Seventh Framework Programme
Theme 3:
Information And Communication Technologies

Challenge 6:
ICT for Safety and Energy Efficiency in Mobility
Logistics for Life
ICT-2009.6.1

Deliverable 1.2
D1.2 Best practice cases
Workpackage WP1
Leading Partner: BIBA
Security Restriction: PU
26.11.2010
Version 1.0

Versioning

Version	Description	Author	Date	Comments
0.1	Initial draft	JannickeBaalsrudHauge	19.1.2010	Table of content ,context and guidelines
0.2	Working document	Jannicke Baalsrud Hauge/Cemile Cabuk	9.6.1010	First classification of projects
0.3	Revised concept	Jannicke Baalsrud Hauge	20.8.2010	Development of template for best practices
0.4	Working document	Jannicke Baalsrud Hauge/Cemile Cabuk	1.9.2010	Updating Projects
0.5	Working document	Jannicke Baalsrud Hauge/Cemile Cabuk	20.10.2010	Adding projects, analysis and conclustion
0.6	Working document	Jannicke Baalsrud Hauge	26.10.2010	Sent to reviewers (resent to new reviewer at 23.11.2010)
	Working document	Kostas Kalaboukas	30.11.2010	Feedback
1.0	Final version	Jannicke Baalsrud Hauge	5.12.2010	Final review comments has been processed

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Complete form on Smartfreight, efreight, D2D

Deliverable process schedule

No	Process step	Responsible	Timing (working days)	Involved persons	Notes
1	Deliverable plan Initial planning of process including: - Identification of individual contributors and peers. - Draft table of contents. - Detailed planning of timeline.	Leader		- All WP 1 Member	Leader must propose schedule, identify involved contributors and peers.
2	Structure and guidelines Initial drafting of the Deliverable including structure, guidelines and first basic content to be sent to the Contributors.	Leader		- WP leader, WP 2 leader, Chalmers, Tredit	Initial drafting from leader.
3	Leader to organize contributors input and distribute updated version to Contributors, Internal Peers and SP leader	Leader, Contributors		WP1 member, external members with additional project info	
4	Full concept Leader to consolidate contributors input and result.	Leader		Jannicke Baalsrud hauge, Cemile Cabuk	
5	Reviewing Quality check	Peers Coordinator		- Tor-Kjetil Moseng - Kostas Kalabokas	Review by internal peers including cross reading by external peer.
6	Submission to Commission	Coordinator		- Coordinator	Final stage of process.

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1 EXECUTIVE SUMMARY

Logistic for Life aims at bringing together different stakeholders dealing with innovative ICT solution to ensure the long-term sustainability of the European logistic sector. The efficiency of logistic operation is crucial for the competitiveness of small and medium sized manufacturers still forming the back-bone of the European economy (http://ec.europa.eu/index_en.htm). The logistic sector, esp. the fright transport, is not only vital for the competitiveness of the European industry, its contribution to the Co_2 and No_X emissions is tremendously. Consequently, a more efficient fright transport would contribute to the European industrial competitiveness as well as have a positive impact on the environment. The European Commission has realised this several years ago and, hence, launched several strategies like the Green Paper - Towards a new culture for urban mobility [http://europa.eu/documentation/official-docs/green-papers/index_en.htm] and The Strategic Research Agenda ICT for Mobility [http://ec.europa.eu/information_society/activities/esafety/doc/rtd_projects/fp7/sra_ict_mob.pdf].
Subsequently, in order to support the implantation of these strategies, several slots of previous and present work programmes do offer research possibilities within this area. These activities are not limited to EU level, equal trends can be found at company (like DHL, and Dachser), regional and national level within the European Union as well as from non European countries or the EFTA countries.
Many research results within efficient ICT based fright transport are actually available, but for someone not knowing the research programme structure or not having the right language skills, it is difficult to identify the right project. Additionally, it is hardly possible to search for a suitable solution of a problem in any database, since there is no common defined terminology. The objective of WP 1 – Survey, Observatory and Synergy is to collect as much information on relevant projects and initiatives, analyse the content and potential impact this may have of Logistic for Life Stakeholders and provide this information, not only to the consortium but also back to the projects and to the public. In a first step, D1.1 the observatory report collected information and made a first classification based upon the framework under development in WP 2. Based upon these results, around 15 projects dealing with ICT solution supporting energy efficiency within the freight sector have been chosen as best practices. These projects contribute to the objective at different levels- one project like Freightvision deals with policy aspects were as others like SmartCM, Integrity, Freightwise and NS Fritz can offer ICT solutions itself. This is the first of three reports, and some projects like EURIDICE, Discwise and Rising have been identified as very relevant projects, but since they do not have evaluated results yet, they will be presented in the next report instead.

2 INTRODUCTION TO THE WORKPACKAGE1

The main objective of Logistic for Life coordinated action is to provide an overview of all initiatives and project dealing with ICT for energy efficient transport.

2.1 Scope and objective of this workpackage

Workpackage 1 lays the foundation for most of the activities carried out in the project. Workpackage 1 will work as catalysator, gathering analysing and providing information to the other WPs.

All other workpackages rely on the community and information-exchange links built and managed in this WP, but WP4 will also contribute to WP 1 via Forum activities. The main goal of this work package is to achieve synergy between the existing regional, national and international research and projects with a particular attention to ICT/IST, DG TREN and DG Research initiatives.

In order to disseminate the information and to ensure a smooth utilisation in the other workpackages all partners will participate in the work of WP1. The work is distributed geographically between the partner to get as an efficient collection of information and to get contacts to initiatives in different European countries. WP 1 collects information and best practices from all these related activities and sources, and consolidates it in the form of observatory reports on industry **requirements** and available **best practices**. Once processed and enriched by WP 2, formalized knowledge is returned back as input to the **Roadmap** that constitutes the main result of WP 1.

2.2 Relation to other workpackages

The main objective of the Logistics for LIFE project is establishing a common research agenda for energy efficiency. It involves transport industry stakeholders and research organizations working on key ICT-based innovations for the logistic sector. The workplan is designed to support parallel development in different directions, corresponding to the four Coordination workpackages (survey, observatory and synergy, catalyzing knowledge, forum and supportive actions, dissemination and exploitation).

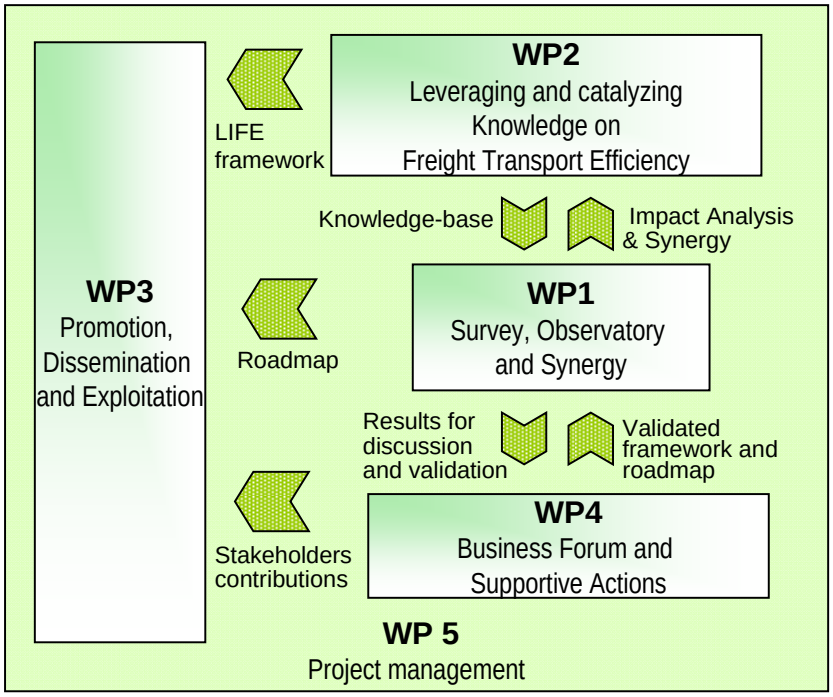

Figure 1: WP overview and dependence

To achieve results in the four areas within the project timeframe, the workpackages run in parallel and the dependencies between them are managed by sharing outcomes and interacting on common topics. In particular, as shown in Figure 1. WP1 will feed the other three workpackages with impact analysis and different versions of the roadmap, and will in return get formalized knowledge from WP2 and validated results from WP4. WP1, WP2 and WP4 will all contribute to promotion and dissemination in WP3 by providing results that can be presented and will contribute to the creation of the network. In the current phase of the project WP 1 and 2, working in parallel, exchange information. Hence, the results and the mapping carried out in this analysis of relevant best practices have been structured in such a way, that it fits to the framework developed in WP 2. D1.2 lays the foundation for D4.7 showcase and the content of D1.2 will be input for the DB in WP2.

2.3 Objectives and structure of deliverable 1.2

This deliverable provides information on approaches and technologies that are considered most relevant, in terms of application potential and diffusion, to the purpose of increasing energy-efficiency in the logistics sector. For each identified Best Practice, the report contains enough information for its inclusion, classification and comparison in the Logistics for LIFE Framework. To take into account input from the other Workpackages, as well technology developments from related projects, this Deliverable will be produced in three incremental versions (1.2a, 1.2b, 1.2c). This is the first version.

In order to choose the best practices the following elements have been considered in this deliverable.

- Description of the “best practice”
    - Offering enough information for following tasks that means: First the project is described in a short way, then the relevant approach identified, should be described in

very detail. From the information offered in this part, the approach should be understandable.

- Furthermore the best practice should be described according to its special characteristics:
  - Why is the practice a “best” practice?
  - Are there other approaches dealing with the same idea, or is this a completely new practice?
  - Why is it relevant for Logistic for Life?

- Inclusion of the project to the L4L framework (adapted ARKTRANS framework)
  - inclusion to higher levels of the structure
  - With which practices does the project contribute to which area of the framework:
    - Transportation network management
    - Transport demand
    - Transport service management
    - On-board support and control
    - Transport sector support
  - Why is the described practice special in this field of the framework
- Classification of the single functionalities to the Framework on the lowest structure level
  - After matching the single practices to the functionality areas, they should be classified to the single functionalities they offer
- Comparison of the best practices within the framework
  - The comparison is an own section. Here the identified best practices of the different analyzed projects will be compared according to their benefits and their applicability to real business cases. Especially if there is more than one best practice covering a functionality of the framework, there will be a detailed description of differences, advantages and disadvantages of them.

2.4 Terms and conventions used in the document

Abbreviation Explanation

Esp.	especially
CA	Coordinated Action
CORDIS	Community Research and Development Information Service
DB	Database
DLR	Deutsches Zentrum für Luft- und Raumfahrt
CO2	carbon dioxide
DoW	Description of Work
EU	European Union
FP	Framework Programme
FTMS	Freight Transport Monitoring System
ICT	Information and Communication Technologies
ITS	Intelligent transport System
NOx	Nitrogen
Logistics for LIFE-	**Logistics** Industry Coalition **forL**ong-term, **I**CT-based **F**reight Transport **E**fficiency
L4L	Logistics for LIFE
RFID	Radio Frequency Identification
TCMS	Transport Chain Management System
e.g	for example
etc	et cetera
WP	Workpackage
DG-TREN	Directorate-General for Mobility and Transport
DG	Directorate-General
D	Deliverable
ISO	International Organisation for Standardization

Abbreviation	Explanation
CEN	European Committee for Standardization
IPv6	Internet Protocol Version 6
CALM	Communications access for land mobiles
IBC	Intermediate Bulk Container
FWF	Freightwise Framework
UK	United Kingdom
CSD	Container Security Device
DSCR	Debt service coverage ratio
GSM	Global System for Mobile Communication
3G	3rd Generation
GNSS	Global navigation satellite system
3PL	Third Party Logistics
IT	Information technology
AEO	Authorised economic operator
SICIS	Shared intermodal container information system
SCEM	Supply chain event management
GPS	Global positioning system
LPS	Logistic service provider
EIRF	European intermodal route finder
OD	Origin-destination
FEA	Fuel efficiency adviser
W	Weighted value
HGV	Heavy goods vehicles

3 METHODOLOGICAL APPROACH

This chapter describes how the best practices have been chosen and what we have been looking for in the analysis more than 100 projects identified in D1.1 and then selected as a best practice.

3.1 Introduction

Best practices regarding approaches and technologies should be chosen regarding their relevance to the L4L ideas.

Approaches and technologies identified as best practices should support energy efficient and ICT supported. The main aim of the practice and approach should offer long term sustainability in financial, societal and environmental direction. Hence, it is important the practices are applicable to various different logistic situations. L4L addresses the logistic sector and here the modal as well as the inter-modal freight transport. Consequently the practises chosen have to contribute to this. Characteristic for best practises are that they can be adapted to different situations instead of are created in a fix way for just one specific situation.

The aim of the following sections is to collect various best practices addressing various challenges to offer a set of solution opportunities. L4L aims at proving a nearly complete overview of technologies and approaches that can offer an overall solution specialised to contribute to all three sustainability dimensions mentioned above. Secondly, only projects concerning

- Support Energy efficient und ICT
- Freight transport

will be considered.

3.2 ARKTRANS model

This section describes the Norwegian multimodal framework for ITS of ARKTRANS, to enable an attachment of the projects analyzed in D1.1. Every identified project relevant for L4L should be compared within the ARKTRANS framework, which is the basis for the L4L framework. For this reason this section comprises a short description of the framework, its characteristics and finally possible gaps and prospects regarding the fact of covering all the addressed areas by the identified projects. For further information about the ARKTRANS framework please take a look at D2.1.

The ARKTRANS framework addresses the whole transport sector, thus it is applicable to all transport modes: road, sea, rail and air. It can be applied to national as well as to European and global transport scenarios and offers modal and co-modal solutions. The potential of applicability to different situations is caused by the basic ideas of the framework. It is holistic and mode-independent which is possible by using different views and a high abstraction level. The content ARKTRANS offers is organized into different abstraction layers and into different viewpoints, shown in Figure 2.

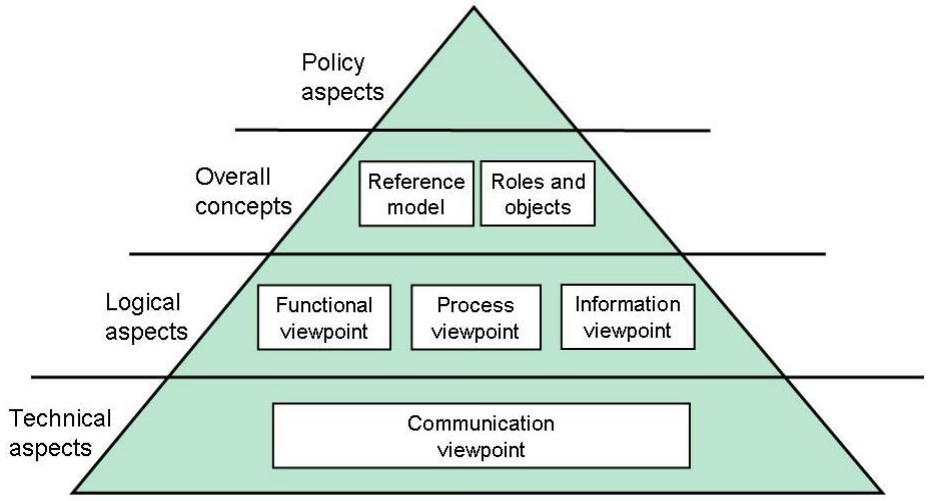

Figure 2: The ARKTRANS content

Figure 2 illustrates different abstraction layers of the framework:the overall concept, logical aspects and technical aspects. Policy aspects are not covered by ARKTRANS.

- The overall concept includes
  - reference model,
  - generic roles and object description.

  The reference model is describes in more detail below. A generic role stands for a unique set of responsibilities and relates to just one domain of the reference model.
- The logical aspects comprises three points of view:
  - Functional
  - Process
  - Information.

  The functional viewpoint describes the functionalities and will be the main viewpoint within L4L. Each functionality is under the responsibility of a role and as such related to one domain. The process viewpoint identifies the required interactions between the functionalities or roles. The required information objects including their attributes and relation that are exchanged between the functionalities are describes within the information viewpoint.
- In the communication viewpoint specifies the implementation of the services defined in the information viewpoint.

The reference model classifies the transport sector into different domains describes through their own roles and responsibilities. The domains are the following:

- Transportation Network Infrastructure Management,
- Transport Demand,
- Transport Network Utilisation,
- Regulation Enforcement,
- Emergency Enforcement
- And Transport Sector Support.

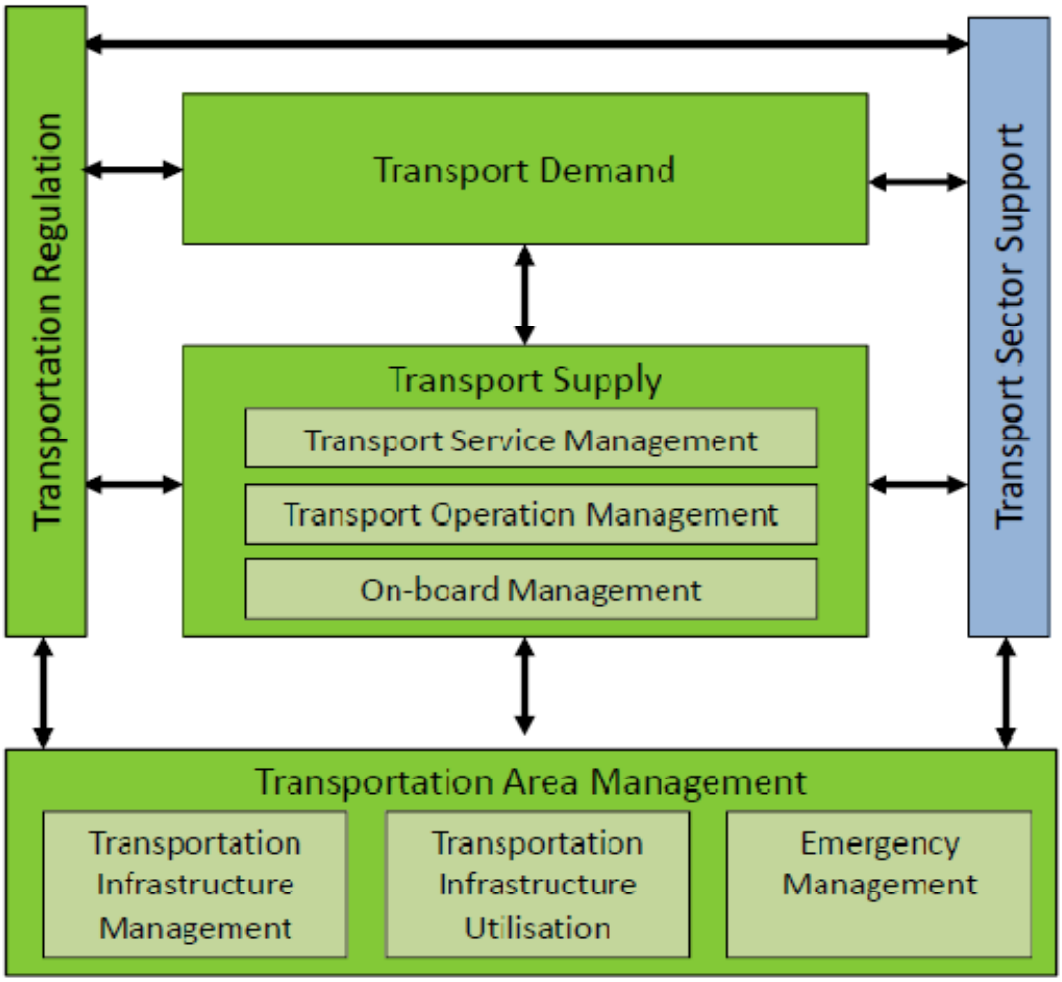

Figure 3: The ARKTRANS reference model version 7

The domain Transport Network Management takes care of the areas safe, efficient and environmental friendly transport. It includes the management of physical transportation network infrastructure (e.g. road, railways, fairways and terminal areas), traffic management (of traffic flows and individual transport means), regulation enforcement (e.g. customs) and emergency management.

The domain Transport Demand represents the transport user, which defines the transport demands, does transport planning, requests the required transport services, and follows up the transport.

The Transport Service Management domain is responsible for providing transport services to the transport user in the Transport Demand domain. This also includes the management and execution of the transport operations (e.g. transport, passenger/goods handling, document handling, etc.).

The On-board Support and Control domain is responsible for the safe and efficient operation of the transport means (e.g. navigation and adaption to traffic situation).

The Transport Sector Support domain provides generic services to the other domains, (e.g. different types of information services)

All domains described within the ARKTRANS framework are relevant for the L4L aims. The most significant reason for this is that the L4L objectives are related to increase the freight transport efficiency with the help of ICT and since ARKTRANS is a holistic and multimodal architecture for both freight as well as person transport there are elements targeted.

One of these elements is the sub-domain Emergency enforcement; another element left out of consideration is the Transport sector support.

By attaching the results of the identified projects, especially the best practices to the framework it is important to recognize that a project or a best practice does not have to contribute to only one domain. Results can achieve benefits in more than one domain.

Every domain is characterised through functionalities. The onesrelevant for L4L are the following shown in Figure 3.

- Transportation Network Management functionalities
- The Transport Demand functionalities
- On-Board Support and Control

The coloured functionalities shown in the figures are not relevant, and as such not observed within the analysis of best practises.

The analysis and the template developed for L4L Best Cases was based on ARKTRANS version 6. Now, a new version covering the needs of the freight sector in a better way have been realised. Thus, we matched the old to the new.

3.3 Policies

L4L is a European project aiming at proving ideas and an overview of technologies and approaches contributing to sustainability in the three dimensions: financial, societal and environmental. Policies are important to set goals and enable a structured proceeding and assessment. These are not addressed in the ARKTRANS framework hence we have been looking for projects contributing to the policy aspects, and this how to incorporate this aspect in the L4L framework. Within the L4L goals we identified a number of policies that give a structure and one additional criterion to choose best practices, these are the following:

- Third Maritime Safety Package
- Maritime transport without barriers
- e-Maritime
- e-customs
- European external border surveillance system (EUROSUR)
- Mid-Term of the 2001 Transport whitepaper
- FRA whitepaper

A detailed description of each policy is in the annex. In the following there is a summary of the main objectives of the policies.

The “Third Maritime Safety Package” aims at:

- Prevention of accidents
- Measures in case of accidents

“Maritime transport without barriers” got the following main objectives:

- Increasing the efficiency and productivity of all European seaports;
- Balancing the need to increase investment capacity with respect for the environment;
- Modernising the ports network by, among other things, simplifying administrative procedures and making increased use of information technologies (e-maritime);
- Guaranteeing fair competition between ports;
- Addressing the human aspect within a new framework for social dialogue.

The policy „e-Maritime“ aims at:

- Accelerated take up across EU of SafeSeaNet, EU LRIT and navigation
- Improved utilization of the GALILEO and its integration with traffic monitoring processes;

- Improved information exchange between administration and business (A2B & B2A) with dependable interoperability platforms (Single Window), online services and regulatory compliance reporting systems;
- Improved utilization of resources by supporting maritime transport stakeholders co-operate efficiently in co-modal networks;
- Improved efficiency and quality of shipping services through integrated fleet management systems
- Enhanced attractiveness of short sea shipping and its role in an efficient door-to-door supply chain;
- Development of European Ports as key logistics hubs particularly through advanced Port Single Windows and Port Community systems;
- Promotion of e-learning for maritime transport industry 8/20 professionals focusing on seafarers;
- Development of information, knowledge and entertainment sharing facilities for seafarers;
- Promotion of communications infrastructure solutions providing versatility, fast response and high integrity for ship-shore communications
- Promotion of technologies that allow seamless communications across diverse communications media and protocols

The European external border surveillance system (EUROSUR) got the following objectives:

- Reduce the number of illegal immigrants who enter the European Union undetected;
- Reduce the number of deaths of illegal immigrants by saving more lives at sea;
- Increase the internal security of the EU as a whole by contributing to the prevention of cross-border crime.

The Mid-Term of the 2001 Transport whitepaper policy tries to help provide the Europeans with efficient, effective transportation systems that:

- *Offer a high level of **mobility** to people and businesses throughout the Union.* The availability of affordable and high-quality transport solutions contributes vitally to achieving the free flow of people, goods and services, to improving social and economic cohesion, and to ensuring the competitiveness of European industry.

- ***Protect** the environment, ensure energy security, promote minimum labour standards for the sector and protect the passenger and the citizen*

    - Environmental pressures have increased substantially and significant health and environmental problems will persist in the future, for example, in the field of air pollution3. The promotion of a high level of protection and improvement of the quality of the environment is therefore necessary.

    - Equally, as one of the major energy *consumers transport must contribute to ensuring energy security.*

    - In the social area, the EU policy promotes employment quality improvement and better qualifications for European transport workers.

    - EU policy also protects European citizens as users and providers of transport services, both as consumers and in terms of their safety and, more recently, their security.

- ***Innovate*** *in support of the first two aims of mobility and protection by increasing the efficiency and sustainability of the growing transport sector.* EU policies develop and bring to market tomorrow's innovative solutions that are energy efficient or use alternative energy sources or support mature, large intelligent transport projects, such as Galileo;

- ***Connect internationally,*** *projecting the Union's policies to reinforce sustainable mobility, protection and innovation,* by participating in the international organisations. The role of the EU as a world leader in sustainable transport solutions, industries, equipment and services must even be better recognised.

In ARKTRANS, the policy level, which forms the top of the ARKTRANS' pyramid, is not considered; however for any future research activity supporting freight efficiency, this aspect is highly relevant. Consequently, we have also been looking for projects looking on policies and future trends.

4 BEST PRACTICES

4.1 Selection of best practises

All selected projects supports energy efficiency for freight transport, but not every project has a holistic aspect or cover all elements in our framework. Hence, we have chosen different projects, so that it all together should give any stakeholder the opportunity to find a solution covering his needs.

The matrix below shows the main contribution from the projects. The content of the projects are more deeply analysed in the following subitem

Project	Technology	Approach	Policy	Concept	FUNCTIONALITIES/ PROCESS SUPPORT
CVIS	X				
E-FREIGHT	X	X			
SMARTFREIGHT	X				X
EUROFOT				X	
SMART-CM		X			
DHL go green				X	
FREIGHTWISE	X	X			X
TRANSECO					
D2D	X	X			
CASSANDRA				X	X
NECARTIS					
FREIGHTVISION			X		
GIROROADS					
INTEGRITY	X	X			X
M-TRADE					X
RETRACK				X	
SUPER GREEN					
FREILOT					
BE LOGIC					
GOOD ROUTE		X		X	
NS FRITS				X	
FREILOT					
DISCWISE					
EURIDICE	X	X		X	X
RISING					

Table 1: Overview best practices

CVIS offers a technical solution enabling the communication and connectivity between the actors of the transport process

- technical solution allowing all vehicles and infrastructure elements to communicate with each other in a continuous and transparent way using a variety of media and with enhanced localization

E-FREIGHT offers different types of best practices relevant for L4L

- Relevant technology:
  - Shippers find best transport option
- Relevant approach:
  - Transport service providers manage efficiently stakeholder interactions and optimize door to door transport processes
- Relevant approach, Relevant technology:
  - Administrations facilitate automated compliance and co-operate on security, safety and environmental risk management

SMARTFREIGHT offers technical solutions to optimize the communication between the stakeholders of the process:

- Information and Communication Technology (ICT) solutions that integrate urban traffic management systems with the management of freight and logistics in urban areas.
- Actual transport operations carried out by the freight distribution vehicles will be controlled and supported by means of wireless communication infrastructure and on-board and on-cargo equipment.

EUROFOT offers

- Analysis of new Intelligent Vehicle Systems regarding their applicability and effectiveness
- Enables the decision of which technology should be used in order to optimize the transport process

SMART-CM offers a relevant approach by:

- Providing a simple - transparent - neutral - easy to handle solution for the interaction between public administrations (primarily customs) and the market players involved in the container transport chain management and administration business

DHL Go Green Program uses technologies and approaches

- To reduce CO2 emission
- Uses environmental friendly solutions that can be adapted other scenarios

FREIGHTWISE

- Support the co-operation of
  - Transport Management : Shippers, Forwarders. Operators and Agents;
  - Traffic and Infrastructure Management : Rail, Road, Sea, Inland waterways;
  - Administration : Customs, Border Crossing, Hazardous Cargo, Safety and Security
- Create suitable intermodal transport solutions
- Support the modal shift of cargo flows from road to intermodal transport using road in combination with short sea shipping, inland waterways and rail.
- promotes EU-policies encouraging the development of open and interoperable systems, which meet the requirements of cargo owners, transport operators and intermodal freight integrating services.

TRANSECO offers best practices in the following areas:

- Strategic decision making tools for the public sector
- Renewable energy and transport systems.
- Combination of technologies, e.g. information technology and materials sciences, with energy savings in transport
- Development of ICT for the transport sector, bio-fuels and technology for reducing the fuel consumption of vehicles.

D2D offers relevant approaches and technologies in the following areas:

- A system for overall management of the transport chain, the TCMS, short for Transport Chain Management System
- A system for recording detailed information about transport activities and progress, the FTMS, short for Freight Transport Monitoring System
- A communication platform for facilitating efficient communication

CASSANDRA

The purpose of the project is to study how to use new technologies and solutions in order to achieve a higher degree of security and effectiveness in transportation. The project involved the creation and development of:

- Requirements analysis for transport operators
- Intelligent Cargo
- Intelligent Truck
- Advanced Route planning

The objective is improving efficiency and security of transport systems by the use of information sharing enabled by state of the art technologies.

NEARCTIS

- Cooperative systems in the field of traffic management optimisation
- road traffic optimization
- Develops systems able to cope with what are the main problems at stake: safety, energy consumption, environmental impacts and congestion as an obstacle to mobility.

FREIGHTVISION

- Develops a long-term vision and a robust and adaptive action plan both for transport and technology policy for sustainable long-distance freight transport, supported as much as possible by the relevant stakeholders.

GIROADS

- Develops solutions based on the use of GNSS (Global Navigation Satellite System) for road transport, implying, following most important applications of GIROADS relate to toll collection, tracking, emergency services, traffic information and navigation assistance.

INTEGRITY

INTEGRITY aims at improving the visibility and security of intermodal global door-to-door container transport. The platform SICIS developed within the project will consolidate information about the transport and, utilizing complex authorization mechanism, make it easily accessible for the partners involved in the transport chain. Based on this reliable information, logistics processes are optimized, especially in case of deviations from the planned schedule, which are reported at an early stage making

it possible to adopt the planning in the best possible way. In addition, trips of empty trucks are prevented due to the availability of information concerning the release of containers. Besides the positive effects on logistics processes, this also opens up an ecological dimension of the project. Furthermore, relevant data is also provided to Customs, improving risk assessment processes and thus enhancing container security. The project aims at a sustainable solution, including the world's biggest terminal operator Hutchison Ports and DHL as project partners and cooperating with the world's second and third biggest terminal operators.

- Develops so-called Shared Intermodal Container Information System (SICIS) allowing authorised companies and authorities to access planning and status information of selected transports.
- Proactive planning following the Supply Chain Event Management (SCEM) approach allows forecasting problems well before they might occur.
- Allows satisfying both the logistics industry and Customs Authorities fulfilling their duties thus creating win-win situations.

M-TRADE

- Explores and promotes GNSS (EGNOS /Galileo) use in Freight Multimodal Transport.
- Motivates stakeholders to use multimodal transportation
- Allows precise and reliable freight localisation and tracking during the journey
- Timely and complete information exchange among all involved actors, to enable the seamless, safe and secure transfer of goods from one mode to another
- Integration of reliable position information (Integrity information) for the tracking of dangerous and/or abnormal goods in the supply chain management.

RETRACK

- Applying an innovative rail freight service concept to the movement of rail freight across Europe.
- Design, development and implementation of a commercial trans-European rail freight service along the rail corridor between Rotterdam (Netherlands) and Constanza (Romania) on the Black sea

SUPER GREEN

- Development of sustainable transport networks by fulfilling requirements covering environmental, technical, economic, social and spatial planning aspects. This will be achieved by:
- "Green technologies" Among the green technologies considered may be novel propulsion systems, alternative fuels, cargo handling technologies, new terminal technologies, cleaning technologies, heating and cooling technologies, or novel concepts of any kind relevant for the multimodal Green Corridors.

GOOD ROUTE

- Cooperative system for dangerous goods vehicles routing monitoring, re-routing (in case of need), enforcement and driver support, based upon dynamic, real time data, in order to minimise the Societal Risks related to their movements, whereas still generating the most cost efficient solution for all actors involved in their logistic chain.

BE LOGIC

The aim of BE LOGIC project is to improve the quality and efficiency within and across different modes of transport, by means of benchmarking in logistics and co-modality.

A benchmark of logistics chains can give SMEs insight into the potential gains of reconsidering their logistics choices in terms of costs and performances, environmental impact, quality of service.

The project will define different benchmarking methodologies and analyze a number of relevant real cases, which will contribute to the definition of a web-based benchmarking tool.

Therefore, the key objectives of the project are:

- Improve the efficiency within and across different modes of transport
- Support the development of a quality logistics system

Furthermore, BE LOGIC will pursue the following derived objectives, and respond to research questions:

- Develop a methodology to assess transport logistics performance in quantitative terms at different levels in Europe and globally
- Applying the benchmark methodology to assess logistics and intermodal policies of Member States and other countries
- To assess transport logistics choices and performance from shippers/LSP
- To assess transport logistics performance from transhipment points
- Examine existing quality standards (e.g. ISO, CEN) for transport logistics
- Consider the need for new quality standards for transport logistics

NS FRITS

North Sea Freight Intelligent Transport Solutions - NS FRITS is set to dramatically improve accessibility for the road freight sector in the seven countries of the North Sea Region by improving safety as well as efficiency and reducing the risk of accidents and security threats for drivers of Heavy Goods Vehicles.

The first project of its kind, NS FRITS will provide live in-cab communications in a series of languages of drivers, transport managers and freight handlers.

FREILOT

The ***FREILOT*** service aims to increase energy efficiency drastically in road goods transport in urban areas through a holistic treatment of traffic management, fleet management, the delivery vehicle and the driver, and demonstrate in four linked pilot projects that up to 25% reduction of fuel consumption in urban areas is feasible

UPCOMING Projects

Some very relevant projects will first be analyzed next time. The reason for this is that they do not have any results yet.

DiSCwise* - Deployment of Digital Supply Chains for European SME's based on *FREIGHTWISE

Framework concept

Logit Systems is involved in the fully funded EU project DiSCwise.

Internet for cargo

The Internet is now widely used for the booking of air tickets and hotels using systems where airlines and hotel operators have agreed to publish their offerings in central databases. For air transport standard names for airports are used to enable connection of flights when there is no direct flight between origin and destination. In principle, there is no reason why similar capabilities should not be offered for freight transport and logistics.

Certain portals are offering similar possibilities, but many of them are offered by large transport operators and are only to be used for transport operations offered by these. Furthermore, the freight transport & logistics market is characterised by large numbers small operators to the extent that it

seems completely unrealistic to assume that a "central reservation system" can be established for this purpose.

DiSCwise aims to develop an reference architecture and demonstrate an ICT implementation that makes internet for cargo a reality, addressing the needs of SMEs in particular.

Logit will utilize its Logit D2D Transport Chain Management Solution Logit D2D to facilitate the 3 pilot projects in Poland, Benelux and Portugal together with project partners and industrial companies.

Rising

Europe's freight transport system has much room for improvement. Congestion, capacity problems and delays affect mobility and economic competitiveness and are detrimental to the environment and quality of life.

Growing overseas trade and EU enlargement towards Central and Eastern Europe are key economic factors which have a great impact on freight transport volumes in Europe; According to forecasts, freight transport volumes are expected to increase by one third until 2015.

Present patterns of transport growth and the reliance on road transport have lead in many regions to congestion and pollution, the cost of which are expected to double to 1% of Europe's annual GDP by 2010. Source: Communication from the Commission on the promotion of inland waterway transport "NAIADES"

Shifting transport to less energy-intensive, cleaner and safer transport modes is a main concern of the European Union: the EU has committed itself to pursue the goal of promoting the use of transport modes which are less energy-intensive, cleaner and safer. Inland Waterway Transport (IWT) is an obvious choice to play a more prominent role in reaching these targets.

In this view of this situation, all modes must become more environmentally friendly, safer and more energy efficient as well as easily compatible in the transfer points. Co-modality, i.e. the efficient use of different modes on their own and in combination, will result in an optimal and sustainable utilisation of resources. Together with other modes, Inland Waterway Transport (IWT) can contribute to the sustainability of the transport system.

EURIDICE

The EURIDICE project has the following main objectives:

- Supporting the interaction of individual cargo items with the surrounding environment and users on the field
- Improving logistic performances through application of the intelligent cargo concept and technologies in the working practices of operators and industrial users
- Developing collaborative business models to sustain, promote and develop an intelligent cargo infrastructure
- Realizing more secure and environment friendly transport chains through the adoption of intelligent cargo to support modal shift and door-to-door inter-modal services

Figure 4: Best practices within ICT solution areas

In order to describe and analyze each project in the same way a structured template was developed. This was based on the template used in best log project. The questionnaire was completed by the project members. The questionnaire is divided in four parts on different detail and content level:

- I General
- II Positioning
- III. Functionality
- IV. Evaluation

The questionnaire template you find in the ANNEX of this deliverable.

The first part "general" asks for general project information, like acronym or project leader. Afterwards this part askss for information about the project contents.

The second part of the questionnaire "positioning asks for information seeing the project within a wider context, it:

1. Defines the area of the practice within the supply chain
2. Defines the areas within the supply chain affected by the practice
3. Identifies the drivers of the practice and transferability limitations.

The "functionality" part is responsible for the matching of the "best practices" to the ARKTRANS framework-functional view.

The last section of the questionnaire is the "evaluation", it aims at

1. Identify the benefits according to the Social, Economic and Environmental dimensions
2. Confirm that the benefits were achieved (where possible)
    - Quantitative
    - Qualitative

The following sections represent the results achieved through the questionnaire and due to this a detailed descriptions of the various “best practices” listed in section 4.

4.2 I. 4,2 Best practise Projects

To get an overview of the projects analyzed as best practices first an overview is given in the following sections. In those a short summary of the projects as well as their aims and objectives is described. Afterwards the sum of projects is analyzed.

4.2.1 CVIS

The main idea of the CVIS project is enabling communication between vehicles and infrastructure (i.e. back offices and Internet access) using IPv6 over the ISO standard CALM for different available communication media.

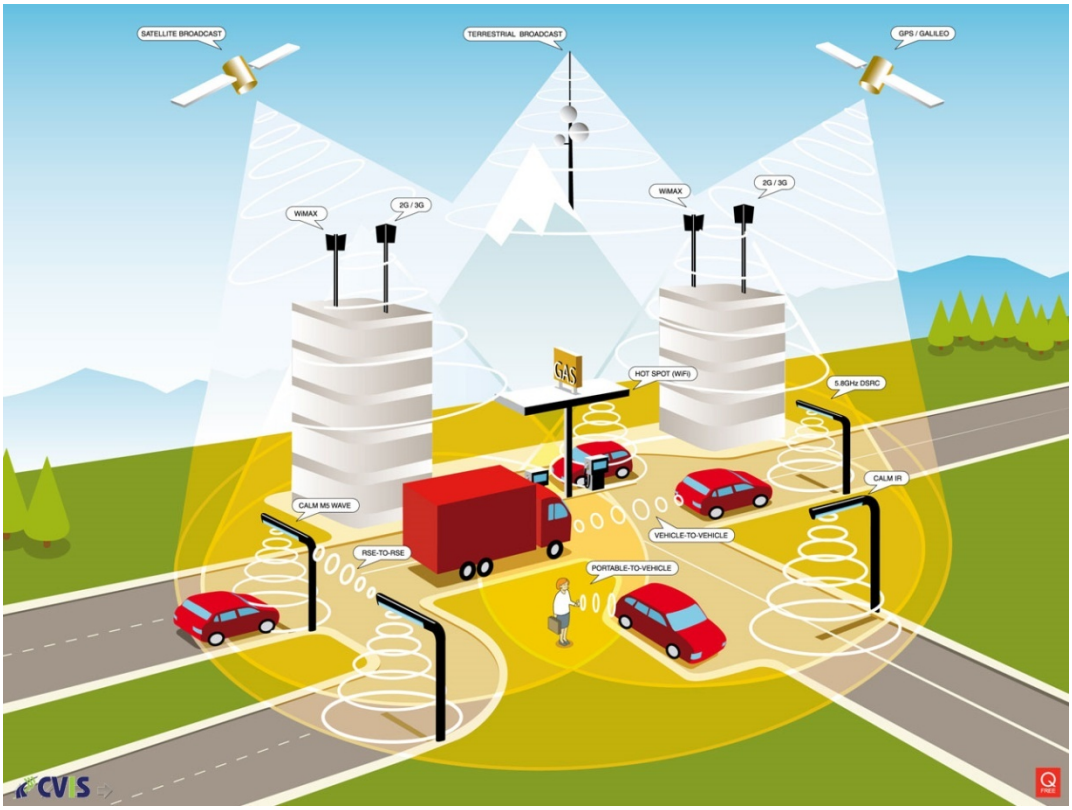

Figure 5: CVIS project

In this context the specific objectives are:

- to create a unified technical solution allowing all vehicles and infrastructure elements to communicate with each other in a continuous and transparent way using a variety of media and with enhanced localisation;
- to enable a wide range of potential cooperative services to run on an open application framework in the vehicle and roadside equipment;
- to define and validate an open architecture and system concept for a number of cooperative system applications, and develop common core components to support cooperation models in real-life applications and services for drivers, operators, industry and other key stakeholders;
- to address issues such as user acceptance, data privacy and security, system openness and interoperability, risk and liability, public policy needs, cost/benefit and business models, and roll-out plans for implementation.

4.2.2 Cassandra

The aim of the Cassandra project was to analyze and provide an architectural outline and prototype for a transportation information system that meets the future’s demands in transportation effectiveness and security.

To serve as the basis for the analysis and to establish a common ground in the interviews with representatives from the involved actors, a transportation case was provided by Volvo Logistics and Volvo Technology. The Cassandra case was a transport scenario of washer fluid containers (IBC-containers) travelling round trip from Aspen Petroleum (Hindås) to Volvo Cars (Gent, Belgium) and back.
The project delivered a demonstration prototype that incorporated all the components of the project, including an advanced route and risk planning system. The route planning chooses the routes based on cargo characteristics and statistics on day/night population, accidents and crimes.
The main objectives can described as in the following:

- Improving efficiency and security of transport systems by the use of information sharing enabled by state of the art technologies.

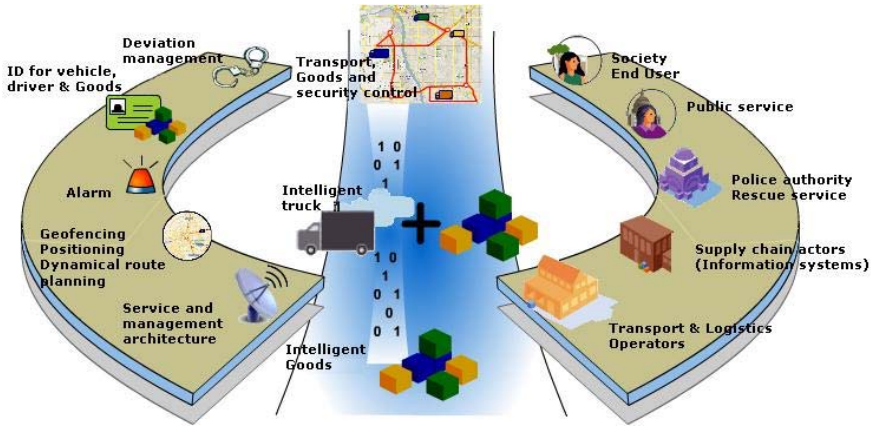

Figure 6: Scope of the Cassandra project

4.2.3 FREIGHTVISIONIn the next years and decades the European Union faces the following challenges in the freight sector:

- Ensure and increase economic growth and
- Deal with an increase of freight transport demand

while at the same time

- Reduce environmental emissions (mainly CO2),
- Reduce dependency on fossil energy,
- Reduce accidents and
- Avoid congestion and other negative impacts on the environment and population.

A lot of different stakeholder groups have created their proposals to achieve sustainable freight transport. Most of them address only part of the problem or focus on only one aspect of a solution. Following these advices leads to sub optimisation and less efficient solutions. A holistic approach is needed integrating all aspects of the problem (infrastructure, vehicles, fuels, interoperability etc.) and all types of criteria in the solution (research, technologies, policies and pricing).

FREIGHTVISION will therefore

- Develop a long-term vision and a robust and adaptive action plan both for transport and technology policy for sustainable long-distance freight transport,

which are supported as much as possible by the relevant stakeholders.

In order to develop a vision and an action plan the following tasks will be performed: analyzing transport policy, technology development, and mega trends with regard to long-distance freight transport; integrating them into forecasts, developing scenarios how to reach a desirable future and defining for this the vision and action plan.

4.2.4 FREIGHTWISE

FREIGHTWISE was an integrated project within the EU's 6th Framework Programme. It aimed at bringing together three different sectors:

- Transport Management: shippers, forwarders. operators and agents;
- Traffic and Infrastructure Management: Rail, Road, Sea, Inland waterways;
- Administration: Customs, Border Crossing, Hazardous Cargo, Safety and Security

The FREIGHTWISE project supported the co-operation of these sectors in order to develop and demonstrate suitable intermodal transport solutions in a range of business cases. The project supported the complex service integration into integrated transport chains. The technical expertise in the project focused on the development of a reference architecture for intermodal transport and the integration of relevant IT systems—including legacy systems—in the business cases

Under the heading of the FREIGHTWISE FRAMEWORK - FWF- the project intended to develop generic system architecture for intermodal transport management based on previous European and national efforts. But the FWF provided also support in the use of management tools and demonstrated some new developments intended to facilitate market transparency and a management framework supporting the organisation of intermodal transport chains.FWF was developed together with input from nine business cases. The FWF developed the necessary stakeholder and business models together with the process models for the typical functions needed for planning and managing intermodal transport chains. Some of the cases directly advanced in their planning of intermodal solutions while others had to analyse the scope for action before they implement and demonstrate the use of management systems. In building the FWF FREIGHTWISE followed the methodology of ARKTRANS project.

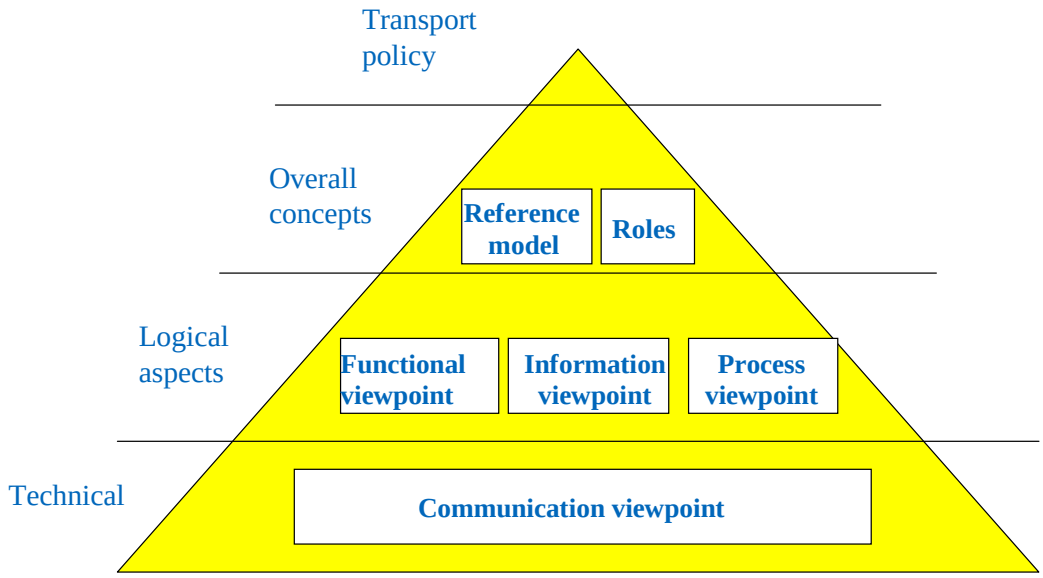

Figure 7. The content of the FREIGHTWISE framework architecture (FWF)

The overall concepts in FWF are the FREIGHTWISE Reference Model and the FREIGHTWISE set of Roles. The Reference Model (Figure 3) and the Roles form the context of the FWF. The logical aspects in the FWF are described by means of a functional viewpoint consisting of the functions that are to be performed during the three main processes and the process viewpoint, where the exchange of information between the roles is described. There are three overall phases in FREIGHTWISE, namely Transport Planning, Transport Execution and Transport Completion. Finally, the information viewpoint describes the Information Packages that are exchanged between the roles in the FWF (Figure 1) when performing the functions.

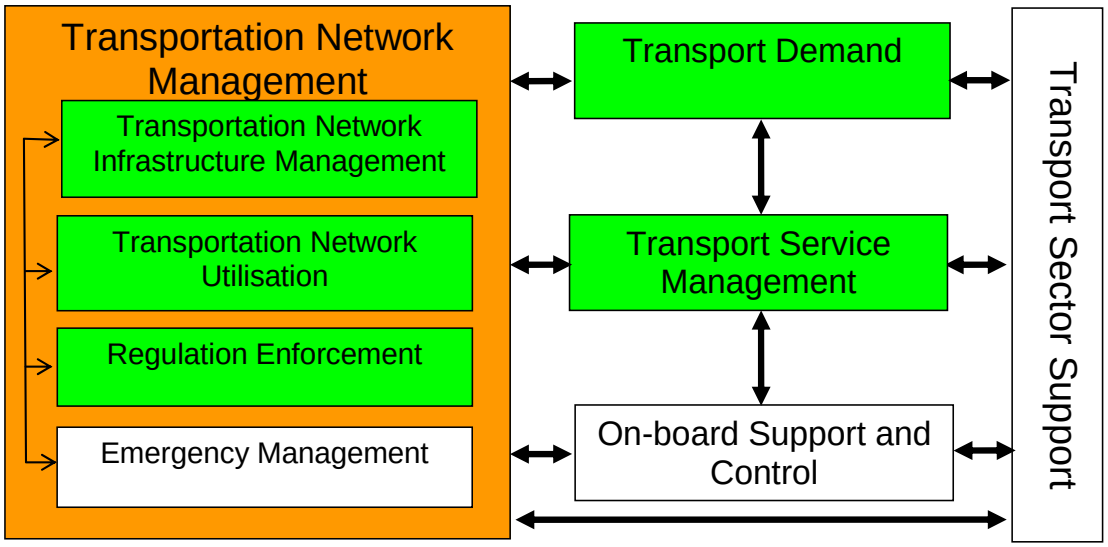

Figure 8. The FWF reference model

FREIGHTWISE's overall objective was to support the modal shift of cargo flows from road to intermodal transport using road in combination with short sea shipping, inland waterways and rail. It tried to achieve this objective by means of improved management and facilitation of information access and exchange between large and small, public and private stakeholders across all business sectors and transport modes.
FREIGHTWISE promoted EU-policies encouraging the development of open and interoperable systems, which meet the requirements of cargo owners, transport operators and intermodal freight integrating services. The aim was to support the Commission in formulating future legislation and in developing initiatives that can provide a platform on which the industry can develop management solutions thus helping to increase the competitiveness of intermodal transport.
In order to achieve its aims FREIGHTWISE developed an architecture framework for interoperable systems. In FREIGHTWISE FRAMEWORK (FWF) standard roles of the stakeholders of the transport domain were identified and the information exchanged by them was grouped in information packages.

4.2.5 NS Fritz

North Sea Freight Intelligent Transport Solutions - NS FRITS is set to dramatically improve accessibility for the road freight sector in the seven countries of the North Sea Region by improving safety as well as efficiency and reducing the risk of accidents and security threats for drivers of Heavy Goods Vehicles.

The first project of its kind, NS FRITS will provide live in-cab communications in a series of languages of drivers, transport managers and freight handlers

The system will help:

- improve traffic flow within major transport corridors
- address logistical problems around congestion and freight volumes
- improve driver safety by highlighting poor weather conditions, road accidents, traffic disruption and local driving conditions
- reduce carbon emissions by encouraging better driving and avoiding extensive engine idling times
- reduce the risk of security threats, for example through providing information about crime hotspots, secure parking locations and local policing practices

The Interreg IVB North Sea Region Programme is co-funding the groundbreaking €4.9m NS FRITS project; 50% of which is funded from Europe. A public/private sector partnership drawn from the UK, Germany, the Netherlands and Sweden find the remaining 50% of the project costs and bring together representatives from high-tech communications, logistics, crime reduction, education, policing and transport planning.

The Bremerhaven scenario

ISL will design the Bremerhaven pilot supported by Bremen Senator for Science and Education and Bremen Senator for Economy and Ports. The scenario will contain the following key tasks:

- Analysis of existing approaches regarding truck pre-notification and regulation such as
  - Pre-notification at terminal (e.g. the Southampton bonus malus system with peak and off-peak time windows, no-show fee)
  - Information of the terminal about estimated waiting time
  - Secure space as pre-stacking area (interface to SETPOS project, which concerns to with installation and booking possibilities of secure space)
- Conceptual design of the Bremerhaven pilot (harmonized with approaches in other regions) implicate factors like
  - Business processes/ work flow
  - Technology/ supporting IT methods
  - Pricing model, bonus malus system
  - Possible system operators
  - View benefits of all stakeholders.

To get consent of the concept the stakeholders in Bremerhaven are involved with an active role. That are at least terminals, truckers, haulage contractors and port authorities.

4.2.6 Smart CM

Figure 9: Smart-CM

SMART-CM aims to make trade and transport more efficient, secure, visible and competitive across the world in a global intermodal context, working along with existing initiatives such as that of AEO and the Green Lanes implementation.

Two real-life demonstrators will validate the innovative organizational technologies and processes:

- Corridor A: Antwerp-Port Said - feeder service to Thessaloniki – Dubai - NAVA SHEVA / Mundra.
- Corridor B: Antwerp-Singapore - feeder service to LaemChabang in Thailand and Ningbo in China.

SMART-CM made proof of three main project concepts:

A. “Interoperable Single Window platform solution”, enabling all logistics actors and customs authorities to monitor the container security status independently of the Container Security Device (CSD) technology applied in a trade lane. No bias towards specific CSD technology providers and no bias towards customs or businesses.

B. “Neutral information administering organization”, managing the plat-form, guaranteeing data integrity along the whole process of security related container info gathering and provisioning information from the platform to the stakeholders.

C. “Industry Added Value creation” on the basis of the information the technology and the trusted environment of a neutral platform enable to be made available in order to create direct business benefit. Thus the “burden” of the security regulation compliance may be transformed to an added value for the transport industry

The main aim of Smart CM can be described as in the following:

- Advance technology implementation in order the global container door-to-door transport chains to become more efficient, secure and competitive.

4.2.7 SMARTFREIGHT

Goods distribution is important for businesses and the life of a city. However, the efficiency as well as the environmental impacts is negatively influenced by traffic congestion, scarcity of loading areas, sub-optimal delivery routes and too little use of return loads. The transport of dangerous goods is also a safety risk.

This project will make urban freight transport more efficient, environmentally friendly and safe through smarter use of the distribution networks and improved delivery and return-load systems. The basic idea is to integrate urban traffic management systems with freight management and onboard systems.
This project will try to create a win-win situation, where both city authorities and freight operators will gain. ICT will enable a co-operation between traffic and freight management operations, as a step towards an integrated urban transport system.
Freight transport will be monitored and controlled through open ICT services. Traffic management measures will be tailored towards *individual* vehicles by means of onboard units and a wireless communication infrastructure based on CALM (the ISO framework for heterogeneous communication in mobile environments). Individual routing and control depending on the individual vehicle profile, type of cargo and traffic situation will be possible.
Freight operations will benefit from access to real travel time and traffic status information. Onboard units, sensors and smart tags using CALM MAIL (enabling DSRC communication with battery-powered units) and the wireless infrastructure will enable monitoring of goods transport, loading and unloading.
Architecture will specify open solutions applicable to European cities. This will be achieved by obtaining user viewpoints addressing concepts, logical relations, open ICT services and preferred technical solutions.
Test sites will evaluate the technical solutions, through real and simulated application of the concepts for urban traffic and transport in cities.

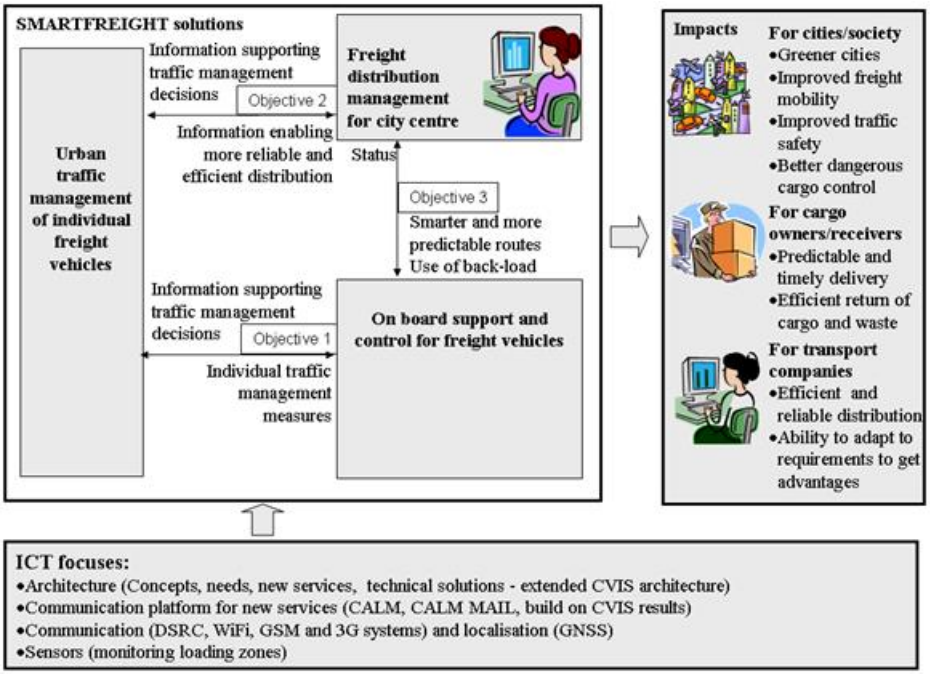

Figure 10: SMARTFREIGHT

4.2.8 TRANSECO

TransEco is a research program on road transport energy savings and renewable energy. The five-year (2009 - 2013) TransEco program forms a research platform aiming at a comprehensive review and development of the energy and emission solutions in the road transport sector. The results will be used in Finland, when new operation models will developed and launched.

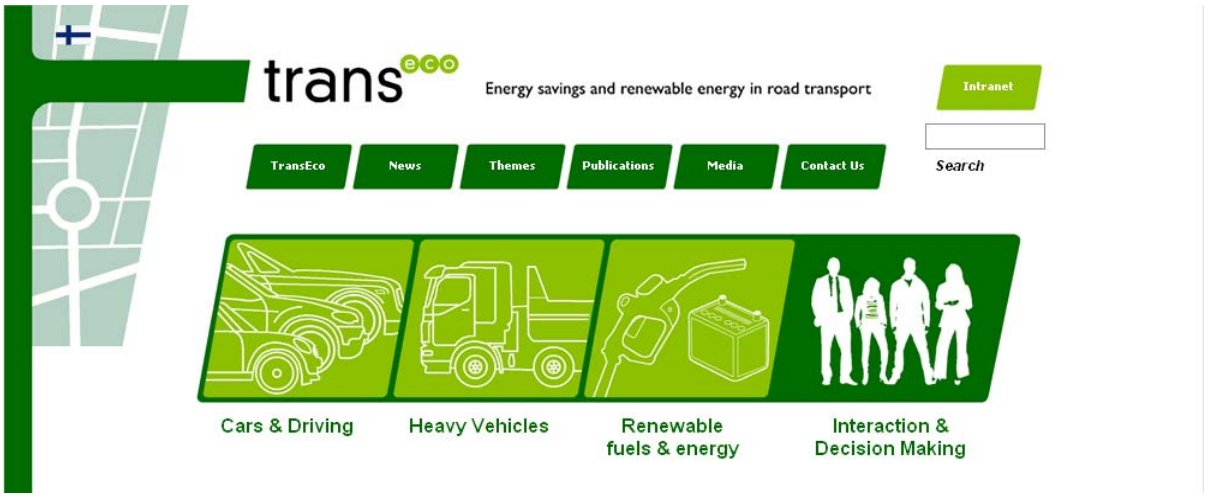

Figure 11 The TRANSECO project

"Cooperation on roadmapping and requirements gathering":

- High level: strategic decision making tools for the public sector
- System level: renewable energy and transport systems.
- Interface level: combination of technologies, e.g. information technology and materials sciences, with energy savings in transport
- Technology and component level: development of ICT for the transport sector, bio-fuels and technology for reducing the fuel consumption of vehicles.

4.2.9 Integrity

INTEGRITY – Intermodal Global Door-to-door Container Supply Chain Visibility

Figure 12 Shared Intermodal Container Information System

The INTEGRITY project aims at significant improvements of the reliability and predictability of global door-to-door container transports by optimizing the cooperation between transport industry and Customs Authorities in the China-EU trade corridor. The consolidation of data will significantly improve the transparency of the transport chain. At the same time the container security will be significantly improved, for example by providing access to reliable sources of consignment information.

The core of the project is the development of the Shared Intermodal Container Information System (SICIS) allowing authorised companies and authorities to access planning and status information of selected consignments. The challenge of SICIS is the combination of existing technologies and new business processes together with legal and administrative agreements. Proactive planning according to the SCEM (Supply Chain Event Management) approach allows problems to be forecast well before they might occur. Matching logistics data with security information, including data from electronic seals, container security devices, and scanning equipment, together with the integration of the AEO (Authorised Economic Operator) concept, are basic measures.

Customs and shippers/3PLs are satisfied in one integrated approach. Several recent investigations show that the enhancement of Supply Chain Visibility provides significant benefits for all participants in the chain – both industry and Customs – this was already validated during the project.

The INTEGRITY project is funded by the European Commission in the 7th Framework Programme for Research & Development and liaises with several EU Directorates.

SICIS – An open IT platform providing Supply Chain Visibility

In September 2009 – after a duration of the INTEGRITY project of one year - the open IT platform SICIS started to track containers along the entire logistics chain by consolidating all relevant data and

related events which are generated during the transport. Since then SICIS regularly monitors containers during their door-to-door transport from China to Europe. As an example, interfaces to terminal operating systems were developed in order to feed terminal messages into the system. Another important feature is linking the container monitoring data with AIS vessel tracking information provided by satellites.

An important SICIS feature especially for Customs is the possibility to upload consignment data, which can be used by Customs to further optimize risk assessment processes.

SICIS is an open IT platform. It can easily be adapted to any trade lane worldwide. Due to its sophisticated interfacing possibilities, there are practically no limitations in data exchange with other systems. Amongst others, interfaces to platforms like the EU projects SmartCM dealing with different aspects of container visibility and CHINOS addressing the issue of RFID in container logistics were developed. Furthermore, data exchange with new cooperation partners like DP World was established, the latter being the second of the worldwide leading terminal operators implementing data exchange with SICIS in addition to project partner Hutchison.

Furthermore, SICIS is able to interact with any kind of Container Security Device (CSD). Interfaces to CSD provider Savi Networks and China-based CIMC and Long Sun were developed, negotiations with several further CSD providers are in progress.

The first CSD equipped container started its trip from the DHL Consolidation Centre in Hong Kong in March 2010. After following the major INTEGRITY trade lane from China to Europe, the container was discharged at the Delta DDE Terminal of project partner ECT in Rotterdam in April and was unloaded at the DHL Global Forwarding Ocean Freight Warehouse in Rotterdam.

Since then SICIS tracks container movements by merging CSD data, terminal messages and AIS vessel tracking data on a regular basis. The vessels' positions together with related events like course divergences are visualized on a world map.

In the past, the starting event in SICIS was still a manual process performed by the factory where the container was stuffed. With the use of CSDs this process is also automated. By closing the container, the CSD is activated. Immediately a GPS position is acquired and all details are transferred to the SICIS server. The GPS module and the GSM communication allow the reporting of waypoint events by using geo-fencing functionality. It also reports any tampering of the container. Possible gaps during the sea leg of the voyage are closed by integrating AIS signals of the vessel obtained via satellites.

However, it should be noted that, although the data quality provided by CSDs cannot be achieved by other means, the INTEGRITY approach is in no way dependent on CSD use. Equipping each and every container with a CSD in the near future is unlikely. Therefore, a manual start process and tracking based on terminal data only are still options, which already imply significant benefits.

Improve the security as well as the tracking and tracing possibilities for all stakeholders in global intermodal door-to-door supply chains. Provide relevant information about the container transports to authorized stakeholders in the supply chains.

Impact: better planning, less delays, cost and time saving, improved security, increased efficiency and consequently a positive impact on different sustainability factors. Customs risk assessment processes are supported by providing reliable consignment data and supporting the AEO concept.

4.2.10 Be Logic

The aim of BE LOGIC project is to improve the quality and efficiency within and across different modes of transport, by means of benchmarking in logistics and co-modality.

A benchmark of logistics chains can give SMEs insight into the potential gains of reconsidering their logistics choices in terms of costs and performances, environmental impact, quality of service.

The project will define different benchmarking methodologies and analyze a number of relevant real cases, which will contribute to the definition of a web-based benchmarking tool.

Objectives

The ultimate goal of benchmarking logistics and co-modality is to improve the quality and efficiency within and across different modes of transport.

Therefore, the key objectives of the project are:

- Improve the efficiency within and across different modes of transport
- Support the development of a quality logistics system

Furthermore, BE LOGIC will pursue the following derived objectives, and respond to research questions:

- Develop a methodology to assess transport logistics performance in quantitative terms at different levels in Europe and globally
- Applying the benchmark methodology to assess logistics and intermodal policies of Member States and other countries
- To assess transport logistics choices and performance from shippers/LSP
- To assess transport logistics performance from transhipment points
- Examine existing quality standards (e.g. ISO, CEN) for transport logistics
- Consider the need for new quality standards for transport logistics

An important result of the project will be an e-tool that aims to support a company's search for potential strategic improvements due to a modal change. In order to compare the current practice with an alternative based on a different transport mode, six main criteria are used: time, cost, flexibility, reliability, quality and sustainability. The alternatives are compared with each other, giving a percentage difference on each of the criteria. The combination of these criteria provides the user with a broad overview of the potential effects of a modal change. The BE LOGIC tool makes use of the judgement of the user, a European Intermodal Route Finder (EIRF) containing intermodal services and a calculation tool for emissions.
The e-tool is mainly aimed at SMEs, but is definitely also very useful for larger companies that want to investigate the impacts of a modal shift on the six aforementioned criteria (time, cost, flexibility, etc.). Especially cargo owners (shippers) can use the tool to see if a modal shift helps them to 'green' their supply chain, while at the same time keeping other performance criteria at least at the same level. Of course the same applies to transport companies.
The European Intermodal Route Finder (EIRF) has become a tool in itself. The EIRF enables users constructing their own intermodal routes (direct terminal-terminal relations and indirect terminal relations using one transhipment terminal). Further, it offers the possibility to print intermodal route reports, providing the user with an overview of intermodal alternatives on a certain origin-destination relation (OD), including information on transit times, frequencies and modes used for each alternative that has been found in the database. The database comprises around 800 intermodal terminals (including modes sea, inland shipping, rail, road) across the EU27 plus Croatia, Norway and Switzerland. The route finder has been developed in MS Access and will be accessible through the internet by the end of 2010.

4.2.11 EUROFOT

The Intelligent Car Initiative has identified road safety, energy efficiency, and traffic congestion as the main challenges currently being faced by European transportation. Despite their severity, these issues may be improved with the use of new in-vehicle technologies currently not available in the market. However, implementing new technologies implies a risk to manufacturers. Factors such as different markets, user acceptance, and real-world driving conditions are difficult to assess before in-the-field testing. This restricts our capabilities for making the correct business and political decisions for deployment, and for understanding which aspects would benefit from further development the most. The goal of EuroFOT is to identify and coordinate an in-the-field testing of new Intelligent Vehicle Systems with the potential for improving the quality of European road traffic. This permits assessing their effectiveness on actual roads, while determining how they perform towards the intended objectives. In addition, this offers an early publicity of the technologies, and enables the analysis of the user acceptance and its subsequent potential for market penetration.
This will be accomplished through a series of discrete steps. First, EuroFOT will specify a test plan identifying proper driving scenarios, factors with maximum safety potential, and expected results. Subsequent steps will involve the recruitment and training of customers, with the necessary installation of data loggers into their vehicles. In this way, customers will drive and collect data under

normal driving conditions.
During the final section, EuroFOT will analyse both objective and subjective data describing the driver behaviour and adaptation, vehicle dynamics, and system acceptance. This will permit EuroFOT to be considered representative of ordinary driving conditions in European roads, and ultimately evaluate the overall effectiveness and feasibility of Intelligent Vehicle Systems.

The Fuel efficiency adviser (FEA): Dynafleet, a transport information system from Volvo Trucks, provides in real time the current location of vehicles, their fuel consumption, messages, driver times, service intervals and much more. Fuel-efficient driving, or eco-driving, is supported through on-board functions for the driver as well as follow-up reports in the back-office system Dynafleet Online.
The general idea of EUROFOT can be illustrated in Figure 13.

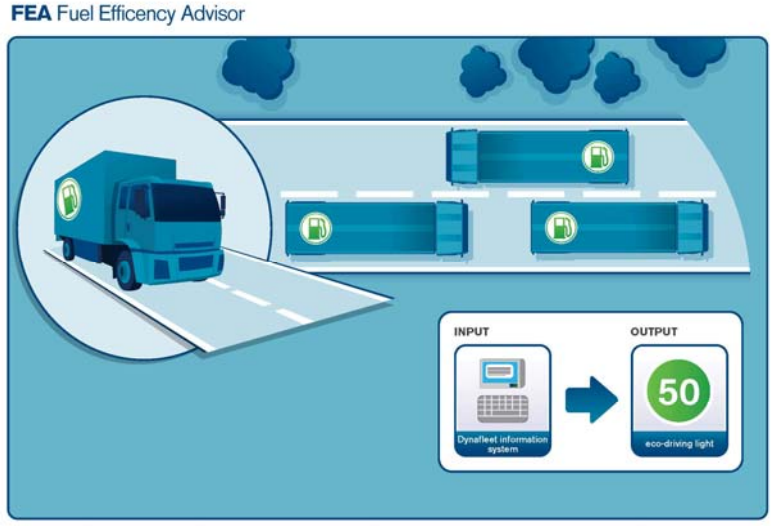

Figure 13: EUROFOT project

4.2.12 DHL Go Green Program

GoGreen comprises a range of initiatives along five major lines of activity:

- Transparency: implementation of a group wide carbon accounting and reporting system in line with international standards respectively in support of their development. Figures are audited by third party organisations and presented annually in the Annual (Business) Report and the Corporate Responsibility Report (formerly Environmental or Sustainability Report).
- Efficiency: improvement of carbon efficiency through initiative that (a) reduce absolute carbon emissions e.g. by replacing fossil fuels with renewable or modern vehicle technologies, and/or (b) improve the utilisation of fuels for logistics activities e.g. through increased load factors. ICT can be an enabler in this context e.g. for eco-driving training and assistance, improved route and tour planning and navigation, access management including public infrastructure especially in cities, contactless tracking and tracing (to reduce the need for buffer stocks and balancing transport), seamless logistics chain information across actors and modes, and electronic documents.
- Mobilisation: inclusion of all staff levels in the process
- Value at market: inclusion of carbon aspects in the product and service portfolio of DPDHL. The most prominent example at present is the GOGREEN range of carbon-neutral products, where DPDHL calculates specific emissions for individual products respectively customers and offers to offset these through the acquisition and surrender of quality emission certificates. This entire process again is certified by independent third party auditors.
- Policy: DPDHL supports specific policy action aimed at reducing climate impacts of logistics and transport

The GoGreen program is an umbrella initiative to achieve the stated objective of improving carbon efficiency, i.e. carbon emissions per activity such as shipments, tonkm or sqm warehouse space, by 30% until 2020 against a 2007 baseline. As an interim target DPDHL aims to improve the carbon efficiency of its own operations (i.e. conducted with own assets) by 10% until 2012, against the 2007 baseline.

The following projects will be describes in more detail later: e-freight, D2D, Freilot.

4.2.13 Summary of all projects

Most of the projects offering a "best practice" are initiated by the European Commission, but there are also ones on national level. The DHL Go Green Program is the only project, which is initiated by industry and is already in use in the company. The practical evaluation of these projects was between 2007 to 2010, regarding to this the projects deal with actual situations so that an adaption to other current business scenarios is possible and can be successful. According to this the implementation of the "best practices" was already done in various ways, mostly we face the situation that the project contents and results were implemented in business scenarios as pilots, the number of project implemented their results in terms of their "best practices" in theory, use or standard is nearly the same. Hence the technologies and approaches identified could already be tested in real business scenarios, so that L4L can profit from this experiences.

Most of the projects focus on transport and collaborative as well as interoperable freight management. Hence there is a large assortment on solutions approaches from that the end user can select the most applicable regarding his own business situation. Furthermore due to this fact it is possible to combine different approaches according to specific situations and scenarios. Additionally the different best practices, covering the areas transport and collaborative as well as interoperable freight management can be compared so that possible failings can be detected and corrected in use.

But there are also best practices covering following areas:

- Vehicle efficiency and "green" navigation
- Cargo mobility information services
- Freight monitoring and enforcement
- Data infrastructures for energy-efficient logistics
- Policy project

At the moment there is no best practices identified covering another important area: Logistic brokers.

The stakeholders addressed by the mentioned areas are mainly:

- Logistic Service Provider
- Transport operator
- Infrastructure operators
- Authorities/Organizations

Obviously these are the mainly addressed user groups within the project. The best practices are justified to optimise the areas the mentioned areas work in.

But also stakeholders like ICT provider or Transport purchases are addresses by the best practices.

- Technical Service Providers:
- Container Security Device Providers
- AIS Vessel Tracking Providers (satellite based and terrestrial)

These stakeholders are indirectly addressed by the best practices. Hence they are not the end user of the approaches but they coordinate, help and manage the implementation of the technical approaches.

The areas, in terms of Industry and sectors the projects work in are mainly Logistics service provider and the transport industry followed by the automotive industry. Retail, chemicals, bulk perishables, dangerous goods and high value goods are sectors focused on only within single projects of the identified.

Obviously the projects aim at optimisation of different situations. The main objects of the different projects can be shown by the following statements:

Sector positioning within the supply chain

The second part of the questionnaire, which in the Annex is represented, asks for information seeing the project within a wider context, it:

1. Defines the area of the practice within the supply chain
2. Defines the areas within the supply chain affected by the practice
3. Identifies the drivers of the practice and transferability limitations.

For this reason there is a mapping into of the most relevant areas into Figure 14.

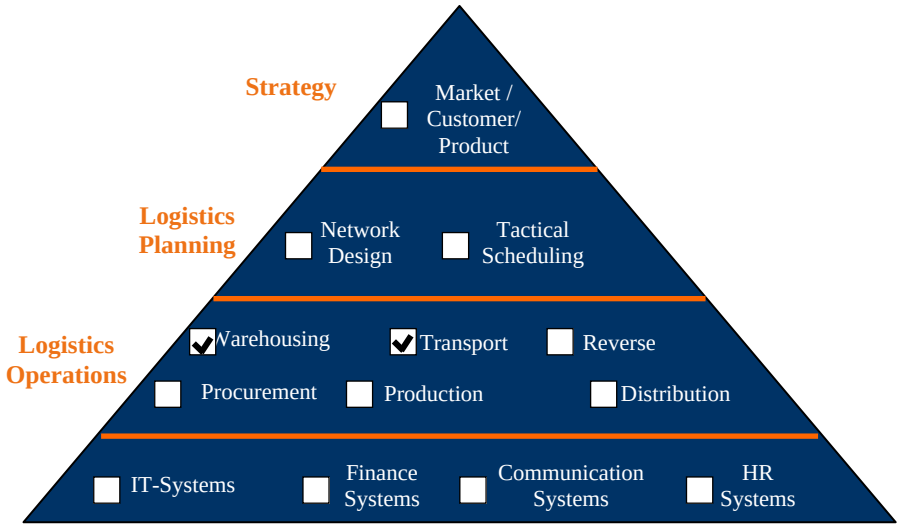

Figure 14: Area of practice

Regarding the area of the practice within the supply chain, there is following result. The area most addressed within the supply chain is Logistic operations and here transport, warehousing and distribution. There is no focusing on the other areas of logistic operations. Strategy and logistic planning as well as IT and communication systems are also areas in which best practices could be implemented. Right now there are no best practices covering the other not mentioned areas, as Finance or HR systems.

The same results are achieved by regarding the areas affected by the best practices.

The approaches can mostly be implemented to any industry as well as to any geography and company size. Hence we nearly face no limitation factors by implementing the best practices to real scenarios. Comments regarding this fact can clarify this:

- The current implementation is not accessible for most low budget companies due to the required On-Board Equipment.
- The current implementation is not accessible for most low budget companies due to the required On-Board Equipment.
- Since FREIGHTWISE did not proposed a specific technology but a framework, the highest benefit would arise from its adoption by the whole logistics and transport community (or by a critical initial mass).

- Multi language applications; usage of FRITS applications and services respectively applicable interfaces to connect to information;
- Price limitations of available devices may influence transferability.
- The use of the CVIS technology will be demonstrated in SMARTFREIGHT, and the usability and reliability of the technology will be tested. However, SMARTFREIGHT will not set up a full scale implementation, so the results with respect to the environment of the city and urban area must be objectives for some follow-up activities.
- The intermodal route finder developed covers terminals and their mutual relations across the EU27 plus Croatia, Norway and Switzerland. This could be extended with other non-EU countries of course.
- DHL Go Green Program sees no restrictions in terms of industry or geography, though specific adaptations of the program to the respective business or societal environment might be required. Implementation requires specialist knowledge that might be more difficult to come by for SME than for medium and large companies (also liberty to enact measures might be more constrained for smaller subcontractors).

4.3 Functionality

The “functionality” part is responsible for the matching of the “best practices” to the ARKTRANS framework-functional view. This point of view on the best practices emerging from the various identified and analysed projects is important to get an idea of in which situation the different best practices can be used and adapted to.

The following table shows the functionality view of the ARKTRANS framework, in an adapted way for L4L. To get an whole overview of which best practise is able to be adapted to which situation, the projects are matched to the functionalities. The number behind the projects gives information about the relevance of the functionality for the best practice.

The weighted value ((W) 1, 2, 3) describes the contribution to the best practice.

W1: Significant contribution, practically tested in production/pilot setting

W2: Smaller, practically validated contribution or significant theoretical contribution

W3. Theoretical contribution, other

Transport Demand					
Demand / Project	EUROFOT	FREIGHTWISE	NS Fritz	SMARTFREIGHT	SmartCM
Plan and Prepare Transport	X				
Manage Long Term Demand					
Identify Long Term Transport Needs					
Manage Long Term Contracts					
Define General Transport Preferences	X	X			
Gather Information	X				
Get Traffic Information	X	X	X	X	
Get Generic Information	X			X	
Define Transport Demand	X	X			
Define Actual Transport Preferences (ATP)	X	X			
Define Transport Item	X	X			X
Find Transport Service Alternatives	X				
Get Transport Service Information	X	X			
Get Transport Network Info.	X	X	X	X	
Manage Journey	X	X			X

Transport Demand								
Demand / Project	EUROFOT	FREIGHTWISE	NS Fritz	SMARTFREIGHT	CVIS	SmartCM	Integrity	CASSANDRA
1 Plan and Prepare Transport	X							
1.1 Manage Long Term Demand								
1.1.1 Identify Long Term Transport Needs								
1.1.2 Manage Long Term Contracts								
1.2 Define General Transport Preferences (GTP)	X	X						
1.3 Gather Information	X							
1.1.1 Get Transport Service Information	X	X						
1.1.2 Get Transportation Network Info.	X	X	X (2)	X (3)				
1.1.3 Get Traffic Information	X	X	X (2)	X (3)				
1.1.4 Get Generic Information	X			X (3)				
1.4 Define Transport Demand	X	X						
1.4.1 Define Actual Transport Preferences (ATP)	X	X						
1.4.2 Define Transport Item	X	X				X		
1.5 Find Transport Service Alternatives	X							
1.6 Manage Journey	X	X				X		
2 Manage Booking	X							
2.1 Define Transport Execution Plan	X	X				X		
2.2 Manage Contract	X	X		X(2)		X		
4.1.1 Manage Contract Agreement	X							
4.1.2 Manage Contract Information	X							
2.3 Manage Service Definition	X	X				X		
2.4 Book Transport Service	X	X						
3 Manage Transport	X	X	X(3)			X		
3.1 Receive Context Related Information								
3.2 Manage Transport Status	X	X		X(1)		X	X(1)	X(2)
3.3 Monitor Transport Items	X	X		X(1)		X	X(1)	X(2)
3.4 Track and Trace Transport	X	X		X(1)	X(1)	X	X(1)	X(2)
3.5 Manage Reporting								

3.6 Consider Transport Amendment								
4 Manage Transport Finalisation								
4.1 Manage Financial Transactions	X							
4.2 Manage Statistics	X	X				X		

Transport Supply - Transport Service Management								
Transport Supply – Transport Service Management / Project	EUROFOT	FREIGHTWISE	NS Fritz	SMARTFREIGHT	CVIS	SmartCM	Integrity	CASSANDRA
1 Transport Service Management	X	X						
1.1 Publish Transport Service Information	X	X						
1.2 Manage Customer Relations	X	X						
1.2.1 Manage Contract	X	X						
1.2.2 Manage Transport Service Request	X	X						
1.2.3 Manage Bookings	X	X						
1.2.4 Manage Itinerary Information	X	X		X(2)				
1.2.5 Manage Status Information	X	X						X(2)
1.2.6 Manage Claims	X	X						
1.2.7 Handle Ad Hoc Demand	X	X						
1.3 Perform Yield Management								
1.4 Manage Strategic and Tactically Transport Service Planning	X	X					X(1)	
1.4.1 Identify Transport Service Needs	X						X(1)	
1.4.2 Decide Operation Strategies	X							
1.4.3 Plan Transport Service	X	X		X(2)				
1.4.4 Plan Yield Management	X							
1.4.5 Schedule Resources	X			X(1)				
1.4.6 Plan Use of External Services	X							
1.4.7 Plan Resource Backup	X							
1.4.8 Optimise Plan	X							

Transport Supply - Transport Operation Management								
Transport Supply – Transport Operation Management / Project	EUROFOT	FREIGHTWISE	NS Fritz	SMARTFREIGHT	CVIS	SmartCM	Integrity	CASSANDRA
1 Transport Operation Management	X					X	X(1)	
1.1 Plan and Prepare Transport Operation	X	X		X(1)			X(1)	
1.1.1 Adapt to Traffic Management Policy	X	X		X(1)				
1.1.2 Acquire Traffic Situation Information	X	X	X(2)	X(1)	X(2)			
1.1.3 Acquire Transportation Network Information	X	X	X(2)	X(1)	X(2)			
1.1.4 Plan Transport Operation	X	X		X(1)	X(1)			X(1)
1.1.5 Allocate Space and Resource	X	X		X(2)				
1.1.6 Allocate Resource Backup	X			X(1)				
1.1.7 Manage Exceptional Transport Needs	X						X(1)	
1.1.8 Prepare Use of Transportation Network Resources and Services	X			X(1)	X(3)			
1.1.9 Verify that Transport Operation is Possible	X			X(1)				
1.1.10 Define Incident Handling	X	X		X(1)		X		
1.1.11 Define Deviation Handling	X	X		X(1)		X		
1.1.12 Manage Performance	X			X(2)				
1.1.13 Define Itinerary	X	X		X(2)		X		
1.2 Manage Transport Resources							X(1)	
1.2.1 Manage Certificates and Licences				X(1)				
1.2.2 Manage Personnel Information				X(2)			X(1)	
1.2.3 Manage Transport Means Information				X(1)		X	X(1)	X(1)
1.2.4 Manage Equipment Information				X(1)		X	X(1)	X(1)
1.2.5 Manage Sub-contracting Information								
1.2.6 Evaluate Performance				X(2)			X(2)	
1.3 Control Transport Operation		X					X(1)	
1.3.1 Request Traffic Management Measures				X(1)				
1.3.2 Perform Quality Assurance Control				X(1)	X(1)			X(1)
1.3.3 Provide Route Guidance								
1.3.4 Manage Use of Transportation Network				X(1)				
1.3.5 Handle Transport Problems and Aments				X(2)				

1.3.6 Manage Schedule and Deviation		X		X(1)		X		
1.3.7 Manage Incidents				X(1)		X		
1.4 Transport Operation Execution		X				X	X(1)	
1.4.1 Manage Transport Operation Information and Progress		X				X	X(1)	
1.4.2 Support Transport Task Execution		X		X(2)		X	X(1)	
1.4.3 Report on Transport Operation		X		X(2)		X	X(1)	
1.4.4 Manage Transportation Network Resource Bookings				X(1)				
1.5 Monitor Transport Operation		X				X	X(1)	X(1)
1.5.1 Track Transport Means				X(1)	X(1)	X	X(1)	
1.5.2 Track Load Item		X		X(2)		X	X(1)	
1.5.3 Monitor Load Item		X		X(2)		X	X(1)	
1.5.4 Monitor Equipment				X(1)	X(1)	X	X(1)	
1.5.5 Evaluate Transport Regulation Compliance						X		
1.5.6 Evaluate Safety Status				X(2)	X(2)	X		
1.5.7 Evaluate Schedule and Deviation		X		X(2)	X(2)	X	X(1)	X(3)
1.5.8 Record Transport Operation Progress				X(2)	X(2)	X	X(1)	
1.6 Manage Transport Operation Information		X				X	X(1)	X(1)

Transport Supply - On-Board Management								
Transport Supply – On-Board Management / Project	EUROFOT	FREIGHTWISE	NS Fritz	SMARTFREIGHT	CVIS	SmartCM	Integrity	CASSANDRA
1 On-Board Management								
1.1 Manage Transportation Network Usage							X(1)	
1.1.1 Monitor and Control Driver Behaviour				X(2)	X(2)			
1.1.2 Monitor Transport Means				X(1)			X(1)	
1.1.2.1 Monitor Transport Means Status				X(1)	X(1)		X(1)	
1.1.2.2 Register Transport Means Tracking Information				X(1)	X(1)		X(1)	
1.1.2.3 Monitor and Control Gas Leakage				X(3)	X(3)			
1.1.2.4 Monitor and Control Fire				X(3)	X(3)			
1.1.2.5 Monitor and Control Noise				X(3)	X(3)			
1.1.2.6 Prevent Transport Means Theft			X(2)			X	X(1)	
1.1.3 Support and Control Mobility and Transport Means Operation								
1.1.3.1 Support Quality Assurance						X	X(1)	
1.1.3.2 Manage Route				X(1)				X(1)
1.1.3.3 Support Navigation					X(1)			X(1)
1.1.3.4 Use Information Services				X(2)	X(2)		X(1)	X(1)
1.1.3.5 Support Traffic Flow Management				X(1)	X(2)			
1.1.3.6 Support Transportation Network Conditions Management				X(1)	X(2)			
1.1.3.7 Provide Automated Driving Support				X(3)	X(3)			
1.1.4 Support Incident and Emergency Management							X(1)	X(3)
1.2 Manage Transport Means Information							X(1)	
1.2.1 Manage Crew Information								X(2)
1.2.2 Manage Transport Means Characteristics				X(1)				
1.2.3 Manage Transport Means Properties				X(2)				
1.2.4 Manage Certificates			X(2)	X(1)				X(3)
1.2.5 Manage Transport Means Reporting				X(1)				
1.2.6 Manage Fee Payment				X(2)				
1.3 Manage En-Route Reporting						X	X(1)	

1.3.1 Report Transport Means Tracking Info.				X(1)	X(1)	X	X(1)	
1.3.2 Report Transport Means Access Info.				X(1)	X(1)	X	X(1)	
1.3.3 Support Traffic Situation Reporting				X(1)	X(1)		X(1)	
1.3.4 Report Transport Means Status Info.				X(1)	X(1)	X	X(1)	
1.3.5 Report Transport Means Safety Status Information				X(1)	X(1)			

Transportation Area Management

Transportation Area Management / Project	EUROFOT	FREIGHTWISE	NS Fritz	SMARTFREIGHT	CVIS	SmartCM	Integrity	CASSANDRA
1 Transportation Infrastructure Utilisation							X(2)	
1.1 Plan Transportation Network Utilisation				X(2)			X(2)	
1.1.1 Prognosticate Transport Demand							X(2)	
1.1.2 Prioritise and Schedule Traffic				X(1)				
1.2 Perform Operational Traffic Management								
1.2.1 Perform Operational Traffic Management Planning				X(1)				
1.2.1.1 Register Traffic Exception		X		X(1)				
1.2.1.2 Administrate Entry and Exit Information		X		X(1)				
1.2.1.3 Prepare Prognosis		X						
1.2.1.4 Plan Traffic Control		X		X(1)				
1.2.2 Monitor Traffic Situation					X(3)			
1.2.2.1 Monitor Environmental Conditions				X(1)				
1.2.2.2 Monitor Hazardous Goods				X(1)				
1.2.2.3 Monitor Traffic Flow				X(1)				
1.2.2.4 Monitor Transportation Network				X(1)				
1.2.3 Perform Traffic Control								
1.2.3.1 Predict Traffic Flow				X(3)				
1.2.3.2 Assess Traffic Situation				X(2)	X(3)			
1.2.3.3 Control Environmental Impact				X(1)	X(3)			
1.2.3.4 Control Traffic Flow				X(1)	X(3)			
1.2.3.5 Operate Transportation Network Equipment				X(1)	X(1)			

1.2.3.6 Decide on Priority and Access Policy				X(1)	X(1)			
1.2.3.7 Control Individual Transport Means		X		X(1)	X(1)			X(3)
1.2.3.7.1 Assign Route				X(1)	X(1)			
1.2.3.7.2 Assign Classification to Transport Means				X(1)	X(1)			
1.2.3.7.3 Identify Transport Means and Establish Transport Information		X		X(1)	X(1)			
1.2.3.7.4 Track Transport Means				X(1)	X(1)			
1.2.3.7.5 Manage Presence in Transportation Network Section				X(1)	X(1)			
1.2.3.7.6 Manage Access and Priority				X(1)	X(1)			
1.2.3.8 Manage Safety Measures				X(1)	X(3)			
1.2.4 Provide Traffic Situation Information		X			X(2)			
1.2.4.1 Provide Incident and Accident Information		X(1)		X	X(2)			X(3)
1.2.4.2 Provide Route and Navigation Information				X(1)	X(2)			
1.2.4.3 Provide Traffic Image		X		X(1)	X(2)			X(3)
1.2.4.4 Provide Traffic Flow Information		X			X(3)			X(3)
1.2.4.5 Provide Transportation Network Condition Information		X			X(3)			
1.2.5 Manage Incident								
1.3 Manage Transportation Network Resources					X(2)			
1.3.1 Assign Transportation Network Resource				X(1)				
1.3.2 Monitor Transportation Network Resource Usage				X(1)				
1.4 Provide Transport Means Supportive Services				X(1)	X(3)			
2 Manage Transportation Infrastructure Information								

Transportation Area Management								
Transportation Regulation / Project	EUROFOT	FREIGHTWISE	NS Fritz	SMARTFREIGHT	CVIS	SmartCM	Integrity	CASSANDRA
1 Perform Law Enforcement Operative Control and Supervision						X	X(1)	
1.1 Manage Hazardous Goods Transport Information				X(1)				
1.2 Manage Import and Immigration						X		
1.3 Manage Customs		X				X	X(1)	
1.4 Manage Clearances		X				X	X(1)	
1.5 Manage Incidents				X(2)		X		
2 Manage and Provide Regulation Information								
2.1 Manage Hazardous Goods Characteristics				X(2)				X(2)
2.2 Perform Multimodal Hazardous Goods Mapping				X(2)				X(2)
3 Manage Transport Related Decisions								
3.1 Issue Licences and Certificates				X(2)				
4 Manage Transport Related Directories				X(1)				
4.1 Manage Licence and Certificate Information				X(1)				

According to the matching all main functionality areas are supported by best practices of the projects.

It is interesting to recognize that most matching's got a relevance of 1 or 2, which means that they contribute significantly are practically tested in production/pilot setting or in smaller, practically validated contribution or significant theoretical contribution. Of course there are also theoretic contributions (3) to the functionalities. This is also a very important aspect for future options but not so important for best practices.

The matching of functionalities shows that different projects cover different aspects and needs, hence a freight forwarder, a consignor or a logistic service provider might need to choose among different solution or combine different solutions, for this purpose it is necessary that the solutions are interoperable and use the same standards.

4.4 Evaluation

The evaluation stage aims to:

1. Identify the benefits according to the Social, Economic and Environmental dimensions
2. Confirm that the benefits were achieved (where possible)

- Quantitative
- Qualitative

Social, Economic and Environmental dimensions are separated into further categories (sub-dimensions):

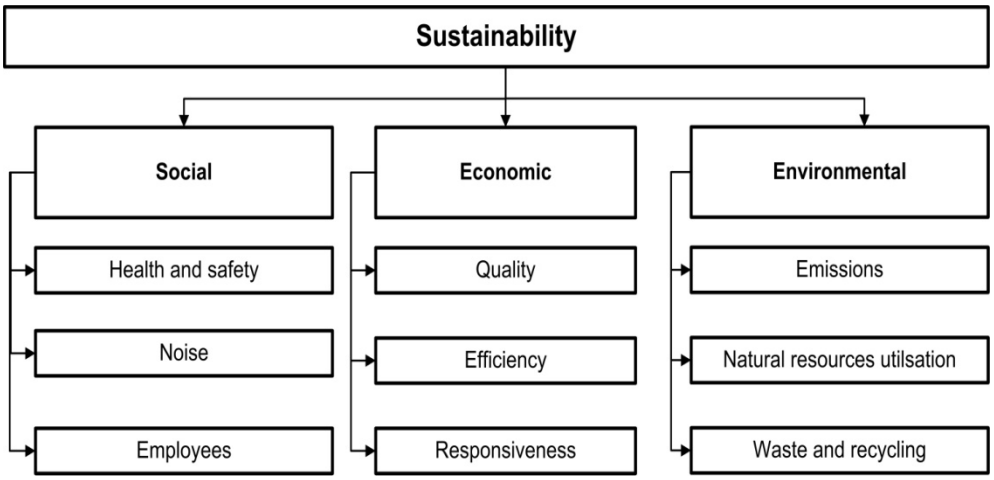

Figure 15: Sustainability[from the questionnaire)

Each (sub-)dimension is evaluated against a set of metrics to evaluate performance in each dimension:

Sub-dimension (category)	Benefits and improvements achieved (examples)
Social	
Health and safety	Toxic, Hazardous emissions, Accidents, Working conditions
Employees	Employment, Training, Job security
Noise	Volume, Timing and location
Economic	
Quality	Quality of products and services, Customer service level, Availability
Efficiency	Utilisation, Productivity, Cost reduction
Responsiveness	Response to customer needs, Response to market changes, Flexibility
Environmental	
Emissions	CO2 emission, Otherpollutantsemissions
Natural resources utilisation	Fuel consumption, Water consumption, Land use, Energy consumption
Waste and recycling	Waste reduction, % of materials/products recycled, Bio-degradable materials used

Figure 16: Sub-dimensions of sustainability

In the following sections the different benefits each project realises are described.

4.4.1 Social benefits

This section summarizes the impact regarding the social benefits regarding health and safety, health and noise for the different best case projects.

4.4.1.1 Health and safety

CVIS:

- Assist the driver for safe driving in the traffic.
- Enables two-way communication for any feedback from the driver and vehicle.

NS Fritz:

- Shipment Security

Integrity:

- Information about deviations from the planned transport schedule will be sooner available by better visibility of the supply chain, thus extra shifts of transport operators can be better planned and will less affect employees.

Freightvision:

- Reduction of road fatalities with HGV involvement -80%

CASSANDRA

- Through advanced route planning algorithms, dangerous goods can be routed outside densely populated areas based on geographic time and location data

4.4.1.2 Employees

Freightwise:

- The pilots proved that the working conditions of employees of the involved partners after the FREIGHTWISE adoption should be considerably improved. The work is automated in a great extend with the use of technology solutions and the frustration created by lost cargo or equipment is reduced. Employees are performing their duties more accurately and easily with the adoption of new technologies. However, the changes demanded a considerable time for education in using the new systems.

4.4.1.3 Noise

NS Fritz:

- Completeness of documents
- Less waiting queues
- Less waiting time
- Avoid traffic congestion
- Availability of information lead to better planning
- Event oriented communication
- Information retrieval on request
- Information about crime hot spots and secure parking may avoid thefts
- Processes on schedule give planning reliability to drivers
- Avoidance of waiting queues and traffic congestion reduces noise

SMARTFREIGHT:

- Less traffic in cities, hence improved the conditions for the citizen.

CASSANDRA

- Reduced administration

All together, it can be stated that the best practice projects we have been looking at contributes more to health and safety than to employees. This is caused by the scope of the projects being selected, because many of the projects dealing with the introduction and use of ICT for freight efficiency, does not focus on employees, but just look at the consequences these might have for them.

4.4.2 Economic benefit

This section summarizes the impact regarding the economic benefits for the different best case projects.

4.4.2.1 Quality

Freightwise:

- The interoperability provided by FREIGHTWISE enables transport service providers have a better view of the supply chain they operate on and thus improve their availability and quality of service they provide. Customers get more accurate and precise information about available services, products, and their cargo that is transported.
- The transparency of the supply chain has a beneficial impact on responsiveness too. Transport service providers can adapt faster to changes and problems that come up.

NS Fritz:

- Completeness of documents
- Less waiting queues
- Less waiting time
- Avoid traffic congestion
- Availability of information lead to better planning
- Event oriented communication
- Information retrieval on request

Smartfreight:

- For city authorities: More transport on less traffic. Better control, and hence less risk, with hazardous goods

4.4.2.2 Efficiency

CASSANDRA

- Loading and unloading errors eliminated
- Improved time efficiency due to faster access to facilities and reduced administration

EUROFOT

- Less fuel consumption leads to cost reduction.

Smartfreight:

- For the transport service provider: More efficient operations, better utilisation of the transport means.

Smart CM:

- Order fulfilment lead time
- % shipments visible/traceable during transportation
- Transportation lead time
- % shipments received damage free
- % schedules changed within lead time

Integrity

- Efficiency of container transports will increase due to improved visibility of the supply chain.

Freightwise:

- The adoption of new technologies improves the efficiency since the work is done more accurately and faster. The involved partners by having a better view of the supply chain handle the available resources (human resources, means of transport, equipment, warehouses) in a more efficient way

4.4.2.3 Reponsiveness

CVIS:

- Two-way communication with vehicles enables individual vehicle control for an improved traffic and freight distribution management.

CASSANDRA

- Real-time response enabled through monitoring

The overview shows that the best practices have a positive economic impact. How ever, most of the projects do not have solid measures, so that it is difficult to measure the impact exactly and to do an analysis of return of investment. Consequently, in the next version of this deliverable, we will try to get some more clear results.

4.4.3 Environmental benefits

4.4.3.1 Emissions

CVIS:

- Individual control of vehicles can control their behaviour for more optimized driving.
- Attached sensors can measure and report emission levels.

Integrity:

- Efficiency of multimodal transports will be optimized, leading e.g. to less traffic of empty trucks

Freightvision:

- 80% GHG emission reduction

Freightwise:

- Efficiency in the overall management of the transport process results in better planning of the intermodal chain avoiding possible disruptions and delays. As a consequence the overall distances travelled are directly affected.

NS Fritz:

- Unnecessary stop and go traffic, waiting queues, traffic congestion reduce emissions

Smartfreight:

- The SMARTFREIGHT concept can be used by traffic management to encourage (and "punsh"/"reward") the use of newer and more environmental friendly vehicles, and also to support route planning so that more of the trucks can avoid running in the peak periods.

EUROFOT

- Reduces emissions due to more efficient driving and less Idling.

CASSANDRA

- Reduced emissions due to fewer stops and less acceleration and braking

4.4.3.2 Natural resources utilisation

EUROFOT

- Reduces the Fuel consumption due to more efficient driving and less Idling.

CASSANDRA

- Improved routing.

Freightwise:

- Efficiency in the overall management of the transport process results in better planning of the intermodal chain avoiding possible disruptions and delays. As a consequence the overall distances travelled are directly affected.

4.4.3.3 Waste and recycling

Smartfreight:

- The SMARTFREIGHT concept can be used by traffic management to encourage (and "punsh"/"reward") the use of newer and more environmental friendly vehicles, and also to support route planning so that more of the trucks can avoid running in the peak periods.

Also of in terms of environmental impact, many of the best practices do have a positive contribution, but as for the economic ones, these are not quantifiable.

4.4.4 Conclusive summary

The analyse in the previous sections regarding the benefits the specific projects contribute to can be helpful to make the decision which best practice should be chosen to optimise a current business situation. As to see in section 4.4.1to section 4.4.3 the implementation of the mentioned best practices can contribute to benefits on social, environmental and economic dimension. According to the objectives that are aimed at these aspects can be crucial.

The results show that there are projects promising benefits by implementing their best practices in all three dimensions:

- CVIS
- Integrity
- Freightwise
- Smartfreight
- NS Fritz
- CASSANDRA

In contrast to that Freightvision focused on the optimisation only at social and environmental dimension. Complementary to this Smart-CM focused on the economic benefits.

5 CONCLUSION ON BEST PRACTICES AND FURTHER STEPS

In the previous chapter the several projects are analysed regarding their best practices. These different projects are:

- CVIS
- Cassandra
- Freightvision
- Freightwise
- NS Fritz
- Smart CM
- Smartfreight
- Transeco
- Integrity
- Be Logic
- DHL Go Green
- EUROFOTS

Some relevant projects did not delivers detailed information enough information up to today, so as soon as these have delivered, these will be added to the deliverable.

5.1 Best Practices

The previous analysis shows the following reasons for why these projects can be considered as “best practices”.

Arguments for the relevance of the approach of CVIS are:

- CVIS developed technology for providing communication between vehicles and the infrastructure by using the ISO family of CALM standards
- The open application framework provides a mean for easy software development in the transport and logistics sectors
- Traffic management and freight distribution management can control individual vehicles through direct communication with them
- Demonstrations of the power of cooperative systems.

Hence CVIS offers a technical solution to optimise the area data infrastructures for energy-efficient logistics.

The CVIS technology is applicable for any industry and geographic due to its support of ordinary available communication mediums like 2G/3G systems, in addition to the roadside equipment communication (i.e. CALM M5).

But still there are limitations of transfer:

- The current implementation is not accessible for most low budget companies due to the required On-Board Equipment.

To complete CVIS, SMARTFREIGHT is the first project to apply and test the CVIS infrastructure for freight transport, with focus on traffic and transport in urban areas. Due to this fact Samrtfreight contributes to the areas: Vehicle efficiency and “green” navigation, Transport, Collaborative and interoperable freight management, Freight monitoring and enforcement and Policy project.

Smartfreight can be transferred to any company size and nearly every geography. But nevertheless there are limitations in the transferability:

- The use of the CVIS technology will be demonstrated in SMARTFREIGHT, and the usability and reliability of the technology will be tested. However, SMARTFREIGHT will not set up a

full scale implementation, so the results with respect to the environment of the city and urban area must be objectives for some follow-up activities.

The Cassandra project is relevant because of the following facts:

- An in-depth information requirement has served as a basis for the project, in order to produce relevant results.
- The implemented pilot proves both the feasibility and the efficiency of the implemented information sharing.
- The focus of combining societal and business interests and basing the implantation on well-established technologies, create a good starting point for taking the step into full-scale implementation in the industry.

The CASSANDRA project offers an approach using well-established technologies. The characteristics of the projects enable this best practice to be implemented in various business areas: Freight monitoring and enforcement, Cargo mobility information services, Collaborative and interoperable freight management and Transport.

In general the best practice is transferable to any industry, company size or geography.

The potential of Basic technologies readily available in any industry as well as a information sharing model that can be implemented everywhere, make Cassandra transferable to the major part of operators in the areas of transports and terminals.

As far as the FREIGHTWISE FRAMEWORK (FWF) is concerned it provided a generic framework for multimodal transports that refers to all the type of companies/organisations of the transport domain. It also provides ideas for overcoming the obstacle of different standards in the communication between the different stakeholders of the transport domain.

Additionally, it analysed policies adopted in Europe for the transport domain and ended up in some policy proposals for strengthening the multimodal transports. Due to this fact the outcomes of FREIGHTWISE can support following industrial areas: Cargo mobility information services, Collaborative and interoperable freight management and Transport.

Regarding the transferability FWF is generic and therefore is transferable to most of the stakeholders of the transport domain. Although the solutions proposed aimed to improve the multimodal transports they are not restricted to a specific type of transport (road, railway, sea etc.) and can be applied to simple transports as well therefore there are no geographic limitations. Additionally, no special infrastructure is required and thus it can be applied to any company size.

Since FREIGHTWISE did not proposed a specific technology but a framework, the highest benfit would arise from its adoption by the whole logistics and transport community (or by a critical initial mass).

NS Fritz enables following advantages, that make the project to a best practice:

- Stakeholders have been involved in an early project phase to get acceptance.
- Exchange of information with stakeholders over the whole project.
- Incorporate information from as is analysis, requirements analysis and learning from EU partners.
- A realisation of the concept give benefits to all participants.

This approach will support the transport sector, by creating a service-oriented architecture.

Regarding the transferability of NS Fritz the following statements can be listed:

- The project concept concerns the transport issues in all industries and especially the transport branch along the supply chain.
- The project concept is not limited by geographic restrictions.
- There are no limitations relating to company sizes.

But nevertheless there are limitations in the transferability:

- Multi language applications; usage of FRITS applications and services respectively applicable interfaces to connect to information;

Five main facts can be listed making the approach of Smart CM to a best practice:

- Common understanding and trusted environment built among actors of different sectors.

Customs authorities & transport & logistics industrial actors reached an agreement on common and sector specific requirements for the platform core functionality & information administration process.

In the very competing and fragmented environment of global transport, big actors achieved minimum consensus on information sharing and cooperation during project solutions implementation.

- Project Technology was made operationally available leading to an interoperable Single Window Platform
- Demonstration of project solutions in real world environment

The project issued a call to external CSD providers who would like to test their technologies. From the companies expressed their interests two have been selected for participating in real global demonstration corridor. Together with the project partner EDC (Belgium -EU), the new comers RAYTHON (USA) & CIMC (China) completed a good rep-resentation of the CSD technology providers around the globe contributing to project solutions development.

The demonstration corridors operated by the project partners DHL, K&N, COSCON involved major ports around the globe: Antwerp, Rotterdam, Singapore, Ningbo, Dubai, Nhava Sheva (India).

- Green Lane Concept implementation for secured Trade Lanes supported by project

The demonstration activities created the basis for direct interface between EU and non-EU customs involved in the corridors and enabled detailed discussions on the concept implementation.

- Neutral Organisation mission and business model was defined on the basis of project partner's justifications and input from selected limited number of external stake-holders.

Through the implementation of advances technology Smart CM can support following industrial areas: Transport, Collaborative and interoperable freight management, Cargo mobility information service and Freight monitoring and enforcement.

The technology used (based on satellite communication) along with the design of the platform based on SOA (neutral part for data collection and added value services for data aggregation) enables transferability to every industry sector, company size and geography.

But price limitations of available devices may influence transferability.

Transeco is nominated as best practice mainly because of the following arguments:

- The research program aims at comprehensive review and renewal of current road transport related to energy savings and renewable energy.
- The use of ICT (core of L4L) is a part of the development activities of vehicles

This approach mainly supports the areas: Vehicle efficiency, "green" navigation

Transport and Policies.

The solutions are specifically for transportation. Naturally, the transferability is restricted to this sector. Consequently, the "industry" is somewhat restricted.

Otherwise, the solutions should not have geographical restrictions.

The lower transferability in the company size dimension is based on the assumption that new solutions may better fit larger companies with bigger resources. This is mainly related to logistics companies. For customers of logistics services the size may have less importance.

INTEGRITY and its open platform SICIS (Shared Intermodal Container Information System) is a best practice project because of aiming at significant improvements of the reliability and predictability of global door-to-door container transports. The consolidation of data will significantly improve the transparency of the transport chain. At the same time the container security will be significantly improved, for example by providing access to reliable sources of consignment information and supporting the AEO concept.

SICIS allows authorised companies and authorities to access planning and status information of selected consignments. It combines existing technologies and new business processes together with legal and administrative agreements and is applicable to any tradelane worldwide. Customs and shippers/3PLs are satisfied in one integrated approach. Furthermore, SICIS is prepared to interface with any data source (CSD provider, terminal system, port community system). The significant benefits for all participants in the chain – both industry and Customs – were already validated during the project. Improved visibility leads to better planning, less delays, cost and time saving and consequently to an increased efficiency, the consequence of which is a positive impact on different sustainability factors.

SICIS is applicable for any kind of container on any tradelane worldwide. Due to access to SICIS by a web frontend, it can be used by companies of any size. The factthat could limit the transferability could be that the interaction with SICIS requires internet access.

EUROFOT is relevant as practise because it provides information regarding drivers fuel consumption, idle time, and rpm is used to inform the driver how to drive in a way that is efficient. With this technology the Transport and Vehicle efficiency and “green” navigation area can be optimised.

The transferability of the best practice within different industry sectors is very limited. On the other side the approach can be implemented to any company size and geography.

The Fuel Efficiency Advisor can be used by most of the vehicles using Dynafleet, but there are other similar systems available.

Especially regarding the objectives of L4L the contribution to energy efficiency through ICT is relevant. As to see in section 4.4.3 nearly every of the identified best practices contributes to energy efficiency. From this point of view following projects have special relevance:

- CVIS:
- Integrity:
- Freightvision:
- Freightwise:
- NS Fritz:
- Smartfreight:
- EUROFOT

All these listed projects contribute to energy efficiency through their approaches.

As shown in the former description the implementation of the best practices can optimise various business events. But also a combination of various approaches can be implemented. According to the requirements a matching of different solutions can be interesting ans can realise advantages. For example SmartCM does not contribute directly to the environment, but instead of that realises economic benefits. Here a combination of SmartCM with an approach contributing to energy efficiency is possible and promising.

5.2 FURTHER STEPS

This section should give an overview of further steps regarding projects offering best practices. In March 2011 a new version will be released. That version will first of all comprise detailed analysis of

DISCWISE, Rising and EURIDICE, having results by then, but also include more information on those projects, which did not find time to deliver the information needed for a detailed analysis.

Secondly the project consortium will continuously look for new promising solutions for increased freight efficiency. Any such identified will also be analysed and presented.

The best practices described in this deliverable will be inserted into the DB developed in WP2 by the beginning of November 2010.

6 REFERENCES

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7 ANNEX I-QUESTIONNAIRE

Best practice:*[Insert project name]*

I. GENERAL

A. Basic Information

1. Source of the best practice:

   EC project : ☐

   National research project: ☐

   Industrial project/program: ☐

   Other: ☐

2. Title of the project (max 50 characters):

3. Collected by project partner:

4. Validated by project partner:

5. L4L contact persons (Name, E-mail, telephone)

   Name:
   E-mail: @

   Tel.: +

6. Comments (to project, data collection, questions, structure and all other issues):

7. Please provide an image/picture that illustrates the project/best practice, plus short picture title/description.

B. Validation

Check more than one check box when applicable

8. What is the stage of practice?

Theory: ☐ Standard: ☐

Pilot: ☐ In use: ☐

9. When was the practice evaluated (year): (if applicable)

C. General project data and project description

10. Name of project leader:

11. Leader location (country, city): ;

12. Homepage:

13. Project/best practice contact persons (Name, E-mail, telephone)

Name:
Position:
E-mail: @
Tel.: +

Name:
Position:
E-mail: @
Tel.: +

14. List of involved organisations:

15. Type of project

Vehicle efficiency and "green" navigation: ☐

Transport: ☐

Logistic brokers: ☐

Collaborative and interoperable freight management: ☐

Cargo mobility information services: ☐

Freight monitoring and enforcement: ☐

Data infrastructures for energy-efficient logistics: ☐

Policy project: ☐

16. Stakeholders applicable:

- Logistics service provider: ☐
  - Terminal operator: ☐
- Transport purchase: ☐
- Transport operator: ☐
  - Motor carrier: ☐
  - Ferry operator: ☐
  - Container operator: ☐
  - Trailer operator: ☐
  - Rail operator: ☐
  - Distribution operator: ☐
  - Intermodal operator: ☐
- Infrastructure operators: ☐
  - Road infrastructure: ☐
  - Port operator: ☐
    - Digital Infrastructure operator: ☐
- Authorities/Organizations: ☐
  - Rescue service: ☐
  - Customs: ☐
  - Traffic authority: ☐
- Other:

17. Industry/sector:

- Logistics service provider: ☐
- Transport: ☐
- Automotive: ☐
- Retail: ☐
- Chemicals: ☐
- Bulk: ☐
- Perishables: ☐
- Dangerous goods: ☐
- High value goods: ☐
- Other:

18. Please state what was aim/objective of the solution implemented (if applicable):

19. Description of the project, describe the solution implemented (no word limits)

20. Technology categories

Internet: ☐

SOA: ☐

Geofencing: ☐

RFID: ☐

Sensor technologies: ☐

Other:

21. Why is this project relevant to best practice?

II. POSITIONING

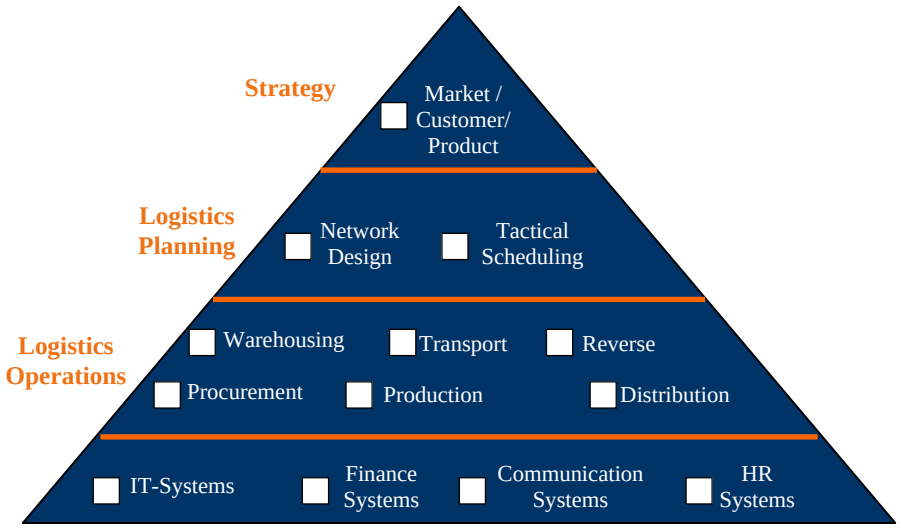
The positioning stage places the case within the wider context, it:

1. Defines the area of the practice within the supply chain
2. Defines the areas within the supply chain affected by the practice
3. Identifies the drivers of the practice and transferability limitations

D. Supply Chain Area

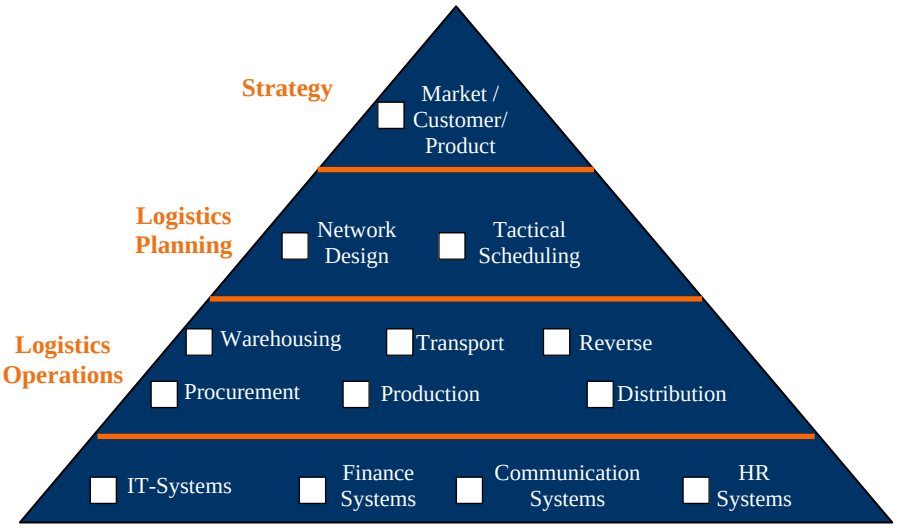
This section serves to define the area of the business on which the practice focuses and identifies the parts of the supply chain affected by the practice

22. Define the **area of the practice** within the supply chain - select most relevant:



Other(s)/comments:

23. Define areas within the supply chain **affected by the practice** - select most relevant:



Other(s)/comments:

E. Transferability

Transferability limitations identify the settings in which the best practice/project can and cannot be used. For example, it is impossible to use inland waterways transport without access to inland waterway infrastructure.

24. In general, can the practice be implemented :

	-- , - , 0 , + , ++
Across any industry	☐ ☐ ☐ ☐ ☐
Across any geography	☐ ☐ ☐ ☐ ☐
Across any company size	☐ ☐ ☐ ☐ ☐
Nowhere else (a unique solution)	

25. Please explain the potential for transferability in terms of the three dimensions above:

26. Please list the limitations to transfer the practice and challenges to implement it?

III. Functionality

I. Functional View (Arktrans based)

1. Transport demand (input data where applicable)

	Description and relevance(1,2,3,)
1. Prepare and Plan Transport	
1.1 Gather Information	
1.1.1 Get Transport Service Information	
1.1.2 Get Transportation Network Information	
1.1.3 Get Traffic Information	
1.1.4 Get Generic Information	
1.2 Define General Transport Preferences (GTP)	
1.3 Define Transport Demand	
1.3.1 Define Actual Transport Preferences (ATP)	
1.3.2 Define Transport Item	
1.4 Manage Transport Execution Plan	
1.4.1 Find Transport Service Alternatives	
1.4.2 Verify Transport Execution Plan Usability	
1.4.3 Define Transport Execution Plan	
1.4.4 Define Required Status Reporting	
1.5 Manage Itinerary	
2. Manage Transport	
2.1 Manage Transport Status	
2.2 Monitor Transport Items	
2.3 Track and Trace Transport	
2.4 Manage Transport Information Exchange	
3. Manage Transport Experience	
4. Administrate Transport	
4.1 Manage Contract	
4.1.1 Manage Contract Agreement	
4.1.2 Manage Contract Information	
4.2 Manage Transport Booking	
4.2.1 Manage Financial Transactions	
4.2.2 Manage Transport Booking Process	
4.2.3 Consider Transport Amendment	
4.3 Manage Market Information	
4.3.1 Manage Service Provider Information	
4.3.2 Monitor Available Services	
4.3.3 Request Statistics	
4.4 Manage Long Term Demand	

2. Transport Service Management (input data where applicable)

1. Provide Transport Service	
1.1 Publish Transport Service Information	
1.2 Manage Customer Relations	
1.2.1 Manage Contract	
1.2.2 Manage Transport Service Request	
1.2.3 Manage Bookings	
1.2.4 Manage Itinerary Information	
1.2.5 Manage Status Information	
1.2.6 Manage Claims	
1.2.7 Handle Ad Hoc Demand	
1.3 Perform Yield Management	
1.4 Manage Strategic and Tactically Transport Service Planning	
1.4.1 Identify Transport Service Needs	
1.4.2 Decide Operation Strategies	
1.4.3 Plan Transport Service	
1.4.4 Plan Yield Management	
1.4.5 Schedule Resources	
1.4.6 Plan Use of External Services	
1.4.7 Plan Resource Backup	
1.4.8 Optimise Plan	
2 Manage Transport Operation	
2.1 Plan and Prepare Transport Operation	
2.1.1 Adapt to Traffic Management Policy	
2.1.2 Acquire Traffic Situation Information	
2.1.3 Acquire Transportation Network Information	
2.1.4 Plan Transport Operation	
2.1.5 Allocate Space and Resource	
2.1.6 Allocate Resource Backup	
2.1.7 Manage Exceptional Transport Needs	
2.1.8 Prepare Use of Transportation Network Resources and Services	
2.1.9 Verify that Transport Operation is Possible	
2.1.10 Define Incident Handling	
2.1.11 Define Deviation Handling	
2.1.12 Manage Performance	
2.1.13 Define Itinerary	
2.2 Control Transport Operation	
2.2.1 Request Traffic Management Measures	
2.2.2 Perform Quality Assurance Control	
2.2.3 Provide Route Guidance	
2.2.4 Manage Use of Transportation Network Resource	
2.2.5 Handle Transport Problems and Amendments	
2.2.6 Manage Schedule and Deviation	
2.2.7 Manage Incidents	
2.3 Monitor Transport Operation	
2.3.1 Track Transport Means	
2.3.2 Track Load Item	
2.3.3 Monitor Load Item	
2.3.4 Monitor Equipment	
2.3.5 Evaluate Transport Regulation Compliance	
2.3.6 Evaluate Safety Status	
2.3.7 Evaluate Schedule and Deviation	
2.3.8 Record Transport Operation Progress	
2.4 Manage Transport Operation Information	
3 Execute Transport Operation	

3.1 Manage Transport Operation Information and Progress	
3.2 Support Transport Task Execution	
3.3 Report on Transport Operation	
3.4 Manage Transportation Network Resource Bookings	
4 Manage Transport Resources	
4.1 Manage Certificates and Licences	
4.2 Manage Personnel Information	
4.3 Manage Transport Means Information	
4.4 Manage Equipment Information	
4.5 Manage Sub-contracting Information	
4.6 Evaluate Performance	
3. **On-Board Support and Control (input data where applicable)**	
1 Manage Transport Means Information	
1.1 Manage Crew Information	
1.2 Manage Transport Means Characteristics	
1.3 Manage Transport Means Properties	
1.4 Manage Certificates	
1.5 Manage Transport Means Reporting	
1.6 Manage Fee Payment	
2 Manage En-Route Reporting	
2.1 Report Transport Means Tracking Information	
2.2 Report Transport Means Access Information	
2.3 Support Traffic Situation Reporting	
2.4 Report Transport Means Status Information	
2.5 Report Transport Means Safety Status Information	
3 Support and Control Transportation Network Usage	
3.1 Monitor and Control Driver Behaviour	
3.2 Monitor Transport Means	
3.2.1 Monitor Transport Means Status	
3.2.2 Register Transport Means Tracking Information	
3.2.3 Monitor and Control Gas Leakage	
3.2.4 Monitor and Control Fire	
3.2.5 Monitor and Control Noise	
3.2.6 Prevent Transport Means Theft	
3.3 Support and Control Mobility and Transport Means Operation	
3.3.1 Support Quality Assurance	
3.3.2 Manage Route	
3.3.3 Support Navigation	
3.3.4 Use Information Services	
3.3.5 Support Traffic Flow Management	
3.3.6 Support Transportation Network Conditions Management	
3.3.7 Provide Automated Driving Support	
3.4 Support Incident and Emergency Management	
4. **Transport Network Management**	5.

1 Transportation Network Utilisation	
1.1 Plan Transportation Network Utilisation	
1.1.1 Prognosticate Transport Demand	
1.1.2 Prioritise and Schedule Traffic	
1.2 Perform Operational Traffic Management	
1.2.1 Perform Operational Traffic Management Planning	
1.2.1.1 Register Traffic Exception	
1.2.1.2 Administrate Entry and Exit Information	
1.2.1.3 Prepare Prognosis	
1.2.1.4 Plan Traffic Control	
1.2.2 Monitor Traffic Situation	
1.2.2.1 Monitor Environmental Conditions	
1.2.2.2 Monitor Hazardous Goods	
1.2.2.3 Monitor Traffic Flow	
1.2.2.4 Monitor Transportation Network	
1.2.3 Perform Traffic Control	
1.2.3.1 Predict Traffic Flow	
1.2.3.2 Assess Traffic Situation	
1.2.3.3 Control Environmental Impact	
1.2.3.4 Control Traffic Flow	
1.2.3.5 Operate Transportation Network Equipment	
1.2.3.6 Decide on Priority and Access Policy	
1.2.3.7 Control Individual Transport Means	
1.2.3.7.1 Assign Route	
1.2.3.7.2 Assign Classification to Transport Means	
1.2.3.7.3 Identify Transport Means and Establish Transport Information	
1.2.3.7.4 Track Transport Means	
1.2.3.7.5 Manage Presence in Transportation Network Section	
1.2.3.7.6 Manage Access and Priority	
1.2.3.8 Manage Safety Measures	
1.2.4 Provide Traffic Situation Information	
1.2.4.1 Provide Incident and Accident Information	
1.2.4.2 Provide Route and Navigation Information	
1.2.4.3 Provide Traffic Image	
1.2.4.4 Provide Traffic Flow Information	
1.2.4.5 Provide Transportation Network Condition Information	
1.2.5 Manage Incident	
1.3 Manage Transportation Network Resources	
1.3.1 Assign Transportation Network Resource	
1.3.2 Monitor Transportation Network Resource Usage	
1.4 Provide Transport Means Supportive Services	
2 Manage Transportation Network Information	
3 Regulation Enforcement	
3.1 Manage Transport Related Directories	
3.1.1 Manage Licence and Certificate Information	

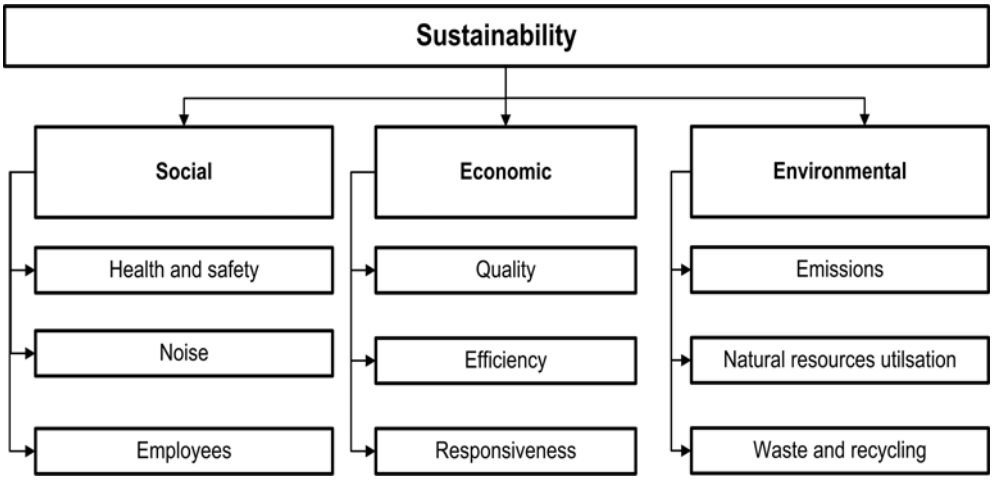
3.2 Manage Transport Related Decisions	
3.2.1 Issue Licences and Certificates	
3.3 Perform Law Enforcement Operative Control and Supervision	
3.3.1 Manage Hazardous Goods Transport Information	
3.3.2 Manage Import and Immigration	
3.3.3 Manage Customs	
3.3.4 Manage Clearances	
3.3.5 Manage Incidents	
3.4 Manage and Provide Regulation Information	
3.4.1 Manage Hazardous Goods Characteristics	
3.4.2 Perform Multimodal Hazardous Goods Mapping	

IV. EVALUATION

The evaluation stage aims to:

1. Identify the benefits according to the Social, Economic and Environmental dimensions
2. Confirm that the benefits were achieved (where possible)
   - Quantitative
   - Qualitative

Social, Economic and Environmental dimensions are separated into further categories (sub-dimensions):



Each (sub-)dimension is evaluated against a set of metrics to evaluate performance in each dimension:

Sub-dimension (category)	Benefits and improvements achieved (examples)
Social	
Health and safety	Toxic, Hazardous emissions, Accidents, Working conditions
Employees	Employment, Training, Job security
Noise	Volume, Timing and location
Economic	
Quality	Quality of products and services, Customer service level, Availability
Efficiency	Utilisation, Productivity, Cost reduction
Responsiveness	Response to customer needs, Response to market changes, Flexibility
Environmental	
Emissions	CO2 emission, Other pollutants emissions
Natural resources utilisation	Fuel consumption, Water consumption, Land use, Energy consumption
Waste and recycling	Waste reduction, % of materials/products recycled, Bio-degradable materials used

F. Efficiency Benefits

6. **Impact on quality** (wherever possible provide quantitative data – value or %)

7. **Impact on efficiency** (wherever possible provide quantitative data – value or %)
8. **Impact on responsiveness** (wherever possible provide quantitative data – value or %)
9. Please explain any other economic benefits:

G. Social Benefits
10. **Impact on health and safety** (wherever possible provide quantitative data)
11. **Impact on employees** (wherever possible provide quantitative data)
12. **Impact on noise** (wherever possible provide quantitative data)
13. Please explain any other social benefits:

H. Environmental Benefits
14. **Impact on emissions** (wherever possible provide quantitative data – value or %)
15. **Impact on natural resources utilisation** (wherever possible provide quantitative data – value or %)
16. **Impact on waste and recycling** (wherever possible provide quantitative data – value or %)
17. Please explain any other environmental benefits:

END

8 ANNEX II

In this annex, you find more information on some of the most relevant policies

"Better Regulation" policy

Main objectives

- Prevention of accidents
- Measures in case of accidents

Safety Package:

- Flag State responsibilities
  - A missing link in EU legislation has been filled
  - EU Member States required to control that ships flying their flags effectively respect IMO standards
  - Mandatory audit plan of national maritime administrations
  - Certification of national maritime administrations quality management systems (ISO 9001/2000)
  - Firm commitment of EU member States' flags to secure outstanding ratification of Maritime Safety Conventions
  - Ensuring the ratification of the International Liability Conventions
  - Apply the IMO Flag State Code & the audit scheme
  - Ensuring that both instruments are made mandatory at international level
  - Objective that all Member States flags be listed on the white list of the Paris MoU on Port State control by 2012 at the latest.
- Classification societies
  - Classification Societies are fundamental for maritime safety.
  - Better performance of classification societies is less room for sub-standard shipping
  - Radical improvement in the quality of the work undertaken by classification societies
  - Independent quality control regime (audit & certification of the quality management of EU-Recognisedorganisations) by a specialized body .
  - Transparency and cooperation obligations.
  - Stricter requirements for EC agreement
  - New system of financial penalties for preventing underperformance
- Port State control
  - Revision of the existing system of port State control
  - A more stringent regime for substandard vessels (frequence of inspections, banning …
  - Setting up of a new inspection regime with a full EU inspections coverage (now 25% - after 100%)
  - Frequency of the inspection: depending on the risk the ships pose. The most dangerous ships will be inspected every 6 months
  - Ships not fulfilling the rules will be banned
- Vessel traffic monitoring
  - Places of refuge: responsibility of independent authorities, clearer rules.
    - » Defining clear and precise legal framework on places of refuge,
    - » Guarantee an independent decision
    - » Ensuring that the authorities possess the necessary elements for decision-making.

- SafeSeaNet: Guarantee that all the Member States are interconnected via an EU-wide electronic system for maritime data exchange
- Automatic Identification System (AIS) mandatory for fishing vessels

- Accident investigation
  - Obligation to carry out a safety investigation after each very serious casualties
  - Fully in line with international principles (IMO Code)
  - Independent, professional investigative bodies
  - Common methodology, technical support provided by the European Maritime Safety Agency
  - Permanent cooperation framework between investigating bodies
- Liability and compensation for damage of passengers
  - Introduction into European legislation of the Athens Convention of 2002
    - » modernised carrier liability rules
    - » a mandatory insurance system, and
    - » a satisfactory compensation ceiling
  - Apply to all passengers who have purchased their tickets in Europe, to all EU flagged ships and to all voyages to/from European member States
- Insurance of shipowners for maritime claim
  - Compulsory insurance for all ships entering a maritime area under the jurisdiction of a Member State.
  - Cover with the ceilings set out in the Convention of IMO on the Limitation of Liability for Maritime Claims (1996 version).
  - Proof of insurance will be provided by a commercial insurance certificate.
  - Carrying an insurance certificate can be verified during an inspection under the Port State Control Directive
  - When no certificate the ship may be detained or even expelled

Maritime transport without barriers

The freight passing through European ports is increasing constantly. For example, the volume of containerized freight entering and leaving seaports has doubled within the space of several years. Indeed, around 90% of the European Union's trade with third countries passes through the ports of Europe, with some 3.2 billion tonnes of freight being loaded and unloaded annually. The European Union's seaports play a vital part in ensuring the competitiveness of both its internal and external trade, and they provide essential links to its islands and remote regions. Moreover, the ports generate more than half a million jobs either directly or indirectly, and they drive the dynamism and development of entire regions, including most of the EU's remote regions.

Consequently, Europe needs a network of accessible and efficient ports. It needs greater port capacity, and existing capacity has to be streamlined. The Commission Communication on the European ports policy identifies all of the issues which European ports must resolve if they are to meet the ever-growing demand for transport, cope with technological change (such as containerised freight and new ICT technologies) and address the need to reduce emissions. The Commission wants, above all, to help European ports meet these challenges, develop their operations and become more competitive. The Communication is the result of an eight-month consultation with interested parties. In March 2006, Vice-President Barrot decided to launch a broad-based consultation in a move to better understand the port sector. This consultation covered a wide range of issues such as port services, port funding, environmental issues, employment at ports, hinterland connections, and relations with thirdcountry ports.

The Communication sets out an action plan and announces future legislative

initiatives to meet the five main challenges facing the European port network today:

- Increasing the efficiency and productivity of all European seaports;
- Balancing the need to increase investment capacity with respect for the environment;
- Modernising the ports network by, among other things, simplifying administrative procedures and making increased use of information technologies (e-maritime);
- Guaranteeing fair competition between ports;
- Addressing the human aspect within a new framework for social dialogue.

The common aim of these initiatives is to set up a framework enabling European ports to achieve sustainable development and to obtain the investment they need for modernisation. The modernisation of port facilities should help attract new customers and play a crucial part in providing real intermodal solutions for European carriers. The action plan will thus contain a set of indispensable practical tools for investors, including guidelines on environmental regulations (and how to apply them to port development projects) as well as on State aid for ports.

The Communication also includes legal guidelines on access to the port services market (port concessions, technical nautical services and boatage) and on employment in ports. The Commission has focused particular attention on the latter. It is working to make the profession more attractive and ensure that there is a well-trained workforce in this sector by proposing a directive on the training of port employees, by closely monitoring the application of health and safety rules and by helping to create a sectoral dialogue committee.

Promoting a European maritime transport area without barriers

Unlike road transport, which has been reaping the benefits of the internal market since 1993, shipments of goods by sea between the ports of the European Union are treated in the same way as shipments to third countries. Consequently, maritime transport between Member States involves many documentary checks and physical inspections by the customs, health, veterinary, plant health and immigration control officials. The fact that modes of transport should be treated differently is no longer justified.It penalizes maritime transport, which is cheaper and has less of a negative impact on the environment, even though maritime transport should be used to cut the number of lorries on an increasingly congested road network. It is paradoxical, for example, that goods shipped by sea between ports as close together as Antwerp and

Amsterdam should be considered to have left the territory of the European Union whereas lorries can drive unhindered throughout Europe. To rectify the situation, the European Commission has introduced the idea of a European maritime transport area with a view to eliminating or reducing the numerous administrative procedures which apply to goods shipped by sea between European ports. The general use of ship tracking systems will mean that national authorities will be able to monitor the area to ensure that it is operating correctly. The aim of this is to allay fears of an increase in fraud resulting from the lifting of controls. On 17 October, the Commission is launching a two-month consultation period with interested parties to discuss the idea of a European maritime transport area. The Commission will present the results of this consultation, as well as an impact analysis of the various scenarios for implementing this maritime area and other relevant proposals, in 2008.

Motorways of the sea

The establishment of a European maritime transport area is absolutely crucial in ensuring the effective development of the "motorways of the sea" – key sea routes between the Member States of the EU. Combined with other modes of transport, they provide regular, high-quality services which offer an effective alternative to transporting goods only by road. The motorways of the sea represent a cleaner, more cost-effective solution for transporting freight and will reduce congestion at the main bottlenecks on Europe's roads. What is more, they also provide effective, viable links to the remoter regions of Europe. A whole network of motorways of the sea will have to be established to absorb a significant portion of the growth expected for road freight traffic. At the same time, short-sea shipping will have to continue improving its performance. Six years after announcing this initiative in the White Paper on European transport policy, the Commission is publishing a report on the progress made in developing the motorways of the sea. The report shows that the Member States are actively involved in setting up support mechanisms for the motorways of the sea. It also demonstrates that the private sector has shown great interest in the idea, and not just in the financing options offered through Community instruments.

In order to address these developments, the Commission is launching a consultation on a number of new ideas. These include devising performance indicators, benchmarking the various options for getting goods from their point of origin to their destination, and recognising some existing services as motorways of the sea.

The Commission is very hopeful that a first list of "motorway of the sea" projects can be adopted in 2010. The Commission believes in this policy and is ready to play its part. It has set up financial instruments such as the TEN-T (trans-European transport network) and Marco Polo programmes which enable greater financial Community support to be given to developing motorways of the sea. In a move to facilitate cooperation between all the public and private sector parties involved, the Commission has appointed Luis Valente de Oliveira as European coordinator for these projects. The ball is now in the court of the public and private sectors. They need to come up

with good "motorways of the sea" projects which will shift a significantly greater share of freight transport to the seas and thus reduce congestion in our transport system as well as making it cleaner and more energy-efficient.

E-Maritime

- "e-Maritime" stands for online interactions between all the different stakeholders in the maritime sector
- The EU E-Maritime initiative embodies a set of policies, strategies and capabilities facilitating the development of "e-Maritime" in support of an efficient and sustainable waterborne transport system throughout Europe, fully integrated within the transport logistic chains
- The results must be defined through measurable economic, social and environmental benefits
- Policy aim
    - Bring the European maritime transport industry and services sectors to the forefront of ICT developments
    - A framework directive for the establishment of technical requirements, specifications and conditions for the deployment of e-Maritime systems
- Objectives:
    1. Accelerated take up across EU of SafeSeaNet, EU LRIT and enavigation
    2. Improved utilisation of the GALILEO and its integration with traffic monitoring processes;
    3. Improved information exchange between administration and business (A2B & B2A) with dependable interoperability platforms (Single Window), online services and regulatory compliance reporting systems;
    4. Improved utilisation of resources by supporting maritime transport stakeholders co-operate efficiently in co-modal networks;
    5. Improved efficiency and quality of shipping services through integrated fleet management systems
    6. Enhanced attractiveness of short sea shipping and its role in an efficient door-to-door supply chain;
    7. Development of European Ports as key logistics hubs particularly through advanced Port Single Windows and Port Community systems;
    8. Promotion of e-learning for maritime transport industry 8/20 professionals focusing on seafarers;
    9. Development of information, knowledge and entertainment sharing facilities for seafarers;
    10. Promotion of communications infrastructure solutions providing versatility, fast response and high integrity for ship-shore communications
    11. Promotion of technologies that allow seamless communications across diverse communications media and protocols
- Concept:
    - *A virtual network in an electronic environment based on open platform and standards to ensure interoperability between different maritime-related applications*
    - *This network should enable administrative and commercial communications between ships, between ships and shore, including* port communities, administrations, operators, freight forwarders and other hinterland actors

E-customs

The European Commission has adopted two proposals to modernise the EU Customs Code and to introduce an electronic, paper-free customs environment in the EU. The first proposal aims to simplify and streamline customs processes and procedures. The second proposal is designed to make Member States' electronic customs systems compatible with each other; introduce EU-wide electronic risk analysis and improve information exchange between frontier control authorities; make electronic declarations the rule; and introduce a centralised customs clearance arrangement. The result should be to increase the competitiveness of companies doing business in Europe, reduce compliance costs and improve EU security.

"These proposals would achieve the dual objective of enhancing security at the EU's external borders and facilitating trade" said European Taxation and Customs Commissioner LászlóKovács. "The work ahead of us is daunting but I am hopeful that we can achieve our goals with the support of business and Member States who have been consulted extensively on this initiative."

The proposal for a Regulation to modernise the Customs Code would simplify legislation and administration procedures both from the point of view of customs authorities and traders. It would

- simplify the structure and provide for more coherent terminology, with fewer provisions and simpler rules;
- provide for radical reform of customs import and export procedures to reduce their number and make it easier to keep track of goods;
- rationalise the customs guarantee system; and
- extend the use of single authorisations (whereby an authorisation for a procedure issued by one Member State would be valid throughout the Community).

The proposal for a Decision promoting electronic customs contains actions and deadlines for making Member States' electronic customs systems compatible with each other and creating a single, shared computer portal. This would facilitate communications between traders and customs and would allow for faster and better exchange of information between European customs authorities. Electronic declarations would become compulsory, with paper-based declarations becoming the exception.

The proposal also suggests the setting up of an electronic "Single Window" whereby traders of proven trustworthiness ("authorised importers") would only have to deal with one body instead of several frontier control authorities as happens at present. Customs and other policy-related information relating to any given import consignment would then only have to be sent once. The goods would then be controlled by customs and other authorities (e.g. police, border guards, veterinary and environmental authorities) at the same time and at the same place under a 'One Stop Shop' arrangement.

The Customs Union is one of the pillars of the European construction and is at the heart of the Internal Market. Current legislation on customs procedures and processes is generally complicated and is based on paper declarations,. While all Member States have electronic customs systems, they are not inter-connected. The Commission considers that, if customs legislation were simplified, customs processes and procedures streamlined and IT systems converged, traders would save money and time in their business transactions with customs. In addition to improving safety and security checks, this would contribute to the competitiveness of European business and thus to the main goals of the Lisbon strategy.

European external border surveillance system (EUROSUR)

The Communication examines the parameters within which a European border surveillance system (EUROSUR), focusing initially on the Union's southern and eastern maritime borders, could be developed, and proposes a roadmap for setting up such a "system of systems" over the next few years. It focuses on enhancing border surveillance in order to:

- reduce the number of illegal immigrants who enter the European Union undetected;
- reduce the number of deaths of illegal immigrants by saving more lives at sea;
- increase the internal security of the EU as a whole by contributing to the prevention of cross-border crime.

A European border surveillance system (EUROSUR) should help the Member States achieve full awareness of the situation at their external borders and enhance the reaction capability of their law enforcement services. "Situational awareness" measures the capability of the authorities to detect cross-border movements and find reasoned grounds for control measures; "reaction capability" measures the lapse of time required to control any cross-border movement and the time and means necessary to react adequately to unusual circumstances.

EUROSUR would provide the common technical framework required to rationalise cooperation and 24-hour communication between the Member States' authorities and foster the use of cutting-edge technologies for border surveillance. One essential operational objective must be to create an information-sharing (excluding personal data) environment among national and European systems.

- **Mid-Term of the 2001 Transport whitepaper**

The objective of an EU sustainable transport policy is that our transport systems meet society's economic, social and environmental needs. Effective transportation systems are essential to Europe's prosperity, having significant impacts on economic growth, social development and the environment. The transport industry accounts for about 7% of European GDP and for around 5% of employment in the EU. It is an important industry in its own right and makes a major contribution to the functioning of the European economy as a whole. Mobility of goods and persons is an essential component of the competitiveness of European industry and services. Finally, mobility is also an essential citizen right.

From a slow start, the European Union's transport policy has developed rapidly over the past 15 years. The objectives of EU transport policy, from the transport White Paper of 19921 via the White Paper of 20012 to today's Communication, remain valid: to help provide Europeans with efficient, effective transportation systems that:

- *offer a high level of **mobility** to people and businesses throughout the Union.* The availability of affordable and high-quality transport solutions contributes vitally to achieving the free flow of people, goods and services, to improving social and economic cohesion, and to ensuring the competitiveness of European industry.
- ***protect** the environment, ensure energy security, promote minimum labour standards for the sector and protect the passenger and the citizen*
    - Environmental pressures have increased substantially and significant health and environmental problems will persist in the future, for example, in the field of air pollution3. The promotion of a high level of protection and improvement of the quality of the environment is therefore necessary.
    - Equally, as one of the major energy *consumers transport must contribute to ensuring energy security.*
    - – In the social area, the EU policy promotes employment quality improvement and better qualifications for European transport workers.
    - – EU policy also protects European citizens as users and providers of transport services, both as consumers and in terms of their safety and, more recently, their security.
- ***innovate** in support of the first two aims of mobility and protection by increasing the efficiency and sustainability of the growing transport sector.* EU policies develop and bring to market tomorrow's innovative solutions that are energy efficient or use alternative energy sources or support mature, large intelligent transport projects, such as Galileo;
- ***connect internationally,** projecting the Union's policies to reinforce sustainable mobility, protection and innovation,* by participating in the international organisations. The role of the EU as a world leader in sustainable transport solutions, industries, equipment and services must even be better recognised.

These objectives put the Union's transport policy at the heart of the Lisbon agenda for growth and jobs. As this Communication shows, they are also longer-term in nature, balancing the imperatives of economic growth, social welfare and environmental protection in all policy choices.4

The internal market has already brought benefits to the road and aviation sectors and this is expected to be the case also for rail and waterborne transport in the future. Efficiency gains supported by EU policies will make notably rail and waterborne transport more competitive, in particular on longer routes. Mobility must be disconnected from its negative side effects using a broad range of policy tools. Therefore, the future policy will have to optimise each mode's own potential to meet the objectives of clean and efficient transport systems. The potential for technology to make transport more environmentally friendly must be enhanced,

in particular in relation to greenhouse gas emissions. A number of major infrastructure projects will help to alleviate environmental pressure on specific corridors. Shifts to more environmentally friendly modes must be achieved where appropriate, especially on long distance, in urban areas and on congested corridors. At the same time each transport mode must be optimised. All modes must become more environmentally friendly, safe and energy efficient. Finally, co-modality, i.e. the efficient use of different modes on their own and in combination, will result in an optimal and sustainable utilisation of resources. This approach is fully in line with the conclusions of the European Council of 16/06/2006 and the renewed Sustainable Development strategy, in particular its chapter on transport.