TRANSPORT CHALLENGE IN HORIZON 2020

ECTRI SUGGESTIONS FOR THE THIRD WORK PROGRAMME (2018-2020) *in the field of* "FREIGHT AND LOGISTICS"

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.

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TABLE OF CONTENTS

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 Freight and Logistics (TG-Freight and Logistics). 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 22** Transport Research Institutes and Universities representing 15 countries. Most of the institutes are working in the field of freight transport and logistics. Members are: Fraunhofer, AIT, BME, CDV, CENIT, DEUSTO, DLR (rapporteur), FhG, HIT, IFSTTAR (leader), ITS, KTI, TØI, TRL (TTR), TTI, UL, UNEW (rapporteur), UNIZA, UPM, UVEG, VGTU, VTI and VTT.

TG-FREIGHT 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".

The present position paper focuses on the vision of an integrated and seamless transport system constituted of collaborating logistics actors. However, it focuses also on innovation, new business models and the role of innovation competition.

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 paper[1]: 1. Systemic approach; 2. Resilience; 3. Human factors; 4. Policy-making.

Trade Offs

The organisation of a sustainable logistics and freight transport system faces different challenges and trade-offs:

One trade-off is about integration vs. competition: on the one hand, the manufacturing, trade, and private households are interested in efficient and reliable transport services. This requires stakeholder and process integration along transport chains. In order to realize economies of scale, integration of planning systems and consolidation of shipments are required. On the other hand, there is an increasing demand from companies and end consumers for innovative transport solutions; including green transport, flexible solutions for small consignments, and domestic just-in-time deliveries. Generally, innovation requires competition.

A second trade-off is between the different dimensions of sustainability: cost efficiency, environmental performance and social equity in the workplace. The choice between lower cost competitive freight operators in an open free market needs to be balanced with the need for lower energy use and lower environmental dis-benefits, whilst considering the needs of employees for satisfying and acceptably secure work in a thriving sector.

A third trade-off in networks in general is between short term process optimisation and long-term planning. Charges that based on short-term marginal cost in order to establish an optimum routing of flows in a network are not necessarily sufficient to re-finance capital intensive assets like physical infrastructures.

[1] ECTRI position paper on the third Transport Work programme "Towards low carbon mobility", July 2016

These trade-offs raise questions about the role of the state and the market and the respective value of market interventions in the form of direct investment, behavior management through incentives and disincentives, and the surety that long term infrastructural needs beyond normal economic horizons are addressed. These trade-offs are also not static, in the every increasing pace of technological and technical change we have experienced since the Industrial Revolution, assumptions and accepted wisdom can rapidly shift.
There are no simple answers on these complex trade-offs, but research can contribute in several ways:

- Research can contribute to find new technological solutions improving efficiency whilst fulfilling ecological goals
- Research can develop new business models dealing with the opportunities from digitalisation
- Research can evaluate upcoming business models
- Research can support experimental implementations of new technologies and logistics organisations, where the different stakeholders can readjust their roles and their interaction (competition vs. collaboration)
- Through new standards in IT communication, competition as well as collaboration could be eased

Therefore, research contributes significantly to the challenge of creating a sustainable integrated and seamless freight transport system across the European Union and connecting the Union with trade partners. To do so, it is crucial to consider freight transport as a complex socio-technological system consisting of technologies, actors, their interplay, and of institutions.

Research is best when conducted to design integrated social & technical systems as well as the accompanying policies to achieve them. Competition and collaboration are not opposite and exclusive strategies; instead, co-opetition is a valid business and societal strategy, respecting both opportunity and the cultures of the entities involved. Transitions from one sociotechnical system to another can be disruptive, positively and negatively, and strategies to enhance the former and mitigate the latter should also be considered. Choosing to not proceed is a valid outcome of good research, avoiding real world problems by simulation or evaluating the outcome of a proposed solution, such as the systems' resilience to social, economic and environmental factors.

Domains

Against this complex, scientific and yet very human background, we have reflected on and chosen various suggested topics in the form of research priorities. We, as experts aware of the main momentum of EU policy and also previous and current research, aim to highlight their significance for inclusion in the upcoming calls of Horizon 2020. The TG-Freight and Logistics proposes the following five major "Domains" which can be used to map proposed research topics and ensure that all research activities will collectively contribute to them throughout the course of the next programming period.

Domain A: Integrated freight transport system: designing the freight social and technical systems in tandem

Freight transport systems face a triple challenge. In order to satisfy customers it must satisfy the demands of globalised trade on one hand and meet environmental requirements on the other, whilst recruiting, developing and rewarding an effective well trained, effective and satisfied workforce. Our purpose is to show that technological and infrastructural innovations are a necessary, but not sufficient, condition for achieving efficient logistics and transport chains. Smart and integrated freight transport can be achieved through designing the freight social and technical systems in tandem so that they work together smoothly.
TG-Freight and Logistics considers the freight transport system as a sociotechnical system, referring to the ***interactions between stakeholders, technologies and infrastructures***. Socio-technical systems consist of a cluster of elements, including technology, regulation, user practices and markets, cultural meaning, infrastructure, maintenance networks and supply networks. In this framework, ***smart and***

integrated freight transport is the result of the joint optimization of the social and technical factors. The corollary of this is that optimization of each aspect alone (socio or technical) tends to decrease the system's performance. Then, research should be conducted to facilitate the planning and/or self-organisation of appropriate social and technical systems in tandem. The transitions from one sociotechnical system to another should also be considered, as well as the systems' resilience, in the context of economic crises, human resource failings and climate change.

Domain B: Smart infrastructures (hubs and corridors) to promote door-to-door freight transport systems

From an infrastructure perspective, sea ports, airports, inland ports, rail terminals and logistics hubs-contribute to the functioning and competitiveness of territories, particularly metropolitan areas and more diffuse city regions. These gateways to the metropolis are essential nodes in international systems of door-to-door transport. They are essential for the geographical areas they serve and help to make them competitive, particularly in the case of metropolitan areas. The key elements in the explanation of the domination of road transport in the "last mile" problem lie with: the issues of door-to-door trips and of transhipment; access/egress to the distribution from/to freight terminals; and of their connection to each other. So, some improvements are needed, in particular for decreasing the number of bottlenecks and problems that freight transportation is facing such as organizational, technical, infrastructural, operational, financial and economic as well as political. Solutions are possible for improving the infrastructure and services in terminals and for improving the networks and their interconnectivity.

Domain C: Technological innovations according to the stakeholders needs

Innovation is a traditional lever of sustainable transport policy. The innovation policy explicitly promotes technical innovations to enable the transition of the current transportation system into a sustainable transportation system. Telematics, safe logistic systems and new vehicle concepts, electric mobility and others are the subject of the current innovation policy. However, policy should also consider non-technological innovation covering at least three dimensions: innovation supply, process innovation and business model innovation that should also be considered. Another important topic is the definition of relevant technological innovations, according to the stakeholders' needs. Innovations must take account of the possibilities of adoption by the social system of transport. The deployment of innovation requires a change in the organization of the system and the relationships between industry, state players, employees, operators and users that has to be studied and supported.

Domain D: Towards collaboration: promoting changes in the freight transport social system

From a stakeholder perspective, collaboration has become a critical ingredient for the smooth functioning of supply chains, in several domains and practices. In sustainable supply chain management, collaboration is the key driver to face the challenges of integration among the actors in order to achieve economic, environmental and social goals. Establishing effective and sustainable collective actions is easier said than done. Competitive interests, dissimilar organizational cultures, and conflicting objectives are just a few factors that can undermine success. Although the main thrust in supply chain collaboration is to achieve a win-win solution for all participating members, there is often a large disparity between the potentials and the practice. "Collaboration" often manifests as a power play amongst the chain members. Such behavior has the potential to result in "win-lose" rather than "win-win" outcomes. On the other hand the topic of co-opetition, which sees organisations both co-operating and competing, is a normal commercial activity in many sectors, and it's deployment in logistics has been evidenced but needs facilitation, perhaps through clusters and the use of third parties as 'honest brokers'.

Challenges

Furthermore, TG-Freight and Logistics proposes the following seven "Challenges" that can be used, in order to map proposed research topics and ensure that all research activities will collectively contribute to them throughout the course of the next programming period.

Challenge 1: smart infrastructures (hubs and corridors) to promote door-to-door transport chains

Research topics under this challenge shall address the infrastructures improvement associated to integrated freight transport systems. Focus will be made on the major nodes in international systems of door-to-door transport: logistics clusters, multimodal rail/waterway/road terminals, ports and airports.

Challenge 2: relevant (and radical) technological innovations and conditions for their deployment

Research topics under this challenge shall precise the stakeholders' needs for technological innovations (ITS and e-freight, electric vehicles…) as well as related organizational innovations and new business models (physical internet concepts, multimodal integrators, synchronized transport chains).
Research topics study the conditions and barriers for their deployment: Individual and societal acceptance, maturity of the technology and feasibility, risk, market conditions and incentives, and regulations.

Challenge 3: Competition and collaboration between stakeholders and new regulations of the freight transport social system

The deployment of innovation in the entangled logistics, transport and infrastructure systems might require a change of the behavior of several players in the system and their interplay, i.e. of the organization of overall system including institutions. The cooperation of different logistics stakeholders in order to develop innovations has to be accompanied by policy strategies (transport policy, economic policy, and environmental policy) and research activities. In some cases, new technologies and business models are no longer compatible with the existing system and constitute a major thread of existing technologies and business models. However, these potential innovations might be major elements of a sustainable multimodal freight transport system in the future. In such cases, policy makers should protect innovators and help to create niches.
Topics under this challenge shall address the trade-offs between competition and collaboration to deploy new technologies and organizations in logistics and freight transport. They should provide a framework to collect experiences with new. Projects should provide answers to the questions what roles can the state and local authorities play to bring about convergence between policy goals with regard to co-modality, the management of networks and the environment.

Challenge 4: resilient freight transport systems

At a micro level, firms are dependent on cost-efficient and reliable transport and logistics chains. At a macro level, whole sectors and economies relate on a robust and resilient transport system. In the last decades, complex value adding chains have been built all across the EU and the world. Logistics strategies to manage complexity have focused on reducing safety stocks and principles of industry 4.0 increase the vulnerability of value adding chains.
Research topics under this challenge shall assess the system's reluctance to different kind of changes: macro changes such as climate changes or (economic) crises and micro changes such as stakeholders' new strategies. Projects should assess the impacts of these changes using harmonized calculation tools and provide decision support for infrastructure planners and managers as well as for logisticians.

Challenge 5: Labor conditions and demographical changes

Logistics and freight transport has become a relevant and crucial economic sector in Europe. Its development is dynamic and faces continuous changes – the rise of new business models ("contract logistics"), changes in the structure of freight flows ("E-commerce and parcel deliveries"), and as a consequence changes in the labor conditions including gender aspects and the spatial location of logistics facilities. At the same time, new changes are ahead as consequences of digitalization and demography. Given the relevance of freight transport and logistics and the dynamics in the labor conditions, projects under this challenge should address following aspects: Activities and spatial organization in logistics, labor conditions in general, gender and demographic aspects, and formation and education in logistics. They should also address solutions to tackle with the multiple challenges, logistics firms and their employees are facing today and in the future.

Challenge 6: European harmonized data for freight transport

Reliable data on the movement of freight are needed to inform public policy decisions on issues such as congestion mitigation, transportation security, air quality improvement, economic development, and land use. Reliable, high-quality freight transportation data are also needed by the private sector to inform a range of strategic investment decisions relating to topics such as equipment utilization, new market opportunities, and business relocation. Accurate freight transportation cost data are also required for cost-benefit comparisons, impact and systems analyses, and modal optimization.

Challenge 7: New consumption and supply of goods

Goods supply of households is closely related to spatial patterns of population and shopping opportunities, as well as to consumer behavior and new sale and distribution channels. Those factors underlie under constant processes of change. Especially in small and mid-size cities, a delocalization of the retailing sector is observed. Shopping opportunities move to larger cities and are lost to alternative distribution channels such as internet stores. As a consequence, many cities lose their role as urban centre. Research under this challenge could contribute to understand the dynamics in the retail sector and consumer behavior, and contribute to new organizational and technological solutions,

Suggested research topics

TG FREIGHT suggests seven research topics (RTs), based on the conviction that increased knowledge will be important for improving the efficiency of multimodal supply chains. In relation to the key drivers mentioned above, those seven topics are:

RT1: Integrated freight networks, hubs and improved cargo transhipment

Motivation

Support the EU objective of shifting 30 % of road freight flows that are transported longer than 300 km from road to rail, sea or IWW by 2030. The goal for 2050 is to shift 50 %. There is a need for an integrated transport network that is also integrated with freight terminals to support efficient urban-interurban freight transport and TEN-T freight corridors. The freight terminals are important nodes for improvement, use and implementation of new ICT technology.
The way the maritime and inland/coastal ports as well as airports and rail terminals are operated and governed has a major effect on the logistics artery that supports mobility for growth. In the networks of ports, small and medium sized ports and terminals play an important role in linking local and regional economies to the global economy through feeder traffic (hub-and-spoke port systems).

Research needs / aspects to consider

The scopes for this topic will be:

- to improve efficiency in freight terminals, included loading and unloading systems as well as internal organizing of the terminals.
- to introduce and test new technologies in small and medium sized freight terminals in the freight networks.
- to tie together regional and local freight networks and last mile access to users with trans-European freight networks.
- to remove barriers hindering co-modal freight transport and improve local traffic management and monitoring.
- to develop performance profiles and monitoring of performance indicators to identify “best practice” and to compare efficiency in different regions.
- to analyse how governance of hubs affect efficiency, level of service and value added services offered
- to propose dynamic tools allowing terminals and hubs to be an active part of the transport chain.

Expected impacts

- Improve efficiency and increased competitiveness of small and medium sized terminals and to improve the performance in the total freight network.
- Reduced emissions, noise and congestion and better environment. Improved efficiency and door-to-door logistic performance and improved efficiency at freight terminals and transhipment points.

Actions will also result in a clear understanding of competition and cooperation models among small and medium sized ports and hubs in EU regions and between these and deep-sea ports. Particular attention will be paid to governance models improving efficiency, reduced costs and emission benefits from freight handling and freight flows passing through networks of small and medium sized nodes. Practical guidance will result in better integration of small and medium sized ports and port networks with deep-sea ports. Clear commitment from participants, and leadership for an ambitious Europe –wide take up and roll out of results during and following the project(s) are expected.

Funding level and instrument

RIA and CSA

RT 2: Efficient green freight corridors: focus on transport planning at different scales

Motivation

The White Paper 2011 clearly differentiates freight into a hub and spoke model that split last mile and city logistics away from the 300km + long haul freight, with a short haul between the two. The target is for cities with only clean vehicles and a 50% modal shift for freight over 300km to rail/sea/waterborne. This raises a variety of challenges to support mobility for growth, notably enhancing safety and reducing transport's dependency on fossil fuels, whilst promoting co-modal logistics services that deliver attractive solutions improving the efficiency and resilience of logistics chains, and allowing greater sustainable choice to shippers, operators and pro-active receivers of goods.

Research needs / aspects to consider

Proposals should address one or several of the following aspects:

- Railfreight needs to become completive, especially on international routes due to increased reliability and harmonised train control and information as well as planning systems. Road haulage research needs to address the need to reduce the disbenefits of road haulage, inland waterways needs to find business models that connect the many fragmented players. All need to develop optimization techniques, systems and competition, collaboration and co-opetition businesses to address the co-modal challenges of the interfaces from and to backbone long distance corridors and the more diffuse short legs before connection to last mile city logistics.
- Efficient green corridor should be implemented through integrated systems for freight. The conditions for fully integrated rail, water and road networks and services for freight (e.g. co-modality) should be analysed. The role of technological developments, as well as ITS should be assessed. Innovative freight services (e.g. Transportation of air cargo by rail, development of premium rail freight offerings, use of barges as slow moving storage in kanban systems, horizontal integration between shippers) and radical new freight vehicle concepts (e.g. electrification of motorways, shorter faster trains, longer heavier trains, cleaner barge propulsion, self organising non hierarchical unplanned logistics systems, intelligent cargo) are also expected.
- Rail freight terminal arrangements are a significant barrier to achieve modal shift targets. At present the rail terminal network lacks sufficient density to ensure that the rail leg of the journey transports goods close to the end consumer and the suitable aggregation of goods transported in smaller volumes.
- A truly, fully integrated network must ensure the seamless handling of goods between modes. Until this is achieved, the aspiration to capture new markets will remain extremely challenging.Testing Intelligent Hubs concept by achieving information and capacity sharing among modal terminals in defined geographical areas along corridors can realistically support co-modal solutions provision to customers and end users. Technology should act as an enabler to efficient green freight corridors and business models but on its own will not capture new markets. Technological solutions should help to facilitate freight transport integration by providing a one-stop shop for potential customers and seamless peer-to-peer data interoperability that recognises and can adapt to the changing contractual nature of client-supplier, a relationship that can change from contract to contract as well as over time.

Expected impacts

- Capacity enhancement e.g. Integrated optimisation of system capacity for freight networks (e.g. traffic volume, vehicle occupancy, revenue flow, load factors);
- The reduction of emissions from diesel rolling stock e.g.: Hybridisation of diesel power trains; Technology transfer from automotive sector and systems integration.
- Intelligent automated traffic management systems

- Information management (databases, customer access, etc.) and "one-stop-shop" open platforms for info and service; provision at level of Hubs
- Integration of freight planning and execution between modes,
- Innovative freight services addressing lost markets of higher value for rail and waterways
- Innovative freight services incorporating new freight vehicle concepts and advcancing them from technology development to service innovation
- Integrated freight network synchronising water, road and rail modes at terminals or where goods are transferred
- One stop shop providing complete supply chain visibility for potential freight customers
- Radical new austere terminal designs incorporating fully joined up thinking with the entire supply chain and between interfaces

Funding level and instrument

RIA and CSA

RT 3: Re-evaluating urban logistics as a demand driven activity

Motivation

Last mile logistics, in particular in cities, is a current subject in many cities across the world due to the pressure to become more sustainable in noise, air quality, congestion, and carbon emissions.
Goods, waste and service trips in urban areas impose traffic and negative environmental impacts and take place in space shared with many other actors including public transport operators, private car users, taxis, cyclists and pedestrians. The European Commission pointed out several key challenges in urban logistics:

- A lack of focus and strategy on urban logistics as part of urban mobility, and few cities have an individual in authority responsible for urban logistics;
- A lack of co-ordination among actors involved in urban logistics, and in many cases insufficient dialogue between city authorities and private actors who operate there;
- A lack of data and information which makes it difficult to improve operational efficiency and long-term planning.

Classically defined top down integrated city logistics schemes have failed across Europe. To face the urban freight challenges, and taking into account the lessons from the previous experiments, new co-operative and fully sustainable innovative solutions have to be developed.
The supply of goods primarily underlies currently a revolutionary process. The development is visible in a constant growth of the e-commerce sector connected with a growth of small-scaled shipment delivered by parcel services and a decreasing density of retail stores. This might become a major problem for rural regions and small cities. Therefore, this development might have severe consequences with regard to distributive aspects, spatial development, and commercial as well as private traffic flows.

Research needs / aspects to consider

Future research activities should therefore address the expressed ongoing processes and focus on interactions between the receivers, consumer and institutional, and suppliers who respond to that demand to understand and demonstrate their dynamics and its consequences. Potential research topics might include:

- Understanding the development of consumer behaviour in the age of information
- Understanding the interdependency between consumption patterns, shopping facilities, logistics, and traffic
- Development and analysis of new solutions to guarantee food supply, especially in rural areas.
- Managing the flows of small consignments in urban areas (cargo bicycles, robots, and connected business models).
- The development of public procurement policies to support sustainable and clean urban logistics in a free deregulated market.
- Methodologies and processes to develop business models that capture and deliver value in private and institutional buying to monetize and reward sustainable logistics.

Co-operative models as developed in projects such as SMARTFUSION and NOVELOG should be considered, as well as simple intervention in institutional purchasing to separate the competitive tendering of goods from the provision of the inbound transport to deliver it.. The different implemented solutions should be assessed.

Expected impacts

This should result in sustainable urban logistics plans by institutions as part of city planning for sustainable urban logistics in SUMPS, whereas the city itself and the other public and private

institutions take responsibility for their own purchasing behavior and directly impact such issues as air quality for which their own activity is a major issue.

Funding level and instrument

RIA

RT 4: Enhancing resiliency of freight transport: considering industry more than infrastructures: what does it mean in terms of new production process and new logistic paradigm

Motivation

Resilience of international and inter-continental supply chains is a prerequisite for the EU competitiveness given that 40% of the intra-EU trade consist in intermediaries (such as parts, components, sub-systems and modules) which are processed at several European industrial locations and then brought to original producers as readymade merchandize suitable for retailer distribution. In some industries, such as automotive and civil aviation the share of the intra-EU geographically distributed intermediary processing reaches 60 % of sectors' output. Further, a large part of European industrial manufacturing depends on inputs from extra-European locations which are brought to Europe either as raw materials and/or sub-systems for assembling and/or final aggregation, branding and consumer marketing. At the same time about 30 % of EU industrial production is totally dependent on extra-European imports. These simple facts underscore the immense importance of supply chain's ability to deliver goods in right conditions, to right locations and on-time. However, the recent high frequency of natural and man-made hazards combined with climatic variability and long-term climate change impacts affect both the physical and the virtual transport infrastructure and pose considerable threats of disruptions and breakdowns of international supply operations and services.

Besides, a survey of research on climate resilience building funded by the 6 and 7 FP revealed that out of 398 projects, 378 assessed preparedness needs of the well-established Western EU member countries. Only 20 project consortia working on these themes included one or two partners from Central and/or South Eastern Europe. Participation of the North Eastern countries was higher, but still at lesser degree than the core EU nations. As a result, the proposed adaptation measures were tailored for the established members' hazard types, and produced solutions, which the new EU member or candidate countries neither might need nor afford. Thus, the adaptation measures offered by the Climate-Adapt EU climate-change resilience database might not be directly applicable to climate hazards that the Central, South Eastern and North Eastern EU nations might be exposed to. As a result, knowledge of climate risk profiles and preparedness requirements in the underrepresented countries is lacking. In order to *increase the overall quality of European climate proofing*, much broader collaboration between the well-established and the most recent EU members need to take place as regards climate risk assessments, hazard projections, and recognition of the most severe socio-economic and physical adversities that need to be prevented. Furthermore, to improve *effectiveness of the EU climate change protection policy,* European legislators, regional authorities and national and local governments need to take into account the local specifics such as the financial, cultural, political and social conditions when deciding when and how to implement the European and when the local adaptation policies. When adversities trans-pass several national responsibility domains, knowledge of socio-environmental features of impacts surroundings may motivate the joint resource apportioning to speed up recovery, rebuilding and long-term resilience enhancement.

Research needs / aspects to consider

The disruptive impacts of climate change, extreme weather events and natural and man-made hazards on reliability of multimodal supply chains need to be analyzed, particularly those cutting across several countries, several climatic zones and continents.
These developments require a lot of new knowledge on how to build the capacity for preparedness to and management of the short-term disruptions and traffic stops, and also how to effectively use resources for long-term operational resilience.
In particular, safety and security of cargo going through terminals is a number one priority: the cargo system is a complex network that handles a vast amount of freight and is therefore vulnerable to

several security threats (explosives, illegal shipments of hazardous materials and criminal activities). The complexity is further increased through the involvement of several actors.
In order to base their climate adaptation policies, strategies and investments on contextually validated understanding of climate change in the Central, South Eastern and North Eastern countries, these nations' public and private decision makers need to have better scientifically embedded insights. These should encompass a broad inter-disciplinary knowledge of the roles that the local geophysical, atmospheric, hydrological, economic, industrial and social factors play in the enhancing of climate risks, and expected adversities. Subsequently, assessments of the different socio-economic impacts with cross-boundary and time distributed consequence, need to be performed. Based on both outcomes, the integrated and highly targeted climate adaptation policies need to be devised for not only tackling the hazards in the new target nations but also for collaborating with other member states on mitigation of hazards that span across several national and/or regional borders. Finally, these results should also provide input to much broader and better empirically embedded EU climate-adaptation policies and instruments applicable to different hazard/social context combinations.

Proposals under this topic should address the following:

- Experiences of and lessons learned from previous disaster-events affecting freight transport and supply chains
- Analyses of the robustness and resilience of individual value adding networks
- Trade-off between stock-holding (preparation against interruptions) and flexibility/resilience (ability to reorganize processes) in logistics
- Vulnerability, criticality and redundancy analyses of infrastructure networks and multi-modal networks
- Identification of short term quick wins and medium to long term measures, strategies and policies for adapting freight transport and logistics to climate change, disasters and extreme weather events
- Increased network redundancy and decreased vulnerability (in particular: Eastern Europe, and: railway networks)
- Increased substitutability between modes in cases of disrupting events
- Understanding of roles and perspectives of multiple actors – (shippers, infrastructure operators, public sector) in setting up precaution measures and in disaster management
- Increased risk awareness and improved risk management at multi-actor level
- Increased preparedness for unexpected events – knowledge, training, awareness, institutions/legislations/exceptions from them
- Roadmaps for climate change adaptation of freight transport and supply chains

Expected impacts

Solutions to limit the disruptive impacts of climate change, extreme weather events and natural and man-made hazards on reliability of supply chains.

Enhancing resiliency of the freight transport system would allow it to "absorb" small scale disruptions and quickly recover from major ones. The scope is to minimize the impact of disruption to the system and the time required for the system to recover.

Funding level and instrument

CSA/CA or STREP

RT5: Work environments in transport and logistics

Motivation

Given the increasing demand for freight transport and logistics services, this sector will continue to offer good employment opportunities. In some cases, the working conditions are considered to be problematic, because they sometimes involve a high degree of physical work, working hours are frequently unpredictable, and the workforce is required to show a high level of mobility and flexibility. It is therefore imperative to ensure that working conditions are socially balanced and that the training of skilled workers is secured on a long term basis.
Besides, wide differences in labor and social market structures create gaps that can lead to transport companies being encouraged to adopt disloyal competition and social dumping practices. Furthermore, the development of "Uber-trucking" could lead to changes in the freight industry structure.
As far as logistics is concerned, gender dimensions should also be studied. Gender in transport research has been examined in the field of mobility, public transport, car usage etc. It has not been touched on with any great degree of scope in European transport research and yet we know from the "Women in Transportation" research network conference at TRA each year that gender has distinct, not always intuitive and revealing effects about mobility and life choices.

Research needs / aspects to consider

- Analysis of the most pressing issues and trends affecting the social and working conditions of professional drivers and warehouses'workers
- Evaluate the working conditions in the freight transport and logistics sector
- Improve safety in the road haulage sector
- Deploy an effective enforcement strategy that guarantees the drivers and warehouses' workers better living and working conditions
- Fund revelatory studies based on mixed methods research into the role of gender in the business of logistics from the perspective of, not exclusively: operations, employment, work/life balance, child rearing, fulfilment, efficiency, and the opportunities that exist for operators, employees and customers to better achieve the specific challenges of 21st century logistics and the wider H2020 topics.

Expected impacts

Solutions to for better living and working conditions in the freight transport and logistics sectors

Funding level and instrument

CSA/CA or RIA

RT6: Radical innovations in multimodal transport

Motivation

Transport is one of the most innovative industries in Europe. Moreover, transport is a research and innovation field given great priority in both Europe and the United States, due to its importance for the economy, employment, and European integration. Business also gains significant global competitive advantages from it. In addition, innovations help in coping with the challenge regarding the growth of greenhouse gas emissions. However, the available information on its cost, impact, potential market, difficulties in introduction… is, without exception, very fragmentary. Innovation is a traditional lever of sustainable transport policy at all levels, including the European Union. Despite the achievements in the implementation of innovation policies, environmental problems remain associated with transportation. This leads to a need for more radical innovations due to their great leverage.

Research needs / aspects to consider

Researchers should consider the following questions:

- How can one promote the emergence of radical innovations?
- What are the relevant interfaces between science and industry?
- Recent findings show the necessary link between research and the economic actors, but it is necessary to analyze the procedures. What interfaces between actors need introducing?
- What is the role of the state?
- What are the levels of intervention?

Expected impacts

New radical innovations for multimodal transport

Funding level and instrument

CSA/CA or RIA

RT7: European harmonized freight data

Motivation

Freight activity and passenger travel both affect the demand for transportation facilities and services. One consequence of the focus on passenger needs—and complaints—is a lack of widely available data to inform decisions about freight transportation issues. For example, analysis of the effectiveness and costs of alternative options for mitigating congestion in urban areas requires better data on patterns of freight movements. Reliable data on the movement of freight are needed to inform public policy decisions on issues such as congestion mitigation, transportation security, air quality improvement, economic development, and land use. Reliable, high-quality freight transportation data are also needed by the private sector to inform a range of strategic investment decisions relating to topics such as equipment utilization, new market opportunities, and business relocation. Accurate freight transportation cost data are also required for cost-benefit comparisons, impact and systems analyses, and modal optimization.

Traditional freight transport statistics are unimodal in their design. Information from these traditional statistics contains origin and destination of the journey of the vehicle, the weight in tons, the ton-kilometres, type of goods and so forth. In this manner it is possible to draw a picture of all transports performed in one year for each mode. But there is no available information of the reasons behind these transports and no information on intermodal transports because there are no interactions between modes in traditional statistics. It does not state where goods are transhipped from one vehicle to another and gives no information about the real transport chain in the case of multi-legs chains.

Research needs / aspects to consider

European freight data framework would be developed. The researches should focus on the development of new statistical methods and models aiming at building up and understanding of multimodal transport chain. The framework for harmonized shippers surveys at the EU level could be designed, considering the selection of companies, and methods to increase the answering rate.

Expected impacts

Harmonized European freight data, enabling to consider multimodal chains

Funding level and instrument

CSA/CA or RIA

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