



## **TRANSPORT CHALLENGE IN HORIZON 2020**

### **ECTRI SUGGESTIONS FOR THE SECOND WORK PROGRAMME (2016-2017) *in the field of* “MOBILITY”**

**December 2014**

The European Conference of Transport Research Institutes (ECTRI) is an international non-profit association that was officially founded in April 2003. It is the first attempt to unite the forces of the foremost multimodal transport research centres across Europe and to thereby promote the excellence of European transport research.

Today, it includes 24 major transport research institutes or universities from 19 European countries. Together, they account for more than 4,000 European scientific and research staff in the field of transport. ECTRI as the leading European research association for sustainable and multimodal mobility is committed to provide the scientifically based competence, knowledge and advice to move towards a green, safe, efficient, and inclusive transport for people and goods.

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## 1. Introduction

ECTRI launched its Thematic Groups in September 2007 as a means to facilitate exchanges among its researchers interested in similar research fields and in order to promote joint initiatives and positions. One of the groups is the Thematic Group on Mobility (TG-MOBILITY). The main objectives of this group are to define research topics of interest for supporting EC policies and programmes, to increase successful participation in EU projects and to provide a platform for networking and scientific exchanges. The group consists of 53 experts from 23 Institutes and Universities representing 18 countries. Most of the institutes are working in the field of travel behaviour analysis and modelling, transport policies, mobility services, intermodality, ITS and land-use and transport interactions. Members are: AIT, BAST, CDV, CENIT, DLR, DTU, DVS, FHG, HIT, IFSTTAR, KTI, LNEC, POLITO, TOI, TRL, TTI, UNEW, UNIZA, UPM, UVEG, VGTU, VTI and VTT.

TG-MOBILITY wants to play an active role in the understanding and forecasting of travel behavior and needs of individuals living in urban, periurban and rural areas and in the definition and evaluation of new services and public policies that can contribute to reduce the negative environmental, social and economic aspects of mobility.

TG-MOBILITY focuses firstly on the understanding on travel behavior by analyzing the numerous and complex key factors (related to lifestyles, societal norms, habits, tec.) that contribute explain travel demand and needs at short, middle and long-term. New lifestyle, new technologies, changing socio-economic patterns and new challenges (climate change) make it necessary to constantly update our knowledge. Car ownership and car usage are likely to change dramatically in the coming years and the sustainability of these changes have to be considered. ICT not only contribute to produce new data for understanding travel behavior and improving transport management, and also allow new vehicles to be developed (autonomous or semi-autonomous cars), they also contribute (or are likely) to changing our activities and their organization in time and space, and then the demand for mobility. In addition we think that societal aspects, like travel socialisation, have to be better taken into account in the understanding of travel behaviour and especially mode choice.

Secondly, TG-MOBILITY focuses on intermodal aspects of urban mobility which has to be encouraged in order to reduce car use and make transport systems more resilient. New mobility services, like car-sharing and bike-sharing, are developing in urban areas and make it necessary to rethink how to better integrate the different transport modes and especially public transport and new mobility options. In addition climate change and economic/financial constraints have to be taken into account in order to propose resilient mobility solutions.

TG-MOBILITY focuses thirdly on the land-use and transport reciprocal interactions at the different spatial scales. Land-use influences the transport options made available and reciprocally the location decisions of people and economic activities take into account the costs of mobility (in terms of money and time). We think that it is time to renew the understanding and modeling of the land-use and mobility interactions given especially the rise of ICT and ITS, new transport modes (electromobility, connected vehicles-infrastructure) and new mobility services especially in urban areas.

We acknowledge the work of other platforms such as ERTRAC and participated actively for instance to the Integrated Research Initiative "Land-Use and Transport Interactions" in June 2013, but believe that TG-MOBILITY has a complementary role and added value by taking into account all transport modes and especially intermodal aspects.

TG-MOBILITY has identified several research topics that are of general interest to the group and that we believe are highly relevant for the Horizon 2020 programmes. The topics are those where we believe we can gain new insights and knowledge in the three fields mentioned above: the understanding of travel behaviour, the intermodal aspects of urban mobility and the land-use/transport interactions. ECTRI thinks that given their importance, these aspects should be identified as research themes in future programme of “Horizon 2020”.

The suggested research topics are reflected in the form of research priorities, aiming to highlight their significance for inclusion in the upcoming calls of Horizon 2020. The proposed research topics are well related to the Challenge aiming to achieve “Smart, Green and Integrated Transport” and also have a close connection to four of the five main areas of research for advancing an integrated transport system suggested by ECTRI: –Individual users’ mobility behaviour; –Multimodal mobility systems and services; –Resilient and secure transport systems; and –Research support for decision-making.

## 2. Suggested research topics

TG-MOBILITY is proposing fourteen research topics based on the conviction that increased knowledge in those areas will be important for improving the sustainability of travel behaviour in the coming years and helping public and private authorities to develop more sustainable and resilient transport systems. They are classified into the three fields mentioned above:

### I. Understanding travel behaviour:

1. Merging traditional and Big Data sources in planning and operations of urban mobility systems (p.4)
2. Contribution of ICT, new mobile devices, and social platforms to changing travel behaviour (p. 5)
3. Influence of high automatic or autonomous driving vehicles on future mobility (p. 6)
4. Impact assessment of electromobility scenarios and behavioural analysis of electric vehicles’ users in urban areas (p. 7)
5. Role of mobility culture and travel socialisation on travel behaviour (p. 9)

### II. Intermodal aspects of urban mobility:

6. Intermodal mobility behaviour and planning in the area of new mobility options (p. 10)
7. Multimodal mobility management (p. 11)
8. Resilient Mobility (p. 12)
9. Mobility as a service (p. 13)
10. Climate change adaptive European Transport System (p. 14)
11. Green mobility and urban competitiveness (p. 15)
12. Managing walking, cycling and public transport (p. 16)

### III. Land-use and transport interactions:

13. Neighbourhood based mobility management for cleaner and better urban mobility (p. 17)
14. Contribution of land use to improving sustainability of mobility behaviour (p. 18)

# 1

<b>Suggested title of the research topic</b>	Merging traditional and Big Data sources in planning and operations of urban mobility systems
<b>Programme</b>	Transport, ICT
<b>Timing/year Work Programme</b>	2016/2017
<b>Indication on “research area”</b>	
Socio-economics and behavioural research and forward looking activities for policy making	
<b>Specific challenge</b>	
<p>Big Data is the result of the many innovations and technologies that have been introduced in everyday life. An explosion in the quantity and range of new digital data is taking place, data that have the potential to allow decision makers to improve planning, track development progress and understand where existing policies and operations need adjustment. The transport sector has been a long time user of traditional data collecting techniques but now could largely benefit from new technologies and mobile devices that increase the ability to track fleets and monitor traffic. The challenge is to use these new available data sources in conjunction with the already existing ones to improve the quality and efficiency of transport services and thereby enhance mobility within cities.</p>	
<b>Scope</b>	
<p>In order to meet this challenge, proposals should explore Big Data potentials and usefulness in the transport sector and assess their efficiency compared to traditional data sources, addressing one of the following domains:</p> <ul style="list-style-type: none"> <li>- Comprehensive traffic management: real-time insights into current urban situations and prediction of traffic conditions; real-time timing analysis of traffic lights, monitoring and prediction of traffic congestion;</li> <li>- Urban public transport planning and operations: modeling and optimization of demand, capacity, schedules, pricing, and better customer feedback.</li> </ul> <p>Based on the above, the research should provide an overview of the strengths and weaknesses of each data collecting approach and produce innovative approaches that merge traditional and big data sources and that could be adopted in planning and operations of urban mobility systems. Recommendations, tools and guidance material could be developed and tested to support operators and authorities in developing new advanced data collecting systems that match their needs and circumstances.</p>	
<b>Expected impacts</b>	
Big Data are now seen as one of the biggest enablers for smart mobility. The action(s) are expected to generate a high leverage on Big Data use in the transport sector and more specifically in traffic management and mass transit systems planning and operations.	
<b>Further suggestions regarding this topic</b>	
Research and Innovation Action (RIA) 5 M€	

## 2

<b>Suggested title of the research topic</b>	Contribution of ICT, new mobile devices, and social platforms to changing travel behaviour
<b>Programme</b>	Transport, ICT
<b>Timing/year Work Programme</b>	2016/2017
<b>Indication on “research area”</b>	
Socio-economics and behavioural research and forward looking activities for policy making	
<b>Specific challenge</b>	
<p>The question of the relationship between the spread of communication tools and the physical mobility of individuals is not new and arose with the arrival of the fixed telephone and, more recently, the development of the Internet and especially e-commerce and of ITS. However the extraordinary spread of individual, especially portable, communication tools like the mobile phone and the upcoming wearable devices, and the observation that the links between ICT and trips cannot be considered in isolation from the organizational, economic and societal context in which they perform a coordination function have recently generated new interest in this topic in the fields of transportation economics, geography and sociology.</p> <p>New analyses are now needed in socio-economic research terms of interactions with the spatiotemporal organization of daily activities and the size and maintenance of social networks in order to explore on the one hand how ICT (especially mobile ICT, but also virtual contacts in social networks, teleworking, teleshopping, etc.) are contributing to change spatial-temporal organizations of people’s daily activities, and then passenger travel behaviour (at the short, middle and long term) and on the other hand how ICT can be used by public authorities and organizations in order to promote more sustainable behaviours both for private and professional mobility (commutes and business trips).</p>	
<b>Scope</b>	
<p>Proposal should address the following aspects:</p> <ul style="list-style-type: none"> <li>- Analyze the links between ICT use, individuals’ activity planning horizons, social networks and the deployment of their private and professional activities in time and in space at the short, middle and long term</li> <li>- Evaluate the consequences and sustainability of new shopping behaviour using ICT (e-commerce, drive, etc.) on travel behaviour of people and goods</li> <li>- Evaluate how mobile apps and new devices dedicated to mobility (traveller information, vehicle reservation, etc.) contribute to change individual travel behaviour (mode choice, route choice, departure time, etc.)</li> <li>- Explain how ICT can be used by public authorities, organizations and individuals in order to change travel behaviour for both private and professional activities (like business travel)</li> </ul>	
<b>Expected impacts</b>	
<p>The outcomes will be a better understanding of how local, regional and national authorities but also organizations (especially firms) and individuals (especially if transport costs increase significantly) can use ICT (in a broad sense) in order to change travel behaviour: reduce car use and especially trip frequency or the number of kilometres travelled by car (for instance by reducing the amount of annual business trips), and use more environmental friendly modes, both for leisure and business trips.</p>	
<b>Further suggestions regarding this topic</b>	
<p>Research and Innovation Action (RIA) 4 M€, Two-stages</p>	

### 3

<b>Suggested title of the research topic</b>	Influence of high automatic or autonomous driving on future mobility
<b>Programme</b>	Transport
<b>Timing/year Work Programme</b>	2016/2017
<b>Indication on "research area"</b>	
Socio-economics and behavioural research and forward looking activities for policy making	
<b>Specific challenge</b>	
<p>The grade of automation is growing for individual vehicles as well as in public transport. Multiple important players are testing and successfully improving vehicles in the field of driverless operation. Even though legal and organisational framework conditions are not ready for autonomous driving at the moment, the impact of this technology must be evaluated, now. The usage of autonomous vehicles gets more likely from year to year, but proper conditions and steps for the integration into existing transport systems as well as the impact on mobility behaviour are not evaluated adequately. The availability of autonomous driving vehicles will influence the mobility behaviour remarkably in many fields, as for example car usage, car ownership, or co-modality. User groups not able to afford or drive their own cars will get access to individual transport facilities. On one hand this is a main step to a fair society, but on the other hand this can lead to more undesired individual traffic, if there is no reasonable concept and implementation of integrating individual transportation with PT services. If properly integrated into the context of intermodal transportation the usage of automation and autonomous driving is a promising way to more efficient use of energy as well as to the goal of city centres and environments worth living in.</p>	
<b>Scope</b>	
<p>Proposals should build on existing knowledge of socio-economic, behavioural and transport policy related research as well as on the evaluation of new technology and shall address some of the following domains:</p> <ul style="list-style-type: none"> <li>- Identification and evaluation of autonomous driving scenarios in different European member states and abroad based on the available transportation system and infrastructure in these countries, including an analysis of the expected user behaviour for different user groups and the impact on economy.</li> <li>- Analysis of the user acceptance for driverless transport not restricted to separated lanes, risk analysis, assisting technical devices and supporting training measures.</li> <li>- Development of a concept for proper and sustainable integration of driverless vehicles into an effective PT system, including the identification and specification of relevant services and ICT support for urban and/or rural areas.</li> <li>- Estimation of the impact of autonomous driving vehicles on a transport system working in a mixed operation mode including vehicles in different stages of automation as well as non-motorised transport users.</li> <li>- Evaluation of the relation between eMobility and automation of vehicles and the cross-fertilisation of these technological concepts.</li> </ul>	
<b>Expected impacts</b>	
<p>The proposed topic will build up a reliable base of knowledge for the integration of upcoming driverless vehicles into the existing transport system by addressing the benefits as well as the risks and of mixed systems and concepts to overcome. This will enable the decision makers in the European Member States and in other countries to define the proper steps for this integration process.</p> <p>The research must be performed by experts of different faculties, bringing together socio-economic research, technical knowledge and ICT competences as well as local authorities, traffic consultants and SMEs dealing with vehicle or infrastructure improvement. The knowledge gained by this research can be used by the European partners to strengthen the market position.</p>	
<b>Further suggestions regarding this topic</b>	
<p>Research and Innovation Action (RIA) 5 M€, Two-stages</p>	

# 4

<b>Suggested title of the research topic</b>	Impact assessment of electromobility scenarios and behavioural analysis of electric vehicles' users in urban areas
<b>Programme</b>	Transport
<b>Timing/year Work Programme</b>	2016/2017
<b>Indication on "research area"</b>	
Urban Mobility & Socio-economic and behavioural research	
<b>Specific challenge</b>	
<p>Electric vehicles (EVs) are regarded as a promising component of the European strategy to decarbonise transport until 2050 and to answer the growing concerns of climate change. However, there's a lack of understanding of the impact of various factors on users' demand (e.g. battery performance, % of renewable energy sources or fossil fuel in the electricity production mix and the social cost/km, access to charging infrastructure, vehicle ownership costs, incentive measures, role of social media). Integrated knowledge of all potential influential factors is required for policy makers to promote a higher uptake of EVs in most European countries and those in the emerging economies. On the other hand, the electrification potential and the transferability of vehicle technologies to most polluted cities in Asia and Latina America remains to be fully explored. This also requires further research into business models and market feasibility analysis under a broad range of conditions. Combined results from a comprehensive range of "impact assessment tools" such as foresight analysis, Well-to-Wheel analysis (WTW), extended cost-benefit analysis (CBA) including key external effects (e.g. health and environmental) and financial models need to be analysed. Further research shall include how the above mentioned influential factors can interact together in the short to long-term to influence users' choices and help desirable changes into more sustainable mobility patterns in urban areas.</p> <p>A more comprehensive impact assessment of electro-mobility based scenarios is required where a broader range of combined transport and energy production options can be jointly evaluated along with optimising the use of existing transport. The setting of naturalistic and behavioural experiments at the level of individuals' users will allow new knowledge to be generated for policy making. Context-specific studies shall allow the development of new e-mobility services that could better answer the needs and expectations of most vulnerable groups of citizens such as the elderly.</p>	
<b>Scope</b>	
<p>Proposals should build on existing knowledge of socio-economic, behavioural and transport policy related research and shall answer one or two of the following domains:</p> <ul style="list-style-type: none"> <li>- A top-down impact assessment approach with combined analysis tools: Impact assessment of electro-mobility scenarios in different European member states and in other selected countries/cities outside Europe (e.g. cities in Asia and Latin America with most acute air pollution problems) under different scenarios for the electricity production mix. The range of tools shall cover the various sustainability perspectives and shall include foresight analysis, extended CBA, LCA (WTW) and financial analysis. Integrated transport and energy scenarios shall explore the interaction of different factors and incentive measures and present results by means of a set of key performance indicators (KPIs), including economic/financial, environmental, social/equity impacts. KPIs shall include the external costs associated to each scenario to better evaluate the societal impacts of electro-mobility options.</li> <li>- Bottom-up behavioural approach tailored to each specific city context: Develop specific city tailored naturalistic and behavioural experiments for assessing user's behaviour, role of different factors and potential users' preferences for alternative e-mobility options; these will focus on the behaviour of different types of users but paying special attention to most vulnerable users such as the youngsters (e.g. as potential e-bikers) and the elderly (e.g. those able to change to EVs). Experiments can include cognitive surveys to better understand possible disruptive impacts (and ways to tackle them) that may result from a change from a familiar driving experience (conventionally-fuelled vehicles) to an EV based mobility option.</li> </ul>	

<b>Expected impacts</b>
The proposed RIA is aligned with key aspects of the European strategy – decarbonisation of transport and of boosting its economic competitiveness. Research and innovation activities will bring together a wide diversity of actors (transport research institutes, industry partners, cities/regional bodies, etc.) for a set of behavioural experiments across Europe and in other World cities of emerging economies. This international cooperation will help decision-makers to support the development of a new generation of e-mobility services for social cohesion purposes – those that would fit mobility needs of the most vulnerable groups of society. This will catalyse innovation for new urban e-mobility services for the cities of the future. Also, a strong position can be expected to be achieved by European partners in the World market of electric-mobility and for the exchange of research capacities for achieving common policy goals.
<b>Further suggestions regarding this topic</b>
Research and Innovation Action (RIA) 5 M€, Two-stages

## 5

<b>Suggested title of the research topic</b>	Role of mobility culture and travel socialisation on travel behaviour
<b>Programme</b>	Transport
<b>Timing/year Work Programme</b>	2016/2017
<b>Indication on “research area”</b>	
Socio-economics and behavioural research and forward looking activities for policy making	
<b>Specific challenge</b>	
<p>To achieve car use reduction and promote the use of walking and cycling, it is important to better understand the factors that influence mode choice, their interaction and development in the life-course. Preferences for specific transport modes are not only influenced by functional aspects, such as travel time and costs, but also by affective and symbolic aspects. In addition, recent research stresses the importance of social norms for changes in transport mode decisions. Finally, perceived constraints related to family and household demands as well as lacking accessibility hamper car use reduction. While we know that transport related attitudes, norms and (perceived) restrictions play a significant role for modal choices beyond demographic and infrastructural factors, we still know little about how these factors develop during the life course and how they are shaped by the family and the broader mobility culture we live in or originate from. Exactly this knowledge is crucial for developing measures for changing people’s modal choices in favour of sustainable transport in a long-term perspective.</p>	
<b>Scope</b>	
<p>Proposal should address the following aspects:</p> <ul style="list-style-type: none"> <li>- Identify the different mobility cultures in different European regions – taking into account the local transport infrastructure, existing transport policies such as taxation, parking policies etc. and the broader socio-cultural context with site-specific attitudes and values, and analyze how attitudes, norms, socio-economic and infrastructural factors have different effects on mode choice in different mobility cultures</li> <li>- Analyze if ongoing changes in mobility (sub) cultures can be noticed. In particular, can the trend to more multi-modal and less car-oriented travel behaviour of young people be confirmed in other European countries and are older people by contrast in general becoming more car-reliant? What spatial differences exist (e.g. urban-rural; east-west...)?</li> <li>- Analyze how immigrants adapt to new mobility cultures. Are specific transitions from one culture to another more difficult than others? How can, e.g., the adaption to cycling-oriented cultures be supported and to car-cultures prevented? In how far can differences in the mode choice of immigrants and natives be explained with differences in travel socialisation vs. socio-economic and spatial factors?</li> <li>- Understand what aspects of travel socialisation are most crucial for later mode choice decisions and how they can be influenced by public policies</li> </ul>	
<b>Expected impacts</b>	
<p>The outcomes will be a better understanding of how travel socialisation and the mobility culture influences preferences for specific transport modes and related habits and which interventions to reduce car use will be most effective in which mobility culture.</p>	

## 6

<b>Suggested title of the research topic</b>	Intermodal mobility behaviour and planning in the era of new mobility options
<b>Programme</b>	Transport
<b>Timing/year Work Programme</b>	2016/2017
<b>Indication on “research area”</b>	
Socio-economics and behavioural research and forward looking activities for policy making	
<b>Specific challenge</b>	
<p>Recently, increasing supply of new mobility options, particularly in urban areas, like car-sharing and bike-sharing, gives rise to this diversity of mobility options. Thus, intermodal mobility behaviour is facilitated. In addition, new developments in information and communication technologies facilitate complex routing of users. Due to socio-demographic changes, the amount of licence ownerships has changed to lower percentages in younger age groups and higher percentages in older age groups. This leads to changing mobility behaviour and changing demands towards the urban (public) transport system. Intermodal mobility has a high potential for replacing mono-modal car use and thus promoting sustainable mobility. Yet, it is not much known about intermodal mobility behaviour. New research is needed. Special attention must be paid to the interfaces and changing between the different means of transport.</p>	
<b>Scope</b>	
<p>Proposal should address the following aspects:</p> <ul style="list-style-type: none"> <li>- Investigate the key factors that favour intermodal behaviour: identify intermodal users, trip purposes and means of transport which are predominantly combined, and explain which circumstances facilitate or hamper intermodal mobility behaviour, and how users perceive and deal with changing between different means of transport. Understand how distance, time and spatial structure influence the decision for intermodal mobility behaviour. Understand the influence of ICT on intermodal behaviour and how they could favour intermodal behaviour</li> <li>- Understand how public transport systems can foster intermodal behaviour in relationship with new mobility services (like car and bike-sharing)</li> <li>- Evaluate how planning creates beneficial circumstances, not only in urban areas but also in peri-urban or rural areas</li> </ul>	
<b>Expected impacts</b>	
<p>Valuable hints for planning authorities can be given in order to adjust their transport system and additional services/infrastructure (e.g. bike storage / bike sharing at public transport stations) dependent on the needs of the users and to implement a sustainable mobility policy. Providing a great variety of mobility options and thus facilitating intermodal mobility behaviour contribute to reduction of car use and promoting sustainable mobility. A better understanding of intermodal mobility behaviour can give valuable hints for planning authorities to adjust their transport system and additional services/infrastructure (e.g. bike storage / bike sharing at public transport stations) dependent on the needs of the users and to implement a sustainable mobility policy. Providing a great variety of mobility options and thus facilitating intermodal mobility behaviour can contribute to reduction of car use and promoting sustainable mobility.</p>	

# 7

<b>Suggested title of the research topic</b>	Multimodal mobility management
<b>Programme</b>	Mobility for Growth
<b>Timing/year Work Programme</b>	2016/2017
<b>Indication on “research area”</b>	
Socio-economics and behavioural research and forward looking activities for policy making	
<b>Specific challenge</b>	
Several research activities have concentrated their efforts in identifying new mobility management schemes and solutions. The use of new tools and methods for identifying the complex interactions between demand for transport and supply has allowed the development of robust solutions for managing these interactions, primarily however at uni-modal transport systems. Research efforts shall be placed in developing the future multimodal mobility management systems for European cities and their in-between connections, by developing new tools, methods and solutions able to cope with, manage and leverage the positive impacts of truly multimodal mobility systems.	
<b>Scope</b>	
Proposals under this topic shall address the following aspects:	
<ul style="list-style-type: none"> <li>- Concrete identification of the positive impacts of multimodal mobility systems</li> <li>- Development and assessment of the performance of new and innovative multimodal mobility management systems, services and solutions</li> <li>- Development of decision support tools for mobility managing authorities (including reliable forecasting and predictive mobility analytics) and novel traveller information and feedback services</li> <li>- Integration of passenger and freight mobility management</li> <li>- Leveraging the potentials offered by big and open data</li> <li>- Demonstration of multimodal mobility management systems in real environments across Europe</li> </ul>	
<b>Expected impacts</b>	
<ul style="list-style-type: none"> <li>- Multimodal mobility management for reduced environmental footprint, increased mobility performance and increased safety levels</li> <li>- Improved utilization of existing modes of transport</li> <li>- Holistic management at urban and inter-urban level</li> <li>- Next generation of multimodal mobility management systems</li> </ul>	
<b>Further suggestions regarding this topic</b>	
Research and Innovation Action (RIA) Two-stages, 8-10 M€	

## 8

<b>Suggested title of the research topic</b>	Resilient mobility
<b>Programme</b>	Mobility for Growth
<b>Timing/year Work Programme</b>	2016/2017
<b>Indication on “research area”</b>	
Socio-economics and behavioural research and forward looking activities for policy making	
<b>Specific challenge</b>	
<p>Current research efforts in the fields of adopting new mobility solutions and tools, including ITS, have primarily focused on the capabilities offered through the integration of novel technologies in the transport domain, as well as on the quantification of potential impacts and benefits arising through large scale deployment. However, little attention has been placed on understanding the overall environment in the years to come, where these technological solutions will be actually implemented. It is therefore important to analyze the complex relationships that are foreseen to exist in the future between the transport sector, the new modes of transport that will exist in a few years (e.g. electromobility and connected vehicles-infrastructures), the societal challenges that will prevail, including economic/financial constraints, and the changing climate, where significant disturbances in the daily transport operations are (already observed) and foreseen.</p>	
<b>Scope</b>	
<p>Proposals under this topic shall address the following aspects:</p> <ul style="list-style-type: none"> <li>- Identification and assessment of uncertainties in weather, environment, society, economy and technology</li> <li>- Analysis of complexity between transport and the uncertainty parameters identified</li> <li>- Account for new modes and types of transport that are expected to serve as mobility fleets in the future (e.g. electromobility)</li> <li>- Account for new types of infrastructures and mobility monitoring mechanisms in the future (e.g. connected vehicles and infrastructures)</li> <li>- Provide cost-efficient solutions for coping with uncertainties in the above fields</li> </ul>	
<b>Expected impacts</b>	
<ul style="list-style-type: none"> <li>- Reduced exposure of the mobility sector to risks and hazards</li> <li>- Increased resilience of mobility solutions</li> <li>- Increased certainty of future framework conditions affecting the mobility domain in Europe</li> </ul>	
<b>Further suggestions regarding this topic</b>	
<p>Research and Innovation Action (RIA) Two-stages, 4-6 M€</p>	

# 9

<b>Suggested title of the research topic</b>	Mobility as a service
<b>Programme</b>	Mobility for Growth
<b>Timing/year Work Programme</b>	2016/2017
<b>Indication on “research area”</b>	
Socio-economics and behavioural research and forward looking activities for policy making	
<b>Specific challenge</b>	
<p>The current status of research and deployment in the fields of urban mobility and Intelligent Transport Systems is characterized by technology and industry driven approaches, coupled with and supported by research groups’ activities. The relevant policy objectives and documents at EC and national level are providing the necessary framework conditions. Substantial achievements have been accomplished towards user-friendly, environmentally and safety aware solutions. However, forward looking research activities are necessary to contribute to the transformation of the current landscape towards inclusiveness, innovation, sustainability and widespread deployment of novel technologies, which are expected to be achieved as a result of mobility-as-a-service within the framework of the envisioned smart cities.</p>	
<b>Scope</b>	
<p>Proposals under this topic shall identify, explore, assess and demonstrate the applicability of completely new mobility schemes provided as services, by incorporating and adopting technologies in all fields of transport and by transforming Intelligent Transport Systems to Intelligent Mobility Services. Methods and tools required for this transformation need to be studied, together with applicability and deployment opportunities assessments both at EU and at national and local/city level towards the accomplishment of the objectives set out also by the smart cities initiatives. Collaboration between all involved stakeholders including city authorities, policy entities, industry (including innovative SMEs) and research institutions is necessary.</p>	
<b>Expected impacts</b>	
<ul style="list-style-type: none"> <li>- Identification of innovative concepts for providing mobility-as-a-service</li> <li>- Increased acceptance of new services by end users</li> <li>- Study on the necessary adaptations of existing technologies to accommodate this need</li> <li>- Utilize big and open data in the mobility domain</li> <li>- Assessment of options selected regarding economic, environmental and societal impacts, accounting for long term viability of the proposed solutions</li> <li>- Demonstration in at least three EU cities with active participation of all involved stakeholders</li> <li>- Methods for adaptation and accelerated take-up of proposed solutions in large scales, including the creation of sustainable ecosystems</li> </ul>	
<b>Further suggestions regarding this topic</b>	
<p>Research and Innovation Action (RIA) Two-stages, 8-10 M€</p>	

# 10

<b>Suggested title of the research topic</b>	Climate change adaptive European transport system
<b>Programme</b>	Mobility for Growth and/or Security
<b>Timing/year Work Programme</b>	2016/2017
<b>Indication on “research area”</b>	
Socio-economics and behavioural research and forward looking activities for policy making	
<b>Specific challenge</b>	
<p>The exposure of the European Transport System to extreme weather phenomena and natural hazards as well as its vulnerability to the resulting disruptions have been made apparent during several events during the last years, with increasing frequency. The EU White Paper “Adapting to climate change: Towards a European framework for action” (COM(2009) 147) identifies the consequences of climate changes as difficult for several economic sectors, including transport. Both national studies in most member states as well as previous projects at pan-European level have provided until today assessments of the impacts of climate change, extreme weather phenomena and natural hazards on various modes, systems and networks at regional, national and international level. All have concluded to results and conclusions, which highlight the importance of a coordinated, integrated and dynamic (in the sense of regularly updated) adaptation process across all EU countries from a multi-modal, multi-level and multi-actor perspective. This adaptation process needs to be reflected in the next programming period (2014-2020).</p>	
<b>Scope</b>	
<p>Proposals under this topic shall contribute to the development of a commonly agreed impact assessment and adaptation planning methodology, covering all modes and all countries (including EU neighbouring and feeding networks). The methodology needs to reflect both the current level of knowledge and practice – and thus be pragmatic – but also provide the framework conditions that will allow for updates and expansions in the future, in order to fulfil its long term objectives. Coordination with national adaptation plans shall also be ensured. Results, conclusions and methodologies of previous and ongoing research projects, including WEATHER, EWENT and MOWE-IT must be considered. Financial, social, technical, technological and organizational aspects related to the adaptation of multimodal transport systems and networks need to be considered and be part of the integrated methodology. Furthermore, related data collection and analysis mechanisms that will allow the continuous implementation of the methodology need to be designed, implemented and demonstrated, in order to ensure the project’s afterlife viability and continuity.</p>	
<b>Expected impacts</b>	
<p>Activities under this topic are expected to contribute to reduce the vulnerability of the European Transport System and to form a permanent framework for transport adaptation to climate change, weather extreme phenomena and natural hazards. In addition, a permanent collaborative and living framework for updating the necessary activities in a coordinated manner at pan-European shall also be established. Finally, all actions shall directly contribute to the objectives of all respective EU policy documents.</p>	
<b>Further suggestions regarding this topic</b>	
<p>Research and Innovation Action (RIA) Two-stages, 8-10 M€</p>	

# 11

<b>Suggested title of the research topic</b>	Green mobility and urban competitiveness
<b>Programme</b>	Mobility for Growth
<b>Timing/year Work Programme</b>	2016/2017
<b>Indication on “research area”</b>	
Socio-economics and behavioural research and forward looking activities for policy making	
<b>Specific challenge</b>	
<p>On the research as well as on the implementation side we see many ideas and project on multi-modal mobility projects emerging in European cities. These include fostering of walking and cycling, extension of high quality public transport, new fuels and propulsion technologies for road transport, sharing systems, etc. But little is yet known on the impacts of these systems for the cities and regions implementing them.</p> <p>Potential benefits include the reduction of infrastructure costs through less road traffic, the attraction of young well-skilled people through better conditions of life, healthier citizens, etc. These may, however, be contrasted by a number of difficulties. Besides funding these could be losses of public transport users through supporting of slow modes, a loss of jobs through restricting car travel or increased travel due to the ban of cars from city centres.</p> <p>The task shall first develop a set of urban / regional key performance indicators which are relevant to the decision making situation of local planners and policy-makers in close co-operation with cities and regions. Based on these it shall review benefits and costs of new mobility cultures and relate these to the competitiveness of cities with increasingly mobile employees.</p>	
<b>Scope</b>	
<p>The task should cover different types of European cities by size, income or location. Considered should further be alternative scenarios of Europe’s economic future, population and migration trends and technological developments.</p> <p>Impacts to be investigated should include:</p> <ul style="list-style-type: none"> <li>Urban finances</li> <li>The competition of systems (PT vs. slow modes)</li> <li>Jobs and other social implications</li> <li>Environmental impacts</li> </ul>	
<b>Expected impacts</b>	
<ul style="list-style-type: none"> <li>- Supporting sets of argumentation for urban and regional decision makers to implement / expand sustainable mobility projects.</li> <li>- Extension of benefit-cost analyses methods for assessing green mobility projects.</li> <li>- Through that: further spread of green mobility solutions in European cities.</li> <li>- Impact on planning and decision-making cultures on cities and regions through the use of their specific key performance indicators.</li> </ul>	
<b>Further suggestions regarding this topic</b>	
<p>Research and Innovation Action (RIA) Two-stages, 8-10 M€</p>	

# 12

<b>Suggested title of the research topic</b>	Managing walking, cycling and public transport
<b>Programme</b>	Transport
<b>Timing/year Work Programme</b>	2016/2017
<b>Indication on “research area”</b>	
Socio-economics and behavioural research and forward looking activities for policy making	
<b>Specific challenge</b>	
The balance between cycling, walking and public transport vary substantially between European cities. Bicycles is an obvious extension to public transport – potentially benefit of effective multimodal travel patterns. However, bicycles, public transport and to some extent the walking mode are competing options. Integrated monitoring and management strategies at the city level are required to effectively promote energy and space efficient travel patterns.	
<b>Scope</b>	
The scope of the project include assessment and development of management strategies based on improvements, design and space management in transit nodes, pricing schemes, urban and central area access and transport plans incl. parking provisions, traffic environments and provisions for bicycles and pedestrians.	
<b>Expected impacts</b>	
Innovation and testing in combined urban and transportation planning. Best practices – reflecting EU diversity in transport behaviours and urban contexts – to follow.	

# 13

<b>Suggested title of the research topic</b>	Neighborhood based mobility management for cleaner and better urban mobility
<b>Programme</b>	Transport
<b>Timing/year Work Programme</b>	2016/2017
<b>Indication on “research area”</b>	
Urban mobility	
<b>Specific challenge</b>	
<p>Multimodal mobility is increasingly recognized in urban areas, although it is not yet widely practiced. Multimodal persons use their own mobility resources (car, bike etc.), sharing options (car, bike) and public transport. A potentially efficient, but so far largely neglected way of multimodal mobility management are area i.e. neighborhood based approaches. Such concepts integrate vehicle fleets (cars, bikes etc.) into housing estates. Their objective is to provide user-adequate mobility options, increase the use of shared means of transport, provide alternatives to the car, and contribute to the reduction of negative environmental effects. At the same time, they can have positive economic effect, e.g. through the reduction of costs for the provision and maintenance of parking space. While the increasing availability of and experience with shared options as well as increasing possibilities of information and communication technologies provide the preconditions, such schemes are so far limited in spatial scale as well as in size.</p> <p>To assess the potential of neighborhood based concepts, new research is needed. This includes broadly the following questions: How can they respond best to residents/user needs and demands? What is the extent/scope to which they can contribute to reduce environmental effects (emissions, space requirements)? In which way can they be implemented and what are the options for local Public Authorities to promote and regulate them?</p>	
<b>Scope</b>	
<p>Proposal should address the following aspects:</p> <ul style="list-style-type: none"> <li>- Analyze what spatial structures and infrastructures are required to improve multimodal model mobility; how can the mix of uses in neighbourhoods/quarters influence travel (lengths of trips, mode choice); to what extent does the potential exist to avoid travel?</li> <li>- Understand what influences mode choice and mode combination and how far do potentials exist to switch to shared, environmentally friendly modes. What additional incentives are needed to motivate a shift away from ‘owned’ car (ownership and use) to other modes?</li> <li>- Evaluate what car related developments (sharing-concepts, electromobility) are particularly suited to be part of area-based schemes; how about other transport means (bicycles, electric bicycles, goods bicycles etc.) and public transport?</li> <li>- Evaluate if can spatial and transport planning regulation contribute to make the use of an area based shared fleet attractive (infrastructure, parking)</li> </ul>	
<b>Expected impacts</b>	
<p>Contribution to an environmentally friendly mobility in urban and peri-urban areas through alternative area based mobility management options as well as the potentials of spatial and transport policy. Demonstration of area based mobility management schemes can show how this can work in practice.</p>	
<b>Further suggestions regarding this topic</b>	
<p>Research and Innovation Action (RIA) 5 M€, Two-stages</p>	

# 14

<b>Suggested title of the research topic</b>	Contribution of land-use to improving sustainability of mobility behaviour
<b>Programme</b>	Transport
<b>Timing/year Work Programme</b>	2016/2017
<b>Indication on “research area”</b>	
Socio-economics and behavioural research and forward looking activities for policy making	
<b>Specific challenge</b>	
<p>Land-use is composed of firstly formal land use (qualitative attributes of space such as its form, pattern and aspect described by many indicators including density, capacity or the number of employment subcenters which indicates if the territory is monocentric or polycentric, and secondly functional land use (economic nature of activities, such as production, consumption, residence, and transport, and characteristics of people such as revenue, size of households, average age, occupation, etc.).</p> <p>Whatever the spatial scale of analysis, land use influences the transport options made available in terms of geography of trips, average number of trips, length (distance and duration), modal share and relationships between the modes (including multimodality). Reciprocally, land use is not independent from the different characteristics of the transport system, especially in terms of accessibility to the jobs and services. Indeed, to a certain extent the location decisions of people and economic activities take into account the costs of mobility (in terms of money and time). Hence land use contributes to determine the need for spatial interaction, or transport services, but transport system, by the accessibility it provides, also determines spatial development.</p> <p>The interactions between land use and passenger travel behaviour interactions are far from being well understood. In addition, fundamental societal challenges like climate change, the increase in energy prices, and the necessity to reduce emissions, environmental pressure and social inequalities, together with the development of new transport systems (in particular cleaner and more integrated systems) and information and communication systems, make it necessary to investigate several new topics in the field of the complex relations between land use, transport, energy, pollution and more broadly sustainable development. In addition, the economic crisis makes it necessary to re-evaluate some of the relationships between land use and transport. For example, the lower income of employees may influence the choice of residence and therefore the travel choices and patterns, while the reduction of public funding or private investment for large transport infrastructures may influence the location of residency and commuting. Finally new challenges are posed to public authorities by the development of peri-urban and, more recently, rural areas in many European countries. Hence research is still needed to provide elements of decision for policy makers at the different spatial scales in the fields of land use and transport planning.</p>	
<b>Scope</b>	
<p>Proposal should address the following aspects:</p> <ul style="list-style-type: none"> <li>- Understand to what extent do people choose a location according to the dwelling characteristics and/or according to the spatial patterns (proximity to job location, availability of public transport in the surroundings, number of shops, etc.) and their mobility preference (residential self-selection)</li> <li>- Analyze how can knowledge on mobility related location characteristics influence location choice and how information platforms/policies on mobility costs/accessibility can influence location choice</li> <li>- Evaluate how people will react to a strong increase in energy costs, depending on their residential location (urban, peri-urban or rural area). In particular, will people living in rural and peri-urban areas tend to relocate in urban areas?</li> <li>- Identify what type of solutions can be deployed in peri-urban and rural areas in order to promote changes in travel behaviour: transport solutions and/or land-use planning (more jobs, shops, services, etc.)</li> </ul>	

<b>Expected impacts</b>
Proposals under this topic will contribute to better understand and assess the contribution of spatial structure and spatial policy for achieving an environmentally friendly mobility in urban, peri-urban and rural areas. Research in this field should include some developments focusing on the applicability through detailed results and synthetic presentation of findings so that local government could use these results to adapt, develop their action towards more environmental friendly transport systems and travel behaviour of the inhabitants.
<b>Further suggestions regarding this topic</b>
Research and Innovation Action (RIA) 4 M€, Two-stages

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