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Theme TPT.2007.6 Development of methodology and evaluation of the impact of FP5 and FP6 projects in the field of transport

**Deliverable 4**

**Final Report – Results and Conclusions**

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Authors of Deliverable 4: Daniela Carvalho, Haibo Chen, Liana Giorgi, Bryan Matthews, Christian Reynaud, Michael Schmidt, Joao Viera

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Executive Summary

The SITPRO Plus project assessed the impacts of transport projects funded by the European Commission within the 5th and 6th Framework Programmes for Research and Technological Development. Its final aim was to use these findings to define new transport research policy objectives and to provide the European Commission with a methodology for impact assessment in ongoing and future Framework Programmes. The project was funded by the European Commission as part of the 7th Framework Programme.

This report is the fourth and final Deliverable of the SITPRO Plus project and contains the main results and conclusions of the project as well a set of recommendations for transport research policy.

The main conclusions and recommendations of the project are summarized in the following sections.

Main conclusions

1. Applied research targeting industrial applications, often in collaboration with universities, is the standard and mainstream type of research within the transport field unlike in other research areas.

2. There is a gap between the stated and actual use of transport research results by relevant stakeholders or users. Between 30 and 60 percent of research goes unexploited. Exploitation in this context means ‘documented use’ as through reference or acknowledgement in documents. The degree of lack of exploitation is higher if the actual implementation of research results is considered instead. The fall-out rate of the use of transport research is high not only among policy institutions (such as the EU institutions or national public administrations) but also within the industry—a surprising finding considering that the industry is the main beneficiary of transport research contracts.

3. Transport research continues to produce two main types of outputs: academic outputs such as publications and methods on the one hand; and transport modelling tools and components, on the other. Neither technologies nor policy-relevant outputs are as important, contrary to the rhetoric of some Framework Programme documents on the subject.

4. The policy impact of transport research is often more by name than real. Six out of ten projects consider their results policy-relevant and four out of ten projects think that their research contributes to policy harmonization. However the policy relevance dwindles when specific transport policy objectives such as rail harmonization, road policy or the TEN-T are considered. The gap, which cannot be explained away by the thematic variation of the projects, is the combined result
of two factors, namely, the comparatively low specific knowledge of transport policy issues among some project coordinators in conjunction with the transport modelling paradigm still dominant among those in charge of designing the European transport research programme.

5. All transport projects are, as expected, actively involved in disseminating their results through the standard means of publications, workshops, conferences, websites and project reports. The latter are, however, considered the least efficient means for disseminating project results.

6. Projects which are large in terms of partnership (often also involving users and stakeholders in their consortia) and diffused in terms of contents (i.e. having more than one topic and a broad scope) are more likely to consider themselves as policy-relevant. This is in line with the present logic of policy-design which emphasizes cross-sectoral integration. However, insofar as specific policy output is concerned, projects which are more focused in terms of topic and research design are more likely to produce real policy outputs. This is the case for both small and large projects (in terms of number of partners) but more so the case for large projects.

7. National administrations appear more receptive to transport research results (of all types of research projects) than European institutions. This could also suggest that project coordinators are finding it easier to ‘sell’ their project results to their national administrations than to representatives of European institutions, not least because they are more familiar with the former than with the latter.

8. Projects which are large and diffused in terms of content, i.e. which tap on different topics and display a broad scope, are perhaps less likely to produce evidence for policy use; but they are more likely to lead to new business opportunities and also to a wider transfer of knowledge.

9. There remain significant science-policy gaps in the transport field that need to be addressed, over and above the specifics of individual projects, but rather at the programme level, if European transport research is to have greater impact in the future.

**Research Policy Objectives**

1. Energy efficiency and CO2 emissions - A large proportion of project coordinators appear to agree that the most important challenges for research are currently related to improving the energy efficiency of the transport system and reducing its CO2 emissions. In terms of concrete objectives for research policy two issues were particularly highlighted. The first is the charging for or **pricing** of transport infrastructure. Charging schemes in line with current EU legislation still do not take into account the full environmental costs of transport and are thus not ideally suited to address the issue of CO2 emissions.
The second suggested shift in research policy priorities relates to propulsion systems of (mostly road) vehicles. In recent years there has been an increasing emphasis on supporting research towards battery based electric vehicles. From the research community there are serious doubts whether those types of vehicles can and should be promoted as a medium term feasible alternative to various types of combustion engines or fuel cell based electric vehicles. For a variety of reasons it is suggested promote research into a number of different technologies including second generation biofuels, fuel cells, hydrogen storage, efficiency increases of “conventional” combustion engines, hybrid technologies, etc.

2. Safety - Safety improvements in the transport system are still towards the top of the agenda for large parts of the research community. This includes all modes of transport but particular emphasis should be placed on further safety improvements in road transport and (maritime) shipping. The latter also includes a modernization of the shipping industry towards an increased uptake of electronic management solutions similar to those that have already been introduced in other modes of transport (e.g. road and air). For this purpose benchmarking activities and transfer of knowledge could be undertaken.

3. Innovative products and technology - Innovative products and technologies are both an aim in itself (to boost the international competitiveness of European industry) and a support for other transport research objectives, such as improving energy efficiency and safety. Among the important targets for supporting research on innovative products are a number of technologies, materials and concepts that contribute to reducing the weight of vehicles / vessels.

4. Social cohesion - Increasing social cohesion and supporting capacity building is one of the important impacts of the Framework Programme in general and of the transport programme in particular. Maximizing this impact should remain an objective of certain projects or lines of research in the transport programme.

5. Standardization - An early integration in projects or programme of possibilities for standardization greatly improves the potential impact of transport research. In a number cases it was found that research itself or the successful exploitation of its output was dependent on the degree to which the stakeholders responsible for standardization were involved in a project from an early stage onwards. In some cases already the conception of a project in the FP Workprogramme would benefit from a stakeholder consultation to investigate the potential for standardization and agreements on technical specifications. This is especially relevant in the railway sector but also in terms of standardizing interfaces and components in the car industry.

6. Harmonization - Harmonization among Member States should be further pursued in those areas in which it has not yet been addressed or achieved (e.g. the training of drivers; railways and road).
Recommendations

The following paragraphs present the ten key recommendations derived from the analysis of the SITPRO Plus project.

1. **Develop a strategic research agenda for surface transport**
   The surface transport programme would benefit from being based on a strategic research agenda similar to the one currently in place for aeronautics in the framework of ACARE.

2. **Formulate a clear policy for collaboration with third countries**
   The globalization of research calls for clear and consistent policies for the involvement of partners from third countries beyond time limited programmes for certain regions. This policy needs to provide a secure medium to long term framework in which collaboration with non-EU partner organizations can be built up and maintained.

3. **Specify European added value for individual tasks**
   In reality the European added value of FP transport projects differs widely and should be specified for individual research tasks or at least by project types. This goes beyond the directly expected impacts of individual projects and refers to the more long term and indirect effects of projects, particularly their long term contribution to overarching EU policy goals such as, for example, social cohesion, economic competitiveness or the freedom of movement of goods and persons.

4. **Reconsider appropriate project sizes**
   More differentiation should be introduced for the size of project in individual research tasks. Considering the adequacy of projects’ budgets at the evaluation stage remains necessary but in many cases this is too late since the entire project design (including the partnership) has already been built around an envisaged budget which is either too low or too high for the task at hand.

5. **Align timing and user involvement**
   Especially in policy relevant research the timing of the availability of results is crucial. For some FP5 and FP6 highly useful results could not be taken into account because projects were only completed at a time where the relevant decisions had already been taken. This also explains why certain support activities are increasingly subject to short term tenders rather than being supplied through projects of the Framework Programme. To maximize the policy relevance of FP projects it would be useful to put a particular emphasis in involving the end users already at an early stage of preparing a work programme to align the timing of research work with their demands.
6. **Increase flexibility**  
Flexibility in managing FP projects should be increased to allow a better reaction to changes of external demands during the duration of the project.

7. **Increase continuity consider institutionalizing follow up actions**  
In many areas of FP5 and FP6 a lack of continuity was found to lead to inefficiencies and a loss of know-how. Continuity should be increased through institutionalizing follow up actions for those projects which are deemed to be particularly successful.

8. **Improve dissemination beyond the end of the project**  
One specific aspect of increasing continuity (see point 7) is to create a system for improving the dissemination of projects’ results beyond their official duration. Currently this is sometimes being done on a project by project basis and the Transport Research Knowledge Centre at least provides for the availability of project documentation. However, a more active and comprehensive strategy is needed to maximize the exploitation of know-how generated by FP transport projects.

9. **Improve feedback loop from projects to EC**  
The feedback loop from projects to the European Commission should be improved beyond the single link via the individual task officer. This also includes regular feedback to the FP programme committee.

10. **Institutionalize accompanying evaluation**  
Continuous evaluation of FP transport projects should be built into the system including requirements for projects in terms of supplying necessary and relevant documentation to evaluators.
1 Introduction

The SITPRO Plus project assessed the effects of transport projects funded by the European Commission within the 5th and 6th Framework Programmes for Research and Technological Development. Its final goal was to use these findings to define new transport research policy objectives and to provide the European Commission with a methodology for impact assessment in ongoing and future Framework Programmes.

The project was funded by the European Commission as part of the 7th Framework Programme. Along with four other research projects it forms part of a broader initiative in the EU Transport Research Programme for developing specific impact assessment methodologies for projects funded by the European Commission.

The conceptual framework of SITPRO Plus for analyzing and evaluating transport research projects was based on an ‘objectives-led’ approach where the types of impacts are measured against the following objectives:

- Strengthening the industrial competitiveness of European industry;
- Contributing to sustainable development and addressing societal problems; and
- Improving Community and public policies.

SITPRO Plus provides an analysis of the research results of the FP5 and FP6 transport projects in a way that aims to be directly useful for providing feedback not only on the definition of new research objectives, but also on the development of the Common Transport Policy and the European Research Area.

SITPRO Plus covered all modes of transport and thus all 512 transport projects funded under the GROWTH programme in FP5 and all 457 transport projects funded under Priorities 4, 6 and 8 in FP6.

This document is the Final Report of the SITPRO Plus project and presents the overall results, conclusions and policy recommendations of the project. The report is structured into eight chapters; following this introduction the second chapter is dedicated to transport research in FP5 and FP6. This contains the most relevant facts and figures as well as presentation of the structures of the programme, their changes over time and the instruments used.

Chapter three describes the methodology of the SITPRO Plus project while chapter four presents the concept of the “impact pathway” and describes the types of impacts derived from transport projects in the EU Framework Programme. Chapter five contains the main results and conclusions of the project. Finally, in chapter six key recommendations for the future development of the Transport Programme are presented.

This deliverable, together will all other project documents, can be downloaded from the SITPRO Plus website (www.sitproplus.eu).
2 Transport research in FP5 and FP6

Transport research has been a part of the EU Framework Programmes (FP) since the start of FP2 in 1987. According to DG RTD, transport research in FP2 and FP3 was largely focused on increasing industrial competitiveness, whereas environmental concerns and other issues of public interest were added to the research agenda as of FP4. This trend continued with FP5 and with an additional emphasis on social issues, thus the overarching goal of sustainable development. With the creation of the concept of a European Research Area (ERA) in 2000 (cf. European Council 2000) and the terrorist attacks of 11 September 2001, two new issues appeared in the design stage of FP6. The first was the introduction of new instruments for research funding specifically designed to support the re-structuring required for the establishment of the ERA. The second was research on security in the transport system, which was given a prominent role in the Work Programme.

2.1 Overview of transport projects

In total 969 projects were funded in FP5 and FP6. Figure 1 and Fehler! Verweisquelle konnte nicht gefunden werden, show the distribution of projects organized by mode of transport (Air & Space; Surface Transport; Overarching/Transport Policy). The first and most obvious observation is that the overall number of transport projects was reduced from 512 in FP5 to 457 in FP6, while the budget was increased from 2.4 million to 3 million. This clearly shows a significant increase in average project size, mostly due to changes in the types of instruments used.

In terms of transport modes, in FP5 just over half of the projects were dedicated to surface transport, approximately one third to air transport and just over 10% to policy research (such as the long-term planning of the European transport system). As a result of larger project sizes in the air sector, the overall budget distribution was strongly in favour of air transport (56%), with 36% allocated to surface transport and only 8% to policy research.

For FP6 the picture looks slightly different. Table 1 shows that a larger proportion of the 457 transport projects was devoted to air & space (52%), while the number of surface transport projects was reduced in absolute numbers (from 277 to 210) and in proportion (from 54% to 46%). But it is important to note that in terms of absolute budget there was in fact an increase for surface transport (from 860 million Euro to more than 1.2 billion). The reason for this divergent trend was the large increase in

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1 Interviews carried out for SITPRO Plus project with 11 officials from DG RTD and DG TREN (see Deliverable 1 for details).
average project size for surface transport from FP5 to FP6, whilst the average size of air transport projects was largely stable. The total budget for air & space increased from 1.4 to 1.8 billion, which is a similar proportional increase to that of the surface transport budget.

Figure 1: Share of projects in FP5 and FP6 by mode

Due to changes in the structure of the transport programmes, the project and budget figures for policy research are not easily comparable between FP5 and FP6. While in FP5 most policy research projects were grouped together in the thematic area ‘Socio-economic research scenarios’, in FP6 the same kind of research projects were dispersed over several areas. In FP6, for example, urban transport including policy research became a separate category within ‘surface transport’ and is statistically not attributed to ‘policy’ in Fehler! Verweisquelle konnte nicht gefunden werden..

Table 1: Number and budget of FP5 and FP6 transport projects by mode

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<thead>
<tr>
<th></th>
<th>FP5</th>
<th>FP6</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Number of projects</td>
<td>Share of projects in %</td>
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<tr>
<td>Policy</td>
<td>68</td>
<td>13.3</td>
</tr>
<tr>
<td>Surface transport</td>
<td>277</td>
<td>54.1</td>
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<tr>
<td>Air &amp; space</td>
<td>167</td>
<td>32.6</td>
</tr>
<tr>
<td>Total</td>
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<td>100</td>
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</table>
2.2 **Project instruments in the Framework Programme**

With two exceptions, similar types of instruments were used for research, demonstration and networking projects in FP5 and FP6.

Table 2 presents the seven different types of instruments and indicates in which Framework Programme they were used. For the first three groups – research, support and co-ordination – there was basically only a change of names between FP5 and FP6. The remaining four groups are Framework Programme specific. The most important change between the two FPs was the introduction of Networks of Excellence and Integrated Projects.²

**Table 2: Project instruments in FP5 and FP6**

<table>
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<tr>
<th>Acronym</th>
<th>Instrument</th>
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<tr>
<td>Research</td>
<td>Research, demonstration &amp; combined projects, cost-sharing contracts, RTD projects (FP5); STREPs (FP6)</td>
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<tr>
<td>Support</td>
<td>Preparatory, accompanying and support measures (FP5); specific support actions (FP6)</td>
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<tr>
<td>TN/CA</td>
<td>Thematic networks/concerted actions (FP5); co-ordination actions (FP6)</td>
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<tr>
<td>TP</td>
<td>Technology platforms (FP5)</td>
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<tr>
<td>CRC</td>
<td>Co-operative research contracts (FP5)</td>
</tr>
<tr>
<td>IP</td>
<td>Integrated projects (FP6)</td>
</tr>
<tr>
<td>NoE</td>
<td>Networks of excellence (FP6)</td>
</tr>
</tbody>
</table>

Figure 2 and Fehler! Verweisquelle konnte nicht gefunden werden. show the distribution of project instruments in FP5 and FP6. The vast majority of projects were research projects in both FPs, whereby they were divided between ‘traditional’ small-scale research projects and Integrated Projects in FP6. In the area of networking projects the number of Thematic Networks and Concerted Actions in FP5 was roughly the same as the number of Co-ordination Actions in FP6. However, with the additional introduction of NoEs in FP6 the networking component of the transport programme was significantly strengthened. A small increase can be observed for ‘Support’ projects.

² This is described in detail in Deliverable 1 of the SITPRO Plus project.
A first analysis of the distribution of project instruments in Fehler! Verweisquelle konnte nicht gefunden werden. may suggest a large reduction in the number of research projects from FP5 to FP6, a stable number of networking projects and a large number of projects which are ‘New Instruments’ in FP6. However, if we were to assume, for the purpose of comparative analysis, that IPs are essentially large research projects and NoEs correspond to large-scale TNs/CAs, Fehler! Verweisquelle konnte nicht gefunden werden. actually shows that the introduction of the New Instruments did not lead to a large change in the structure of the transport research programme from FP5 to FP6. In FP5, 343 projects were research, demonstration or combined projects (RTD), which corresponds to 67% of all projects.
In FP6, 327 projects were RTD projects or IPs, i.e. 70% of all projects. A similar observation can be made for networking projects; in FP5 there were 63 Thematic Networks, Concerted Actions and Technology Platforms, as opposed to 56 Co-ordination Actions and NoEs in FP6.

The only significant change can be observed for the Support projects where the number of projects remained largely the same, but the average project size in terms of budget was reduced by more than 50%. A more detailed analysis shows that this is not due to a few ‘outliers’ of very large Support projects in FP5 or a few, very small, projects in FP6, but rather to a real systematic shift reducing the average project size.

2.3 Introduction of ‘New Instruments’ in FP6

In FP6, two new instruments for research funding were introduced; Integrated Projects (IPs) and Networks of Excellence (NoEs). IPs are large-scale research projects with the objective of "integrating together the critical mass of activities and resources needed to achieve ambitious clearly defined scientific and technological objectives". (EC 2003a, p.1) NoEs, on the other hand, are networking projects designed to "overcome the fragmentation of European research where the main deliverable consists of a durable structuring and shaping of the way that research in Europe is carried out on a particular research topic". (EC 2003b, p.1)

According to the official decision establishing the 6th Framework Programme, there were three principal reasons for introducing the New Instruments (cf. Decision 1513/2002/EC). First and foremost, they were seen as a means to support the integration of European research activities in line with the decision of the Lisbon Council Meeting to establish a European Research Area (ERA) (cf. European Council 2000). Second, larger projects were to help to attain a critical mass of capacities in the fragmented research sector. Third, the New Instruments were expected to simplify management procedures by concentrating efforts on fewer, but larger projects.

Interviews with European Commission officials suggest that there might have been a range of additional reasons of varying importance for the decision. Most officials agree that simplification of management procedures and thus a reduction of the administrative workload on the Commission played an important role. But, instead of an overall reduction in workload, there was rather a shift of the burden from the Commission services to project management teams (see also section 5 below). This became necessary given ever growing EU research budgets, not accompanied by corresponding increases in European Commission personnel.

In some sectors, especially in aeronautics, the need for bringing together critical mass in large projects appears to be undisputed. This is due to the wide range of expertise

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3 Technology Platforms are not solely dedicated to networking activities.
required for certain types of research, as well as the feasible minimum size for industrial development in the aeronautics sector. In many other sectors, however, critical mass considerations seem strangely out of place. This was mentioned by EC officials particularly for urban transport and many types of strategic research.

The most commonly mentioned additional reason for introducing the New Instruments was the urge to innovate and to show that the Framework Programmes are constantly improving. This was referred to by one interview partner as “policy entrepreneurship” and by another as “change for change's sake”. It was also mentioned that a general bureaucratic tendency to favour fewer, larger projects may have come into play, with the desire for increased visibility to relevant stakeholders and the general public. Finally, some respondents saw the New Instruments also as a reaction and a signal to the new target group of large industrial consortia, for whom autonomy in project management would be important.

Both of the New Instruments are characterized by their large size, both in terms of budget and number of partners. The median budget in the FP6 transport programme was more than 19 million Euro for IPs and 5.5 million for NoEs (see Fehler! Verweisquelle konnte nicht gefunden werden.). This means that the average IP was more than five times as large as the average research project in FP5, and the average NoE was roughly four times the size of the FP5 Thematic Networks. The only comparable instruments in FP5 were the Technology Platforms (TPs) with a median budget of around 6 million Euro and with more than 30 partners on average. However, only 23 TPs were carried out in FP5, as opposed to 84 IPs and NoEs in FP6.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>FP5 median budget</th>
<th>FP6 median budget</th>
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<tbody>
<tr>
<td>Research</td>
<td>3,577</td>
<td>3,676</td>
</tr>
<tr>
<td>Support</td>
<td>804</td>
<td>355</td>
</tr>
<tr>
<td>TN/CA</td>
<td>1,323</td>
<td>1,150</td>
</tr>
<tr>
<td>TP</td>
<td>6,863</td>
<td>-</td>
</tr>
<tr>
<td>CRC</td>
<td>1,188</td>
<td>-</td>
</tr>
<tr>
<td>IP</td>
<td>-</td>
<td>19,447</td>
</tr>
<tr>
<td>NoE</td>
<td>-</td>
<td>5,500</td>
</tr>
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What the information on budget does not reveal, however, is potential changes in participation between different types of instruments. According to the 2004 evaluation of the effectiveness of the New Instruments, the participation of SMEs and project partners from the New Member States was particularly low in IPs and NoEs (cf. Marimon 2004).
After nearly six years of experience with the New Instruments their record can at best be described as mixed. Whilst the 2004 evaluation was still hopeful that there was a "broad consensus on the relevance of the New Instruments" (Marimon 2004, p.10), more recent reports have questioned their success and usefulness (e.g. COWI 2009).

In general, the main criticism focuses on the administrative burden on the project consortium, the size and composition of consortia and the expectations for durable integration. According to Marimon (2004), the latter two issues are particularly problematic for NoEs, where consortia are often artificially large in order to achieve a specific project size or regional balance. Competitors might also be willing to cooperate in a project, but they are very unlikely to integrate in the way initially foreseen for NoEs. Realizing these problems, the air transport programme of DG RTD decided two years ago not to issue any new calls for NoEs.

2.4 Project sizes and number of participants

The number of partners in European transport projects ranges between one and more than one hundred in FP5 and FP6. More than half of all projects, however, are in the range of between six and twelve partners. This section illustrates the project sizes in terms of project participants for different modes and types of transport projects and the development from FP5 to FP6.

Fehler! Verweisquelle konnte nicht gefunden werden. shows a breakdown of the differences in project size (defined by the number of participants) across research under the different modes (policy; surface transport; air & space) for FP5 and FP6 respectively. Over half of the transport projects in FP5 had 6-12 participants (57%). It is interesting to note that the average number of participants for policy research and surface transport were almost equal, whereas in air transport there were only a few small projects and many large ones. More specifically, the percentage of large projects (13+ participants) was 43% for air as compared with only approximately 27% for surface transport and policy research. Only 7 out of 156 air & space research projects in FP5 were small projects with 1-5 participants.

In FP6, the overall proportion of medium-size projects with 6-12 participants fell to 45%. In air & space and surface transport research there was a shift to larger projects. The increase in the proportion of surface transport projects with more than 13 participants was particularly striking (27% to 40%). The shift was proportionally smaller for air & space (44% to 51%) because the number of large projects within this mode was already quite high in FP5. This shift to more project partners can be explained by the introduction of the New Instruments in FP6. Although Technology Platforms in FP5 generally had a lot of participants, they only accounted for 4.5% of

\[ \text{4 Technology Platforms in transport research in FP5 had an average (mean) of 35 participants, with the size ranging from 5 to 130 participants.} \]
projects (see Fehler! Verweisquelle konnte nicht gefunden werden.). By contrast, IPs and NOEs accounted for 18.4% of projects in FP6.\(^5\)

**Table 5: Number of participants by mode**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Number of participants per project</th>
<th>Total</th>
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<tbody>
<tr>
<td></td>
<td>Small (1–5)</td>
<td>Medium (6–12)</td>
</tr>
<tr>
<td><strong>Policy</strong></td>
<td>% within FP5 (n=58)</td>
<td>15.5</td>
</tr>
<tr>
<td></td>
<td>% within FP6 (n=10)</td>
<td>0</td>
</tr>
<tr>
<td><strong>Surface transport</strong></td>
<td>% within FP5 (n=258)</td>
<td>13.2</td>
</tr>
<tr>
<td></td>
<td>% within FP6 (n=200)</td>
<td>13.0</td>
</tr>
<tr>
<td><strong>Air &amp; space</strong></td>
<td>% within FP5 (n=156)</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>% within FP6 (n=202)</td>
<td>8.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>% within FP5 (n=472)</td>
<td>10.6</td>
</tr>
<tr>
<td></td>
<td>% within FP6 (n=412)</td>
<td>10.4</td>
</tr>
</tbody>
</table>

On the whole, Fehler! Verweisquelle konnte nicht gefunden werden once more illustrates the results of the introduction of the New Instruments in FP6. Regardless of how the projects are organized, nearly all categories show a steep increase in the number of large projects with 13 or more participants.

### 2.5 Country distribution of project co-ordinators and participants

As a general principle any country may participate in the Framework Programmes, but the procedures for participation and the access to funding depends on the country in question. From FP5 to FP6, the number of countries represented in transport research grew from 37 to 56, although the vast majority came from the Member States and associated countries (who also pay a share of the Programme’s overall budget). In FP6, associated countries included the EEA countries (Iceland, Norway, Lichtenstein), candidate countries (e.g. Turkey, Croatia), as well as Israel and Switzerland (cf. EC 2009). Furthermore, the Commission encourages a regional balance within projects,

\(^5\) IPs had an average of 31 participants and a range of 6-67; NOEs an average of 26 participants and a range of 13-70.
i.e. the involvement of researchers from across the Union. However, no project co-ordinators came from Cyprus, Hungary, Latvia, Lithuania or Malta in FP5 or FP6.

This section compares the distribution of project participation and project co-ordination within the European Union and the associated countries in FP5 and FP6. To achieve this, Member States and (selected) associated countries were re-classified into groups according to both ‘geography’ and ‘size’. These groupings are shown in Fehler! Verweisquelle konnte nicht gefunden werden. and Table 7. (All other countries from which participants, but not co-ordinators came were grouped as ‘Non-EU’.) In analyzing the distribution of projects, population was used as a guide as to whether the proportion of participation/co-ordination from each country group was ‘representative’. (See Annex 1 for more details on methodology.) The assignment of specific countries to the country groups is presented in Fehler! Verweisquelle konnte nicht gefunden werden. and Fehler! Verweisquelle konnte nicht gefunden werden. above.

The first observation to be made from Fehler! Verweisquelle konnte nicht gefunden werden. and Table 7 is that the different regions are not equally represented in the Framework Programmes. Fehler! Verweisquelle konnte nicht gefunden werden. shows that transport research projects were particularly concentrated in ‘Continental’ countries (with around 50% of the participants in both FP5 and FP6, while accounting for only 37% of the total population) and away from ‘Eastern’ countries (accounting for 21% of the population, but with only 4% and 8% of the participants in FP5 and FP6 respectively). This observation is reflected in Table 7 by the over-representation of the ‘EU-15: Other’ group and the under-representation of new Member States and associated countries.

Table 6: Project co-ordination and participation across country groups (by geography)

<table>
<thead>
<tr>
<th>Country groups</th>
<th>FP5</th>
<th></th>
<th>FP6</th>
<th></th>
<th>% of total population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of co-</td>
<td>% of all</td>
<td>% of co-</td>
<td>% of all</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ordinators</td>
<td>participants</td>
<td>ordinators</td>
<td>participants</td>
<td></td>
</tr>
<tr>
<td>Nordic/UK/Ireland</td>
<td>29.5</td>
<td>23.2</td>
<td>16.0</td>
<td>19.7</td>
<td>17.5</td>
</tr>
<tr>
<td>Continental</td>
<td>54.3</td>
<td>52.5</td>
<td>59.7</td>
<td>47.2</td>
<td>37.4</td>
</tr>
<tr>
<td>Southern</td>
<td>15.0</td>
<td>19.8</td>
<td>19.7</td>
<td>22.4</td>
<td>24.3</td>
</tr>
<tr>
<td>Eastern</td>
<td>1.2</td>
<td>3.7</td>
<td>4.6</td>
<td>8.3</td>
<td>20.7</td>
</tr>
<tr>
<td>Non-EU</td>
<td>-</td>
<td>0.8</td>
<td>-</td>
<td>2.4</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>(Count)</td>
<td>(512)</td>
<td>(4045)</td>
<td>(457)</td>
<td>(5960)</td>
<td>(497,056,380)</td>
</tr>
</tbody>
</table>
Table 7: Project co-ordination and participation across country groups (by geography)

<table>
<thead>
<tr>
<th>Country groups</th>
<th>FP5 % of co-ordinators</th>
<th>FP5 % of all participants</th>
<th>FP6 % of co-ordinators</th>
<th>FP6 % of all participants</th>
<th>% of total population</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU-15: Large</td>
<td>66.0</td>
<td>64.3</td>
<td>63.2</td>
<td>59.0</td>
<td>60.6</td>
</tr>
<tr>
<td>EU-15: Other</td>
<td>29.3</td>
<td>27.2</td>
<td>29.8</td>
<td>25.8</td>
<td>16.0</td>
</tr>
<tr>
<td>New Member States and associated</td>
<td>4.7</td>
<td>7.7</td>
<td>7.0</td>
<td>12.7</td>
<td>23.4</td>
</tr>
<tr>
<td>Non-EU</td>
<td>-</td>
<td>0.8</td>
<td>-</td>
<td>2.4</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>(Count)</td>
<td>(512)</td>
<td>(4045)</td>
<td>(457)</td>
<td>(5960)</td>
<td>(497,056,380)</td>
</tr>
</tbody>
</table>

The second observation is that the distribution of project participation is not the same as the distribution of project co-ordination. In both re-classifications, the over-(Nordic/UK/Ireland, Continental, EU-15) or under-(Southern, Eastern, New/associated) representation of each region in the Framework Programmes was more pronounced for the co-ordination of projects than for overall participation. This was most striking for Eastern Europe, which accounts for 21% of the population, but only 1% of project co-ordinators in FP5 and 5% in FP6. This discrepancy can be explained by the later entry of the 'Eastern' Member States into the EU, and suggests that project consortia still tend to select the project co-ordinator from one of the old Member States. The one noticeable exception to this observation is the representation of the 'Nordic/UK/Ireland' region (18% of total population) in project co-ordination, falling from 30% of co-ordinators in FP6 to 16% in FP5, compared with a fall in the proportion of total partners from the region of only 23% to 20%.

Third, the distribution of project participation and co-ordination shifted from FP5 and FP6, in most cases towards a more ‘representative’ distribution. The most interesting change is the 14% drop in the proportion of co-ordinators from ‘Nordic/UK/Ireland’, which was compensated by a rise in the proportion of co-ordinators from the three other regions (6% in ‘Continental’ countries, 5% in ‘Southern’ and 4% in ‘Eastern’). The only other category to see a fall in its representation among project co-ordinators was the large EU-15, with a much more muted decrease from 66% to 63%. Specifically, there was a marked fall in the number of projects co-ordinated by the UK (falling from 81 to 41 projects), but there was a more than 50% fall in project co-ordination in Denmark (12 to 2 projects), Ireland (7 to 2) and Norway (15 to 7) within the ‘Nordic/UK/Ireland’ region (see Table 8).
Table 8: Reduction in ‘Nordic/UK/Ireland’ co-ordinators from FP5 to FP6

<table>
<thead>
<tr>
<th>Country</th>
<th>FP5 (Co-ordinators)</th>
<th>FP6 (Co-ordinators)</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>DK</td>
<td>12</td>
<td>2</td>
<td>-83%</td>
</tr>
<tr>
<td>FI</td>
<td>7</td>
<td>5</td>
<td>-29%</td>
</tr>
<tr>
<td>IE</td>
<td>7</td>
<td>2</td>
<td>-71%</td>
</tr>
<tr>
<td>NO</td>
<td>15</td>
<td>7</td>
<td>-53%</td>
</tr>
<tr>
<td>SE</td>
<td>21</td>
<td>16</td>
<td>-24%</td>
</tr>
<tr>
<td>UK</td>
<td>89</td>
<td>41</td>
<td>-54%</td>
</tr>
</tbody>
</table>

Regarding the types of organizations involved in FP5 and FP6 projects Figure 3 shows that more than 80% of all projects involved universities as partners followed by industry and SME participation. Public and commercial research organizations were only involved in 45% and 32% of the projects respectively.

Figure 3: Transport research partnerships (in terms of frequency in %)
3 SITPRO Plus Methodology

The following section presents a summary of the methodology employed by the SITPRO Plus project for carrying out an ex-post review of the impacts of the transport projects in FP5 and FP6. A detailed account of the methodology is given in Deliverable 2 of the project. On the whole, the methodological approach of the project comprised the following seven elements.

1. Analysis of databases
   Basic information on all 969 projects (duration, budget, partners, abstracts, etc.) was obtained from DG RTD and complemented with data from the CORDIS website and the Transport Knowledge Research Centre website. This information was fed into the SITPRO Plus database. This data was then subject to a preliminary analysis to group the projects by different characteristics (e.g. size, instrument, topics addressed) for the sampling procedure.

2. Interviews with Commission officials
   Semi-structured interviews with eleven European Commission officials served the dual purpose of accessing relevant data sources and identifying the crucial points for evaluating the strengths and weaknesses of transport projects in FP5 and FP6.

3. Project sampling
   A sample of 120 projects (12.4%) was drawn, based on three criteria: thematic area/mode, project instrument and size in terms of budget.

4. Desk review of project reports
   From nearly 100 out of the sample of 120 projects SITPRO Plus managed to collect sufficient project documentation for evaluation purposes. "Sufficient project documentation" refers to all cases in which at least the "Description of Work", the final project report and at least one additional key project report was obtained. Those documents were evaluated according to an in-depth procedure by external experts and/or members of the project team. The project studies sought to assess each project in terms of the extent to which research was progressing along its "impact pathway" (see below), in contrast to reasonable expectations.

5. Telephone interviews with co-ordinators
   Telephone interviews were conducted with the co-ordinators of more than 80 of the 120 projects selected in order to contrast and complete the information provided by the desk reviews of the project documentation. The qualitative information obtained from those interviews was analysed and fed into the assessment of the impact pathways described in the following chapter below.

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6 In more than 20 cases sufficient documentation could not be obtained due to confidentiality reasons or the lack of available contact persons or documents (e.g. if coordinating organization no longer existed).
6. Internet questionnaire
A survey was conducted among all 969 project co-ordinators based on an internet questionnaire. The response rate to the questionnaire was 41%. The full questionnaire is provided as an Annex to Deliverable 3 and can be downloaded together with all other project documents from the SITPRO Plus website (www.sitproplus.eu).

7. Assessment of the impact of project pathways
The project developed a method for assessing project impacts according to their implementation pathway. This impact pathway methodology was be developed for typical projects and then applied to the assessment of individual projects, thus complementing the information collected through in-depth desk reviews and co-ordinator interviews.

The impact analysis in SITPRO Plus was based on the assumption that many of the impacts that might arise from EU funded transport projects will not materialize for several years. Therefore, the project examined the mechanism by which impacts are reached. This mechanism was termed the ‘research impact pathway’ and represents the key concept and innovation of that project.

The research impact pathway provides a framework for understanding how impacts can be expected to occur. It is expected to have the following distinct stages (see also Hence, there are three, fairly clearly linked steps (1-3), followed by a final, much less clearly defined, step (4). The transmission mechanism from step one to step four can take several years, and possibly even decades, to observe. Despite this, the strength of the research impact pathway concept is that a research project’s progress along the pathway, e.g. through steps one, two and three, can be charted and evaluated, even where its final impacts may be some years away.
Figure 4):

1. production of research outputs – creation of the “product”;
2. dissemination of outputs – raising the level of awareness about the product;
3. exploitation of outputs – by key intermediaries or end-users of the research; and - much longer term:
4. end impacts on society – on consumers and producers.

Hence, there are three, fairly clearly linked steps (1-3), followed by a final, much less clearly defined, step (4). The transmission mechanism from step one to step four can take several years, and possibly even decades, to observe. Despite this, the strength of the research impact pathway concept is that a research project’s progress along the pathway, e.g. through steps one, two and three, can be charted and evaluated, even where its final impacts may be some years away.
It is important to note, however, that progress along the impact pathway can differ quite widely amongst different projects, for the following reasons:

- whilst projects generally need to be disseminated before they can be exploited by users, this may not always be the case; in some instances the main users of research may be the researchers themselves;

- there may be a ‘feedback mechanism’ between exploitation and dissemination, whereby a project’s findings are disseminated, then exploited by one user and then this exploitation is disseminated leading to further exploitation by other users. The final impact is then the product of these multiple rounds of dissemination and exploitation.

- good, well disseminated research may have varying levels of exploitation potential, depending upon political or other considerations external to the project; for example, urban road pricing has received considerable research attention, much of which appears to have been well disseminated, yet very few urban road pricing schemes have been implemented. The production and dissemination of that body of research has, nevertheless, helped to bring closer a more widespread implementation of urban road pricing.

Impacts were only considered to be of relevance if they contributed towards the achievement of Programme objectives; in SITPRO Plus medium and long term impacts were measured against contributing to the following three objectives:

- Strengthening the industrial competitiveness of European industry;
- Contributing to sustainable development and addressing societal problems; and
• Improving Community and public policies.

*Exploitation to date* was seen to be the most credible and robust indicator of progress along the Research Impact Pathway. Exploitation means that outputs have a value. Exploitation to date means that the use of the outputs can be both verified and assessed.
4 Types of impacts of FP Transport Projects

SITPRO Plus distinguished four different types of impacts; industrial, scientific, societal and policy impacts.

Figure 5 illustrates how those four impact groups relate to classification provided by two of the other Ex-post Evaluation Cluster projects, namely the MEFISTO and the METRONOME projects. Each of the impact types is described in turn in the following paragraphs.

**End user or industrial impacts** either derive in the short or medium term from directly usable project outputs or they derive in the long term from different types of – tangible and intangible – project results. The latter include structuring effects of the industrial landscape, such as improved collaboration, or intermediary products, concepts and developments which are used as inputs for further Research and Development. While direct impacts tend to benefit one individual or one group of companies indirect and longer term impacts tend to improve the overall competitiveness of an entire sector.

**Scientific or research impacts** are those that contribute to the qualification of R&D personnel, assist in the development of a European Research Area (ERA), improve collaboration of researchers with valuable partners within Europe and beyond and, more generally, strengthen the capacity of transport research in Europe.

Figure 5: Types of project impacts

**Driving**
- Lisbon Agenda

**Structuring**
- Transport Policy
- ERA

**Leveraging**
- Support to SMEs
- International relations

**(Specific) Policy impacts**

**End user / industrial impacts**

**Scientific impacts**

**(Wider) Societal impacts**

*Source: MEFISTO, METRONOME, SITPRO Plus Projects*
**Wider societal impacts** encompass the entire realm of “sustainable development” including its environmental, social and economic elements. While most FP transport projects might have wider societal impacts in some way or another, in the overwhelming number of cases those impacts will only arise in the long term (see also stage four of the impact pathway in section 3 above).

**Policy impacts** in terms of contributions to specific EU policy goals arise not only from especially dedicated support actions but also from research projects whose primary objectives are not policy related. Examples include contributions to social cohesion through researcher mobility programmes or to the free movement of goods and persons.

The (qualitative) impact assessment of SITPRO Plus equally considered impacts of all four types without any particular weights or rankings. However, the following sections 5 and 6 do highlight potential trade-offs and/or inconsistencies in attempting to maximize different types of inputs simultaneously with the same project or programme.
5 Results and conclusions

Following the logic of the impact pathway methodology presented in section 3 the results and conclusions are also grouped according to the production of the output (i.e. work on the project itself), dissemination, exploitation and wider societal impacts.

5.1 Project design and project work: success factors and problems

Several relevant results relate to the stage before the actual project work is started, i.e. to the phase of project design. Most importantly, it was found that project sizes are not always adequate to the tasks at hand. This was particularly evident in FP6 where the so-called “New Instruments” (i.e. Integrated Projects and Networks of Excellence) proved to lead to unnecessarily large projects for certain purposes. But more generally project coordinators and external evaluators alike tended to be of the opinion that a significant proportion of projects could be carried out equally well with smaller budgets and/or fewer partners (see also next paragraph below). Notable exceptions were the area of aeronautics and space and certain types of smaller projects (mostly coordinating actions).

An important factor in the project design stage is the building of a consortium of partners. From an ex-post perspective independent evaluators and project coordinators alike found in virtually all projects an imbalance of the quantity and quality of work various partners contributed. In fact, most projects displayed one or several “non-performing” or “dormant” partners. By and large there are two different reasons for the existence of such partners in FP consortia; the first reason is that a partner does not meet the (legitimate) expectations of the coordinator. This is more likely to happen in new partnerships where organizations have not yet collaborated before 7 but in general those were found to be random mistakes which are to be expected in any large programme. The second reason is that from the very beginning certain partners were not really expected to contribute real value to the work of the project but were added for a different reason; most commonly mentioned were considerations of regional balance, stakeholder/user inclusion or SME participation. While regional balance is by no means a formal criterion for project evaluation most project coordinators remain convinced that regional balance is vital for the success of a proposal.

Among others, two key factors were identified for smooth and efficient project work; the first relates to confidence among project partners and the second to the interface between the project consortium and the European Commission. Regarding the issue of confidence among project partners it is not surprising that this was found to be especially crucial in project working on outputs with a direct commercial value. But

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7 See issues of “continuity” below.
even in less commercially oriented projects the work was often obstructed by a lack in the willingness of partners to share information. The data gathered through the interviews once again confirms the obvious importance of long standing collaboration for building trust among partners. However, especially in surface transport the structure and procedures of FP5 and FP6 did not sufficiently facilitate continuous collaboration of project partners beyond single projects. This is due to the fact that even highly successful projects were not given any type of opportunity for follow-on actions and the topics contained in the work programme were continuously changed over the course of FP5 and FP6 for most areas. While this continuous changing of topics is clearly necessary and useful to keep up with the changing challenges for the Common European Transport Policy and industry developments it also causes problems for building up trans-national European research expertise in some areas. In certain parts of aeronautics research (e.g. research on noise reduction) it appears that a good balance has been struck between meeting ever changing demands but still providing a continuity of research over more than 15 years. Finally, it should be noted that a strong emphasis on supporting continuity might have a second drawback (in addition to loosing some flexibility to react to actual developments); well established patterns of cooperation have a tendency of turning into “closed clubs” into which potentially innovative newcomers find it hard to break into.

Most coordinators in the various surveys conducted in SITPRO Plus also stressed the importance of the interface between the European Commission and the project consortium. Especially the role of the task officer was highlighted as a facilitating factor for the “success” of a project both in terms of the work during the project and in terms of the dissemination and exploitation of the projects’ results. This is discussed in more depth in section 5.3 on exploitation.

5.2 Research impact pathway

The impact of research on policy, the industry and, by default, economy and society is not a linear process; nor is it one which follows a single pathway. There is an extensive social scientific research on this topic but it is beyond the scope and character of the present report to go into this. Suffice here to note that what theory and previous research shows is that it is as important to attention to the differences of research communities as it is to try to make them more efficient according to standard

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performance criteria. There are dissemination and exploitation means that work well within one research community but not in another.⁹

In order to gain better insight into this set of differences, we classified the projects which responded to our survey in four categories according to their variation on two key dimensions:

a) Their thematic scope (focused on one topic or on two and more)
b) The size of their partnership (1-4 or more than 5)

Figure 6 displays the four-fold matrix that emerges through this classification.

**Figure 6: Typology of transport projects**

- Type A projects are those projects which are small in terms of partnership, i.e. have no more than four partners and which are also focused in terms of thematic scope.
- Type B projects are thematically focused like type A projects but they are bigger in terms of the size of their consortium.
- Type C projects are small with regard to partnership but diffused in terms of thematic orientation.
- Type D projects are projects which are large—both with regard to the size of their partnership and in terms of their thematic scope.

⁹ See also Deliverable 1 of the first Sitpro Report (2001, Giorgi and Pohoryles); as well as the special issue on the role of Social Sciences and Humanities for Research of Innovation; The European Journal of Social Science Research, Vol. 23, No. 1 (Edited by Ronald Pohoryles).
The SITPRO Plus achieved sample can be considered representative of the whole reference population of research projects in the Fifth and Sixth Framework Programmes (for details see Deliverable 3 of the project).

In what follows we compare the four types of projects according to some performance criteria of output, policy relevance and dissemination as discussed already for the whole population in the previous sections.

5.3 Importance and shortcomings in dissemination

We now turn to the subject of dissemination. Figure 16 displays the use of dissemination instruments (also in terms of quantity) by different types of projects. We considered the use of websites (three or more), external events (six or more), external publications (six or more)—for instance in academic journals, online publications and own publications.

Figure 7: Use of dissemination means by different types of projects

We see that the different types of projects are quite similar in terms of dissemination outputs with respect to website representation and representation in external events, with type D projects, i.e. projects which are large in terms of partnership and diffused in terms of thematic scope, being the most successful. The differences between projects are more pronounced in terms of publications, with types C and D projects ‘leading’ as compared to projects A and B.
In other words, the projects which are more generic in terms of their topics are more likely to be successful in terms of dissemination than projects which are more specific, and especially when they have many partners—as the size of the consortium acts then as a multiplying factor.

These results are especially interesting against the background of the previous results regarding actual exploitation. If validated as correct, what the Sitpro Plus survey data suggest is that the Framework Programme dissemination and exploitation policy, which is based on the treatment of the concepts of ‘exploitation’ and ‘dissemination’ as complementary (if not interchangeable), might have been premised on the wrong assumption. This is that there is a close association between dissemination and exploitation, i.e. that those projects which are successful in terms of dissemination are also those which are successful in terms of exploitation. Yet our results show that in fact the projects which are successful in terms of exploitation, i.e. in having a direct impact, say, on policy, are not the same projects that are successful in terms of having a wide impact in terms of the dissemination of knowledge. This finding is consistent with the theoretical knowledge from STS studies and science evaluation that research is different—and in more ways than the mere basic vs. applied distinction.

Figure 5 displays the users of transport research based on the self-assessment of the project coordinators. The patterns follow quite closely those identified with respect to partnership.
The industry and RTD community, who also dominate transport research as knowledge producers, are also those most commonly identified as the prime users of the research results. EU and national public institutions (such as ministries of transport or DG-TREN) are considered important users by five to six out of ten respondents—almost in equal share of importance as transport operators. Transport service providers and international organizations are considered important users by four out of ten respondents, while non-governmental organizations are only judged relevant for two out of ten respondents.

Table 8 presents a somewhat different perspective on the users of transport research. We compared the answers of respondents to the question on the users of their research with their answers to the question on the latter’s relevance and also the answers as to the consortium partnership. The comparison of the answers to these three questions reveals some interesting contradictions.
Table 9: Users of research, relevance and inclusion in consortium

<table>
<thead>
<tr>
<th>Type of users</th>
<th>In % of answers</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual users</td>
<td>Relevance</td>
<td>Consortium</td>
</tr>
<tr>
<td>Industry / SMEs</td>
<td>87</td>
<td>87</td>
<td>79</td>
</tr>
<tr>
<td>RTD Community</td>
<td>86</td>
<td>88</td>
<td>81</td>
</tr>
<tr>
<td>EU institutions</td>
<td>57</td>
<td>37</td>
<td>50</td>
</tr>
<tr>
<td>Transport operators</td>
<td>55</td>
<td>36</td>
<td>44</td>
</tr>
<tr>
<td>Public institutions</td>
<td>54</td>
<td>44</td>
<td>51</td>
</tr>
<tr>
<td>Service providers</td>
<td>46</td>
<td>36</td>
<td>39</td>
</tr>
<tr>
<td>International organizations</td>
<td>45</td>
<td>39</td>
<td>35</td>
</tr>
<tr>
<td>Infrastructure providers</td>
<td>36</td>
<td>24</td>
<td>27</td>
</tr>
<tr>
<td>NGOs / CSOs</td>
<td>27</td>
<td>17</td>
<td>24</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>244-322</strong></td>
<td><strong>222-344</strong></td>
<td><strong>233-345</strong></td>
</tr>
</tbody>
</table>

Based on the above comparative analysis, the users of transport research can be classified in three categories:

a) Those who are positively assessed as users of research results, who are considered relevant and who are frequently also found as members in transport research consortia. This includes the industry (and SMEs) and the RTD community. This is the traditional or ‘academic’ model of research use characteristic of basic research, whereby the producers of research knowledge are also its main users.

b) Those whose formal involvement in transport research as users or producers of knowledge does not correspond to their estimated relevance. This applies to public administrations (and especially those at the EU level) and transport operators.

c) Those whose overall assessment as users or producers or transport research corresponds to their perceived relevance: this is the case of service providers and international organizations. These are considered as users (and/or producers) of transport research by around four out of ten respondents and only slightly less (three out of ten) consider them relevant.

d) The fourth and final category includes institutions who are rarely mentioned as either users or producers of transport research and who are also not considered particularly relevant for the sector. This applies to non-governmental organizations but also, surprisingly, to infrastructure providers.

The above results tell us indirectly something about the success of the European Commission in promoting mode-2 or applied type of research in the transport field, i.e. research that is policy relevant or meets user requirements through the closer interaction (during research) of the users and producers of knowledge. From the perspective of the producers of transport knowledge, this type of research is only
considered valid insofar as the industry is concerned, whereby for transport this is nothing new, since the industry (together with academia) have always been the key drivers of transport research. Alternatives to this mainstream type of transport research would be research that is more directly policy-relevant (by answering to the demands of public policy institutions at national or European level) or research that answers the needs of the extended transport user community such as civil society. This type of research is still treated with caution within the transport research community, whereby there is a qualitative difference between national and European policy institutions, with the former still considered more relevant than the latter.

A surprising finding is the comparative low relevance for research (actual or assessed) of those institutions involved directly in the provision of transport infrastructure, services or operators. This too suggests a certain gap between these organizations and those engaged in the production of transport knowledge either within the industry or the academia which deserves closer attention.

Table 9 turns to another interesting aspect of the use of transport research, namely, its actual documentation. Respondents to our survey were asked to state which of the users they had named as important for their research had actually also made use of their research results, for instance by implementing them or by referring to them in policy documents.

**Table 10: Documented use of research**

<table>
<thead>
<tr>
<th>Type of users</th>
<th>In % of responses</th>
<th>References in documents</th>
<th>Implemented results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual users</td>
<td>Used data</td>
<td></td>
</tr>
<tr>
<td>Industry / SMEs</td>
<td>87</td>
<td>50</td>
<td>NA</td>
</tr>
<tr>
<td>RTD Community</td>
<td>86</td>
<td>62</td>
<td>NA</td>
</tr>
<tr>
<td>EU institutions</td>
<td>57</td>
<td>40</td>
<td>34</td>
</tr>
<tr>
<td>Public (national / local)</td>
<td>54</td>
<td>35</td>
<td>21</td>
</tr>
<tr>
<td>International organizations</td>
<td>45</td>
<td>31</td>
<td>27</td>
</tr>
<tr>
<td>Service providers</td>
<td>46</td>
<td>28</td>
<td>NA</td>
</tr>
<tr>
<td>Infrastructure providers</td>
<td>36</td>
<td>19</td>
<td>NA</td>
</tr>
<tr>
<td>NGOs / CSOs</td>
<td>27</td>
<td>17</td>
<td>NA</td>
</tr>
<tr>
<td>Total</td>
<td>244-322</td>
<td>396</td>
<td>396</td>
</tr>
</tbody>
</table>

What the above table shows is the gap between the stated and actual use of transport research results—from the view of project coordinators—which is a reality even for those institutions which are directly involved in research (like the industry or academic community), or policy institutions which according to the research work programmes are expected to benefit from the research in terms of policy analysis and planning. Figure 9 visualizes what we refer to as the fall-out rate in the use of transport research. For each type of potential user, this represents the share of non-use of
transport research. Had we used instead the share of non-implementation, the fall-out rates would have been even more dramatic.

Figure 9: Fall-out rate in use of transport research

What the above figure brings out very well is how much transport research and knowledge goes unexploited by relevant stakeholders. Close to 55 per cent of national and public administrations identified by transport coordinators as potential users of their research do not use the results. The fall-out rate is next highest with 47 percent for infrastructure providers but here it should be recalled that these are not frequently selected as users. The fall-out rate is lowest among EU institutions (30 percent) and the RTD community (29 percent). It is comparatively high for the industry (with 42 percent) considering that the industry is among the most frequent beneficiaries of transport research contracts within the EU framework programmes.

There are various ways in which project results can be disseminated: through publications, presentations at workshop or conferences, newsletters, website announcements or project reports. The Sitpro Plus survey asked respondents to rate the relevance and actual use of different dissemination means. Figure 9 displays the results of this analysis.
As can be seen from Figure 10, FP transport projects make use of different means of dissemination. The most interesting finding, however, concerns the importance they attribute to different instruments, and especially to project reports. The latter are contractual deliverables and, following the logic of the EC Framework Programmes, they constitute the basis for disseminating information about research results within the Commission services, and within policy communities more generally. Yet, only very few project coordinators think that this is also being achieved. There are two possible explanations for this negative assessment: either that the project reports are not taken seriously by project coordinators for presenting their research (treated instead more as administrative outputs); or that the Commission officials are not able to disseminate these reports within their policy units. It is possible that both factors are at work thus creating a vicious circle: in conjunction with the unclear status of project reports as either administrative or scientific deliverables and against the background of the failure of the Commission services to actively or proactively use them in policy consultations, project coordinators end up valuing them less as means of dissemination.
By contrast, publications as well as own and external conferences are used and considered useful means of dissemination. These are the standard ‘academic’ instruments of dissemination. Their advantage is that they represent well-tried and known instruments to the academic community—entailing also their own means of quality controls (such as peer-reviewing). Their disadvantage is that they usually work best within academic or scientific communities and have a longer time span in terms of non-academic impact. However, considering that other short-term oriented dissemination instruments, such as project reports or project websites, are not having the expected output, it might be useful for European research policy-makers to consider ways for linking the scientific and policy communities through other measures such as workshops specifically designed for this purpose. It might also be useful to pay more attention to engaging middle-level management policy officials (such as task officers) in the processing and dissemination of research knowledge rather than merely in its contractual administration.

On the scientific side, what perhaps ought to be improved is the collaboration among partners outside the framework of specific projects, or after these are concluded. There is a tendency among members of the transport community engaged in European transport research to view FP transport projects mainly in instrumental terms, i.e. as a source of funds. In conjunction with their low level of knowledge of transport policy developments noted in the earlier section, this undermines the potential for knowledge transfer of project results over and beyond the specific project activities. This is shown, among else, by the significant drop in partner collaboration after the end of projects (Figure 11).

**Figure 11: Partner cooperation during and after projects**

![Partner cooperation during and after projects](image-url)
5.4 **Exploitation of projects’ output**

Figure 12 displays the assessment (in terms of mean values on a scale of 1-5 where 1 stands for ‘very relevant’ and 5 for ‘not relevant at all’\(^{10}\)) of the relevance of different users of transport research for different type of projects. The results were found to be statistically significant across types.

**Figure 12: Relevance of users by project type**

The general finding is that type B and D projects—and especially those of type D—are more likely to positively assess the relevance of use of the knowledge they are producing for external users such as EU institutions, national administrations, operators or NGOs. Type B and type D projects are both project types which are large in terms of partnership, thus are also more likely to include users in their research consortia. In other words, the appreciation of the ‘use’ of transport research is a function of consortium size, but more likely to occur in projects with a large thematic scope.

The above finding is on its own not surprising—but rather commonsense. In a further step of our analysis, we looked at what this ‘relevance’ might mean in practice, by

10 Note that the scale, especially as visualized in figure 12, is counter-intuitive: the higher the number (and bar chart) the lower the relevance.
comparing the four types of projects with respect to the actual use of their results by EU institutions (Figure 13).

Figure 13: Use of transport knowledge by EU institutions

<table>
<thead>
<tr>
<th>Type</th>
<th>Used</th>
<th>Referred</th>
<th>Implemented</th>
<th>Ratio I/U</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A</td>
<td>28</td>
<td>39</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Type B</td>
<td>26</td>
<td>35</td>
<td>33</td>
<td>42</td>
</tr>
<tr>
<td>Type C</td>
<td>7</td>
<td>12</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Type D</td>
<td>33</td>
<td>18</td>
<td>31</td>
<td>32</td>
</tr>
</tbody>
</table>

Type B and D projects continue to score better in terms of actual use, referral and implementation. However type B projects, i.e. those projects which are large in terms of partnership but focused in terms of contents are much more likely to lead to project result implementation—and they are those displaying the highest ratio of implementation to use. What this suggests is that the exploitation of transport knowledge is not alone a function of networking (through the manifold increase of project partnerships to include different research organizations and/or users); but also a function of concentration in terms of subject-matter. Those projects which are both large and diffused do not score better on exploitation than smaller projects or projects which are more specific in terms of their objectives. This finding is a critique of the conceptual logic of the Framework Programmes which display an ‘all-inclusive’ attitude in terms of task description, aiming to achieve as many objectives under one task as possible. Even though this might be an understandable approach from the policy perspective (as in policy design it is important to adopt a multi-factorial or integrated approach), in research this might be counter-productive as it leads to dispersed or non-operational research designs which are inherently problematic in terms of implementation. This also says something about the less than expected success of the new instruments introduced by the Sixth Framework Programme such as networks of excellence or integrated projects (already addressed by Deliverable 1). Our results suggest that the size of such projects are not in themselves the problem—at least insofar as transport research is concerned (they might be in other fields where the research communities are used to operate with smaller units or budgets); the problem is rather their thematic scope or their ambition to integrate all possible
relevant knowledge under a certain topic through one single integrated project or network of excellence.

The same results are repeated in the case of the use of transport knowledge by national public administrations (Figure 14)—with the interesting distinction that all types of projects are more likely to display a higher actual use, referral or implementation. This suggests that national public administrations (such as transport ministries) are more receptive to results from transport research than European institutions.

Figure 14: Use of transport knowledge by national institutions

![Use of results by national inst](image)

Interestingly however, the *actual* policy use of transport project results as measured by referral in documentations or implementation is not congruent with the *perceived* policy relevance of transport projects as assessed by project coordinators. Figure 15 displays the perceived policy relevance of projects.
In terms of the perception of policy relevance, scope is here the discriminatory variable. The coordinators of types C and D projects (both of which are characterized by a wide thematic scope) are more likely to positively assess the policy relevance of their results. Yet in terms of the actual use, it is project type A and, especially, type B that are more likely to lead to actual policy exploitation.

5.5 **Maximizing wider societal impacts**

The low policy-impact of transport research is also shown by the answers to our question on this topic. Unlike former surveys on the same subject we did not only ask respondents to indicate the policy-relevance of their research, but we also asked them to reply to specific policy questions. The deviation between the answers to the generic and specific questions is enormous (Figure 8).
Six out of ten respondents consider their research to be policy relevant—a very high share indeed. By contrast the answers to the specific policy goals of the European transport policy turn out thinner. We still find a relatively large number of respondents (46 percent) stating that their research contributes to the harmonization of national transport policies—and there are still 24 percent that see a contribution of their research to safety and 22 percent to energy efficiency. All other policy goals, including road policy, air policy, freight logistics, the TEN-T, air-traffic management, co-modality or rail liberalization receive between four and ten percent of references. This raises, of course, the question, what policy the transport research is contributing to if not to the explicit goals or themes of the European transport policy which in the meantime is pretty aligned, if not harmonized, to the national transport policies.

There are two possible answers to the above curious results—and both entail an element of truth.

The first is that the specific knowledge by transport project coordinators of transport policy is in fact very superficial—so that they are not able to articulate the policy relevance of their research even when this is present. If this is indeed the case, this could represent a major barrier to the policy exploitation of transport research results. Because however good transport research might be, if the producers of the knowledge are not aware in what way it relates to policy, because their knowledge of policy is
shallow or sketchy, then this might explain why dissemination and exploitation, at least insofar as policy is concerned, does not work.

A second explanation is that the transport research is, in fact, not policy relevant, despite the contrary belief both among project coordinators and Commission officials. This would mean that the so-called policy-relevance of the transport research produced under the Framework Programme is more symbolic than real. An indication that there might be some truth in this second explanation is the emphasis on transport-modelling as the main output of transport research noted above. Undoubtedly transport modelling is an important and necessary tool for transport policy analysis and planning. However its over-emphasis also reflects a specific social construction of policy-relevance within the transport field, i.e. one that is driven by demand and supply. To what extent this is a sufficient approach for realizing research that is policy relevant is something that deserves scrutiny.

Another interesting finding concerns the self-assessed impacts of research projects in terms of business or the creation of jobs.

Figure 17 displays the share of project coordinators anticipating (or being able to already document) the creation of spin-offs, prototypes or products on the basis of their research.

Figure 17: Business impacts of transport research

In terms of products there are, in fact, no significant differences between the different types of projects. With respect to prototypes, types B and D projects are slight—but not highly significantly—more likely to produce such outputs. This appears to be the
result of the size of the partnership. The differences are more significant with regard to spin-offs where type D projects come out as significantly better-performing. That is, projects with a large number of partners and multiple objectives or themes are more likely to lead to the creation of spin-off companies. This finding suggests that such projects are incubators for innovative ideas in that they are dispersed, or even a bit chaotic, and this is not only good in terms of the wide dissemination of knowledge (see Figure 16 earlier) but also in terms of leading to new business ideas. New business ideas thus do not arise out of the focused and clearly designed projects but rather from those that are more generic, multi-themed and inter-disciplinary in orientation.

The results are similar, albeit less accentuated, with respect to the creation of jobs (Figure 18).

Figure 18: Anticipated creation of jobs by transport projects

As we are here concerned with transport research, it is not surprising that all projects score better with respect to the creation of jobs in the transport sector than either in the construction, environment or energy sectors. Type D projects are always a bit better followed very closely by types B and C projects. The ‘least’ performing projects in this respect are type A projects which is perhaps understandable in view of the latter’s limited size and scope.
5.6 Conclusions and discussion

Let us reiterate the main findings of the Sitpro Plus project:

10. Applied research targeting industrial applications, often in collaboration with universities, is the standard and mainstream type of research within the transport field unlike in other research areas.

11. There is a gap between the stated and actual use of transport research results by relevant stakeholders or users. Between 30 and 60 percent of research goes unexploited. Exploitation in this context means ‘documented use’ as through reference or acknowledgement in documents. The degree of lack of exploitation is higher if the actual implementation of research results is considered instead. The fall-out rate of the use of transport research is high not only among policy institutions (such as the EU institutions or national public administrations) but also within the industry—a surprising finding considering that the industry is the main beneficiary of transport research contracts.

12. Transport research continues to produce two main types of outputs: academic outputs such as publications and methods on the one hand; and transport modelling tools and components, on the other. Neither technologies nor policy-relevant outputs are as important, contrary to the rhetoric of some Framework Programme documents on the subject.

13. The policy impact of transport research is often more by name than real. Six out of ten projects consider their results policy-relevant and four out of ten projects think that their research contributes to policy harmonization. However the policy relevance dwindles when specific transport policy objectives such as rail harmonization, road policy or the TEN-T are considered. The gap, which cannot be explained away by the thematic variation of the projects, is the combined result of two factors, namely, the comparatively low specific knowledge of transport policy issues among some project coordinators in conjunction with the transport modelling paradigm still dominant among those in charge of designing the European transport research programme.

14. All transport projects are, as expected, actively involved in disseminating their results through the standard means of publications, workshops, conferences, websites and project reports. The latter are, however, considered the least efficient means for disseminating project results.

15. Projects which are large in terms of partnership (often also involving users and stakeholders in their consortia) and diffused in terms of contents (i.e. having more than one topic and a broad scope) are more likely to consider themselves as policy-relevant. This is in line with the present logic of policy-design which emphasizes cross-sectoral integration. However, insofar as specific policy output
is concerned, projects which are more focused in terms of topic and research design are more likely to produce real policy outputs. This is the case for both small and large projects (in terms of number of partners) but more so the case for large projects.

16. National administrations appear more receptive to transport research results (of all types of research projects) than European institutions. This could also suggest that project coordinators are finding it easier to ‘sell’ their project results to their national administrations than to representatives of European institutions, not least because they are more familiar with the former than with the latter.

17. Projects which are large and diffused in terms of content, i.e. which tap on different topics and display a broad scope, are perhaps less likely to produce evidence for policy use; but they are more likely to lead to new business opportunities and also to a wider transfer of knowledge.

18. There remain significant science-policy gaps in the transport field that need to be addressed, over and above the specifics of individual projects, but rather at the programme level, if European transport research is to have greater impact in the future.
6 Research Policy Objectives

In addition to assessing the impacts of the transport projects funded under FP5 and FP6 SITPRO Plus also investigated potential research policy objectives for future EU transport research activities. This was especially geared towards the ongoing initial preparations for setting up the transport programme for the 8th EU Framework Programme.

The identification of new objectives for transport research policy was based on opinions and information obtained from project coordinators through an on-line survey and in-depth interviews. This was followed by an analysis of how different objectives are interrelated and how they correspond to the more general objectives of the Common Transport Policy and other related Community policies.

Even though SITPRO Plus undertook an analysis of projects for all modes of transport the specific issue of research policy objectives was only covered for surface transport. The reason for this restriction is the large scale parallel effort of the AGAPE and MEFISTO projects to involve all relevant stakeholders in air transport to discuss and update the progress of the sector towards its strategic research objectives. A comprehensive overview can therefore be found in the reports of those two projects.11

In total, six areas of policy objectives were identified and are described in turn below. They represent the main priorities of the research community towards the future development of the European transport research programme.

7. Energy efficiency and CO2 emissions

A large proportion of project coordinators appear to agree that the most important challenges for research are currently related to improving the energy efficiency of the transport system and reducing its CO2 emissions. In terms of concrete objectives for research policy two issues were particularly highlighted. The first is the charging for or pricing of transport infrastructure. Charging schemes in line with current EU legislation still do not take into account the full environmental costs of transport and are thus not ideally suited to address the issue of CO2 emissions.

The second suggested shift in research policy priorities relates to propulsion systems of (mostly road) vehicles. In recent years there has been an increasing emphasis on supporting research towards battery based electric vehicles. From the research community there are serious doubts whether those types of vehicles can and should be promoted as a medium term feasible alternative to various types of combustion engines or fuel cell based electric vehicles. For a variety of reasons it is suggested promote research into a number of different technologies including second generation biofuels, fuel cells, hydrogen storage, efficiency increases of “conventional” combustion engines, hybrid technologies, etc.

11 http://www.transport-research.info/web/projects/project_details.cfm?ID=37069
8. **Safety**
Safety improvements in the transport system are still towards the top of the agenda for large parts of the research community. This includes all modes of transport but particular emphasis should be placed on further safety improvements in **road transport** and (maritime) **shipping**. The latter also includes a modernization of the shipping industry towards an increased uptake of electronic management solutions similar to those that have already been introduced in other modes of transport (e.g. road and air). For this purpose benchmarking activities and transfer of knowledge could be undertaken.

9. **Innovative products and technology**
Innovative products and technologies are both an aim in itself (to boost the international competitiveness of European industry) and a support for other transport research objectives, such as improving energy efficiency and safety. Among the important targets for supporting research on innovative products are a number of technologies, materials and concepts that contribute to **reducing the weight** of vehicles / vessels.

10. **Social cohesion**
Increasing social cohesion and supporting capacity building is one of the important impacts of the Framework Programme in general and of the transport programme in particular. Maximizing this impact should remain an objective of certain projects or lines of research in the transport programme.

11. **Standardization**
An early integration in projects or programme of possibilities for standardization greatly improves the potential impact of transport research. In a number cases it was found that research itself or the successful exploitation of its output was dependent on the degree to which the stakeholders responsible for standardization were involved in a project from an early stage onwards. In some cases already the conception of a project in the FP Workprogramme would benefit from a stakeholder consultation to investigate the potential for standardization and agreements on technical specifications. This is especially relevant in the railway sector but also in terms of standardizing interfaces and components in the car industry.

12. **Harmonization**
Harmonization among Member States should be further pursued in those areas in which it has not yet been addressed or achieved (e.g. the training of drivers; railways and road).
7 Recommendations

The following paragraphs present the ten key recommendations derived from the analysis of the SITPRO Plus project.

11. Develop a strategic research agenda for surface transport
The surface transport programme would benefit from being based on a strategic research agenda similar to the one currently in place for aeronautics in the framework of ACARE.

12. Formulate a clear policy for collaboration with third countries
The globalization of research calls for clear and consistent policies for the involvement of partners from third countries beyond time limited programmes for certain regions. This policy needs to provide a secure medium to long term framework in which collaboration with non-EU partner organizations can be built up and maintained.

13. Specify European added value for individual tasks
In reality the European added value of FP transport projects differs widely and should be specified for individual research tasks or at least by project types. This goes beyond the directly expected impacts of individual projects and refers to the more long term and indirect effects of projects, particularly their long term contribution to overarching EU policy goals such as, for example, social cohesion, economic competitiveness or the freedom of movement of goods and persons.

14. Reconsider appropriate project sizes
More differentiation should be introduced for the size of project in individual research tasks. Considering the adequacy of projects' budgets at the evaluation stage remains necessary but in many cases this is too late since the entire project design (including the partnership) has already been built around an envisage budget which is either too low or too high for the task at hand.

15. Align timing and user involvement
Especially in policy relevant research the timing of the availability of results is crucial. For some FP5 and FP6 highly useful results could not be taken into account because projects were only completed at a time where the relevant decisions had already been taken. This also explains why certain support activities are increasingly subject to short term tenders rather than being supplied through projects of the Framework Programme. To maximize the policy relevance of FP projects it would be useful to put a particular emphasis in involving the end users already at an early stage of preparing a work programme to align the timing of research work with their demands.
16. **Increase flexibility**
Flexibility in managing FP projects should be increased to allow a better reaction to changes of external demands during the duration of the project.

17. **Increase continuity consider institutionalizing follow up actions**
In many areas of FP5 and FP6 a lack of continuity was found to lead to inefficiencies and a loss of know-how. Continuity should be increased through institutionalizing follow up actions for those projects which are deemed to be particularly successful.

18. **Improve dissemination beyond the end of the project**
One specific aspect of increasing continuity (see point 7) is to create a system for improving the dissemination of projects’ results beyond their official duration. Currently this is sometimes being done on a project by project basis and the Transport Research Knowledge Centre at least provides for the availability of project documentation. However, a more active and comprehensive strategy is needed to maximize the exploitation of know-how generated by FP transport projects.

19. **Improve feedback loop from projects to EC**
The feedback loop from projects to the European Commission should be improved beyond the single link via the individual task officer. This also includes regular feedback to the FP programme committee.

20. **Institutionalize accompanying evaluation**
Continuous evaluation of FP transport projects should be built into the system including requirements for projects in terms of supplying necessary and relevant documentation to evaluators.
8 References


CORDIS (2009a)


