Ticketing, trust schemes, specifications and certification, and to develop, agree and publish the requirements (functional and technical) for smart ticketing interoperability and to promote interoperability in

Smart Ticketing by cooperation with other European and international institutions (Smart Ticketing Alliance, 2014).

#### ■ **Commission Staff Working Document Towards a roadmap for delivering EU-wide multimodal travel information, planning and ticketing services**

The Commission staff working document (SWD (2014) 194 final) deals with EU-wide multimodal travel information, planning and ticketing services. After illustrating the key issues in the introduction, the policy context and an overview of the fragmented landscape are provided, followed by challenges and barriers to overcome as well as the way forward, which includes an indicative timeline. Currently, the Commission services are working on an impact assessment (European Commission, 2014k).

Each of these existing policy initiatives, measures and funding mechanisms will have a role in, or are relevant to, the development and implementation of a MIMP framework, therefore it is important to bear them in mind when developing a roadmap.

### 4.3 Relevant trends

There are a lot of different trends which may have an impact on future developments in this area, where the interpretations sometimes depend on points of view and interests. Some further developments may be highly relevant in the future although their possible impacts cannot yet be fully grasped at the moment (e. g. social media). Nevertheless these must be considered and observed carefully in the future. We can expect that the passengers will be increasingly better connected, not only to the transport operators, but also to each other. This will increase the demand for more, and more accurate, information and services as well as passenger feedback platforms. It will be up to the operators to provide these services in order to address their customers' needs or otherwise risk losing them to more agile market players who can make best use of available communications channels.

Regarding **economic development**, within regions, large urban areas will continue to attract people from rural areas, making it more and more difficult to keep feasible public transport services in these rural areas.

Here creative solutions are necessary in order ensure a minimum service level while at the same time keeping costs low. In general, access to ICT infrastructure will strongly depend on income and location (Eurostat, 2013). **Education** will remain an important factor for increasing the awareness of the impacts individual modal choice have and the services provided by multimodal traveller information systems. In recent years, it has become apparent that although younger people still obtain driving licenses, **car ownership** among this group is decreasing, especially in urban areas (Economist, 2012). Moreover, car-sharing is also emerging as an alternative means of mobility, over car ownership in Europe. **Environmental awareness** is also increasing across Europe. Care should be taken to ensure that transport services also cater for the mobility requirements of people with special needs and services must ensure that multimodal transport is accessible to them.

There is also a shift away from the perception of cars as status symbols, towards other technological consumables, such as the smartphone. Indeed, **mobile computing**, in the form of tablets and smartphones will continue to have a large impact on how users access MIMP systems (MobileNewsBlog, 2013). In the past, services related to information on public transport have been provided by transport operators in a very top-down fashion. Social media, computers, smartphones, etc. have increasingly led to bottom-up approaches, filling gaps left by the transport operators, which puts on an enormous pressure on operators to provide better service quality. The **willingness to pay** for information only exists if a service provides notable additional value to the users, since a lot of free services are available. In this area, new inventions like for example, smartwatches or Google Glass (Google, 2013) could have a significant impact, but could also bring up discussions about data protection and privacy issues for the user and the people around. The question of possible surveillance is one that is being asked more frequently than in the past and any MIMP systems must stand up to public scrutiny and ensure that **privacy and security issues** can be addressed satisfactorily. If this is not the case, then this might be an issue where, in the long run, public acceptance could be lower than expected and thus a European MIMP system may have very little impact on modal choice. Closely connected to security and privacy concerns is the general acceptance of IT solutions.

All these trends must be seen as opportunities to which one has to react rather than as threats. It should also be seen as an encouragement for further cooperation both within one mode (e. g. different train operators) as well as between modes to offer the best services for their customers and make multimodal transport more attractive.

#### 4.4 Key barriers and fields of conflicts

In course of the TRANSFORuM project and other activities (e. g. public consultations<sup>1</sup>) several challenges and barriers for a MIMP system were identified. In the present section some of these challenges are discussed. The section is not exhaustive; instead its main purpose is to serve as a basis and offer background information, allowing the discussion of potential steps towards the White Paper goal in the following sections.

To start with a MIMP framework represents a **legal** challenge. Existing legal obligations, requirements and restrictions vary between the European and the national policy level and across Member States, and they may sometimes contradict each other. It is therefore no easy job to bring these legal preconditions into accordance and prepare them for the introduction of a coherent European framework. Supposed obligations to open data sharing (in order to enable smart services) could interfere with requirements of data protection and control, considering the varying perspectives on the relative importance of an individual's privacy against other public interests. Furthermore, usually internal systems are not designed for publishing data and there is a need for support, implementation guidelines, frameworks and standards. While section 4.2 presents a number of policies and initiatives that are designed to contribute to a MIMP framework, these will be only a part of the required full sample of legal acts. Many legal issues are still being discussed and there are no consensual solutions for the existing problems on a European level at the current time.

With respect to **data availability**, the biggest challenge is to make transport data complete with regard

1 [http://ec.europa.eu/transport/themes/its/road/action\\_plan/its\\_for\\_urban\\_areas\\_en.htm](http://ec.europa.eu/transport/themes/its/road/action_plan/its_for_urban_areas_en.htm)

to geographical coverage, real time, transport modes etc., and ensure high quality, reliability and validity as well as traceability and transparency. Apart from supporting the collection of missing data by the use of funding instruments, legislation and cooperation should lead the way. Social media to get users' feedback and collecting missing data through social networks and crowd sourcing will be increasingly relevant in the future.

**Access to travel data**, especially real time and fare data is another challenge. Further promotion of the PSI Directive as well as further legislative measures or other binding instruments will help to assure the sharing of travel data. It must be ensured that such measures do not harm commercial interests while keeping the public interest in mind, therefore viable, self-standing and sustainable business models to deliver are needed. Furthermore, principles of fairness and non-discrimination have to be applied, while clarifying liability and ensuring data protection.

The **lack of interoperable data formats, protocols and interfaces** requires the development or definition of data formats and standards, which should ideally be 'light' standards and usable to ensure flexibility and the promotion of interoperability. Coordinated European efforts, cross-border cooperation and agreements are needed to solve organisational and administrative challenges. Data exchange is a very crucial topic for a MIMP system. In order to support data exchange, a number of standards (within CEN, ETSI and ISO (e. g. DATEX, TRANSMODEL, SIRI, NETEX etc.)) and Directives (PSI, ITS, INSPIRE) exist at the moment and/or will be further developed in the future. It is necessary to also consider including information about new services like car-sharing/pooling or free bike services into multimodal information services to provide complete solutions. On the one hand, confidential information should not be made available to competitors, on the other hand, in a truly integrated system, booking and payment must be possible on one platform for different modes of transport and transport operators. Here the concept of a trusted third party could play an important role, where such an entity carries out the transactions between the different operators in a way that is fair, transparent and impartial while at the same time ensuring that no sensitive information is exchanged. Such a development could greatly ease the cooperation between different partners in the transport system and could present a

level playing field for everyone involved. At the same time this could also lead to entry barriers depending on how open a trusted third party is to new operators and service providers. Establishing better interfaces between transport modes would not only improve the organisation of transport and mobility solutions, but help to create robust business models for supplying information and services.

In terms of **integrated tickets**, fare data is the most difficult to obtain, i.e. to get the price of a multimodal cross-border trip, particularly if reductions and 'last minute' price adjustments are involved. From the users' perspective a user-friendly system would make multimodal travel more attractive, and it might be a key towards modal shift and enhancing accessibility of public transport.

**Trust** between the different actors and of users (e. g. passengers) is another challenge. This challenge relates to the need for financial transactions when buying tickets, but also to payments between operators (related to services like data provision). Beyond the required trust to allow all necessary transactions, some operators and competitors may not be willing to share data and information in the first place because data ownership can also mean a competitive advantage that could require protection. As experience from local contexts shows, the required collaborative actor settings are sensitive and would be even more complicated on a European scale.





## 5 Steps towards a MIMP system

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In order to reach the White Paper goal, we actually have to deal with three different systems (information, management and payment). These systems are closely related by the data they use, the infrastructure and communication channels. At the same time, they are very different with regards to timeliness, security, trust, liability, and so forth. Different actors are involved to differing degrees as well. What binds them together is that they all rely on information, either as a user or as a provider – and very often as both. We already see some problems involved – privacy and security. The closer it gets to a real time system, the more this becomes an issue. At the lowest level, we have static timetable information. Building a pre-trip booking and payment system on top of that can be considered standard nowadays in most parts of Europe. That this information is used for operational management is obvious and necessary. As long as this is all done by one operator this is very straightforward and does not raise many questions. Even if we remain only on the level of timetable information, it becomes more complex if we add dynamic information and information from different operators. Add to this a booking and payment system and we have already reached a level which works fairly well if we have one operator, ideally operating on his home network. But as soon as there is a change between modes or networks (especially

cross-border), or long-distance and local transport are combined, and so forth, the limits of what is currently the state of the art will soon be reached. With each layer, the complexity increases and for setting up an integrated system this complexity is usually more institutional than technical. That clearly shows that there is also a need for evaluation of measures in order to justify expenses, show benefits, assess the (cost-)effectiveness of existing systems and establish the basis for future development and implementation as well as a common/better understanding and acceptance.

It is not yet clear how and to what extent the three systems will ultimately be integrated. In the next sections the three topics of information, management and payment will, as a first step, be treated separately, trying to capture the status quo and suggest possible ways forward. The last section relates to the potential of integrating the three systems.

All three topics have already been addressed in previous work of the TRANSFORuM, particularly relating to case study examples and good practice lessons that can be learned from them. These results can be found in the **project Deliverables 5.1 and 5.2.**<sup>2</sup>

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<sup>2</sup> Deliverables 5.1 and 5.2 are available at [www.transforum-project.eu/resources/library.html](http://www.transforum-project.eu/resources/library.html)

## Good practice examples

Throughout the following sections, examples from TRANSFORuM's previous work on good practice in the context of the White Paper (Deliverables 5.1. and 5.2) will demonstrate identified factors of success. These examples will be presented in small blue boxes.

### 5.1 Topic A: Multimodal information system

Multimodal information is currently the most developed of the three topics in Europe. Current Directives (e. g. PSI, ITS, INSPIRE) already address how and what data must be made available. Nevertheless, there is still a long way to go before reaching a truly European multimodal information system. Information to be made available covers timetables from public transport, information on traffic status, road congestion, etc. Here it is clear that the public and private sector have different statuses, as it can only be mandatory for public organisations to make data available to the general public.

Some data exchange formats have already been well defined (e. g. Datex II, Transmodel) and a large number of local and regional solutions exists that bring together not only information on public transport but also from other sources (e. g. parking, car-sharing, etc.). These allow both route planning based on different criteria and even provide real time information. The downside is that, at the moment, there is no mandatory quality control. Providers depend on the goodwill of operators and usually booking options are limited, if they exist at all. A large number of projects on the national and EU levels have already been carried out, showing the technical feasibility of such information systems, some local but some also cross-border.

At the moment there is a lack of a convincing business models. On the one hand, it is in the public interest to support a shift to public transport and help ensure that the current infrastructure is used in the most efficient manner, on the other hand, commercial operators are interested in promoting their own products but, justifiably, have limited interest in

selling others, as long as they do not see a benefit for themselves. Here again we can see a different role for the public and private sector and it could be that the former must take the first steps. It is important to note that a functioning information system is a basic requirement for the other systems (management and payment).

If a truly European information system is to be achieved then it must take into account all systems already in place and provide interfaces to help connect them. In addition, it must be ensured that all those participating in such a system will not have a competitive disadvantage. In the long run, such a system should be advantageous to all actors involved and the general public as well, and a detailed assessment should be carried out to evaluate this.

#### Possible steps to be taken in order to reach this sub-goal:

- Decide on a clear vision of what a European multimodal information system should look like, what information it should provide and which players it should include, including a consideration of the expected benefits of such a system.
- Decide if this should be a single system or consist of a combination of (compatible) systems. If it should be a combination of systems, the EU should define the relevant interfaces and establish the necessary standards. Define a (minimum) level of service on how information is to be made available and to whom.
- Ensure that such a system is open and flexible enough to include new actors relevant for multimodal transport. New actors may also come from outside the transport sector, requiring that standards and regulations come in the character of strong recommendations which are not overly strict, so that innovation is still possible.
- Differentiate between public and private sectors – the public sector (in collaboration with the private sector) should take the lead in standardisation efforts while encouraging the private sector to take them up.

- Ensure that public raw data is available for free, while products and applications using the data may in certain cases have a price.
- Ensure quality control of data (which cannot be done by the EU itself).
- Support use of real time data.
- Provide incentives (e. g. research funding, challenges, etc.) to use available data in an innovative way to help provide new services.
- The framework must include a legal and technical basis to ensure compatibility but also a social consensus on what a multimodal information system is supposed to provide and achieve.
- The role of the EU in creating the framework should be to work on a partnership basis and work towards building consensus and/or common commitment among all involved parties, particularly addressing existing barriers and conflicts.

### Good practice: Co-Cities, real time traffic information in Budapest, Rejseplanen

**Co-Cities** was a 3-year European project, which aimed to develop a 'dynamic feedback loop' to foster a collaborative relationship between mobile transport users and the traffic information services. Co-cities did not re-invent the wheel but built on the success of and learned from a previous project. The full interoperability of the platform which is now technologically mature was showcased at the ITS World Congress in Vienna. See [www.co-cities.eu](http://www.co-cities.eu)

Since 2010, a series of developments have been made to integrate **real time traffic information in Budapest**, with the aim of reducing congestion across the city. A real time information system has been put in place, with cameras installed across the city, at motorway entry points and other identified traffic bottlenecks – including the bridges over the Danube.

**Rejseplanen** is the biggest public transport journey planning service in Denmark, offering door-to-door journey planning and also selling tickets. It delivers 10 million online travel plans each month making it the largest public internet service in the country. The prime objective of the service is to provide travellers with complete up-to-date travel information across all public transport modes and walking and cycling. The site is owned and operated by Rejseplanen A/S, but relies on a close working relationship with DSB, the Danish bus and train operator to function. Even though Denmark represents only a relatively small transport market with few operators involved, the selected approach demonstrates what good journey planning can look like for users. See [www.rejseplanen.dk](http://www.rejseplanen.dk)

### Traffic Information Austria (VAO)

**Traffic Information Austria** provides a collaborative, high-quality information service Austria-wide covering all traffic developments (cyclists, pedestrians, public transport, private motor vehicles, Park & Ride). By highlighting alternatives, the options available to switch to more environmentally-friendly transport become attractive and greater awareness is ensured. VAO can be made available directly, but it can also be used as basis for the project partners' traffic information services. This leads to improved data quality and more comprehensive information. The administration benefits as well by having new options in active traffic control and management and in the provision of up-to-the-minute information relating to ongoing traffic developments.

See <http://www.verkehrsauskunft.at/>



Measure	Responsibility/ key actors (*: coordinating/ triggering role)	Expected level of stakeholder/ public acceptance	Barriers	Timeline
<b>Create common understanding/vision of what is to be achieved and expected impact</b>	European policy*, National policy* stakeholders	Medium	Contradictory visions and interests, different levels of development across Europe	Short-term
<b>Define minimum level of service</b>	European policy*, stakeholders	Medium	Ensuring compliance	Short-term
<b>Define roles of public and private sector</b>	European policy*, national policy	Medium	Structural inertia of actors, contradictory visions and interests	Short-term
<b>Regulate access to public data</b>	European policy, national policy, stakeholders	Medium	Contradictory interests, data privacy and security	Short- to mid-term
<b>Ensure quality control</b>	European policy, national policy	Medium	Limited funds, ensuring compliance	Short- to mid-term
<b>Define data format/data exchange standards</b>	European policy*, stakeholders	High	Contradictory visions and interests, danger of technological lock-in	Short- to Mid-term
<b>Examine funding needs</b>	European policy	High	Limited funds, contradictory interests	Short- to Mid-term
<b>Support availability of real time data</b>	European policy*, national policy*, stakeholders	High	Contradictory interests, privacy and security issues	Short- to Mid-term
<b>Encourage private initiatives to use available data</b>	National policy	High	-	Short-term
<b>Support knowledge exchange</b>	European policy*, national policy, stakeholders	High	Use of exchanged knowledge	Short-term
<b>Evaluate effectiveness of measures</b>	European policy*, national policy, stakeholders	Medium	Unambiguous definition of goal, limited funding, availability of necessary data, impartial interpretation of results	Short-term

Table 1: Proposed measures for reaching a multimodal information system<sup>3</sup>

<sup>3</sup> The explanation of time scales used in the tables is as follows: short- to mid-term: can/should be implemented by 2020

## 5.2 Topic B: Multimodal management system

A multimodal management system should help make best use of the available transport resources, avoid or reduce congestion and react to different kinds of disruptions. This is furthest developed in urban areas, where there is a direct interest to manage different modes of public transport in an efficient manner, especially if only one actor is involved.

Universal Traffic Management Control (UTMC), open standards and specifications for data exchange, already exist and can support development in the future. Like all systems discussed here, multimodal management systems have to rely on information provided. Here it is even more important to have reliable real time data in order to react quickly and efficiently. Systems like real time passenger information (RTPI) are now becoming the norm rather than the exception. Management can take many forms, ranging from demand to access management and also include parking management. The overall goal is to make transport as efficient as possible, which will help in promoting the use of more sustainable modes. This needs to be done by providing reliable information, showing availability of different transport options, and reacting to changing demand in a timely manner. Compared to the first system, fewer actors are involved and these include data providers, content providers, service operators, and traffic control centres.

### Possible steps to be taken in order to reach this sub-goal:

- Define to what extent the information needs are different to those covered in topic A.
- Management system is both provider and user of information, so it must be designed to fulfil both functions.
- Management system operates on all geographic levels and data exchange between regions and countries is crucial to ensure seamless medium- and long-distance transport. Therefore, for cross-border transport, interfaces must be defined in order to provide relevant information to all users.

- Be aware that there may be no business case, unless it helps to increase efficiency of a particular network – but intermodal management systems are of high public value and the EU should support further development and implementation of these over the coming years.
- Real time intermodal management may be even more difficult and may only be viable in larger urban agglomerations where they can provide added value.
- A perspective on specific corridors (i.e. a core network connecting the EU Member States and regions) may be helpful as these are cases where multimodal management has a larger potential impact. These may also benefit from existing protocols between transport management institutions.
- Be aware that multimodal management may not be the most useful instrument to make the transport system more efficient (e.g. by encouraging modal shift). Instead, this can only happen if other improvements like better public transport infrastructure or the introduction of fair pricing across transport modes take place in parallel.

### Good practice: ID Tickets in Tallinn

The Estonian city of Tallinn implemented a payment system (**ID tickets**) whereby electronic tickets for both public transport and certain local attractions were carried on a personal ID card. The tickets were obtained through mobile devices and on a specific website. In January 2013, the Tallinn City Administration took the unprecedented step and of making public transport free for registered users. The 'green card' was introduced as an alternative to the ID card and is available to all registered citizens of the city. Non-residents can load the required amount of money on to the so-called 'green card' to get about the city too. Although the service is free, users are still required to touch card to reader when using services in order that the public transport authority can have a better idea about patronage of the network. See <http://www.tallinnlt.ee/en>

Measure	Responsibility/ key actors (*: coordinating/ triggering role)	Expected level of stakeholder/ public acceptance	Barriers	Timeline
<b>Create common understanding</b>	European policy*, national policy*, stakeholders	Medium	Contradictory visions and interests, different levels of development across Europe	Short-term
<b>Define minimum level of service</b>	European policy	Medium	Ensuring compliance	Short-term
<b>Define roles of public and private sector</b>	European policy	Medium	Structural inertia of actors, contradictory visions and interests	Short-term
<b>Regulate access to public data</b>	European policy, national policy, stakeholders	Medium	Contradictory visions and interests, data privacy and security	Short- to mid-term
<b>Ensure quality control</b>	European policy, national policy	Medium	Limited funds, ensuring compliance	Short- to mid-term
<b>Define data format/data exchange standards</b>	European policy*, stakeholders	High	Contradictory visions and interests	Short- to mid-term
<b>Examine funding needs</b>	European policy	High	Limited funds, contradictory interests	Short- to mid-term
<b>Support knowledge exchange and cooperation</b>	European policy	High	Use of exchanged knowledge	Short-term
<b>Evaluate effectiveness of measures</b>	European policy	Medium	Contradictory visions and interests	Mid to long-term

Table 2: Proposed measures for reaching a multimodal management system<sup>4</sup>

<sup>4</sup> The explanation of time scales used in the tables is as follows: short- to mid-term: can/should be implemented by 2020; mid-to long-term: can/should be implemented after 2020

### 5.3 Topic C: Multimodal payment and ticketing system

In order to make it public transport systems more efficient, integrated ticketing is increasingly important. Payment and ticketing systems exist in many forms and are increasingly automated. Many different technologies are currently used – from paper to printed tickets, smart cards, tickets on mobile phones, Radio-frequency identification (RFID)/Near-field communication (NFC) etc. Payment and ticketing must fulfil many demands; it must be secure, allow quick access to public transport and customer-friendly. In this regard, mobile phone operators and their billing systems are candidates for possible collaboration. Integrated ticketing can mean a single ticket from start to destination, covering all modes of transport as well as other services (e.g. parking fees, etc.) or the use of a ‘smart wallet’ that combines all necessary individual tickets. Ideally, this distinction is irrelevant for the customer. In order to ensure a large modal shift, it must be ensured that convenient ticketing is accessible to all passengers, irrespective of their own special needs.

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Fare management is most complex, especially when combining different modes and operators. How to deal with promotions, group discounts, weekly or monthly passes, and so forth? Many actors are involved in setting up a multimodal payment and ticketing system, e.g. customers, public transport authorities and operators and the payment industry. For the transport industry, the long-term advantages would be that services would be more attractive to customers and should also lead to a reduction of costs. Integrated ticketing is beneficial for both daily commuters who have to use different modes of transport as well as for those who have varying or less frequent/regular travel patterns. Achieving these systems would mean changing many back-office processes. Public acceptance is very important, and the introduction of any new system will probably encounter resistance unless it is well-communicated. The awareness-raising related to privacy and security is also something to consider. In the field of ticketing, standards are already well-established, e.g. the ISO/IEC 24014-1 standards for fare management systems (implementation specification for the use of smart ticketing published in 2013) which is due to the high sensitivity of any payment and ticketing operation.

Distribution of collected fares among different operators involved is complex and either needs exact collection of the travel patterns of each customer or otherwise can only be solved by agreed distribution arrangements. While the first method is very complex, expensive and could raise privacy issues, the second could lead to unfairness. In general, whatever approach is favoured, a large amount of trust is necessary between the different parties involved. For the operators, ticketing has a clear business case and here many established players are active and must be included in the discussion. Outsourcing of some operations can be attractive for operators.

At the ITS European Congress Helsinki in 2014 a number of sessions covered this topic. There is a high demand to integrate smart ticketing infrastructure, as multimodal travel is a daily activity of most people. These systems must provide reliability, security, affordability, simplicity, speed of service and must focus on travellers and their demands. It is expected that a single system used by multiple operator and service providers can also provide economies of scale. The integration of the existing system, methods and effective solutions should be preferred to establishing completely new technologies. (ITS European Congress Helsinki 2014, 2014)

#### **Possible steps to be taken in order to reach this sub-goal:**

- Work towards a consensus among all involved stakeholders in order to define what an integrated payment and ticketing system should look like.
- Simplify fare structures to help achieve an integrated multimodal payment and ticketing system.
- In order to make public transport accessible for all customers, payment methods and distribution channels must be flexible (e.g. to allow elderly or disabled people or persons without a bank account to purchase tickets).
- Establish a central one-stop smart access point to public transport which is linked with other authorisations (e.g. transport discounts, store/access/event cards...)
- Increase the attractiveness of integrated payment and ticketing systems by combining different services (parking, sharing etc.).

- Include more innovative fare collection schemes (e. g. post-travel).
- Look at good practice examples (e. g. trusted third parties for fare management, mobile phone roaming and roaming prices, airline rules regarding passenger rights).
- Include established developers and implementers.
- Consider existing payment systems, particularly for low-value transactions, namely credit card payment. These may make separate systems obsolete in some cases and could bring in the back-office experience of the banking sector, as well as being very convenient for customers who would not be required to use another system/technology. The banking sector could also bring in its experience with complex multi-actor settings.
- The legal context must be considered carefully. This particularly refers to issues about data privacy, where a balance between operators' interests in collecting lots of information about their clients and customer interests must be found. Passenger rights in multi-actor settings also need to be considered. This is especially important where data on individual passengers is exchanged between different operators. This issue implies a general decision to be taken by EU officials: whether to follow MIMP from operator or user perspective and how to find a right balance between them.
- Ensure data security in order to provide secure financial transactions and establish trust of users.
- Regional transport solutions work quite well. However, in order to enable them to be integrated, interfaces need to be defined.
- Present standards and requirements must be checked against potential needs for further adjustments. Development of additional standards necessary to ensure interoperability.
- Consider the different challenges for long-distance transport and urban (suburban) transport, including potential needs for a clearance system that links different sub-systems.
- Define what a clearance system could look like in order to be acceptable to all parties involved.

### Good practice: ACTIV Card in Bucharest, GA Travel Card, Oyster Card, Touch & Travel

**ACTIV** is the smart ticketing system used for public transport in Bucharest, Romania. Its introduction was intended to increase the attractiveness of public transport by integrating all modes across the city and introducing a flexible fare policy. ACTIV brought together the underground, tram, bus and trolleybus operators, and the system is open to include more actors in the future. See [www.card.ratb.ro](http://www.card.ratb.ro)

The **SWISS GA ('Generalabonnement')** travel card offers discounts for frequent travellers at monthly and annual rates. It is flexible, of economic benefit and environmentally-friendly as compared to travelling by car. It gives customers unlimited travel on the entire Swiss Federal Railways (SBB) network, as well as most private railways across Switzerland. It is also valid on postbuses, boats and municipal public transport services such as trams and buses in most cities. See [www.sbb.ch/en/travelcards-and-tickets/rail-passes/ga.html](http://www.sbb.ch/en/travelcards-and-tickets/rail-passes/ga.html)

The **Oyster Card** was introduced in 2003 following the decision to invest in integrated ticketing technology in 1998. Oyster is supported by Transport for London and can be used across most modes of transport on the Greater London network. As contactless smart cards, they can hold various ticket types and money can be added to the card via ticket machines, online or at some credit card terminals. Passengers must 'touch in' at the beginning and 'touch out' at the end of their journey. Globally, Oyster was the second system for smart ticketing to be introduced, after Octopus in Hong Kong. See [www.tfl.gov.uk/fares-and-payments/oyster](http://www.tfl.gov.uk/fares-and-payments/oyster)

Deutsche Bahn introduced the **Touch & Travel** scheme for integrated smartphone ticketing and payment at 320 of its long-distance stations in 2011, now expanding to more stations with regional connections. Before each journey, customers must log on with their Touch & Travel app and at this point the customer has a valid ticket and simply shows their phone to on-board inspection staff. The system uses global positioning system (GPS) tracking and the cost for the trip is calculated at the end of the trip. Deutsche Bahn keeps track of all the journey information and will calculate the cheapest fare for each journey and for multiple trips in one day. See [www.touchandtravel.de](http://www.touchandtravel.de)

	Responsibility/ key actors (*: coordinating/ triggering role)	Expected level of stakeholder/ public acceptance	Barriers	Timeline
<b>Create common understanding/ vision of what is to be achieved and the expected impact</b>	European policy*, national policy*, stakeholders	Medium	Contradictory visions and interests, different levels of development across Europe	Short-term
<b>Define minimum level of service</b>	European policy*, stakeholders	Medium	Ensuring compliance	Short-term
<b>Secure payment and clearance systems</b>	National policy*, European policy	Medium	Trust, contradictory interests	Short- to mid-term
<b>Integration of long distance and local transport</b>	European policy, national policy	Medium	Contradictory interests, limited commercial benefit	Mid-term
<b>Ensure quality control</b>	European policy, national policy	Medium	Limited funds, ensuring compliance	Short- to mid-term
<b>Define data format/ data exchange standards</b>	European policy*, national policy, stakeholders	High	Contradictory interests	Short- to mid-term
<b>Simplification of fares</b>	National policy*, stakeholders	Medium	Contradictory interests	Short- to mid-term
<b>Combination with other services</b>	European policy*, national policy*, stakeholders	Medium	Institutional	Short- to mid-term
<b>Safety and security of booking and payment operations</b>	European policy	Medium	-	Short- to mid-term
<b>Support knowledge exchange and cooperation</b>	European policy	High	Use of exchanged knowledge	Short-term

Table 3: Proposed measures for reaching a multimodal payment and ticketing system<sup>5</sup>

<sup>5</sup> The explanation of time scales used in the tables is as follows: short- to mid-term: can/should be implemented by 2020







## 6 European integration

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As outlined above, it is assumed that eventually there will not be one European MIMP system but a number of systems, be it local, national and sometimes European, for either information, management and payment and ticketing or a combination of the aforementioned. What will be the essence of a future truly intermodal European system is the interfaces, data formats and standards, security and privacy systems, defined minimum service levels and in general, a common understanding of what is being done and why. Such an approach must, however, reconcile contradictory interests.

As a first step there must be an agreement as to how far the integration of the different systems should go and what benefits can be achieved by this integration. Benefits must be examined both for the different actors and for the European transport system, and alongside the achievement of the White Paper goals in general. When looking at actors, the role of the public and private sector is extremely important. On the one hand they must cooperate to a certain extent; on the other hand they are in competition. In the different areas of information, management and payments systems, this applies in varying degrees. One actor perhaps plays the most important role in speeding

up integration – the traveller. As instant information and comfortable interfaces are seen as a minimum requirement nowadays, all actors in the transport sector must try to meet these expectations or otherwise lose potential customers. So when we talk about the willingness of actors to participate in integrated MIMP systems – whatever form these might have – this will soon not be a matter of choice, but of survival. At the same time the wider policy dimension must be considered, e.g. reduction of GHG emissions, optimal use of infrastructure, maintaining a certain level of service, and so forth. In order to support this integration, the following steps are essential.

1. Define what form(s) an integrated system should take
2. Identify potential impact
3. Create a common understanding of what is to be achieved by an integrated system
4. Highlight benefits for each of the actors involved
5. Define the roles of the different actors
6. Define minimum level of service for each system
7. Identify where policy actions are needed



8. Identify missing standards for data formats and exchange protocols
9. Security and privacy issues are a constant concern and should always be considered
10. Ensure that the system is accessible to all travellers
11. Public transport should act as a forerunner for integration
12. Support cooperation between stakeholders
13. Highlight benefit(s) of integrated system
14. Service quality must be monitored
15. Open system up for new services

At the ITS European Congress Helsinki in June 2014 it was shown that there are already many projects implementing cross-border multimodal travel services, but in order to reach full interoperability and real cross-border solutions with existing services, international agreements are necessary to avoid the need for new middleware-platforms. If interoperability between services throughout Europe is to be achieved, this would require a central platform, with a central actor operating it. Other approaches to achieving cross-border functionality can be the standardisation of interfaces/protocols or only exchange data among various regions or countries as the EDITS project proposes. It might be the case that total interoperability will be unachievable because of limited demand, relatively high cost to address organisational issues, and the necessity of multiple platform interfaces (ITS European Congress Helsinki 2014, 2014)

### Good practice: Autolib' in Paris

**Autolib'** is an electric car-sharing service, which has been operating in Paris since 2011. Its success is in part due to the integration between the customer interface and back-end technology used for battery charging, payment and management. Autolib' customers can subscribe online, at a subscription kiosk, or in the Paris showroom using their driving licence, ID and a credit card. Once registered, customers receive an RFID badge, which can be used to unlock the car door and also to access the unit to recharge the vehicle's battery. Of all the means available to use the service, nearly 80 % of Autolib' bookings are made via smartphone apps.

The Autolib' system has been devised in a way that means that the batteries, cars, information, security, communication, operations, payment and location tracking are all fully integrated into one package, which makes the hiring experience for the user better and the system management easier. The technology behind Autolib' has now been rolled out to other French cities and plans to roll it out internationally are afoot. See [www.autolib.eu/en/](http://www.autolib.eu/en/)

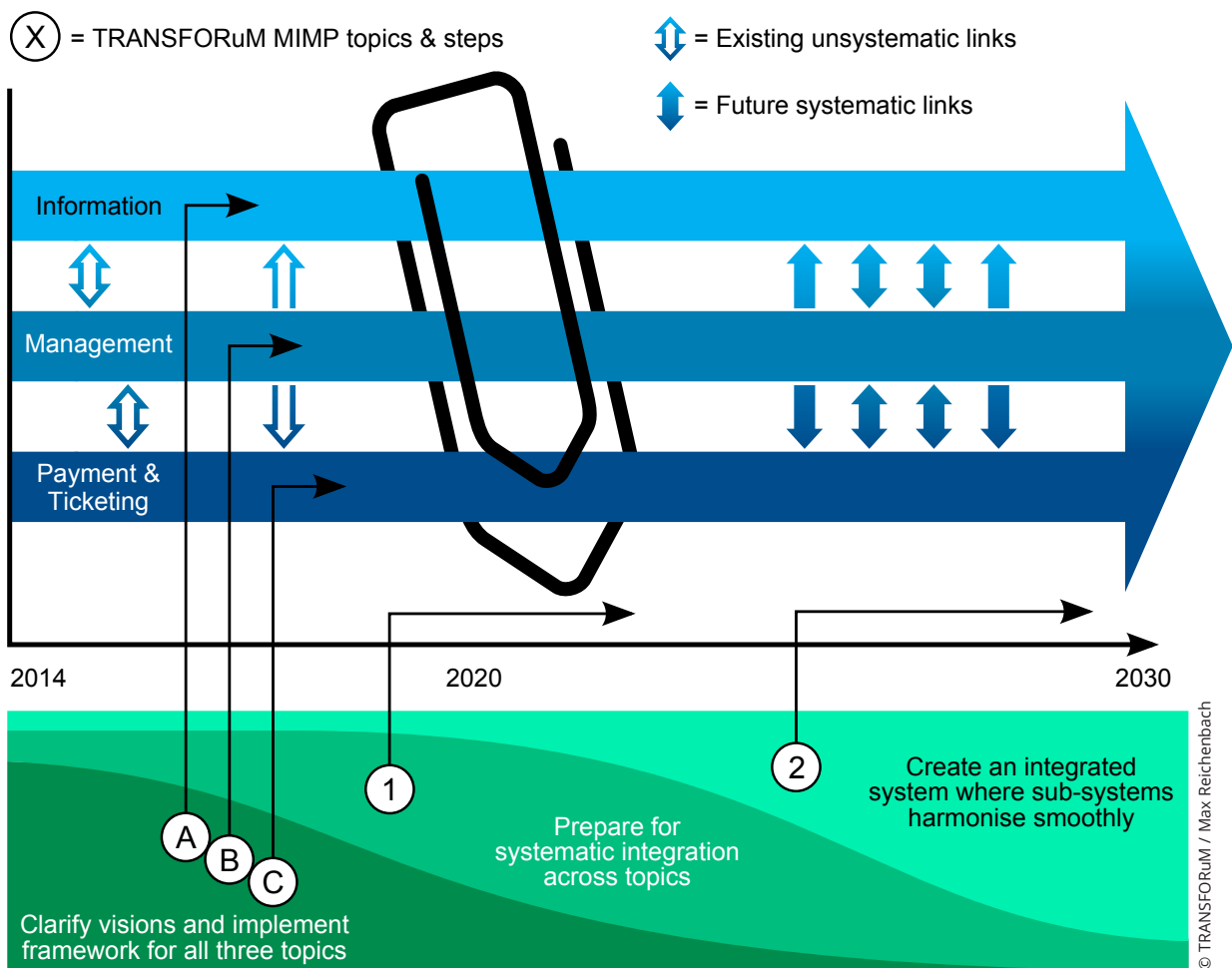


Figure 1: Moving towards the White Paper MIMP goal

Figure 1 is designed to illustrate the multifaceted integration challenge. The present roadmap outlines a multitude of measures towards a framework for each sub-topic – information (A), management (B), and payment (C). This corresponds with the fact that it will not be possible to create a single all-encompassing system that fulfils the requirements of all three topics (see above).

However, the preparation (1) and creation (2) of systematic interfaces between the topics and systems must be kept in mind throughout the process – and this is where the measures proposed in the present section play their role. The current unsystematic and sometimes confusing practice of linking single systems needs to be overcome by agreements and a reasonable balance between cooperation and competition as outlined above. While the White Paper goal itself ‘only’ refers to establishing a framework until 2020, such constructive collaboration will allow for fully functional systematic links between information, management and payment systems to be made in the more distant future.

Measure	Responsibility/ key actors (*: coordinating/ triggering role)	Expected level of stakeholder/ public acceptance	Barriers	Timeline
<b>Create common vision and understanding for an integrated MIMP</b>	European policy*, national policy	Medium	Contradictory visions and interests	Short-term
<b>Define minimum level of service</b>	European policy	Medium	Structural inertia of actors	Short- to mid-term
<b>Monitor access to data (public/private)</b>	European policy*, national policy, stakeholders	High	Contradictory visions and interests	Short- to mid-term
<b>Ensure continuous quality control</b>	European policy*, national policy	Medium	Contradictory interests and limited funds	Short- to mid-term
<b>Ensure suitability of defined data format/data exchange standards</b>	European policy	High	Contradictory visions	Short- to mid-term
<b>Extend cross-border pilot projects to support full regional implementation</b>	European policy*, national policy, stakeholders	High	Contradictory visions and interests	Short- to mid-term
<b>Examine additional funding needs</b>	European policy	High	Contradictory interests	Short- to mid-term
<b>Support knowledge exchange and continuous improvement</b>	European policy	High	Use of knowledge exchanged	Short-term
<b>Evaluate effectiveness of measures</b>	European policy	Medium	Contradictory visions and interests	Short-term

Table 4: Proposed measures for reaching an integrated MIMP system<sup>6</sup>

<sup>6</sup> The explanation of time scales used in the tables is as follows: short- to mid-term: can/should be implemented by 2020; mid- to long-term: can/should be implemented after 2020



## 7 Considering different contexts across Europe: A perspective on Central and Eastern Europe

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The process of current expanding the EU through the accession of a number of new Member States began in 2004. Countries in Central and Eastern Europe which were formerly under the regime of socialism wanted to join the project of European integration. To affiliate to the EU, a state needs to fulfil economic and political conditions. The transport sector is an important area of the national economies of Central and Eastern European countries, influencing virtually all domains of public and private life as well as the business sphere. It is a very financially demanding sector but at the same time it also contributes significantly to public budgets. This sector represents a necessary condition for improving the competitiveness of Central and Eastern European countries, as with the rest of Europe, mobility is a key part of modern life. Private and business travel has become possible and affordable for increasing numbers of people in the EU. Multimodal information is an important factor for smart and seamless door-to-door mobility. The potential societal, environmental and economic benefits of multimodal travel information and planning services are huge (European Commission, 2014k).

### 7.1 Specific characteristics of Central and Eastern European countries

Every state, every city has its own historical, geographical, socio-economic, demographic and business characteristics. That is why transport requirements are not the same everywhere – each region has its own requirements and priorities which fit with its distinct administration, institutions, organisation and planning. Local policies are influenced by both EU regulation and specific national legislation. Many cities are implementing ITS, but they are not compatible with each other because they use different technologies, or are based on different formal and legal solutions (Catch-MR, 2012).

It is clear that MIMP systems are being developed at a very slow pace, in Central and Eastern European Member States, as well as in the rest of the EU, on the basis of voluntary coordination of key players and by means of incentive funds from public budgets. This allows defined strategies and transport policies to be met at both national and European level. This is long-term process which often exceeds the lifespan of the implemented systems.



There are not specific challenges that could be generally considered in relation to just new Member States or Central and Eastern European countries. Within Central and Eastern Europe we can find diverse public transport organisation. We can say that historically in a majority of those countries, public transport has a long history. In the Communist era public transport organisation worked quite well as there was no competition between carriers and central management. The subsequent privatisation of public transport has resulted in fragmentation into functional units.

Then there are systems where services are run by several competing companies. It means if you buy a train ticket, you have to know not only where and when you want to go, but also with which transport company. The tickets are valid only for one transport company and not necessarily for others. Also competition can lead to situations where connections do not function.

Such a complicated situation obviously causes problems for information as well. There are search engines that enable journey planning but often cannot provide information about transfer connections (although they may say that they do) and none of them have data from all carriers (such cases can also be found in Western countries).

On the other hand we can also find well organised public transport within Central and Eastern Europe. For example, in the Czech Republic where PT T has still a markedly high share of urban public transport in comparison to EU-15 countries (Union of Passengers in Public Transport in Czech Republic, 2013). This success began with the development of integrated transportation systems at the beginning of the 1990s. Nowadays the individual systems, formally administered by counties (municipalities), are integrated at various levels.

Generally we can say that within cities in most of Central and Eastern Europe, the public transport works and is organised very well – even from a MIMP point of view. After the privatisation of city public transport companies, a business model similar to a joint-stock company – where a city is the only shareholder – has often been applied. The reason for this is simple – such a small company is much more flexible than the city administration. We can find competition between carriers and reluctance for MIMP integration more in intercity or regional public transport.

## 7.2 Further development needed in integration of local MIMP services

To solve the integration problem between counties and municipalities, a legal entity could be created – individually or jointly – entrusted with establishing and organising integrated public transport services for passengers. Ownership interest in such a legal entity can only be shared by the state, county or municipality. The legal entity should not operate public railway or urban passenger transport.

The legal entity could be authorised (on behalf of the county or municipality) to contract for public passenger transport services on a specified area and specified transport modes. As a small company it is much more flexible and effective and less expensive than a state administration would be.

We consider such a perspective to be a useful one for Central and Eastern European countries to consider. We also consider that local service providers and open data feeds are the backbones of the future development of MIMP, across the entirety of Europe.

Local service providers should provide their systems in an open way, i.e. provide data freely and in standardised formats. Modern ITS tools can profit from local data availability; it means that a mobile phone application developed for example, in Spain, can also be operated in Latvia as the local data is provided in similar way in both places. This is a user support-oriented approach and such “mighty” applications can be European-wide and used by millions of people, travelling across Europe. Standardisation would lay the groundwork for such a development, which would be followed up with widespread promotion.

To enable such European MIMP functionality in the future, it is first necessary to create national public transport information centres that gain data from local centres (e. g. city public transport centres) and exchange it with other local systems on one hand and with national central systems on the other, based on global standardisation.

This bottom-up approach creates a sovereign central public transport system for specified territories (e. g. a Member State) that can share data according to common rules with a similar centre in another state.

Currently it is not clear whether, or to what, extent the European Commission will get involved in the preparation of prospective European regulatory measures related to MIMP across Member States. Presently, all alternatives for regulation come into consideration – from zero (no regulation necessary, everything will be

solved by market mechanisms) to strong regulation (obligatory implementation of solutions with certain parameters in the EU Member States). If any EU grants (operational programmes, regional development programmes) are used for MIMP development, then there should be assurance that national standards based on European normative documents will be implemented.

Last but not least, local political support is an essential aspect in the implementation process and it should

## Good practice: IDOS Czech Republic, RATP Ploiesti

The multimodal public transport journey planner “IDOS” in the Czech Republic has information on time-

tables, connections and linked services for travellers. It was awarded best multimodal planner 2012 by ERTICO, in the EU’s First Smart Mobility Challenge competition. IDOS is one of the best Czech data products in the field of databases and search engines and the best in the field of transport. Although its 1.7 million real users consider it absolutely commonplace (in October 2013 there were 1.95 million users, source: NETMONITOR/SPIR), it is extraordinary in the European context, given that the nation’s population is 10 million. The available information allows Czech citizens to plan their entire journeys by public transport (all modes and connections that stop in the Czech Republic), which is hard to imagine in most of the EU states.

In the context of MIMP, it is important to mention that the IDOS internet address was adjusted in order to be used by blind and partially-sighted citizens ([www.jizdnirady.cz/blind](http://www.jizdnirady.cz/blind)). Adjustments were implemented in compliance with “Blind Friendly Web”. See [www.jizdnirady.cz](http://www.jizdnirady.cz)

Being part of the CIVITAS-SUCCESS project concerned with advanced IT solutions, Romanian public transport company RATP Ploiesti implemented a system that uses GPS sensors to improve dispatching (Emig, 2011). The bus fleet has been monitored via GPS since 2007 and real time information panels are installed at bus stops. The project has served to improve traffic management in the city centre, provide higher quality travel information, reduce congestion, and increase public transport ridership (Ibid.). See [www.ratph.ro](http://www.ratph.ro)

be engaged from the outset of the planning process. In order to ensure this support, it has to be determined that the majority of the public transport users (including disabled people) can benefit from a new MIMP system.

The decentralised public transport systems usually work on market driven principles. But integrating them from a MIMP perspective is almost impossible from an organisational point of view and very costly. For example Transport Direct in Great Britain cost approximately £100 million (€128m) (estimated by Mark Cartwright, RTIG General Manager) and after ten years of service, it was discontinued on 30<sup>th</sup> September 2014. It was found that a large number of other services were providing similar functions based on transport data freely available to web developers (Department for Transport, 2014). On the other hand the centralised public transport systems have to be co-financed. The real challenge is then to find a functional business model for MIMP services.

Mainly from an information services perspective, an open data policy will induce many journey planners to be created. The issue is how these information services can be guaranteed (quality of data updates; planning based on commercial influence etc.).

Transport is a public issue and transport infrastructure is a public asset. So from strategic point of view and those of business models, the relationship between public and commercial interests has to be well balanced.



## 8 TRANSFORuM's relationship with other initiatives

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It was discussed in the previous sections that MIMP is a complex topic involving many actors and activities. This becomes apparent when looking at the list of existing policies in section 4.2, many overlap exist and there are strong links between them.

The most recent initiative to be considered is the Commission staff working document "Towards a roadmap for delivering EU-wide multimodal travel information, planning and ticketing services" (European Commission, 2014k). A special need to highlight this document comes from the fact that it provides a roadmap towards a framework for MIMP services – and therefore envisages the same task as the TRANSFORuM project. Consistently, there are many similarities between the two roadmaps, e. g. the identification of a trend towards co-ownership where travellers are no more pure consumers of information but also providers of information and feedback to operators. Moreover, some similar problems have been identified, most prominently regarding the issues of data quality, passenger rights in multi-actor settings, or the reluctance of some private operators to sharing data because of commercial interests.

However, the two roadmaps are not the same and can therefore complement each other. Issues which

are not mentioned in the Commission's roadmap but considered to be relevant in the TRANSFORuM's roadmap include awareness raising of users and travellers about data privacy issues. This topic implies the need to find a careful balance between improving transport system efficiency and serving traveller needs and interests while at the same time ensuring data security and privacy protection – also weighing different business interests. Another issue that should be highlighted is the fact that not much is known yet about the actual effects of electronic MIMP services alone. These services promise to contribute to a more efficient use of all means of transport – but user mode choice depends on a whole range of other parameters, among which MIMP services can only address some.

Therefore, these services must be combined with other instruments and measures that provide additional incentives for multimodal transport (e. g. physical improvements). This should be highlighted when discussing initiatives and measures towards MIMP services. Within the TRANSFORuM project, this is a reason for enhancing the present roadmap and the project's three other thematic roadmaps with a separate perspective on "Recommendations on Joint Actions across Actor Groups".





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## A word on the independence, credibility and relevance of TRANSFORuM's results

Goals raise expectations and attract criticism but without them, we could only stumble into the future. So TRANSFORuM's starting point was to take the goals as formulated in the European Commission's White Paper on Transport (2011) seriously. A second constitutive principle of TRANSFORuM was to listen to those whose job it is to implement these goals, that is, all kinds of stakeholders in the European transport arena. Because transformation requires, by definition, innovative ideas, products, policies, services and new actors we made sure that the stakeholders we consulted included the entire spectrum from incumbent market players to emerging niche creators. For the same purpose, our workshops were held under the Chatham House rules and their minutes as well as list of attendees are available to the public on our website.

At times, these two principles (loyalty to the White Paper goals and a stakeholder-driven approach) got into conflict when stakeholders questioned the sensibility, operationalisation or feasibility of certain White Paper goals. We consider this in itself a worthwhile finding and as such this is recorded at appropriate points in the Roadmaps. On such occasions, the TRANSFORuM team felt called upon as a neutral broker to think about possible amendments of the goals to ensure that they are more widely accepted

and therefore more likely to be implemented. A similar phenomenon occurred where stakeholders highlighted that certain aspects of a White Paper goal are already outdated, for example, due to technical developments since 2011. It is worth emphasising in this context that the perceived appropriateness of these goals varied across the four thematic areas pursued by TRANSFORuM.

In other words, we had to find a balance between our loyalty to the White Paper goals and to the principle of a stakeholder-driven process. An ideological dominance of either of them would not have led to a coherent set of policy packages. To put it bluntly: TRANSFORuM is not a frictionless communication channel of stakeholders' wish lists to the European Commission. Neither is it the Commission's unconditional servant. Instead, TRANSFORuM used the strength of its members' scientific calibre and independence in the process. Our results are therefore "based on" stakeholders' views but essentially TRANSFORuM's. There is, however, a slight "division of labour" across TRANSFORuM's different outputs

For the **Roadmaps**, we tended not to question the White Paper goals as such. They are designed to be implementation-oriented, focusing on actors, bud-

gets, time horizons, etc. TRANSFORuM has released four Roadmaps, corresponding to its four thematic areas: Urban mobility, long-distance freight, high-speed rail and multimodal travel information, management and payment systems.

The **Recommendations** are also contained in a separate document, covering all four thematic areas in combination. They highlight proposed actions by all relevant actors and show how coordinated action can be more than the sum of isolated efforts.

The **Strategic Outlook** will be released in January 2015 and is essentially a sensitivity analysis to assess the robustness of the current Roadmaps and recommendations against the inevitable insecurity of long-term trends beyond the year 2030.

We hope this suite of products is not only useful to practitioners, stakeholders and policy-makers but also of particular value for the forthcoming review of the Transport White Paper. And even if not every page abounds with radically new ideas, the added value of TRANSFORuM is still:

- A new robustness and independence of the suggested prioritisations;

**A wish is a dream until you write it down.  
Then it's a goal!"**  
(Anonymous)

- A cross-disciplinary and cross-sectoral consolidation of what has been done in silos before;
- A fresh approach, based on a balanced chorus of voices, including incumbent and new actors;
- A refreshing sensitivity to the national and cultural differences across Europe;
- A rare legitimacy and credibility of our conclusions based on the transparency of the entire process;
- A holistic view, manifest in suites of suggested measures in the form of "policy packages";
- An encouraging and transferability-aware good practice collection across four White Paper themes;
- A novel and thorough participatory process with stakeholder-backing throughout;

Ralf Brand  
(Project coordinator)



## Acknowledgements

TRANSFORuM would not have been possible without the help and contributions of a very large number of people, many of whom worked tirelessly in the background, facilitating, supporting, commenting etc. Amongst them all, we would like to express our explicit gratitude to the following:

- | Eight external reviewers provided comments on our near-final Roadmaps. One of them prefers to remain anonymous; the other are: James Tate, Laetitia Dablanc, Wiktor Szydarowski, Francesca Pagliara, Jacques Beltran, Eric Sampson, Stephane Kaba, Jaime Borrell and Jennie Martin.
- | All members of our Advisory Board: David Banister, Yves Crozet, Torsten Fleischer, Niels Buus Kristensen, Gunnar Lindberg, Marcin Wolek, Lars-Göran Mattsson, Martin Pipa, Martin Russ, Siegfried Rupprecht, Inge Vierth, Dennis Schut, Jolanta Skalska, Sylvain Haon, Ivo Cré, Cristina Pronello, Stefan Back, Krzysztof Kamieniecki. The latter seven as external Advisory Board members.
- | 34 stakeholders and experts, who agreed to being interviewed by a member of the TRANSFORuM team.
- | 127 stakeholders who attend one or several of the 10 TRANSFORuM workshops.
- | Ulla Kaisa Knutsson for the perfect organisation of these events.
- | The European Economic and Social Committee (EESC) whose premises TRANSFORuM was allowed to use for the final conference on 8 December 2014. Special thanks to the members of the EESC's permanent study group "Implementation of the White Paper on Transport".

Ralf Brand  
(Project coordinator)

## List of Deliverables

TRANSFORuM's final results are primarily based on the views of stakeholders we consulted through various means, in particular through a series of 10 face-to-face workshops. In the spirit of complete transparency and credibility we made the essence of these events available online at <http://www.transforum-project.eu/resources/library.html>.

Our conclusions also build upon a dovetailed set of background research and genuine analysis, which was condensed into a number of Deliverables we produced along the way. These are:

D2.1: "Shaping the TRANSFORuM Network". This document spells out the criteria that guided the selection of stakeholders to TRANSFORuM events;

D3.1: "Summary on main policies, funding mechanisms, actors and trends";

D4.1: "Challenges and barriers for a sustainable transport system – A state of the art report";

D4.2: "Challenges and barriers for a sustainable transport system – exploring the potential to enact change";

D5.1: "Good Practice Repository - Transformation is possible!";

D5.2: "Good practice in the context of delivering the White Paper";

D7.1: "Communication and Outreach Strategy". This document defined TRANSFORuM's target audience and the best means and channels of communication with them.

These documents are also available at <http://www.transforum-project.eu/resources/library.html>



# Mobile ticket

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DEPARTS  
10:30 AM



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