



TRANSPORT CHALLENGE IN HORIZON 2020

ECTRI SUGGESTIONS FOR THE THIRD WORK PROGRAMME (2018-2020)

*in the field of
“MOBILITY”*

October 2016

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 28 major transport research institutes or universities from 21 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.

European Conference of Transport Research Institutes | ECTRI aisbl

Rue du Trône 98 | 1050 BRUSSELS | Belgium

Tel: + 32 (0)2 500 56 87/88 | Fax: + 32 (0)2 500 56 89

Number: 831 370 370

Website: www.ectri.org

Contact: Caroline Alméras, Secretary-General

E-mail: caroline.almeras@ectri.org

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 57 experts from 26 Institutes and Universities representing 19 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, BME, CDV, CENIT, DEUSTO, DLR, DTU, FHG, HIT (leader), IFSTAR (rapporteur), KTI, LNEC, POLITO, TOI, TRL, TTI, UL, UNEW, UNIZA, UPM, UVEG (rapporteur), VGTU, VTI, VTT and WVL (RWS).

TG-MOBILITY has identified several research topics that are of general interest to the group and that are seen as highly relevant for the Horizon 2020 programmes. ECTRI thinks that given their importance, these aspects should be identified as research themes in future programme of “Horizon 2020”. This TG being closely connected to the ERTRAC Urban Mobility WG (several TG experts participating in that WG), those suggestions will be brought in that WG for further consideration.

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, and in particular to the Challenge aiming to achieve “Smart, Green and Integrated Transport”. Those topics also have a close relation to the key drivers for supporting the achievement of low carbon mobility as suggested by ECTRI in its recent position paper¹: 1. Systemic approach; 2. Resilience; 3. Human factors; 4. Policy-making.

2. Suggested research topics

TG-MOBILITY is proposing seven 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. In relation to the key drivers mentioned above, those seven topics are:

I. Systemic approach:

1. Multimodal mobility management (p. 3)
2. Merging traditional and Big Data sources in planning and operations of urban mobility systems (p.4)
3. Intermodal travel: the crucial role of modal interfaces and interchanges (p.5)

II. Resilience:

4. Resilient Mobility (p. 6)
5. Climate change adaptive European Transport System (p. 7)

III. Human factors:

6. Realistic modelling of mobility behaviour (p. 8)
7. Active travel modes in urban areas – linking infrastructure and mode choice (p. 10)

¹ ECTRI position paper on the third Transport Work programme “Towards low carbon mobility”, July 2016

1

Suggested title of the research topic	Multimodal mobility management
Programme	Mobility for Growth
Timing/year Work Programme	2018-2020
Indication on “research area”	
Urban Mobility	
Specific challenge	
<p>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.</p>	
Scope	
<p>Proposals under this topic shall address the following aspects:</p> <ul style="list-style-type: none"> - Concrete identification of the positive impacts of multimodal mobility systems - Development and assessment of the performance of new and innovative multimodal mobility management systems, services and solutions - Development of decision support tools for mobility managing authorities (including reliable forecasting and predictive mobility analytics) and novel traveller information and feedback services - Integration of passenger and freight mobility management - Leveraging the potentials offered by big and open data - Demonstration of multimodal mobility management systems in real environments across Europe 	
Expected impacts	
<ul style="list-style-type: none"> - Multimodal mobility management for reduced environmental footprint, increased mobility performance and increased safety levels - Improved utilization of existing modes of transport - Holistic management at urban and inter-urban level - Next generation of multimodal mobility management systems 	
Further suggestions regarding this topic	
RIA, two-stage, 8-10 mil. €	

2

Suggested title of the research topic	Merging traditional and Big Data sources in planning and operations of urban mobility systems
Programme	Transport, ICT
Timing/year Work Programme	2018-2020
Indication on “research area”	
Urban Mobility	
Specific challenge	
<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>	
Scope	
<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"> - 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; - Urban public transport planning and operations: modeling and optimization of demand, capacity, schedules, pricing, and better customer feedback. <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>	
Expected impacts	
<p>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.</p>	
Further suggestions regarding this topic	
RIA, 5 m.	

3

Suggested title of the research topic	Intermodal travel: the crucial role of modal interfaces and interchanges
Programme	Transport
Timing/year Work Programme	2018-2020
Indication on “research area”	
5 Urban Mobility 9 Socio economic and behavioural research and forward looking activities for policy making	
Specific challenge	
<p>Mobility in urban Areas is to a large extent characterised by a combination of different means / modes of transport along for single trips. This is likely to increase in future due to new mobility supply models (like sharing schemes) and better information and communication. Intermodal mobility has a high potential for replacing mono-modal car use and thus promoting sustainable mobility particularly in and around larger cities. Yet, it is not much known about intermodal mobility behavior in quantitative terms including effects on the transport system and emissions. New research is needed. Special attention must be paid to the interfaces and changing between the different means of transport. Also, the effects and potentials of technological innovation in ICT and automation are not yet understood.</p>	
Scope	
<p>Proposal should address the following aspects:</p> <ul style="list-style-type: none"> - 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 - Research the potentials of multi-modal mobility choices, particularly with regard to digitalization, clarifying the role of the interchange for the intermodal choice; - Develop integrated models to assess developments and policies concerning the location and characteristics of interchanges and the effects - Analyze tools and approaches for improving accessibility and integration of transport modes - Analyze and test new intermodal mobility solutions 	
Expected impacts	
<ul style="list-style-type: none"> - Providing a great variety of mobility options and thus facilitating intermodal mobility behaviour can contribute to reduction of car use and promoting sustainable mobility. - Inform the design of infrastructures based on user needs / requirements - Quantify the effects and likely benefits to reduce emissions - Demonstrate new intermodal mobility solutions 	
Further suggestions regarding this topic	
RIA	

4

Suggested title of the research topic	Resilient Mobility
Programme	Mobility for Growth
Timing/year Work Programme	2018/2020
Indication on “research area”	
Urban Mobility and/or Infrastructure and/or Socio-economic research	
Specific challenge	
<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 (eg electromobility and connected vehicles-infrastructure), 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>	
Scope	
<p>Proposals under this topic shall address the following aspects:</p> <ul style="list-style-type: none"> - Identification and assessment of uncertainties in weather, environment, society, economy and technology - Analysis of complexity between transport and the uncertainty parameters identified - Account for new modes and types of transport that are expected to serve as mobility fleets in the future (eg electromobility) - Account for new types of infrastructures and mobility monitoring mechanisms in the future (eg connected vehicles and infrastructures) - Provide cost-efficient solutions for coping with uncertainties in the above fields 	
Expected impacts	
<ul style="list-style-type: none"> - Reduced exposure of the mobility sector to risks and hazards - Increased resilience of mobility solutions - Increased certainty of future framework conditions affecting the mobility domain in Europe 	
Further suggestions regarding this topic	
RIA, two-stage, 4-6 mil. €	

5

Proposal for programming a H2020 research topic	
Suggested title of the research topic	Climate change adaptive European Transport System
Programme	Mobility for Growth and/or Security
Timing/year Work Programme	2016/2017
Indication on “research area”)	
Infrastructures	
Specific challenge	
<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>	
Scope	
<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>	
Expected impacts	
<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>	
Further suggestions regarding this topic	
RIA, two-stage, 8-10 mil. €	

6

Suggested title of the research topic	Realistic modelling of mobility behaviour
Programme	Transport
Timing/year Work Programme	2018-2020
Indication on “research area”	
socio-economic and behavioural research and forward looking activities for policy making	
Specific challenge	
<p>Against the background of political climate and environment protection goals human mankind relies on the switch to renewable energies and to use them in a more efficient way. In the past the main focus was predominately put on technological innovations for this purpose. However, these technologies also led to counterproductive and undesirable direct and indirect rebound effects. To achieve ambitious transport-related policy goals like increasing active mobility, reducing motorised private transport and fulfilling climate targets, more emphasis needs to be put on understanding and anticipating human reactions to behaviour change measures, encouraging people to cease their behaviour habits but change towards more sustainable patterns. Therefore, there is a need to combine attempts of natural and engineering sciences to increase energy efficiency with the knowledge of social sciences concerning sufficiency and consistency in an innovative way.</p> <p>Knowledge on human factors in transportation and behavioural rebound effects needs to be structured to give a broad and detailed overview for practitioners in urban and regional planning, for decision makers in all fields of mobility services as well as for the multi-disciplinary research community. Based on this knowledge, current transportation models need to be improved and developed to overcome dominating unrealistic models based on utility maximisation in the spirit of the <i>homo economicus</i>. This effort requires a broad spectrum of disciplines, e.g. spatial and transport planning, geography, traffic engineering, computer- and system technology, telecommunication, mathematics, sociology and psychology. A compendium of existing knowledge and related models and tools will enable practitioners to understand human reactions to transportation measures, to assess the impact of new mobility options, policy interventions or societal trends on actual changes in behaviour patterns, and to identify effective measures for achieving mobility behaviour change and reduce rebound effects.</p> <p>In this context the main challenge of this topic is to examine requirements for improving existing transport behaviour models and develop new approaches for realistic modelling of human reactions to different (directed or undirected) influences on mobility behaviour.</p>	
Scope	
<p>In order to meet this challenge, proposals should address the following aspects:</p> <ul style="list-style-type: none"> - Generating a compendium on mobility behaviour knowledge by collecting and systemizing the international state-of-the-art concerning theories and case studies on human factors and rebound effects in passenger transport and freight traffic - Identifying knowledge gaps and restrictions of existing theories and models and tapping new resources for data (including data from complementing disciplines and collecting data in missing areas) - Generating new approaches to model mobility behaviour and reactions to influence factors (e.g. new services, societal trends, policy measures) and assess rebound effects <ul style="list-style-type: none"> o Identifying new model classes (e.g. latent class and variable models, random regret minimization models or association rule based approaches and decision heuristics) o Considering behaviour of different social groups (e.g. identification of reaction types related to groups based on categories of social inequalities blended with socio-spatial categories related to accessibility, spatial structure or local culture) o Combining different modelling approaches for achieving comprehensive models for assessing the impact of behaviour influences in the mobility context (e.g. linking 	

econometric rebound models with microscopic mode-choice-models considering different social groups)

- Deducing recommendations for strategies to evaluate mobility behaviour change interventions (data bases, methods, models) as well as technological and social innovations for raising awareness and considerations to prevent negative rebound effects in the entire transport system with respect to high-level political goals on transport and mobility issues
- Broad dissemination of results: on scientific level, but especially for practitioners using appropriate, low-threshold communication channels

Expected impacts

For developing successful influence measures, it is important to understand group-specific mobility behaviour, preferences and needs, but also to model and forecast the underlying travel behaviour. Due to the complexity of transportation systems and behaviour patterns as well as the current focus on rational choice models, the simulation of the actual impact of measures to achieve mobility behaviour changes is difficult and error-prone, hindering effective identification of successful measures and interventions. Improving of current models would provide more reliable assessments of the consequences of planned interventions and is therefore of high interest for municipalities, transport providers and planners. Ensuring broad access to a comprehensive overview of related knowledge to practitioners and decision makers will support and foster a paradigm shift in the development and implementation of effective measures for initiating behaviour change and avoiding unintended negative rebound effects.

Further suggestions regarding this topic

Research and Innovation Action, two stages, relation to MG.9.2-2014. User behaviour and mobility patterns in the context of major societal trends and MG-8.5.2016 Shifting Paradigms: Exploring the dynamics of individual preferences, behaviours and lifestyles influencing travel and mobility choices.

Budget: contribution from the EU between 1 and 2 million Euro per proposal

7

Suggested title of the research topic	Active travel modes in urban areas – linking infrastructure and mode choice
Programme	Transport
Timing/year Work Programme	2018-2020
Indication on “research area”	
5 Urban Mobility	
Specific challenge	
<p>Active travel modes, namely bicycling and walking, are important forms of urban mobility. New technologies (e.g. electrically assisted bicycles) and new mobility concepts (e.g. sharing concepts) emerge and expand the usability of active and light travel modes. Furthermore, active and light travel modes can be an important link in intermodal travel choices. They have a strong potential to contribute to livable communities, emission reduction and human health. Regarding ongoing urbanization, promoting active travel modes can be an appropriate strategy to deal with growing mobility needs coupled with limited availability of space. In many urban areas, increasing shares of active mobility can already be noticed and municipalities aim to support these tendencies. Thereby, infrastructures can have an important role to promote the use of active travel modes. Infrastructure is also important with regard to real and perceived safety of active and light modes. Municipal activities often target the enhancement and extension of tailored solutions for the development of a suitable urban infrastructure. Thereby, the proceeding differentiation of vehicle types (e.g. powered two wheelers or cargo bikes) and usage pattern/ user groups affect the significance of future infrastructures. Diverse different infrastructural solutions lead to different municipal strategies and different user preferences. Various different approaches are currently being tried out. However, the link between infrastructure and active travel mode choice is not clear yet. Also, the role of the infrastructure in the interplay with other, e.g. individual, factors needs to be analyzed.</p>	
Scope	
<ul style="list-style-type: none"> - Identify barriers and enablers toward active travel mode choice - Identify specific barriers/enablers related to the built environment and infrastructures for the choice of active travel modes - Analysing how and what infrastructure encourages active travel mode choice - Analysing the effects and trade-offs of active travel mode choice in relation to car use, as well as car ownership - Analysing the effects and trade-offs of between infrastructural and individual factors regarding active modes of transport - Differentiating impacts of specific strategies and solutions on user groups - Learn from gained experiences in pioneer and catching up municipalities - Analysing sustainability of infrastructures by investigating suitability for different vehicle types (e.g. PTW, cargo) regarding future diffusion of such. 	
Expected impacts	
<ul style="list-style-type: none"> - Design of infrastructures based on user needs / requirements - Quantify the effects - Transferability of solutions - target group specific infrastructure development - Integrate perceived safety in strategies - Future-proof infrastructure 	
Further suggestions regarding this topic	
RIA	

Contact

ECTRI Mobility Thematic Group (TG MOBILITY)

Vangelis Mitsakis
Moderator of TG Mobility
Researcher
HIT, Greece
emit@certh.gr
+30 2310 498459

Anne Aguiléra
Rapporteur of TG Mobility
Researcher
IFSTTAR, France
anne.aguilera@ifsttar.fr
+33 1 81 66 88 60

Pedro Alfonso Perez-Losa
Rapporteur of TG mobility
Researcher
UVEG, Spain
Pedro.Perez@irtic.uv.es
+34 96 35 43822