European Technology Platform on Logistics input for the first calls of the HORIZON 2020

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INTRODUCTION

This document includes a compilation of projects proposals initially proposed by WINN Project to the Steering Group of the European Technology Platform on Logistics for their review and prioritization.

The 21 proposed topics are classified according to the preliminary pillars:

- Sustainable, Safe and Secure Supply Chains
- Corridors, hubs and synchromodality
- Information systems for interconnected logistics
- Supply Chain coordination and collaboration
- Urban Logistics

The prioritized list of projects (topics in the EC jargon) will be discussed with the EC to be included for EU funding under the first calls of the next European R&D Programme **Horizon 2020**. Each topic proposed has been structured in order to better reflect FP7 Topics' structure.

Prioritization

In order to provide the EC with a list of the most relevant projects/topics we ask each Steering Group member to do the following prioritization exercise.

According to their expertise and knowledge, each SG member will decide to rank projects under at least 1 and up to the 5 pillars.

The SG member will distribute 100 points per pillar who decides to rank. After the exercise, all marks will be compiled to get the prioritization.

Prioritization Example

SG member 1 decides to rank topics under pillars 1 and 3 as they are close to his competences and knowledge. He distributes the following marks:

Pillar 1		Pillar 3	
Topic 1	20	Topic 9	50
Topic 2	10	Topic 10	0
Topic 3	30	Topic 11	10
Topic 4	30	Topic 12	30
Topic 5	0	Topic 13	10
Topic 6	10		
Total points distributed	**100**	**Total points distributed**	**100**

SG members are kindly requested for feedback related to the proposed projects descriptions and expected results as well as other project ideas that should be included in the list.

SUMMARY OF THE PROPOSED TOPICS

This section briefly summarizes each of the topics proposed as input for the first Horizon 2020 calls by describing their expected smart results.

1. **Transport scenarios, resource depletion, and logistics concept for a circular economy.**

   Expected smart results:

   Availability of more realistic bulk flow scenarios, therefore ensuring that the logistical sector contributes to a sustainable economy

2. **Advanced Global freight transport models for the European economy**

   Expected smart results:

   New models for forecasting and policy analysis in freight transport, which can be used for addressing the effects of logistics innovations on European competitiveness and sustainability.

3. **Distressing the supply chain**

   Expected smart results:

   To identify and estimate the consequences in terms of sustainability of slow steaming (slowing down the speed of transport modes) in the overall logistics and supply chain including efficiency, safety, and security aspects

   To shape new business models, paradigms in line with slow steaming, including the possible new collaboration or cooperation schemes and regimes within the logistics industry

   To communicate and divulge to the public the potential of slow steaming in improving sustainability and foster the acceptance of the stakeholders

4. **E-commerce based retail logistics**

   Expected smart result:

   Designing and delivering a proof of concept model for e-commerce logistics execution that can be extended by pluggable software services that incorporate the latest R&D results (e.g. stock location, dynamic pricing services). The model does not only offer the transaction environment but also serves as an infrastructure for information sharing, historical information visualization and decision support.

5. **Resilient supply chains and transport networks for a faster and more efficient disruptions recovery**

   Expected smart results:

New methods and tools to configure supply chains and transport networks including disruptions identification and disruptions risk assessment (e.g. likelihood vs impact vs cost) in decision-making processes.

New methodologies and tools to define collaborative contingency and continuity business plans between every supply chains and transport network stakeholder.

New methods and tools to capture knowledge and to ensure learning from experiences

6. **Demand driven European incentive programme for sustainable and competitive mobility with a network oriented approach**

Expected smart result:

A more cost-effective and greener logistics and mobility system through international awareness and cooperation

7. **Automating loading/unloading systems allowing terminals and hubs to operate different modular cargo units automatically**

Expected smart results:

The expected results are mainly the progress on automation of the load/upload process for small containers by using enhanced robotized machines doing the process more efficiently.

In addition, an interaction between these machines and AGV vehicles will increase the performance of both technologies and reduce one of the barriers to progress to a more co-modal freight transport.

8. **Governance and business models for readiness of Internet of Freight**

Expected Smart results:

The progress to an Internet of Freight needs to consider the Governance aspects related to ICT infrastructure desirable behaviour and its risk management, such as ownership of infrastructures, security aspects, or rules for information sharing, as well as the business models behind there. This will support a seamless integration and compliance of the different logistics ecosystems including and beyond the technological aspects. Results of previous projects mentioned in the topic description are providing the ICT tool, while this project is about the use (Governance and business models) of such global tool.

9. **European Logistics Information Sharing Architecture**

Expected smart result:

An architecture for sharing logistics information for interconnected supply chain planning and execution, which will speed up the formation of a single logistics information space in Europe.

10. **Improved cross-border data exchange in multimodal transport chains including customs information**

Expected smart results:

Developing and implementing an ICT framework for exchanging customs and transport documents between EU members and countries outside of EU specially Russia, Belarus and Ukraine. The framework should allow an electronic interfaces to already existing customs systems. Moreover the customs and transport documents harmonization and standardisation should be proposed for different transport modes.

11. ICT platform for empty container repositioning

Expected smart results:

The proposed ICT platform is a comprehensive tool, which responds to individual requirements of different links in transport chains of empty containers. Functionality of dynamic delivery planning is supported by e-commerce solutions what enable optimal utilization of empty boxes in the global scale.

12. European Interoperability for Integrated Freight Management

Expected smart results:

Development of novel solutions managing connectivity, tracking and monitoring of goods and assets, so as to automatically verify the information compiled from different transport modes managers (road transport managers, port authorities, etc.) to carry out electronically the compensation and invoicing of the whole transport route

13. Business and data infrastructure for collaborative freight management

Expected smart results:

Replicable business models for supply chain collaboration and cooperation, validated and disseminated through industry-led demonstrators.

Open data infrastructure for collaborative supply chain management, supporting collaborative planning and synchronization of door-to-door logistic services.

14. Smart Hubs Realise Horizontal Collaboration

Expected smart results:

A new method for establishing smart logistics hubs for realising horizontal collaborations in logistics and supply chain between different actors

15. Improving logistics effectiveness through horizontal collaboration and co-location

Expected smart results:

New logistic systems deploying collaborative business models and infrastructures in different sectors and on-field applications, including:

- *Mutualisation of containers among ship owners.* Gray container concept: instead of having shipping lines allow shippers (their customers) to staff only containers belonging to them, allow customers to staff any container of any line to ship his goods to the port instead of having to wait for the next empty container of his service provider to be available nearby.

- *Mutualisation of specialized truck fleets usage among various shippers.* Optimisation of the use of trucks and drivers, therefore, fuel consumption and CO_2 emissions will be substantially reduced; establishment of business models.
- *Implementing co-opetition concept in containers movements.* The aim is to develop complex solution for co-opetition in containers transport and verify it in practise.

16. Transformation of operational and business models to enable sustainable urban freight deliveries

Expected smart results:

New ways of collaboration and concerted actions between local authorities, shippers, retailers and logistics service providers to reduce flows through improved collaboration

New concepts for the design of distribution centers in cities for last-mile distribution (e.g. cross-docking methodologies), and impact on infrastructure optimal utilization (leading to policy guidelines)

New approaches for home deliveries to reduce the unsuccessful deliveries and to accommodate to customer conveniences

Optimization, modularisation and standardization of packaging and load units in distribution vehicles for business and home deliveries. Packaging solutions for home delivery specially of fresh products

New models to integrate direct and reverse logistics for some sectors (e.g. empty bottles in restaurants)

The use of data on goods with consideration for the possible exploitation of e-Freight for urban freight delivery

Use of ICT to enable cooperation between stakeholders with the exchange of data and the provision of information by each of these stakeholders

Better information and data capture possibilities to better steer and control logistics activities in cities (change regulation framework form restrictions to regulations stimulating efficient urban freight deliveries)

ICT solutions for an optimal management of public infrastructures (e.g. reservation of load/download spaces and lanes use)

Use of ICT for improving synchromodality in urban logistic and reduce number of empty deliveries.

17. Urban freight consolidation schemes

Expected smart results:

Development of tools to identify and measure freight consolidation opportunities in cities, as well as to propose consolidation schemes

To define business models for the consolidation schemes, including fleet and freight sharing and pooling, and define the adequate collaboration framework between the different players running freight delivery currently

To define appropriate governance models including cities, logistics service providers and retail, of these models that should allow consolidation schemes roll out.

18. Relevance of e-commerce and home deliveries in urban freight impacts

Expected smart results:

Mapping and analysis of potential logistic and mobility impacts on urban areas due to activities of E-commerce, E-retail and last mile logistics related industries, from a social, an environmental and an economic perspective.

Mapping of concepts that can drive further optimization in E-commerce (and related: ex.: reverse) logistics.

19. Creating a framework for a more efficient urban freight system through a better understanding of this activity

Expected smart results:

To develop a framework for data collection to properly analyse urban freight movements in cities (structure of the sector, load factor, type of operations, relative share of different type of freight (retail, food, construction, post, etc.), expected impact of home deliveries, etc.).

20. A valorization framework – from research to innovation

Expected smart results:

A better use of research results by industry; and more effective and efficient transformation of knowledge in the domain of logistics and supply chain

21. Bridging Supply Chain and Finance: European Platform Driving Knowledge to Innovations in finance and supply chain

Expected smart results:

A more efficient and effective project management for each individual company; substantial cost reduction in the whole supply chain; international awareness.

DESCRIPTION OF TOPICS

Pillar: Sustainable, Safe and Secure Supply Chain

The concept “Design for Logistics” has been known for decades. Usually, it refers to the design of products and processes in such a way that the logistics costs associated with products movements are minimal. Such a strategy offers significant opportunities to reduce work-in-process inventories and hence the associated capital investment throughout the chain. However, environmental effects have never been taken seriously enough into account so far; inclusion of these effects may lead to important additional benefits from both an environmental and an economic point of view.

On the other hand, enforcement of strict safety and security regulations and procedures is a trend. The challenge will be to design new and adequate procedures in such a way that, exploiting the information infrastructure as discussed above, delays in handling goods flows are kept to a minimum. Again, standardisation of procedures at an EU level will be key in attaining this objective.

1. Transport scenarios, resource depletion, and logistics concept for a circular economy

Expected smart result: Availability of more realistic bulk flow scenarios, therefore ensuring that the logistical sector contributes to a sustainable economy

Rationale: long-term scarcity of resources, higher need for reverse logistics. Dispersed sourcing and impact on supply chain network design. Consolidation and integration of reverse logistics networks

Type of project: CP-FP

Objectives, contents and scope:

The main goal is to ensure that the logistical sector is prepared in the best way to contribute to a more sustainable economy. Key objectives are:

- To develop scenarios of (1) production capacity over time of natural resources that are foreseen to get scarce up to 2050, (2) substitution by other than the scarce natural resources, (3) shift of production locations requiring large amounts of natural resources within the EU and/or outside the EU, and to implement these scenarios in an economic equilibrium model suitable to take into account the capacity restrictions of natural resources.
- To model transport and logistical movements based on the economic scenarios
- Resource scarcity leads to substitution of resources and the uptake of the cyclic economy. In this renewed situation resources are often sources from fragmented locations throughout the EU such as for biomass and recycling of raw materials. How can we anticipate to this in order to have the most sustainable logistical solutions in place?
- A likely scenario is that economy will experience a negative pressure from resource scarcity. Alternating periods with high resource prices and economic stagnation followed by a period with lower prices (due to reduced demand) and growing economy can very well be

expected. How can the logistical sector anticipate to this situation and adjust their capacity in a flexible limiting the economic damage?

- How can the market uptake of sustainable solutions for the logistical sector be improved?
- To mitigate waste in logistics, and to reuse resources (e.g. products and materials) more efficiently and cost-effectively, reverse logistics is essential. Two issues need to be addressed: (1) to assess the legal, contractual and economical barriers which hinder the reverse logistics scheme; (2) to conduct tests on how to deal with these obstacles.

Implementation:

The breakthrough is that there are more realistic bulk flow scenarios available. Further the scarcity issue has an impact on the trade of also the other commodities which is also calculated under the proper side constraints. The substitution can also lead to different trade relations and transportation routes chosen. All in all it will provide a more realistic picture of expected transport and related needs for investments.

Resource scarcity will be demanding a more efficient use of resources, and will also lead to substitution of resources and massive reuse of resources in a circular economy. A circular economy can lead to very dispersed sourcing of resources requiring a policy aimed at location of production facilities in order to optimise the logistical process and reduce the need for transport infrastructure. For the development of the bulk flows being transported these developments have significant implications. The predictions of the bulk flows do not follow the traditional growth patterns but are being restricted by the maximum production capacity of the resources. When natural resources reach maximum production levels prices get high leading to an impulse for substitution by other resources where possible. Higher price levels also have consequences of derived products and on economy as a whole. Integration of economic models and models covering production capacity and substitution of natural resources are beyond the state of the art.

Resource scarcity is a phenomenon that can have a significant impact on our way of living. Up to now this has not been experienced at the scale that we are facing now. Systems developed up to now mostly are assuming unrestricted growth of economy and continuous enlargement of the scale of operation. Many of these systems are also depending on an enlargement of the scale of operation to be successful. Robustness of these systems in case of economic downturns is not taken into account.

The fragmented production of the resources as will be the case for instance for biofuels but also for other resources that will be recycled at a large scale is not a completely new phenomenon, but is new for some specific resources which have a significant impact on the capacity of the road network if not directly organised in such a way that other modes can be used. The dedicated approach is what is needed here together with the solutions required.

The transition process of the logistics sector is often not taken explicitly on board. More accent on this topic is required since many more sustainable solutions are existing but not being picked up by the sector. Continuous attention is required since new options might also require new solutions for market uptake.

A diversity of developments are on-going and are to be expected, leading to the research question.

The scarcity of resources (amongst which energy) will lead to significant prices increases which will have a negative effect on economy. For instance the price of oil is increasing despite the economic crisis. As a consequence a likely scenario is that periods of economic growth will be followed by periods of recession in an alternating pattern. How can the logistical sector anticipate in the best way with this alternating situation avoiding financial damage.

Sustainable solutions (for efficiency and use of alternatives) are available and being developed but the uptake is going at a too slow pace. Companies in the logistical sector that should implement the solutions only pick up the solutions that have a very short pay-back-period. For the other solutions implementation should be supported by policies to ensure a level playing field and a more rapid transition.

Concerning reverse logistics, a test site for retailers and their clients need to be selected, and the type of products (to be recycled or used) need to be determined. In addition, there is a need to design the waste collection process and resources, as well as to test and to assess the economic performance of the operation.

Expected Impact:

This topic is directly related to the economy.

Economic impact is that infrastructure capacity needs are better predicted. In case of a lower than expected need for capacity this avoids unnecessary investments. If more capacity is needed than expected this lead to a better anticipation and therefore a less restricted future.

Using scarce resources as efficiently as possible will lead to operation at lower costs than those who are less successful in achieving this. This will give a competitive advantage for the EU to the rest of the world. Furthermore scarcity of a resource can be prevented by using alternatives as much as possible. This will avoid the higher prices, and therefore will generate more space for economic growth. Avoiding unnecessary road transport will reduce congestion. Less congestion has a positive impact on the economy. Non-renewable resources (raw materials and energy) will be saved.

2. Advanced Global freight transport models for the European economy

Expected smart results: New models for forecasting and policy analysis in freight transport, which can be used for addressing the effects of logistics innovations on European competitiveness and sustainability.

Rationale: Basic model for use at the industry and policy-makers levels for supply networks design.

Type of project: CP-FP

Objectives, contents and scope:

The objective of the research is to develop improved models for forecasting and policy analysis in freight transport, by adding features of logistics in terms of supply chain management (including warehousing and supply chain design) and intermodal transport (overseas and within Europe, including transhipment and cross-docking). The research includes specification, data acquisition, estimation and validation of the model. Also a series of case studies on actual EU policy questions need to be done to provide proof of its applicability. The scope of the work should be global, as many production networks and logistic networks are governed by global players, who extend their span of control beyond Europe. The work should be linked to research on the base of European transport statistics that can be used for modelling.

Implementation:

At present freight transport models do not allow policy analyses to be carried out with a view to logistics networks and transport chains; this hampers the proper assessment of EU transport

policies. In TRANS-TOOLS, the EU transport model, these higher level structural changes are handled only to a very limited extent within the freight module. An improved freight and logistics model will take into account linkages from transport towards global trade and regional economic growth, based on a model of distribution logistics (warehousing) and of transport logistics (intermodal transport chains). So far such freight logistics models have not yet been implemented with sufficient support from the appropriate European statistics or in a way that they are responsive to changes in policy. Once such a model would become available, the effects of logistics innovations on European competitiveness and sustainability could be assessed, along with the effects of possible policy measures meant to support logistics innovations or influence markets.

Transport and supply chain logistics are determinants of freight transport and as such of key importance to European transport policy. Firstly, logistics is essential for the efficiency of distribution of goods within the internal market and thus an instrument for economic integration. Secondly, logistics is a key instrument of global economic competitiveness. As the logistics industry will face trade-offs between sustainability and competitiveness, the effects of EU policy on location choices of the industry should become clear. Thirdly, the growth of freight transport and its economic impacts depend on the way logistics networks will respond to changing patterns of consumption and production, increasing cost levels, pricing measures and traffic congestion. Finally, ports and other industrial concentrations are hubs for global supply chains and attractors of economic activities like trans-shipment, storage, value added logistics services and production, and thus important for regional economic development. The above factors are not only highly dynamic; their influence on the freight system is highly uncertain, because of the volatility of many global production and logistics networks. It is the role of freight models to map these uncertainties by providing scenario based forecasts and impact assessments. However, the current freight transport models do not take into account the essential aspects of logistics. This limitation implies that the aggregate impacts of transport policy on the European logistics system, its competitiveness or on changes in freight flows due to changes in logistics can not be evaluated.

Expected Impact:

The economic impacts of this research can be found in the area of well informed decision making on those freight policies that facilitate the freight transport system and Supply network design for the industry. These improvements include intelligent forms of regulation, appropriate investments, port policy, development of ICT systems, spatial policy etcetera. The effects of logistics reorganization also emerge at the regional level and can demand substantial new investments. Due to the uncertainties in (magnitude and location of) expected growth, there is a risk of under- or overinvestment in transport facilities. Finally, the influence of logistics drivers on sustainability and competitiveness will allow policies to be developed that help to achieve both objectives.

3. Distressing the supply chain

Expected smart results:

To identify and estimate the consequences in terms of sustainability of slow steaming in the overall logistics including efficiency, safety, and security aspects,

To shape new business models, paradigms in line with slow steaming, including the possible new collaboration or cooperation schemes and regimes within the logistics industry

To communicate and divulge to the public the potential of slow steaming in improving sustainability and foster the acceptance of the stakeholders

Type of project: CSA

Objectives, contents and scope:

The aim of the research will be:

- To define new concepts for slow steaming vessels, barges and vehicles, involving size and shape of holds, hulls, bodies, frames and engines
- To shape new business models, paradigms in line with slow steaming, including the possible new collaboration or cooperation schemes and regimes within the logistics industry
- To identify and estimate the consequences in terms of sustainability of slow steaming in the overall logistics including efficiency, safety, security aspects,
- To communicate and divulge to the public the potential of slow steaming in improving sustainability and foster the acceptance of the stakeholders
- To determine new logistics models of the whole transport chain to comply with production and manufacturing requirements, including those at transhipment and handling point

Scope of the subject is the whole transport and logistics chains, both inland and overseas, long and short hauls.

Implementation:

Relevant EU policies include:

- The 7th Framework Programme for Research, Technological Development and Demonstration Activities. ICT and Transport themes. Reducing greenhouse gas emissions by 30 % (before 2020) compared to 1990 levels
- Communication from the Commission: Freight Transport Logistics Action Plan, Brussels, 18.10.2007, COM (2007) 607 final.
- European Green Cars Initiative. Roadmap Comodality & Logistics
- The Transport White Paper

Increased energy efficiency is a key enabler to sustainable growth and Green House Gas reduction targets. As a matter of fact, increasing efficiency is a continuous process building on improvements from the current state. Technological efficiency (vehicle and terminal “hardware”), logistics efficiency (mode, utilization and load makeup, routing etc.), and new business models for energy management in the entire logistics chain (transportation, terminals, distribution and consolidation centres, warehouses) are the key drivers of energy efficiency in the future.

Opportunities for energy efficiency within intermodal transport include “slow steaming” in freight transport, as the transfer of goods at lower speed between transhipment points, to reduce the energy consumption which is not proportional to speed due to hydro or aero dynamics factors.

Expected Impact:

Along and at the end of this avenue of change, innovation will result in:

- New logistics models of the whole chain in line with de-stressing target
- Specifications for slow steaming vehicles and technologies to fulfil logistics paradigms
- New Business models, including collaboration regimes

A profound benefit on sustainability is expected, which should be evaluated by specific accompanying actions like measurement campaigns based on commonly acknowledged data sets.

4. E-commerce based retail logistics

Expected smart result: Designing and delivering a proof of concept model for e-commerce logistics execution that can be extended by pluggable software services that incorporate the latest R&D results (e.g. stock location, dynamic pricing services). The model does not only offer the transaction environment but also serves as an infrastructure for information sharing, historical information visualization and decision support.

Rationale: Sustainable logistics for e-commerce

Type of project: CSA or CP-FP or IP

Objectives, contents and scope:

Before the internet era, consumers would typically take care of the last mile delivery themselves, by buying products and transporting them to their homes with their own cars. More and more products are nowadays, however, ordered through the internet, with the subsequent need for professional order fulfilment and delivery. This requires a tight coordination of products flows, as well as the design of both physical and IT networks that enable such coordination for delivery and returns of internet orders. In particular, a so-called multi-channel approach in which physical and internet-based outlets closely cooperate seems promising.

Implementation:

Three aspects are central to this project:

- Cross-border retail logistics. While online channels have no borders and allow for quick international expansion, consumer preferences for types of e-fulfilment are likely to differ across regions and borders. Cross-border expansion will only be successful when retail logistics solutions use the right localized form of last mile distribution, or incentives and demand management techniques to address these different local preferences.
- Cross-chain retail logistics. Online and offline retail are more and more integrated on an operational level (time windows, collection & drop-off points), tactical level (inventory location and assortment planning) and strategic level (market focus, partner selection). Models for successful online expansion, within border and cross-border, should therefore be adapted to include the right role for offline outlets on all three levels.
- Supply chain integration. Not only web shops are involved in order-to-delivery management, but other parties as well: logistics service providers may take care of delivery and collection but there may also be a role (e.g. for stocking parts) for suppliers/manufacturers of products sold. Moreover, consumers can be actively involved for example in the coordination of the delivery (e.g. through social media) and optional returns to reduce peaks and no-shows.

First results have been obtained through two Dutch Dinalog-based projects, i.e. Cross-chain Order Fulfillment, and CateLog, but a further expansion to a European level is badly needed to grasp the full potential.

Expected Impact:

The main objective of this project is to strengthen the European e-commerce supply chains by identifying business models and best practices for implementation and use that lead to increase e-commerce revenues. More concretely, the project objectives are as follows:

1. To substantially contribute to the development of scientific knowledge on the interface of logistics, marketing and ICT in e-commerce.
2. To understand cross-border consumer requirements that enable consumer-focused supply chain activities rendering increased sales
3. To contribute to the further development of the e-commerce sector by means of:
    a. Identifying improvement opportunities in logistics and stock management and implement these improvements
    b. b. Defining cross-chain business models and logistics processes and procedures that are both efficient and that entail in increased revenues.
    c. Providing insights in best practices through benchmark study.
    d. Providing architectures and tools that can support cross-chain logistics processes and procedures
4. To reduce obsolescence of retailers and enhance revenues by means of dynamic pricing models.
5. To design and deliver a proof of concept of an agile software architecture for e-commerce logistics execution that can be extended by pluggable software services that incorporate the latest R&D results (e.g. stock location, dynamic pricing services). The architecture does not only offer the transaction environment but also serves as an infrastructure for information sharing, historical information visualization and decision support.

5. Resilient supply chains and transport networks for a faster and more efficient disruptions recovery

Expected smart results:

New methods and tools to configure supply chains and transport networks including disruptions identification and disruptions risk assessment (e.g. likelihood vs impact vs cost) in decision-making processes.

New methodologies and tools to define collaborative contingency and continuity business plans between every supply chains and transport network stakeholder.

New methods and tools to capture knowledge and to ensure learning from experiences

Type of project: CSA or CP-FP[1]

Objectives, contents and scope:

Global supply chains and transport networks form the backbone of the global economy and economic growth. They are becoming highly sophisticated and vital for the competitiveness of many companies. New production and distribution trends such as lean manufacturing, just-in-time inventory, reduced product lifecycles, outsourcing, and supplier consolidation have yielded compelling business benefits. However, they have also introduced new kinds of supply chain risk and reduced the margin for error.

Recent high-profile events related to environmental (e.g. Iceland volcano eruptions in 2010, the 2011 earthquake and tsunami in Japan and the 2011 floods in Thailand), geopolitical (unrest, terrorism, organized crime and corruption), economic (currency fluctuations, commodity price

[1] Small or medium-scale focused research project, according tp EC definition

volatility, sudden demand shocks, border delays and ownership/investment restrictions – many of which have been highlighted by the global financial crisis in 2008 and the current Eurozone) and technological disruptions (unauthorised access or actions by hackers, unencrypted network traffic, industrial espionage or malicious software), have highlighted how risks outside the control of individual organizations can have cascading and unintended consequences that cannot be mitigated by one organization alone.

As a result, most companies state that supply chains and transport network risk is important in strategic and operational decision making and has become a greater priority in their organization over the last five years (World Economic Forum 2011). They agreed on the need for better awareness and management of global risks across industries increasingly characterized by complexity and interdependencies, and the requirement for new models of supply chains and transport risk management.

Companies should aim to take a more holistic approach to manage supply chains and transport network risk and achieve greater visibility, flexibility and control. In the long run, the key will be to build a "resilient" supply chains and transport network that not only seeks to reduce risks but also is prepared to quickly adjust and recover from any unanticipated disruption that occurs. In the short run, the key will be the collaborative ICT infrastructure needed to establish in real time the most suitable supply chains and transportation network to deal with a specific disruption.

Therefore, there is a pressing need to evolve from the current disciplines of risk awareness, risk management, business continuity planning and disruption handling to an integrated approach that covers all these domains. It is important to define a new research area: resilience management in the context of supply chains and transport network management to decrease the level of vulnerability to expected and unexpected disruptions, to change and adapt to the current changing environment and to recover from disruptions as soon as possible and at the lowest cost.

Current tools and limited adoption of advanced technologies are often constraining companies' ability to understand and mitigate today's evolving supply chains and transport networks risks. Due to the fact that they cannot be eliminated, providing companies with the ability to quickly bounce back from disruptions and continue business operations as efficiently as possible will likely be integral to remaining competitive requires further work in the following areas:

- New methods and tools to configure supply chains and transport networks including disruptions identification and disruptions risk assessment (e.g. likelihood vs impact vs cost) in decision-making processes.
- New methods and tools to assess supply chains and transport network risks as part of procurement, management and governance processes.
- New methodologies and tools to define collaborative contingency and continuity business plans between every supply chains and transport network stakeholder.
- Development of ICT tools for increasing network risk visibility and understanding amongst all entities through multi-way information sharing and collaborative development of standardized risk assessment and quantification tools.
- Development of ICT tools, based on process alignment and cooperation processes within and between the entities, for establishing in real time the best supply chain and/or transport network that mitigates the effect of a given disruption.
- New methods and tools to capture knowledge and to ensure learning from experiences.
- Development of methods and tools for improving supply chain transparency allowing product authentication. Authentication concerns the social aspects of logistics such as health and safety as it is about ensuring tracing of the origins of products and confirming that a product is what its packaging claims to be. The value of fake products market was estimated $250 billion in 2008, including exclusively international transactions and is significantly increasing. The improvement

of supply chain transparency would contribute to the decrease of fake products trade ensuring social safety and security.

Implementation:

The project consortium should include global supply chains and transport networks formed by manufacturers, suppliers and, logistics operators. Participation of SMEs and companies from different countries in the same supply chain will be particularly appreciated.

The project will be based on past and ongoing European projects' results such as LOGSEC, CASSANDRA, INTEROP, and V-CHAIN.

Advanced modelling, simulation, optimization and data analytic tools may be considered as key technologies for the development of the project. Similarly, new ways to store, share and communicate data based on the Internet (cloud computing) will be assessed.

Interoperability standards related to information exchange between supply chains and transport networks should be met. It is advisable to incorporate interoperability functionalities in the ICT tools developed in order to facilitate enterprise legacy systems integration at all levels of the supply chains and transport networks.

Screening of existing national/international standards such as ISO/IEC 31010: 2009, Risk management – Risk assessment techniques, ISO 31000: 2009, Risk management – Principles and guidelines, ISO Guide 73: 2009, Risk management – Vocabulary or ISO 22301: 2012, Societal security - Business continuity management systems – Requirements will be required. Other standardisation, regulation and pre-normative research aspects should also be considered.

The key will be to establish the system providing the process of authentication verification to be easily connected with the autonomous systems of other supply chain players verifying the product authenticity (mostly the Customs). The system should enable automatic connection with the product manufacturer data base and should rely on global identification and communication standards so to allow immediate and proper identification. The standardising organisations should be involved in the action so to develop the process according to the available standards.

Expected impact:

- Significant increase of the supply chains and transport networks resilience by generating robust contingency and continuity plans to different risk scenarios.
- Relevant reduction of risk vulnerability in strategic decisions associated to supply chains and transportation networks configuration (e.g. facilities location, inventory allocations or freight transport system).
- Huge decrease of the recovery time and cost required to cope with supply chains and transport networks disruptions.
- Reducing transport volumes of fake products that are damaged when proved fake.
- Enhancing the identification of products moved.
- Reducing the cost and time required for verification of products authentication.
- Development of identification standards for logistics sector and its use among the supply chain players.

6. Demand driven European incentive programme for sustainable and competitive mobility with a network oriented approach

Expected smart results: A more cost-effective and greener logistics and mobility system through international awareness and cooperation

Rationale: Awareness, harmonization, roll-out and deployment of results from previous projects (MODULUSHCA, CO3, COFRET…)

Type of project: CSA

Objectives, contents and scope:

Mobility is the motor of the economy of the fast moving interconnected society in the 21st century. However, a growing mobility is an increasing burden on the environment; and this is a global challenge. So how to achieve cost savings and a reduction of our environmental impact at the same time?

This major challenge will demand:

- An optimization of the international supply chain;
- A growing awareness of the individual responsibility of all companies and authorities involved in the chain, articulating shared values and concrete targets;
- Their willingness to co-operate and join forces for the realization of these concrete targets;
- A bottom-up, demand driven approach, starting from the network itself because only the network can bring about innovation and effective change;
- The harmonization of CO2 calculation methods with an eye to the standardization of CSR reporting.

Implementation:

Start of an internationally coordinated (European) incentive programme:

- Focusing on one or two concrete target(s);
- Demand driven;
- Network approach (network realizes innovation);
- Visibility & Differentiation;
- Results are implemented on a European level

Expected impact:

The mobility sector is an international sector: hauliers as well as carriers operate internationally. Optimising the supply chain for a more competitive and sustainable industry therefore includes co-ordination beyond the borders. The optimization of the chain is a matter of international attention which can be realized through a strong international network. The effects of a concrete incentive programme will be favourable not only for private companies and public authorities involved, but also for the international economy and ecology.

Pillar: Corridors, hubs and synchromodality

It goes without saying that a well-developed physical infrastructure is fundamental to operational excellence in logistics. Apart from the well-known road, rail, water and air infrastructures, cross-docking and warehousing facilities that function as transfer hubs between various transport modes, together building up transport corridors, will become increasingly important. The tendency towards co-modal and synchromodal freight transport facilities (mimicking an already long existing practice in passenger transport) strengthens the importance of a smooth performance of synchromodal transfer hubs. City distribution centers are another example that may help to reduce environmental effects while at the same time reducing logistics costs significantly.

7. Automating loading/unloading systems allowing terminals and hubs to operate different modular cargo units automatically

Expected smart results: The expected results are mainly the progress on automation of the load/upload process for small containers by using enhanced robotized machines doing the process more efficiently.

In addition, an interaction between these machines and AGV vehicles will increase the performance of both technologies and reduce one of the barriers to progress to a more co-modal freight transport.

Type of project: CP-FP

Objectives, contents and scope:

The objective is to develop innovative technology solutions in order to improve freight logistics by automating the processes of loading and unloading between the factory and the port, railway terminal, airport terminal, etc., and between modes.

One of the challenges of the EU is to reduce road traffic and to contribute to a low environment impact.

One of the great advantages of the rail network is the high transport capacity with low emissions while the stiffness of the railway infrastructure is a disadvantage compared to the flexibility of road transport especially the processes of loading and unloading cargo transfer.

Currently in Europe a 70% of the freight transport is carried out by road obtaining the rail transport a 17% of the total transport. One of the limitations that exist in promoting the use of rail infrastructure is the unit price of tone transported. Today, the cost of transporting goods by road is cheaper than using rail. From one side this is due to the lack of investment in freight transport by rail and in the other for the low utilization of resources and inefficiency in the operation. To solve this problem the efforts should be focused on the optimizing of available infrastructure and the appropriate design of the new infrastructure.

The general objectives are:

- To improve mobility, accessibility and logistics through optimal definition and management of transport infrastructure and associated services directly or indirectly, especially of the rail intermodal terminals.
- To incorporate new technologies that allows better management and optimization of infrastructure.
- To Increase the competitiveness of infrastructure by improving its optimization.

Currently the loading / unloading of goods is done by manual machines (forklift) and the disadvantage is that it is necessary a large team taking into account the consequent problem of limited time. An automated system will reduce the human intervention increasing safety and reliability degree.

The target is the optimization of the automatic loading and unloading in intermodal small containers (maximum 2x2 m). This has to include aspects such as:

- Development of robotized machines for the automatic loading/unloading process;
- ICT for supporting these machines as well as the optimisation of the whole process;
- (re)design of terminals, transport vehicles, and/or small containers itself; as well as
- Study of how these automatic systems interact with automatic vehicles (AGV's) that can be customized for internal transit on terminals (and between these and other logistics centres)..

The improvement of the technology should lead to optimization of the process of load/unload and, in consequence, to:

- Benefit the freight intermodal transport by the reduction of one of the main barriers, the movement of small freight containers between modes. This could lead to replace road transport by other transport modes with less CO2, GHG and contamination emissions, as well as reduce the need for new transport infrastructures by increasing the use of the existing ones
- Increase the asset utilization factor by reducing the awaiting time to be loaded/unloaded, both in intermodal terminals and in origin/destination places.
- Benefit the freight operations in terminals and industry by reducing time and cost of these movements, as well as reducing number of errors produced by manual handling
- Increase the performance of the terminals and, as consequence, reduce the need of new related infrastructures, by optimizing the use of the existing ones
- Contribute to the optimization of terminals (re)design by including the automatic load/unload aspects, as well as to the (re)design of transport vehicles.

Implementation:

Results of previous EU projects, such as Transformer (under negotiation) will have to be taken into account.

Expected Impact:

- Reduce the bottleneck represented by manual operations in case of loading/unloading of small containers between different transport modes.
- Reduce CO2 by increasing the use of non-road transport for goods.
- Reduce the freight awaiting-time on terminals
- Improve the performance of existing infrastructures and reduce the need of available space

Pillar: Information systems for interconnected logistics

The progress on the transition to a better interconnected logistics is based on the evolution of ICT technologies and its application to logistics sector by enabling the following aspects:

- Generic aspect by developing initiatives contributing to evolve to a European common view on how the ICT systems collaborate and integrate information, as well as ensuring it is inclusive of all the actors in the logistics, e.g. SME. This includes generic initiatives on architecture, governance or data exchange
- Concrete examples of collaboration between logistics and related systems such as the tolling or cross-border.

8. Governance and business models for readiness of Internet of Freight

Expected Smart results: The progress to an Internet of Freight needs to consider the Governance aspects related to ICT infrastructure desirable behaviour and its risk management, such as ownership of infrastructures, security aspects, or rules for information sharing, as well as the business models behind there. This will support a seamless integration and compliance of the different logistics ecosystems including and beyond the technological aspects. Results of previous projects mentioned below are providing the ICT tool, while this project is about the use (Governance and business models) of such global tool.

Type of project: CP-FP

Objectives, contents and scope:

ICT solutions to allow seamless interoperability across different ecosystems

The progressive integration of Logistic Ecosystems is raising the need to complete this integration including the following aspects:

- Governance of the resultant logistic ecosphere, i.e. a system composed by all the ecosystems (in the sense of existing/on-going platforms such as Port communities, RIS, ir company-based freight management systems).
- These ecosystems governance could be performed at regional, national, European and International level, but pursues the objective of a world class governance of the global logistics ecosphere. This include examples such as: the connection of all port community systems, the integration of vehicle tracking solutions for truck and inland barging, or the integration of cargo, vehicle and loading unit, as well as the integration of all the mentioned ecosystems
- Preparation of new business models that take advantage of the Logistics ecosystem/s and the global Logistics ecosphere

Currently, there are initiatives facing the technical aspects of collaboration between logistics platforms, e.g. iCargo faces the semantic interoperability of platforms. However, governance goes further than technical aspects and needs more concretion in aspects such as ownership of infrastructures, security aspects, confidentiality and propriety of data, performance dashboards, or rules for information sharing, as well as the business models supporting it.

Preparation of a large demonstration where the governance aspects and new business models were shown

Implementation:

Results of previous EU projects, such as CO3, Modulushka, iCargo, LogiCon, (under negotiation) FINEST and cSpace will have to be taken into account.

Expected Impact:

- Rationalize the freight transport in order to reduce energy consumption, GHG emissions, contamination and road traffic intensity, by improving the load factor and reducing the number of KM of ICE based vehicles
- Prepare and demonstrate the governance aspects of the logistic ecosphere
- Stimulate the debate about the logistic ecosphere governance from the perspective of the opportunities can offer, also looking at the social and political acceptance by citizens, authorities and the business itself
- Involve additional countries to the European logistics ecosphere initiative. E.g. African countries, Brasil, Japan.
- Involve SME is both Governance aspects and new Business models

9. European Logistics Information Sharing Architecture

Expected smart results: An architecture for sharing logistics information for interconnected supply chain planning and execution, which will speed up the formation of a single logistics information space in Europe

Type of project: CSA or CP-FP

Objectives, contents and scope:

In the coming decade major steps will be taken to improve the technology base of information systems for decision making within the freight and logistics sector. New international and intermodal repositories and data pipelines are being created that improve chain visibility, the sensoric and self-organizational capacity of the transport system is improved by digitization of transport documentation and automation of decision processes, integrative (multimodal) management systems (TMS, WMS and ERP) systems are deployed and new data mining capabilities are developed to deal with the data flood for logistics decision making. As a mirror of these developments, on the side of the potential users, many new ideas are being developed for transport functions and support applications, including e.g. control towers for multimodal transport booking and planning, risk based compliance management around seaports or automated generation of transport statistics. All these purposes of use of the data involved different information systems, different user requirements (varying from long term, strategic performance indicators to highly dynamic operational transport characteristics), different business models and different deployment trajectories.

A complex task lies ahead of developing architectures for information sharing and valorization, so that the rich source of transport data can be exploited by a multitude of parties on a basis of

trusted business agreements. The research will develop an architecture that facilitates real time information exchange and co-operation between agents in the network. Such an architecture includes technical and organizational guidelines for data and information system governance, technical aspects of IT solutions, business models and processes. Its scope includes all modes of transport, land based, sea and air, domestic and international, with particular attention to intercontinental standards, to protect and enhance Europe's gateways. It should also allow use in public/private spheres, to allow performance measurement and as such strengthen the consistency between long term transport policy and user needs.

The research will identify barriers for interoperability (including legal and environmental) for unimodal and intermodal transport options, considering emerging network configurations (direct shuttles, extended gate, hub/spoke, shuttle terminal etc.), new contract types and forms of haulage (carrier/merchant/terminal). The deployment roadmap will define the long term vision and use back-casting to develop alternative pathways for introduction of technologies.

Key will be to establish decentral and autonomous systems for interconnected supply chain planning and execution. Operational framework.

Implementation:

The task of developing broad architectures requires a merger of at least two communities in freight data R&D representing the latest innovative practice from the public and the private sector. The experiences from the public freight data projects ETIS, TRANS-TOOLS and WORLDNET should be brought together with the latest logistics data oriented initiatives in CASSANDRA, SMART-CM, iCARGO, eFreight, Modulushca, CO3 and DEMANES. Obviously, the process of developing architectures cannot succeed without the involvement of a broad range of private firms whose daily business is in logistics services, public/private companies in the port sector and transport associations. Preferably, leading IT-oriented companies should be involved. AS currently there are several architectures evolving, solutions addressed to their convergence and/or collaborative co-existence has to be faced.

Expected Impact:

The creation of an architecture for logistics information sharing and valorization will speed up the formation of a single logistics information space in Europe, that is accessible for the transport sector, its users and, in addition, government. It will allow the European co-modal freight transport system to work as one connected network and will strengthen EU competitiveness. It will improve speed of deployment of promising new technologies and public policies, as performance management in the sector will provide constant feedback to the transport sector and policy makers. The expected economic impacts lie in the areas of trade facilitation (lower import and export costs), lower cost for the internal market and increased productivity of the European industry, including logistics services. In addition, responsive operations in co-modal networks are expected to substantially reduce congestion, as well as contamination and environment impact, as freight assignment will be more flexible depending on the situation at hand in the different modal networks.

10. Improved cross-border data exchange in multimodal transport chains including customs information

Expected smart results: Developing and implementing an ICT framework for exchanging customs and transport documents between EU members and countries outside of EU specially Russia, Belarus and Ukraine. The framework should allow an electronic interface to already existing customs systems. Moreover the customs and transport documents harmonization and standardisation should be proposed for different transport modes.

Type of project: CP-FP

Objectives, contents and scope:

The main aim of the call is to develop an innovative infrastructure for trans-border information flow in intermodal transportation, which allows a transparent, reliable and standardized electronic data interchange in intermodal transnational transport corridors.

Implementation:

During the transportation processes a lot of information is required to be exchanged. At the moment there are different standards regarding transport documents depending on transport modes, countries and organizations. There are differences in customs operations in cross-borders transportation. The main challenge for this call would be to establish an ICT framework enabling customs and transport documents exchange, in particular between EU members and countries outside of EU. Moreover harmonization and standardization of customs and transportation documentation required in importing and exporting outside EU including different transport modes specially rail, sea, inland water-ways and roads should be proposed. At the East border of EU there exists a common customs system connecting Russia, Belarus and old soviet republics like Lithuania and Latvia which should be taken into consideration when harmonizing transportation processes to speed up the customs operations.

Expected impact:

- Improved efficiency and visibility of transnational transport and document exchange.
- Increased speed of transport management in transnational transport corridors.
- Increased speed and reliability of customs declarations.

11. ICT platform for empty container repositioning

Expected smart results: The proposed ICT platform is a comprehensive tool, which responds to individual requirements of different links in transport chains of empty containers. Functionality of dynamic delivery planning is supported by e-commerce solutions what enable optimal utilization of empty boxes in the global scale.

Type of project: CP-FP

Objectives, contents and scope:

Yearly, some 45 mio TEU is used worldwide for transfer of goods between continents. Majority of intercontinental traffics are imbalanced (between inbound and outbound deliveries). Some 20% of containers transported along ocean routes and some 40% of boxes in overland transport are empty so there is a great potential for improvements in managing worldwide movements of empty containers.

Implementation:

The key will be to establish the ICT platform for empty container management meeting the following functionalities:

- containers are equipped with the ICT device that allows (besides track & trace and alert in case of uncontrolled opening of container) online communication with the main maritime freight transport stakeholders including deep sea carriers (owners of containers), seaport and inland container terminals, depots, road, intermodal and short sea transport operators as well as freight forwarders.
- This ICT device shall allow the owners of containers to:
    - control of own container stock at depots worldwide,
    - order reposition of containers with depot operators or freight forwarders / carriers,
    - send information on empty containers to freight exchange to check freight possibilities,
    - order container cleaning or repair with specialized companies,
    - alert in case of delay of journey.

Expected Impact:

- Increased load factor in containerised transports.
- Reduction of the road congestion.
- Creation of the ecosystem of co-opeting companies and institutions.

12. European Interoperability for Integrated Freight Management

Expected smart results: Development of novel solutions managing connectivity, tracking and monitoring of goods and assets, so as to automatically verify the information compiled from different transport modes managers (road transport managers, port authorities, etc.) to carry out electronically the compensation and invoicing of the whole transport route

Type of project: CP-FP

Objectives, contents and scope:

Relevant European transport policy goals aim to optimise performance and efficiency in the face of growing demands for mobility; By 2030, 30 % of road freight transport over 300 kilometres should shift to rail and waterborne transport. A continuous and efficient pan-European transport of people and goods, also internalising external costs, requires a new European multimodal transport management, information and payment system.

The main objective is to support the interoperability of the freight transport systems in Europe, and to contribute to further develop and implement the intermodal door-to-door transport chain combining efficiently road transport, rail transport and short-sea shipping, as a sustainable, environmentally friendly and plausible solution for the capacity and mobility problems of the European freight transport system.

The proposed topic should aim at validating novel solutions managing connectivity, tracking and monitoring of goods and assets, so as to automatically verify the information compiled from

different transport modes managers (road transport managers, port authorities, etc.) to carry out electronically the compensation and invoicing of the whole transport route.

The idea is to capitalize on the implementation of a standard of European Electronic Road Toll systems (EETS) and make it interoperable with transport management and collection systems implemented for short sea shipping and/or railway transport.

The back office system of the global solution will be devised and developed so as to be able to manage the transportation process of freight identification and tracking, collection or rewarding for the carrier, management of black lists of users, payment compensation among different transport system, etc. which will be considered as a key component of the solution to be developed.

Implementation:

Results of projects funded under the call GC.SST.2012.3-2 will have to be taken into account.

The following normative should be fully considered regarding the interoperability within road toll systems:

- Directive 2004/52/EC on the interoperability of electronic road toll systems
- Decision 2009/750/EC on the definition of the European Electronic Toll Service (EETS) and its technical elements.

Expected impact:

Proposals should make important contributions to these ambitious policy goals:

- A substantial reduction of traffic congestion: achieved by implementing a fully intermodal 'door-to-door' transport system and promoting greater integration and interoperability between freight transport modes (motorways tolling, short sea shipping, railway).
- Substantial improvements in the mobility of goods: achieved through the development and widespread use of intelligent transport applications and management systems for information and payment that are interoperable Europe-wide. By the use of EETS compliant tags in the vehicles, transporters should be able to smoothly interact, not only with different road toll systems in Europe, but also with other transport systems by sea and by railway, in a transparent way to them.

Pillar: Supply Chain Coordination and Collaboration

A key development expected in the next decade is the transition from the current independent supply networks, where transport and logistics resources cannot be shared or accessed by different cargoes and shippers, to open global networks[2] where resources are compatible, accessible and easily interconnected. This will enable innovative freight management practices in two main areas:

- *Supply Chain Collaboration* will deal with maximising resources utilization, such as vehicle and infrastructure capacity, by matching demand from multiple shippers with available transport and logistics services from different modes and service providers. This type of collaboration is also referred to as *horizontal collaboration.*
- *Supply Chain Coordination* will deal with the provision of door-to-door services based on the synchronization and dynamic update of logistics and transport plans across a variety of actors (manufacturers, retailers, logistics services providers, carriers, terminal operators). This practice is also referred to as *vertical collaboration.*

13. Business and data infrastructure for collaborative freight management

Expected smart results:

- Replicable business models for supply chain collaboration and cooperation, validated and disseminated through industry-led demonstrators.
- Open data infrastructure for collaborative supply chain management, supporting collaborative planning and synchronization of door-to-door logistic services.

Type of project: IP or CP-FP

Objectives, contents and scope:

The main objective for research and innovation initiatives in this area is removing the barriers to *load factor increase,* across all modes of transport. Current legal and competition regimes, alongside existing technical and information barriers, limit the possibilities of having cargo from competing shippers in the same transport handling unit or vehicle. For example when shipping cargo to the same supermarket, large manufacturers employ different trucks without even considering the possibility to combine their shipments. This limits the possibilities of improving load factors and, therefore, reducing the environmental impact of transport.

A further objective is better *integration of different transport and logistic services along the supply chain*. Seamless management of cargo across different providers is nowadays complicated by the fact that ICT approaches and standards have developed differently in each mode of transport, for example TAF/TSI for railways and eMaritime standards for sea transport. This prevents vertical collaboration, resulting in poorly synchronized, relatively inefficient door-to-door services.

[2] Physical Internet Manifesto, www.physicalinternetinitiative.org

Research under this topic will address the following aspects:

- Methods and business models for collaborative end-to-end logistics planning, matching demand, capacity and constraints from all actors in the transport-logistic chain.
- Data infrastructure for open global supply networks, supporting automated collection and sharing of data from a variety of stakeholders and sources, including connected cargo and vehicle.

Implementation:

Planning and distribution optimization methods by themselves are a mature topic from a research perspective but, in their current implementations, they are applied to optimize individual supply networks from a single stakeholder viewpoint. Multi-criteria and multi-actor logistics planning approaches are needed, aiming to optimize both environmental and logistics performances, taking into account capacity targets and available capacity on vehicle and infrastructure level, emissions on cargo unit level as well as at consignment level, route alternatives and traffic conditions.

Business models for both horizontal and vertical collaboration are needed, safeguarding the autonomy and profitability of each involved actor. Projects in this area should take into account the complementary work of projects like MODULUSHKA, CO3 and iCargo.

A shared data infrastructure, underpinned by common information models, is needed to support decision-makers in both operational and strategic planning decisions. The infrastructure shall make accessible data on logistics services demand from shippers, on resources availability and infrastructure status, both statistical and in real-time, to support various kinds of collaborative freight management processes. The infrastructure shall encompass the scope of current standardisation initiatives, consolidating key information elements and services descriptions across the various sectorial standards (e.g., OASIS/UBL, CEN, UN/CEFACT, TAF/TSI and eMaritime). Projects in this area should take into account the cooperative work of previous EU projects on one Common Framework for Information and Communication Systems in Transport and Logistics[3].

Monitoring data will include emissions, calculated following a common supply-chain carbon footprint approach as specified by CEN/TC 320/WG 10 standard. Data infrastructure administration models and governance rules are needed to ensure that proper levels of visibility are granted to decision-makers while safeguarding commercial competition and privacy rules.

Expected Impact:

- Load factor increase for all transport modes.
- Significant market growth for environment-friendly logistic services, including multi-modal offerings.
- Data availability and increased data accuracy for strategic and operational planning, for all stakeholders.

[3] One Common Framework for Information and Communication Systems in Transport and Logistics, version 1.0. [Online] http://www.intelligentcargo.eu/node/55

14. Smart Hubs Realise Horizontal Collaboration

Expected smart results: A new method for establishing smart logistics hubs for realising horizontal collaborations in logistics and supply chain between different actors

Type of project: CP-FP

Objectives, contents and scope:

The objective of this research is to develop a systematic approach to establish smart logistics hubs to realize horizontal collaborations in logistics between operating companies of one organization or between separate companies with complementary or even competing products.

In theory it is easy to ascertain that the utilization factor of transportation capacity can be improved substantially by combining the goods of different companies on the same lane. However, to realize co-loading physical locations somewhere in the network need to be added to bring goods together and split up in separate flows again. The research objectives include three main issues:

- Low investments in dynamic, foot loose solutions to facilitate (also short term) multi partner relations;
- Fair system to share costs and benefits and with supportive entry and exit barriers.

Implementation:

Horizontal collaboration issues are already studied and regulated for a longer period. The actual situation on the road, in ports and in cities combined with the growing urge to reduce costs and energy consumption strongly creates a fruitful environment to bring horizontal collaboration to reality now. ICT systems are reaching the desired maturity levels to effectively support those types of collaboration models.

Although there were promising initiatives in the past, without a real need to collaborate from economic perspective, most of the innovations didn't survive. High initial investments and a lack of suitable governance and gain sharing models kept away from successful implementations. , the impact of urban freight transport and the solution possibilities changed considerably over the last few years.

A diversity of developments are on-going and are to be expected, leading to the research question.

- Freight transport and logistics have negative impacts on the logistics infrastructure due to their contribution to the congestion and reduction of air quality. Especially in urban areas sharing also the same infrastructure with vulnerable road users (reducing traffic safety) and increasing nuisance for residents and people working in cities;
- A lot of the trucks are not fully loaded at the moment and drive a lot of empty kilometers before arriving at the next loading location. Due to the fact that information on the load factor is becoming more transparent and tangible by widely using ICT systems, the awareness is growing that bundling of cargo has a huge potential to reduce kilometers.

Expected Impact:

Positive impacts for the companies involved (more efficient, lower costs) but also for the whole society: due to less trucks on the road less congestion and less emissions.

Strong participations of shippers is encouraged under this topic.

15. Improving logistics effectiveness through horizontal collaboration and co-location

Expected smart results: New logistic systems deploying collaborative business models and infrastructures in different sectors and on-field applications, including:

- *Mutualisation of containers among ship owners.* Gray container concept: instead of having shipping lines allow shippers (their customers) to staff only containers belonging to them, allow customers to staff any container of any line to ship his goods to the port instead of having to wait for the next empty container of his service provider to be available nearby.
- *Mutualization of specialized truck fleets usage among various shippers.* Optimisation of the use of trucks and drivers, therefore, fuel consumption and CO_2 emissions will be substantially reduced; establishment of business models.
- *Implementing co-opetition concept in containers movements.* The aim is to develop complex solution for co-opetition in containers transport and verify it in practise.

Type of project: IP

Objectives, contents and scope:

The project goal is to develop and implement example cases of horizontal collaboration in transport. It has been common practice for individual shippers to optimize their respective distribution systems in such a way that their own customers can best be delivered. From a societal perspective however, these individual optimizations cause unintended structural inefficiencies for the logistics service providers that perform the actual transports. For less-than-vehicle-load shipments, the fact that shippers' warehouses are geographically dispersed has to be compensated by the logistics service provider's consolidation network. Recent research and pioneering pilot cases have shown that this consolidation step with its accompanying kilometres and emissions can be avoided if shippers collaborate horizontally. A promising way of horizontal collaboration is to co-locate stocks of companies delivering to the same customers or customer regions. If these collaborating shippers are granted only a limited degree of flexibility from their (joint) customers in terms of delivery quantities and/or timings, flows can be synchronized and bundling to optimize transport to a degree that is not achievable for individual companies. It can therefore contribute significantly to achieving the European Commission's ambition of reducing greenhouse gas emissions by 60% in 2050.

Implementation:

The proposal shall be based on the latest insights from logistics literature, results of recent successful cases, and related EU-funded projects such as CO3. It must give good confidence that a significant number of cases of horizontal shipper collaboration can be established within the horizon of the project. Furthermore, it must explicitly address the perspectives of shippers, logistics service providers and the society to arrive at an organization that is beneficial to all these stakeholders. And it must address the aspect of fair gain sharing, the possibilities for modal shift between the logistics clusters to be developed, and other relevant aspects of horizontal collaboration.

Specific implementation issues include:

- Have several shipping lines agree to rent their containers between themselves and allow customers on a certain terminal/port to staff any of them, whatever the shipping line used.

- Consider and reuse experiences that have already been led by individual producers (for instance CEMEX) not to tie the trucks to a specific batching plant but to make them available for all batching plants in a certain area. This experience could be extended and replicated to other business/trades.
- Take the collaboration concept developed by previous projects such as INTEGRITY, SMART-CM, CASSANDRA, COMCIS and iCargo, CO3 as the base for the real co-opetition. However, this action not only requires a new concept of collaboration, which is co-opetition, but there is also a need to provide containers to machine communication so as to improve data exchange processes.

Participation of SMEs with proven experience in horizontal collaboration will be considered an asset. Proposals will clearly indicate the baseline in terms of kilometres driven and CO2 emissions as well as other emissions and the progress (reduction %) expected as a result of the project.

Expected Impact:

The project will be the next step in establishing horizontal collaboration as a standard in logistics. It is expected to reduce energy consumption and thus CO2 emissions of the supported supply chains by at least 30% compared to the situation before horizontal collaboration. Furthermore, it will deliver at least five collaborations that can serve as an inspirational example for future collaborating shippers as well as a practical handbook.

Specific measurable impacts include:

- Reduced number of containers needed. Reduced space for containers storage on hinterland ports and terminals.
- Reduced road congestion in urban areas, optimizal use of trucks and drivers, reduced fuel consumption and CO_2 emissions.
- Increased utilization of container space in backhaul transports.
- Cheap and safe container to machine communication.
- Reduction of the road congestion.
- Creation of the ecosystem of co-opeting companies.

Pillar: Urban Logistics

The four themes mentioned before do not constitute an exhaustive list and are certainly not mutually independent. An important domain which needs input from all four pillars is Urban Logistics. In 2007 the earth passed the point in which more than 50% of the world's population is living in urban areas; in parts of Western Europe that percentage is now well beyond 70%. Therefore, cities are the centres of economic activity and hence logistics is a key enabler to citizen's prosperity. Urban logistics typically faces all three aspects of sustainability (social, economic and environmental) together with adequate safety and security procedures. It addresses aspects of how to redesign logistics processes (given new technological means) and infrastructure (e.g. urban distribution centres), a sound information infrastructure for retailers and consumers (also in view of the rapidly increasing internet sales), and collaboration of authorities, shippers and logistics service providers to reduce emissions, noise, congestion and the like.

16. Transformation of operational and business models to enable sustainable urban freight deliveries

Expected smart results:

New ways of collaboration and concerted actions between local authorities, shippers, retailers and logistics service providers to reduce flows through improved collaboration

New concepts for the design of distribution centers in cities for last-mile distribution (e.g. cross-docking methodologies), and impact on infrastructure optimal utilization (leading to policy guidelines)

Better integration of freight operations in network management strategies and operations

New approaches for home deliveries to reduce the unsuccessful deliveries and to accommodate to customer conveniences

Optimization, modularisation and standardization of packaging and load units in distribution vehicles for business and home deliveries

Packaging solutions for home delivery specially of fresh product

New models to integrate direct and reverse logistics for some sectors (e.g. empty bottles in restaurants)

The use of data on goods with consideration for the possible exploitation of eFreight for urban freight delivery

Use of ICT to enable cooperation between stakeholders with the exchange of data and the provision of information by each of these stakeholders

Better information and data capture possibilities to better steer and control logistics activities in cities (change regulation framework form restrictions to regulations stimulating efficient urban freight deliveries)

ICT solutions for an optimal management of public infrastructures (e.g. reservation of load/download spaces and lanes use)

Use of ICT for improving synchromodality in urban logistic and reduce number of empty deliveries.

Type of project: IP Level 1

Objectives, contents and scope:

In 2007 the earth passed the point in which more than 50 % of the world's population is living in urban areas; in parts of Western Europe that percentage is now well beyond 70 %.

Additionally to this concentration of population, urban freight distribution patterns are changing:

- Home delivery market has rapidly increase worldwide. This affects the urban logistics system (both due to other channels, where usually large postal operators make most home deliveries, but also due to changes in the conventional stores located in cities);
- Chain retailing and commercial centres are expanding. In European cities, large retailing brands with subsidiaries or franchises are increasing their share of the urban space at the expense of independent local stores. This changes the way goods are supplied to these stores; with less frequent deliveries, a larger share of consolidated shipments and larger and better loaded vehicles;
- Other segments, such as the food industry and non-chain retailers (usually SMEs), remain usually unorganized in their deliveries to the city.

Europe has set a policy target of achieving a 60 % reduction of CO2 by 2050. It aims at halving the use of 'conventionally-fuelled' cars in cities and achieving virtually CO2-free city logistics in major urban centres by 2030. In this regard, Europe is putting many efforts in "green" vehicle research and development initiatives to reduce noise, emissions, petrol dependency and energy consumption. However, the introduction of new vehicle concepts while keeping existing logistic models will be not enough to address this new complexity, and new approaches in the way to distribute goods in cities will be necessary.

The objective is to enable a more efficient integration of urban freight deliveries in the urban transport system and in the logistic chain. New logistical concepts and infrastructures must be researched, developed and tested. These new approaches should be the result of a combination of operational, organizational, technological and regulatory measures.

In order to achieve these objectives the research will be focused on the following areas:

Operational/organizational:

- New ways of collaboration and concerted actions between local authorities, shippers, retailers and logistics service providers to reduce flows through improved collaboration.
- New concepts for the design of distribution centers in cities for last-mile distribution (e.g. cross-docking methodologies), and impact on infrastructure optimal utilization (leading to policy guidelines)
- Better integration of freight operations in network management strategies and operations.
- New approaches for home deliveries to reduce the unsuccessful deliveries and to accommodate to customer conveniences
- Optimization, modularisation and standardization of packaging and load units in distribution vehicles for business and home deliveries.
- Packaging solutions for home delivery specially of fresh product
- New models to integrate direct and reverse logistics for some sectors (e.g. empty bottles in restaurants).

Information technology:

- The use of data on goods with consideration for the possible exploitation of eFreight for urban freight delivery
- Use of ICT to enable cooperation between stakeholders with the exchange of data and the provision of information by each of these stakeholders.
- Better information and data capture possibilities to better steer and control logistics activities in cities (change regulation framework form restrictions to regulations stimulating efficient urban freight deliveries)
- ICT solutions for an optimal management of public infrastructures (e.g. reservation of load/download spaces and lanes use).
- Use of ICT for improving synchromodality in urban logistic and reduce number of empty deliveries.

Regulatory:

- Change regulation framework form restrictions to regulations stimulating efficient urban freight deliveries)

Implementation:

A typical consortium will include cities, logistics fleet operators, vehicles, equipment and packaging manufacturers, smart cities technology providers, research centers and universities.

Results of previous EU projects such as such as Citylog, LaMiLo, Straightsol, BESTFACT, FR-EVUE, SMARTFUSION, Green-eMotion, business models for horizontal collaboration insights (e.g. CO3) will have to be taken into account.

Expected Impact:

- Less congestion, better air quality, less nuisance (societal benefits) and positive impacts for logistics system (more efficient, lower costs)
- Energy savings in urban areas contribute to a reduction of the energy scarcity problems foreseen. So this means less pressure on the energy market and lower energy prices, which have appositive effect on economy as a whole. Less dependence on scarce energy (oil) for the transport sector means a better competitive position of the sector.
- Contribute to standardization in terms of traffic information and data exchange between stakeholders, and standardization of load units for business and home deliveries in urban areas.

17. Urban freight consolidation schemes

Expected smart results:

Development of tools to identify and measure freight consolidation opportunities in cities, as well as to propose consolidation schemes

To define business models for the consolidation schemes, including fleet and freight sharing and pooling, and define the adequate collaboration framework between the different players running freight delivery currently

To define appropriate governance models including cities, logistics service providers and retail, of these models that should allow consolidation schemes roll out.

Type of project: CP-FP

Objectives, contents and scope:

By 2030 it is expected that essentially CO2 free vehicles will carry out urban freight deliveries, whereas long-haul trips will continue to be operated with conventional transport means. Therefore, effective urban logistics will require successful implementation of freight consolidation schemes at urban-interurban distribution centres, where incoming cargo shall be collected, consolidated according to delivery schedule and destination, and dispatched through the urban distribution network. Successful consolidation schemes will achieve two main objectives:

- To maximize the utilization of urban logistic resources, i.e., the electrical fleet, urban infrastructure and space; therefore urban deliveries shall have to include cargo from different shippers, regardless of origin and brand considerations.
- To ensure efficient deliveries and a proper service level to the shippers, who will have to significantly revise their logistic networks and practices to comply to the common consolidation scheme.

The latter objective is particularly challenging, since many shippers will not adhere to the consolidation scheme unless it proves as effective and no more expensive than their current delivery process.

Urban freight is mostly run by small companies that work independently and that make every day deliveries to their customers networks. This implies, multiple players delivering goods to urban commercial areas which may have a clear opportunity for consolidation schemes in which freight may be pool to increase optimization opportunities meaning increasing load factors.

The project will address the following items:

- Tools to identify and measure freight consolidation opportunities in cities, as well as to propose consolidation schemes.
- Define business models for the consolidation schemes, including fleet and freight sharing and pooling, and define the adequate collaboration framework between the different players running freight delivery currently.
- Define appropriate governance models including cities, logistics service providers and retail, of these models that should allow consolidation schemes roll out.

Implementation:

Results from past projects such as Smartfusion, Citylog and Freilot should be taken into account.

The project will pilot and validate these models in real urban environments. The purpose of the validation is to demonstrate that the objectives of all key stakeholders, in terms of profitability, sustainability and user service level, are met thus providing a sound basis for successful take-up after the project.

Expected Impact:

The project will deliver tools to measure freight consolidation opportunities and to define appropriate consolidation schemes, as well as the collaboration framework and governance model required to run consolidation schemes. This will result in

- Reduced freight traffic in cities;
- More efficient utilization of road network and parking space;
- Increase sustainability of urban delivery system in terms of economic, environmental and societal benefits.

18. Relevance of e-commerce and home deliveries in urban freight impacts

Expected smart results:

Mapping and analysis of potential logistic and mobility impacts on urban areas due to activities of E-commerce, E-retail and last mile logistics related industries, from a social, an environmental and an economic perspective.

Mapping of concepts that can drive further optimization in E-commerce (and related: ex.: reverse) logistics.

Type of project: CP-FP

Objectives, contents and scope:

E-commerce (and related) services are growing rapidly worldwide and in Europe and tend to create an increasing number of externalities, especially in urban regions. The proposed project will provide an overview of the E-commerce, E-retail and last mile logistics related industries. Potential logistic and mobility impacts will be mapped and analyzed, based on proper data collection.. The roles of the various stakeholders will be considered. The project should develop a vision on the future of E-commerce related logistics in cities in Europe by using the results of the problem analysis and looking at possible future scenarios and solutions from the following perspectives:

1. Data collection and analysis concerning the impacts of E-commerce on urban areas. A major problem concerning urban logistics is the tremendous lack of high quality data, especially data related to E-commerce logistics. A majority of cities does not have data about:
    - Potential problem spots or locations related to direct-to-consumer deliveries
    - Direct-to-consumer data versus business-to-business data
2. Decoupling of delivery and reception.
    - Flexible drop off points (offices, public transport hubs, parkings, neigborhood retired people): Are collection point deliveries more sustainable than home deliveries?
    - Lead time implications & delivery time on costs and sustainability: Effects of time related delivery issues (short lead time, narrow delivery time windows, etc.)
    - Payment schemes. Example: cordon pricing based on for example time
3. Logistics systems for efficient management of home deliveries (Ex. ICT)
4. Reverse logistics implications
5. Optimal functional unit and packaging
    - Impacts on home deliveries
    - Cluster opportunities
    - Also related to fresh products
6. Links between direct-to-consumer deliveries (both home + collection points) and passenger transport
7. Direct-to-consumer supply chains too much based on business-to-business supply chains
    - More efficient new last mile set-ups

Expected Impact:

A first deliverable will concern the collection of urban logistics data. Other research deliverables will map concepts that can drive further optimization in E-commerce (and related: ex.: reverse) logistics. The research deliverables will list also potential effects from a social perspective (ex. Ageing population), from an environmental perspective (Ex. Environmental effects of collection points and its externalities) and impacts from an economical perspective (Ex. High last mile cost related to time definite home deliveries)

19. Creating a framework for a more efficient urban freight system through a better understanding of this activity

Expected smart results:

To develop a framework for data collection to properly analyse urban freight movements in cities (structure of the sector, load factor, type of operations, relative share of different type of freight (retail, food, construction, post, etc.), expected impact of home deliveries, etc.).

Type of project: CSA

Objectives, contents and scope:

Urban freight delivery represents a significant part of the traffic in the urban environment and contributes significantly to the negative impact of transport on the urban environment: CO2 emissions, congestion, noise and air quality. While it has been the focus of several type of research activities, there remains an important lack of knowledge on the sector and on the framework which can create the best conditions for an efficient urban freight policy.

The coordination action should agree on a framework for urban freight data collection (new or already available) and sharing in cities providing value for logistics optimization. In many cases the required data does exist, but is not available to use for (logistical) policies. Example: Cities that use cameras in specific zones for fining, etc. (Only police use). Collected data should contribute to proper analysis of urban freight movements in the cities (structure of the sector, type of operations, vehicles, load factors, relative share of different type of freight: retail, restaurants and hotels, courier, construction, waste, etc.

Implementation:

The analysis should also support a clear understanding of the optimization opportunity for the urban freight and the market trends in the different areas: retail distribution, home deliveries, courier, waste and recycling and the most appropriate transport mode.

We also need to see how to improve awareness about this activity. For this purpose, being able to evaluate the inefficiency of urban freight delivery would be useful. Complex interactions between land use and transport should be compared considering a series of factors to identify promising policies and planning processes.

Expected Impact:

The expected results would include a framework for data collection to properly analyse urban freight movements in cities (structure of the sector, load factor, type of operations, relative share

of different type of freight (retail, food, construction, post, etc.), expected impact of home deliveries, etc.).

It would also include guidelines and recommendations on the governance framework to plan urban freight policies and measures and implement them, as well as on the options on raising awareness on this activity. Guidelines and recommendations should therefore identify suitable framework for the future development and implementation of already demonstrated (night deliveries, management of loading unloading bays, consolidation centers in historic cities, etc.) innovative urban freight delivery solutions.

Other topics

This section corresponds to topics not belonging to any of the previous pillars, but which are still important to be funded in the next Horizon 2020 Programme.

20. A valorization framework – from research to innovation

Expected smart results: A better use of research results by industry; and more effective and efficient transformation of knowledge in the domain of logistics and supply chain

Type of project: TPT

Objectives, contents and scope:

A lot of valuable results that have been achieved by research institutions are not brought (successfully) to market. This is not due to a lack of potential, but to a lack of interest from industry. There is clearly a mismatch between research results and exploitation of the results.

The objective of the CSA is to improve the transfer new technologies and scientific results into innovative products and services.

Implementation:

A model for creating a standardised valorisation process for research results.

The framework will stimulate researchers to seek various approaches for promoting their results to industry, for implementation and creation profitable innovations, besides focusing on solving scientific problems.

Expected Impact:

Research will be driven by industry and results will be implemented quickly by industry. This will help to reduce the mismatch between research results and their application.

21. Bridging Supply Chain and Finance: European Platform Driving Knowledge to Innovations in finance and supply chain

Expected smart result(s): More efficient and effective project management for each individual company; substantial cost reduction in the whole supply chain; international awareness

Type of project: CSA or CP-FP

Objectives, contents and scope:

Context:

Definition of Supply Chain Finance: financial arrangements in the form of debt, equity or financial contracts used in collaboration by at least two supply chain partners (buyer and seller) and facilitated by the focal company with the aim to improve the overall financial performance and mitigate the overall risks of the supply chain

Research objectives/scope:

1. Building a European network of research institutes and corporations specifically around the topic of supply chain finance and aimed at sharing, exchanging knowledge and researching & developing new knowledge
2. Research and development of innovative Supply Chain Finance (SCF) solutions that will strengthen the position of European corporations in global supply chains. This involves exploiting the specific skills and knowledge developed by research institutes and large corporations and sharing resources between them when developing new supply chain finance models.
3. A third objective is development of new business models that can grow into a new SCF service industry, focusing on Europe's main logistics centres.

Implementation:

Supply chain finance is a new proposition for many business users, as well as for researchers in many European member states. The R&D efforts in the area of supply chain finance in Europe can advance in several directions.

First, research and development capacity in Europe should be mapped and assessed across institutes and corporations across the European market place. There is limited overview in Europe with regard to research on SCF objectives and scope and the level of corporate involvement. There are studies and initiatives underway in several member states like e.g. the Netherlands, France, UK, Germany, Italy and Spain.

Second, R&D efforts across Europe need to aligned in terms of developing new SCF models and instruments. This involves exploiting the specific skills and knowledge developed by research institutes and large corporations and sharing resources between them when developing new supply chain finance models.

Expected Impact:

- Enhancing impact of R&D efforts across Europe
- Sharing valuable knowledge between research institutes and corporations which improves competitiveness of European companies in global supply chains
- Attributing to the development an new SCF service industry