

CEDR Transnational Road Research Programme

MoDBeaR
Mobility Management and Driver Behaviour Research

Research Findings Report

January 2019



CEDR - Transnational Road
Research Programme

Research Findings Report

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This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Contents

	Page
1 Findings: Mobility Management	6
1.1 Definition and Policies	6
1.2 Role in Mobility Management	11
1.3 Measures and Challenges	16
1.4 Funding	25
1.5 Stakeholders	29
2 Findings: Traffic Management	33
2.1 Definition and Policies	33
2.2 Role in Traffic Management	37
2.3 Measures and Challenges	38
2.4 Funding	42
2.5 Stakeholders	43
3 Summary and Conclusions	46

Table of Figures

Figure 1: Definition and Understanding of Mobility Management	6
Figure 2: Key focus areas of Mobility Management Concepts and Definitions	7
Figure 3: Policies and strategies covering Mobility Management	9
Figure 4: Involvement of CEDR members in planning and implementation of Mobility Management	12
Figure 5: Involvement of CEDR members in Mobility Management in different scenarios.....	13
Figure 6: Mobility Management measures used by CEDR members.....	16
Figure 7: Media and communication channels used for Mobility Management	18
Figure 8: Challenges in Mobility Management.....	19
Figure 9: Main Funding Mechanisms for Mobility Management.....	25
Figure 10: Main Stakeholders in Mobility Management	30
Figure 11: Traffic Management Definition and Understanding	33
Figure 12: Key Focus Areas of Traffic Management Definition and Concept	34
Figure 13: Traffic Management Policies	35
Figure 14: Involvement of CEDR members in Traffic Management in different scenarios.....	37
Figure 15: Traffic Management measures	38
Figure 16: Media and communication channels used in Traffic Management	40
Figure 17: Key Challenges in Traffic Management	41
Figure 18: Funding mechanisms used in Traffic Management	42
Figure 19: Stakeholders in Traffic Management.....	44
Figure 20: Maturity level of Mobility Management across CEDR members	46
Figure 21: Maturity level of Traffic Management across CEDR members...	47
Figure 22: Existing approach of Mobility Management and Traffic Management being separated.	50
Figure 23: Recommended strategic approach for NRAs to work with Mobility Management and Traffic Management.	51

Glossary

Term/abbreviation	Definition/explanation
CEDR	Conference of European Directors of Roads, European platform for cooperation between National Road Authorities
CEDR member/NRA/CEDR NRA	A body or an institution representing interests of a particular country and its NRA in CEDR
CEDR member State	A respective country of a particular CEDR member/NRA/CEDR NRA
CEDR jurisdiction	A remit and domain assigned to a particular CEDR member/NRA/CEDR NRA
EPOMM	European Platform on Mobility Management
GHG	Green House Gas(es)
MM	Mobility Management
ModBeaR/MODBEAR	Mobility Management and Driver Behaviour Research
NRA	National Road Authority/National Road Administration
TM	Traffic Management
WP	Work Package

Executive Summary

The following report presents the findings of the Mobility Management and Driver Behaviour Research (MODBEAR) project (Work Package 1, Work Package 2 and Work Package 3). This project was commissioned by CEDR (Conference of European Directors of Roads) and carried out by Arup, Trivector and Hasselt University.

The aim of this project was to analyse current Mobility Management policies and practices in place across CEDR National Road Authorities (NRAs) and to derive recommendations for NRAs and CEDR for future Mobility Management implementation.

In the context of this project, Mobility Management is referred to as a long-term focussed change of travel behaviour from car driving to more sustainable modes of transport by mainly using soft measures, such as information campaigns and others.

The Research identified that Mobility Management rarely sits within the remit of CEDR NRAs. Despite this, CEDR NRAs do get occasionally involved in various Mobility Management projects and programmes, particularly during planned and unplanned road events.

There is often no well-established and universal understanding and definition of Mobility Management within NRAs. Some NRAs tend to associate Mobility Management with Traffic Management.

Most CEDR member NRAs see both Mobility Management and Traffic Management as mechanisms to achieve more effective operations of their transport networks. However, they do distinguish between these two concepts on a planning and policy level.

CEDR NRAs understand that Mobility Management achieves effective transport network via long-term behavioural change, whilst Traffic Management achieves it with the help of a more short-term network management.

In the actual implementation, however, Mobility Management and Traffic Management are very often intertwined when CEDR NRAs work with them, and NRAs rarely aim to draw a line between the two and separate them.

Behavioural change and modal shift as well as reduction of GHG emissions were found to figure as key objectives within Mobility Management and to a lesser extent within Traffic Management in some CEDR member States. However, no prominent interrelation between these parameters was established.

Similarly, fluctuations in the use of the private motorised transport were not found to have been associated with or predetermined by any particular Mobility Management or Traffic Management measures used.

There is a lack of a robust and transparent framework for monitoring and evaluation of the effectiveness and cost-efficiency of Mobility Management measures used which results in a poor level of knowledge and understanding of the real value and impact of Mobility Management.

This **Research Findings Report** is to be read in conjunction with **the Research Structure Report** and **Mobility Management Guidance** document.

***Research Structure Report** describes the process of the MODBEAR project implementation including methodology, assumptions, challenges and results.

***Research Findings Report** describes the findings of the MODBEAR research project and describes good practice examples.

***Mobility Management Guidance** presents final recommendations and guidelines developed as a result of the MODBEAR research project.

The contents of this report are based upon comprehensive data collected through desktop research, questionnaires to individual CEDR members, and additional one-to-one contacts to fill any gaps left from the questionnaires.

Structure

This Findings Report is structured as follows:

Chapter 1 – Findings for Mobility Management presents findings for the Mobility Management part of the MODBEAR project.

Chapter 2 – Findings for Traffic Management presents findings for the Traffic Management part of the MODBEAR project.

Chapter 3 – Summary and Conclusions summarises the overall findings and results of the MODBEAR project.

Appendix – Fact sheets summarise findings for every CEDR member.

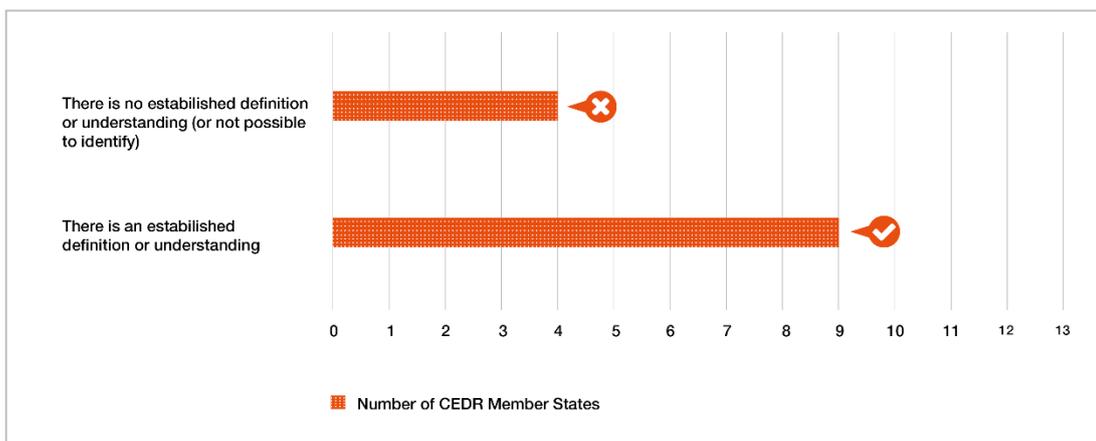
1 Findings: Mobility Management

1.1 Definition and Policies

1.1.1 Definition

Out of 13 CEDR members that completed the questionnaire, nine have an established definition and/or understanding of Mobility Management concept. Four CEDR members have no established definition of Mobility Management concept. **Figure 1** below provides a summary of responses received.

Figure 1: Definition and Understanding of Mobility Management



**Number of CEDR members that clearly stated in their responses that they have a definition for Mobility Management or for which it was possible to identify from their responses that they have an established understanding of Mobility Management concept*

Whilst definitions vary from country to country, in the majority of them Mobility Management is defined as a mechanism and a set of soft measures and strategies to encourage the use of more sustainable transport modes, influence travel behaviour and transport demand to ensure more effective use of transport networks.

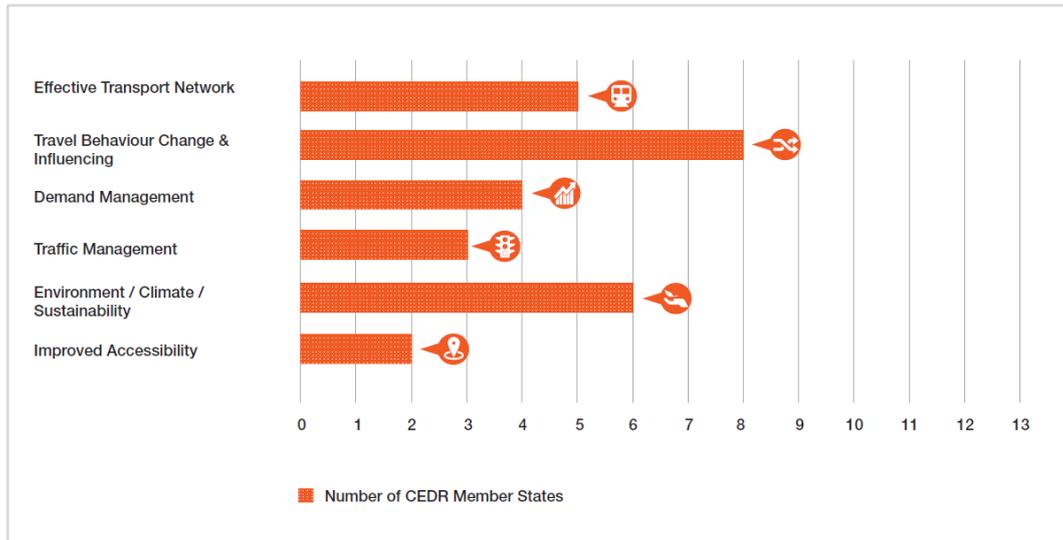
Whilst it could be considered a part of the effective transport network, the concept of the improved accessibility does not stand out as a separate focus for Mobility Management. CEDR members do not always see the improved accessibility as an objective on its own, but rather as a derivative of the reduced travel demand and improved network performance. An example of this is the definition of the Irish NRA, which defines Mobility Management as a “transport demand management mechanism that seeks to provide for the transportation needs of people and goods and encourage more efficient use of the transport network”.

Such a vision could somewhat narrow the view of the existing problems and of an approach to resolve them. Particularly, it narrows everything down to road network demand management. Having improved accessibility set as an objective on its own could potentially widen vision of mobility and associated issues.

Only two CEDR members (Public Works Department in the Ministry of Transport, Communications and Works in Cyprus and the Swedish Transport Administration, Trafikverket) explicitly mentioned that improved accessibility is a dedicated objective of Mobility Management in their states.

Figure 2 below provides a summary of responses with regards to the focus of Mobility Management definition and concept across CEDR member States that completed the questionnaire.

Figure 2: Key focus areas of Mobility Management Concepts and Definitions



**Number of CEDR members that clearly stated in their responses and for which it was possible to identify from their responses that Mobility Management in their CEDR member States focuses on the above listed areas*

For some countries, the definition of Mobility Management tends to be closely intertwined with the concepts of Traffic Management and Demand Management (the Netherlands). Whilst Traffic Management and Demand Management are much narrower concepts and in essence form a part of the wider Mobility Management concept, CEDR members have not always shown a clear understanding of this interrelation.

Different countries promote Mobility Management under different names some of which are Smart Mobility, Smarter Travel, Mobility Planning, Demand Management, Behavioural Change and others.

As part of the definition, some countries also specify the time scale and geographical extent of their Mobility Management, but there is no clear trend within these parameters across all CEDR members. An interesting finding is that Mobility Management can be seen as both short-term and long-term tool within one country (the Netherlands) and can be used as both strategic and localised tool within two countries (Ireland and the Netherlands).

In the Netherlands, the definition of Mobility Management covers the aspect of organising smart mobility with the aim to optimally utilise the total transport system, to influence transport demand, and to facilitate and (where necessary) influence travel demand.

Cooperation with national and regional partners, the private sector and stakeholders is crucial to achieve this. Starting point is aiming for increased flexibility in travel behaviour in terms of time, place, and mode of travel. Mobility Management is often used for short-term and medium-term congestion reduction as an alternative to major infrastructure investments which in contrast often take decades. At the same time, Mobility Management is used for the long-term travel behaviour change.

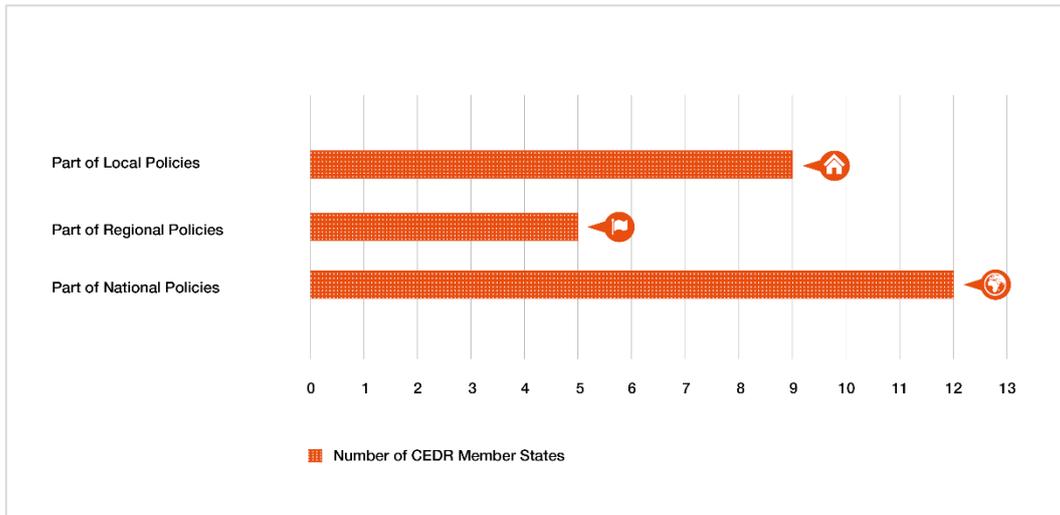
The Swedish NRA has developed the concept of Mobility Management in the construction phase which aims to reach accessibility for all travellers and transport modes during construction. It is an expanded concept that includes both ordinary Mobility Management measures as well as measures ensuring the usability, safety and competitiveness of walking, cycling, public transport and carpooling before private car. Accessibility of freight transport is also prioritised. Mobility Management in the construction phase does not necessarily focus on long-term behaviour shift, but accessibility during the construction phase.

1.1.2 Policies

From responses provided, it was not always possible to identify if a CEDR member State has a dedicated Mobility Management policy. In the assessment of responses, it was identified that only two CEDR member States (Ireland and Sweden) have a dedicated Mobility Management Policy. One CEDR member State (Greece) mentioned that their Mobility Management Policy was under development at the time of this study.

For most of CEDR member States (12), the Mobility Management concept is covered by the wider national policies and strategies. These policies normally cover such aspects as Transport, Infrastructure, Spatial Development, Spatial Planning, Environment and Energy.

Some CEDR members stated that Mobility Management principles are also communicated within regional and local policies where applicable and relevant. Sometimes these are documented in regional strategies and local town plans and reflect the principles set in the wider national policies. **Figure 3** below provides a summary of what policies cover Mobility Management across CEDR member States.

Figure 3: Policies and strategies covering Mobility Management

**Number of CEDR members that clearly stated in their responses and for which it was possible to identify from their responses that Mobility Management is covered by their national, regional and local policies.*

1.1.3 Good Practice

The MODBEAR research identified some good practice examples in relation to the Mobility Management definition and policies. These examples are outlined below:

- In Ireland, the National Transport Authority (NTA) provides a set of guidance documents for local authorities and companies to support the implementation of **Workplace Travel Plans** which is the key element of their **Smarter Travel** concept (Mobility Management concept). The presence of formal guidelines sets the direction to follow for local authorities and private companies in Mobility Management planning and implementation.
- In the Netherlands, Mobility Management and Traffic Management are merging into one **Smart Mobility** concept, launched in the Optimising Use programme ('Beter Benutten'), and are no longer treated as separate elements. This integration of two concepts allows to establish a universal and fully integrated approach on how the entire transport network is managed, no matter if it is for private or public transport.
- The concept of **Mobility Management in the construction phase**, developed by the Swedish Transport Administration, is described in a handbook and brochures on planning Mobility Management measures during the construction phase. The aim is to reach accessibility for all travellers and transport modes during the construction phase of infrastructure projects. Implementing Mobility Management, and not just Traffic Management, at the construction stage of a project becomes critical to ensure travellers are provided with alternative mobility options.

- In Austria, the **Klimaaktiv mobil** initiative aims to provide guidance on Mobility Management implementation for different parties such as schools, companies, public administrations, tourism, spatial planning, residential developments, cities, municipalities and regions. Establishing a dedicated dissemination channel/platform for Mobility Management is important to provide clear and consistent guidelines and directions to stakeholders at all levels.

In addition to the MODBEAR research findings, the Project Team compiled a list of some other good practice examples in relation to the Mobility Management definition and policies. These examples are presented as additional case studies below.

Case studies (additional input of the Project Team)

The university of Liège (Belgium) documented how Belgian cities and municipalities perceive the concept and the phenomenon of 'the Smart City' (definitions, components, dimensions), how the cities deal with the implementation of smart city projects in Belgium (number of projects, involvement of stakeholders, potential problems and need for awareness) and finally how cities and municipalities manage these dynamics and projects. The results of the project indicate that Belgian cities and municipalities view the Smart City dynamics as a top-down process, in which mainly local authorities are involved. Initiatives like this can be useful for the NRAs in their knowledge building.

*The German **Sustainable Development Strategy (2016)** outlines the importance of sustainable development for the Federal Government's policies. All federal institutions are called upon to contribute to the achievement of particular targets in their own fields. Among them, there are specific mobility goals, which state that mobility should be guaranteed while protecting the environment. The Strategy outlines three mobility indicators and sets targets for them. The first and second indicators are about final energy consumption in freight and passenger transport, with targets for each of them to achieve a decrease of 15-20 % until 2030. The third indicator is a population-weighted average travel time with public transport from each stop to the next medium-sized / large city. Aligning with the overarching national strategies is essential to ensure consistency across different industries and organisations. The NRAs have to make sure their policies and objectives are in line with the wider national targets and ambitions.*

*France's ambition to change people's behaviour towards more sustainable mobility choices is embodied in the **National Strategy for Clean Mobility**, published in 2016, following the 2015 energy transition law. The Strategy includes six key objectives, where four are directly related to Mobility Management.*

These four objectives are: mitigating the demand for mobility, optimizing the use of existing vehicles and networks, developing carpooling, and creating incentives for modal shift. It was not possible to ascertain whether the French NRA is involved in the development of this strategy and whether the principles of this strategy are embodied in its own policies. Active participation in workstreams like this on the national level would be important for the NRAs.

In 2016, the Finnish NRA published a report examining its own role in supporting the national strategy and sustainable development in general. The report defines MM as an essential tool for reaching these goals. The aim in the National Energy and Climate Strategy for 2030 is to reduce CO₂ emissions from the transport sector by 50%. Around 30% should be achieved through improving the energy efficiency of the transport system and the rest by more efficient vehicles and increasing the use of renewable fuels.

*In 2011, in Portugal, a national reference framework, entitled **Mobility Package**, was developed for addressing issues related to mobility, transport, accessibility and territory. This work produced a number of technical guidelines, legislative proposals, national and local workshops, facilitated further communication and provided technical support for sustainable mobility projects. In the area of sustainable mobility some major programmes underway are: decentralization of the urban transport sector, the decarbonisation of the public transport fleet, the expansion of the Lisbon Metro and Porto Metro Networks, the electric mobility and the soft mobility programme. Developing mobility packages like this can be useful for the NRAs as well.*

1.2 Role in Mobility Management

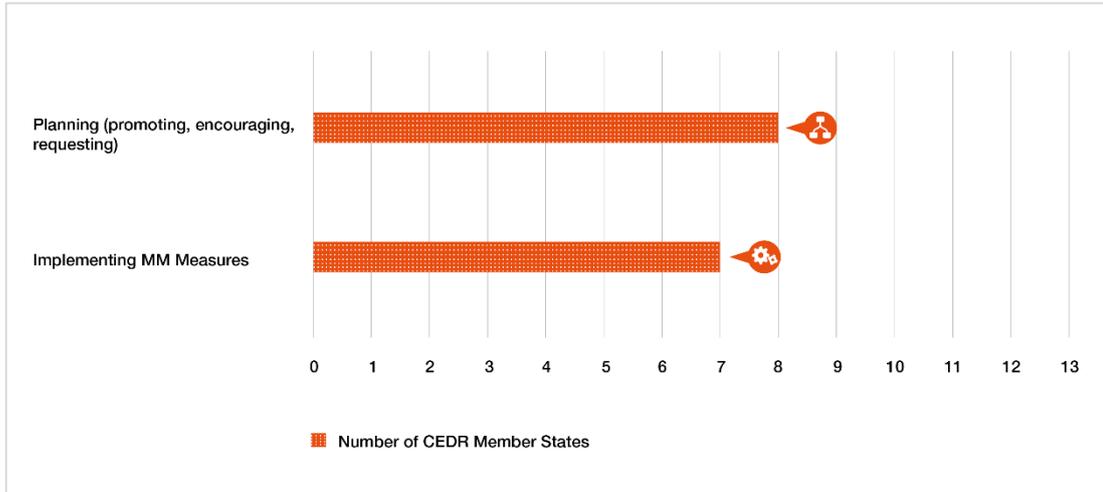
1.2.1 Planning and Implementation

The study shows that Mobility Management, as a standalone discipline, rarely sits in the domain and mandate of CEDR members or NRAs because their typical and primary role is to supply and maintain the road network. This means they do not tend to have a leading and driving role in Mobility Management but rather a supporting and influencing role. Despite this, three CEDR members (Cyprus, Norway and Finland) specified that they have somewhat a leading role in Mobility Management. From responses provided, it was identified that eight CEDR members are involved in Mobility Management planning as part of their regular role. This usually involves promoting, encouraging and requesting Mobility Management as part of their everyday activities and projects.

It was also identified that seven CEDR members are involved in Mobility Management **implementation** as part of their regular role. This usually involves direct or indirect, full or partial involvement in projects aiming to influence and change mobility patterns.

Figure 4 below summarises responses obtained from CEDR members in relation to their role in Mobility Management.

Figure 4: Involvement of CEDR members in planning and implementation of Mobility Management



**Number of CEDR members that clearly stated in their responses and for which it was possible to identify from their responses that they are involved in Mobility Management planning and implementation.*

The Finnish NRA has been organising Mobility Management since 2010, providing national coordination and expert services through the state-owned company Motiva Ltd. Motiva coordinates the national Mobility Management expert network, the European Mobility Week and sharing of experience through stakeholders all over Finland. The NRA also has been granting subsidies to municipalities since 2012. Since the launch of the national subsidy scheme, the Mobility Management work has become better established in smaller municipalities as well.

The Norwegian NRA is often involved in the implementation of Mobility Management measures in cooperation with public transport administrations and operators with the objectives of achieving a more sustainable transport system, managing long-term events affecting the transport network capacity, and for piloting new mobility services.

1.2.2 Different Scenarios

CEDR members use Mobility Management as part of different scenarios and situations, from normal everyday network operations to particular road scenarios, such as planned and unplanned road events.

Figure 5 below provides a summary of responses received from CEDR members on what situations they use Mobility Management in.

Figure 5: Involvement of CEDR members in Mobility Management in different scenarios



**Number of CEDR members that clearly stated in their responses and for which it was possible to identify from their responses that they are involved in the situations listed above.*

As it can be seen in **Figure 5**, the majority of CEDR members indicate that they use Mobility Management for planned events on road network such as roadworks and social events, and unplanned events on road network such as accidents and severe weather.

Such distribution of answers indicates that Mobility Management is mainly used to resolve and improve short-term and local road situations, both planned and unplanned. Sometimes, however, Mobility Management is used for more strategic objectives, for example to support road works, and for a wider scale, for example for a region (for example, in the Netherlands).

However, the responses provided indicate that the understanding of Mobility Management and Traffic Management is often mixed up. For unplanned events, incident management and traffic management systems are often mentioned as examples of Mobility Management, although they are not.

Only few countries exercise Mobility Management as part of their normal road network operations to promote and encourage the use of other travel options. For example, in the Netherlands the concept of Smart Mobility promotes alternative mobility options to travellers, such as alternative modes, alternative routes, alternative travel time or not to travel at all.

1.2.3 Good Practice

The MODBEAR research identified some good practice examples in relation to the NRA roles and involvement in Mobility Management. These examples are outlined below:

- The Swedish NRA has had the leading role in developing and promoting the so-called **Four Step Principle**, a method used to identify the most appropriate measures to a particular transport problem or situation.

The four steps refer to (1) measures that effect a change of travel patterns, (2) measures that optimise the use of the existing road network, (3) minor road improvements (reconstruction) and (4) major road improvements (new construction). This approach allows to distinguish between various situations and to choose the most suitable, feasible and cost-efficient measures to address a particular transport problem. The Four Step Principle is used by both the national authority in their planning activities but also by regional and local authorities in transport and infrastructure planning.

In addition to the MODBEAR research findings, the Project Team compiled a list of some other good practice examples in relation to the NRA role and involvement in Mobility Management. These examples are presented as additional case studies below.

Case studies (additional input of the Project Team)

*Since late 1990s, the Austrian Federal Ministry of Sustainability and Tourism (BMNT) has been taking the national responsibility for Mobility Management. Since 2004, it has been leading the climate protection initiative in transport, known as **Klimaaktiv mobil**¹, which aims to reduce greenhouse gas emissions associated with transport. In partnership with the Ministry of Transport, Innovation and Technology (BMVIT), BMNT has developed the new national strategic framework for implementing the EU Climate and Energy framework known as the Integrated Energy and Climate Strategy. In this strategy, the transport sector is highlighted as one of the most important sectors to reduce greenhouse gas emissions. Additionally, a new action plan for competitive and clean mobility is under elaboration jointly by the same ministries, as well as the Federal States, the cities, the business sector, academia and other stakeholders.² This case study illustrates how the NRA (BMVIT in this case) can be involved in planning of and policy-making for Mobility Management.*

*As part of **the Climate Policy Programme for 2009-2020**, the Finnish Transport Agency (the FTA) is assigned to look after national coordination of Mobility Management by the Ministry of Transport and Communication. This role was strengthened in 2016 when the FTA published a report examining its own role in supporting the national strategy and in supporting state's sustainable development. In their work, the FTA see and define Mobility Management as an essential tool for achieving both. The FTA use top-down approach to make Mobility Management known at a local level and to spread the use of best practices.³ This example illustrates how the NRA (the FTA in this case) can get involved and have a leading role in Mobility Management planning and implementation.*

¹ www.klimaaktivmobil.at

² EPOMM (2018) Mobility Management Strategy Book, Austrian section.

³ EPOMM (2018) Mobility Management Strategy Book, Finnish Section.

*In Germany, on the national level, the Federal Ministry of Transport and Digital Infrastructure (the NRA) is, among other matters, responsible for shaping mobility in an environment- and climate-friendly way.⁴ Among the projects serving this purpose are **the Federal Transport Infrastructure Plan**, the evolution of **the Mobility and Fuel Strategy** and the promotion of local public transport, cycling, electric mobility, noise mitigation, and EU policy issues. The NRA is hence responsible for the development of encompassing strategies and objectives that go beyond Mobility Management and establish a connection between transport, energy and climate change long-term goals. This is a good example of how the NRA can be involved into Mobility Management policy-making on the wider national and cross-disciplinary level.*

*In Italy, the Ministry of Infrastructures and Transport, the Ministry of Environment and the Ministry of Economic Development are in charge of mobility-related matters. The role of the Ministries is to **implement policies on the national level** through laws, regulations, incentives, etc. The first Ministry covers land use planning and infrastructure, the second one covers environment and climate change, and the third one grants incentives, in particular for the automobile market and fuels with low environmental impacts. This is a demonstration of how the bodies at the national level contribute to the Mobility Management policy-making and implementation and ensure consistency across different sectors. The NRAs can follow this example and get involved in associated and relevant workstreams.*

*The Portuguese Institute of Mobility and Transport, I.P. (the CEDR member) acts on matters related to the Ministries of Internal Affairs, Planning and Infrastructure, Environment, and Sea, under the supervision and authority of the Minister of Planning and Infrastructure. The mission of The Institute of Mobility and Transport, I.P. is to perform the **functions of a technical regulation, licensing, coordination, supervision and planning on transport and mobility related issues**. It also has responsibilities in the management of concession contracts granted by the State in the specified sectors. This is an example of the establishment of a national level body that is dedicated to Mobility Management and related tasks and that also acts as a CEDR member.*

*In April 2017, the UK national government (for England and Wales) has produced a **Cycling and Walking Strategy**, which drives policy on active travel. Each local authority is encouraged to develop a **Local Cycling and Walking Investment Plan (LCWIP)** aiming to increase cycling and walking by encouraging modal shift from short car trips.*

⁴ EPOMM (2018) Mobility Management Strategy Book, German section.

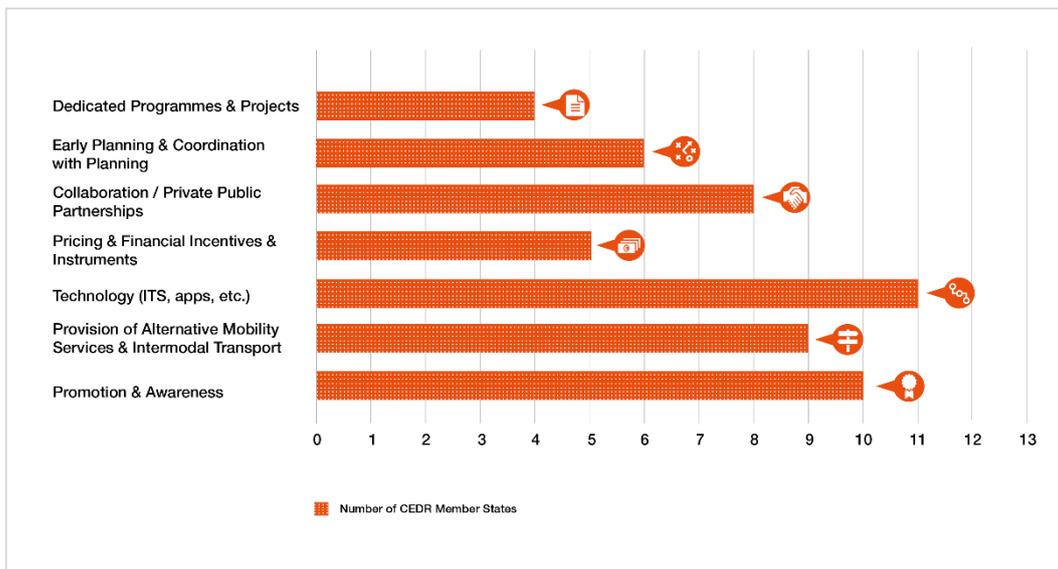
Local authorities who are interested in engaging with the strategy are eligible for technical and strategic support, as well as potential future funding. National support and guidance are often highly appreciated among regional and local authorities. Getting involved in initiatives like this on the regional and national level can be useful for the NRAs.

1.3 Measures and Challenges

1.3.1 Measures

CEDR member States use a variety of Mobility Management measures which differ in nature and application. Responses received from different CEDR members were analysed and merged into several groups for interpretation. Results of this assessment are presented in **Figure 6** below.

Figure 6: Mobility Management measures used by CEDR members



**Number of CEDR members that clearly stated in their responses and for which it was possible to identify from their responses that they use, implement or get involved in the implementation of the above listed Mobility Management measures.*

As it can be seen in **Figure 6**, CEDR members use and get involved in implementation of various Mobility Management measures. The majority of them widely use technological solutions such Intelligent Transport Systems, phone applications, etc. Equally, promoting and raising awareness of Mobility Management as well as early planning and coordination with wider spatial planning disciplines are other ways being used for Mobility Management implementation. Finally, nine out of 13 CEDR members responded that they already provide intermodal transport services and promote alternative travel options in some situations.

1.3.2 Monitoring and Evaluation

Ten out of 13 CEDR members stated that they monitor and evaluate the implementation of Mobility Management measures. However, the information provided indicated that experiences in this area differ considerably from one CEDR member State to another, both in terms of what is measured and what measurement methods are used.

Based on the responses provided by CEDR members, it was not possible to identify common trends on which Mobility Management measures had the greatest effect on travel behaviour and which measures proved to be the most cost-efficient.

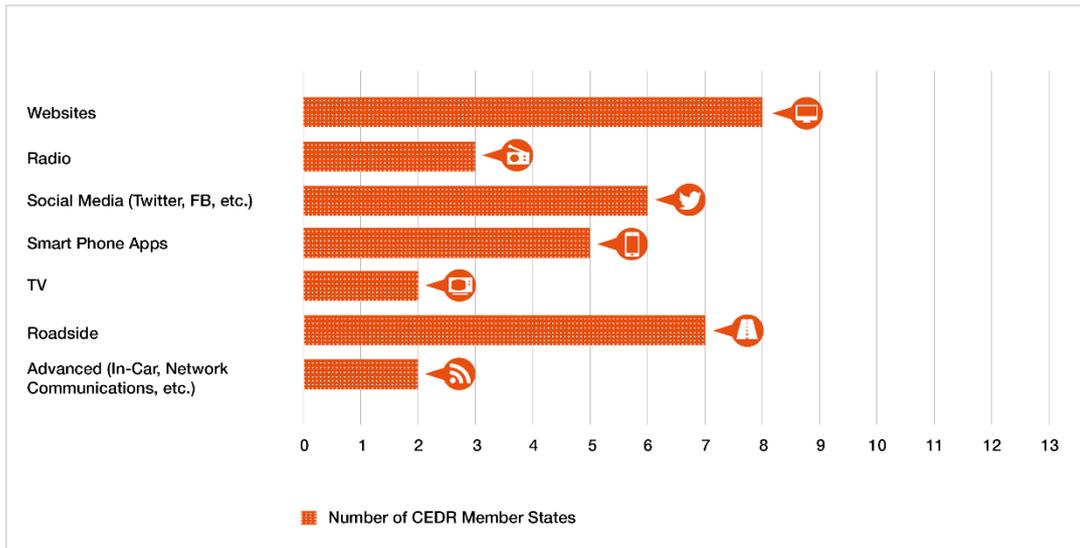
Generally, the knowledge level of the effectiveness and cost-efficiency of Mobility Management measures was found to be limited. This is mainly due to the lack of consistent evaluation methods and processes in place. Because of this, it was not possible to draw a consistent conclusion on common trends across CEDR members with regards to the effectiveness and cost-efficiency of various Mobility Management measures used.

Despite this, some CEDR members did provide information on some of their measurement and evaluation techniques. For example, Rijkwaterstaat, the Dutch CEDR member, specified that they use a dedicated evaluation indicator known as “peak-hour avoidance”. Every time one person does not travel by car, one peak-hour avoidance is achieved. During road works, the number of peak-hour avoidances required to keep congestion down to acceptable levels is calculated. Based on the results, preferred Mobility and Traffic Management measures are selected.

Other ways of evaluating Mobility Management measures are by measuring if information has reached the intended audience (Norway), or by monitoring that Mobility Management measures are being implemented by the relevant stakeholders (Ireland and Finland).

1.3.3 Media and Communication Channels

CEDR members use a variety of media and communication channels for the implementation of Mobility Management as part of their regular role. This is illustrated in **Figure 7** below.

Figure 7: Media and communication channels used for Mobility Management

**Number of CEDR members that clearly stated in their responses and for which it was possible to identify from their responses that they use these Media and Communication channels in Mobility Management (non-exhaustive list).*

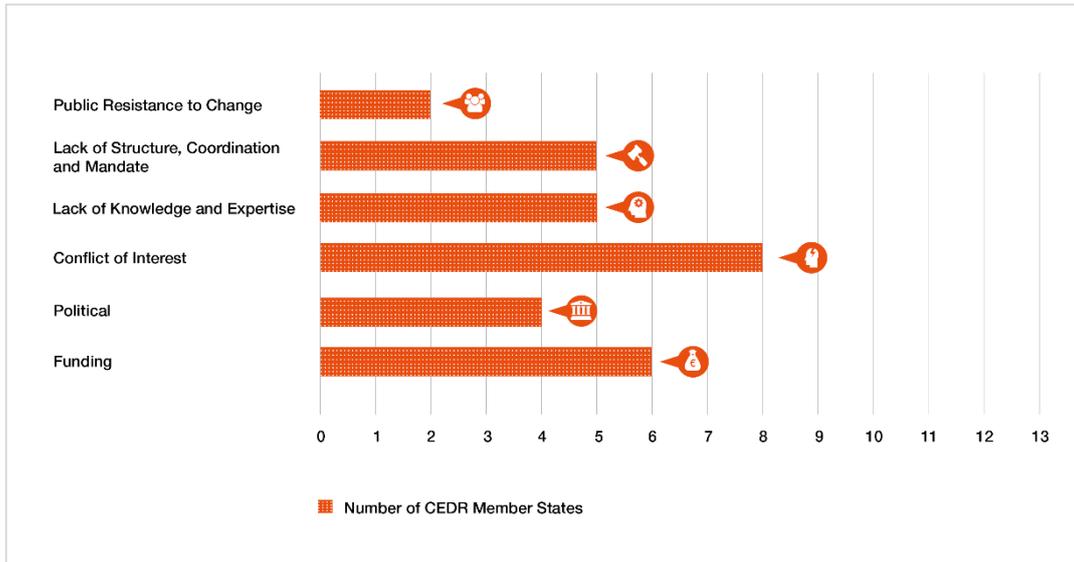
It can be seen in **Figure 7** that CEDR members mainly use websites and Roadside Technology (such as Variable Message Signs) for communication when implementing Mobility Management. Smart phone applications as well as Social Media are also common communication tools across CEDR members. Advanced technologies like in-car based or network communications are relatively new and were mentioned to be used in only two CEDR member States (Hungary and the Netherlands).

Media communication channels and other information technologies prove to be important tools for the NRAs in their everyday operations and particularly for planned and unplanned events. It was not possible to identify common trends and preferences with regards to the used tools and communications channels. The NRAs normally use several of them at the same time to target different audiences and for different purposes.

1.3.4 Challenges

When implementing Mobility Management measures, CEDR members encounter a number of challenges, the most relevant of which are listed in the **Figure 8** below.

Figure 8: Challenges in Mobility Management



**Number of CEDR members that clearly stated in their responses and for which it was possible to identify from their responses that they encounter the above listed challenges when implementing Mobility Management.*

Most of CEDR members stated in their responses that they experience conflicts of interest and priority when implementing Mobility Management. This indicates there are inconsistencies in the existing objectives across various policies, across different organisations and across different levels.

Another challenge observed is a lack of structure, coordination and mandate in Mobility Management planning and implementation which is somewhat related to the challenge described above.

An interesting observation from Ireland is that the lack of clarity in used terminologies creates confusion and is a challenge. For example, terms like workforce travel planning, travel plans, and mobility management might have similar meanings. A similar challenge is experienced by the Swedish NRA. Stakeholders do not know what Mobility Management in the construction phase is and how to work with it and confuse it with ordinary Mobility Management.

Six out of 13 CEDR members indicated that lack of funding is another problem affecting the implementation of Mobility Management.

A challenge experienced in the Netherlands is that the aim of the Optimising Use programme ('Beter Benutten') projects is not always what local authorities agree is needed.

1.3.5 Good Practice

The MODBEAR research identified some good practice examples with regards to the Mobility Management measures. These examples are outlined below:

- The Finnish Transportation Agency (FTA) supports and facilitates the deployment, piloting and development of **MaaS (Mobility-as-a-Service)**. The MaaS concept promotes mobility as one rather than split between different travel modes and focuses on providing customised and flexible mobility packages to people rather than single travel solutions. Getting involved in projects like this is important for the NRAs as they push the implementation of Mobility Management to an advanced level where there is no separation between road and other transport networks.
- In the Netherlands, a dedicated **Smart Mobility toolkit** was developed and is used to facilitate Mobility Management implementation. The toolkit represents a set of Mobility Management measures that are used to influence travel behaviour. These measures are grouped so that to allow and encourage travellers to consider alternative mobility patterns such as: choosing alternative travel routes, alternative travel modes, alternative travel times, alternative destinations, or choosing not to travel at all. Important tool used as part of this programme is better communication, such as offering small incentives and sending warning messages to users of a popular mobile app. The toolkit also implies collaboration with major employers and logistics companies to maintain optimal accessibility.
- Good practice measures implemented by the Swedish Transport Administration during road construction are Mobility Management campaigns such as **e-bike test** and **test riders on public transportation**. For example, one e-bike campaign covered 200 persons which were lent an e-bike for 3 months. The effects were savings of 90-140 kg CO₂/person during the study period because they used a bike instead of a car. The change of behaviour of these test bikers added up to the goal of decreasing the number of car trips during the period of road construction and to achieve improved accessibility for all.

In addition to the MODBEAR research findings, the Project Team compiled a list of other good practice examples of Mobility Management measures. These examples are presented as additional case studies below.

Case studies (additional input of the Project Team)

*In Finland, the NRA has been leading **the national Mobility Management coordination programme** since 2010 as a way to spread awareness, knowledge and best practices in Mobility Management. The coordination includes managing the national network of experts, organising the European Mobility Week and other knowledge sharing activities. By the end of 2016, the network had over 600 members. Similar national networks can be found in other countries, e.g. Belgium and Germany, but they are not always led by the NRA.*

*One example of projects encouraged by the Finnish NRA is **Aviapolis MaaS (Mobility-as-a-Service)**. The Aviapolis district consists of a large and expanding cluster of workplaces located around Helsinki-Vantaa international airport. In 2016, the City of Vantaa started to use the district as a testbed for new mobility services. The project started with an evaluation of the current mobility situation, and two innovative services were selected to be tested: **Go Now!** – a car-sharing service; and **VediaTaxi** – facilitating shared taxi rides. By the end of the pilot, the associated mobility apps had over 1,200 downloads and 400 registered users. Projects like this have the potential to push mobility to a new level where owning and driving a car is no longer necessary.*

*In France, companies with more than 100 employees have to set up **workplace travel plans** to reduce car use and promote public transport, cycling and carpooling. Such travel plans are mandatory since January 1st, 2018. In addition, companies must fund 50% of their employees' commuting fares. This initiative was established by the Ministry of Labour with more social and economic objectives in focus. This is a good example of how mobility at workplaces can be improved with support from the national level.*

*A similar supporting mechanism has been used in Italy since 1998, **the Decree on Sustainable Mobility in Urban Areas**, introduced by the Ministry of Environment. This decree introduced the position of a Mobility Manager for companies (both public and private) with more than 300 employees, in order to engage businesses and workers in identifying alternatives to the use of private vehicles. The decree requires adopting **the home-to-work mobility plans** for companies, defining the role of the Company Mobility Manager, and the creation of a support structure for the coordination of the Company Mobility Managers within each municipality.*

*In the Brussels Capital Region, an ordinance was approved **in July 2013 giving regulatory status to its new Regional Mobility Plan**. The purpose of the ordinance was to make regional and municipal mobility strategies and projects more consistent with one another.*

Currently, the IRIS 2 Mobility Plan Brussels Capital Region (2015-2020) is being implemented with measures promoting active modes and giving priority to public transport. Some examples of those measures are: cycling infrastructure and services, bus priority lanes and public space design, as well as promoting measure to rationalize car use and access control for residential areas. A third-generation mobility plan is being developed focusing on freight transport. This project has been carried out by the regional authority without the involvement of the NRA.

*The Government of Flanders (Belgium) supports **Mobility Management related research** by establishing **Support Centres**, which mainly consist of university partnerships of research groups and institutions. Examples of projects they focused on in the past years are: (1) the evaluation of dynamic traffic management at network level, (2) the use of a driving simulator in transport related issues, e.g. the impact of traffic calming measures in urban areas, (3) optimizing and updating of policy tools for mobility management, and (4) the development of a framework for the monitoring of accessibility in Flanders. This kind of research supports the government in making policy decisions and can also be useful for the NRAs.*

Within the Optimising Use programme ('Beter Benutten'), the Netherlands have implemented 354 measures in 2011-2017. Examples are stimulating public transport, improving road infrastructure, creating car pool and park and ride lots, bicycle parking and developing multimodal information services. It is estimated that a 19% reduction of congestion in the routes have been achieved in rush hours and resulted in around 48.000 rush hour avoidances per working day (one peak-hour avoidance is achieved every time one person does not travel by car).

*The City of Örebro did not have a particular focus on sustainable transport when **the urban mobility planning** process, that involved various measures, started. As a first step, capacity-building assessment was carried out in a working group as part of the self-assessment to identify knowledge gaps among the employees. The finding was that the municipality had a good detailed knowledge of transport-related issues, but mainly within narrow fields. To facilitate the implementation of **sustainable urban transportation**, a special unit – also responsible for raising awareness among employees and politicians – was set up. The unit has, among other things, planned seminars focusing on the reduced need for cars through spatial planning. Carrying out a capacity-building assessment is a good way of identifying knowledge gaps within an organisation.*

The City of Gent in Belgium set an aim to develop new approaches to change urban mobility, public space and people's minds to make the city more livable for its children in 2050. To achieve this, a special 'Transition Arena' was created. It comprised a group of creative people from various backgrounds including young entrepreneurs, citizens, architects and transport professionals. The project was initiated by the City's Environmental Department and Mobility Department. As part of this initiative, 'The Living Street' project was tested by citizens. For one month, two city streets were closed for the road traffic and turned into a car-free zones allowing temporary street furniture and creating places for residents to meet. New forms of mobility were tested such as e-bikes, cargo bikes and other shared services⁵. Citizens' involvement can strengthen the implementation of measures and will help gaining approval for new projects and measures.

The German Sustainable Development Strategy (2016) outlines the importance of sustainable development for the Federal Government's policies. All federal institutions are called upon to contribute to achieving particular targets in their own fields. Among them, there are specific mobility goals, which state that mobility should be guaranteed while protecting the environment. The strategy outlines three mobility indicators and sets targets for them. The first and second indicators are about final energy consumption in freight and passenger transport, with targets for each of them to achieve a decrease of 15-20 % until 2030. The third indicator is a population-weighted average travel time with public transport from each stop to the next medium-sized/large city. This case study shows the type of targets and indicators that can be used for the evaluation and measurement of the Mobility Management measures.

*In Ireland, the Government introduced the **TaxSaver scheme** in 1999 which incentivises people to use public transport to and from work. As part of this scheme, employers can purchase monthly or annual tickets for their employees. The cost of these is then deducted directly from the employees' gross salary. As a result, significant savings of between 29% and 52% can be made off the regular price, depending on ticket type and the employees' tax band. Schemes like this promote the use of sustainable transport.*

MaxSumo is a tool for planning, monitoring and evaluating Mobility Management measures and projects developed in the MAX-project⁶.

The aim of MaxSumo is to break down the complex process of behavioural change into smaller steps that can be monitored with ongoing implementation, and possible deviations can be corrected at early stages.

⁵ StadGent Klimaatverbond, 2012

⁶ MAX-project – Successful Travel Awareness Campaigns and Mobility Management Strategies, 2006-2009.

It is a standardised and systematic method which also makes it possible to compare progress between projects. MaxSumo can be used for single measures as well as for combined measures and projects.⁷

*Another evaluation tool related to Mobility Management, also developed in the framework of the MAX-project, is **MaxQ, a quality management method** focusing on developing, monitoring, assessing and improving the Mobility Management policy and work of an organisation. The method helps to find strengths and weaknesses and to continuously improve services provided by the organisation in a consistent manner.⁸*

From the questionnaire responses, it was not possible to draw consistent conclusions on which measures are the most effective and the most cost-efficient. However, information and experiences gained from other sources indicate that the following Mobility Management measures are regarded as effective:

- ***Promotion and awareness campaigns** aim to provide travellers the most up-to-date information on available and the most effective travel options in different situations and through different media and communication channels.*
- ***Targeted behaviour change campaigns**, such as targeting test travellers on public transport, cyclists, or personalised mobility advice are effective tools to achieve behavioural change in relation to both planned events and everyday mobility. Examples from France, Sweden, Finland, the Netherlands highlight that a combination of supply and demand measures are the most successful combination.*
- ***Workplace travel plans** are an efficient way of reaching particular target groups for a certain geographical area, for example workplaces close to a road construction site, encouraging and achieving changes in travel behaviour. Experiences from France and Italy show positive results of travel plans.*
- ***Travel data provision** is crucial for travellers as it allows them to make timely decisions on their destination, route and mode choices. Travel data is provided through a variety of media and communication channels, from VMS signs on the roads to travel applications, websites and radio.*

*It was also identified that **providing good infrastructure for pedestrians, cyclists and public transport users is essential** to maximise the benefits of the above listed soft measures.*

Complementary mobility services like bicycle rental, adequate infrastructure and a good public transport offer is key to achieve long-term benefits.

⁷ <http://www.epomm.eu/index.php?id=2602>

⁸ <http://www.epomm.eu/index.php?id=2757>

For example, in Aberdeen (Scotland) Park and Ride sites⁹ were established in order to encourage sustainable transport. On major routes into the city, necessary facilities were provided to assist commuters and visitors travelling into Aberdeen to complete their journey by sustainable transport means, such as bus services, walking, cycling or car-sharing.

*Of no less importance is providing and ensuring **intermodality** and **integration** of various travel modes as it makes non-car trips more effective and more attractive.*

1.4 Funding

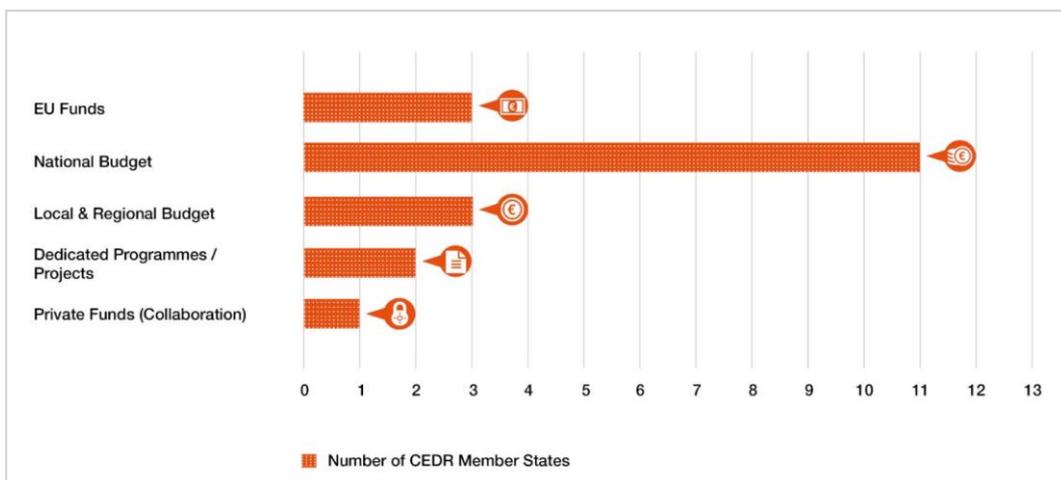
1.4.1 Funding Mechanisms

The MODBEAR research indicated that there are different funding mechanisms used for Mobility Management in different CEDR member States.

Mobility Management is more often financed by designated funds coming from EU, national and local budgets. It is often the case that Mobility Management is financed by a combination of various funding mechanisms, for example from a local budget and partly by the NRA where the NRA is involved. This normally happens when Mobility Management is implemented as part of a dedicated project or programme as it happens in Greece and the Netherlands.

The results of the analysis of the funding mechanisms used for Mobility Management across CEDR member States are presented in **Figure 9**.

Figure 9: Main Funding Mechanisms for Mobility Management



**The amount of CEDR members that clearly stated in their responses and for which it was possible to identify from their responses that they use the above-mentioned funding mechanisms for the implementation of Mobility Management measures.*

⁹ <https://www.aberdeencity.gov.uk/services/roads-transport-and-parking/public-transport/park-and-ride#1911>

As it can be seen in **Figure 9**, in 11 out of 13 CEDR member States funds for Mobility Management are drawn from the national budget. Regional and local funds are stated to be used in three CEDR member States. Three CEDR members specified they also use dedicated EU funds for Mobility Management.

One CEDR member (Rijkswaterstaat, the Netherlands) indicated private funds can also be used as part of a combination.

1.4.2 NRA Funding

With regards to the NRA role in Mobility Management funding, where Mobility Management does not sit within a remit of a particular NRA, it is rarely funded by the NRA funds. Despite this, NRAs do provide funding for Mobility Management when they are involved in a project that requires of them to implement Mobility Management measures. In this case, funding usually comes from the NRA budget. According to the questionnaire responses, only seven out of 13 CEDR members who replied stated that they fund Mobility Management. That is the case for Austria, Cyprus, Estonia, Finland, Greece, and the Netherlands.

Sweden is currently going through an internal process aiming to identify what measures can be financed by the NRA and under what circumstances. Generally, provision of physical measures supporting the travel behaviour change and associated information campaigns can be funded by the Swedish NRA. However, improvements of other travel mode services as well as dedicated behaviour change measures have to be funded by other stakeholders.

1.4.3 Good Practice

The MODBEAR research did not identify any relevant good practice examples or preferred models in relation to the funding of Mobility Management. However, the Project Team compiled a number of case studies showing how Mobility Management is funded in different countries. These examples are outlined below:

Case studies (additional input of the Project Team)

*The federal government in Belgium recently invested 4 million euros in a **smart-mobility call** to support projects that focus on mobility and open data. With this project, the government wants to give a financial boost to the most promising initiatives that are still under development. In particular, the government wants to support projects that ensure a better integration of the transport networks, in line with an intermodal, sustainable, digital and connected mobility policy. The NRA is not directly involved in this project, but its principles can be an important inspiration for the NRA to set up and fund such initiatives.*

*The Ministry of Transport and Communications through the Finnish Transport Agency has a leading role in Mobility Management in Finland. Since 2012, the **national government subsidies have been used to promote Mobility Management** work on a local level (€900.000 per year). The support involves funding projects for cities, municipalities, regional bodies and non-profit*

organisations, specifying that the subsidies must be used for marketing, information and service development that promote favourable modal choices. Since the launch of the national subsidy scheme, Mobility Management work has become better established in smaller cities as well as bigger ones.

*The Austrian **Klimaaktiv mobil financial support programme** funds CO₂-reducing mobility projects for companies, municipalities and associations up to 20 % of environment-related investment costs. If a project proves to be successful, an additional 10 % bonus can be given. Funding focus is on promotion of cycling and walking and electric mobility and other alternative travel options.¹⁰*

*In Germany, the federal government supports the federal states and local authorities on their public transport projects with **dedicated regional funds** and thus makes a considerable contribution to the environmentally friendly mobility. The funding programme is regulated via special financial acts, the Disentanglement Act and the Community Transportation Financing Act.*

*The Urban Agreements in Norway are **binding agreements** between the state and the urban areas. The objective of the agreements is to achieve zero growth in car traffic in the nine largest urban areas in Norway. To receive additional state funding for investment and operation of public transport and other environmentally-friendly forms of transport, environmental goals need to be achieved as part of the agreements. Four out of nine urban areas have signed the agreements. They are Oslo/Akershus, Bergen, Trondheim and Stavanger. The Urban Agreements scheme has been successful in making local authorities adhere to the zero-growth goal for car traffic and promoting walking, cycling and public transport.*

*The **Optimising Use programme ('Beter Benutten')** in the Netherlands is co-funded by the State, the regional governments and the business sector (50-50%). A total of €1.7 billion has been invested into the programme by the participants. The programme was created in 2011 and runs until mid-2018. The programme aims to support projects that reduce congestion and improve travel times. Programmes like this provide a platform for joint funds to be accumulated and used for mobility related projects.*

This programme was launched by the Ministry of Infrastructure and Environment. The Dutch NRA, Rijkswaterstaat, is one of the partners within the programme.

¹⁰ EPOMM (2018) Mobility Management Strategy Book, Austrian section

*A new **Cycling and Walking Strategy for England** was published in April 2017, which for the first time included legally binding targets as well as a five-year plan and funding (£ 1.2 billion, of which £ 316 million is from central government). The Government wants cycling and walking to become the norm by 2040 and will target funding in innovative ways to encourage people walking and cycling for shorter journeys. In addition, local authorities will be encouraged to implement **Local Cycling and Walking Infrastructure Plans** and there will be strategic and technical support provided by the Department for Transport and its partners.*

*In the United Kingdom, the Department for Transport provided £540m to the **Local Sustainable Transport Fund (LSTF) 2011-2015 programme**. LSTF was designed to implement **the 2011 Creating Growth and Cutting Carbon Strategy**. It was delivered via 77 local authorities. Twelve large projects received over £5m of funding and 84 smaller projects received under £5m funding. LSTF was an objective-based fund that sought to support the local economy and facilitate economic development, for example by reducing congestion, improving the reliability and predictability of journey times, or enhancing access to employment and other essential services. It also aimed to reduce the carbon emissions, for example increasing the volume and proportion of journeys made by low carbon sustainable modes, including walking and cycling.*

*The development of **an Urban Consolidation Centre** in Bristol in May 2004 was designed to serve a major retail area of 350 commercial establishments. It was initially realized within **the CIVITAS European Program framework (Vivaldi project)**. Third party logistics companies were invited by the Bristol City Council to bid to operate the city centre. This case is a good example of a public private partnership and an interesting case showing how private parties can support financially with transport- and mobility-related objectives.*

*In Finland, there is **a national Mobility Management expert network** that includes stakeholders from various fields, such as healthcare, education, environment, transport and others. The network facilitates the communication and collaboration between various parties and also provides a platform for project and funding synergies that are beneficial for all parties involved. Up to date, a minimum of six mobility-related programmes were financed with funds coming from various stakeholders that are part of the Mobility Management expert network. This network is managed by the state-owned company Motiva Ltd that supports the Finnish NRA in its Mobility Management knowledge building and sharing.*

With regards to the actual funding sources, funds for Mobility Management can be drawn from the same channels that are used to collate funds for any transport or infrastructure-related programmes and projects.

Some of the funding sources are particularly appropriate to Mobility Management as they are designed to support such objectives as sustainable transport, more accessible land use development and pollution reductions. Examples are described below:

- **Transportation Impact Fees:** *These are fees paid by developers based on the transportation costs imposed by their projects. This way of funding is common in the USA. Successful examples can be found in Bellingham, Shoreline and Santa Monica.*

In France, a comparable fee can be found. The transport tax (Versement Transport) requires employers with more than nine staff to contribute towards local public transport investment and operational costs.

- **Road Pricing:** *Some countries and cities use road tolls and congestion fees to fund transportation programs, including the provision of the road infrastructure, transport improvements and Traffic Demand Management programs. For example, Norway applies road pricing in three of its urban centres: Trondheim, Oslo and Bergen. Revenues are being used for road infrastructure, public transport, pedestrian and bicycle facilities.*
- **Vehicle impact mitigation fees:** *This is a fee on each vehicle registered in the region to pay for programs and projects that serve motorists and mitigate the negative impacts caused by vehicle traffic. For example, in Germany, a mineral oil tax and various environmental taxes on vehicles and parking facilities are applied, which later are used to fund public transport related projects.*

It was not possible to identify cases where the NRAs would allocate funds collected through the sources specified above to the projects associated with Mobility Management. Appropriate mechanisms should be put in place so that the NRAs could avail of this opportunity and so that the ultimate allocation of the funds is linked with the actual fund sources.

1.5 Stakeholders

1.5.1 Sector Cooperation

Identifying the different stakeholders that are involved in Mobility Management can provide insight into the level of awareness, planning, implementation and integration of Mobility Management within CEDR member States. Cooperating with appropriate stakeholders can be an important step towards a holistic approach to Mobility Management planning and implementation.

The research identified a variety of stakeholders that are involved in Mobility Management from public authorities to private companies. The results are presented in **Figure 10**.

Figure 10: Main Stakeholders in Mobility Management

**The amount of CEDR members that clearly stated in their responses and for which it was possible to identify from their responses that they interact with the above listed stakeholders for Mobility Management planning and implementation.*

As it can be seen from **Figure 10**, across all CEDR member States, the NRAs mainly interact with local and regional authorities as 10 CEDR members stated so. Local and regional authorities are important stakeholders for many CEDR members as their local and regional plans tend to incorporate plans on relevant parts of the national road network the operation of which normally sit within a remit of the NRA.

In comparison, only seven CEDR members stated that they work with national bodies. This presumably indicates that the level of cooperation and coordination between national bodies is quite low.

Only seven CEDR members stated that they liaise with transport operators, which presumably indicates the cross CEDR level of cooperation between the NRAs and actual operators and providers of public transport services is quite low. Similarly, almost half of all CEDR members mentioned they work with parties like private companies, manufacturers and developers.

In four CEDR member States (Austria, Denmark, Finland and Greece), CEDR members highlighted that universities and research institutes are also involved in Mobility Management as part of some projects. Transport Infrastructure Ireland and the Swedish Transport Administration, Trafikverket, mentioned that they tend to involve specialised consultants as part of the wider projects to advise on various operational aspects including Mobility Management.

1.5.2 Cross-sector Cooperation

In five countries (Estonia, Finland, Germany, Greece and the Netherlands), CEDR members indicated that there is cooperation with bodies from non-transport related industries in relation to Mobility Management, for example with various bodies in the health sector, navigation and mapping, environment, energy, economic affairs, communication, spatial planning etc.

Although being essential for consistent and integrated efforts in Mobility Management, cross-discipline cooperation is not very widespread across CEDR States at present as per results obtained.

1.5.3 Good Practice

The MODBEAR research identified some good practice examples with regards to the Mobility Management stakeholders. These examples are outlined below:

- The Finnish Transport Agency (FTA) has established the largest national **Mobility Management network** in Europe with over 600 professionals who are provided with newsletters, invitations to national meetings, links to webinars and social media releases. The presence of an extensive and well-developed network of Mobility Management professionals facilitates the dialogue on Mobility Management topics and creates a platform for Mobility Management planning and implementation, which facilitates communication and collaboration between the members. Stakeholders from various industries can contribute to the network, for example, from healthcare, education, environment, transport, etc. The network is managed by the state-owned company Motiva Ltd. that supports the Finnish NRA in its Mobility Management knowledge building and sharing.
- The Netherlands run the dedicated **Optimising Use programme** that encourages innovative collaboration between various stakeholders for a better and optimised use of the existing infrastructure and focuses on local improvements. In particular, the programme encourages the State, regional authorities and private sector companies to work together. Specially designated programmes and projects like this prove to be an effective mechanism for Mobility Management implementation. The Dutch NRA is one of the partners of the programme and has a strategic role. They are usually not directly involved in every project.
- In Germany, there is a **dedicated central platform for Mobility Management**, known as **DePOMM**, which was initiated to exchange experience and to inform on various Mobility Management measures. The presence of a dedicated networking and promoting platform helps to promote Mobility Management and establish a firm dialogue between all stakeholders.

In addition to the MODBEAR research findings, the Project Team compiled a list of some other good practice examples in relation to the Mobility Management definition and policies. These examples are presented as additional case studies below.

Case studies (additional input by the Project Team)

Aberdeen in Scotland became the first winner of the European Commission's Sustainable Urban Mobility Plans (SUMP) Award in 2012. Aberdeen showed an outstanding participatory approach on how to involve stakeholders and citizens in the SUMP development process.

*The developed **Communications Plan** indicated the appropriate stages at which stakeholders could be consulted as well as frequency, method and format of communication with stakeholders and citizens. The draft **Sustainable Urban Mobility Plan** had its key elements drawn from the problems and solutions that Aberdeen City and Shire citizens and stakeholders identified. Stakeholder involvement is an important element in the transport planning process and an example like this can act as inspiration for NRAs.*

*In 2006, the City Council of Odense in Denmark decided to develop a **traffic plan** that would lead to the closure of the two biggest through roads of the city and link its city center with the north of town. In 2007, work began on a comprehensive **Traffic and Mobility Plan**. It started out as a classic traffic plan but eventually covered not only roads and cars but people and the quality of life in the city. The City Council involved numerous stakeholders in the process from citizens living in the area to companies, organizations and other large user groups interested (cycling associations, retailers, sports clubs and associations representing older people and the handicapped). After numerous and extensive consultations and promotion campaigns, the Traffic and Mobility Plan was finally approved unanimously by the City Council¹¹. Stakeholder involvement is an important element in the transport planning process and an example like this can act as inspiration for NRAs.*

*Since the late 1990s, the Austrian Federal Ministry of Sustainability and Tourism (BMNT) has been taking the national responsibility for Mobility Management. Since 2004, it has been leading the climate protection initiative in transport, known as **Klimaaktiv mobil**¹², which aims to reduce greenhouse gas emissions associated with transport. In partnership with the Ministry of Transport, Innovation and Technology (BMVIT), BMNT has developed the new national strategic framework for the implementation of the **EU Integrated Energy and Climate Strategy**. In this strategy, the transport sector is highlighted as one of the most important sectors to reduce greenhouse gas emissions. Additionally, a new action plan for competitive and clean mobility is under elaboration jointly by the same ministries, as well as the Federal States, the cities, the business sector, academia and other stakeholders.¹³ Collaboration between BMNT and BMVIT has been successfully growing and presents a good example of how national level bodies can team up for the joint objectives.*

¹¹ CIVITAS Vanguard, 2011

¹² www.klimaaktivmobil.at

¹³ EPOMM (2018) Mobility Management Strategy Book, Austrian section.

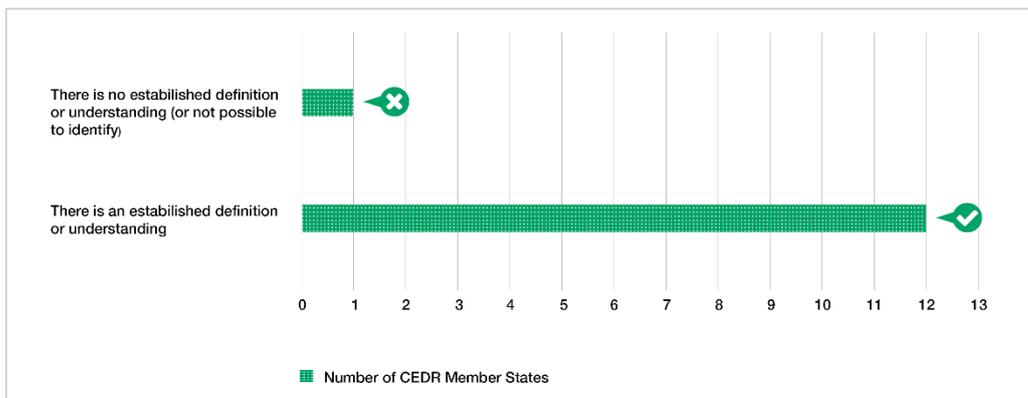
2 Findings: Traffic Management

2.1 Definition and Policies

2.1.1 Definition

The majority of the CEDR members have a clear definition and/or understanding of Traffic Management. Only one CEDR member, the General Directorate for National Roads and Motorways in Poland, provided too little information and it was not possible to identify whether they have an established definition or not. This is illustrated in **Figure 11**.

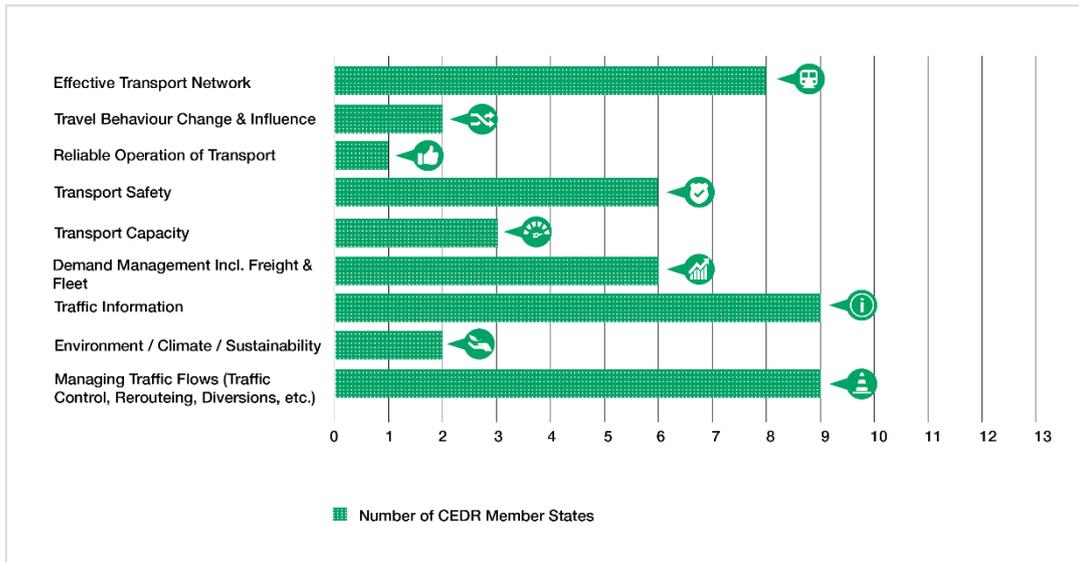
Figure 11: Traffic Management Definition and Understanding



**The amount of CEDR members that clearly stated in their responses that they have a definition for Traffic Management or for which it was possible to identify from their responses that they have an established understanding of Traffic Management concept.*

A definition that is common for many CEDR members describes Traffic Management as a management of traffic flows (people, vehicles and goods) with the help of demand management, traffic information, traffic control and other measures. Key focus areas of Traffic Management definition and concept across various CEDR jurisdictions are presented in **Figure 12**.

Figure 12: Key Focus Areas of Traffic Management Definition and Concept



**The amount of CEDR members that clearly stated in their responses and for which it was possible to identify from their responses that their Traffic Management concept is focused around the above listed aspects.*

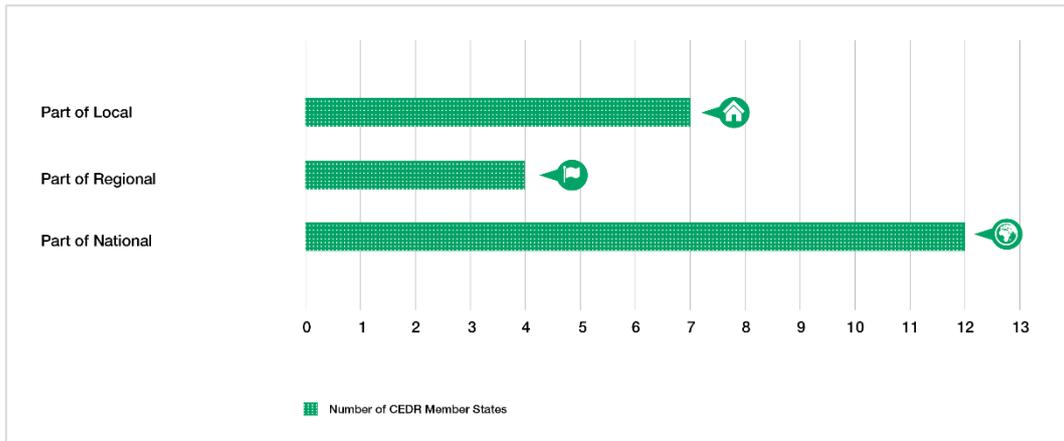
As it can be seen in **Figure 12**, nine out of 13 NRAs mention traffic information and traffic control as key focus points of their Traffic Management concept. Eight NRAs also specified effective transport network being the cornerstone of their Traffic Management approach. Six CEDR members replied that transport safety and demand management (including freight and fleet management) are elements of their Traffic Management concept.

Only two CEDR members specified that their Traffic Management concept is focused around behavioural change (Finland, the Netherlands) and climate change (Germany, Greece).

2.1.2 Policies

The research results indicated that in many CEDR member States there is a dedicated Traffic Management document or policy that sets general guidelines for Traffic Management implementation. Sometimes these documents are more focused on the description of actual operational procedures rather than on setting strategic aims and objectives, such as behavioural change, in Traffic Management.

In many CEDR member States, Traffic Management is also covered by wider national policies and strategies. In some cases, it forms part of regional and local policies and strategies as well, but this varies a lot among the CEDR member States. **Figure 13** summarises the extent to which Traffic Management is covered by various policies and strategies across CEDR jurisdictions.

Figure 13: Traffic Management Policies

**The amount of CEDR members that clearly stated in their responses and for which it was possible to identify from their responses that Traffic Management is covered by wider existing national, regional and local policies.*

As per responses provided, local and regional strategies are more common for larger cities or metropolitan areas with, presumably, a more complex traffic situation. There are also examples of regional and local departments that operate according to national regulations and guidelines. Norway, for instance, has a number of regional Traffic Management centres operating on regional and local road networks according to national regulations and guidelines.

2.1.3 Good Practice

The MODBEAR research identified some good practice examples in relation to the Traffic Management definition and policies. These examples are outlined below:

- **EasyWay Guidelines**¹⁴ is the best practice document used by many European countries. EasyWay is a trans-European project co-financed by the European Commission focusing on the deployment of Intelligent Transport Systems (ITS) for roads. EasyWay involves 30 European countries in a platform bringing ITS expertise together. The main objectives of EasyWay are to improve safety, reduce congestion, reduce environmental impacts, and promote the continuity of services at regional and European level through the coordinated deployment of real-time information, traffic management and freight and logistics services.
- The EasyWay Guidelines developed within the platform are a first step to harmonise ITS deployment in Europe by creating a common definition, harmonisation focus, requirements and recommendations.

One CEDR task identified in the Strategic Action Plan is to provide the structure and means for a close cooperation between the European

¹⁴ <https://dg.its-platform.eu/DGs2012>

Commission and NRAs for the deployment of EasyWay Guidelines and future challenges regarding ITS. (See task N7 – ITS)¹⁵.

- CEDR has a dedicated workstream aiming to **harmonise network operation services** and particularly **decrease the congestion**. One of the CEDR strategic tasks is to understand and deal with **the increased use of individual mobile devices and information** and identify how that affects transport management. To date it was identified this increase is likely creating independent behaviour with positive effects on congestion and affecting the existing centralised traffic management. (See **task N6 – Congestion**)¹⁶.
- In the Netherlands, Mobility Management and Traffic Management are merging into one **Smart Mobility concept** and are no longer seen and treated as separate and different elements. This integration of two concepts allows to establish a universal and fully integrated approach on how the entire transport network is managed, no matter if it is a private or public transport.
- In Norway, there is a new **Guideline for Traffic Management**¹⁷ (2017) where requirements for design of traffic management systems and functionality are described. The guideline informs of procedures regarding signage for rerouting, harmonisation of speed limits, localisation of VMS as well as traffic management plans and principles for the Norwegian road network.
- A few other countries mention national guidelines and guidance for Traffic Management. For example, Poland has a good practice guidance for **ITS in Traffic Management**. Finland have developed national guidelines covering **Level of Service for Dynamic road traffic control**¹⁸ and **Level of Service for Tunnel control**¹⁹. Germany has two regulations about **the Equipment of traffic control centres and sub-centres (MARZ)** and **Technical delivery conditions for road stations (TLS)**²⁰.

¹⁵ <http://www.cedr.eu/strategic-plan-tasks/n6-congestion/>

¹⁶ <http://www.cedr.eu/strategic-plan-tasks/n6-congestion/>

¹⁷ https://www.vegvesen.no/_attachment/2059792/binary/1216876?fast_title=H%C3%A5ndbok+R311+Trafikkstyringssystemer+p%C3%A5+veg.pdf

¹⁸ http://www2.liikennevirasto.fi/julkaisut/pdf3/ito_2013-01_tieliikenteen_vaihtuvan_web.pdf

¹⁹ http://www2.liikennevirasto.fi/julkaisut/pdf8/ito_2015-02_tietunneleiden_liikenteenhallinnan_web.pdf

²⁰ http://www.bast.de/DE/Verkehrstechnik/Publikationen/Regelwerke/Regelwerke_node.html

2.2 Role in Traffic Management

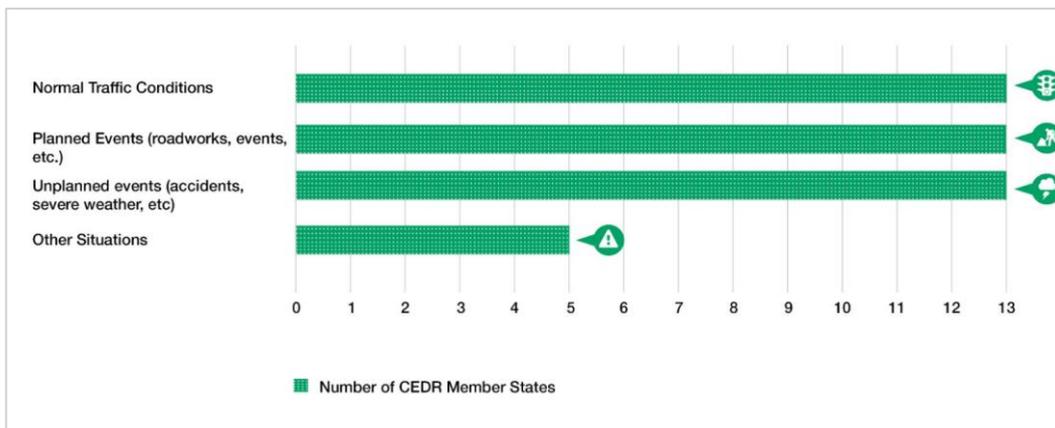
2.2.1 Planning and Implementation

All CEDR member NRAs who answered the questionnaire stated that Traffic Management planning and implementation (operation and maintenance) is the key role of their authority. Eight of the NRAs clearly emphasised that their competence only applies to national/state road network. Some NRAs mentioned they can also operate on a regional and/or local road network.

2.2.2 Different Scenarios

All CEDR members stated they are involved in Traffic Management for normal conditions, planned events and unplanned events, which is illustrated in **Figure 14**.

Figure 14: Involvement of CEDR members in Traffic Management in different scenarios



**The amount of CEDR members that clearly stated in their responses and for which it was possible to identify from their responses that they have a role in the above listed situations.*

Five CEDR members replied they are also involved in other situations which mainly refer to collaboration with police and emergency services, developing future intelligent transport and international collaborations for better cross-border services.

Based on the answers provided, it was also possible to identify that Traffic Management can be used for both strategic travel demand management and for a more local resolution of traffic situations. This varies amongst different CEDR jurisdictions.

2.2.3 Good Practice

The MODBEAR research did not identify any relevant good practice examples with regards to the NRA role in Traffic Management. The Project Team's additional research has identified one good practice example which is presented as a case study below.

Case studies (additional input by the Project Team)

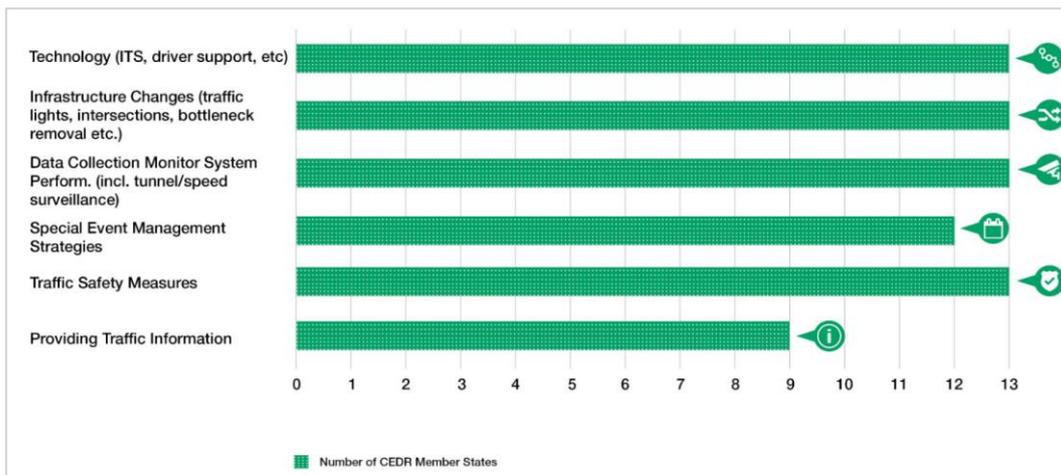
The executive arm of the Ministry of Infrastructure and environment in the Netherlands launched a project which is called **Roads to the Future**. The main objective of the project is to find smart solutions to address traffic congestion and environmental pollution. Amongst solutions considered are such as flexible road markings using special lights in the road’s surface and the use of roll-up asphalt. Citizens, businesses, authorities and research institutes work together in the programme.

2.3 Measures and Challenges

2.3.1 Measures

All CEDR member NRAs work with a variety of Traffic Management measures. These measures differ in their nature from soft measures like providing travellers with travel information to heavy measures like road reconstruction etc. Key types of Traffic Management measures that were mentioned by CEDR members are presented in **Figure 15** below.

Figure 15: Traffic Management measures



*The amount of CEDR members that clearly stated in their responses and for which it was possible to identify from their responses that they implement the above listed types of Traffic Management measures.

As it can be seen in **Figure 15**, all types of measures are being widely used across all CEDR members that provided their response. All CEDR members use technology-based solutions (such as Intelligent Transport Systems), traffic data and performance monitoring solutions, traffic safety measures as well as infrastructural changes like reconfiguring intersections, removing bottlenecks, installing traffic lights etc. During road works, both construction and maintenance, Traffic Management measures are used as a way of minimising congestion.

Providing road users with travel information is a key measure that is often used, under normal conditions as well as under temporary events. Media and communication channels used in Traffic Management across CEDR jurisdictions are summarised in **Figure 16**.

2.3.2 Monitoring and Evaluation

The research identified that 11 out of 13 NRAs monitor and evaluate the implementation of Traffic Management measures. Different NRAs use different parameters and methods for this. For example, Rijkswaterstaat uses a specially developed evaluation methodology which uses 13 different parameters for evaluation and monitoring that cover a variety of operational aspects.

In contrast, in Austria and Estonia, NRAs focus on traffic safety when monitoring various measures. Some NRAs, even if not evaluating Traffic Management measures, use speed monitoring and other similar tools to monitor network performance.

According to the responses provided by CEDR NRAs, the most effective Traffic Management measures for traffic and travel behaviour change are special Traffic Management Plans which incorporate intersection improvements and traffic lights, speed monitoring and enforcement tools. Among other effective measures are traffic information on VMS and digital channels, traffic safety measures and bottleneck removal.

As per responses, the most cost-efficient measure is the provision of traffic information via various communication channels. Speed monitoring and enforcement measures and other information technology measures are also considered to be cost-efficient by CEDR NRAs. The Swedish Transport Administration, Trafikverket, also mentioned that local parking strategies are the most cost-effective measure to influence travel behaviour on a city scale.

2.3.3 Media and Communication Channels

Figure 16: Media and communication channels used in Traffic Management



**The amount of CEDR members that clearly stated in their responses and for which it was possible to identify from their responses that they use the above listed types of media and communication channels.*

As it can be seen in **Figure 16**, the most common media and communication channel in Traffic Management across CEDR is roadside technology like Variable Message Signs (VMS) as 13 CEDR members stated they use it. The use of websites, radio and phone apps is also common.

Road side information is used both as a strategic channel to inform of every day accessibility, e.g. risk of congestion during rush hours, and to inform road users of sudden traffic conditions and provide route choices. This measure is used by all NRAs, either in digital, automatic or manual format. Using Variable Message Signs (VMS) is the most common type of road side information measures. As Rijkswaterstaat mentioned, this is the most successful information channel as every driver has the chance to see the information displayed on VMS.

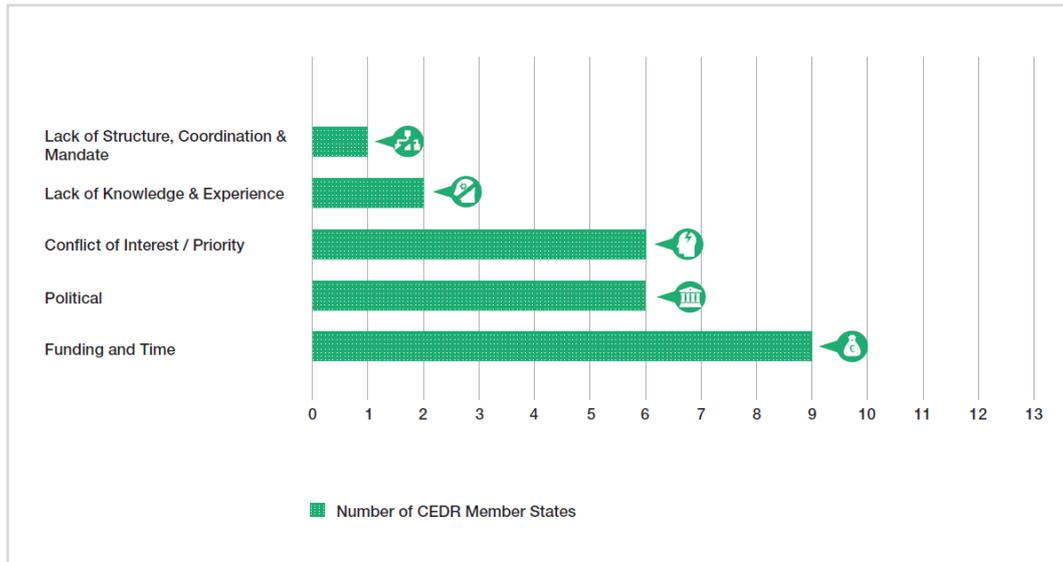
It was also identified that radio is used more to alert road users when an accident has occurred, or a sudden obstacle on the road could cause an accident.

Three CEDR members (Greece, Hungary, Poland) highlighted they use dedicated call centres for communication. The Hungarian Public Road Non-profit Company stated that a call centre is the most effective information channel.

Two CEDR members (Hungary, the Netherlands) also indicated they started using new advanced technologies for communication such as in-car-based and network communication technologies.

2.3.4 Challenges

When implementing Traffic Management measures, CEDR NRAs encounter various challenges and barriers. The most relevant of these are listed in **Figure 17** below.

Figure 17: Key Challenges in Traffic Management

**The amount of CEDR members that clearly stated in their responses and for which it was possible to identify from their responses that they face the following types of challenges in Traffic Management.*

As it can be seen in **Figure 17**, nine CEDR NRAs stated that they face lack of funding and time when planning and implementing Traffic Management. The other most mentioned barriers are lack of political support as well as conflicts of interest within the organisation, between different organisations or at different country levels.

A few NRAs also mentioned that they experience lack of knowledge and expertise when working in Traffic Management. Only the Swedish Transport Administration, Trafikverket, mentioned a lack of structure and coordination as a challenge.

2.3.5 Good Practice

The MODBEAR research identified some good practice examples with regards to the Traffic Management measures. These examples are outlined below:

- In the Netherlands, **a report** which gives an overview of various case studies in Traffic Management is prepared **annually**. This practice is useful as it allows reviewing and informing on the existing successful Traffic Management practices and associated measures.
- For evaluation purposes, Rijkswaterstaat use **the FEZ methodology** which includes the evaluation of up to 13 parameters depending on the aim of a particular project. These parameters include total time of delay, travel time, location of congestion, vehicle kilometres travelled, length of queues and waiting queues, congestion time, network capacity etc.

In addition to the MODBEAR research findings, the Project Team compiled a list of other good practice examples with regards to the Traffic Management measures and practices. These examples are presented as additional case studies below.

Case studies (additional input by the Project Team)

The executive arm of the Ministry of Infrastructure and environment in the Netherlands launched a project which is called **Roads to the Future**. The main objective of the project is to find smart solutions to address traffic jams and environmental pollution. Amongst solutions considered are such as flexible road markings using special lights in the road’s surface and the use of roll-up asphalt. Citizens, businesses, authorities and research institutes work together in the programme.

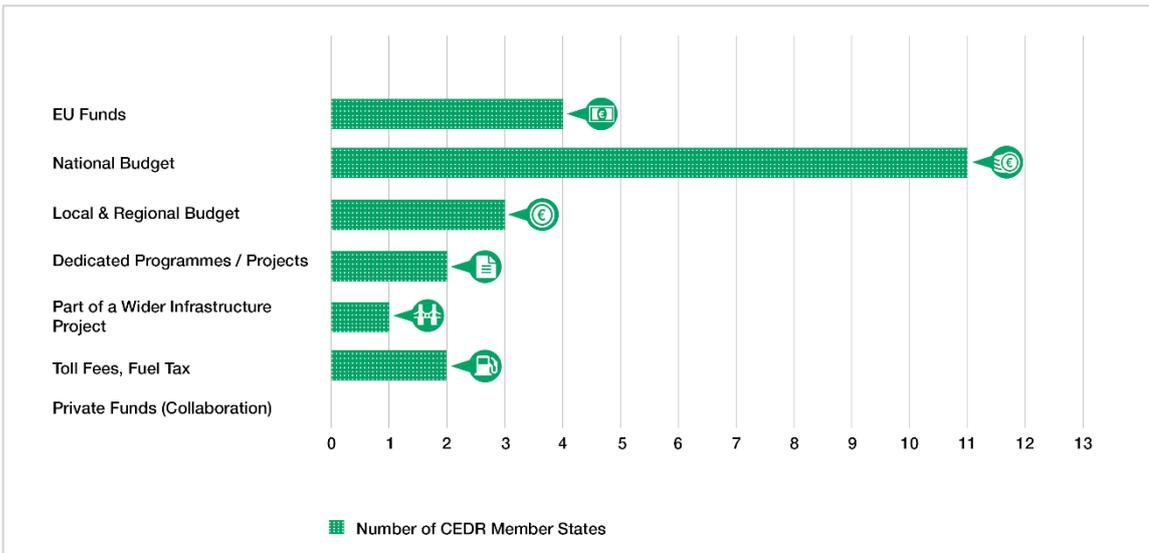
The city of Ghent (Belgium) is realising a project named **TMaas**, which stands for **Traffic Management as a Service**. TMaas is one of the urban projects that were selected for subsidies by the EU initiative known as Urban Innovative Actions (UIA). The Traffic Management as a Service platform is a radically new way to develop a traffic centre for small and medium-sized cities. This is an example of how the Traffic Management implementation can be done on a local city level. The Belgium’s NRA has no input in this project, but the case study can be an inspiration to follow for the projects being done on the national level.

2.4 Funding

2.4.1 Funding Mechanisms

The research identified that Traffic Management measures are financed by a variety of funding mechanisms which are listed in **Figure 18** below.

Figure 18: Funding mechanisms used in Traffic Management



*The amount of CEDR members that clearly stated in their responses and for which it was possible to identify from their responses that they use the above-mentioned types of funding in Traffic Management.

As illustrated in **Figure 18**, Traffic Management measures are in most cases funded by the national budget (11 CEDR member States). Funds coming from local and regional budgets and/or EU-funds are also used, particularly for specially designated city- or region- scale projects. Interesting exceptions are Greece, where road tolls and fuel taxes finance Traffic Management, and Austria, where Traffic Management is financed entirely by toll revenues and from the national and international programmes for the Traffic Management investments.

2.4.2 Good Practice

The MODBEAR research did not identify any particular good practice examples with regards to the funding mechanisms for Traffic Management. However, the Project team was able to identify one good practice example which is presented below.

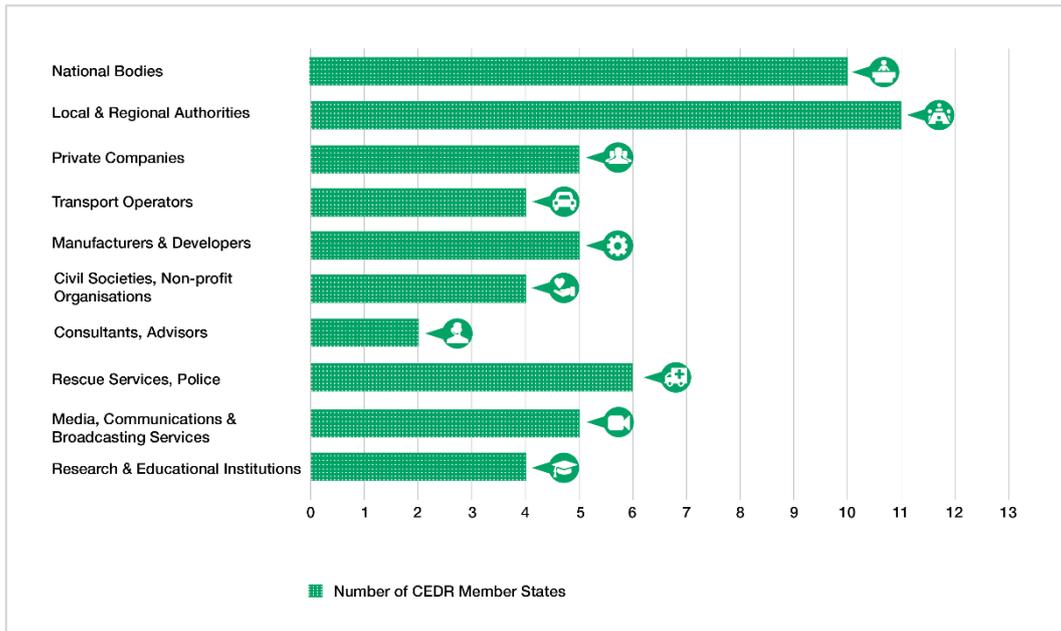
Case studies (additional input by the Project Team)

*The authorities in the Netherlands, amongst which is the Dutch NRA, altogether operate around 150 different control centres for the management of roads and waterways, tunnels, public spaces, etc. To be more cost-efficient, the Ministry of Infrastructure and the Environment started **the iCentre programme**, which aims to achieve a smarter and more efficient control centre operation. The Ministry attracted 13 private partners to cooperate on this project.*

2.5 Stakeholders

2.5.1 Sector Cooperation

All CEDR member NRAs involve a variety of stakeholders in the implementation and planning of Traffic Management. These stakeholders are listed in **Figure 19**.

Figure 19: Stakeholders in Traffic Management

**The amount of CEDR members² that clearly stated in their responses and for which it was possible to identify from their responses that they interface with the above listed types of stakeholders.*

As it can be seen in **Figure 19**, most CEDR members specified they work with national bodies as well as authorities on a local and regional level. Other most mentioned stakeholders are police and rescue services, hardware manufacturers and software developers, media and broadcasting companies, and private companies assisting with day-to-day road operation and maintenance such as contractors, builders etc.

The assessment showed that CEDR NRAs of Germany, Ireland and the Netherlands tend to work with diversified combinations of stakeholders when planning and implementing Traffic Management. The rest of NRAs work with only a few stakeholders.

2.5.2 Cross-sector Cooperation

Six of the NRAs highlighted that their work in Traffic Management is cross sectional, as they work with various other bodies representing industries such as economy, environment, energy, etc.

2.5.3 Good Practice

The MODBEAR research identified one good practice example with regards to the stakeholder collaboration in Traffic Management. This example is outlined below:

- Hungary works with the existing and planned **Memorandum of Understanding** between the neighbouring countries in the field of **Cross-Border Traffic Management**.

Good practices highlighted in this area are European cross border collaborations, such as **C-ROADS**²¹ and **CROCODILE**²². This case study illustrates the cross-national stakeholder collaboration.

In addition to the above example, the Project Team also identified the following good practice example.

Case studies (additional input by the project team)

*The authorities in the Netherlands, amongst which is Rijkswaterstaat, the Dutch NRA, altogether operate around 150 different control centres for the management of roads and waterways, tunnels, public spaces, etc. To be more cost-efficient, the Ministry of Infrastructure and the Environment started **the iCentre programme**, which aims to achieve a smarter and more efficient control centre operation. The Ministry attracted 13 private partners to cooperate on this project. This case study demonstrates intensive stakeholder collaboration aiming to optimise the operation of all control centres and therefore improve the entire transport network performance.*

²¹ <https://www.c-roads.eu/platform.html>

²² <https://dg.its-platform.eu/content/crocodile>

3 Summary and Conclusions

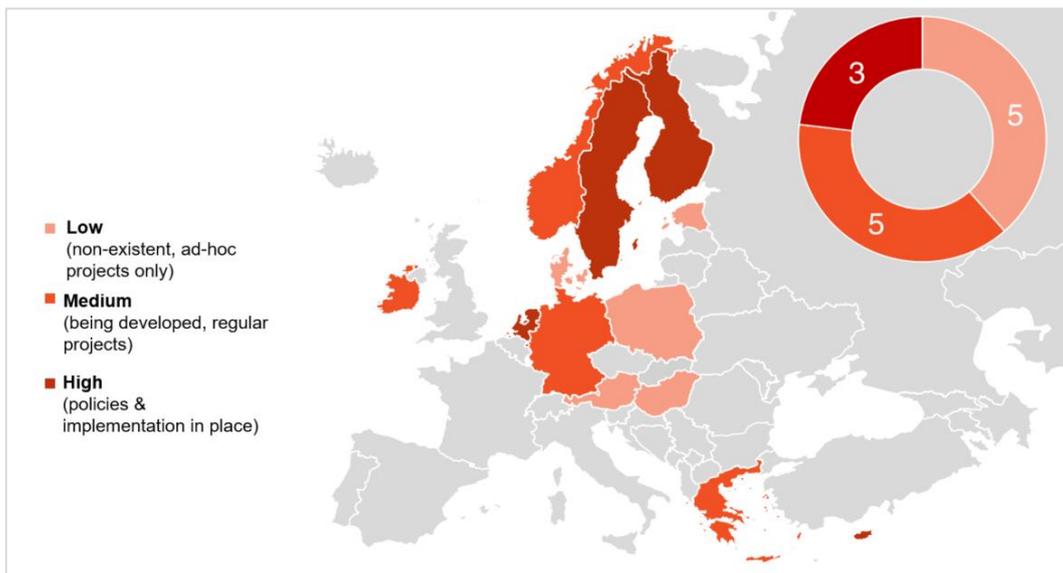
Upon the completion of Work Packages 1, 2 and 3 of the MODBEAR project, a range of conclusions can be made with regards to Mobility Management and Traffic Management in CEDR member NRAs that participated in the research. Key conclusions are summarised in this Chapter.

Mobility Management doesn't often sit within the remit of CEDR NRAs. As a result, not all NRAs are directly in charge of Mobility Management planning and implementation and have varying responsibilities for Mobility Management. In some countries, these responsibilities are clearly defined, whilst in others they are not. Because of this there is often no well-established common understanding of Mobility Management within NRAs. Not all NRAs have a consistent understanding of Mobility Management and often associate it to Traffic Management.

Despite the above, CEDR NRAs do get involved in various Mobility Management projects and programmes. CEDR NRAs are not always the main drivers behind these projects, but in some occasions were found to take the leading role in them. At the same time, it was not possible to identify whether their involvement in Mobility Management is associated with any particular road events and situations. In some countries Mobility Management is applied on a regular basis, especially for planned events.

The overall level of Mobility Management maturity across CEDR members is summarised in **Figure 20** below. The maturity level represents to what extent the NRA works with Mobility Management planning and implementation. This assessment was based on the information collected as part of the research exercise.

Figure 20: Maturity level of Mobility Management across CEDR members



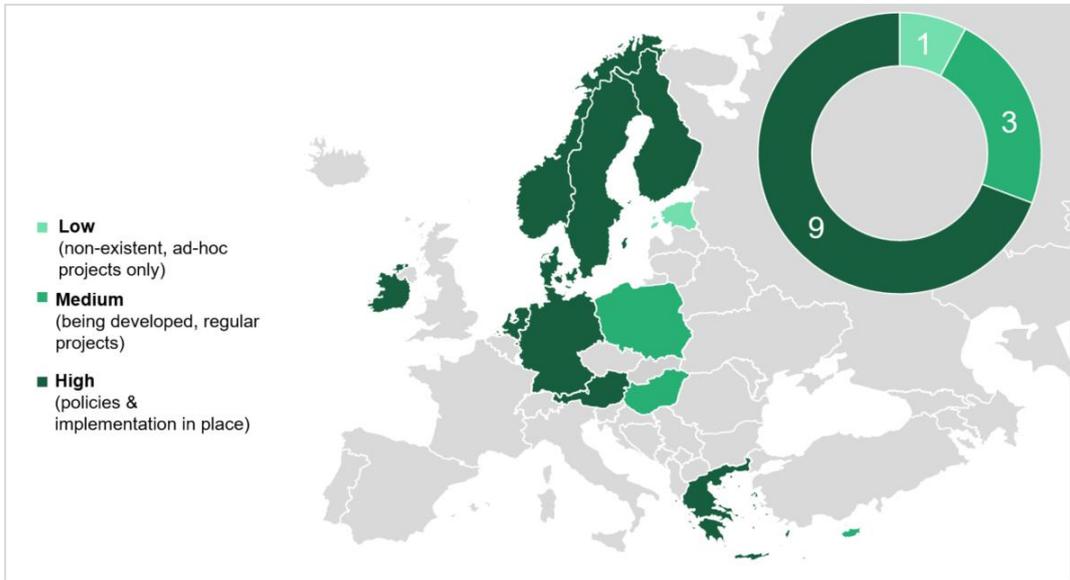
In contrast, the understanding of Traffic Management is generally more established than that of Mobility Management across CEDR members.

This is due to the fact that Traffic Management tends to be a key responsibility of all NRAs. CEDR NRAs carry out Traffic Management for all kinds of traffic situations, from normal every day conditions to various planned events and unplanned events. It is important to add, however, that the NRAs are mainly in charge of the national road networks and do not always implement Traffic Management on a more local level.

When dealing with planned road events such as roadworks, either short-term or long-term, CEDR NRAs tend to complement their Traffic Management with the use of some Mobility Management measures. Sometimes this is done and financed as part of the wider Mobility Management projects which involve other stakeholders such as local and regional authorities as well as private companies.

The overall level of Traffic Management maturity across CEDR members is summarised in **Figure 21** below.

Figure 21: Maturity level of Traffic Management across CEDR members



The perception of Mobility Management and Traffic Management across CEDR is complex. Most CEDR member NRAs see both Mobility Management and Traffic Management as mechanisms to achieve more effective operations of their transport networks. They do distinguish between these two concepts on a planning and policy level.

CEDR NRAs understand that Mobility Management achieves effective transport network via long-term behavioural change, whilst Traffic Management achieves it with the help of a more short-term network management. In the actual implementation, however, Mobility Management and Traffic Management are very often intertwined when CEDR NRAs work with them, and NRAs rarely aim to draw a line between the two and separate them.

Being a more well-established concept across CEDR, Traffic Management generally has a better developed structure and framework, on both national and international level, as it already has some policies and formalised collaboration tools in place. CEDR could apply some of those practices to establish a more consistent approach to Mobility Management planning and implementation.

The analysis of the historical data on the evolution of the usage of private motorised transport and associated GHG emissions indicated that there is no evident correlation between the two parameters for most CEDR member States. In addition to this, it was not always possible to identify whether fluctuations in the use of the private motorised transport were somewhat associated with or predetermined by any Mobility Management or Traffic Management measures.

In spite of the above, it was also identified that behavioural change and modal shift as well as reduction of GHG emissions are key objectives within Mobility Management and to a lesser extent within Traffic Management in some CEDR member States. However, the interrelation between these two parameters does not appear to be defined and established well enough.

Establishing a more robust and transparent link between modal shift and a resulting reduction in GHG emissions within both Mobility and Traffic Management is critical. It could help to achieve an ultimately desirable result when car emissions considerably decrease following a significant behavioural and modal change instigated by the successful and effective implementation of both Mobility and Traffic Management. Establishing a solid framework for monitoring and evaluation of Mobility and Traffic Management measures will be another element critical to achieve this.

The research carried out is not sufficiently comprehensive to identify whether the various approaches adopted by CEDR members are more or less beneficial than others. This is mainly because every CEDR member State has its own conditions and environment and thus measures working well for one State may not necessarily work for others. Despite this, it was possible to identify a number of elements that seem to predetermine the overall success of Mobility Management and Traffic Management planning and implementation. These elements are listed below.

- Establishing clear objectives and directives for the NRAs with regards to travel behaviour change and Mobility Management constitutes an important first step. Wider vision and strategy are essential for the NRAs to shape their everyday work in the right way. To date, the prevailing vision amongst the NRAs is to provide and facilitate the effective road network performance rather than to provide and facilitate effective mobility and improved accessibility. The MODBEAR Project Team believes that Mobility Management should be an integral part of the wider vision and strategy of every NRA. In order to achieve this, the NRAs need to be provided with the formal directives and incentives to work with Mobility Management and particularly with tools and mechanisms to finance it.
- The second step should be to establish clear responsibilities for the NRAs and other stakeholders with regards to Mobility Management policy-making and implementation.

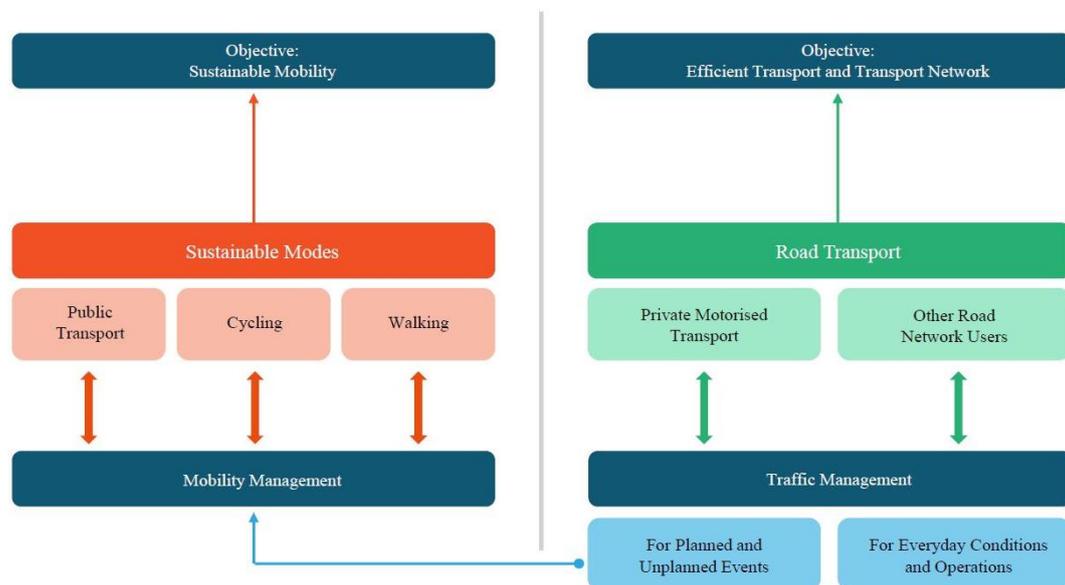
A lot of Mobility Management work is already done at a local and regional level. Understanding responsibilities of other national authorities representing industries like energy, environment, health and spatial planning is also crucial. Understanding roles of various parties involved and how they are interlinked will facilitate a more consistent and transparent approach to Mobility Management on a national level.

- The relationship between the NRA and a leading Mobility Management body (the one that sets policies and promotes measures) is critical to ensure consistency in policies and measures developed and used by the NRA. In some CEDR jurisdictions, cooperation with this stakeholder does not appear to be well established.
- The relation between the NRA and key stakeholders in closely related industries is critical. In particular, it is important to have a healthy cooperation with leading bodies in sectors like environment, energy, economy, spatial planning and development to ensure consistency in policies and measures developed and used by the NRA. In some CEDR jurisdictions, the NRA works with institutions in these sectors whilst in the others there could be no cross-sector cooperation at all.
- Establishing a process for the identification and selection of the Mobility Management measures for different situations and scenarios is important to provide the NRA with a systematic approach to Mobility Management implementation. As part of this, the evaluation process also needs to be put in place to facilitate the measurement of the effectiveness and cost-efficiency of various measures. Several countries have already established national networks and knowledge platforms from which the NRAs can benefit.
- The structure of the actual CEDR member and NRA appears to be critical. The most favourable scenario is when CEDR member is an actual NRA that is involved in both policy-making for and management of the road network. For some CEDR jurisdictions, all of these functions are separated which could result in a poorly integrated and inconsistent approach to the overall functioning of the road network including Mobility Management.
- The relation between the NRA and local and regional stakeholders is critical. It is important to establish a good cooperation with local/regional authorities and players to ensure geographical consistency in planning and implementation of Mobility Management measures. NRAs can benefit from experiences gained at a local and regional level to enhance Mobility Management implementation. In some CEDR jurisdictions, there is a lack of cooperation as well as conflicts of interest between key stakeholders at various levels.
- The relationship between the NRA and transport providers (such bus and rail operators) is critical. Good cooperation with transport providers could facilitate the development of intermodal services and solutions which are key to effective Mobility Management. In some CEDR jurisdictions, cooperation with transport providers does not appear to be well established.

Whilst different CEDR NRAs develop and exploit different approaches with regards to the above listed aspects, some of them have already come through the initial stages of Mobility Management and have developed either formal or informal good practice documents and guidelines to inform their future planning.

The research found that the objectives of working with Mobility Management and Traffic Management diverge in most CEDR member States. While Mobility Management usually aims to achieve an increase in the use of sustainable transport modes, the objective of Traffic Management is to achieve an efficient transport and transport network focusing primarily on private motorised transport modes. These two objectives are usually not integrated in practice, except in a few cases. This siloed approach is presented in **Figure 22**.

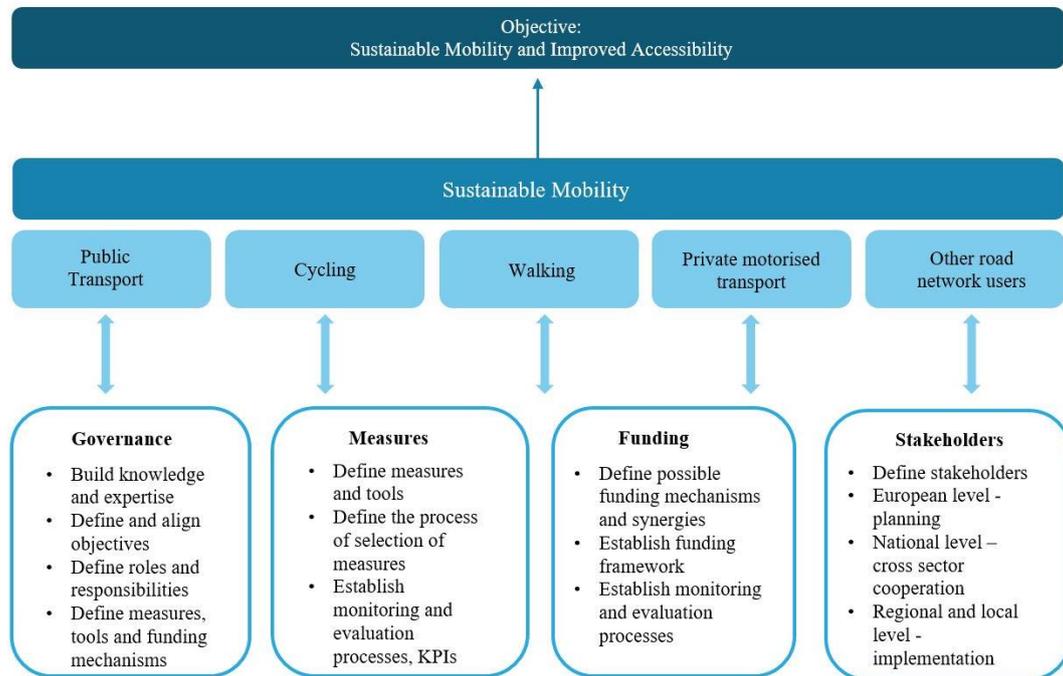
Figure 22: Existing approach of Mobility Management and Traffic Management being separated.



As per this conventional approach illustrated in the table, Traffic Management sometimes utilises the Mobility Management tools and practices, most often for the effective management of planned and unplanned road events, for example construction road works or severe weather. However, resolution of these road events with an ad hoc application of Mobility Management facilitates effective operation of the road network rather than wider accessibility and sustainable mobility. Objectives like better mobility and climate change does not sit well with this conventional set-up.

A couple of CEDR member States illustrated that they are moving to a more advanced approach where Mobility Management and Traffic Management merge and both aim to achieve more sustainable mobility and improved wider accessibility, not just effective operation of the road network. This integrated approach is presented in **Figure 23** below.

Figure 23: Recommended strategic approach for NRAs to work with Mobility Management and Traffic Management.



There are several advantages with uniting the objectives of Mobility Management and Traffic management into “Sustainable Mobility and Improved Accessibility”, establishing a holistic approach. This common objective comprises all modes of transport and users of the transport network and facilitates sharing the same toolkit for governance, measures, funding and stakeholders to achieve the objective.

Under this advanced set-up, achieving objectives associated with the climate change, such as the reduction of GHG emissions for example, is more streamlined, transparent and realistic.

This integrated system also represents a proactive rather than reactive approach to addressing challenges associated with the climate change as well as other mobility related challenges such as better accessibility.

Overall, the findings and observations of Work Packages 1, 2 and 3 of the MODBEAR project helped to identify and develop recommendations for successful Mobility Management planning and implementation by CEDR NRAs. These recommendations are summarised and presented in the Mobility Management Guidance document which should be read in conjunction with this report.

Appendix – Fact Sheets

The Appendix – Fact Sheets is available on the project website www.cedrmodbear.com.