PROJECT FINAL REPORT

Publishable summary

Grant Agreement number: 215455

Project acronym: ROADIDEA

Project title: Road Map for Radical Innovations in European Transport Services

Funding Scheme: Collaborative Project

Small or Medium Scale focused research project

Period covered: from 01-12-2007 to 30-09-2010

Name of the scientific representative of the project's co-ordinator, Title and Organisation:

Dr. Pirkko Saarikivi, Managing Director, Foreca Consulting Ltd

Tammasaarenkatu 5, FIN-00180 Helsinki, Finland

Tel: +358 9 6689 6466

Fax: +358 9 6689 6411

E-mail: Pirkko.Saarikivi@foreca.com

Project website address: http://www.roadidea.eu

Executive summary

The objective of ROADIDEA was to study the potential of the European transport service sector for innovations, to analyse available data sources, to reveal existing problems and bottlenecks, and to develop better methods and models to be utilized in service platforms. These were to be capable of providing new, innovative transport services for various transport user groups, while trialling a formal innovation process to achieve this. The central issue was the Innovation Process itself and its value in undertaking this important task.

The work was organized in three main layers:

- Infrastructure layer: Analysis and development of transport infrastructure, in particular sources and collection of data, development of methods such as data filtering and fusion, and weather and road condition models.
- Innovation layer: New innovative transport service ideas were produced in a systematic way by organising two annual Futures Seminars.
- Exploitation layer: Piloting and testing a selection of the new innovations in real service platforms, evaluating their business potential and user acceptance.

ROADIDEA was focused on the most basic objective of ICT Theme of FP7, working towards a road map for improving the competitiveness of European industry and helping drive and stimulate creativity and process innovation in products and services. The following specific execution objectives of ROADIDEA were achieved:

- The ROADIDEA transport service platform was designed and implemented to test the use and integration of various data and models in the provision of new services.
- The availability of useful data for transport services was analysed.
- New types of data sources and the needs for new kind of services were analysed.
- Better tools and standards were defined to allow for data storage and mediation.
- Better transport and weather models were developed, using the new sources of data in an innovative way.
- Data analysis, fusion and mining features were studied and developed for utilization in services to several different user sectors.
- Innovative new knowledge-intensive products and services for transport users were identified.

The main project outcomes have been a documented and demonstrated trial of formal Innovation Processes applied to ITS services, resulting in a Roadmap and a White Paper “ITS deployment in the future”. Outcomes included an identification of the need for the European Transport Data Portal containing in the first phase an initial common minimum ITS data set and the criteria and processes for its expansion to secure the social and community gains available from the expansion of ITS services.

Detailed information on the project results, the team and all public reports are available on the ROADIDEA website http://www.roadidea.eu .

Table of contents

Executive summary 2

1. ROADIDEA background and objectives 4

2. The Consortium and the work plan 4

2.1 The Infrastructure layer 5
2.2 The Innovation layer 5
2.3 The exploitation layer 6

3. ROADIDEA key results 7

3.1 Innovation of new services 7
3.2 Analysis of available data and models 8
3.3 Transformation of data and models into services and pilots 10
3.4 Sustainable services with feasible business models 14

4. Removing barriers of innovation 15

4.1 Poor prerequisites for services 15
4.2 Poor business models 16
4.3 Fragmented policies of governments 17
4.4 Benefits of services 17
4.5 Privacy and security issues 17

5. Conclusions and recommendations 18

7. Potential impacts 24

7.1 Technological impacts 24
7.2 Socio-economic impacts 26

8. Dissemination and exploitation 27

9. References 28

10. Beneficiaries and contact information 30

1. ROADIDEA background and objectives

Project ROADIDEA (2007-2010) studied in detail the European transport service system, and analysed in particular its potential and barriers for new service innovations. This theory has been tested, and also trialled in practice, by identifying, innovating and implementing new service pilots. The key objectives were to find the major barriers and facilitating factors for new transport service innovations, and offer guidelines for the next steps in an action plan to strengthen the potential for and lower the barriers to transport service innovations in Europe.

As the initial hypothesis, ROADIDEA argued that effective accessibility to all kinds of useful background information combined with advanced data fusion methods and technological information platforms with high level of standardisation are prerequisites for creation of innovative mobility services. These help in developing better information infrastructures as well as public and private services providing Clean, Safe and Efficient mobility for people and goods.

The hypothesis was verified in Northern, Central and Southeastern parts of Europe among the eight partner countries of Finland, Sweden, the Netherlands, Germany, Italy, Hungary, Croatia and Slovenia. Sub-project ROADIDEA-INCO on International aspects extended the focus area to the USA and Canada. The differences of the existing transport systems and available data sources were analysed as well as the problems caused by local climate and geography. The main focus for research was on road transport with all its user sectors, but co- and multimodality and other forms of transport were not excluded.

2. The Consortium and the work plan

ROADIDEA Consortium had 14 partners: Foreca Consulting Ltd (coordinator), VTT (technical coordinator), Destia, Finnish Meteorological Institute and Logica from Finland, Klimator and Semcon Caran from Sweden, Demis from the Netherlands, DLR and Pöyry Infra Traffic from Germany, Arpa Veneto from Italy, Road Safety Engineering Bureau from Hungary, Meteo-Info from Croatia and Amanova from Slovenia. Project started in December 2007 and after duration of 34 months finished in September 2010. The total costs were 5,1 M€.

Work was organised into three main layers:

- ***The infrastructure layer***, analysing and developing transport infrastructure, in particular sources and collection of data, development of methods such as data filtering and fusion, and weather and road condition models.
- ***The innovation layer***, where new innovative transport service ideas were produced in a systematic way by organising two annual Futures Seminars.
- ***The exploitation layer***, including piloting and testing of the new innovations in real service platforms, and evaluating their business potential and user acceptance.

Fig. 1 presents the flow through the main building blocks of a general technical platform for generating information services, and the corresponding Work Packages in ROADIDEA.

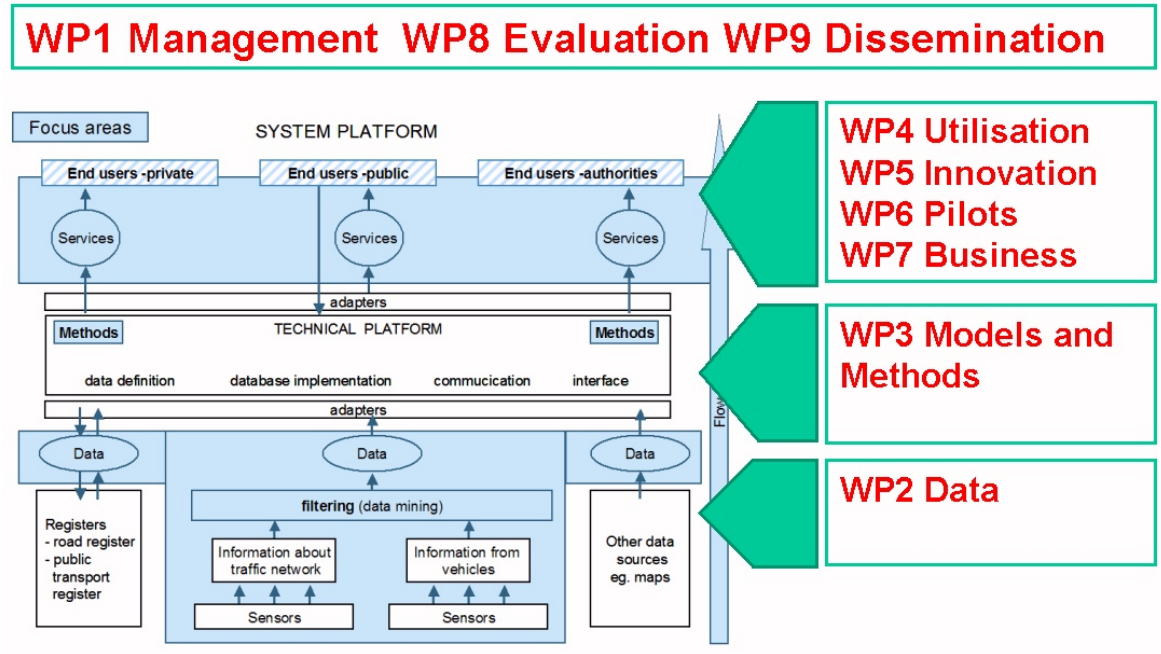

Fig. 1. The building blocks of a general technical platform for information services with related ROADIDEA Work Packages. Revised from [RI_TA, 2007].

2.1 The Infrastructure layer

ROADIDEA created a concrete information infrastructure in a form of a platform for transport services to work with, having all necessary components and ingredients for value formation and service provision. This system concept was studied as a whole and in detail.

To make the new data sources available for service providers there is a need to have access to the basic information and to develop methods to generate new information using all available data. The methods developed utilised a system platform making it possible to have access to wide data sources generated using exclusive methods, such as road weather forecasting models and road congestion models.

2.2 The Innovation layer

Innovation means developing a useful application of new invention or discoveries. The focus may be on the generation, prioritisation or development of radically new ideas, as opposed to on-going, incremental product development. Innovation can be also interpreted as the process of successfully implementing and transforming new ideas into sustainable businesses. However, whether incremental or disruptive, innovation and learning always benefits from experiments that involve customers and partners. Joint innovation, such as in ROADIDEA project, accelerates the innovation process and reduces the time to market.

Ideation process is the key to systematic innovation methods. It is the process for generating, managing and prioritising a list of new or improved ideas. The process is key to ensuring that the ideas generated address the common interests. The innovation methods used in ROADIDEA are drawn from the established Futures Research Discipline. The aspect of innovation work that leads to new idea creation is necessary to find the new, unforeseen ideas that are imperative in the complex multidisciplinary R&D of ITS. The methods used in ROADIDEA proved to be well suited to this work, allowed for the continuous readjustment and redrafting of work, thereby creating an iterative hyper-cycle. Successful innovation calls for multiple types and sources of expertise to be persuaded to interact and contribute in open and honest interaction, and assumes mutual interests amongst the participants to drive the group dynamics.

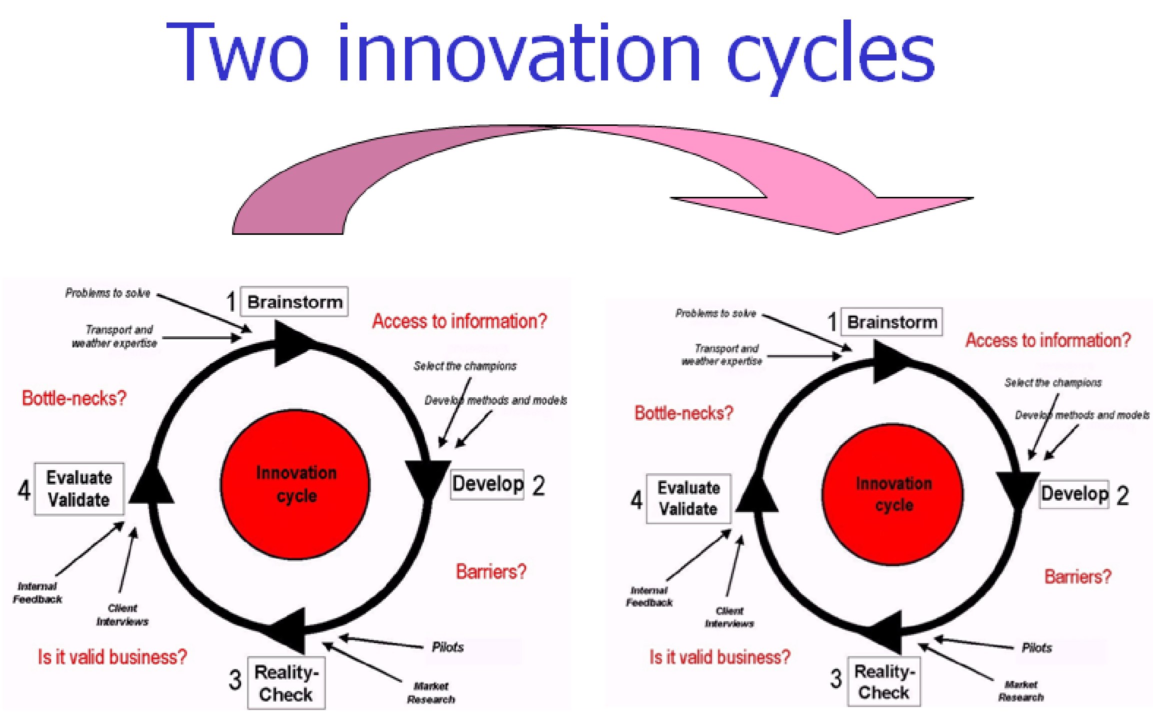

Fig. 2 The ROADIDEA two-cycle innovation work plan

2.3 The exploitation layer

It is a long path from initial new service innovation to a successful, sustainable service. To succeed, one must determine and know the user needs, have access to high-quality data and models, do content formulation well, have reliable real-time management, and realise a final sophisticated and tailored fulfilment of identified needs. Attention to the formulation of appropriate Standards is necessary, as well as the development of feasible business models. Technology is a means to provide safe, clean and efficient mobility services for people and goods. ICT can make all this reality if and when we have acceptance from the market, i.e. the users.

After the first brainstorming event, the most popular ideas were short-listed and chosen for the pilot phase and further development. The most promising services for exploitation were tested with real users. Business models for such information services were analysed, developed and assessed.

Conclusions of the project were summarised in two reports. In the Road Map, ROADIDEA presents a road map to a more innovative and competitive European transport service sector, to be utilised by transport service developers, policy and decision makers. [ROADIDEA 2010a] The white paper "ITS deployment in the future" summarised future visions of transport services in Europe. [ROADIDEA 2010b]

3. ROADIDEA key results

3.1 Innovation of new services

The innovation methods used in ROADIDEA were drawn from the Futures Research Discipline. These are the Futures Workshop and Synectics, as defined by the Millennium Project (a global independent non-profit think tank and collaborative futures research initiative). The methods were used for group work, brainstorming, idea grouping, idea evaluation, and process evaluation. Emphasis was on the innovation process as part of idea refinement as well as initiation, and in catalytic effects across specialist disciplines to move towards fresh new service ideas. Detailed results and evaluation surveys are presented in ROADIDEA reports D5.2, D.5.3, D6.4 and D8.3. [ROADIDEA 2008a, 2009a, 2009b, 2010c]

In ROADIDEA, two innovation creation processes were conducted with 12 months' interval. Each innovation cycle started with a Futures Seminar involving over 30 participants working together for two full days to create new ideas and short-list the best ones for further development. The participants were project partners and invited experts from key stake holder sectors. Altogether more than one hundred ideas where created.

The first innovation seminar (5/2008) created ample material for defining service pilots for further development, defining ideas for research items, and planning the road map.
The second innovation seminar (5/2009) was based on futures scenarios and the scope was to innovate more futuristic services. The results consisted of six futures ideas for new R&D and services, and ample material for new understanding of relevant ITS products and services.

The first innovation seminar in Prague in May 2008 produced various service ideas, of which the most popular ideas were selected for further development. The ideas on surface friction modeling and fog warning system resulted in concrete pilot service demonstrations. Combining traffic and weather models in Gothenburg and modelling the multimodal traffic situation in the Port of Hamburg were selected and analysed as new service concepts.

The second innovations seminar was held in Dubrovnik Croatia in May 2009. Its focus was further in the future and especially on radical innovations, reflecting different predefined future scenarios. Audience selected best service concepts including e.g. semi-public transport of advanced transport services, and cooperative dynamic navigation, which is multimodal and scalable. Results indicate that more advanced traffic models in general and related to major congestion problems are needed. General development needs are in the availability of data, in better user interfaces, and also in stay-home services, to reduce congestion and emissions.

Based on the results from ROADIDEA it can be concluded that more frequent and systematic innovation activities among multi-disciplinary expert groups would be beneficial to accelerate the creation of service innovations and reduce their time to market in Europe. Innovation work as 'idea creation' is necessary to find the new and unforeseen ideas that are imperative in the complex multidisciplinary R&D of ITS. The key findings of ROADIDEA innovation creation activities can be summarised as follows:

- Innovation work should support ITS development plans which set a justified policy framework for burning practical problems to be tackled
- The methods used in ROADIDEA proved to be appropriate for this work, and allowed for continuous readjusting and redrafting of work.
- In Futures seminars where innovative people are brought together, the guidance for work undertaken there needs to be adjusted according to the process flow, thus creating an iterative hyper-cycle.
- Successful innovation calls for multiple sources of expertise to be engaged and encouraged in open and honest interaction, and assumes mutual interests will help to drive the group dynamics. It also calls for a solid knowledge of the state-of-the-art and the state-of-research in core field of discussion (i.e. ITS).
- The ideology of Innovation work is based on cross-fertilisation of diverse expertise and cross-associations of unexpected viewpoints, and thus radicalism cannot be forecast in advance. 'Radical' is a post-modern relativist term, where what is regarded as a radical idea from one expert's point of view is not necessarily so from another expert's point of view.
- Without creative and guided innovation work the ever-present time constraints in collaborative R&D work would substantially hinder success, and new ideas would have far less opportunity to emerge.

3.2 Analysis of available data and models

The data layer of the transport information service platform was addressed in Work Package 2 of ROADIDEA. The work comprised the investigation of a data sources in Europe, concentrating on traffic and weather data, describing data integration efforts, defining data format for a project archive and setting up a Data Mediation platform. The results are published in ROADIDEA reports D2.1-D2.5. [ROADIDEA 2008b, 2008c, 2009c, 2009d, 2009e]

The data survey revealed that the main problem in creating and implementing new mobility services in Europe is at its foundation, the input data layer. The core data set that is presently available throughout Europe is small but invaluable. However, the data needs for new services are numerous and the lack of necessary data is hindering the implementation of many potential success stories. The main conclusions, achievements and barriers for innovation found during the work in WP2 are:

- One of the key problems is the heterogeneous availability of data for ITS in Europe with large differences between highly developed national transportation systems in middle- and northern European countries and the still less developed circumstances in South-Eastern countries.
- Heterogeneous political regulations and data policies still persist, but can and should be addressed in a unified European Union.
- Data necessary for some of the ROADIDEA pilots and ideas proved to be possible to secure locally for demonstration purposes, but some pilots failed because no data was available (eg. the Port of Hamburg pilot).
- Only a few cross-border implementations were feasible with necessary data, and in such cases demonstrations were possible.
- Generally speaking: No ROADIDEA application is ready for European wide implementation due to the lack of the necessary data across Europe.
- The same applies to demonstrations, pilots and applications of some partner projects, such as Easyway. In other projects main data-related findings need to be taken into account.
- Thus, as a main outcome of data consideration in ROADIDEA, the necessity of a common European data catalogue for ITS became apparent and urgent.
- The administrative powers of the EC are needed to support this proposal and to unify the present heterogeneous data policies. The recent political actions in the form of the PSI and INSPIRE Directives have somewhat improved the common data policy, but their influence is not yet evident in everyday life.
- A wider discussion of what to standardise has to be undertaken before moving on to formal European standardisation efforts.
- As a specific action, with respect to the objectives of ROADIDEA (combination of traffic and weather models), and to achieve an initial ITS data inventory, a European wide overview of availability of road weather observations and road traffic observations needs to be summarised with final project reports and recommending papers.
- Such a data inventory will be used as a starting point for a European discussion and may be taken up by several EC working groups and data regulation and standardisation initiatives.
- The main objective of such an ITS data inventory is to ease the data exchange and to allow data comparison and cross-border ITS service implementations.
- If possible and applicable, lessons learned from the international cooperation project ROADIDEA-INCO should be used in order to show the value of the long standing and politically supported US policy of the free availability of public data.
- Examples of other existing platforms and networks to be studied further are the CLARUS initiative in the USA, the global SIRWEC winter weather maintenance community and the European VIKING.

These topics were addressed in all above mentioned project reports and documents.. The key threads to be followed to build on the position reached in ROADIDEA are to:

1. Show the problem of poor availability of ITS data revealed with the data source investigation in ROADIDEA WP2 and its impact for European ITS services,
2. Point out the necessity and grounds for the motivation towards a common data catalogue for Europe to overcome these barriers, and
3. Recommend specific next steps, contributions and related responsibilities.

ROADIDEA Work Package 3 investigated models and methods to be used in the next step: processing of the input data. The methods focussed on data filtering and data fusion. Model building concentrated on forecasting traffic density in relation to weather phenomena, and developing new models for the two most popular new service ideas: Service pilot "Pulp Friction" to forecast and warn drivers about slippery road conditions, and developing a better fog warning service in Northern Italy by combining models, observation sensors and satellite information.

The results of WP3 are documented in ROADIDEA reports D3.1-D3.4. [ROADIDEA 2008d, 2008e, 2009f, 2010d] The results show that weather clearly has an impact on traffic and also that it is possible to build a model with the ability to recognize and demonstrate that poor weather (with weather history), affects traffic in a negative way. The two new models chosen for pilot development, i.e. friction and fog, are maybe the two most challenging parameters for meteorologists to forecast, and these initial models still require substantially more observational and model development studies, and careful verification.

Generally, the development of forecasting models is an on-going process with continuous, incremental innovations such as those made in ROADIDEA. In this work the availability of flows of free data (in-situ observations from surface networks, vehicles, etc.) is of utmost importance, and results in similar recommendations to those made by WP2 on the needs for more and better input data access.

3.3 Transformation of data and models into services and pilots

Transformation of the previously described data and models into workable and sustainable services is an on-going process involving users, experts and developers. User needs provide the fuel for these processes, whereas for prevailing ITS-strategies, regulations and standards provide the framework within which the organisations and enterprises fulfilling these tasks must act.

The fourth Work Package of ROADIDEA analysed these aspects of European transport services, existing systems, architectures and standards. ROADIDEA reports D4.1-D4.6 [ROADIDEA 2008f, 2009g, 2009h, 2009i, 2010e, 2010b] describe the processes in generating new advanced information, utilising this information by private and public end users, technical requirements and specifications of driver and traveler support services, and document useful existing standards and standardisation requirements. Some visions for the future deployment of ITS in Europe are given in the last document. WP4 provided summary analyses of the other technical work packages of ROADIDEA and thus provided a combined vision of major barriers and facilitative factors in the process of innovating mobility services.

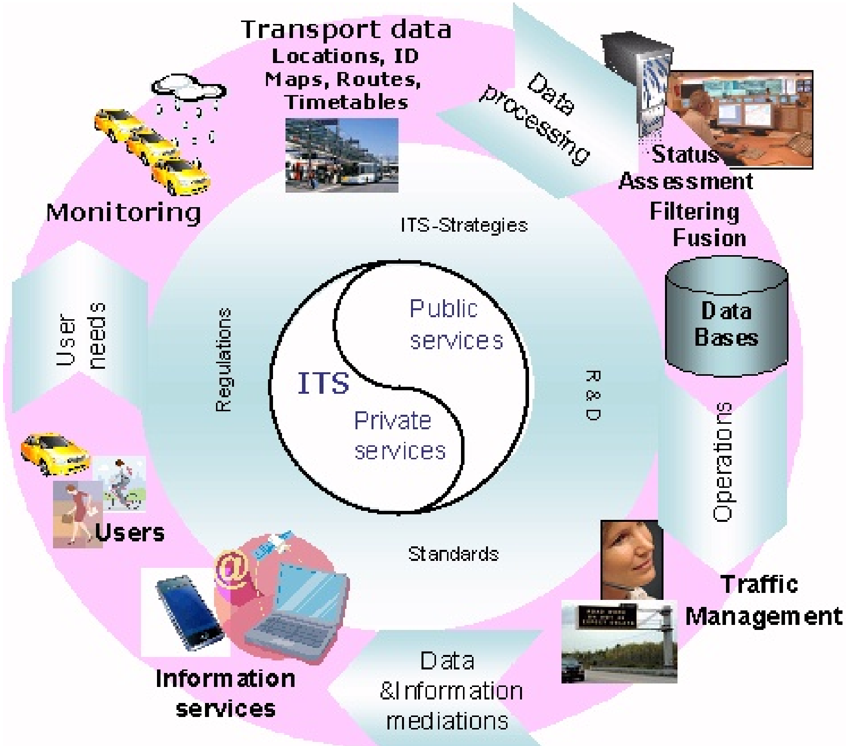

Fig. 3 The framework and development cycle of mobility services

To provide a concrete example of a complete innovation cycle and utilisation processes from the ROADIDEA project, the most popular innovations created in the first Futures seminar were selected for further development. This was done in Work Package 6. In the following 2.5 years three ideas were developed into pilot services that were successfully demonstrated and very close to operational use, namely the "Pulp Friction" road surface slipperiness warning pilot in Finland, the Fog warning pilot in the Po Valley region in Northern Italy, and the "Do I get wet?" bicycle route planner in the Netherlands. Results are summarised in report D6.5 [ROADIDEA 2010f].

These successful pilots comprise the most visible and concrete exploitable results of ROADIDEA. However, to expand these services over Europe would need the open and free access to input data as envisioned in earlier Work Packages.

Fig. 4 "Pulp Friction" slipperiness warning service as web and mobile applications

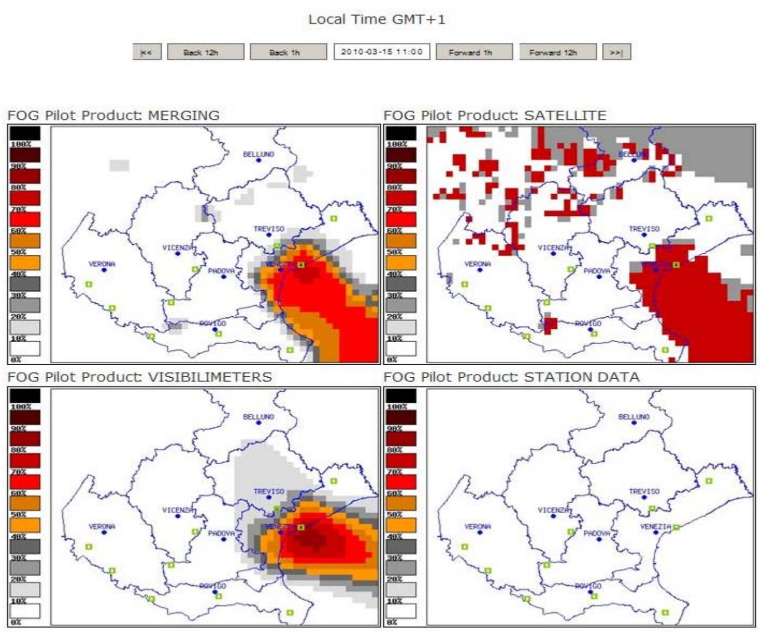

Fig. 5 The Fog warning pilot shows the probability of visibility reduction under 500 meters over Veneto Plain for the final merged product (on the upper left) and separate methods

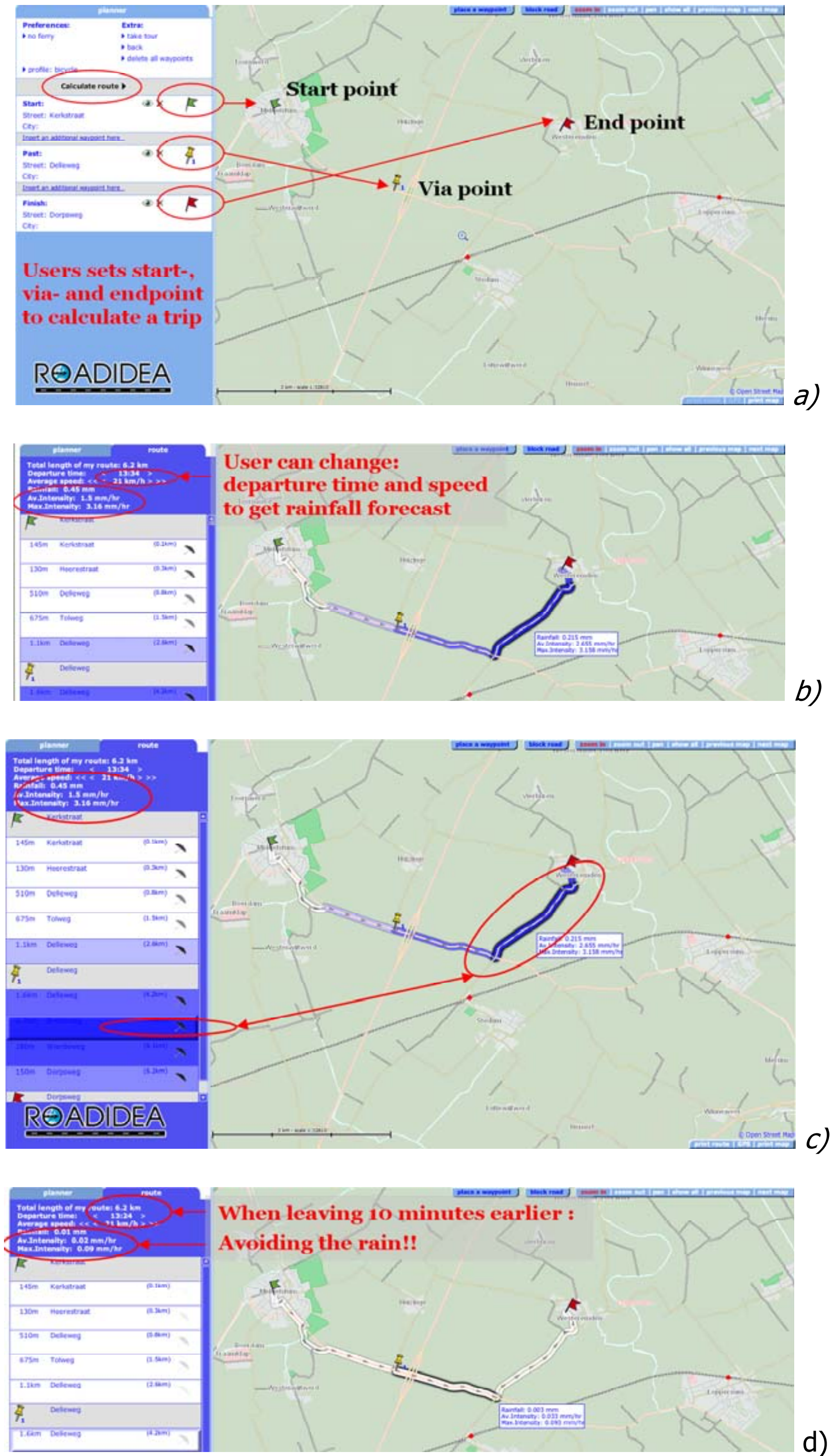

Fig. 6 Steps of using the "do I get wet?" bicycle route planner: a) Plan the trip, b) Set the departure time and average speed, c) Observe the trip rainfall forecast, d) Vary the departure time to find an optimum period for the drive.

Some other service ideas that were investigated further also failed in operational implementation due to lack of data, such as the Gothenburg pilot of combining traffic data and weather models, and the Port of Hamburg data for modelling the congested traffic in the city harbor.

It is important to note that the innovations process itself is also an exploitable result of ROADIDEA, and was central to the proposal and the outcomes. All pilots and the innovations process were thoroughly validated and evaluated in WP8, and the results were summarised in report D8.3b [ROADIDEA 2010c].

3.4 Sustainable services with feasible business models

ROADIDEA Work Package 7 Business Models delivered an analysis of current European transport information services and their business models. The objectives were to:

- Analyse, develop and assess business models of information services
- Undertake context-dependent identification of different stakeholders and their expectations and likely benefits
- Define potential business roles (for example information brokers) in the transport information service area.

Generic business model approaches were applied to clarify the definition of the components of (potentially) different information service business models.

Reports D7.1 (Transport information service business environment identification) and D7.2 (Transport information service models) [ROADIDEA 2009j, 2010g] provide detailed descriptions of the business model elements of the ROADIDEA innovation service pilots. Details of the users, benefits, value, stakeholders, necessary data were included. These reports also included an analysis of the applicability of different generally known business models to transport information services. The ROADIDEA information platform, which gathers various input data and includes several processes and models to make the final services was also assessed. In report D7.2 some new innovative business models are also presented. The analysis showed that not one business model was uniquely better than any of the others, and different business models are needed for different transport information services.

For instance, ”must have” –services related to safety of transport users and transported goods are often publicly funded. In the future insurance companies may have a larger role in funding these kinds of services, as public funds are getting scarcer and there are precedents for insurance companies investing in road infrastructure as a sound commercial risk assessment (the Transport Accident Commission in Victoria Australia has had such a policy for many years) and ITS integrated services with a quantifiable safety benefit fall into the same category. A large fraction of the ideas assessed require a change in the pricing models used for public data, especially continuous feed collected by public bodies.

With the invention of the Internet, mobile phones and GPs satellite navigators, a large variety to ”nice-to-have” –services has emerged that may not have such a large safety aspect, but still help the transport users in their travel planning before and during the trip. These services increase the comfort and reduce the congestion and emission by making the transport more efficient. These kinds of services are most often either privately funded or generated with public-private partnerships or offered by transport companies wishing to enhance their patronage by lowering the information barriers to users (the "TramTracker' iPhone App which provide real time location, routing and timing on all the trams in the Melbourne metropolis is free and valued by the users).

To develop transport information services with sustainable business, just one business model may not be enough. Often mixed funding models are needed, including advertisements, sponsors, end user payments, etc. The rapid spread of mobile equipment offers an ever expanding new potential for transport information services, to the large number of potential users that are then easily reached on the road or using transit vehicles. Linking transport information services to other information services adds further potential for larger audiences, which would help to secure the sustainability of such services.

Public-private partnerships are in many cases a good way, even an only way to start developing a new service with relatively large development costs. However, few of these services have yet reached financial sustainability. This is clearly shown when the services did not survive after public funding support ceased. It is now widely accepted that new services need at least three years to reach and gain a stable and large enough customer base to survive. Consequently public funding should not be terminated too early in this phase of the service's life cycle.

After the growth of the mobile as well as the static Internet, viable business models for information services have completely changed. Most of the services delivered over the Internet are free of charge for the end users, who nowadays take it for granted that all services should be free of charge. That is why the business models are usually based on sponsorship or web advertising. End users' willingness to pay for these kinds of services is quite low, but micro payments or low prices are better accepted especially if the user interface is a mobile phone.

One special barrier to success is the question of data quality and guarantees of service level. In some cases these may be difficult and/or costly to offer to customers to keep up their satisfaction level. If the service is targeted to mobile customers, mobile equipment version control is a continuous process that requires the costly resources of mobile software experts.

4. Removing barriers of innovation

4.1 Poor prerequisites for services

Innovative transport system services are produced by a sequence of stages- or by networked processes where everything starts from users, their needs and requirements. Many technologies and systems exist and are developed but few have so far provided substantial effects on the large scale to the end users as citizen and companies. The operating environment consisting of public and private operators should offer the necessary incentives and opportunities to make business but also to take care of creation of prerequisites for innovativeness and unprejudiced development.

Reliable and good quality data is one of the main prerequisites for proper services development. Although, same kinds of data sources are available in most of the European countries, the effective and practical use differs. There are no recommendations available on minimum data set and catalogue. Although, the needs of services are not the same in every country, there is a need for data standardisation and harmonisation activities because of developing European wide services such as eCall and because of cross-border traffic and freight operations. [ROADIDEA 2009i]

Many road traffic information services are based on traffic data produced by the public sector (road authorities and operators). Some of the end-user services are also provided by the public sector. In a few European countries like Finland, road traffic and weather data is available free of charge, but in many countries there are high barriers for the further use of such data. Private end users are usually the final beneficiaries of both public and private services. Private services are directed either to personal users as normal citizens and also to companies and different types of organisations with various functions. In many cases public operators or public-private cooperating operators offer a wider services platform offering then also access to many kinds of data for private services operators and new value-added services production. [ROADIDEA 2009i]

Data quality is crucial element in service production. Data has to be of high quality and include reliability. Users need exact answers to their problems, not those that are vague and even sometimes misleading. Data producers have to be able to cater for service operators and providers with stable and high quality data with excellent integrity. Timeliness is also required for many ITS emergent services.

EU has lately seen this problem of prerequisites as one of the key barriers of services development both in the new ITS Directive and ITS Action Plan. It is hard to get affordable data and data access even from the public sector, although the data has in most cases been produced by public money. In ITS Action Plan EU has also defined the need for universal traffic information services including real-time traffic related services and free minimum traffic information services. The first priority area of ITS Action Plan covers optimal use of road, traffic and travel data including the availability and accessibility of data, the facilitation of the electronic data exchange between various parties, the timely updating of road and traffic data. The clear definition of priority areas and delegating focused responsibilities to Member States will speed up this necessary process of solving the key problem of data availability and accessibility. [EU 2008, EU 2010]. EGNOS and other data integration and business delivery platforms offer greater possibilities, especially as the GALILEO satellite constellation move to completion and offers synergies for multiple safety-of-life rated LBS services.

4.2 Poor business models

The transport information services require the creation of a service network of partners complementing each other’s competencies and resources. Typically one of the partners operates as a central point, service integrator or a network manager taking care of the service delivery and management.

The main challenges from the business modelling viewpoint include: (1) Creation of sufficient revenue to cover the costs of information services and (2) Sharing the revenues in the service network. Many information services have problems to create sustainable services, with revenue streams covering the costs. In general, the stakeholders benefiting of the services should compensate the costs. However, it is a challenge to make private end-users to pay about information services. The users tend to select free information instead of a paid service even if they receive worse quality. In some cases more detailed and tailored information can make the users to pay for the service. [ROADIDEA 2009i]

In many European countries the definition of roles in this networked cooperation being anyway dependent on PPP activities have been analysed very carefully. The available research results show that public sector has to take serious initiatives in development end deployment of ITS services. However, still an open question seems to be in what kind of division of roles and responsibilities would be most beneficial from the point of business development and social needs.

4.3 Fragmented policies of governments

Governments have still had difficulties in defining the ITS priorities within the national transport and technology policies. Transport problems solving is too often seen as only an infrastructure related problem that can be tackled by building away capacity restrictions and bottlenecks. ITS should be seen as a strategic level tool, but also as an operative tool working besides the other means solving transport problems.
The priority given to ITS in government transport strategies will also be reflected in citizens and companies priorities to be active user and developers in ITS building barriers to fast uptake and interests to investments and risk taking.

4.4 Benefits of services

Although we have available a lot of reliable research results on benefits of ITS services there seems still be missing tangible evidence. The started action of eSafety Forum to create an open database of available research results is a necessary element in awareness building. However, as we know very well, it takes time until deeply rooted attitudes and beliefs are modified. Therefore, in all ITS development and implementation projects enough attention should be devoted to deployment and exploitation of the results.

4.5 Privacy and security issues

European culture is traditionally very sensitive to privacy issues. New technology can solve manifold problems in the society but the utilisation is based on available data. In ITS the average statistical data is usually not enough and we have to get more detailed data penetrating close to individuals and users. Citizens do not favor situations where they can be identified and will preserve completely their privacy. This basic need will cover both data concepts and sources and data security risks.

It is very evident that privacy and security issues are not those issues that are treated and analysed in later phases of the projects but right at the beginning phase. If the management of these key issues is not defined early enough during the development and definition process the whole business model is under a great risk.

5. Conclusions and recommendations

The recent important European actions directed to raise the strategic importance of ITS development and deployment in transport (ITS Action Plan and ITS Directive) are opening the doors to major innovations. In addition, the actions directed to define roadmaps and focus of actions are welcomed e.g. Easyway actions to support the development of core European ITS services.

As recently raised up in many forums, we need to take several actions to remedy the situation. The most urgent actions include the following [ROADIDEA 2010a]:

Solving data issues:

- The European Transport Data Platform Initiative (ETDP) should be established as soon as possible as the key measure in the Working Programme on the implementation of the ITS Directive.
- Establish ITS Innovation Task Force to follow up and steer the development and deployment of ETDP in particular, and the development of the innovation potential in the European service sector in general.
- Use the concept of European Minimum Data Set for ITS development and service production when establishing the first stage of the ETDP, including a minimum formal metadata specification. Concentrate in solving the problems e.g. related to traffic and other data and especially on access of data, free of charge or with minimum cost.
- In this context, agree on new European rules for access to public weather data in affordable manner and in line with the existing European Public Sector Information Directives.
- Specify quality level recommendations aiming towards optimal data quality, optimising the benefit to cost ratio following the attempts by the QUANTIS project.
- Replicate the successful experiences of federated data bases and communications in the social sciences to enable cross country integration thereby (e.g. Nesstar).

Improving and exploiting models and methods:

- ROADIDEA innovations methods are recommended for wide and systematic use providing a proven model for faster and better harnessing of diverse creative skills in a rapidly changing environment, and providing rapidly declining lead times for service innovation and implementation. Provide means for developing effective and innovative methods and models to be used in information formulation when producing new and added value services.
- Solve the problems of data integration and harmonisation to be able to use effectively versatile and cross-border data. Give room for personalisation.
- Speed up the efforts to find new and innovative ways for data collection and production by using e.g. V2I, I2V, mobile phones and PDAs, floating car and satellite technology. In particular Galileo and Egnos should be exploited with GIRAODS API interfaces.

Profitable and sustainable transport service business:

- Explore and demonstrate new business models in targeted research activities funded by the EC and governments.
- G4 expansions of seed and capacity of the mobile internet will enable an explosion of peer to peer services with quite new business models. Make further analysis on user behaviour, interest, needs and requirements and awareness when defining necessary services in order to be able to better understand the real added value for him and how the user should be seen as a client.
- R&D projects should devote adequate and detailed efforts on user tests and stakeholder analysis when piloting new services. Devote sufficient efforts to user awareness and customer oriented thinking in the service concept phase.
- Require customer perception exploitation as part of reporting in relevant FP projects.
- Open the European markets for effective business development by removing the barriers of re-use and financing of data and especially weather related data.
- Devote additional resources on innovative business model development solving the problems of cooperation, financing, revenue sharing and user interest and stakeholder cooperation. New models for intellectual property use maybe required.
- Enhance support to public sector commitment by making suitable recommendations on alternative and effective ways to cooperate with private sector e.g. pave way to innovative procurement models such as pre-competitive procurement of new service development.

General support for ITS deployment:

- Support the activities in the EU ITS action plan and the eSafety Forum by targeted research projects including innovation activities
- Carry out systematic evaluation studies of the new service innovations and present their results in tangible manner
- Maintain benefit and costs databases of ITS applications
- Utilise the code of practice approach to solve the liability issues of new services, taking up privacy and security issues in the beginning of the development circle.
- Mandate interoperable interfaces in Europe, and preferably globally at least including USA, Canada, Japan, China and India.

The detailed analysis of the European transport service system in ROADIDEA had the focus on ITS development. The studies and concrete innovation procedures resulting into new service pilots revealed the potential and barriers for new sustainable service innovations. The key barrier to service innovations appears to be the access required to various sources of useful information, and for some services also finding viable business models. Several recommendations on how to remove these barriers have been presented.

Sensor and mobile communications technologies are being taken up very swiftly by the community as consumer electronics. The product life cycle is a matter of months as against 3-5 years for vehicle design and production model cycles. This offers a large and growing market of users who have already bought their own sensors, LBS and communication equipment, and a shift in the ITS vehicle-road and vehicle-vehicle dyad balance is likely to occur as a result.

ITS services will adapt to this, and to the micro payment model of information provision - but only if public sector data is made accessible as a public infrastructure service. Information provision (air pollution, visibility, temperature as well as location and speed) are all going to be available from personal cell phones, and opens the way to mass crowd sourcing approaches to reduce the capital infrastructure bills for advanced ITS deployments that include drivers, walkers and other transport users directly.

A user oriented service and business model approach is therefore indicated by ROADIDEA ideas and pilots and should be added to the existing ITS Road Maps. Moreover, ROADIDEA can help the core services and implementation steps of the ITS Action Plan and Directive, e-Safety, EASYWAY by identifying the fields of action where innovation activities (e.g. Innovation Seminars) could support finding solutions to mentioned unresolved ITS development problems. It would be beneficial to integrate the forms of ROADIDEA innovation activities in the most relevant ITS policy activities. The effect would be the ROADIDEA would support solution finding in those ITS fields, which were discovered as relevant and burning in Europe. Thus regular Innovation Seminars supporting the decisive EU policy initiatives in ITS are recommended.

The results of ROADIDEA clearly indicate that the technological infrastructure or alternative user interfaces pose no barriers to develop new innovative transport services. The main problem seems to be the availability, accessibility and economic constraints in getting necessary information for the new service concepts. There are major problems in accessing road weather information or vehicle measurements. Present European Union data policy seems not to be capable of ensuring adequate access to data sources for new innovative and beneficial transport services for European transport users. ROADIDEA is recommending European-wide concerted action to study and gradually overcome these data barriers, and has formulated a recommendation for a minimal data catalogue to be available throughout Europe as a first step towards better data accessibility.

EU together with Member States and the active ITS organisations have been able via their various policies, research activities and citizen requirements to recognise the importance of transport system development and utilisation of intelligent transport systems in their activities towards more a sustainable future. It has also became evident that the strategic political policies aiming at keeping Europe at the main edge of this development calls for a system concept accelerating innovation production, market creation, services production, citizen acceptance and political commitment. This same need for a new direction has not been identified only in Europe but also in the U.S. and other countries having a major impact on innovation based global markets.

Without a comprehensive concept and policy the deployment of ITS will be slow. This has been shown in Europe e.g. in the identification and implementation of Europe-wide systems having a remarkable and proven effect on the main transport policy objectives (e.g. eCall). Many major initiatives by the European Commission and industry have been launched but no radical changes in the uptake and markets of ITS have been seen before joining the efforts with MoU´s and stronger tools. This same observation is seen in many Member States with missing political commitment and real trust in the private sector and companies. Organisations seem to be more waiting for opportunities to be brought out than to create opportunities by their own efforts. The recent major initiatives can also be viewed against the business strategy philosophies and the future - we cannot predict the future but we have to try to make it.

The recent developments aiming towards ITS deployment and uptake are very welcome. The major players have to play together but they have also to adapt their own playing according also to the other relevant players e.g. discussing very clearly, openly and practically the goals and milestones with real commitment to be able to create real trust among the major players. In Europe these instruments seem to be the ITS Action Plan, ITS directive, and e.g. the ELSA initiative. Hopefully, the adopted European mechanism of cooperation with the Member States is based on the fact that fostering deployment is almost totally dependent on national commitment and activities although a common European policy and collaboration are of major importance.

The identified need for redirections of a common ITS strategy and policy is promising with regard to ITS deployment. In ROADIDEA, we have identified several real deployment barriers as well as needs for actions and made several recommendations that are mostly in line with the major recent initiatives [ROADIDEA 2010e].

We have proposed many main necessary actions that are summarised in ROADIDEA conclusions e.g. in the Road Map ([ROADIDEA 2010a]. Data and data quality have been some of the action areas needing urgent improvements. The ITS Action Plan and Directive have stressed the idea of defining free safety related information for all travellers opening the gates effectively for service development and focusing e.g. on: greater cooperation as PPP, fair and transparent access to public sector information, increased data quality, multimodal cooperation, and cross-border exchange.

The ROADIDEA summary of necessary actions include of course improvements of business models, but it is still very clear that ITS measures have to be summarised, and made available for political and other decision makers and citizens. This is because no deep understanding of ITS and its potential has been achieved so far and the deployment task with awareness building should be a continuous effort. In ROADIDEA we have also confronted the problems of privacy and security issues. One cannot stress their importance too much because we continuously face, also in media, the debate about privacy and security and this makes a barrier to many modern technology utilisations introducing delays and other problems on services development.

It is also a fact both on EU and on national level that cooperation with public and private sector has to be fostered. Public sector needs, offers, supports and masters usually traffic services or some of the key elements in the service chain. Therefore, it is a key stakeholder but cannot develop and deploy ITS alone and without understanding the meaning of innovation in the networked world.

Technology development is the foundation of the modern service production. The utilisation of new innovations in this field is a continuous process, which also suffers from a chicken and egg type of a problem concerning when is the time to implement ideas, and when the technology is mature enough? When committing into large systems, the owners have to make long-term investments and start to live with operating and maintaining the implemented systems. If no standardised solutions are available there is a great business risk both for the buyer and the provider.

The inevitable change from the centrally controlled top-down Traffic and Mobility Management ecosystem into the heterogeneous and fragmented autonomous Mobility ecosystem is going on right now and this process will continue in an even faster pace. In the future the mobility services are on-line and available to the users everywhere in their daily life. People are aware of any disturbances on their planned journeys before and during their trips, and they are able to make informed decisions concerning their journeys and use of time.

The control of driving and personal traffic behaviour management are more and more relying in technical systems, which adjust to the specific driver's needs; the systems which are installed to vehicles are communicating directly with environment and other systems and other movers.

The hot topics now deal with the open platforms (in pockets, at homes and offices, in vehicles) and the new Internet behind all different applications (which are sensing, controlling, guiding, aiding and entertaining) merged and working together. Information and communication technology is becoming smarter, smaller and faster and at the same time, society is progressively becoming more closely connected. Internet and cloud computing supported services are entering a new phase of mass deployment. This is a challenge especially for public authorities to identify their optimal role in this fast development of a multitude of mobility aiding services and open platforms.

ITS services are clearly products of chained and collaborating enterprises and service provision while businesses tend to belong to one of three main categories: a) collective safety related or traffic management services on roadsides and cities (camera enforcement, traffic signals, VMS etc) are specified and procured by the public sector, b) mandatory and regulated in-vehicle services and devices to be attained by end-users' own cost: digital tachographs, road tolling devices, alcolocks etc., and c) the huge numbers of different services or devices which end-users want to buy voluntarily like PND – navigators, mobile phone applications or fixed equipment in cars (for safety, entertainment etc.).

The key players in the public sector are the national road authorities and toll-road operators, which continue to equip their roads with Intelligent Transport Services related ICT and service infrastructures including both roadside and back office software and hardware. The road authorities and operators have to deal with ITS having a totally different lifecycle than traditional road infrastructure, as well as cost structure, where the operation and maintenance of ITS may be relatively much more expensive than for traditional infrastructure investments. Procurement strategies play a vital role, and new procurement practices are likely to emerge to account for the specific properties of ITS deployment.

The most important barrier to large-scale ITS deployment has often been identified to be the lack of adequate business models. The major issue in business models is usually the whole business logic of networked collaboration. Different combinations or mixed business models seem to be needed. In some cases it is seen reasonable to use also public funding for the services, which have a high societal impact. The mixed models may combine end user payments, advertising, sponsors and public funding. One alternative to be reckoned is to combine the transport information services with other types of information or "real" services, for example with social media or transport or tourist services. [ROADIDEA 2010g]

Some basic strategies from the infrastructure provider point of view can be identified for initiating the large-scale deployment of ITS (IIWG 2010):

- start with the locations where the customers are
- start with the infrastructures available
- start with the locations where the problems are
- start with most important roads
- utilise opportunity linked to infrastructure replacement or development
- start with locations managed by visionaries

The optimal strategy will depend on the ITS service and ICT infrastructure in question as well as the prevailing public and private sector ecosystem and situation.

Barriers of data remain also very relevant. In the analysis of mobile business related pilots, the main challenges recognised were in three main categories: data quality, pricing/ willingness to pay and mobile handsets application version control. Data quality is a problem in a case like the Pulp Friction pilot, where the source data provider actively develops the data and modelling. In a case where the data is acquired from a public source without contractual commitments (such as e.g. SLA=service level agreement) no further guarantees for the data can be given by the service provider. Nomadic device or more generally hardware version control is always a challenge when the service is an application and not web service.

The development and realisation of new ITS services will most probably continue in several different ways. To describe the possible ways forward, four different scenarios or development models were formulated [ROADIDEA 2009g]: (1) Islands of technology, (2) Data pool model, (3) Vertical integration and (4) Decentralised networked world. Today, it is not possible to define which of these developments will be in main line or is it a mixture as usually in this kind of major trends, but in a fast developing technology environment, completely new directions may evolve.

We have analysed and reported the development of standardisation within the area of intelligent transport systems. We have also made several recommendations e.g. [ROADIDEA, 2009i] integrating the different applications into a standardised system:

- When the idea and pilot development has left the proof-of-concept phase, the system developers should seriously take into account adopting standards wherever possible but also necessary in up-scaling and disseminating the product. Therefore, the relevant technical standards should be identified and studied at an early stage.
- Having in mind the ongoing standardisation activities, the system developers should be open for identifying the needs for standardisation. These could be fed in the work of standardisation bodies.

The use of a system architecture should be considered for each ITS application. If the application is only used on national or local level, the national architecture of the specific country might be the choice. If the application has the potential for European level deployment, the EITSFA (European Intelligent Transport Systems Framework Architecture) is the architecture, which should probably be chosen. Service-oriented architectures usually suffice, when the harmonisation of interfaces between different service parts and functions is sufficient for interoperability.

It is very evident both on European and on national level that a hybrid, PPP-type of an approach with systems ideology is mostly necessary. In order for a service to get deployed, we know now from many experiences that a shared responsibility will likely fail or lead to very slow deployment. Hence, there is always a necessity to have a leading stakeholder or champion for a service. The leading stakeholder may and even should vary according to the life-cycle phase of the service in question.

It is also very clear that ITS and rather intelligence and innovation is cutting across the major sectors of society and industry reforming the societies in many respects and opening completely new opportunities for utilisation of modern technology, services and business innovations. This is also affecting the traditional ideas of transport, possibly changing the whole systems thinking e.g. electrical cars and new urban forms. The challenge of deployment is not anymore as simple as how to utilise the emerging technology in producing new transport services and products but also on systems level. This in turn may well revolutionise the role of the public sector from being partly a purchaser of products and services and partly a service provider to being a purchaser of transport system performance and policy impacts. This will enlarge the scope and role of private sector stakeholders, and create very large markets for ITS services and solutions, while completely changing the service provision industry.

7. Potential impacts

7.1 Technological impacts

ROADIDEA is working for improved and more innovative transport systems and services in Europe. Better technological platforms, methods and models developed in ROADIDEA lead to better transport services, contributing to improved safety, efficiency and competitiveness of transport systems across Europe. The technological R&D and innovations made during the ROADIDEA project will benefit all four expected impacts in the ICT/Transport work programme:

- "World leadership of Europe's industry in the area of Intelligent Vehicle Systems and expansion to new emerging markets". This target is feasible when potential for incremental and radical innovations is released, as stated in the objectives of ROADIDEA.
- "Improved safety, efficiency and competitiveness of transport systems across Europe, with strong contribution to growth and jobs and towards the objective of reducing road fatalities by 50% in EU-25 by 2010". This target proved to bee too ambitions, but in the long run, better technological platforms, methods and models developed in ROADIDEA lead to better services, and while also improving the access to necessary data, contribute to this target.
- "New targets for efficiency and environmental friendliness in Europe's transport sector through new mobility services". This is what new ROADIDEA innovations aim at, and has been one of the key targets during the innovation sessions.
- "Higher mobility of people and goods across different transport modes through the provision of accessible and reliable information service". This is what the better accessibility of information and innovative new services bring about.

ROADIDEA is providing new methods for more accurate data acquisition and mining, e.g. in developing friction models. The new innovative methods and models will result in a number of very direct impacts.

- The tools will facilitate a comprehensive representation of the road weather and traffic status on a large transport network, even crossing national borders. Today, this is only possible in a very crude accuracy and resolution for large networks. The key conclusion of ROADIDEA is that accurate data in a detailed resolution can and must be provided on a European scale.

- A detailed and accurate account on the road and weather situation will become possible. When successful, this includes also the prediction of incidents, which has so far not been possible in real-time. Better access to incident data is a prerequisite for these kind of services.

- The quality of the transport data will greatly improve due to comprehensive use of advanced data fusion as well as the efficient exclusion of erroneous data. These methods were analysed in ROADIDEA Work Package 3.

- New types of data and novel combinations of different data types will facilitate totally new types of innovative services for the users. In this respect, the greatest potential is for services, which attempt to minimise the climate change effects on road transport by incorporating these effects as dynamic parameters in the control algorithms of the services. Many ideas created in ROADIDEA Futures seminars have this potential.

- The methods and models can be applied in other domains than transport. This is especially evident for weather related information, whose uses in industry, agriculture, sports, fisheries, etc. will benefit from the innovations and achievements within ROADIDEA. Mathematical and statistical methods have been described in detail in ROADIDEA WP4 documents, and these results can be well used in other application areas.

- The new tools developed by ROADIDEA will make investments in road and traffic monitoring much more cost-effective by minimising with data fusion and modelling the need for further investments in monitoring. In particular, mobile observing methods have been developed and piloted in the project.

- The ROADIDEA tools can directly be utilised especially in the infrastructure elements in the development of co-operative systems utilising V2I and I2V communications (Vehicle to Infrastructure and Infrastructure to Vehicle) such as those included in the other EU Framework Programme projects CVIS, COOPERS and SAFESPOT projects.

New sources of data and their novel combinations and integration will facilitate completely new innovative transport services for their users. Minimising climate change effects have been taken on the agenda, for instance in the Stay Home idea, and aiming at more efficient transport and reduction of congestion in ports.

One of the goals of the ROADIDEA project is to contribute to the development of new scientific methods for treatment of very complex phenomena taking place on interconnected, irregular networks under influence of turbulent influences from environment. The main benefits to partners are the new expertise developed during the project, new methods and models which will be a basis for new applications enabling new R&D projects and revenue in other domains, where real-time data is as crucial as in transport

7.2 Socio-economic impacts

In a study conducted recently in Finland, the socio-economic benefits of weather forecasting have been estimated of having a cost/benefit ratio of 1/5 based on present-day forecast quality. In a hypothetical optimal situation, with perfect weather forecasts information available, the c/b ratio would probably double - the truth is naturally somewhere in-between. It is interesting to note that c. 80% percent of the socio-economic impacts in the Finnish case relate to the traffic and transport sector. Excluding air transport, the proportion would still be c. 60% and, in monetary terms, annual gains of c. 200 million euros. Extrapolating to the European level one can foresee huge savings via innovations originating from the ROADIDEA concept.

ROADIDEA has also many indirect impacts via the new services facilitated by the system. The impacts to the citizens will materialise in the form of new and improved ITS services, where the quality is sufficient to enable positive value to the users in the form of better comfort, accessibility, mobility and safety. These services can be related to traffic management, demand management, incident management, traffic information, dynamic road user charging, advanced driver assistance, co-modality, warning systems, and travel planning.

Road operators have benefits from ROADIDEA in the form of more cost-efficient services, where the quality is optimal with regard to the service impacts and the costs are minimised for the lifecycle operation of the monitoring infrastructure and the required information management. In particular, the friction, fog and traffic models developed in Work Package 4 and 6 serve this purpose. The exploitation of the results should be ensured in the deployment of such ITS services in the next phase of the TEN-T programme.

The impacts to the transport industry (hauliers, public transport operators, ports) will come via increased safety during transport, increased competitiveness resulting from improved customer services and also vastly improved transport planning information provided by the new methods and models. The most beneficial impact comes in the form of improved deviation information, primarily accurate estimates of times of arrivals at final and intermediate destinations. This in turn will facilitate even new business concepts based on real-time knowledge of goods locations and arrival times in all cases.

The impacts to the software and ICT industry will have new export opportunities for their products and services, which can utilise the models and methods developed. These opportunities will probably be quite substantial as earlier international attempts towards such methods have been very small-scale and restricted. The most promising domains with regard to the competitiveness of European industry could be road surface friction, public transport scheduling and information as well as road maintenance and transport operations management.

The accessibility to necessary data containing also Public Sector Information is one of the cornerstones of ROADIDEA framework and the key barrier is the poor access to this information in European scale. In general, the European data policy and its Directive on the Re-use of Public Sector Information (22003/98/EC 31 Dec 2003) in particular state that PSI must be available for re-use in all formats and languages in which the information exists. While starting its development of new service ideas, ROADIDEA took this possibility for granted and wanted extensively to integrate public and private sector information. Unfortunately the reality in today's Europe is very far from the spirit of the existing European data policy legislation. It is of utmost importance to improve the access to such information that is vital for the implementation of new transport services.

The key nature of ROADIDEA is to support EU to implement the most crucial EU policy of present times, as stated so well in the Lisbon Declaration: "to become the most competitive and dynamic knowledge based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion". In ROADIDEA, the positive support to Lisbon Strategy stems from combining innovations to technical superiority, business skills to enthusiastic research.

Based on earlier cost/benefit studies made in Europe, it can be assumed that the annual direct benefits of ROADIDEA may be in the range of 5-20 Million euro/year and the indirect benefits in the range of 30-100 Million euro in the longer run. The recent study in Finland suggests though that total benefits may well be ten times as large or even larger.

Finally, the Road Map to Radical Innovations will serve as well analysed and tested guide for European transport policy makers in the European Union.

8. Dissemination and exploitation

There were altogether 83 dissemination elements (papers, presentations, flyers, etc.) produced during ROADIDEA project lifetime and actions will still continue. Main dissemination events were the special ROADIDEA session in SIRWEC 15th International Road Weather Conference in Quebec Canada in February 2010 with eleven presentations. The international audience was very interested in the project results, and in particular the road weather model developments.

The other key event was the exhibition in TRA2010 Transport Conference followed by the ROADIDEA Final Seminar and a special International Innovations Seminar in Brussels in June 2010. The seminar and its web cast attracted altogether 303 participants.

The following specific execution objectives of ROADIDEA were achieved and ready for exploitation:

- The ROADIDEA transport service platform was designed and implemented to test the use and integration of various data and models in the provision of new services.
- The availability of useful data for transport services was analysed.
- New types of data sources and the needs for new kind of services were analysed.
- Better tools and standards were defined to allow for data storage and mediation.
- Better transport and weather models were developed, using the new sources of data in an innovative way.
- The slipperiness warning service "Pulp Friction", the Fog warning service and the bicycle route planner with rainfall forecast were developed into pre-operation phase.
- Data analysis, fusion and mining features were studied and developed for utilization in services to several different user sectors.
- Innovative new knowledge-intensive products and services for transport users were identified.

More information on the project results, the team and all public reports are available on the ROADIDEA website http://www.roadidea.eu .

9. References

[EU 2008].Communication from the Commission. Action Plan for the Deployment of Intelligent Transport Systems in Europe. Brussels, 16/12/2008. COM(2008) 886 final.

[EU 2010]. Directive 2010/EU of the European Parliament and of the Council of on the framework for the deployment of Intelligent Transport Systems in the filed of road transport and for interfaces with other modes of transport. Brussels, 4 May 2010. 6103/10.

[RI_TA, 2007] ROADIDEA Technical Annex I – date 12/10/2007

[ROADIDEA 2008a] Keskinen, A. et al. 2008: ROADIDEA D5.2 Results of Innovation Seminar 1. Available at http://www.roadidea.eu/documents

[ROADIDEA 2008b] Kelpin, R. et al. 2008: ROADIDEA D2.1 Report on the present availability of data for transport systems and services. Available at http://www.roadidea.eu/documents

[ROADIDEA 2008c] Kelpin, R. et al. 2008: ROADIDEA D2.2 Report on new types of data for transport systems. Available at http://www.roadidea.eu/documents

[ROADIDEA 2008d] Wedin, O. et al. 2008: ROADIDEA D3.1 Data filtering methods. Available at http://www.roadidea.eu/documents

[ROADIDEA 2008e] Wedin, O. et al. 2008: ROADIDEA D3.1 Data fusion and mining methods. Available at http://www.roadidea.eu/documents

[ROADIDEA 2008f] Leviäkangas, P. et al. 2008: ROADIDEA D4.1 New characteristics of European Transport System and issues on data utilisation, analysis and value generation. Available at http://www.roadidea.eu/documents

[ROADIDEA 2009a] Keskinen, A. et al. 2009: ROADIDEA D5.3 Results of Innovation Seminar 2. Available at http://www.roadidea.eu/documents

[ROADIDEA 2009b] Manninen, S. et al. 2009: ROADIDEA D6.4 Implementation of second pilot services. Available at http://www.roadidea.eu/documents

[ROADIDEA 2009c] Kelpin, R. et al. 2009: ROADIDEA D2.3 Report on integration of data useful for ROADIDEA system. Available at http://www.roadidea.eu/documents

[ROADIDEA 2009d] Kelpin, R. et al. 2009: ROADIDEA D2.4 Model for data storage in defined uniform archive. Available at http://www.roadidea.eu/documents

[ROADIDEA 2009e] Kelpin, R. et al. 2009: ROADIDEA D2.5 Data mediation. Available at http://www.roadidea.eu/documents

[ROADIDEA 2009f] Wedin, O. et al. 2009: ROADIDEA D3.3 Data fusion – road weather. Available at http://www.roadidea.eu/documents

[ROADIDEA 2009g] Roine, M. et al. 2009: ROADIDEA D4.2 Utilisation of advanced information by private users. Available at http://www.roadidea.eu/documents

[ROADIDEA 2009h] Roine, M. et al. 2009: ROADIDEA D4.3 Utilisation of advanced information in public sector. Available at http://www.roadidea.eu/documents

[ROADIDEA 2009i] Dubbert, J. et al. 2009: ROADIDEA D4.4 Technical requirements and standardisation. Available at http://www.roadidea.eu/documents

[ROADIDEA 2009j] Karvonen, I. et al. 2009: ROADIDEA D7.1 Transport information service business. Available at http://www.roadidea.eu/documents

[ROADIDEA 2010a] Saarikivi, P. et al. 2010: ROADIDEA D1.9 Road Map. Available at http://www.roadidea.eu/documents

[ROADIDEA 2010b] Roine, M. et al. 2010: ROADIDEA D4.6 ITS deployment in the future. Available at http://www.roadidea.eu/documents

[ROADIDEA 2010c] Dubbert, J., et al. 2010: ROADIDEA D8.3b Report on the Validation and Evaluation results (Final version). Available at http://www.roadidea.eu/documents

[ROADIDEA 2010d] Hippi, M. et al. 2010: ROADIDEA D3.4 Road weather model development. Available at http://www.roadidea.eu/documents

[ROADIDEA 2010e] Roine, M. et al. 2010: ROADIDEA D4.5 Summary report on data processing and utilisation processes. Available at http://www.roadidea.eu/documents

[ROADIDEA 2010f] Kiuru, J. et al. 2010: ROADIDEA D6.5 Report of the pilot services. Available at http://www.roadidea.eu/documents

[ROADIDEA 2010g] Karvonen, I. et al. 2010: ROADIDEA D7.2 Advanced transport information service models. Available at http://www.roadidea.eu/documents

10. Beneficiaries and contact information

No	Beneficiary name / Contact & e-mail	Short name	Country	Enter project	Exit project
1 CR	Foreca Consulting Ltd / Pirkko Saarikivi Pirkko.Saarikivi@foreca.com	FORC	Finland	M1	M34
2	VTT Technical Research Centre of Finland / Matti Roine Matti.Roine@vtt.fi	VTT	Finland	M1	M34
3	Finnish Meteorological Institute / Pertti Nurmi Pertti.Nurmi@fmi.fi	FMI	Finland	M1	M34
4	Destia Tieliikelaitos / Jussi Kiuru Jussi.Kiuru@mediamobilenordic.com	DEST	Finland	M1	M1
5	Klimator AB / Jörgen Bogren Jorgen.Bogren@klimator.se	KLIM	Sweden	M1	M34
6	Demis B.V. / Poul Grashoff Poul.Grashoff@demis.nl	DEMI	The Netherlands	M1	M34
7	Deutsches Zentrum für Luft- und Raumfahrt, Institute of Transport Research / Rene Kelpin Rene.Kelpin@dlr.de	DLR	Germany	M1	M34
8	Pöyry Infra Traffic GmbH / Jörg Dubbert Joerg.Dubbert@poyry.de	POY	Germany	M1	M34
9	ARPAV, Centro Meteorologico Teolo / Franco Zardini fzardini@arpa.veneto.it	ARPV	Italy	M1	M34
10	Road Safety Engineering Bureau / Jankó Domokos roadsafety@chello.hu	RODS	Hungary	M1	M34
11	Meteo-Info / Nebojša Subanović Nebojsa.Subanovic@meteo-info.hr	METI	Croatia	M1	M1
12	Caran AB / Pär Ekström Par.Ekstrom@semcon.com	CAR	Sweden	M1	M1
13	AMANOVA d.o.o – Advanced Materials, Intelligent Systems / Igor Grabec Igor.Grabec@amanova.si	AMA	Slovenia	M1	M34
14	LogicaCMG Nederland B.V. / Markku Luoto Markku.Luoto@logica.com	LCMG	The Netherlands	M1	M3
15	Destia Oy / Jussi Kiuru Jussi.Kiuru@mediamobilenordic.com	DEST	Finland	M2	M31
16	Semcon Caran AB / Pär Ekström Par.Ekstrom@semcon.com	CAR	Sweden	M2	M34
17	Logica Suomi Oy / Markku Luoto Markku.Luoto@logica.com	LCMG	Finland	M4	M34
18	Mediamobile Nordic Oy / Jussi Kiuru Jussi.Kiuru@mediamobilenordic.com	DEST	Finland	M32	M34