



FRAMEWORK PROGRAMME 7
THEME: 7
Transport (including aeronautics)

AIMS

Advanced Impacts evaluation Methodology for
innovative freight transport Solutions

Grant Agreement No. 213342

FINAL PUBLISHABLE SUMMARY REPORT

Submission date	15.11.2010
Start date of the project	01. Sept. 2008
Duration	23 months
Responsible Partner	PTV with contribution of all participants

PROJECT FINAL REPORT

“FINAL PUBLISHABLE SUMMARY REPORT”

Grant Agreement number: 213342

Project acronym: AIMS

Project title: ADVANCED IMPACTS EVALUATION METHODOLOGY FOR INNOVATIVE FREIGHT TRANSPORT SOLUTIONS

Funding Scheme: Coordination and Support Action – Support – CSA SA

Date of latest version of Annex I against which the assessment will be made: 31.12.2010

Period covered: from 01.09.2008 to 31.07.2010

Name, title and organisation of the scientific representative of the project's coordinator:

Marcel Huschebeck, PTV AG

Tel: +49-721-9651-178

Fax: +49-721-9651-199

E-mail: marcel.huschebeck@ptv.de

Project website address: www.aims-project.net

Content

FIGURES.....	5
TABLES	5
EXECUTIVE SUMMARY	6
1 CONCEPT AND PROJECT OBJECTIVES.....	7
1.1 Approach and methodology – about TST	8
1.1.1 Definitions	8
1.1.2 Overall approach.....	8
1.2 TST practical framework	8
1.2.1 Process.....	8
1.2.2 Tools	9
1.2.3 Tasks	9
1.3 TST application in AIMS.....	12
1.4 Workplan and structure	15
1.5 List of Deliverables	18
2 RESULTS AND FINDINGS.....	19
2.1 Analyses overview.....	19
2.1.1 Past experiences evaluation.....	19
2.1.2 Diagnosis of the current situation	20
2.1.3 Assumptions on the future.....	22
2.2 Past experiences evaluation (WP2)	22
2.3 Diagnosis of the present (WP3).....	22
2.3.1 Summary results	23
2.4 Assumptions on the future (WP4).....	24
3 CONCLUSIONS AND RECOMMENDATIONS (WP5).....	25
3.1 Air mode	25
3.1.1 Conclusions from the project analyses	25
3.1.2 Conclusions by the air-mode expert	27
3.2 Inland waterway	27
3.2.1 Conclusions from the project analyses	27
3.2.2 Conclusions by the inland waterway expert.....	30
3.3 Intermodal	32
3.3.1 Conclusions from the project analyses	32
3.3.2 Conclusions by the intermodal expert.....	33
3.4 Maritime mode summary	34
3.5 Rail mode	37
3.5.1 Conclusions from the project analyses	37
3.5.2 Conclusions by the Rail mode expert	39
3.6 Road Mode.....	40
3.6.1 Conclusions from the project analyses	40

3.6.2	<i>Conclusions by the road mode expert</i>	42
4	GUIDELINES FOR IMPLEMENTATION ON EUROPEAN FP LEVEL	44
4.1	Research, development and innovation in future EU freight transport	44
4.1.1	<i>Research process, RDI levels of maturity</i>	44
4.1.2	<i>RDI as a key component of the EU freight transport strategy</i>	46
4.1.3	<i>The FP activities as a part of the innovation process</i>	50
4.1.4	<i>A framework for the innovation process</i>	52
4.1.5	<i>Recommendations for implementation</i>	54
5	GUIDELINES FOR IMPLEMENTATION ON PROJECT LEVEL	55
5.1	Project genesis.....	55
5.2	Project realisation.....	57
5.3	Project finalisation and follow-up	59
6	GUIDELINES AND METHODOLOGY FOR ASSESSMENT ON PROJECT LEVEL	60
6.1	Assessment grid.....	62
6.1.1	<i>Genesis</i>	62
6.1.2	<i>Realisation</i>	64
6.1.3	<i>Afterwards</i>	67
6.2	Performance Targets to assess relevance of RTD projects	70
7	CONCLUSIONS	75
8	MANAGEMENT ASPECTS	76
8.1	Consortium.....	76
8.2	Beneficiaries.....	76
8.2.1	<i>Planung Transport Verkehr AG</i>	76
8.2.2	<i>Centre d'Etudes Techniques Maritimes Et Fluviales</i>	77
8.2.3	<i>TL & Associés</i>	77
8.2.4	<i>International Consulting Environnement Services</i>	78
8.2.5	<i>Közlekedestudományi intézet kht. (Institute for Transport Sciences)</i>	79
8.2.6	<i>Institute of Ship Operation, Sea Transport and Simulation, Hamburg University of Technology</i>	79
8.2.7	<i>IVT / ETH Zurich</i>	80
8.2.8	<i>Centre de recherche public Henri Tudor</i>	80
8.2.9	<i>Universite Libre de Bruxelles, Unit QALINC@</i>	81
8.3	Partners – contact persons	82
8.4	Associated group.....	84

Figures

Figure 1: TST basic diagram	9
Figure 2: TST Practical Framework	11
Figure 3: Survey framework for analysis of the offer	13
Figure 4: IWW RDI Project RISING TST diagram	14
Figure 5: IWW mode TST diagram	14
Figure 6: Structure of work packages	17
Figure 7: RDI process, 1st level of maturity	44
Figure 8: RDI process, 2nd level of maturity	44
Figure 9: RDI process, 3rd level of maturity	45
Figure 10: Integrated approach	47
Figure 11: Push project.....	53
Figure 12: Pull project.....	53
Figure 13: The whirlwind model.....	53
Figure 14: Ideal framework of FP activities.....	54
Figure 15: Overall process for innovation implementation	60

Tables

Table 1: List of Deliverables	18
Table 2: FP5/6 Projects selection and analyses	19
Table 3: FP7 Projects selection and analyses (offer side)	20
Table 4: Interviews realised with stakeholders (demand side).....	21
Table 5: Level of maturity of EU research process	46
Table 6: Classification of expected impacts.....	50
Table 7: Criteria to assess innovation processes	55
Table 8: Evaluation grid – EU Transport System RDI project (genesis)	62
Table 9: Evaluation grid – EU Transport System RDI project (realisation)	64
Table 10: Evaluation grid – EU Transport System RDI project (afterwards)	67

Executive Summary

This document is the Final publishable summary report of the AIMS Coordination Action according to the EC Final report template. It describes in a condensed way the project objective, the scientific background and approach for the analyses, the key conclusions from the transport modes and the final version of methodology respectively assessment grid for evaluation. AIMS workplan has been set up in 6 different work packages. The main research activities in the transport modes were mainly conducted in WP2 and WP3. Within the WP2 “past experiences evaluation” the analyses referred to 30 FP5/6 projects in the different modes. Data collection was processed in two main different ways: 1) Personal interviews with project participants/coordinators 2) General E-Mail survey. The personal interviews turned out to be very useful for the evaluation based on a mode specific questionnaire. The general E-Mail survey (to a large number of projects in the FPs) could not generate sufficient information and data for the AIMS analyses as the response rates in almost all modes were rather low. The application of the TST approach in the modes was made using mind-map diagrams. These structured the different aspects in the Techniques – Society and Territory dimensions. From these experiences important statements could be collected in several modes regarding the needs of stakeholder involvement, consideration of user requirements and fostering the implementation and realisation of innovative research results. In frame of the WP2 “diagnosis of the present” 15 FP7 projects were evaluated analysing the offer and demand side of transport research in EU. Naturally the data availability of such running projects can be considered as low depending on the dissemination level of the reports and the willingness of participants and coordinators to communicate about intermediate status of the projects. For the demand side detailed interviews with 43 stakeholders from industry were conducted. At a glance the FP5/6 and also FP7 initiatives seem to meet the market needs; however there is still a lack of planned post-project activities for a further implementation process. Expectations of stakeholders on the future development of FPs have been collected in WP4 “Assumptions on the future” considering available visions for future transport systems in general and concerning different modes. Apart from the general vision of a sustainable, effective, reliable and safe transport system some key issues for future developments in the modes can be derived. For example in Rail mode education is a key issue. Main question should be answered how to get qualified employees in Rail transport in the next 5 to 10 years (which is also an issue for Road mode). Barriers and limitations of RDI management are outlined suggesting a framework for RDI implementation. Research itself cannot solve the market needs alone; it should be accompanied by other complementary measures in the fields of standardization, legislation as well as training and education. Recommendations for implementation on project level are related to the different phases of project lifetime cycle (genesis, realisation, follow-up) and can be differentiated between EC-side and the beneficiaries. D5.1 developed specific performance indicators for each project phase to assess the relevance and problem solving impact of RDI projects. In the project implementation phase indicators like stability of consortium, consideration of existing technologies, commercialisation and standardization issues are to be evaluated. A specific care should be given to key enabling factors for further transport market harmonization.

1 Concept and project objectives

Freight transport is a key element for the economy, raising various environmental, social, security or safety issues that are severely increasing, also in the future. Innovation is a key bridging both streams. High public investments in freight transport RTD (Research and technology development) are made; however, various RTD projects have never passed the commercialization threshold.

Main objective of AIMS is therefore to maximise the success of public or private investments in freight transport RTD. Guidelines for current and future FP7 projects are produced and recommendations for the definition of new research policy objectives are being provided. The results of AIMS should contribute to creating better chances for commercialization of research activities and to lead towards innovative and future leading research foci.

The ambition of this support action requires an approach that can handle the complexity and transversal aspects of innovation in the freight transport system. As well known, the success of innovations is by far not only a question of techniques or technologies. Many non-technological (social, economic, legislative...) factors have a strong influence. Time is also of major importance: what was valid yesterday might be not in the future.

To take into account all these indirect but crucial factors, AIMS is relying on an innovative approach combining a systemic approach and a socio-economic approach: the TST approach (for Techniques, Society and Territories). It permits a coherent grasping of the real impacts that shall be analysed further on, per innovation and axis of RTD envisaged. It allows to highlight both the advantages and disadvantages or difficulties in implementing innovative concepts when faced with the current market situation and the rigidities of society.

AIMS applied this innovative approach to develop a methodology to assess and evaluate research projects related to freight transport in the different transport modes (namely air, inland waterway, maritime, rail, road and also intermodal).

The project analyses have been structured in 6 Work packages. Core research focused on past experiences evaluation of FP5/6 projects (WP2) the diagnosis of the present regarding FP7 projects and assumptions on the future considering available visions for future transport systems in Europe (WP4). The analyses have been performed by high level research institutions for different transport modes and were accompanied by experiences experts.

1.1 Approach and methodology – about TST

1.1.1 Definitions

The success of innovations is not only a question of techniques or technologies. Many non-technological (social, economic, legislative...) factors have a strong influence. To consider all these indirect but crucial factors, AIMS combines:

- A socio-economic approach understood in the North-American meaning: “A global approach of the economic behaviour of our society, which offers an interdisciplinary perspective of the economic problems and completes a purely economic analysis with elements coming from other disciplines”¹ (Beat BÜRGENMEIER). The time factor is crucial: the socio-economy has to prepare the future and in particular new organisations due to new techniques (taken in the widest sense) and/or technologies improvement and implementation.
- A systemic approach referring to the definition of the De Rosnay System2: “A system is composed of a set of elements interrelated in such a way that if one of these elements fails, the whole system becomes dysfunctional”. This implies to model each element in terms of interaction with its environment.

1.1.2 Overall approach

A system is defined as the interrelations of three sub systems: the society (individuals / organisations), the techniques (design, operation, finance and economy...), and the territory (node / link). The situation of the system depends on the considered moment. As a consequence, time is addressed as a crucial criterion by a diachronic and a prospective analysis. Face to a demand, the society uses techniques in a broad sense (not simply technologies, but also administrative frameworks, financial standards...) within a given territory having geographical, geopolitical, cultural, ideological, religious characteristics to propose an offer. To minimise the risks of research, offer and demand must be put in adequacy, i.e. constraints and obstacles identified and solutions suggested. Analyses have to be made iteratively at macro (the whole system) and micro (a subsystem element) levels. Time is addressed globally, considering the past so as to understand the present and build an adequate future, at short, medium and long terms. It is therefore a question, at any given time within the lifespan of this Coordination Action, of combining “who” (the society), “with what” (techniques) and “where” (the territory) and thus ensuring that the “offer” (the innovation) is actually a response to a “demand” and minimize the risks of research and associated investments (public and private). This is the TST approach for “Techniques – Society – Territory”.

1.2 TST practical framework

1.2.1 Process

The TST process is structured around the following activities:

¹ Socio Economy, Economica, 1994

² Le Macrocosome, PUF, Paris, 1975

- Data collection:
 - Desktop research, analyses of available documents
 - Interview of actors using a TST tool (*the questionnaire*); complements may be further obtained through phone calls, emails...
 - Survey and workshop
- Data processing:
 - Organisation under a TST tool (*the model*)
 - Analysis and reporting (report, communication document)
- Assessment and validation by concerned actors and experts

1.2.2 Tools

Different tools are associated to the TST approach; first is the model representing the interrelations inside or between sub-system(s). It allows organising knowledge in a synthetic and visual way. It allows a dynamic approach, integrating the time factor, by opposition to a static approach, only judging of the present situation. At last, it contributes to the exhaustiveness of analyses. It is symbolised on the simplified diagram below: the three blocks represent the three systems. The arrows represent the relationships existing between the systems or in the breast of a single system.

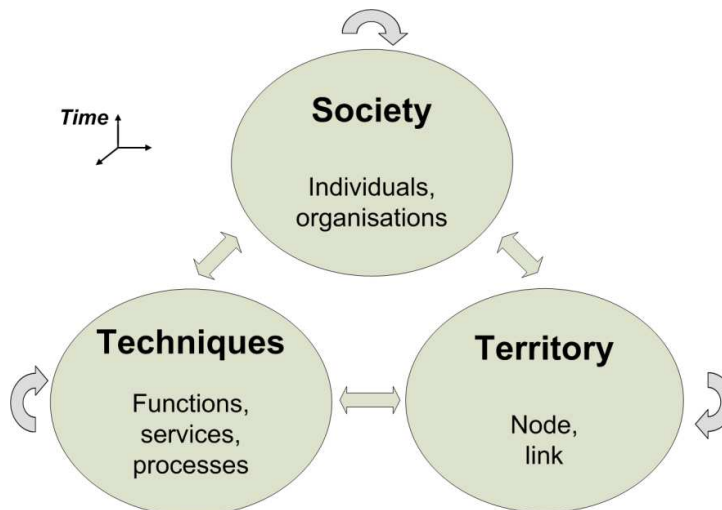


Figure 1: TST basic diagram

The model is used to build the second tool, dear to sociologists: a semi-directive questionnaire aiming to serve as a framework for the interview. It is structured in three parts respectively addressing the past, the present, and the future. The questions cover the different relations between actors, techniques and territory.

1.2.3 Tasks

Data collection

The data collection process has followed a two-layer approach combining a literature review to an interview process.

Data are collected through reading of available official and non official documents. This is useful for a first contact and serves for analyses at a general level.

Interviews allow to receive the points of view of each actor and to characterize each interrelation she/he is concerned with. The interviewed actors bring a unitary and personal vision of the projects through their anecdotes. This implies to:

- Build the panel of actors to be interviewed;
- Elaborate a general questionnaire and adapt it to actors' typology;
- Issue interview guidelines (objective, context and topics to be addressed);
- Contact the actor, transmit the guidelines and organise the interview;
- Realise the interview (2-3 h, 50 questions); record it, if approved, is valuable enabling to use special quote of the interviewee;
- Write the minutes of interview and transmit it to the interviewee for validation.

Survey allows obtaining generic information. It concerns to build the survey panel, elaborate the questionnaire, realise the survey (email, mail), and aggregate results.

The different interrelations are characterized using data obtained during interviews:

- *Criteria* are associated to interrelations allowing to judge of their realisation
- *Expected levels* and *flexibility ranges* are given to each criterion
- Criteria have relative importance: each is given a *flexibility class* representing its potential to be negotiated between actors concerned with the interrelation.

These parameters specify the interrelations; their evolutions influence its realisation.

Analysis

Elaborating a TST model consists in:

- Pinpointing concerned actors, techniques, territories in function of time;
- Defining, formulating and formalising interrelations between each sub-system;
- Identifying missing actors, techniques, territories and interrelations.

Analyses are undertaken based on information gathered through the TST models. Reporting activities synthesizes analyses results under the form of reports and communication documents.

Synthesis

Results are presented during a workshop for validation. Participants' point of view and anecdotes allow supporting, confirming or opposing the presented assumptions.

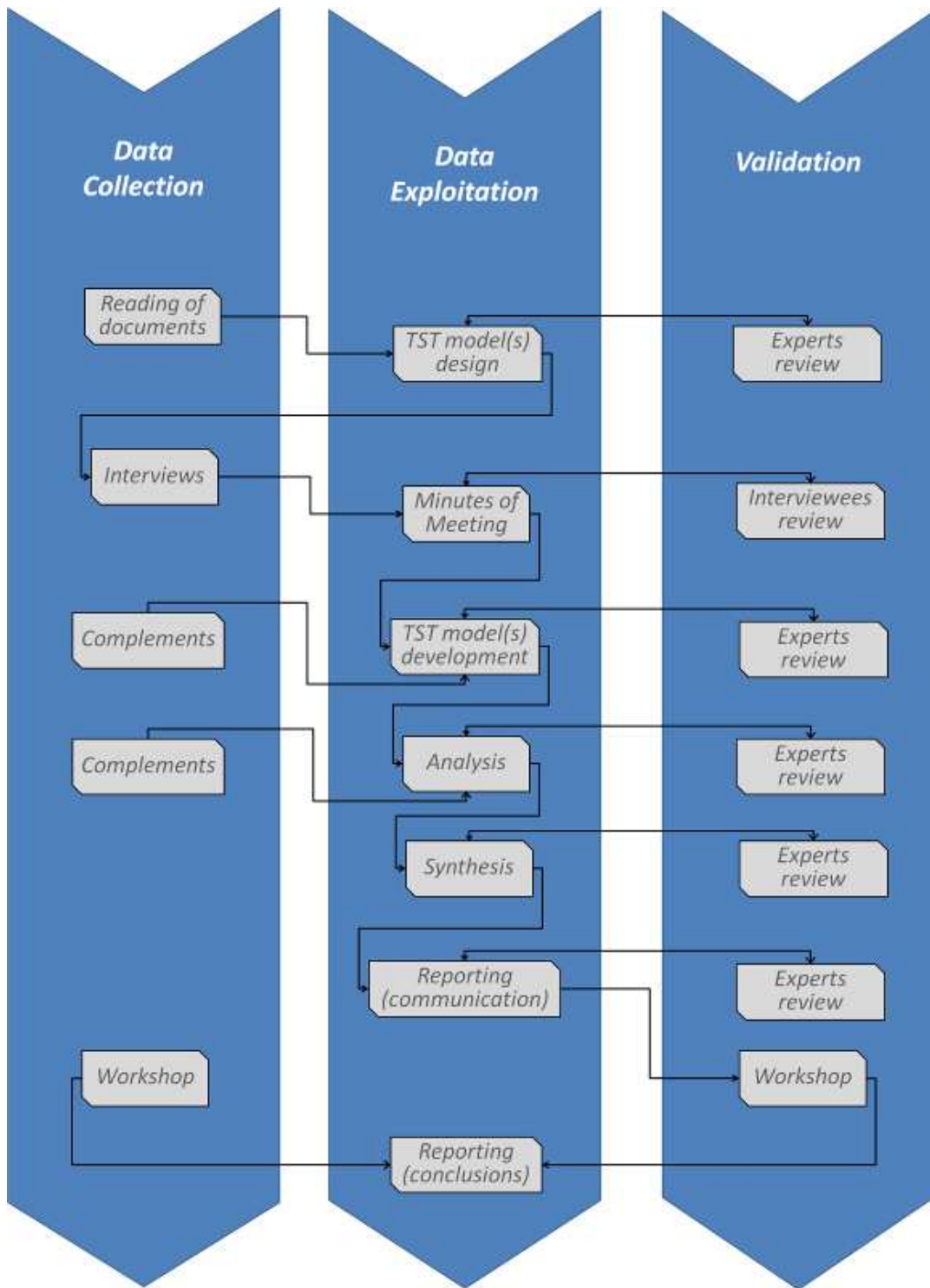


Figure 2: TST Practical Framework

1.3 TST application in AIMS

Stage 1: data collection

The data collection process has followed a two-layer approach. A literature review has been realised (academic / classical / inductive approach), which has brought general/representative information (“macro” vision). In parallel, an interview process has been undertaken (deductive approach), bringing local / specific data (“micro” vision). This has allowed obtaining detailed information on the issues which were addressed; anecdotes have been collected, and actors’ points of view have been discussed in detail. The combination of these complementary approaches has allowed associating concrete case studies illustrated through professional feedback to more abstract considerations with solid basis of scientific justification.

Thus different official and non official documents have been considered for each mode of transport, for instance in relation to FP7 projects the proposal, description of work or deliverables when available, and considering the market analysis, existing studies and general documents on the transport system and market.

First task has been to select FP7 projects to be analysed and transport actors and/or market manufacturers to be interviewed. The different projects to be selected are freight transport related; it can happen that a combined approach (passenger/freight) is proposed. 2-3 projects and 5 actors have generally been selected per transport mode. This selection has been organized in three steps: screening, pre selection, integration and final selection. The project screening has been realised based on three reference points: the CORDIS web site, the DG TREN TRKC, and the IST-World. The search tools proposed for each data base (e.g. the advanced search function of the CORDIS web site) have been used with keywords (simple / multiple) adapted to each mode of transport (e.g. road, rail, inland waterways, waterborne, intermodal, freight, transport...). The screening has been completed using complementary database (e.g. the different excel files transmitted by the project coordinator and received from the EC project officer).

Actors screening has relied on partners knowledge and networks, and when needed literature research.

For the different projects obtained from the screening the following information has been gathered (when available) in order to allow the next selection task: database (where the project has been found e.g. CORDIS, TRKC, IST), program (under which the project has been funded), name and acronym, start date and duration (in months), objective, instrument: (IP, CSA...), budget & funding (in Euros, participants and SME (amount of SME in the project), the data availability (to judge of the availability of data for further investigation) and other elements if any e.g. partners name, roles, project structure, planned demonstrations). In order to obtain the most consistent picture (projects sets), recommendations have been given to responsible partners in relation to the projects attributes; projects have thus to: deal with different programs and instruments, present different duration; types of objectives (tangible / concrete / intangible / conceptual), and budget and funding as well as consortium size. At last, it is proposed to pay strong attention to only select projects for which data can actually be found by the partner. On this basis the final list of projects to be analysed and actors to be interviewed can be determined. This has required

integrating the different lists obtained for each mode of transport while guaranteeing the soundness of the final selection. This has first consisted to identify overlapping or redundancy between transport modes (e.g. intermodal vs. other modes), then to validate the soundness of the final list regarding the recommendations given in the previous chapter (e.g. for FP7 projects: small, medium, large budgets, funding or partnerships; different types of objectives and results; most of instruments; data actually available...). This has implied various discussions among AIMS partners and has been finalised through the validation by the whole consortium.

WP3 interviews have been realised with representatives of companies from the transport industry (e.g. operators, shippers, public authority) for the demand analysis, and with coordinator of RDI (FP7) projects and market manufacturers for the offer.

For instance questionnaires used in relation to FP7 projects have considered:

- The project genesis (idea formulation, proposal preparation and submission of, negotiation):
 - *What has been the idea at the origin of the project? Who was involved in the project genesis? What is the focus of the project?*
- The project implementation (from project start to current moment):
 - *What are the significant elements concerning the project management?*
- The project follow-up (from now to afterwards):
 - *Which project results are planned to be used after the project end?*

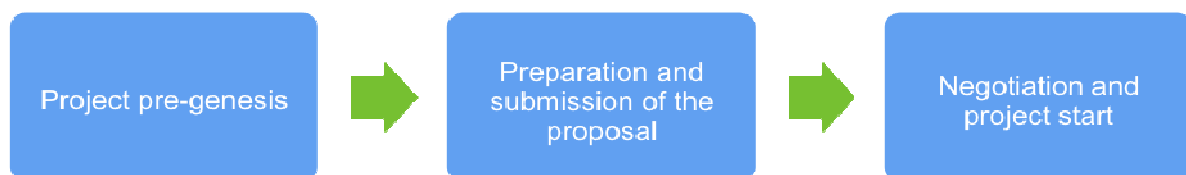


Figure 3: Survey framework for analysis of the offer

Stage 2: analysis

Data collected have then been processed for analysis. In this scope TST models have been elaborated being useful tools to aggregate large sets of (interdependent) data in a synthetic and comprehensive but exhaustive (as much as possible...) way.

Specific TST models (micro) have been designed to study in detail FP7 project or market actor case study (see figure 4), and general TST models (macro) have been built at the level of the global transport system for each mode (see figure 5).

The different interrelations have been characterized based on information obtained during the different interviews and bibliographical studies.

The TST model and results of interviews have been used to build an evaluation grid aggregating in a consistent way the criteria of evaluation of the interrelations (*please refer to deliverable IR3.1*).

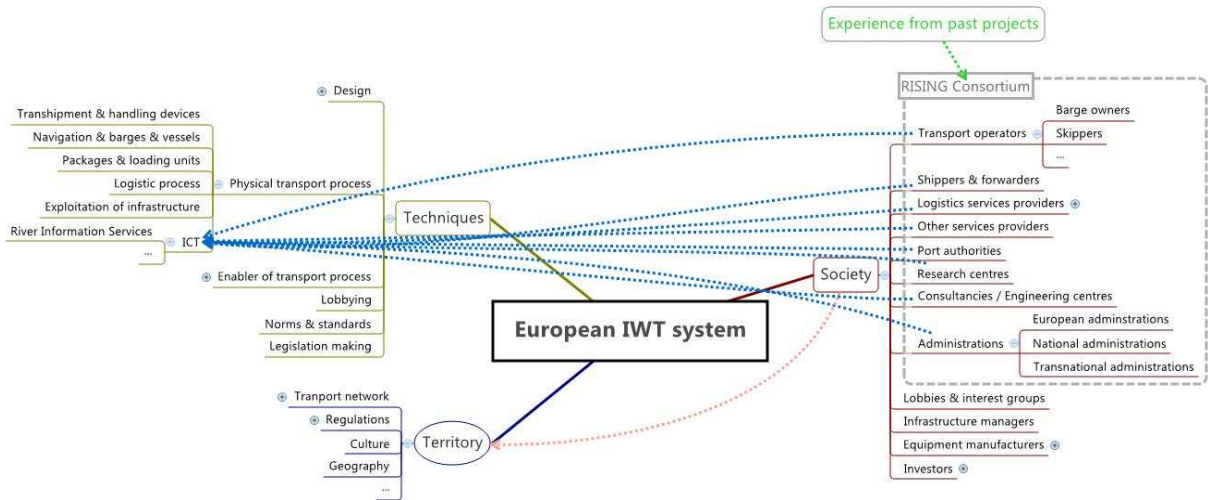


Figure 4: IWW RDI Project RISING TST diagram

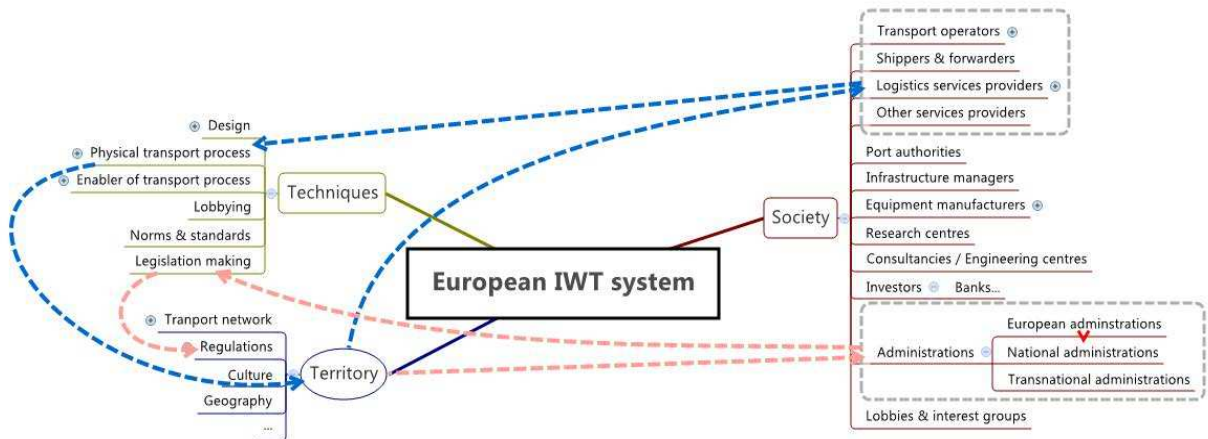


Figure 5: IWW mode TST diagram

Stage 3: synthesis

Reporting activities have been undertaken to synthesize knowledge gathered through minutes of interviews, diagnosis of the current situation, and communication documents for presentation during workshop (WS) n°2 .

WS n°2 has then been organised with aim to present, discuss and validate with concerned actors the knowledge obtained until now. AIMS project members, experts in different fields of transport modes together with a representative from the EC have met in Brussels on October 14th, 2009.

Based on interactive presentations, questions-answers sessions and round table, the WS has allowed confronting the various concerned actors to the results of analyses and discussing them. Different (sometimes divergent) viewpoints have been emitted, which initiated dialogues in-between actors and/or AIMS partners. Through their anecdotes participants have illustrated with a practical and pragmatic view the different issues addressed during the WS: EC objectives concerning AIMS, preliminary results of analyses, current project and initiatives case studies.

1.4 Workplan and structure

The workplan of the AIMS project has been divided under **six workpackages**:

- WP 1: Project Management;
- WP 2: Evaluation & Assessment of past research projects;
- WP 3: Diagnosis of the present situation;
- WP 4: Assumptions on the future;
- WP 5: Conclusions & Recommendations;
- WP 6: Dissemination;

WP 1: Project Management;

A specific WP has been dedicated to **aggregate all management activities of the project** (at the project and WP levels, regarding all co-ordinator and WP leaders management and quality assurance activities). The *WP 1 ("Project Management")* is defined with the aim to accompany and manage the project for all its duration and to allow the coordinator and WP leaders to ensure that the project and WP are carried out as planned, in respect with their pre-assigned objectives and planned schedule, and to take any required corrective actions

This WP includes:

- The overall legal, contractual, ethical, financial and administrative management;
- Overseeing the promotion of gender equality in the project;
- Obtaining audit certificates by each of the participants and any financial security such as bank guarantees when requested by EC;
- Reporting the project status;
- Providing quality follow-up.

WP 2: Evaluation & Assessment of past research projects;

The objective of this WP is to evaluate the real impacts of past transport FP5 and FP6 research projects and apprehend the reasons of their failure or success. Guidelines (methodology and associated assessment grid, best practices, key success factors) for current and future EU-funded research, development and innovation projects will be produced intending to minimise the risk of investments, in other words, to contribute to a higher commercial success rate of future EU-funded projects so that they yield prototypes adapted (and finding their way) to the market.

The analysis of the failure or success of transport research projects (in terms of technologies and organisations) will be performed with the transport business community. The analysis of project impacts (on a representative basis) will be used to evaluate the impacts of any specific instruments (STREP, IP, CA....) during a EU FP and specifically the impacts of FP5 and FP6 programs. AIMS will evaluate the positive or negative impacts of European research FP and projects in particular in the economic, social and environmental fields. Specific care will be given to depict changes operated by the different Member States and catalysed by EU research programs.

WP 3: Diagnosis of the present situation;

This WP intends to make a diagnosis on the current situation in terms of needs related to the Freight Transport System and offer (from the market and current research projects of the 7th FP).

Main dysfunctions or blocking points of the Freight Transport System will be identified. Transport actors demands will be aggregated and put into coherence. Current offer will be characterised. Notably, different FP7 projects selected by the EC will be evaluated under the project methodology and associated assessment grid defined in WP 2. AIMS grant beneficiaries will take care of feeding back the input of the work carried out in WP2 so as to define an offer/demand situation which fully reflects technological and organisational state of the art in Europe. By doing so, awareness of relevant stakeholders will be simultaneously heightened. A diagnosis will then be drawn allowing to highlight the difference between “what is” and “what is needed”. It will notably provide recommendations for the definition of intermediate FP7 performance targets. Results will then be discussed during a second workshop with the Experts, End-Users, Industries, Public Authorities and Technology Platforms & Advisory Councils groups for validation.

WP4: Assumptions on the future

This WP aims to issue recommendations to be used in the scope of the definition of **new research policy objectives**. This will first require to examine:

- Transport professional organisations and actors visions of the future and orientations (e.g. regarding environmental issues);
- Research side orientations;
- Technology platforms and advisory councils visions and research agendas so as to identify waited innovations of the different transport modes;
- Public authorities plan for the future (e.g. land planning).

Based on these first results, scenarios describing “the” future of the Freight Transport System and recommendations for the definition of new transport research policy objectives will be issued. This WP will be based on FP5 and FP6 evaluation outcomes and on the SRAs of the relevant Technology Platforms thus allowing the ex-ante evaluation of their consistency and their expected impacts. Results obtained will be submitted back to the European Commission in the attempt of enhancing coherence.

WP5: Conclusions and recommendations

This WP aims at concluding the project and giving final recommendations, addressed to the wide community of concerned actors, being research organisations, industries, transport actors, public authorities, EC, universities etc..

Final guidelines will be produced toward transport actors with the aim to address the **implementation of innovative technologies and associated organisations through EU-funded projects** in the Freight Transport System (investments, transition period management, and communication). In parallel, final guidelines for public authorities, private / public research groups and industries will be issued. At last, a final assessment will be provided.

This WP will contribute to enhance innovation management capacity by concerned actors (including policy-makers) and to promote the culture of change.

WP6: Dissemination

Dissemination activities have been planned throughout the support action and concern:

- Organisations of meetings, workshops and final conference;
- Diffusion of public documents, project leaflet and reports by mail, email and other support (CD Rom, paper, ...);
- Publications of articles in professional magazines and of a book;
- Elaboration and pro-active publicising of a dedicated Web site;
- Contribution to EC clustering activities (related to topic TPT2007.6);
- Participation to seminars and conferences.

Specific care has been given to ensure all along the project a “two-way” communication between AIMS team and transport community so as to get their reactions and feedback (through the web site, workshops ...).

The structured workplan can be seen in the following picture:

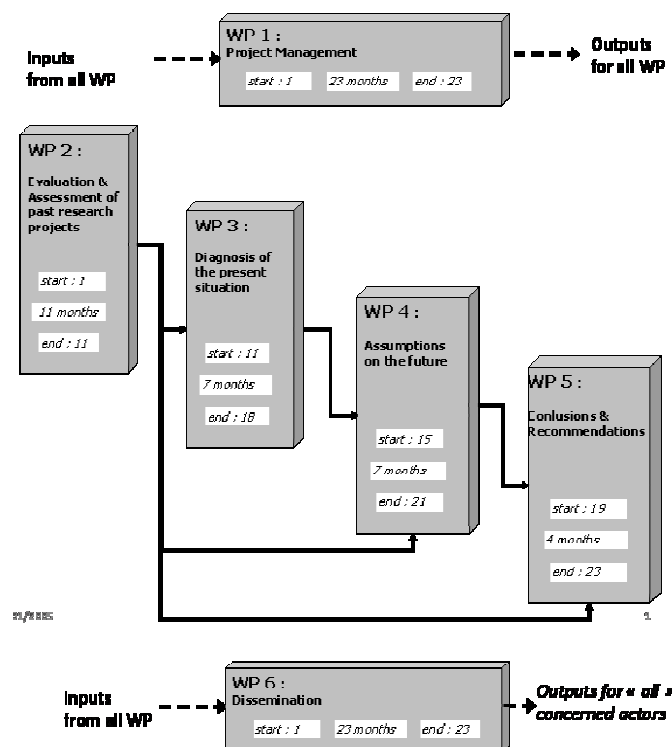


Figure 6: Structure of work packages

1.5 List of Deliverables

The following deliverables/ reports were produced in frame of the AIMS project:

Table 1: List of Deliverables

Deliverable No	Deliverable name	WP Nr.	Lead benef.	Delivery date
D1.1	Project Management Handbook	1	PTV	T2
D2.1	Past experiences evaluation and assessment & key success factors definition	2	TLA	T11
IR 2.1	First version of the methodology	2	ICES	T11
D3.1	Diagnosis of the current situation based on market offers and transport demands analysis	3	TLA	T18
IR 3.1	Second version of the methodology	3	ICES	T18
D4.1	Analysis of the different visions of the future and recommendations for the definition of new research policy objectives for transport	4	TLA	T21
IR 4.1	Third version of the methodology	4	ICES	T21
D5.1	Guidelines for implementation	5	TLA	T23
D5.2	Final assessment (including final version of the methodology)	5	TLA	T23
D6.1	Dissemination Plan	6	PTV	T2
D6.2	AIMS final handbook	6	PTV	T23

2 Results and findings

2.1 Analyses overview

On the basis of the guidelines for application of TST the data collection, analyses and interviews have been conducted regarding the different projects in the modes. Following sections show an overview about the analyses performed in the transport modes for FP5/6 projects (WP2 – Past experiences evaluation) and FP7 (WP3 - Diagnosis of the current situation). The analyses have been carried out using desktop research, general e-Mail survey per mode and face to face interviews.

2.1.1 Past experiences evaluation

Referring to the selection process of FP5/6 projects the following table shows an overview about the analysed projects, their key data and data availability:

Detailed results of the analyses can be found in Deliverable D2.1.

Table 2: FP5/6 Projects selection and analyses

FP	Program	Instrument	Mode	Acronym	Duration	Start	Participants	Data availability	Comment	Interview
5	GROWTH - KA4	SAS	Air	AIR FREIGHT CONTAINER	24	01.04.2001	9	sufficient		no
5	GROWTH - KA2	CSC	Air	CO-ACT	27	01.01.2002	25	sufficient	project cancelled in 2003 by EC	yes
5	GROWTH - KA2	Air	OPAL		21	01.05.2000	16	high	interviewee mentioned poor project results	yes
6	FP6 AERO 1.2	SSA	Air	VEATAL	18	01.10.2006	4	high		yes
5	GROWTH - KA2	CSC	Air	Sourdine II	36	13.11.2001	8	high	very good results mentioned	yes
5	GROWTH	CSC	Inland Waterway	ALSO DANUBE	37	05.01.2000	28	high		yes
5	GROWTH	CSC	Inland Waterway	COMPRIS	36	01.09.2002	44	high		yes
5	GROWTH	TN	Inland Waterway	REALISE	36	01.10.2002	26	high		no
5	GROWTH	CSC	Inland Waterway	PACSCAT	33	01.11.2002	14	sufficient		no
6	FP6-SUSTDEV	STREP	Inland Waterway	CREATING	36	01.06.2004	26	sufficient		yes
5	GROWTH	CSC	Intermodal	INHOTRA	36	01.05.2000	10	sufficient		yes
6	FP6-SUSTDEV	STREP	Intermodal	TRIMOTRANS	36	01.10.2005	11	low		no
6	FP6-SUSTDEV	SSA	Intermodal	INTERMODE-TRANS	19	01.11.2004	4	high		yes
5	GROWTH	TN	Intermodal	EUTP II	48	01.04.2000	11	sufficient		yes
5	IST	CSC	Intermodal	GIFTS	36	01.09.2001	6	sufficient		yes
5	GROWTH	CSC	Maritime	INTERMODESHIP	36	09.01.2002	18	high		yes
5	GROWTH	AM	Maritime	MARQUAL	15	07.01.2003	8	high		yes
6	SUSTDEV-2002	IP	Maritime	MARNIS	48	11.04.2004	50	sufficient		no
6	SUSTDEV-2002	CA	Maritime	MOSES	36	01.06.2007	41	sufficient	project cancelled in 2009 by EC	yes
6	SUSTDEV-2002	SSA	Maritime	EUROMAR-BRIDGES	18	12.01.2006	10	sufficient		no
5	GROWTH	TN	Rail	ProMain	48	01.01.2000	22	high		yes
6	SUSTDEV 2	CA	Rail	NEW OPERA	42	01.01.2005	25	high		yes
6	SUSTDEV 3	STREP	Rail	INFRACLEAR			6	none	amendment process running	no
6	SUSTDEV 3	IP	Rail	INTEGRAIL	48	01.01.2005	39	high		yes
6	SUSTDEV 3	STREP	Rail	ISTU	35	01.11.2003	6	high		yes
5	GROWTH	TN	Road	RISER	36	21.12.2002	10	sufficient		yes
5	GROWTH	TN	Road	ROSEBUD	36	01.10.2002	14	high		yes
6	FP6-SUSTDEV	IP	Road	GREEN	36	01.03.2005	29	sufficient		yes
6	FP6-SUSTDEV	STREP	Road	INTRO	36	01.03.2005	10	sufficient		yes
6	FP6-SUSTDEV	STREP	Road	FIDEUS	36	01.05.2005	13	sufficient		no

All in all 29 personal interviews could be conducted with project coordinators and/ or partners. In specific cases the data availability was very low and no responsible person could be interviewed. The interviews have been conducted on the basis of a standardized questionnaire which has been adapted to the different transport modes. Duration of the interviews was between 1.5 and 4 hours max. Data availability is considered as high when additional material besides final report and fact sheets were available, a productive interview could be conducted and/ or the project website contains all project results meant for the public. Sufficient availability is given when the core documents (reports) are available plus further information by the project

coordinator/ partner. Low data availability means that only very few information could be found and no interview could be conducted.

2.1.2 Diagnosis of the current situation

As WP3 aimed at assessing the compliance between existing needs (of operators, authorities and the Society as a whole) and available offer (from the market and current FP7 research projects i.e. funded in the 7th Framework Program), several FP7 projects in the transport modes as well as market case studies have been scrutinized applying the TST approach and associated analysis process. In that scope, extensive desk researches and interviews process have been undertaken. TST models have been built and used to pinpoint key factors to be addressed to improve European research, development and innovation for the Transport Industry, more particularly maximize chances for RDI success (i.e. implementation and endorsement by business parties). For the analyses of the offer side around two projects per mode have been selected:

Table 3: FP7 Projects selection and analyses (offer side)

Program	Instrument	Mode	Acronym	Duration	Start	Participants	Data availability
AAT-2007-5.1-01	SA	Air	FLY-BAG	24	01.12.2008	8	low
SEC-2007-2.3-04	Coll. P.	Air	IDETECT-4-ALL	30	01.07.2008	10	sufficient
AAT-2007-4.3-03	Coll. P.	Air	AAS	36	01.05.2008	12	low
SST-2007-2-2-2	CSA	Inland Waterway	PLATINA	48	06.02.2008	22	sufficient
SST-2007.2.2-02	Coll. P.	Inland Waterway	RISING	36	01.02.2009	23	sufficient
SST-2007-2.1-02	Coll. P.	Intermodal	BE LOGIC	30	01.09.2008	9	low
SST2007-2.1-01	CA	Intermodal	EIRAC II	30	01.06.2008	4	low
SST-2007-2.1-03	IP	Intermodal	SMART CM	36	01.08.2008	30	sufficient
SST-2007-2.1-03	IP	Intermodal	INTEGRITY	36	01.06.2008	16	sufficient
SST-2007-6.0-05	SA	Maritime	MARPOS	36	09.01.2002	6	low
SST-2007-1.1-04	IP	Maritime	POSE2IDON	48	01.01.2009	31	low
SST-2007-6.0-03	SA	Rail	FUTURAIL	18	01.01.2009	5	low
SST-2007-2.5-02	IP	Rail	INESS	36	10.01.2010	30	low
SST-2007.2.1-04	SSA	Road	FREIGHTVISION	18	01.09.2008	13	low
SST-2007-1.1-02	STREP	Road	EE-VERT	36	01.01.2009	9	low

In most of the cases the data availability was too low for detailed analyses. Running projects cannot be assessed whether they are successful, only if they are in line with their own planning and the FP objectives.

The analyses of the existing demand in freight transport research have been made through several interviews with stakeholders from different sectors. 43 interviews could be realised, the results out of these various perspectives were of highest value for the elaboration of AIMS guidelines and recommendations.

Table 4: Interviews realised with stakeholders (demand side)

Company	Sector	Mode
Iberia Cargo	Mixed cargo carrier	Air
INECO	Consultancy	Air
AENA - Clasa	Public Airport	Air
Zaragoza Airport	Public Airport	Air
TNT	Integrator	Air
DHL	Integrator	Air
Cargolux	Full cargo carrier	Air
Luxair Cargo	Handling Agent	Air
Administration de la Navigation Aérienne	Public Institution	Air
Luxembourg Customs	Public Institution	Air
Panalpina	Forwarder	Air
Westair	Airline	Air
International Air Transport Association	International Association	Air
EFIP	Federation	Inland waterway
ECT Rotterdam	Terminal operator	Inland waterway
Port of Lille	Port	Inland waterway
MARFRET	Services operator	Inland waterway
GICAN	Organization, group	Inland waterway
Hesse Noord Natie	Operator	Intermodal
Kuehne & Nagel	Operator	Intermodal
DHL Global Forwarding	Operator	Intermodal
ECT Delta Terminal	Operator	Intermodal
Decete – Duisburger Container Terminal Gesellschaft	Operator	Intermodal
European Intermodal Association	Professional Association	Intermodal
Union International des sociétés de transport Combiné Rail-Route	Professional Association	Intermodal
European Committee for Standardization	Standardization committee	Intermodal
Intermodal concepts and management	Professional Association	Intermodal
BP2S	Short Sea Shipping	Maritime
ESPO	Sea Port representation	Maritime
CESA	Shipping Lines	Maritime
CMA CGM	Container shipping	Maritime
Neptune	Roro	Maritime
SBB Cargo	Freight railways	Rail
RhB Cargo	Freight railways	Rail
Mosolf Automotive Railway	Freight railways	Rail
DHL Switzerland	Forwarder	Rail
Joseph Meyer	Rolling stock manufacturer	Rail
ABC Consulting	Rail transportation consultancy	Rail
BILK Budapest Logistics Centre	Kombiterminal	Road
PANLOG Logistics Cluster	association	Road
Hungarian Post	State owned post office	Road
DHL Hungary	Forwarder, express	Road
Waberer's group	Forwarder, Logistic service	Road

It has to be noted that the vast majority of this survey has been made via face-to-face interviews, mostly at the offices of the stakeholders throughout Europe. Only in very few cases where timeframe for scheduling a meeting was too tight, a conference call has been organized (telephone interview).

2.1.3 Assumptions on the future

In frame of the work of WP4 the objective was to give recommendations to be used in the scope of the definition of new research policy objectives.

- Therefore several future related perspectives, visions and strategies from different stakeholders have been examined.
- Transport professional organisations and actors visions of the future and orientations (e.g. regarding environmental issues);
- Research side orientations (e.g. topics to be addressed);
- Technology Platforms (TPs) and Advisory Councils (ACs) visions and strategic research agendas (SRA), highlighting innovations planned for the different transport modes;
- Public authorities plan for the future (e.g. transport network planning).

The TST application in WP4 has been done through 3 stages; data collection, data analyses and synthesis. Based on knowledge obtained, scenarios describing “the” future of the Freight Transport System and recommendations for the definition of new transport research policy objectives have been issued.

WP4 is based on knowledge derived from deliverables D2.1 and D3.1 (notably WP3 interviews) and from the SRAs of the TPs and ACs thus allowing the ex-ante study of their consistency and expected impacts.

2.2 Past experiences evaluation (WP2)

TLA was leader of the WP2 (“Evaluation & Assessment of past research projects”). TLA has been assisted by PTV and ICES in the scope of the activities of the AIMS Secretariat (that is regarding methodological and formal aspects). Main participants were the members of the Researchers group, each one being in charge of the analyses for a specific transport mode: ETH for the rail, KTI for the road, TUDOR for the air, CETMEF for the inland waterways, ISSUS for the maritime and ULB for the intermodal. Researchers have been assisted by their dedicated experts who have given their comments regarding the work progress and contribution to deliverable D2.1.

WP2 was intending to evaluate the impacts of past transport FP5 and FP6 projects and apprehend the reasons of their failure or success so as to produce guidelines aiming to maximize the chance of success of current and future EU-funded projects.

2.3 Diagnosis of the present (WP3)

This WP intended to make a diagnosis on the current situation in terms of needs related to the Freight Transport System and offer (from the market and current research projects of the 7th FP).

Main dysfunctions or blocking points of the Freight Transport System were identified. Transport actors demands were aggregated and put into coherence. Current offer were characterised. Notably, different FP7 projects selected by the EC were evaluated under the project methodology and associated assessment grid defined in WP 2. AIMS grant beneficiaries took care of feeding back the input of the work

carried out in WP2 so as to define an offer/demand situation which fully reflects technological and organisational state of the art in Europe. By doing so, awareness of relevant stakeholders were simultaneously heightened. A diagnosis was then drawn allowing to highlight the difference between “what is” and “what is needed”. It provided notably recommendations for the definition of intermediate FP7 performance targets. Results were then discussed during a second workshop with the Experts, End-Users, Industries, Public Authorities and Technology Platforms & Advisory Councils groups for validation.

2.3.1 Summary results

The conclusions for the different analyses regarding past, present and the future have to be differentiated. Concerning the FP5/6 project evaluation it can be concluded that the actors of the selected projects have all expressed that the framework programmes have a positive impact in the transport field, despite some malfunctioning. The actors have highlighted that these Framework Programmes give the opportunity to collaborate with knowledgeable partners and create networks. These networks are beneficial in order to move forward the research. The European Research Framework Programme is undoubtedly an essential tool. Maintaining its pertinence and raising continuously its quality level and efficiency is critical to the achievement of the European Transport Policy Objectives.

Looking at the work process of data gathering it can be concluded that for a qualified and detailed analyses the appropriate data and information are in most of the cases not or not sufficient available. Even in some cases the minimum required information for a short evaluation is not available.

WP3 “Diagnosis of the present” revealed that RDI demand from actors comes from various factors and is mainly shaped by evolutions in legislation and policy (e.g. respect of environment, security). Further drivers are the economic situation and RDI initiatives aiming at optimizing the concerned transport operations, improving its image or enhancing its integration into logistic chains.

Specific characteristics of the transport systems in Europe are affecting the competitiveness in the different modes. In some modes there is lack of innovation-friendly environment. Therefore the implementation of enablers seems essential, aiming notably at harmonizing transport market regulations throughout the different Member States.

Comparing to FP5/6 the research initiatives in FP7 are closer to the market demand than before. This demand is generally covered either by the FP7 activities or by the market. But other aspects are lacking. The project lifecycle perspective should be introduced, the proposed whirlwind model applied and performance indicators for project evaluation developed. The implementation of clear national dissemination strategies for the heterogeneous European transport system is also of great importance. The EC is encouraged to be creative and innovative to redesign the FP.

As guidelines for implementation of RDI management an innovative approach is proposed to lead European research initiative and projects to a higher level of maturity. The proposed approach could be achieved by a close integration of European projects, research demand from the different actors and professional dissemination activities during and after a research project. There should be a closer

loop from real innovations to commercialisation and other innovative ideas to further research activities.

2.4 Assumptions on the future (WP4)

TLA was leader of the WP4 (“Assumptions on the future”). TLA has been assisted by PTV and ICES in the scope of the activities of the AIMS Secretariat (that is regarding methodological and formal aspects). Main participants were the members of the Researchers group, each one being in charge of the analyses for a specific transport mode: ETH for the rail, KTI for the road, TUDOR for the air, CETMEF for the inland waterways and maritime modes (with support from TLA) and ULB for the intermodal. Researchers have been assisted by their dedicated expert who have given their comments regarding the work progress and contribution to deliverable D4.1.

WP4 was aiming to issue recommendations to be used in the scope of the definition of new research policy objectives.

3 Conclusions and recommendations (WP5)

3.1 Air mode

3.1.1 Conclusions from the project analyses

As outlined the situation in the air mode is different comparing to the other transport modes. Key conclusions on the basis of the project analyses and the various interviews have been drawn.

Situation in the mode:

- A specific market situation can be observed in the air mode: key players are a few number of large manufacturers (e.g. Airbus, Thales, Dassault)
- International dimension (world-wide) – the market cannot only be focused on Europe
- Main research activities are dedicated to technical aspects:
 - Long term research founding by EC due to the aircraft cycle;
 - The development and product lifecycle of an Aircraft is very long term:



- In short term perspective research initiatives funded by private side are dedicated to security/safety and air traffic management/air traffic control.
- The air mode supply chain is complex; today some dysfunctions prevent the optimal coordination between the whole actors.

Main Developments

In the field of air transport two main projects are currently in progress:

- Clean Sky is dedicated to the improvement of technological breakthrough in order to decrease the air transport impact on our environment
- SESAR3 is dedicated to Air traffic Management/Air traffic Control in order to give Europe a high-performance air traffic control infrastructure which will enable the safe and environmentally friendly development of air transport.

In the framework of European project, the great majority of projects concern the technical aspect (aircraft modernization, improvement of air traffic management...)

³ Single European Sky ATM Research

Market Players & Research

- Offer is very close to the demand in the field of technical aspect
- Manufacturers involved in the research but stakeholders (air carriers, forwarders...) less

Implementation Issues

- The lack of one crucial stakeholders can be an obstacle to project success

Future Needs

- Infrastructure:
 - balance between passengers and freight;
 - Implementation problem;
- Legislation
 - Harmonize the legislation due to the international dimension of air freight activities
 - Avoid different interpretation possibilities.
- Logistic
 - Improve the coordination between all partners of the air mode chain (*flow and information management; less interruptions in the physical flow due dependency of paperwork processes*);
 - Improve the intermodality

Short Recommendations

- Attract stakeholders (carriers, forwarders...) in the research
- Involve the crucial actors at the beginning of the project
- Match Lisbon objectives
- Address innovative topics

Future topics

For the future, several questions will arise about the strategy of companies. The economic and environmental challenges will push the air freight services to change their strategy and the e-commerce development will also play a role in this change: *Will full cargo be transferred to mix cargo? Will integrators get more market share?*

As mentioned in the demand of stakeholders, an adapted infrastructure is a great challenge for the future. More generally, players in the field expect a concrete support from industry and authorities to face the future. The products of the future decades will have to be more efficient than current ones. Industrials will also have to provide new aircraft generations answering to environmental constraints. Apart from that the EC proposed in the Clean Sky program to decrease 50% of fuel consumption, 80% of NO_x and 50% of noise emissions. Thus a better legislation and improvement in standardization are crucial stakes for the future. The demand made

on the future ATS concerns current ATS and future requirements and social, economic and environmental factors.

3.1.2 Conclusions by the air-mode expert

The distribution of the contents and structure of the recommendations for the development of proposals for research projects on air transport issues revealed three main lines of action:

- To improve the impact aviation has on the environment with the "Clean Sky" project that is a very large Joint Undertakings.
- To develop the comprehensive change in European Air Traffic Management with the "SESAR" project that is another very large Joint Undertakings.
- To increase the technological level with projects focused on aero-engine, air frame, on-board equipment, and airport.

However, the infrastructures and the legislation still need to be deeply explored (for the freight activity, the studies focus on the passengers' activity). The recognition of the freight business compared to its impact in the global economy is still too low. Beyond the problematic of infrastructure and legislation, this activity is faced to severe requirements in terms of efficiency and cost reduction. A few projects are launched in order to improve the freight activity. Projects on the load units, on handling techniques and communication system between all actors can improve the efficiency of the air logistic chain. The main dysfunctions and gaps between offer and demand are:

- Capacity of airport to handle the growth of freight activity;
- Better management of passengers and goods flows on airports;
- Innovation in term of load units (interoperability);
- Innovation in term of loading and unloading technology for aircraft;
- Harmonize the legislation rules.

Legislation issues must be addressed in collaboration by the different concerned authorities in order to avoid the different interpretation of law.

3.2 Inland waterway

3.2.1 Conclusions from the project analyses

Situation in the mode

Inland waterway transport (IWT) in Europe accounts for only 6% of the total of surface transport (in 2007 a total of 141 billions of tons*kilometres was performed by IWT in the European Union) but grows in a modest way (about 3% from 2004 to 2007). Dry bulk transport stays the sub-sector with the highest share in terms of overall IWT volume but growth expectations are modest whereas containers transport by barge saw an unexpected growth in the last years and represents the most promising sub-sector. The European IW network which stretches for around 30,000 kilometres is a mix of large high-capacity rivers and small-scale waterways with generally non-used capacity. IWT operators have to cope with a complex

political and legal framework set by EU and national or specific authorities, including international agreements. Despite the principle of a harmonized European legislation, some IWT issues have not been tackled at the same speed or with the same attention in the different member states. Moreover, transport organisations are not the same across Europe: limited concentration of enterprises in the key western European countries with a majority of 'single-vessel-operators'; a splitting up of larger companies (former national monopolies) in the accession countries. As a consequence, IWT operations in Europe are very heterogeneous, in traffic levels but also in legal and organizational aspects.

Main developments

The set of FP5 and FP6 IWT projects was a mix of policy and technologically-driven activities addressing two thematics: the development of innovative concepts regarding IW fleet and intermodality and the application of ICT through River Information Services (RIS). Several innovative vessels concepts were developed but seem to led neither to European follow-up research projects nor successful implementation on the market yet, likelihood because the concepts were too sophisticated and so unsuited the end-users' needs. However, the CREATING FP6 project (Concepts to reduce environmental impact and attain optimal transport performance by inland navigation) which involved operational actors from the field during the research phase adopted a very promising approach to develop new vessels concepts by starting from the market requirements and putting the emphasis of logistics needs. Despite this interesting method, majority of these concepts are unfortunately not widely implemented yet, as the other main results of the project: innovative cleaner components of IW vessels which have been developed are for the moment only used in a demonstrator vessel called the "Cleanest ship". As a consequence, the CREATING project, even if it does not change in depth IWT operations yet, proved that technologies to strongly decrease environmental impacts of inland navigation are existing and could be implemented in the future, so strengthening the image of IWT as a clean and modern mode. Regarding RIS developments, FP5 and FP6 saw two main steps in the long European research story of this application of ICT to IWT, which begins within FP4 (and partly before within a COST action) and currently goes on within FP7 and the TEN-T program (as well as national projects). These two steps are the ALSO Danube project, a first attempt to use RIS for logistics purposes and the COMPRIS (Consortium Operational Management Platform River Information Services) project completion which, together with the PIANC (the world association for waterborne transport infrastructure) guidelines, led to the RIS European directive.

Market players and research

In a general way, IWT market players are more focused on incremental and linear improvements of existing products and services than on the development of new radically innovative ones. Those who tried this latter approach often face a commercial failure. However, even if developments are made step by step, they can be technically and commercially innovative: RIS and ICT devices, self-loading/unloading and "Jowi-type" container vessels, diesel engines allowing a better compliance with stricter European regulations are now successfully used in some cases...Evolutions of offer coming from IWT players are so generally market-driven,

while FP7 specific IWT activities are both policy and market-driven, focusing on the one hand on the development of specific “enablers” (regulations, standards, guidelines, common databases...) whose aim at facilitating innovations in the future and on the other hand on new developments about RIS-based transport management, innovative vessels or connections between sea and inland ports. Taking into account the heterogeneous aspect of IWT operations, the enablers, mainly in the way of development within the PLATINA project (the platform for the implementation of the European NAIADES program whose goal is the development of IWT), have to strengthen the integration degree of operations and are all the more important as the IWT market and the number of actors involved in it are relatively small. Regarding new developments, the major FP7 IWT technological project which has already begun is RISING (RIS Services for Improving the Integration of Inland Waterway Transports into Intermodal Chains). This project deals with RIS to be used for logistics purposes and consists in another step in the whole RIS development process. If successful, it could have actual impacts at middle term.

Implementation issues

Implementation issues of past developments are generally a wide socio-economic, technical and regulatory matter which can not be addressed within FP7 activities, too far from the market. Other European funds can be used, as the TEN-T program for RIS implementation, or national projects can be launched. These additional grants can be necessary to begin further developments, improving technical quality, social acceptability, integration or economic relevance of the concerned products and services. Moreover, implementation of performed developments can need European specific standards or regulations, ensuring that the implementation process is the same inside the different European countries and sometimes creating the essential circumstances. This is the case for environmental regulations which could led to a wide IW vessels engines renewal.

Future needs

Needs of IWT actors could be divided in four main issues: the optimisation of existing situations, in terms of infrastructure and information and communication process; the improvement of IWT image, more modern and business-profitable; the integration into logistics chains, easing the shift of cargo from road; the enlargement of IWT markets thanks to new products or services (for example for urban logistics purposes). For the optimisation issue, the emphasis have to be put on a better use of existing infrastructure with specific vessels (whose sizes are fitting the characteristics of the network) or concepts (e.g. small vessels concepts), the removal of red tape and the implementation of one-stop shops and single window devices. To strengthen the IWT image as a professional and modern mode is necessary, notably by encouraging the development of new technologies and large-scale infrastructure projects. IWT actors need to conquer new markets and increase their turnover. They so require improvements in infrastructure (higher clearances, better connections with maritime ports...), new vessels for new services (transportation of fresh products...) and technologies, specific organisations and political support to develop the use of IWT for urban logistics purposes. In addition, the continuation of European integration of operations and the creation of a more innovation-friendly context will

still be a major issue where respectively RIS and specific enablers could have a great role to play.

Short recommendations

To put in a nutshell, many technological developments have been done in IWT in the past, partly funded by the European Commission, but did not generally reached the market threshold (except for some RIS developments). A cluster of different reasons can explain this phenomenon and among them, economic or technical inadequacy with actors' needs. Regulatory context or political support have a role to play notably about the implementation of “greener” technologies already available (cleaner fuel...) or to come in a more or less near future (fuel cells...). As a consequence, despite incremental improvements or innovative niche market developments are necessary for IWT to strengthen its position as a highly competitive transport mode, focus will have to be made not on wide technological program or on big ambitious innovative projects but on the way previous developments could be implemented and so actually used in operations.

3.2.2 Conclusions by the inland waterway expert

Inland navigation research innovations were and are predominantly supported on European level by the EU Framework Programmes (FP), while infrastructure investments are realised under different funds (i.e. ERDF, TEN-T, IPA) and modal shift actions are carried out under the Marco Polo programme. Transport research under the 7th Research Framework Programme (FP7) is dedicated to safer, “greener” and “smarter” transport systems including inland navigation amongst all other modes of transport.⁴

FP5

Under the FP5 inland navigation and inland waterway transport (IWT) projects on technological and innovation driven research (ALSO Danube), on transport policy support (SPIN-TN) and River Information Services (COMPRIS) have been realised. IWT was covered by the GROWTH program. It can also be noted that the user-friendly information society program addressed technological issues of Information and Communication Technologies (ICT) within transport but none of them was specifically addressed to IWT.⁵ River Information Services (RIS) are a European success story.⁶ COMPRIS (and INDRIS, FP4) were the starting point for following RIS policy frameworks, legislation roll-outs and for accompanying large scale infrastructure investments, which were and are carried out under the TEN-T programme.⁷

FP6

Under the FP6 environmental innovations have been investigated. The CREATING project elaborated environmental innovations (i.e. clean engines and clean fuels, life-time of engines) in the field of inland navigation in order not to lose its environmental

⁴ Funding guide for inland waterway transport in Europe, Brussels, 2008, p. 11

⁵ AIMS: Deliverable D2.1 (Past experiences evaluation and assessment & key success factors definition)

⁶ AIMS: Deliverable D2.1 (Past experiences evaluation and assessment & key success factors definition)

⁷ AIMS: Deliverable D2.1 (Past experiences evaluation and assessment & key success factors definition)

edge compared to other transport modes. Follow-up project proposals for IWT logistics including RIS were not successful in the respective FP6 multimodal topics.⁸

FP7

Under the FP7 inland navigation research and policy project activities - based on specific topics - could be re-started and successfully continued. The PLATINA project, which implements NAIADES, focuses on innovative concepts to promote inland navigation and to enhance the cooperation between the public and the private sector. The RISING project develops and demonstrates new RIS services for transport logistics processes and this requires the involvement and support of IWT enterprises during and after the project phase. The ECCONET project addresses on the effects of climate change on the inland waterway networks.

FP8

In order to enable the full exploitation of the potential of IWT, to make its full contribution to the transport policy objectives and to hold the existing high level of research and innovation in the European inland navigation sector⁹, framework conditions under the forthcoming FP8 have to take into account the need for specific IWT research topics. Fact is that IWT is niche sector¹⁰ and should therefore not be mixed with other waterborne sectors (maritime, short sea, platforms) in common calls for projects. This leads to the request that under future FP inland navigation research and innovation projects should be carried out as dedicated inland navigation FP8-topics, as already successfully conducted under the FP7 for climate change (ECCONET) and River Information Services (RISING).

The Strategic Research Agendas of WATERBORNE^{TP} and of the PLATINA project contain future research strategies and themes for the European inland navigation and inland waterway transport sector, for responding the future needs and implementations of this respective sector.

General requests for future FP:

- Acceleration of FP contracting and simplification of FP controlling procedures and tools,
- Harmonisation of programme definitions and procedures with other European funding programmes,
- Provision of right research and programme topics at the right time,
- As inland navigation is in contrast to the other modes of transport a niche sector the number of potential project partners for participating research projects is restricted as well as leading inland navigation research actors capable of initiating and managing such projects are limited.

⁸ AIMS: Deliverable D3.1 (Diagnosis of the current situation)

⁹ Communication from the Commission on the promotion of inland waterway transport "NAIADES", COM(2006) 6 final, p. 13.

¹⁰ AIMS: Deliverable D2.1 (Past experiences evaluation and assessment & key success factors definition)

3.3 Intermodal

3.3.1 Conclusions from the project analyses

Situation in the mode

The main challenge in the intermodal transport is to ensure interoperability between the different transportation modes in order to obtain smooth transportation flows. However, the combination of different transportation modes, e.g. a transport chain, though having a huge potential in minimizing drastically the global transport activity negative effects, implies an increased complexity and an increased number of participating actors.

Moreover, to pass the goods from one mode to another, it is necessary to use an intermodal terminal, which adds a level of complexity and number of barriers such as:

- Extensive discontinuities in the transport chain and discrepancies between modes.
- Business, organizational and legal barriers imposed by the wide variety of freight transport actors and public authorities.

Main developments

In support of the European transport policy and the Freight Logistics Action Plan, the recent researches in the intermodal freight transport field focused on the following major issues that can be seen as pre-requisite for a seamless competitive door-to-door intermodal transport:

- Intermodal transport vehicles and loading units: design of appropriate and cost effective vehicles and loading units capable of going through the different transportation modes.
- Intermodal transport infrastructures: location, design and operation of intermodal transfer points and transshipments equipment/infrastructures.
- Alleviating the complexity of the transport chain by harmonising organisational aspects such as the flow of information (use of ICT), the awareness, responsibility and liability of the different actors, custom issues, etc.
- Leverages and driving factors of intermodal transport quality (capacity utilisation, reliability/predictability, controllability/traceability, safety of delivery (lack of damages, loss and theft), delivery time, environmental considerations, cost/price/rate, flexibility, frequency of service, etc.)

Market players and research

A typical intermodal freight transport chain is a complex network of trade participants which can involve sometimes as many as 25 different parties: producers of goods, freight forwarder, carriers (ex: railways, ocean shipping lines, trucking companies), terminal operators (such as seaports or intermodal platforms), governments (contribute the infrastructure and regulate), banks and insurances, etc.

European Intermodal Research Advisory Council (EIRAC) main objectives:

- Optimize the use of public funding, in order to encourage the main stakeholders to invest in research activities
- Manage the results of research, in order to improve the potential available on the market, and to provide their assessment both before and after the execution of the project
- Encourage the participation of SMEs in innovation and research activities
- Find a common position on changes necessary to make transport greener, safer/more secure, and smarter

Implementation issues

- There is a lack of clear overview of a global RDI strategy.
- RDI alone can hardly fulfill market demands: RDI should be a part of a global strategy and supported by other actions (legal, standardization, etc.).
- More actors are to be included (intermodal industry, end users, authorities, normalization institutions, intermodal associations, etc.) in the EU research and assure the participation of all actors from the genesis of the project.

Future needs

Main future needs for fostering intermodal or co-modal transport strategy are:

- Development and implementation of unified communication system for all modes
- Broad implementation of unified loading unit for all modes

Short recommendations

The examined projects include communication and marketing activities, however, in many cases it is not clear how the project results will be exploited after the project end.

- A post-project activity plan that should indicate clear roles and responsibilities regarding the dissemination, communication and marketing actions after the project end.
- The ownership of the results and the plan on how to use them after the project end; a clear definition of how the project results should be used (publicly distributed or propriety of a private actor) should be defined from the beginning of the project -without this, there is a danger of not coming to a compromise in the public-private dilemma and of not making any use of the results at all.

3.3.2 Conclusions by the intermodal expert

For now many years Continental Intermodal Services' market share has been growing very slowly and in some countries has in fact decreased. Whatever the cause may be, despite significant financial support, the intermodal product does not meet the market expectations from both the standpoint of quality as well as price.

This trend, sustained over the years, testifies to the fact that in the prevailing economic environment the markets forces have been unable to generate the creation of services meeting the market expectations.

Current prevailing logistics strategies are based on:

- zero stock (despite historically low financial costs)
- regular, constant (daily or more) delivery flows to consumption areas whether be factories or shops and distribution centres
- consequently this logistics implies size and weight reduction of the individual shipments
- this translates into a requirement for higher delivery frequency and the use of smaller but more numerous vehicles

These widespread strategies are incompatible with sustainable growth and transportation policies. Furthermore, they are also in opposition with and contradictory to the development of an intermodal system characterized by:

- the need to consolidate flows in order to provide for economy of scale
- the obligation to abide by inflexible preset schedules (rail timetable)
- an unattractive commercial speed since delivery cycle is permanent and no intermediate warehousing takes place
- a low ROI
- a questionable service quality

Thus, it is a prerequisite to enable a general economic environment which would foster an intermodal service proposal designed to durably satisfy the market.

Political decision makers would inescapably have to consider and implement game changing rules.

It is suggested that future research develop further studies with the goal to assess, analyze and compare the interaction between the political realm, the decisions the political stakeholders take and the market.

This research could then point towards EU wide proposals based on the outcome of the studies putting forwards a long term vision of the industry:

One may think of the following as initiated by the Commission with the support and implementation by the Member States:

- rules and regulation designed to guarantee a fair modal competition
- long term funding mechanisms in favour of costly infrastructures the market does deem in its interest to finance
- increase the relevance of the environmental factors when establishing modal socio-economic comparisons

Then steps have to be taken by the various Member States implementing EU decisions and according the principle of subsidiarity

3.4 Maritime mode summary

Situation in the mode

Maritime transport (MT) is used to move a variety of both unpackaged raw materials (chemicals, petroleum products or bulk cargo) and packages cargoes (boxes, pallets...) and acts as the backbone of the international trade, ensuring about most of the world commercial exchanges. It is so a significant contributor to the European economy and the European's sea-going merchant fleet -essentially ships carrying dry or liquid cargo- was made up of some 9,732 vessels in 2008. Shipbuilding industry is a strategic sector in a number of European member states and is largely focused on niche markets with high technology requirements. It is confronted with competitors coming from the Far East (mainly China, Korea and Japan) while the European marine equipment industry is a world leader for a wide range of products, from large diesel engines to electronics.

Recently, before the economic downturn, container flows in main European ports rose yearly 10% and more. Maritime companies modify their structures constantly to the alterations in international trade and foreign competition. Large shipping operators apply two processes of vertical integration: they become door to door logistic operators and they operate inland platforms. Because some terminal operators are doing the same, aiming principally at increasing the scale of their activity, this market behaviour creates competition between terminal operators and their clients, the shipping lines.

MT is also a major mode for intra-European cargo exchanges: short sea shipping (SSS) accounts for nearly 40% of volume of goods transported (for comparison, the road mode accounts for 47%) and has grown by 32% in the last five years. But, even if a vessel is travelling between two European ports, SSS remains subject to complicated administrative procedures discouraging numerous shippers. Fortunately, the MT package issued by the European Commission on January 2009 includes a number of rules aimed at reducing the current administrative burden imposed on shipping companies by European and national regulations.

The European Commission also introduced few years ago the e-Maritime concept to ensure a seamless exchange of data between all public and private stakeholders and focusing on ship board and shore based applications for improved navigational safety, security and efficiency, including better environmental performance. Moreover, the concept of Vessel Traffic Monitoring and Information System linked to the information exchange system called SafeSeaNet consists in the first information tool in relation to safety at sea.

Main developments

During FP5 and FP6, the European Commission funded a wide range of research and development projects relating to MT, with different objectives. Some of them aimed at increasing the modal share of the maritime mode and reducing in the same time the potential congestion of road networks, either thanks to new technological developments and concepts of short-sea transportation (e.g. the Intermodal ship project) or decision support systems dealing with logistic processes. This was notably the case for FP5 policy-driven projects, sometimes based on the 2001 White Paper on Transport in Europe which claimed for a change in the modal shift. Some projects aimed also at improving the quality of service or decreasing the costs of MT operations, notably by identifying and disseminating best practices inside Europe,

following the overall objective of maintaining or consolidating the competitive position of the European waterborne-based industries.

In the “sustainable surface transport” FP6 priority, one of the funded coordination action aimed notably at initiating or strengthening the international cooperation about research on MT while the Maritime Transport Coordination Platform (MTCP), another coordination action also funded within FP6 provided support to the Commission for the development of the European MT policy. Finally, the Maritime Navigation Information Services (MARNIS) project, part of the larger e-Maritime developments, integrated ICT in maritime navigation and port stops in order to increase safety, security and efficiency of MT operations.

Results obtained in the different MT projects are wide and range from new concepts or technological systems, communication devices and technical standards to reports for political purposes.

Market players and research

The MT sector is turned towards operation and medium or long terms issues are difficult to integrate. Shipping lines are focusing on ensuring the profitability of their investments and do not participate a lot in public-funded research projects. Regarding innovation, their approach is business-oriented and based on international benchmarks, market analysis and design of business plans to issue return on investments: benefits must be quantified, “visible” at short terms and balanced with costs. The situation is quite the same for the other operational actors from the field: generally there is no dedicated plan or resources for research, but participation to public-funded RDI projects is envisaged “on spot” when opportunity occurs, notably because the rhythm of public research is different from that of MT operators. However, research stays generally positively seen by actors from the sector, considered as required (notably in the scope of sustainable development), so as to solve important problems the MT has to face with and prepare the future. But it is just a tool among others to reach success. EU-funded research can in the best case act as an engine, a catalyst, with a strong multiplier capacity. It notably permits to have more partners, of best of breed expertise.

The FP7 address various research axes in relation to MT ranging from on-board navigation systems to procedures simplifications (reporting and documentation handling satisfying all actors involved in door-to-door logistics whilst simplifying the burden on maritime transport providers), sometimes following previous FP initiatives. Moreover, other topics are covered: VTM and related services; information and data management, infostructure and standards for information transfer (interoperability platforms, single windows protocols...); new business models and best practices establishment; inspection and monitoring tools, advanced communication systems to facilitate fleet management as well as cooperative resources planning and support of equipment and vessels.

Implementation issues

The successful take up of an innovation in MT generally depends on the path of its development. Many barriers can be encountered while carrying out RDI activities. For

example, the inadequacy of the foreseen innovation to the end-user's needs is a barrier which can be removed by adopting inside the consortium even in the beginning of the project a "client-oriented" approach. Some MT projects can be cancelled by the EC some months after their beginning notably because they do not fit with what industrial and public stakeholders wanted. But barriers could also be financial or economic ones, concerning impacts on costs and finances for the decision-maker and on wages and premiums for the operators. The Intermodal ship project is generally considered as a successful project as it developed alternative ship design concept enabled to improve inland and sea transportation. However, as a large part of the cost of a new ship building is funded thanks to bank loans, the Intermodal ship concept could have actual implementation only if the banks agreed to finance the buildings. Other barriers to implementation could deal with administrative, technology, knowledge or even geopolitical or cultural matters.

Future needs

Future needs coming from the market can be to improve safety and efficiency of navigation in ports, considering decreasing manoeuvring space (vessel size in relation to fairways and basins) and increasing traffic; utilisation of non polluting energy sources in ports or on-board ships; new solutions for ballast waters treatment; innovation for ships smokes treatment; distributed architectures and services, hierarchical organization of regional, national and cross-national interests and "virtual organizations" at business level, with strong requirement in terms of data integrity, confidentiality and security; the follow-up of the e-Maritime concept developments, notably through the next MARNIS project.

Short recommendations

Research is crucial, to prepare the future and anticipate the change. Working organisation and rules within research projects may have to be clarified: a required condition for the success of most of the MT projects is that everybody accepts the change, gathered around common interests. Research has to be controlled and not to be used in a way which deviates from its original objective (e.g. to suppress some jobs...).

3.5 Rail mode

3.5.1 Conclusions from the project analyses

The liberalisation of the freight rail market brought three major changes:

- Strong competition in the field of block train services, but still a situation of cooperation in the field of single wagonload service. This created a difficult situation of "competition", especially among the national freight railways. No balance has been found yet.
- The new entrants in the rail freight market decreased the transport prices of the formerly rather lucrative block train services. As a result, the margins of the freight railways are so low (or even negative) that they cannot afford any "research experiments" with an uncertain outcome.

- Before the liberalisation, the national freight railways trained their own employees. In a liberalised market, the employees have a lot more possibilities to change the job. So, it is more and more unattractive for large national freight railways to invest a lot in educating their employees if other (private) rail companies profit afterwards.

Main developments

The formerly rather static and monopolistic freight rail market became a lot more dynamic thanks to the market liberalisation. The freight railways are nowadays also much more market oriented than before.

This also opened a whole new field for innovations (exchanging of data, harmonisation, etc.)

Market players and research

The European freight rail market is characterised by many market players. However, only few freight railways such as DB Schenker Rail are dominating the market. Due to their important role in the European freight rail, they act as both system and innovation leaders. Hence, such dominating companies should be involved in large innovations from the beginning to gain their acceptance.

The new entrants are usually concentrating on some highly profitable regions and/ or segments/customers. It is very difficult and financially very risky for them to set up a large network, which would be necessary to become a real competitor for national freight railways.

Large research issues in freight rail:

- International data exchange (basis for many important applications like customer information, efficient transport planning, track and trace,)
- Increase of the efficiency of international transports (Harmonisation of international rail regulations, decrease the discrimination towards passenger rail transports)
- Improvements in the field of freight wagons (self propelled freight wagons, low noise freight wagons with new breaking materials and technologies, ...)

Implementation issues

- There is often only a benefit of rail research results, if a majority of the freight rail companies (including the largest ones) participates. Additionally, there is a fear that a company invests a lot for implementing the innovation and the other ones are then profiting.
- The freight railways usually still make deficits. Hence, there is no money for implementing innovations, which are not 100% sure for success.
- The market situation within the different European countries is still very heterogenic. So, an innovation developed in France might not be applicable in Germany.

These issues make it very difficult to implement any innovations in the freight rail market

Future needs

IT research issues like a better exchange of data among all transport actors will certainly remain an important field of research.

However, other important questions have to be answered for the future development in rail mode as well:

- How to overcome the identified problems for implementing freight rail innovations?
- What is the future of single wagonload service? What was the (maybe negative) effect of the liberalisation on single wagon load service?
- Who educates in future specialised (freight) rail employees?

It is a positive sign, that some of these topics are foreseen in the FP7 call 2010 or even covered by already running projects like FUTURAIL.

At last, it is very important in rail mode to involve the dominant rail actors (e.g. large freight railways) in large future research projects from the beginning. Otherwise, it will be difficult to gain their acceptance of the results and their willingness to implement them.

3.5.2 Conclusions by the Rail mode expert

Project genesis

The needs of end-users in freight have to be seen in the broader scope of logistical chain operators. In that chain rail is only one part. Since the EU Rail Packages we have two different characteristics: The incumbent railways have high financial potentials, but on the other hand strong barriers against innovations because of complex decision processes. The new entries are financial weak but innovative. If tests are necessary in an operational environment it requires early involvement of the infrastructure managers (IMs). Concerning the integration of SMEs the information of payment procedures and dissemination responsibilities is a MUST in the project preparation phase.

Project realisation

To my experience an “objectives-results loop” has to be created to ensure a process in the project later on, which is comparing the expected results with the reached interim results. It should have the following tools:

- Introduction of an obligatory final WP “Commercialisation” ensuring the project expectations. This needs a Letter of Intend between the end user(s) and project coordinator to agree upon planned project objectives and script of roles.
- Project Advisory Board with senior rail responsible persons with a pre-defined plan for their meetings (based on “Check stones”/milestones in the project plan), its tasks could be: defining and realisation of the business case with verification of the assumptions and pre – agreement on availability of internal data; optional: ensuring border crossing tests in real operation with the relevant IM

- Problem: internal patent rights vs. knowledge transfer. Solution: Lol before the project start between the relevant institutions.

Project finalisation and follow up

Mostly the dissemination is lacking recognizable results, in other words: the project is lacking a professional “After sales management”. A Solution could be: a pre-project agreement on responsibilities and after sales financing.

Another Problem: the role of the SMEs. They have excellent knowhow, but no money for follow up activities. One solution could be: early money providing (“pre-funding”) to overcome cash problems.

3.6 Road Mode

3.6.1 Conclusions from the project analyses

Relevant impacts of the selected projects could be observed in the road mode mainly in the transport safety, the environment protection, the reduction of fuel consumption and the transport organisation as well in the road development and the city logistics. These are in accordance with the priorities of the EU, i.e. increasing the safety, avoiding traffic jams and reduction of environmental damages.

The focus of the research projects is the communication between industry, science and policy in the freight transport sector in Europe.

Useful concept is the concept of boundary work which characterises the interaction between science and policy. Boundary work is the negotiation of a division of labour, in which the identity of practices and actors is negotiated as well as how they are to work together.

Situation in the mode

The road mode can be characterised as a decentralised market, there are many small and medium sized players, but also dominated by large companies. Road transport is often reliable and competitive especially in door-to-door relations.

The road sector had in Central- and Eastern Europe a monopolistic position, but after the political changes it became similar like that in Western-Europe. There are lot of small companies which carry out freight transport activities. The liberalisation process could be observed.

In 2006, EU road freight transport showed the fastest growth in performance and increased by 25% compared with 2000. Road freight transport has been growing steadily in the EU, with a faster growth of transport performance in the EU-12 compared to EU-15.

Road goods transport has been growing faster than GDP, mainly due to changes in the structure and location of manufacturing industries, and the increased demand for just-in-time shipments. Tonne-kilometres have been growing faster than tonnes, which suggest that the average shipment distance has been increasing.

The EU international transport market – including bilateral, cross-trade and cabotage transport – was dominated in the year 2006 by five countries (Germany, Poland, Spain, Netherlands, Italy).

The road haulage sector is fragmented in a big number of small business units in Spain (more than 130.000 companies in 2005), Italy (100.000 companies) and Poland (70.000 companies). Other big markets – France, UK and Germany – include more than 30.000 road haulage operators each. In all the other countries, with the exception of Czech Republic where the number of companies is about 25,000, the number of companies is smaller.

Road transport is the second largest EU producer of CO₂, one of the greenhouse gases responsible for climate change. While some improvements in efficiency of road vehicles have been achieved, continued growth in traffic and congestion mean that CO₂ emissions from road transport have grown overall.

Main developments:

The importance of the door-to-door transport is bigger; the transport volumes increased, the road mode share in many countries is about 70 %, also in the EU.

In terms of research activities in the transport sector many companies have minor interest in participating at EU research projects. Some examples can be given for Hungary. Here the intermodal terminal and the post company were involved in European projects and in similar works.

For the road transport, the subjects are focused on:

- analysing transport policy, technology developments with regard to long-distance freight transport,
- developing scenarios how to reach a desirable future,
- environment protection in the freight transport.,
- evaluate the environmental impact of the new technologies compared to existing vehicles,
- reduction in CO₂ generation and energy consumption.

Recommendations

Different end-users should be involved with different size and origin. For implementation issues safety cases, technical developments should be more represented in the selected topics, or sometimes transport solutions.

In future more activities related to the logistics, transport chains and intermodal transport are needed.

As in FP 6 were less pure road mode projects than in FP 5 the future needs have to be followed, the dissemination of former results as well as the follow-up activities are of importance, relevant is the role of the project coordinators.

Market opportunities have to be managed in terms of exploitation, vehicles, IT, harmonization and standardization. These opportunities have been exploited partly, because of the different national regulations, partly because of the lack of funds of the participants on this market, at last but not least because of the decreasing demands of transport cargos due to the financial crisis.

3.6.2 Conclusions by the road mode expert

Road transport is - according to its share in freight transportation - the main subject we should consider.

The main problem of transportation policy is probably more a problem of institutional organization, more than a problem of “ideas”, research and “solutions”.

My opinion is that when there is no institutional answer or solution to a question, the research process, the policies, and the initiatives taken, are limited, and have weak effects.

In the road domain, we could indicate the following main issues.

- The urban last mile problem,
- The European competition problem
- The greenhouse question,
- The innovation management in Europe.

The urban last mile problem

This problem is very complicated. The solutions have to combine technologies, innovations, organization, and last but not least an institutional organization. This topic is specifically a local problem to be solved locally. European institutions and research programs may help the local bodies to share experiences and good practices. European Union can encourage, communicate, but it is a good example of subsidiarity.

The European competition

Everybody knows that there are fiscal economic and social distortions between the different European road “flags”. This is a fact that inside the Euro Zone it is not possible to regulate the difference of competitiveness between road enterprises by the way of currencies parities. This situation put the emphasis on the problem of cabotage and was in favor of new regulations as the one about time of service, recently extended to owner-operators.

But basically we know that there is no solution without a process of social and fiscal harmonization. Curiously the production of regulations is generally more symbolic than useful. For example the regulation of the time of service is not really based upon an “objective” metric of the time. Few countries control the application of the law, and there is no coordinated process in order to control and to sanction the non-compliance of the Directive about “mobile workers”.

The new – restrictive – regulation about cabotage, is too very symbolic. Whatever we could think about rules in contradiction with internal market objectives, the new regulation and its national declinations are too easy to circumvent, and it is very easy to cheat.

Lot of problems have, by this way, no national solutions, but generate locally lot of negotiations, conflicts, and subsidies, and new factors of distorsion. Everybody knows these different social, fiscal and economic factors, but never put them on the European table.

The Greenhouse question

The Research and the regulations are clearly oriented. The results are monitored. But the problem is to know what to do with the road freight. In fact there are two different policies. The one is focused on rail, inland waterways et sea motorways, with bad or non sustainable results. The other one is focused on motors... and a bit on intelligent transportation. There is no strategy about the future of the road freight system. The lack of European theory (or decision) about the European Modular System (25,25 m), or about automatic motorways, is clearly the symbol of a lack of comprehensive policy.

The innovation management in Europe

This situation is clearly the consequence of the lack of European transport policy and the difficulty to define a global management process in the field of innovation.

The Galileo history is a good example of the difficulty to build and implement an innovation strategy. Airbus is also a good example of tremendous transaction costs generated by our European method based upon national cooperation. What we need is a federal initiative and funding for innovation, and especially in transportation. There is no sustainable solution for rail freight development and for a new zero emission transportation system (using road and other modes) without a global European program, under the leadership of the commission, and European funding.

4 Guidelines for implementation on European FP level

4.1 Research, development and innovation in future EU freight transport

With reference to the analyses and conclusions in AIMS work packages 2 and 3 the most important findings will be summarized in the following chapters. At first the process of research in EU funded projects are being outlined and the different levels of maturity in RDI are being described. These findings are specifically based on the intermodal results in D2.1 and D3.1 and are also referred to the inland waterway results of WP2 and WP3.

4.1.1 Research process, RDI levels of maturity

The classical approach to research can be described as follows:

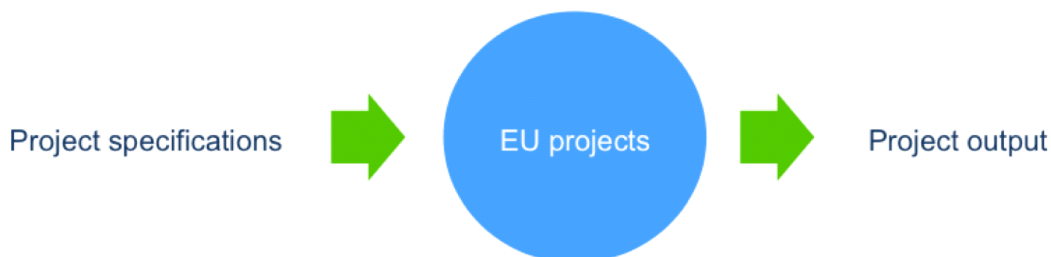


Figure 7: RDI process, 1st level of maturity

A project is considered successful if there is a match between the specifications of the project (contained in a formal contract, the Description of Work) and the project output (the deliverables of the project); but there is no guarantee that:

- The project specifications correspond to an actual market need: the approach is a “push” approach rather than a “pull” approach
- The project outputs are useful and can be implemented in the real world; for instance project results may simply consist in theoretical results

As shown in next figure, a more “integrated” approach can be adopted:

- RDI need is identified, preferably coming from the market
- Outputs consist of tangible results e.g. demonstrations, prototypes



Figure 8: RDI process, 2nd level of maturity

But following this kind of approach there is no guaranteeing that:

- The identified RDI need is in line with market situation and development (legislative, political, economic and social framework).
- Results will be used once the project is over or have any impact on the market

So another approach is to consider the RDI process is cyclic (see next figure):

- The origin of the research is a specific need in the market.
- It is translated into a RDI need, RDI being a part of a global strategy, in line with market developments.
- The RDI need is processed to a EU project, what requires the EU research be attractive and accessible to all relevant parties.
- EU projects are producing tangible results, what is only possible if the implementation strategy has been carefully considered.
- The results are answering a market need (and/or creating a new need) under a condition that these results are applicable to the existing market and that necessary communication and marketing actions have been planned and undertaken, during the project and once it is over.

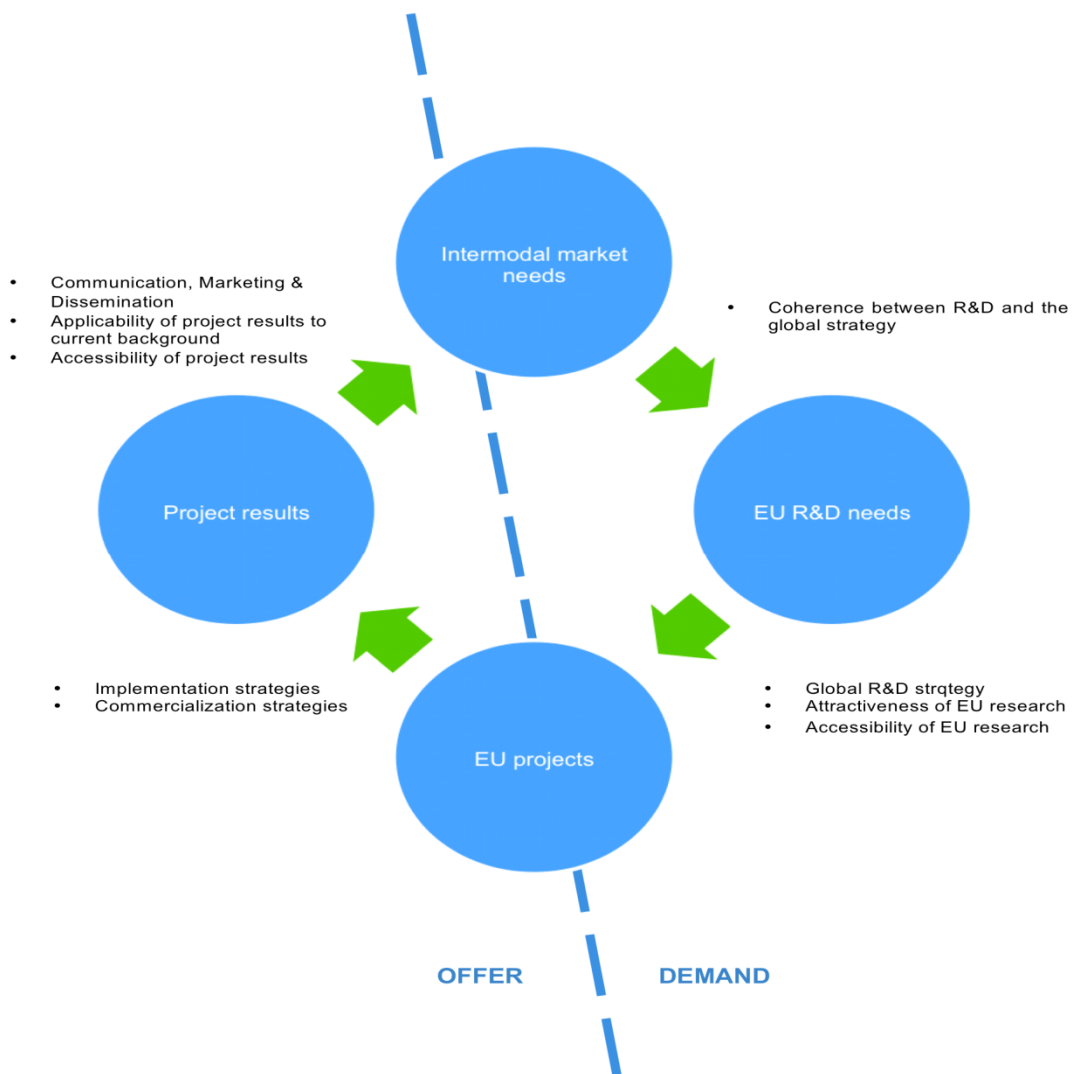


Figure 9: RDI process, 3rd level of maturity

Next table characterizes the three levels of maturity of a research process and the positions in EU research.

Table 5: Level of maturity of EU research process

<i>Research process maturity level</i>	1	2	3	EU
RDI is a part of a global strategy that is clearly formulated and communicated			○	
RDI strategy is clearly formulated and communicated: there is a clear coherence and a clear pipeline of projects			○	
EU research is attractive to all relevant parties			○	
EU research is accessible to all relevant parties			○	
Project start from a specific need that is perceived in the intermodal freight market		○	○	○
Project output corresponds to project specifications	○	○	○	○
Project produces tangible results		○	○	○
Project focus is on demonstration, commercialization and implementation strategy		○	○	○
Project results are applicable to the current background (market conditions)			○	○
A marketing and communication strategy is planned in order to disseminate project results (during the project)			○	○
A marketing and communication strategy is planned in order to disseminate project results (after the project)			○	

At the light of the results obtained during the interviews and the literature research, the general conclusion is that the European research is somewhere between the 2nd and the 3rd level of maturity: solutions have to be found and recommendations formulated to make EU RDI reach the 3rd level.

4.1.2 RDI as a key component of the EU freight transport strategy

Interviewed stakeholders have often highlighted the importance of supporting RDI by other actions that will ensure that the research results have an actual impact on the market situation. As a matter of fact, it is quite rare that a specific market need is resolved by the RDI only: it must be supported by the right framework conditions, including legislation, standardization and complementary measures such as trainings and communication. This “integrated approach” is presented in the following diagram:



Figure 10: Integrated approach

Obviously RDI is just one of the techniques that help in achieving objectives, and that it must be supported by other techniques:

- Standardisation to support RDI results and leverage them
- Legislation to create the right framework conditions where results may be used
- Complementary measures, such as trainings or promoting and creating public awareness on the transport system

There should be a global strategy from which the RDI is a small part and this strategy should be clearly formulated and communicated.

The actions that are part of this strategy (legislation, standardization...) share the characteristics of being quite long to put in place. In order to be effective, the global strategy must be formulated on the long term and anticipate evolutions.

Strategy for the European freight transport

Most of the interviewed stakeholders affirmed lacking a global vision of the European RDI strategy. However, this “helicopter vision” is necessary if one wants to turn perceived RDI needs into European projects and assure consistency in the ongoing research. The recommendation is therefore to focus more on a definition of a global and long-term strategy for the European RDI. This should include:

- Creating a clear pipeline of the EU projects in order to ensure their coherence
- Communicating more this global strategy to all relevant stakeholders
- Adopt a long term vision

Attractiveness and accessibility of the European research concerning the freight transport

In order to turn existing RDI needs in successful projects, it is necessary to attract a certain number of market actors. The European research must therefore be very “attractive” and “accessible” to them. The attractiveness of the research is measured by making a ratio between the invested time and effort and the usable results of the research. The accessibility of the research concerns the opportunity and the easiness for a specific market actor to be a part of a European research, and especially for new actors. Despite the noticeable efforts to make EU research more attractive and accessible to all relevant parties, several observations have been made:

- The participation of market actors (industry and end users) is mostly active once the project has been approved; the time and effort needed to prepare the proposal and run the negotiation process is too big for these actors;
- EU projects are still assimilated with a great administrative burden
- It is quite difficult for the “new” companies to enter a project because of the lack of “know-how” in European research procedures
- The information about the ongoing research/calls is often difficult to follow because it is too time-consuming

Therefore, it is necessary to take actions in order to:

- Include more actors in the EU research
- Assure the participation of all actors from the genesis of the project

Some possible actions for this are:

- Reducing the administrative burden linked to the projects
- Reduce the time/effort needed for writing the proposal or reducing the risk of that time/effort not leading to project acceptance (a “two-step” process for the proposal submission is an option)
- Work more on providing better communication to all actors about the ongoing research/calls

Post-project activity for freight transport RDI

Until now, a lot of emphasis has been put on producing project results that are usable and tangible, which is an important point for the success of the research. However, another important issue should not be neglected: EU projects are expected to have a leveraging effect, meaning results that can be used by the in a big number of different cases throughout the whole industry and not just on a specific case of the project. In order to ensure this leveraging effect, it is absolutely crucial to ensure:

- The applicability of the project results: this concerns the interoperability between the innovation to come and the current situation, meaning the possibility of using the results in the real market; this related to
 - The feasibility of the proposed solutions
 - The economic rationale behind suggested solutions
 - The use of existing standards...
- The accessibility of the project results which relates to defining:

A post-project activity plan that should indicate clear roles and responsibilities regarding the dissemination, communication and marketing actions after the project end

The ownership of the results and the plan on how to use them after the project end; a clear definition of how the project results should be used (publically distributed or propriety of a private actor) should be defined from the beginning of the project - without this, there is a danger of not coming to a compromise in the public-private dilemma and of not making any use of the results at all

Flexibility of the freight transport RDI projects

The cyclic approach to research indicates that there is a certain time gap between the moment where a market demand has been defined and the moment when the project results are supposed to fill in this need. Because of the market and technological advancements during the projects, it is possible that this need will change over time – therefore it is necessary to ensure that the projects have the necessary flexibility to update and if necessary redirect the research during the project course in order to match the best the evolving demand. Another dangers with long delays (writing the proposal, negotiation, start) are that actors within or without the consortium may start to develop parallel projects or that the project results become obsolete by the end of the project. It is recommended to include flexibility clauses from the beginning in order to facilitate any necessary changes further-on.

4.1.3 The FP activities as a part of the innovation process

In fact, in an ideal situation, FP7 activities should:

- Improve territories e.g. toward an innovation-friendly culture and higher integration (geopolitics aspect);
- Follow the innovation loop e.g. ensure relevant projects follow-up and encourage further RDI developments (projects)
- Cope with policy objectives;

Expected impacts are classified in accordance with the proposed framework in the next table.

Table 6: Classification of expected impacts

Activities	Enablers	Previous project	Policy-driven	Next project
Information portal	x		x	
Promotion strategy	x		x	
Funding handbook	x		x	
Alignment of innovation initiatives	x		x	
Barriers monitoring	x		x	
Best practices & success story	x		x	
Identification of business innovation & barriers	x		x	
Research agenda	x		x	
Inventory of existing education & training institutes	x		x	
Harmonized education & training standards	x		x	
Recommendations for land planning	x		x	
Administrative & technical support	x	x	x	
Best practice manual of sustainable planning	x		x	
Support of emerging promotion centres	x		x	
Transport Management Solutions		x	x	x
Effects of climate change		x		x
Innovative transport means		x		x
Connection between modes		x		x

Activities such as the identification of innovation barriers and definition of solutions to overcome as well as the alignment of innovation initiatives may be helpful. Such activities have also to promote European integration and harmonize the European frameworks.

Regarding pure research project (part of an innovation process), the whirlwind model recommends to consider innovation as a different follow-up of one or several previous trials. To qualify such a process, it can be checked whether or not a project makes a clear reference to a former one and how far projects participants have changed. For example, RISING in IWT is a follow-up mix of former European and national projects mainly FREIGHTWISE, ALSO Danube and COMPRIS. Among the

23 partners of the project, almost half participated in one of those projects, the other part can be seen as “new-comer”. Such a percentage ensures both the transmission of previous experiences and the renewal of the research approach. RISING can so be considered as a new innovative loop in the whole process of RIS developments. For projects dealing with innovative vessels, AIMS deliverable D2.1 analysed the past succession of one IWT project to another. One statement which has been concluded is that, while in some domains projects constituted the natural follow-up of trials, research to create innovative transport mean seems to be done only through stand-alone projects. This is clearly hindering the possibility of success of such activities (e.g. the implementation on the market). A possible performance target to highlight this point could be the clear reference to past initiatives and the composition of the consortium which has to be both identical and different in good proportions.

However, for a project to be efficiently engaged following a previous initiative, it must use “boundary objects” formerly created, thus enable to convince actors and transform them in allies. As a consequence, produced results (of any kind) must be as modular and adaptable as possible. It was certainly the case for RIS projects, notably thanks to the creation of open framework thus enabled further development. On the contrary, projects aiming at create innovative transport means resulted in “close” information, generally of few technical interest to be reused. In such a case, marked by the lack of “boundary objects”, realization of a follow-up loop is the sole responsibility of the manager of the former project. In the case of such innovation activities do not fit anymore with his strategy, he will not look for other partners (e.g. allies) to trigger another loop and the project will not have any direct follow-up. A worst situation can even exist when a similar project arises in another context, with completely different partners: the same barrier can then met, for the same result (almost nothing). It is not a so scarce situation, notably because the European research area need to be more integrated (same or overlapping projects currently exist in different European countries).

And boundary objects can be of diverse forms. They are notably part of wide dissemination activities of research project. The use of marketing techniques in dissemination activities is quite essential. As already seen, it is necessary that project managers are able to convince actors, not only thanks to the pure quality of their ideas but also thanks to their rhetoric skills. To do so, they need easily understandable objects. One great example is useful to illustrate this: the FP7 project SHOAL aims at developing a robotic fish to monitor and search for water pollution in port areas (see www.roboshal.com). The project is part of a more global story of the development of chemical sensors to be used in water areas. The original idea is here to develop a specific sensor having the form of a truly fish. Due to this highly and original recognizable form (and even funny) and independently of the pure scientific quality of the work or the partners concerned, the project (which just started in 2009) received a great attention from the media both professional and even generic (e.g. The Telegraph, BBC news...). Moreover, such well “marketed” information can even be disseminated from media to another one without any specific dissemination action from the consortium. This is a classic tip well known by viral marketing professionals, where information is spread without any intervention of the creator of information (like videos though the Internet). In such a case, the boundary object is simply a virtual picture of a chemical sensor to be developed. In transport-related RDI projects, while

the scientific quality of projects remains the one of the main important targets, the use of efficient marketing techniques has to be enhanced.

Such a creation of boundary object notably using efficient marketing techniques can be also of great importance for actions aiming at modify territory (maybe not for initiate another loop by the recruitment of allies but just for the work produced to be used). As already mentioned, number of countries participating to such actions (e.g. essential enablers) is an important criteria. However, as the cultural aspects of transport by one mode or another can be fundamentally different from one country to another, it is highly probable that the efficiency of a boundary object in one country is lower than in another country. As a consequence, quality of the dissemination will be different from one country to another, thus hindering the target of European harmonization. To solve this problem, the creation of specific national boundary objects appears as an interesting solution, and could be supported by specific national dissemination or communication plan.

After the activities aiming at modify the territory and the succession of innovation loops, the next point to be studied is the policy aspect. Of course, as public-funded research projects, FP7 activities need to cope with policy objectives. Such policy objectives can be quite global, like increase in competitiveness, or more focused, and specific to a transport mode. AIMS deliverable D2.1 highlighted the political support as a one of a condition for success as well as the integration of project in a public “ambition”: projects are in such a case highly supported by the EC, sometimes though different FP. This is always true. However, further developments around this question are necessary but will be difficult to perform as they need to consider the EC (and maybe even the European parliament) not outside the system but as an actor deeply anchored in it, interacting with researchers and stakeholders in many ways.

4.1.4 A framework for the innovation process

The target of European FP is to create competitive advantages thanks to scientific research. It is so normally one of the tools that can be used by private companies to perform research and development activities and so develop innovation, using the public funding as compensation in front of the uncertainty and unpredictability characterizing innovation processes.

Innovation processes are often described following a linear model whose typical sequence is basic research, applied research, technological development, market research, product development, production and finally usage. FP projects normally range from basic research to technological development and can sometimes be classified in market research and product development categories. In such a context, innovation processes are divided in series of discrete and sequential events (following an analytical approach), each step providing inputs to the next one. In that situation, innovation processes are often depending on scientists' or technicians' who try to “push” a product to the market.



Figure 11: Push project

However, to reduce the risk of innovation failure, research actors often try to fulfil identified market needs thus carefully used such needs to design a new product. The above linear description of the innovation process can be so refined into a new linear description represented below, and the issue of the processes is qualified as “pull product”.



Figure 12: Pull project

However, innovation can sometimes come from a vague programme and then be progressively transformed through different projects in a device which is capable of gaining interest. The linear description model based on a straight chronological order cannot explain such a movement. That is why another type of description has been developed which is based on a network perspective (see [1]). This type of description is called the “whirlwind model” and aims at describing the set of transformations of innovation according to the trials to which it is submitted. At every loop, properties and targeted actors of the innovation are redefined. Project managers as well as other actors, through a large number of actions, must facilitate the creation of relationships between actors in order to convince them (e.g. to recruit “allies”). This kind of description does not exclude the previous linear models.

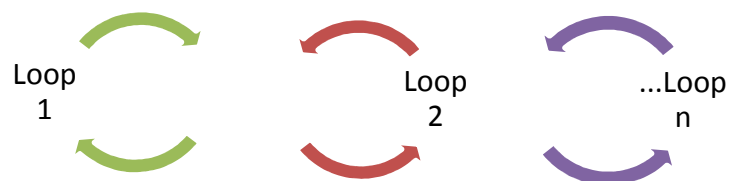


Figure 13: The whirlwind model

While in the linear descriptions knowledge can be transferred and is collected in management systems, in the whirlwind description, data are transferred and circulated with boundary objects and knowledge is what is agreed upon by a number of actors and made stable. Such boundary objects are scientific concepts or technological objects, abstract or concrete, which are both plastic enough to adapt to local needs (and to the constraints of the different parties using them) but yet robust enough to maintain a common identity between the various users. They need to be modular and adaptable (enough vague so as to be adaptable to a precise situation or serving as a means of communication and cooperation). To put in a nutshell, the whirlwind model describes the innovation process as a succession of loops. From one loop to another, properties and targeted actors of the innovation are changed by a transformation of the socio-technical network which supports it. Such a

transformation is notably characterized by the recruitment of allies but changes in the territory where the network operates can also occur and enabled by the use of boundary objects. As a consequence, FP activities, generally part of a wider innovation process, can be either described by a linear modal, thus consisting in applied or technological research projects or by the whirlwind description, thus consisting in a part of a loop or in parts of loops, supported by (a) socio-technical network(s) operating on (a) given territory(s). Moreover, as FP projects are public funded, they normally have to comply with a more or less global policy strategy and policy objectives. It is then possible to issue an ideal diagram of FP activities as part of an innovation process.

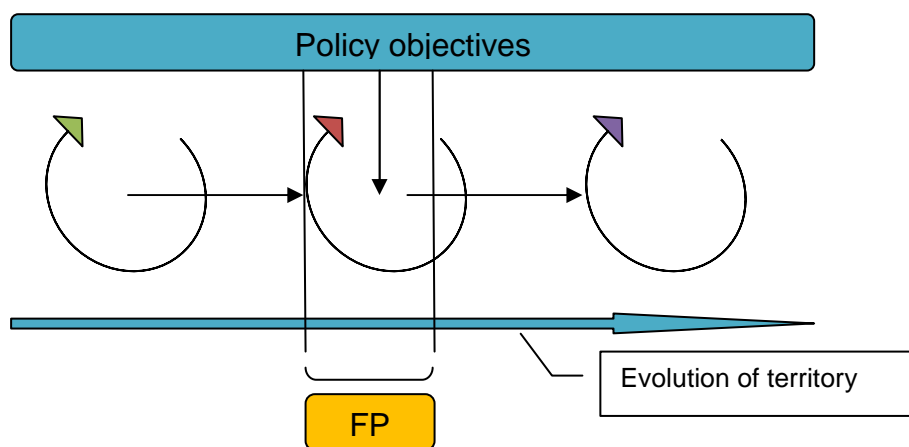


Figure 14: Ideal framework of FP activities

4.1.5 Recommendations for implementation

While the linear description of innovation is well known among EC representatives and used by FP projects evaluators, application of the whirlwind model may be valuable to produce recommendations. Then evolution of the innovation process depends on the ability of the supporting socio-technical networks to evolve by successful recruitment of allies (in favour of the foreseen innovation) and so on the ability of project managers to create interrelations between a large range of actors and integrate their concerns into her/his own working programme.

Diachronically, FP projects are part of an innovation loop (or parts of loops) which follows a former one. Between the former loop and the current one, the supporting socio-technical network evolved by recruitment of allies thus changing the properties and the targeted actors of the planned innovation. However, it stayed close enough to the old network so that innovation process can be seen as continuous. The similarities as well as differences between the two networks are so of major importance. Always in a diachronic logic, an innovation loop can either lead to the innovation foreseen in case of success or to a new loop. In this last situation, the socio-technical network will use boundary objects to perform the needed transformation, boundary objects which have to be modular and adaptable. The territory where the socio-technical network operates can also evolve favouring in one way or another emergence of innovations. In FP projects, the consortium (in its broad

form, including supporting actors, clubs...) together with the EC funding the project, gather the set of actors belonging to the network.

Notably boundaries are results (also in their broad forms, including reports, media...). The following table summarized in a general way the main findings indicated above.

Table 7: Criteria to assess innovation processes

	Criteria to assess the innovation process
Network	ability to evolve, similarities / differences with former network
Project managers	Ability: 1/ to convince, 2/ to integrate actors' concerns (notably users' needs)
Boundary objects	modularity, adaptability, compatibility
Territory	evolutions

5 Guidelines for Implementation on project level

The guidelines for implementation of RDI management in future are given on the operational project level. In this context the different phases of a project lifetime cycle can be identified. Additional to project duration itself the phases before and afterwards are being considered. In the following chapter the guidelines are given for the project genesis, the realisation and implementation phase and also the follow-up phase of an RDI project. Finally these guidelines are completed with performance targets to assess relevance and problem solving nature of RDI projects.

5.1 Project genesis

Project side

First set of recommendations concern the Consortium of the FP research project:

- *Create a coherent, commercially strong and sustainable partnership around:*
 - *A competent and qualified coordinator (proven records) with sufficient authority who knows the actors and the techniques including those useful for a RTD project administration, and who is able to cope with the partners' different goals and strategies.*
 - *Determined industrial(s) and research organisms, who are not looking for funding but results. Successful projects are usually pushed by one or more initiators who have a clear vision of the result of the project.*
 - *One or several end-users (decision-makers and workforces, as nominal partners or in advisory board) in order to ensure that the innovation will fit the needs of the field and maximize the chance to pass the commercialization threshold.*

In terms of consortium size, the number of partners should not be too important. Large projects with more than 20 participants are considered as difficult and costly to manage. Nevertheless, the consortium has to be sufficiently large to be representative at EU level. It has also to present a sufficient variety, with actors in dominant position / recognized, but also SME. For a better collaboration, select partners according to their previous work together, their understanding and

acceptance of common goals, shared influence, mutual respect and cultural differences.

- *Raise awareness of consortium partners on EC research projects environments and procedures (administration, payments...):* it should be made clear at this stage the entire administrative load linked with the realisation of a EC FP project. To alleviate this load for end users, solutions can be set up (simplified administrative procedures...).

Second set of recommendations concern the Techniques of the FP research project:

- *Validate that project goes beyond the state of the art and that the planned innovation is achievable and objectives can be reach in a realistic way (if needed, reduce the scope of objectives and define them to go deeper into the subject). This requires first to present a high quality comprehensive State of the Art.*
- *Perform a cost-benefit analysis, a technical, and socio-economic evaluation (including environmental) in relation to FP objectives*
- *Perform first determination of end-user needs, assess if the innovation is in line with users' needs and validate its transferability.*
- *Separate project management from technical, to reduce the load and ensure better communication and engagement.*
- *Ensure the project structure is strongly interrelated between the work packages.*
- *Enable simple contract change procedures: the projects are at least 2 years "old" when they start and 0.5 - 1 year into the project it should be possible to make substantial changes without another year of bureaucratic discussions.*

Third set of recommendations concern the Economy of the FP research project:

- *Ensure sound distribution of budget efforts, effective and comparable contributions from all partners.*
- *Consider carefully the management costs limits (in case 7% of the overall budget) bearing in mind the enormous management work to be executed especially in large projects.*

Fourth set of recommendations concern the Communication for FP research project:

- *Ensure proposal wording quality (professional writer, English-native speaker)*
- *Cooperate with the national contact points: they frequently provide actual information, make trainings related to EU projects*

Fifth set of recommendations relates to the time of a FP research project:

- *Manage project time vs. FP time and anticipate the date of the call*

Project preparation has to start much earlier than the project call date: it can take more time than expected notably to search for appropriate participants, to receive all contributions, or when speaking about administrative data...or in case of partnership disruption...

EC side

Recommendations are also provided regarding EC FP:

- *Develop a call content:* include description of the state of the art in the call (for the separation of project proposals), use professional writers (could be an English native speaker).
- Improve the proposal preparation and submission procedure, e.g.:
- Two phases submission: first deliver a brief description (project idea) and only prepare the full proposal after this has been successfully screened.
- Moderated preparation of proposal by experts who understand the procedures and support in describing planned achievements and work plan.
- *Improve the evaluation and negotiation procedure regarding the qualification of the reviewers, duration and the level of communication for negotiations... and transparency: the European Commission could provide a grid with qualitative and quantitative criteria to the project coordinator. This will allow a clear assessment during the final phase.*
- *Fix a maximum limit to consortium size and minimum threshold budget per partner, validate efforts distribution soundness and consortium composition*
- *Consider a different funding model for the consultants; the shared funding model does not seem appropriate for them*
- *Improve accessibility to data and/or databases: in collaboration with other organisations the European Commission could allow free access to essential information for all projects partners. Going even further, the European Commission could setup its own body in the field (e.g. Eurocontrol, Eurostat).*
- *Manage project time vs. FP time and decrease the time between call date and project approval (and kick-off): technologies changing and ageing fast and intermodal transport being a sensitive and competitive issue, this time period needs to be reduced to the strict minimum.*

5.2 Project realisation

Project side

First set of recommendations concern the Consortium of the FP research project:

1. *Ensure the participation of different end-users: the end user should be included in the interaction with the consortium (to inform regularly about the development and get their feedback). It could be useful to integrate end users to the advisory board to involve them in the realisation of pilot demonstration foreseen. There should be no hesitation if ever a current project needs to be reoriented in order to fit the expectation of the end users.*

Second set of recommendations concern the Techniques of the FP research project:

- *Undertake a cost-benefit analysis and perform a technical analysis, evaluate the potential transferability of results.*

- *Realise a socio-economic assessment: this assessment contains notably a clear implementation strategy so as to ensure a suitable synergy between technology, procedures and organizations as a response to the user needs previously expressed.*
- *Define the business model and elaborate the business plan.*
- *Give power within the consortium (co-coordinator, steering group) to adjust payments to efforts and deliverables.*

Third set of recommendations concern the Communication of FP research projects:

High quality dissemination activities are required to ensure a successful project as:

- *Ensure a two-way communication, on the one hand informing stakeholders on the project and on the other hand gathering their opinions.*
- *Develop communication and marketing techniques to find investors or end-users and to convince them about the added value the project can bring to their activity: a communication strategy has to be prepared on every aspects of the project, notably the technical and economic ones. Demonstrations have to be planned to involve end-users.*
- *Keep a separate WP for dissemination with detailed list of activities (number of workshop, dedicated events, purpose oriented meetings, articles, publications) as well as those indicators at the final evaluation stage.*
- *Ensure the protection of knowledge to facilitate its transfer: the Consortium has so to propose relevant intellectual property rights measures so as to avoid any problem that could prevent the realization of an efficient work.*
- *Hire and fund (100%) professional PR companies for dissemination activities.*
- *Fund more communication activities: participation at commercial conferences, reviewed articles in well recognized magazines, education material for universities and other relevant educational institutions*

Fourth set of recommendations relates to the time of a FP research project:

- *Ensure a 2-4 years project duration: the typical project duration of 2-4 years is considered as adequate.*

EC side

Recommendations are also provided regarding EC FP:

- *Improve the contribution from the project officer regarding work capacity and financial resources (e.g. for traveling) and the contribution from the financial officer regarding availability.*
- *Decrease administrative complexity.*
- *Ensure projects clustering; for parallel projects, ensure integrated coordination*
- *Control the project development at specific milestones: the en route evaluation process of the project should be speedier and less an administrative task. It should be a tool that helps in making the project fits the real end users need. A 'blind' evaluation process involving end users should be envisaged. Such type*

of 'blind' evaluation protects the property rights and solves any competition issues between evaluators and project partners. It should also be ensured that EC evaluations/reviews/audits provide qualified reviewers who do not base reviewers on their opinion but on project goals (laid down in the Technical Annex and Plan of Work). Consider taking audit costs into account in the funding, not as overheads.

- *Improve the payment process:* the payment process should be reviewed and made more in line with the ambitions of sound governance set by the EC policy: it is indeed unacceptable to witness payment delays exceeding 2 years, especially for SMEs. The European Commission could re-introduce pre-project funding.

5.3 Project finalisation and follow-up

Project side

First set of recommendations concern the Communication for FP research project:

- *Ensure afterwards knowledge transfer:* the main issue is to make the re-utilization of results easier. For that, the results made as public as allowed by measures taken regarding intellectual property rights. This knowledge transfer must be one the results of the communication plan defined during the realization phase of the project.

Second set of recommendations concern the Economy of the FP research project:

- *Ensure the continuation or implementation of the development:* partner companies may have a good product at the end of the project but not the financial capacities to bring it to market (notably SME). So many promising products from public European research activities remain prototypes and are forgotten over the years.

Third set of recommendations relates to the time of the FP research project:

- The official project end should not correspond with the project end for the coordinator and/or key partners (follow-up, dissemination...). This has to be considered adequately from the beginning.
- There should be a time period of 3 to 5 years after the project end where the coordinator and/or partners should be available upon request from the European Commission for the provision of data or results to following or follow-up projects.

EC side

Recommendations are also provided regarding EC FP:

- *Undertake a technical audit to check if the technical quality of the created product well corresponds to the foreseen objectives:* regarding the technical aspects, it appears necessary throughout the analysis to perform a complete technical audit at the end of the project. The knowledge of the technical potential of the innovation is in fact necessary to well prepare the communication action. For example, such a document, if public, could convince investors and/or end-users to implement the product.

- *Make possible funding for next development:* to help an implementation, it should be possible to fund program destined to end-users (operators) for the implementation of innovations obtained.

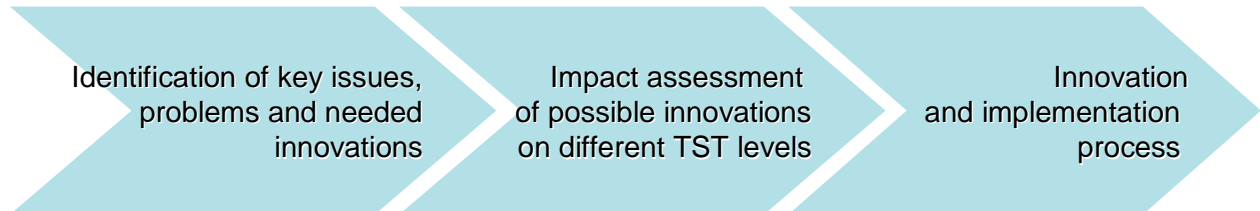


Figure 15: Overall process for innovation implementation

6 Guidelines and Methodology for assessment on project level

The guidelines for implementation of RDI management in future are given on the operational project level. In this context the different phases of a project lifetime cycle can be identified. Additional to project duration itself the phases before and afterwards are being considered.

The methodology of evaluation and assessment of FP RDI projects is structured upon a set of evaluation grids, either dedicated to a specific transport mode or to the EU freight Transport System in general. In the following chapter the evaluation grid on EU transport system level is being depicted.

The set of grids has a three-layered structure: grids are declined for different time periods being genesis, realisation or afterwards.

The genesis concerns the idea generation, the consortium constitution, the proposal elaboration, the budget constitution, the negotiation with EC... Realization relates to the period from project kick-off to contract termination; thus it gathers all the project development history. At last, the afterwards period begins from the project termination to address further activities e.g. follow-up project, commercialization, industrialisation... This step deals with project impacts.

A grid is made of macro-criteria integrating in a specific way (e.g. in terms of weight in the case of a linear extrapolation) several micro-criteria which are further characterised (in terms of level and variation range).

“Specific” means here relevant for the context, situation and environment of the case study.

An attempt is then made to draw a synthetic framework of evaluation and assessment of RDI projects which could be applied whatever the transport mode thus losing the specificity (and sharpness/precision) of each modal evaluation framework but opening a path toward standardisation.

The final version of the methodology is designed based on results of WP2, 3 and 4 analyses, gathered in deliverable D2.1, D3.1 and D4.1.

Criteria are derived out of the criteria used to judge of the realisation of a concerned TST model interrelation (“actors use techniques on territories”).

Expected levels (i.e. threshold to be ensured) have to be fixed to each criteria through negotiations between actors concerned by the interrelation; for remind the “importance” coefficient determines the potential for a criteria to be negotiated by a specific actor.

At last the range of allowed variation is determined considering the criteria flexibility range for each concerned interrelation.

Finally the methodology is completed with performance targets to assess relevance and problem solving nature of RDI projects

6.1 Assessment grid

6.1.1 Genesis

Table 8: Evaluation grid – EU Transport System RDI project (genesis)

Macro-criteria	Micro-criteria	Specification	
Acceptance	Society as a whole	Societal impacts on environment, safety and security , social impacts on organisations role, missions, “powers”, and images., but also on working conditions, employment, wages...have to be assessed to allow judging of their compliance with society rules.	
	Partners motivation	This concerns new products, new market... Detailed report on the objectives and expectations of partners in relation with the project; validation of their motivation for project realisation. Budget validation.	
	EU research	This relates to the relevancy to the topics of a concerned FP call (and future ones).	
	End- user needs	<i>Who is the user, what does he want exactly?</i> The participation of end-users to the proposal preparation is highly recommended to ensure that targets fit their needs and that framework conditions to pass the commercialization threshold have been defined. End-users should be planned from the beginning to participate to the advisory board and host a demonstration.	
Efficiency	Management	This is linked to the partnership, coordinator experience and expertise of EC administrative process; in opposition to the size of the Consortium, which has to be maximized depending on the concerned instrument (e.g. 40 partners is a maximum for an IP, 20 being more realistic).	
	Integration	financial	Business models and plans have to be drawn, including costs-benefits analysis, identification of collateral benefits.
		activity	This relates to the association of partners research teams, different experience in collaborative projects.
		sectorial	Integration between sectors structuring the development of technological innovation has to be looked for.
	territorial	This relates to the differences between partners culture, internal culture of the organisations.	

Profitability	Financial planning		Expected level of investments, exploitation and maintenance costs have to be estimated.	
	Funding and budget		Sufficient funding has to be granted and its distribution among partners has to be relevant. This relates to the expected benefits versus level of risk, comparison between budget, funding and project ambition (objectives). A minimum level of resources and budget should be guaranteed per partner.	
Capacity / Feasibility	Innovation	Innovation level		Comparison with existing products has to be drawn to identify improvement beyond the state of the art. Even if innovation is a breakthrough, RDI projects have to be built on previous FP RDI projects results and make it visible in the proposal.
		Achievable potential		This relates to the innovating characteristics, links with previous EC/national projects, differences in between technical culture, technological push/pull degrees.
	Compatibility with:	Technologies	This is linked with the compatibility with existing technologies (interoperability and interconnectivity level).	
		Operation	This relates to the expected impacts on existing operational schemes and practices.	
		Norms & standards	This is linked to existing standards and norms and their expected evolution, planned participation by partners or promotion activities toward associated normalisation working groups.	
		Legislation	This relates to the existing framework and expected evolution, promotion activities toward politics.	
	Change capacity		The flexibility and modularity of the product, its capacity to be upgraded have to be assessed. The involvement of several end users and manufacturers is a crucial hint.	
	Implementation	Excellence		Excellence relates to scientific competencies, knowledge and expertise about the transport industry; benefiting from their global “aura”, experts bring the scientific caution to the project what is essential; peer reviews procedures strengthen scientific objectivity and develop ethics, with positive effects in terms of image. The participation to previous comparable projects or studies is a further asset which contributes to maximize project chances to be successful.
		Representativeness		Different end-users and industrials companies hve to be in the consortium, with different size, origins...Market leaders are welcome... Industries with high market visibility, partners in large EU and international networks. One end-user as a minimum (not sufficient in large projects e.g. IP). Key actors may have to be associated in the course of the project. Whenever a project does not expect industrial application, cooperation between industrials, research institutes and universities will always be fruitful.
		Easiness to learn		Impacts on the required education level have to be assessed; communication toward education community has to be planned.

	Trainability	This relates to the existing training programs such as expected impacts in terms of training.
	Exploitation capacity	This is linked to the partners' current industrial tool and sales forces; geographic implantation; marketing culture; the participation of industrial during the preparation of the proposal is crucial. The involvement and active participation of decision makers contribute to a sustainable project success. Presence of a motivated end-user with allocated resources (no symbolic participation)
	Market potential	The market size, targets, accessibility, penetration rate and growth have to be estimated... A first market analysis is realised to validate innovation potential. Market positioning has to be determined (industry push, market driven?).

6.1.2 Realisation

Table 9: Evaluation grid – EU Transport System RDI project (realisation)

Macro-criteria	Micro-criteria		Specification
Acceptance	Compliance with:	Partners strategy and motivation	This relates to partners strategy (existing products, strategy and plans for the future), industrial partners current and expected RDI efforts, ROI targets.
		EU RDI strategy	This is linked to the relevancy for topics of the concerned FP call(s), past ones (built upon) and future ones.
		End-user needs	This results from the gap between final specifications and users initial needs can strongly impede a RDI project development. Specifications have to be negotiated with end-users.
		Society requirements	Social, environmental and economic impacts of innovation must be assessed. Impacts on organizations, working conditions, qualifications, education and training; safety and security also have to be addressed. Relevant partners (end-users, expert) are responsible to assess the project results at mid-term..
Efficiency	Administration		This relates to partners and coordinator administrative activity, delays for administrative issues. Controls have to be planned at specific milestones conjointly with all partners, with the writing of a concise progress report.
	Dissemination		Website, conferences, newsletters and workshops must allow external actors to easily obtain information on the project development and give a feedback

	Communication with:	EC	Exchanges between the consortium partners and the EC are essential: support is expected from the EC, and availability / work capacity of the project officer and the financial officer to deal respectively with the project (for support and guidance) and financial resources (e.g. to travel). A strong collaboration must be maintained throughout the project.	
		External entities	It is important to keep in touch with beneficiaries, interest groups and experts in the specific research area during the project. The external communication ensures this exchange of knowledge, which allows an outside reflection of the results and approach.	
	Integration	This relates to the coordinator activity, running of the internal communication process, existence of a detailed consortium agreement and process to manage IPR and the protection/exploitation of knowledge (patents), level of the communication between researchers and workers, acceptance/awareness of cultural differences, dissemination activities. It also concerns the different collaborative mechanisms. It also concerns partnership stability: this factor is crucial; a high frequency and number of changes in the consortium composition is a threat to the project stability and success. Objective is to reach a common understanding about project targets and approach is crucial: uncertainties and misunderstandings create a lot of additional work and may even put in danger the project quality.		
Viability	Financial plan	A financial plan has to be elaborated, detailing the level of investments, exploitation and maintenance costs, partnership's investment plans, indicators to judge of the cost-effectiveness, profit vs. time curve (horizon, total), adequacy of expected ROI with partners targets...		
	Funding and budget	This is linked to the financing delays and budget consumption progress.		
Capacity	Innovation	Innovation level	Comparison has to be drawn with existing products/projects to identify improvement beyond the state of the art.	
		Quality of achieved results	This relates to the innovations obtained, patents obtained, success of review meetings. An external relevant partner (end-users, expert) must assess the results of the project at mid-term to allow to redirect the project.	
	Implementation	Compatibility with:	Technologies	Compatibility with existing technologies (interoperability and interconnectivity level) has to be assessed.
			Operations	Impacts on existing operational organisation have to be estimated.

			Norms and standards	This is linked to the existing standards and norms and their evolution, participation by partners or promotion activities toward associated normalisation working groups. Discussions have to begin early in the project and will be reactivated at the project end, standardization being a long term process.
			Legislation	This relates to the existing legislative framework and its evolution, political support, promotion activities toward politics to obtain support; besides support from EC is a great advantage.
		Excellence		This is linked to the level of knowledge and expertise on the transport environment of research partners, participation of experts, authorities and operators, on-site visits and immersion with operators realised. Key actors may have to be involved during the project to allow the validation of the products features with the current rules/norms and to support the innovation.
		Change capacity		Flexibility and modularity obtained for the product, capacity to be upgraded have to be assessed. This require the validation of several end users and manufacturers, such as the realisation of various dissemination activities. This relates to the differences between cultures and histories, geography, geopolitics, ideologies inside EU.
		Knowledge management	End-users awareness	This is linked to the level of awareness of potential users, communication activities realised to make people knowledge evolve (e.g. to present the benefits of the system), on-site tests (to make users participate and judge on their own), prototype final coverage. Impacts on the average level of education required. This also concerns knowledge protection regarding patens or innovation. This has to be firmly managed all along the project.
			Education change	
			IPR	
		Exploitation of project results		This concerns activities realised toward the product commercialization (in conjunction with initiatives toward standardisation and legislation). If a project aims to commercialise its result, a timely start of their preparation is needed. As a successful commercialisation is mostly very difficult to achieve, a careful preparation is mandatory.
		Trainability		This relates to the planned evolution of training programs, impacts in terms of training. A Transition Period Management Plan has to be elaborated.
		Visibility		The possibility to demonstrate the project result with real examples (software/hardware prototype, demonstrators) is crucial for an effective promotion and commercialisation. Make benefits visible promote the innovation adoption. Demonstration further allows showing tangible results and increasing end-users awareness. Visibility also concerns the EC and its capacity to disseminate information about the FP (e.g. to interest industrial partners); indeed it is important for the EC to facilitate the understanding regarding the steps to follow in order to enable RDI for industry partners and private companies

	Geographical coverage	Considering the features of modern Supply Chains, it is recommended that projects consider the overall international context.
	Market potential	A market study has to be developed including the critical mass of market, targets, accessibility, penetration rate estimation and growth, partnership's commercial potential (available networks), opportunities, competition, promotion activities toward potential clients...

6.1.3 Afterwards

Table 10: Evaluation grid – EU Transport System RDI project (afterwards)

Macro-criteria	Micro-criteria		Specification
Acceptance	Compliance with	Partners expectations	This relates to the existing products, market position, RDI efforts, and plans for the future.
		European research strategy	The relevancy to the past (built upon), current (concerned) and future (EU plans) FP thematic and topics in relation to freight transport has to be estimated.
		End-user needs	This relates on the natural gap (hard to avoid in modern society) between final specifications and users initial demand; indicators measuring benefits of the system have to be built and estimated to convince end-users.
		Society requirements	This relates to the respect of environment, safety and security, such as the quality of life (decrease stress of human beings), and the respect of ethics and human rights including privacy.
Efficiency	Accessibility		A long-living and updated website and long term accessibility to project public documents are highly recommended.
	Continuity of post projects activities		This is linked to the setup of projects follow-ups, negotiations for a potential commercialisation, dissemination activity, publications.
	Dissemination		This concerns the transfer of knowledge, notably the number and quality of dissemination actions. The level of awareness of potential end-users has to be assessed, communication activities have to be planned to increase people knowledge (e.g. with regards to the benefits of the system).
	Communication	EC	It is crucial to maintain collaboration with EC project officer and financial officer.

		Other	Communication activities are required toward education community to promote evolution of education programs (in case an innovation implies the average level / content of education to change), but also toward decision-makers, workers or trade unions for social issues, and environmental lobbies for societal concern. New “champion” may be targeted, to promote the innovation inside his/her organisation. In parallel, lobbying activities have to be organised and political support has to be found.
Profitability	Financial plan		Financial forecasts of commercialisation activities have to be given.
	EC contribution afterwards		This may be linked to funding of follow-up developments, animation of an open pool of end-users.
Capacity / Feasibility (implementation)	Excellence		This relates to the level of knowledge and expertise for exploitation of project results. Market access is a critical parameter; the relevancy of partners for exploiting project results has notably to be evaluated in regards of his/her capability to access the market.
	Innovation level		Evaluation audit must be undertaken to finally judge of the technical performances of the product, of the quality of service obtained.
	Change capacity		Flexibility and modularity of the product, capacity to be upgraded have to be assessed. The validation of several end users and manufacturers is crucial. This is linked to the differences between cultures and histories, geography, geopolitical situation, ideologies and religions inside EU.
	Compatibility with:	Technologies	This concerns interoperability and interconnection capacity.
		Operation	Indicators to measure impacts on exploitation have to be built and estimated.
		Norms and standards	This relates to the existing standards and norms and their evolution. This requires participation by partners or promotion activities toward associated normalisation working groups.
Legislation		This relates to the existing legislative framework and its evolution.	

	Availability	There should be a time period of 3 to 5 years after the project end when the coordinator and/or partners should be available upon request from the EC for the provision of data or results to following projects. Indeed the difficulty in getting information from projects that ended recently is unacceptable. This has to be considered adequately from the beginning.
	Market potential	A detailed market study is elaborated, detailing e.g. market price, time to market, market needs (maybe changed during project), industrial project participation (to exploit results commercially). Often stakeholders complain that they cannot identify the direct impacts of project results at short terms; there's a lack of short terms projects, and of information about time to market: benefits resulting from the innovation, differentiation from competitors and time to market have to be made visible to promote adoption.
	Trainability	This relates to the evolution of training programs. A Transition Period Management Plan has to be elaborated and followed.

6.2 Performance Targets to assess relevance of RTD projects

In frame of the diagnosis of the present within Work package 3 a framework for performance targets has been elaborated. For each transport mode a set of indicators has been identified for the different stages “genesis”, “realization” and “finalization”. In the following section parts of the excel matrix are being shown and explained. The overall version is being provided as an excel file separately and can be also found on the project CD-ROM which will be available to the wide audience.

The performance targets should allow an assessment of relevance and impacts of transport research initiatives. In the phase of project genesis indicators regarding project subject and approach, duration and stakeholder involvement are of great importance. In the project implementation phase indicators like stability of consortium, consideration of existing technologies, focus on commercialisation and CEN involvement are to be evaluated. Indicators for the follow up phase of a project are related to commercialisation activities, dissemination and data availability after duration.

Each criterion is being described in the column “explanation”. The relevance of the criteria regarding project genesis evaluation is being justified in a separate column. The criteria are being allocated with regard to the different types of projects respectively funding instruments according to their relevance. Moreover it is being indicated which stakeholder has influence on the indicator, which transport mode is being addressed and how it can be measured (quantification of effects). Furthermore the operationalization of the indicators can be found in the table referring to the responsibility, how it should be used, data requirements for the evaluation, links between TST levels, key performance relevance and impact on FP success.

It should be mentioned that the following table is an excerpt out of a comprehensive indicators matrix, related to all transport modes. The table is not exhaustive; looking at specific projects some specific criteria to be defined may apply.

Table 1: Intermediate performance targets for R&D projects/ FPs (specific to intermodal)

TOWARDS THE DEFINITION OF KEY PERFORMANCE INDICATORS/TARGETS TO ASSESS THE RELEVANCE AND REAL PROBLEM-SOLVING NATURE OF R&D PROJECTS/Framework PROGRAMMES IN TRANSPORT							
	Name of indicator	Explanation	Justification of its relevance	Relevant to Project type	Who backs it clearly?	Relevant to which transport mode?	How could it be measured?
Genesis	Market-driven subject	Whether the idea's genesis involved the targeted actors	involv actors targeted=research fitting their needs	STREP/IP	The market (see demand analysis)	all intermodal related projects with planned demos/new techniques	%age of actors verified as really involved in the genesis
	antecedent of the subject when not presented as a breakthrough innovation	Is the subject based on or exploiting previous results?	Continuity. Shows that (intention?) to build on previous results	all	Commission for verifying the usefulness of its funded transport	all intermodal related projects	number of previous projects dealing with the subject and which have been truly considered
	Project duration	Is the duration adequated regarding the project type?	Quality and efficiency of research	all	Commission	all intermodal related projects	number of years
	Integrated approach	R&D must be supported by standarads, legislation and external communication	Quality and efficiency of research	all	Commission and the market	all intermodal related projects	enough work package dedicated to these topics
	Innovation	Projects presented as innovative should clearly demonstrate the added value for the operators.	Usefullness of the research	all	Commission and the market	all intermodal related projects	Description of the added value
	Number of consortium participants	The number of consortium partners should be limited	to avoid averhead costs	all	Commission	all intermodal related projects	A number of 10-15 is considered as a maximum (If a greater number of actors is necessary for the realization of the project, these actors can be included in the project Advisory
	Involvement of industrial	Are industrial involved during the genesis to the project?	Quality and Relevance of project	all	Commission, the market and partners	all intermodal related projects	number of industrial as partners or in the advisory board
	Involvement of end-users	Are end-users involved during the genesis to the project?	Quality and Relevance of project output	all	Commission, the market and partners	all intermodal related projects	number of end-users as partners or in the advisory board
	Minimum level ressource per partner	A minimum level of resources and budget should be guaranteed per		all	Commission and partners	all intermodal related projects	benchmark with other projects of the same nature

	How to put it in place? Who is responsible?	How to verify/monitor it? Who is responsible?	Data needs and data sources to measure it?	Is it a unisectoral or multisectoral indicator?	Does it express any strong link S<->S or T<->T or S<->T?	Is it a Key Success Factor, critical to the project success?	Does it have an impact on the underlying Framework Program success?
Genesis	should be among criteria selection of projects. Commission=responsible	Match/Gap with accepted <u>threshold values (?)</u> . Commission=respon	Project proposal, assessors' views, interview of announced actors in the proposal	sectoral [genesis]	Yes a strong link Tech-Society	Yes. Mainly for STREP/IP projects that involve development of new techniques meant to be put quickly into the market	Yes if the aim of the FP is to answer actors'needs
	should be among the criteria for projects selection. Commission=responsible	Intensity/degree of usage of previously funded results	Project proposal, assessors' views, obligation to show the intensity usage of previous results	sectoral [genesis]	Yes a strong link Tech-Tech and Tech-S	Yes, in case of a project " <i>not-a-breakthrough-innovation</i> ". Assures continuity of...	Yes because it shows the necessary continuity and/or relevance (to the market) of the previous FP
	Commission	Monitoring by Commission	Project proposal	multi (genesis, implementation)	Yes (Tech-Tech and Tech-S)	An inappropriate project duration may generate delays or inefficiencies but does not necessarily endanger the final project success.	Yes, if the results are not delivered in time, no aggregation with related projects can be made.
	should be among the criteria for projects selection.	Monitoring by Commission	Project proposal	multi(all)	Yes (all)	Yes	Yes, direct
	should be among the criteria for projects selection. Commission=responsible	Monitoring by Commission	Project proposal	multi(all)	Yes (Tech-Tech and Tech-S and Tech-Terr)	Yes, in case of breakthrough innovative projects	Yes, direct
	should be among the criteria for projects selection. Commission=responsible	Monitoring by Commission	Project proposal	multi (genesis, implementation)	Yes (Tech-S and S-Terr)	Yes	Undirect
	should be among the criteria for projects selection.	Monitoring by Commission	Project proposal	multi(all)	Yes (Tech-S)	Yes	Yes, direct
	should be among the criteria for projects selection.	Monitoring by Commission	Project proposal	multi(all)	Yes (Tech-S)	Yes	Yes, direct
Partners	Monitoring by Commission	Project proposal	multi (genesis, implementation)	Yes (Tech-S)	Yes	Undirect	

TOWARDS THE DEFINITION OF KEY PERFORMANCE INDICATORS/TARGETS TO ASSESS THE RELEVANCE AND REAL PROBLEM-SOLVING NATURE OF R&D PROJECTS/Framework PROGRAMMES IN TRANSPORT							
Name of indicator	Explanation	Justification of its relevance	Relevant to Project type	Who backs it clearly?	Relevant to which transport mode?	How could it be measured?	
Implementation	Stability Consortium	To verify the frequency and number of changes in consortium composition of the consortium composition	An unstable consortium is risky more particularly when the targeted actors leave it.	all	Commission, Project partners reputation	all intermodal related projects	Number of partners leaving per reporting period, type of partners leaving, reasons for leaving
	CEN involvement	to involve the CEN authorities during the project implementation	Quality and Relevance of project output	IP STREP	Commission	all intermodal related projects	Number of contact with CEN authorities and workshops
	External communication (website and dissemination)	To ensure public awareness of the project	efficiency of research	all	Commission	all intermodal related projects	Number of training and promoting events
	Focus on existing technologies	To apply existing technologies in a certain context	efficiency of research	STREP/IP	Commission	all intermodal related projects	benchmark, degree of consideration of existing technologies
	Focus on commercialization and implementation	to have a real output	success of commercialization	STREP/IP	Commission	all intermodal related projects	impact assesment and SWOT analysis
Follow up	Commercialisation of project results	are the targeted actors getting really profit from the project results	A project intended to help actors and whose results are not use by these is a failure	mainly for STREP/IP.	Commission, Project partners reputation, actors	all intermodal related technical projects	Number of patents, number of solutions applied, etc.
	Organisation of activities after the project end		the official project end should not correspond with the project end for the coordinator and/or key partners	all	Commission and public	all intermodal related projects	Number of promotion activities and publications
	Long term accessibility of project documents	to verify ifl the public documents are available	Too many reports are not available and website not updated.	all	Commission and public	all intermodal related projects	Number of detailed project result documents available over the internet
	Availability of the project coordinator and/or partners	There should be a time period of 3 to 5 years after the project end where the coordinator and/or partners should be available upon request from the Commission	the provision of data or results to following projects	all	Commission and public	all intermodal related projects	Coordinators or partner

	How to put it in place? Who is responsible?	How to verify/monitor it? Who is responsible?	Data needs and data sources to measure it?	Is it a unisectoral or multisectoral indicator?	Does it express any strong link S<->S or T<->T or S<->T?	Is it a Key Success Factor, critical to the project success?	Does it have an impact on the underlying Framework Program success?
Implementation	Commission and Coordinator	Monitoring by Commission	Periodical reports	multi (genesis, implementation)	Yes a strong link S-S and S-Tech	Yes	Yes. It expresses obstacles to get access or pursue a EU project and interest of the targeted actors toward the FP
	Coordinator and partners	Monitoring by Commission	Periodical reports	multi (genesis, implementation)	Yes (Tech-S)	Yes for pure tech projects	Undirect
	Coordinator and partners	Monitoring by Commission	Periodical reports	multi (all)	Yes (Tech-S and Tech-Terr)	Yes	Yes
	Commission	Monitoring by Commission	previous projects reports, periodical	multi (genesis, implementation)	Yes (Tech-S)	specific to some projects	Yes
	Coordinator and partners	Monitoring by Commission	reports	multi (genesis, implementation)	Yes (Tech-S and Terr-S)	Yes	Yes
Follow up	Commission, Coordinator and partners	Practical solutions really put into operation	Actors/market feedback	uni (afterwards)	Yes a strong link S-S and S-Tech	Yes. Mainly for STREP/IP projects that involve development of new	Yes. It expresses the real usefulness and added value awaited from any FP R&D
	Coordinator and partners	Commission	annual reports	uni (afterwards)	Yes (Tech-S and S-Terr)	Yes	Yes
	Partners	Commission and partners	Internet	multi (implementation, afterwards)	Yes (all)	Yes	Yes
	Coordinator and partners	Commission	Coordinators or partner	multi (implementation, afterwards)	Yes (Tech-S)	Yes, the difficulty in getting information from projects that ended recently is unacceptable	Yes

7 Conclusions

The conclusions for the different analyses regarding past, present and the future have to be differentiated. Concerning the FP5/6 project evaluation it can be concluded that the actors of the selected projects have all expressed that the framework programmes have a positive impact in the transport field, despite some malfunctioning. The actors have highlighted that these Framework Programmes give the opportunity to collaborate with knowledgeable partners and create networks. These networks are beneficial in order to move forward the research. The European Research Framework Programme is undoubtedly an essential tool. Maintaining its pertinence and raising continuously its quality level and efficiency is of great importance for the achievement of the European Transport Policy Objectives.

Looking at the work process of data gathering it can be concluded that for a qualified and detailed analyses the appropriate data and information are in most of the cases not or not sufficient available. Even in some cases the minimum required information for a short evaluation is not available.

WP3 “Diagnosis of the present” revealed that RDI demand from actors comes from various factors and is mainly shaped by evolutions in legislation and policy (e.g. respect of environment, security). Further drivers are the economic situation and RDI initiatives aiming at optimizing the concerned transport operations, improving its image or enhancing its integration into logistic chains.

Specific characteristics of the transport systems in Europe are affecting the competitiveness in the different modes. In some modes there is lack of innovation-friendly environment. Therefore the implementation of enablers seems essential, aiming notably at harmonizing transport market regulations throughout the different Member States.

Comparing to FP5/6 the research initiatives in FP7 are closer to the market demand than before. This demand is generally covered either by the FP7 activities or by the market. But other aspects are lacking. The project lifecycle perspective should be introduced, the proposed whirlwind model applied and performance indicators for project evaluation developed. The implementation of clear national dissemination strategies for the heterogeneous European transport system is also of great importance. The EC is encouraged to be creative and innovative to redesign the FP.

As guidelines for implementation of RDI management an innovative approach is proposed to lead European research initiative and projects to a higher level of maturity. The proposed approach could be achieved by a close integration of European projects, research demand from the different actors and professional dissemination activities during and after a research project. There should be a closer loop from real innovations to commercialisation and other innovative ideas to further research activities.

8 Management aspects

8.1 Consortium

AIMS consortium bring together partners from six different countries drawn from leading industries (PTV), administration (CETMEF), universities (Budapest, Brussels) and engineering bureau and consultancy (TLA and ICES, being two SME) with extensive operational expertise in the field of freight.

- Each partner has been involved in various projects in the field of freight transport, in various geographical areas in Europe including the Candidate Countries; most of them have already work together, through different projects or studies;
- AIMS participants have different areas of expertise and complementary skills (per each mode of transport and intermodal, considering logistics, infrastructure, technology, operation, socio economics, safety, environment, IT, dissemination, workshops animation, costs-benefits methodologies, ...);
- Through their experience, AIMS partners dispose of active networks to rely on;
- AIMS is co-ordinated by PTV which has already been highly involved in the management of complex and large projects and therefore is able to manage the consortium as well as the co-ordination action in the best optimal way.

8.2 Beneficiaries

8.2.1 Planung Transport Verkehr AG

Partner N°	Acronym	Country	SME	Expected role
1	PTV	Germany	No	Coordinator. In charge of administrative and financial management and dissemination activities. WP1 and 6 leader

The corporate headquarters of PTV are situated in Karlsruhe (Germany). At present (2010) PTV has a workforce of about 450 employees. PTV offers a complete and integrated set of services covering all important problems for today's and the future's traffic and transport. The interdisciplinary working teams of PTV deal with complex planning tasks related to all transport systems, integrating information technology (IT), communication technology and geographical information systems (GIS). PTV is active in the product fields of Transport Logistics, Transport Telematics, Transport Planning, Public Transport, GeoMarketing and Infomobility but also engaged in Research & Development. The Business Unit Transport Logistics deals with solutions for strategic and operational transport-, trip- and route planning for companies active in the fields of freight transport and fleet management. The range of services - based on interactive solutions using GIS functionality - comprises the fleet management, mobile communication, trip planning, route planning, load optimisation, distance matrix, and vehicle scheduling and operation planning. In addition, PTV built up considerable experience within the management of applied research projects both on national and European level, in particular within the areas of transport telematics, transport

modelling, mobility and intermodal freight transport. PTV leads/led the EC projects SIMTRAP (DG III), ITIP, OSIRIS, IRIS, IDIOMA, INFREDAT, BESTUFS, BESTUFS II, PROMIT (all DG VII/DG TREN) VITAL, WELCOM, SURFF, UGFFM I + II, FLEETMAP (all DG XIII/DG IST) and participates/ed in the projects RTR (DG I), TROPIC I + II, SITS, OSSA, SUTRA, EUTP, PROTRANS, SPIN (DG VII/DG TREN), INTACT, COMETA, ASAP, MOSCA (DG XIII/DG IST), CASTORE and ENTIRE (DG XVII), KOMODA (DG RTD), SPIN ALP, e-Freight (DG MOVE)

8.2.2 Centre d'Etudes Techniques Maritimes Et Fluviales

Partner N°	Acronym	Country	SME	Expected role
2	CETMEF	France	No	Responsible for analyses of inland waterways issues.

The Institute for Maritime and Waterways Studies (CETMEF) is an engineering department of the French Ministry of Transport, Infrastructure, Tourism and the Sea with 250 employees. It leads studies and research in the following fields: port, river and coastal engineering, maritime safety, sea and river telecommunications, socio-economic aspects of maritime and inland navigation. The division of spatial planning and transport systems (five engineers and technicians) has the following tasks:

- Technically inspects the projects of the state waterways and sea ports;
- Aids state ports authorities and the state waterways company Voies Navigables de France for the lay-out of the channel fairway, port spatial planning (terminal capacity, inland interface), port equipment, etc;
- Simulates canal and port operations, with different simulation models (bulk cargo handling SITAP, waterways traffic SINAVI, channel fairway traffic SIM2000).

Moreover, the division currently participates to three FP6 European research projects:

- EFFORTS (Effective operation in Ports) which aims at improving port services to ships;
- MARTEC (MARitime TEChnologies) which deals with the strengthening of the coordination of national research programs in the field of maritime technologies;
- CAPOEIRA (Coordination Action of Ports for Integration of Efficient Innovations and development of adequate RTD Activities) which aims at identifying key success factors for port RTD.

8.2.3 TL & Associés

Partner N°	Acronym	Country	SME	Expected role
3	TLA	France	Yes	Participation to the methodological support and to management and dissemination activities. WP2, 4 and 5 leader.

TLA is a French consulting agency and engineering bureau currently made of six senior consultants and three junior specialised in logistics and transport. TLA main specific skills and areas of expertise concern:

- Environmental topics (e.g. ISO 14001);
- Logistics and transports with notably a specific expertise concerning technologies, systems and organisations especially in ports and of the intermodal world;
- ICT aspects (information and communication systems, tracking & tracing technologies).

Backed up by a global network of experts, TLA resources bring the different key elements required to address global studies:

- Their high-value operational and engineering experience (notably in terms of management of information and physical flows);
- Their knowledge of economic and strategic stakes;
- Their expertise to formulate operational objectives;
- Their competencies to apply different methodologies (users' requirements, functional and value analysis, socio-economic, multi criteria analysis).

TLA is composed of four departments: Innovation, Solution, Environment and ICT. The innovation department which will be in charge of AIMS notably aims to:

- Promote development and set up of innovative systems and organisations;
- Communicate on results of projects to encourage use of innovative systems;
- Be aware of the state of the art and anticipate market evolutions;
- Carry out research, development and demonstration projects;
- Collaborate with industries, consultancies, research centres and local administrations to promote efficient developments.

8.2.4 International Consulting Environnement Services

Partner N°	Acronym	Country	SME	Expected role
4	ICES	France	Yes	Participation to the methodological support. Participation to dissemination activities. WP3 leader.

ICES is a French consulting agency born in 1997 specialised in intermodal transport. ICES main specific skills are related to transport operational environment. ICES areas of expertise concern rail, road, maritime and handling organisations design. Through its various and experiences, ICES has developed strong know-how regarding socio-economic methodology juridical aspects dealing with Intellectual Property Rights. ICES has participated to various national (for the French Ministry of Transports) RTD projects, such as NIM/ATC (dealing with the creation of new sea-port interface) and SATF (to develop alternatives to the road transport on the North/South axis). ICES has also participated to the audit of the combined transport between France and Germany and has been charged by the Spanish regional Aragon Government to set up the Saragosse intermodal platform. ICES has also participated to different EC RTD projects such as INHOTRA (dealing with horizontal handling solutions)

and POSEIDON (to ensure wastes transport using inland waterways). ICES currently participates to different EC RTD projects such as CAPOEIRA (aiming to minimize risks of port RTD projects), SECURCRANE (dealing with technological innovation on ship-quay interfaces and associated socio-economic issues) and EFFORTS (integrated project in the field of ports operations, participant to the coordination, training and socio-economic analysis activities).

8.2.5 Közlekedestudományi intézet kht. (Institute for Transport Sciences)

Partner N°	Acronym	Country	SME	Expected role
5	KTI	Hungary	No	Responsible for analyses of road issues.

The first predecessor of KTI was established in 1938 by the minister for trade and transport affairs, under the name of the National Automobile Experimental Station. Since then the activities covered by the institute have grown continually and now include such areas as transport safety, traffic engineering, transport policy, environmental protection, passenger and goods transportation, transport by water and air, network planning and transport economics. The institute has operated under several different managerial formats since its establishment; it was a budgeted research centre under corporate management system, and from 1993 to 2003 operated as a joint stock company. In all cases, though, it has remained in state ownership. In January 2004, the Government of the Republic of Hungary passed resolution N0 2338/2003 (XII.23) transforming KTI into a non-profit company.

KTI has developed a wide range of international relations, and is a member of the European Conference of Transport Research Institutes (ECTRI), the Forum of European National Highway Research Laboratories (FEHRL) and the Forum of European Road Safety Research Institutes (FERSI). KTI representatives participate as national experts in various bodies, including the European Conference of Ministers of Transport (ECMT), the technical commission of the European Commission, the UN ECE WP.1, WP.5, WP.29 working groups, and the European Road Transport Research Advisory Council (ERTRAC). The institute is a member of the World Road Association (AIPCR-PIARC), as a member provides data for the International Transport Research Documentation (ITRD), and is a member of the International Road Traffic and Accident Database (IRTAD) of the OECD countries. The most significant KTI projects within the sphere of the EU IV-VI framework programmes are: ALSODANUBE, AMADEUS, ARTEMIS, CODE-TEN, COMPRIS, FORMAT, IN-SAFETY, LIFETIME, PARIS, ROSEBUD, SAFETYNET, SARTRE, SCENARIO, SCENES, SUNFLOWER-6.

8.2.6 Institute of Ship Operation, Sea Transport and Simulation, Hamburg University of Technology

Partner N°	Acronym	Country	SME	Expected role
6	ISSUS	Germany		Responsible for analyses of maritime issues.

ISSUS was established in 1995 as a unit of Hamburg University of Applied Sciences. Since 1st April 2004 ISSUS has become an entity of the faculty of shipbuilding of the Hamburg University of Technology (TUHH).

The overall objective of ISSUS at TUHH is to provide a complete picture of waterborne transport as part of the whole intermodal chain. This is done by investigating its modules, from ships and terminals to pre- and post-sea transport, storage and distribution. Competitive waterborne transport of passengers and goods calls for innovative ship design, safe operation, easy transfer from and to other carriers and efficient boarding and loading facilities. Students involved in the research itself or participating in lectures delivered by ISSUS gain significant benefits because the application of advanced technologies bridges the gap between scientific knowledge and industrial state of the art.

ISSUS contributed to WP2 analyses and exited the project in August 2009.

8.2.7 IVT / ETH Zurich

Partner N°	Acronym	Country	SME	Expected role
7	ETH	Suisse	No	Responsible for analyses of rail issues.

Swiss Federal Institute of Technology Zurich ETZH is one of the two Swiss technical universities. Institute for Transport Planning and System IVT is responsible of education for civil transportation engineers and a centre of competence in the transportation research. IVT works especially in the field of freight transport and logistics since 1994 and gained a strong reputation. Main focus is on operation processes and infrastructure planning of intermodal transport systems. The IVT's latest research in intermodal transport analysed actual conditions and future potential of European intermodal transport on east-west axes and developed business, market and operational strategies for the operators involved [WICHSER ET AL. (2006)]. Actual projects with connection to intermodal transport are the analysis of a new energy, noise and wear optimised freight wagon bogie construction together with the TU Berlin and the proposal for a new rail infrastructure access charge system for Switzerland. Any research on (intermodal) freight transport was done at the IVT in the context of the 4th and 5th EU Framework Programmes in the projects IMPULSE, IDIOMA and INHOTRA.

8.2.8 Centre de recherche public Henri Tudor

Partner N°	Acronym	Country	SME	Expected role
8	TUDOR	Luxemburg	No	Responsible for analyses of air issues.

Created in 1987, the Public Research Centre Henri Tudor's main aim is to promote innovation in both the private and public sectors by offering a large panel of services and activities: R&D projects, technology transfer, technological assistance and consulting, high level training and qualification, doctoral research, animation of innovation networks, high-tech business incubation. The Public Research Centre Henri Tudor can rely for these activities on a large industrial and institutional partnership. Its main departments are the Laboratory for Industrial Technologies and Materials (LTI), Centre for IT Innovation (CITI), Resource Centre for Environmental Technologies (CRTE), Resource Centre for Health Care Technologies (CR

SANTEC), Resource Centre for Information Technologies in Construction (CRTI-B), SITec® “Lifelong Learning for Technological Innovation”, Technology Watch Centre (CVT) and the High-tech business incubator TECHNOPORT. The Public Research Centre Henri Tudor coordinates eleven innovation platforms: “Quality and certification of IT services”, “Innovation systems security”, “Interoperability standards and e-business”, “e-learning, knowledge management and networked organisations”, “Statistical and prospective studies in the knowledge economy”, “Cleaner production”, “Sustainable construction”, “Health care technologies”, “Information technologies in construction”, “Renewable energies” and “Free and Open Source software”. Every innovation platform gathers around a national strategic goal a range of partners and of multidisciplinary research and transfer activities. More information can be found on the web-site: www.tudor.lu.

8.2.9 Universite Libre de Bruxelles, Unit QALINC@

Partner N°	Acronym	Country	SME	Expected role
9	ULB	Belgium	No	Responsible for analyses of intermodal issues.

QALINC@ is the unit of ULB whose research, teaching and expertise activities are dedicated to Logistics, Supply Chain Management, Quality Management and Transport Management. It belongs to the Faculty of Engineering Sciences (Polytech) of ULB.

QALINC@ R&D activities are built around five axes:

1. Development, through modeling and simulation, of advanced methodologies and tools for a better understanding of the key factors of any nature (including emerging technologies such as RFID, etc.) which impact the structure, integration, sustainability and performance of logistics, transport & supply chain processes;
2. Integration of ideas from the latest research with best practices to highlight the innovative and proactive ways in which organizations can leverage the supply chain to create competitive edge and capture the most value, with a special emphasis on sustainable cross-functional integration that is crucial to drive logistics and supply chain excellence;
3. Aid to the design and implementation of logistics, transport and supply chain solutions: innovative (*i-solutions*), intelligent (*e-solutions*), secure (*s-solutions*) and sustainable (“green”-solutions);
4. Development of advanced systems for benchmarking and auditing the quality and performance of logistics, transport and supply chain processes;
5. Dissemination of knowledge through an active contribution to the implementation worldwide of excellence and knowledge centers (training, research, expertise) in logistics, transport and supply chain management.

8.3 Partners – contact persons

Planung Transport Verkehr AG (PTV)

Stumpfstr. 1, 76131 Karlsruhe, Germany

Marcel Huschebeck

Phone: +49-721-9651-178

marcel.huschebeck@ptv.de

Michael Schygulla

Phone: +49-721-9651-7284

michael.schygulla@ptv.de

Centre d'Etudes Techniques Maritimes Et Fluviales (CETMEF)

Bd Gambetta 2, 60321, Compiègne, France

Lionel Kasniewski

Phone: +33-344926015

lionel.kasniewski@developpement-durable.gouv.fr

TL & Associés (TLA)

22 Rue Pasteur, Levallois Perret, 92300, France

Thierry Leguilloux

Phone: ++33147305460

tlg@tl-a.com

Yann Tremeac

Phone: +33147305464

Yann.tremeac@tl-a.com

International Consulting Environnement Services (ICES)

23, Rue du Carrouge, Savins, 77650, France

Dr. Jean-Louis Deyris

Phone: +33608519090

ices@wanadoo.fr

Közlekedestudományi intézet kht. (Institute for Transport Sciences)

Thán Károly u. 3-5, 1119 Budapest, Hungary

Dr. Ákos Radóczy

Phone: +36 1-3715987

radoczy@kti.hu

Péter Károly

Phone: +36 1-3715835

karoly@kti.hu

Institute of Ship Operation, Sea Transport and Simulation, Hamburg University of Technolog (ISSUS)

Schwarzenbergstr. 95, 21073 Hamburg, Germany

Prof. Jens Froese

Phone: +49 40428786136

jens.froese@t-online.de

Dr. Svenja Töter

Phone: +49 172 4510495

S.Toeter@tu-harburg.de

IVT/ ETH Zurich

Raemistr. 101, 8092 Zurich, Switzerland

Jost Wichser

Phone: +41 446333093

wichser@ivt.baug.ethz.ch

Stephan Moll

Phone: +41 446333092

stephan.moll@ivt.baug.ethz.ch

Centre de recherche public Henri Tudor (TUDOR)

Avenue J.F. Kennedy 29,

David Evaristo

Phone: + 352 425991502

david.evaristo@tudor.lu

Claire Navarra

Phone: +352 425991504

claire.navarra@tudor.lu

Universite Libre de Bruxelles, Unit QALINC@

Avenue Franklin Roosevelt 50, 1050 Brussels, Belgium

Prof. Dr. Alassane B. Ndiaye

Phone: +32 26502787

abndiaye@ulb.ac.be

8.4 Associated group

The Experts group

The purpose of the Experts group is to provide **scientific and technical caution** to the support action. It is composed by a group of recognized experts having a practical view as well as a global background, with sufficiently complementary experiences, competencies and skills to cover all the issues which should be raised by the support action. It will ensure the scientific quality of the work (and technical validity of results) and that deliverables are notably written in a form accessible to those that make investment decisions (e.g. transport operators CEO). They will bring scientific excellence to the consortium.

In that scope, **each mode of transport (and intermodal)** is associated a dedicated expert, who will provide comments, advices and recommendations on technical aspects (e.g. on RTD project evaluation results, on RTD projects to be analysed and promoted, for the definition of new RTD policy objectives) raised by the analyses realised for the mode of transport he is the expert.

Moreover, a dedicated expert is associated to the methodological aspects, with main role to **participate to the application of the TST approach** i.e. provide comments, advices and recommendations on methodological aspects, notably control the robustness and re-usability of the methodology.

In complement, each expert will in the framework of his activity:

- Control quality of the work and validate results (deliverables);
- Elaborate one article or publication;
- Participate to workshops.

The Experts group is composed by:

- **For the methodology:** Dr. Olivier Klein (**FR**) from the Laboratory of Economy of Transports of the CNRS, PhD es transports economics, expert in transport policy appraisal, technical or political innovations in the transport field;
- **For the road mode:** Patrice Salini (**FR**), formerly researcher in INRETS and former director of cabinet of the Minister of Transports in France, expert in processes, techniques, technologies and organisations of the road mode in Europe (including candidate countries);
- **For the rail mode:** Ing. Eckard Kuhla (**GE**), former DB manager, expert for various issues dealing with the rail mode (infrastructure management, operation...);
- **For the maritime mode:** Capt. Wolf Arlt (**GE**), managing director of Hamburg Port Training Institute (HPTI)
- **For the inland waterways mode:** Mag. Manfred Seitz (**AT**) current Head of Via Donau, expert in the field of inland waterways issues (exploitation, navigation, infrastructure, communication, ...)
- **For the air mode:** Pr. Emilio Larrodé (**ES**) from the University of Zaragoza, transportation division, expert in the field of mechanical and transportation engineering;
- **For the intermodal:** Bernard Josselin (**FR**), former SNCF manager, expert in the field of rail cargo and combined transport