Measuring the impact of transport projects in the EU Framework Programmes

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The paper presents an assessment of the types and the scale of impacts of EU funded transport research. The results are derived from the ongoing SITPRO Plus project, funded by the 7th EU Framework Programme. They are based on a survey of all of the approximately 1000 individual transport projects in the 5th and 6th Framework Programme (FP5 and FP6) and an in-depth study of a sample of 120 of those projects. For this purpose a combination of multiple methods are used, including an internet questionnaire, desk review of project reports, and interviews with project coordinators, European Commission officials and users of the research results. This paper conceptualizes impacts not as a static measure but rather in the form of impact pathways. This is in recognition of the facts that most of the impacts of FP5 and FP6 projects have yet to materialize, and that impacts will occur over a long time span. The research impact pathway provides a framework for understanding how impacts can be expected to occur. It has the following distinct stages:

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.

Having explored the expected impact pathway of research, the paper proceeds to an examination of what is occurring in practice.

INTRODUCTION

This paper is based on the ongoing research work of the SITPRO Plus project whose aim is to assess the effects and impacts of transport projects funded by the European Commission within the 5th and 6th Framework Programmes. The project is being funded by the European Commission as part of the 7th Framework Programme.

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

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

SITPRO Plus covers all modes of transport and thus covers 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.

METHOD AND APPROACH

The SITPRO Plus project focuses on those impacts that contribute towards the achievement of the Framework Programme objectives. Programme objectives naturally form two clusters, which in turn means that *two quite different types of impact are considered*. The first set, termed high level objectives are the Community policies most closely associated with transport. The second set, termed research capability objectives, are common to all EU Framework RTD programmes and are based on goals for enhancing research quality and capacity. The associated impacts are respectively material, or 'real life', impacts, and impacts to improve the Community's research capability.

It is considered that it is only at project level that progress towards impacts can be properly understood. Therefore the principal assessment of the Programme takes the form of studies of projects. The method of the project studies seeks to establish the extent to which research is progressing along its impact pathway. The findings are being contrasted with *expectation* concerning progression along the pathway, as a means of measuring the performance of the project. *Exploitation to date* is being identified as the most credible and robust indicator of such progress. Exploitation means that outputs have a value. Exploitation to date means that the use of the outputs can be both verified and assessed.

Some analysis is being also undertaken at the Programme level. An understanding of the Programme structure is needed in order to attempt a randomized selection of projects. We believe that framing the study method in terms of the Research Impact Pathway concept will allow us to track the research's 'potential' for impact, which is likely to be important to identify where we are evaluating research that has been completed within the last 2 years but that might only be expected to realize its full, broader impacts over a much longer period.

Impact Pathways

It is readily apparent that research takes different routes or pathways towards its ultimate impact. This process can be long and very difficult to trace, and in developing the SITPRO Plus methodology it has been very useful to consider a concept which we have termed the research impact pathway[2].

[2] The "Impact Pathway" is a term originally adopted in ExternE (Friedrich et al 1998). In ExternE the concept provides an approach to tracing through the environmental impacts of transport, such as air pollutants from cars, based on a bottom-up approach. The key steps for environmental pollutants are: emission→ dispersion→ concentration→ physical impacts→ long-term effects. Research has a similarly complicated transmission mechanism (although its impact is generally positive!).

Although the Transport Programme is highly heterogenous, the key steps along the research impact pathway can be identified as:

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.

The result is that 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; for example, where the research output is a prototype, the main users of this 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.

The projects do not exist in isolation, and therefore incidence of exploitation may be 'shared' with other projects, or projects may have fed into other projects, which in turn are exploited. Detailed project assessments are required to identify such links. These assessments are carried out using the following four step approach.

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

- Desk review of project reports
  The sample of 120 projects is evaluated according to an in-depth procedure that takes into account at least the final project report and the initial 'Description of Work'.

- Telephone interviews with co-ordinators
  Telephone interviews are conducted with the co-ordinators of the 120 projects selected.

- Internet questionnaire
  A survey is conducted among all 969 project co-ordinators based on an internet questionnaire.

BACKGROUND: TRANSPORT RESEARCH IN THE 5TH AND 6TH EU FRAMEWORK PROGRAMMES

Transport research has been a part of the EU Framework Programmes (FP) since the start of FP2 in 1987. During this period it has rapidly increased in size and there have been several changes in thematic orientation and implementation modalities. According to DG RTD,[3] 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.

European Community decisions on research are made under the co-decision procedure, with the Commission being in charge of drafting initial legislative proposals. These are then discussed and revised by the Council and the European Parliament. According to Graham Stroud, Head of Unit for the Support for the Implementation of the Research Programmes in DG RTD, the Commission's starting point for drafting proposals for Framework Programmes, is "always the previous Framework Programmes and the results and evaluations of outputs… Results can continue to come in a long time after the project finishes, maybe three to five years or more, so you may not see the whole picture for some time" . (CORDIS 2006) The Commission drafts its proposals after, and alongside, extensive

[3] Interviews carried out for SITPRO Plus project with officials from DG RTD and DG TREN (see project reports for details).

public consultation with stakeholders, including academia, industry, civil society and other European Institutions (DG Research 2009).

This process also requires significant intra-Commission consultation. Five Directorate-Generals were involved in managing FP6, for example: DG Research, DG Information Society, DG Transport and Energy, DG Enterprise, DG Fisheries. Programme Committees also play an important role. These committees are composed of experts from Member States and representatives from associate countries, and they consult on, and have to agree to, the Commission's management of a specific Work Programme (CORDIS 2006).

The Commission's proposal for the Framework Programme is simultaneously submitted to the Council and European Parliament (EP) for amendment and/or adoption according to the rules of co-decision. The details of the specific programmes, Rules for Participation and the Work Programmes are worked out in parallel to the co-decision procedure (CORDIS 2006).

Following the official adoption of a new Framework Programme, specific thematic committees are formed to produce a multi-annual work programme. In the case of transport research, the committee is comprised of representatives of DG RTD and DG TREN and may include consultation with external experts. The draft work programme contains a broad outline of relevant research themes within each area of transport and a draft schedule for their implementation throughout the Framework Programme. The draft work programme is then submitted to the so-called Programme Committee, composed of delegates from each Member State, and a final schedule is set for its implementation. Following its adoption by the Programme Committee, the Work Programme is officially published.

The Work Programme is implemented through a set of calls for proposals. DG RTD and DG TREN launch separate calls for proposals, containing different research tasks. Sometimes calls are launched simultaneously, but sometimes one of the DGs launches a call on its own. There are numerous different types of calls, including (unique) periodic calls, in which very specific tasks are published, and open calls are announced with regular cut-off dates where proposals for certain areas of research can be accepted over a prolonged period of time.

In FP5, all transport projects were concentrated in the Specific Programme 'Competitive and Sustainable Growth'. In FP6, transport projects were dispersed over three different top-level priorities of the Research Programme. Each Key Action in FP5 and Priority in FP6 contained several sub-themes.

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 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.

TABLE 1: NUMBER AND BUDGET OF FP5 AND FP6 TRANSPORT PROJECTS BY MODE

	FP5				FP6			
	Number of projects	Share of projects in %	Cumulative budget (in 1000 Euro)	Share of budget in %	Number of projects	Share of projects in %	Cumulative budget (in 1000 Euro)	Share of budget in %
Policy	68	13.3	199,630	8.3	10	2.2	12,860	0.4
Surface transport	277	54.1	859,948	35.7	210	46.0	1,209,436	39.7
Air & space	167	32.6	1,352,139	56.1	237	51.9	1,821,523	59.8
Total	512	100	2,411,718	100.0	457	100	3,043,820	100.0

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 Table 1.

For this reason, and in order better to understand the distribution of *types of research*, a second re-classification was made that distinguishes between strategic research, research on management, systems and design, and technology research (see Table 2). A comparison of this classification between FP5 and FP6 shows not only that policy research was dispersed over different thematic areas from one Framework Programme to the next, but also that the overall number of all kinds of strategic research projects was in fact reduced by more than 60%.[4] On the other hand, the types of projects related to transport management, systems and design increased markedly from 24% of all projects in FP5 to 52% in FP6. This was also at the expense of technology research, which was reduced from 41% of all projects to 33%.

[4] In this classification 'Strategic Research' includes all policy projects, but also strategically oriented surface transport projects related to infrastructure planning and charging, safety, environment, etc.

TABLE 2: NUMBER AND BUDGET OF FP5 AND FP6 PROJECTS BY TYPE

	FP5				FP6			
	Number of projects	Share of projects in %	Cumulative budget (in 1000 Euro)	Share of budget in %	Number of projects	Share of projects in %	Cumulative budget (in 1000 Euro)	Share of budget in %
Strategic	177	35	552,468	23	68	15	263,896	9
Management, system and design	123	24	553,950	23	238	52	1,796,055	59
Technology	212	41	1,305,300	54	151	33	983,869	32
Total	512	100	2,411,718	100.0	457	100	3,043,820	100.0

Commission officials mainly attribute the shift from technology research towards projects in the area of management, system and design to the overall thematic evolution of the transport programme. The early Framework Programmes were mainly designed as support for industrial research with the aim of increasing competitiveness and most of the research therefore focused on technology. In recent years, however, the objectives of the Framework Programmes have broadened to include more general societal concerns and to support a wider range of EU policies, and so from FP5 to FP6 there was a shift to a wider range of research activities supporting the overarching goal of sustainability. Furthermore, once technologies have been developed, the emphasis of research naturally shifts towards how these technologies can be used and applied, and therefore towards research concentrating on issues of management, system and design.

In air transport, for example, a new emphasis was placed on issues such as passenger comfort and passenger rights. In this specific field, non-technological safety and security research has also come to the fore over the last few years and matters of airspace control have grown in importance with increasing congestion in the sky and at airports. In a similar way, in surface transport a broad range of topics was emphasized at the expense of technology research.

In addition to changes in thematic orientation and the shift in focus to the use and application of technologies, technology research appears also to have been reduced due to more structural changes in the Framework Programmes. On the whole, there has been a slight tendency to increase networking and integration activities in line with the attempts to establish a European Research Area (ERA) (see also Table 3). Since technology projects are over-represented among the research and demonstration projects and under-represented among the networking activities, a move towards the latter will automatically reduce the number of technology projects.

The shift away from strategic research appears to be due to several inter-related factors. The first concerns the joint administration of the Work Programme by DG RTD and DG TREN. Traditionally, DG TREN had been in charge of policy research because they were the main beneficiaries of this type of research. For good reasons DG TREN decided they wanted to be as closely linked to the research activities as possible. In FP4, the transport projects managed by DG TREN were monitored by a

separate research unit. This was changed in FP5 with the decision to dissolve the DG TREN research unit and assign the project officers directly to the policy units. This way it was hoped to strengthen the direct interaction with policy makers even further. DG RTD, on the other hand, concentrated on those aspects of transport research that were not directly policy-relevant, such as technological development and basic research. In the process of designing FP6 a larger proportion of the transport research budget was allocated to DG RTD than in FP5 and thus the scope for policy research at DG TREN was somewhat reduced.

A second factor was the perception of policy research by the DG TREN hierarchy. Apparently, certain key policy makers were dissatisfied with the direct applicability of FP4 and FP5 research projects for the development of European Transport Policy. The three most frequently voiced criticisms were that the results of research projects were too theoretical; they were not conveyed well or not in a useful format for policy makers; and research projects were too slow in delivering results as compared with consulting studies directly commissioned by DG TREN. For these reasons, at the end of FP5 it was decided to rely more on the latter and reduce the number of policy projects in the Framework Programme.

Third, it was mentioned by two senior EC officials that, in a way, certain types of policy research had become obsolete for the Commission after FP5. Policy research had first been introduced into the Framework Programmes in the design of FP4, directly following the experiences of DG TREN with the drafting of the first Common Transport Policy White Paper (CTP) in 1992. During this process the Commission realized that they not only lacked much of the policy-relevant data and information for developing a CTP, but there were also no genuinely European networks of transport experts that could be consulted for this purpose. Therefore part of the FP4 transport programme was dedicated to establishing a European transport research community. By FP5 the community of experts was already much better integrated and provided the necessary linkages between the national and the European levels. Indeed, at the end of FP5, the proliferation of 'European expertise' had reached a point where the Commission did not deem it necessary to continue supporting it on a large scale.

Project Instruments

With two exceptions, similar types of instruments were used for research, demonstration and networking projects in FP5 and FP6. **Fehler! Verweisquelle konnte nicht gefunden werden.** in section 2 above 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.

Table 3 shows 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.

TABLE 3: NUMBER OF PROJECTS BY INSTRUMENTS

	FP5		FP6	
	Number of projects	%	Number of projects	%
Research	343	67.0	253	55.4
Support	64	12.5	74	16.2
TN/CA	40	7.8	46	10.1
TP	23	4.5	-	-
CRC	42	8.2	-	-
IP	-	-	74	16.2
NoE	-	-	10	2.2
Total	512	100	457	100

A first analysis of the distribution of project instruments in Table 3 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, Table 3 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,[5] 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.

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

[5] Technology Platforms are not solely dedicated to networking activities.

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. 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 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 Table 4). 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 4: MEDIAN FP5 AND FP6 PROJECT BUDGETS BY INSTRUMENT (IN 1000 EURO)

	FP5 median budget	FP6 median budget
Research	3,577	3,676
Support	804	355
TN/CA	1,323	1,150
TP	6,863	-
CRC	1,188	-
IP	-	19,447
NoE	-	5,500

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 co-operate 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.

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.

Table 4 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,[6] they only accounted for 4.5% of projects (see Table 5Table 3). By contrast, IPs and NOEs accounted for 18.4% of projects in FP6.[7]

TABLE 5: NUMBER OF PARTICIPANTS BY MODE

		Number of participants per project			Total
Mode		Small (1 – 5)	Medium (6 – 12)	Large (13+)	
Policy	% within FP5 (n=58)	15.5	56.9	27.6	100.0
	% within FP6 (n=10)	0	80.0	20.0	100.0
Surface transport	% within FP5 (n=258)	13.2	59.7	27.1	100.0
	% within FP6 (n=200)	13.0	47.0	40.0	100.0
Air & space	% within FP5 (n=156)	4.5	51.9	43.6	100.0
	% within FP6 (n=202)	8.4	41.1	50.5	100.0
Total	% within FP5 (n=472)	10.6	56.8	32.6	100.0
	% within FP6 (n=412)	10.4	44.9	44.7	100.0

Table 6 shows the number of project participants by the type of research. In FP5, by far the highest percentage of large projects can be found in the area of management, system and design with almost 47% of all projects. In comparison, in the areas of strategic research and technology there were much fewer large projects (33% and 23% respectively). This also illustrates the overall picture; there were very few small projects in management, system and design, while more than two thirds of all projects were either 'small' or 'medium' for the other two areas.

Not surprisingly, the number of large projects increases for two of the three areas (management and technology) in FP6 and remains stable for the third (strategic) one. What is more surprising, however, is the increase in the percentage of small projects for management, system and design at the expense of medium-sized projects. One possible explanation is the reduction in the average size of Specific Support activities from FP5 to FP6 (see Table 6). In fact, in the specific case of management, system and design the number of Specific Support activities increased from four projects (3% of all management projects) in FP5 to 32 projects (13%) in FP6. This could also be due to a number of technologies, developed in earlier FPs, entering the demonstration/use stage and entailing a shift in

[6] Technology Platforms in transport research in FP5 had an average (mean) of 35 participants, with the size ranging from 5 to 130 participants.

[7] 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.

research to a management, system and design focus, which is often less resource-driven than the initial technology research.

ON THE WHOLE, BOTH TABLE 6

Table 5 and Table 7 once more illustrate 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.

TABLE 6: NUMBER OF PARTICIPANTS BY TYPE

		Number of participants per project			Total
Type		Small (1 – 5)	Medium (6 – 12)	Large (13+)	
Strategic	% within FP5 (n=160)	11.2	55.6	33.1	100.0
	% within FP6 (n=67)	16.4	50.7	32.8	100.0
MGMT, system & design	% within FP5 (n=120)	4.2	49.2	46.7	100.0
	% within FP6 (n=234)	10.3	40.6	49.1	100.0
Technology	% within FP5 (n=192)	14.1	62.5	23.4	100.0
	% within FP6 (n=111)	7.2	50.5	42.3	100.0
Total	% within FP5 (n=472)	10.6	56.8	32.6	100.0
	% within FP6 (n=412)	10.4	44.9	44.7	100.0

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, 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 Table 7 and Table 8. (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'. 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 Table 7 and Table 8 is that the different regions are not equally represented in the Framework Programmes. Table 7 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 8 by the over-representation of the 'EU-15: Other' group and the under-representation of new Member States and associated countries.

TABLE 7: PROJECT CO-ORDINATION AND PARTICIPATION ACROSS COUNTRY GROUPS (BY GEOGRAPHY)

	FP5		FP6		
Country groups	% of co-ordinators	% of all participants	% of co-ordinators	% of all participants	% of total population
Nordic/UK/Ireland	29.5	23.2	16.0	19.7	17.5
Continental	54.3	52.5	59.7	47.2	37.4
Southern	15.0	19.8	19.7	22.4	24.3
Eastern	1.2	3.7	4.6	8.3	20.7
Non-EU	-	0.8	-	2.4	-
Total	100.0	100.0	100.0	100.0	100.0
(Count)	(512)	(4045)	(457)	(5960)	(497,056,380)

TABLE 8: PROJECT CO-ORDINATION AND PARTICIPATION ACROSS COUNTRY GROUPS (BY GEOGRAPHY)

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

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 9).

TABLE 9: REDUCTION IN 'NORDIC/UK/IRELAND' CO-ORDINATORS FROM FP5 TO FP6

Country	FP5 (Co-ordinators)	FP6 (Co-ordinators)	Change
DK	12	2	-83%
FI	7	5	-29%
IE	7	2	-71%
NO	15	7	-53%
SE	21	16	-24%
UK	89	41	-54%

The analysis of the project data in this first part of the paper revealed three main developments between FP5 and FP6. First, although the budget for transport research in FP6 was larger than in FP5, there were fewer FP6 transport projects. But these projects were generally bigger, both in terms of budget and number of participants, particularly within surface transport research (air & space projects were already fairly large). Second, FP6 saw a shift away from strategic and technology research and towards research on management, system and design. Third, as regards project consortia, the geographical distribution of project participants and co-ordinators generally became slightly more 'representative' from FP5 to FP6, although 'Eastern' countries (i.e. new Member States) were significantly under-represented in both FPs, particularly for project co-ordination. A more unexpected discovery was the dramatic decrease in project co-ordinators from the 'Nordic/UK/Ireland' region in FP6.

Based on an analysis of the project data, literature of the FPs and interviews with Commission officials, it appears that these changes can, in many cases, be explained both by a 'natural' development in the research transport agenda from FP5 to FP6 and by the Commission's changes to the structure and thematic orientation of transport research in FP6. These changes occurred for a variety of reasons and included the introduction of IPs and NOEs (which have generally had a critical appraisal in the literature as well as within the Commission). The shift away from technology research towards management, system and design in FP6, for example, can be explained by the need to explore the use and application of technologies developed in earlier FPs, as well as by the extension of the transport programme's objectives (from increasing economic competitiveness also to including sustainability objectives) and by the increased emphasis on networking activities in FP6 (in which technology research is under-represented) by the Commission. Similarly, the reduction in

strategic research can partly be explained by the success of previous FPs in building up 'European expertise' in transport research (so there was less need to support it in FP6). But it is also due to the shift in the budget for transport research in FP6 away from DG TREN (where the results of strategic transport research are used) towards DG RTD, as well as the perception by some at DG TREN that strategic research was not providing results directly useful to policy making.

PRELIMINARY PROJECT RESULTS

Preliminary results of the project are based on the internet questionnaire conducted among the coordinators of all transport projects in FP5 and FP6. The overall response rate amounted to 39.2%. During the time of writing this paper the analysis of the data was still in its early stages and therefore there was no possibility to elaborate further on the results presented in the figures below. By the time of presenting this paper at the 12th World Congress for Transport Research in July 2010 a second version of this paper will be available.

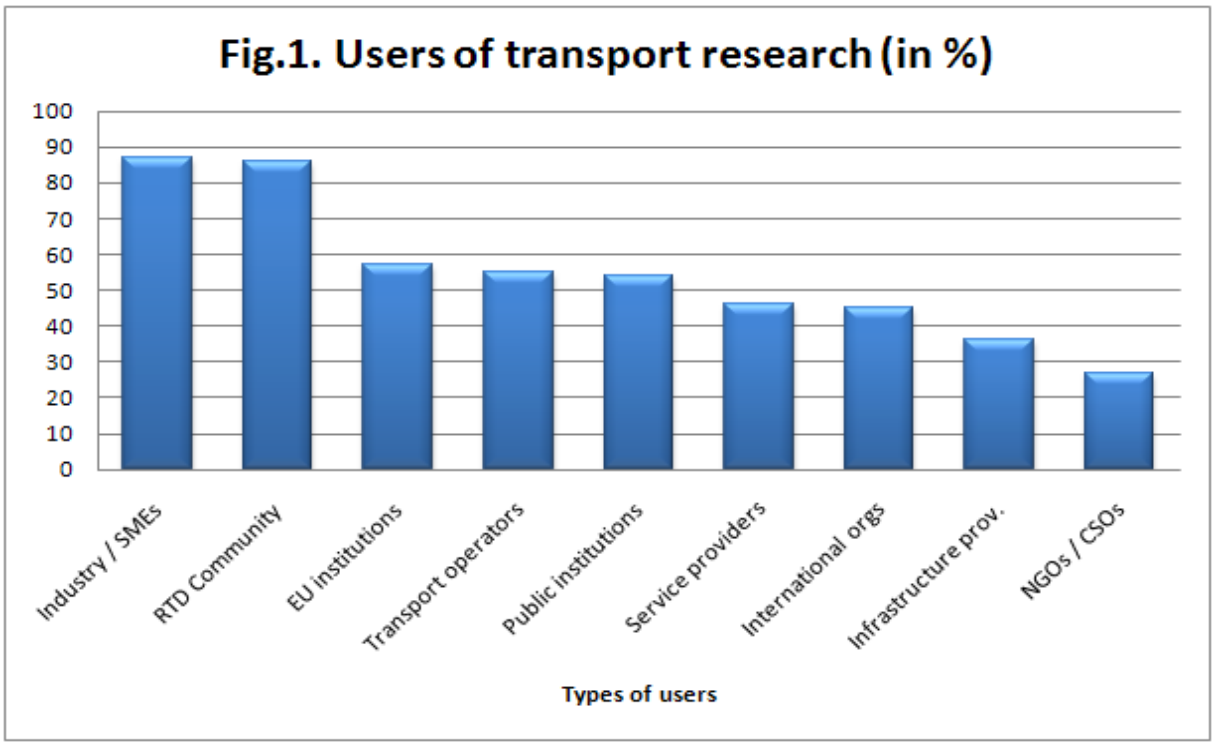


Fig. 2 Perspectives on users of research

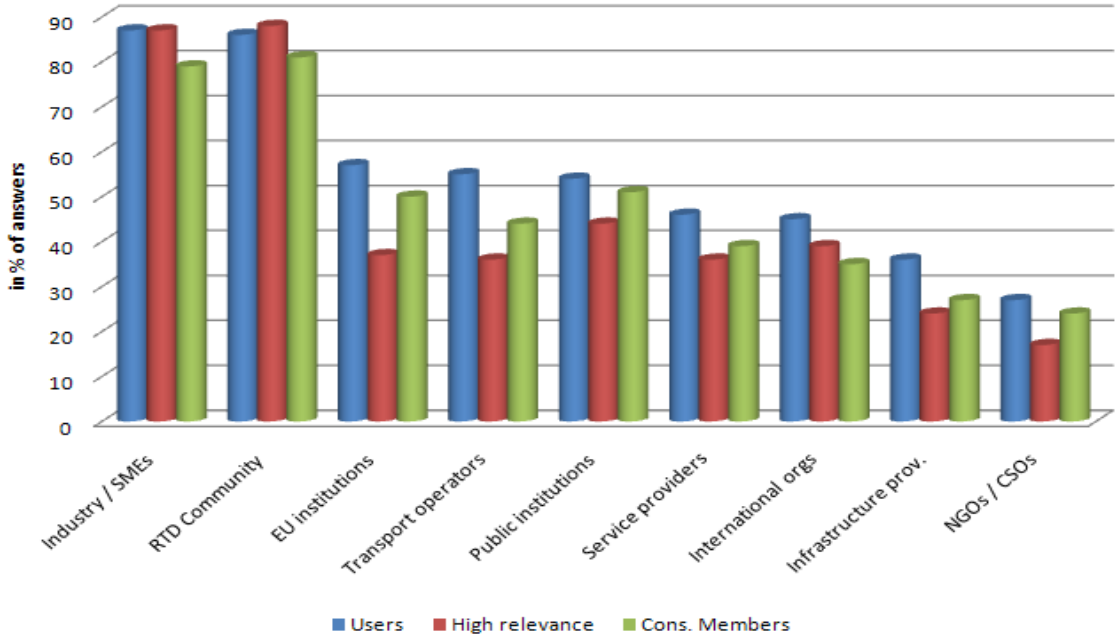
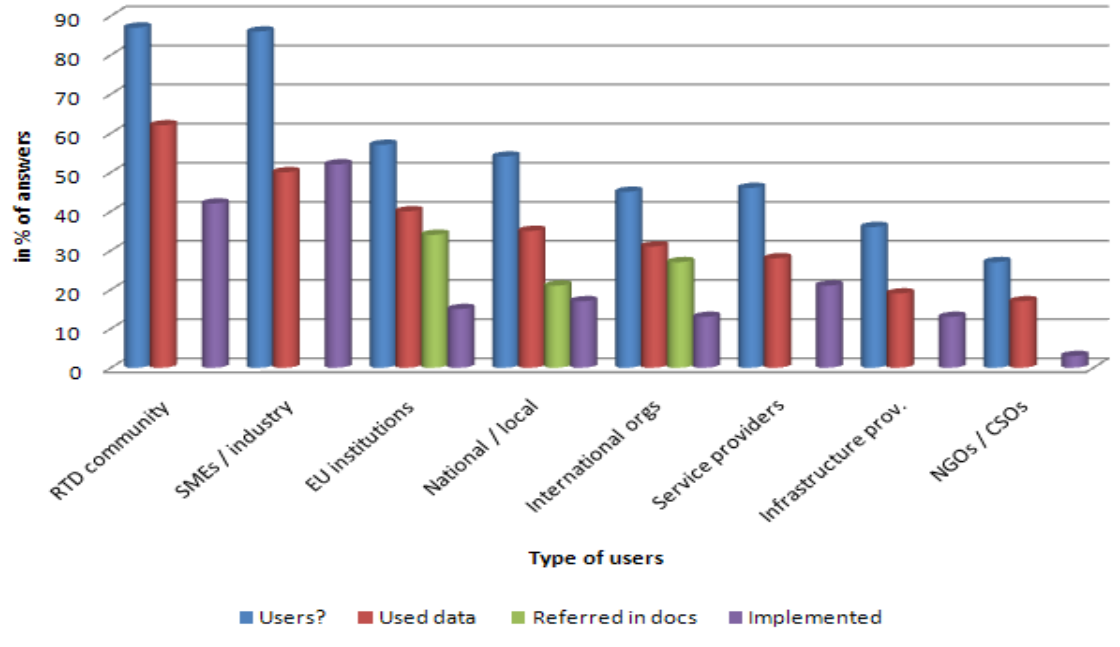


Fig.3 Documented use of research across user types



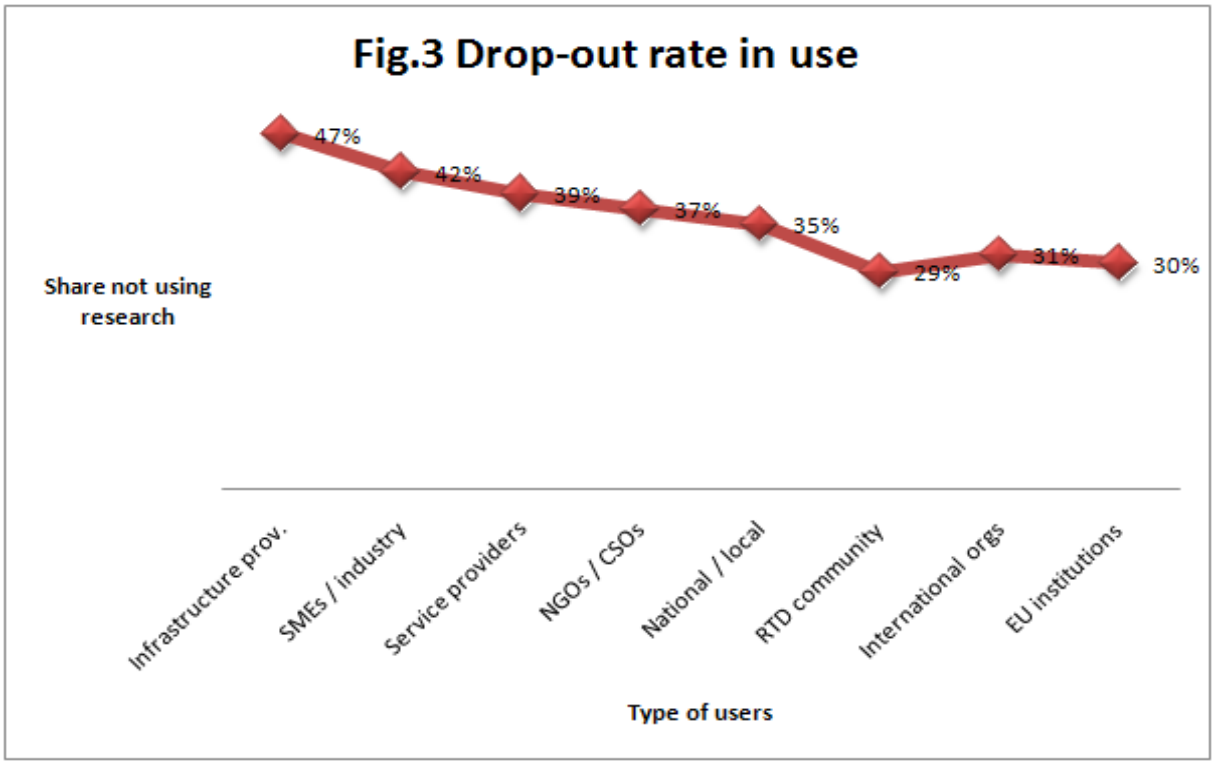


Fig.3 Drop-out rate in use
Share not using research
47%
42%
39%
37%
35%
29%
31%
30%
Infrastructure prov.
SMEs / industry
Service providers
NGOs / CSOs
National / local
RTD community
International orgs
EU institutions
Type of users

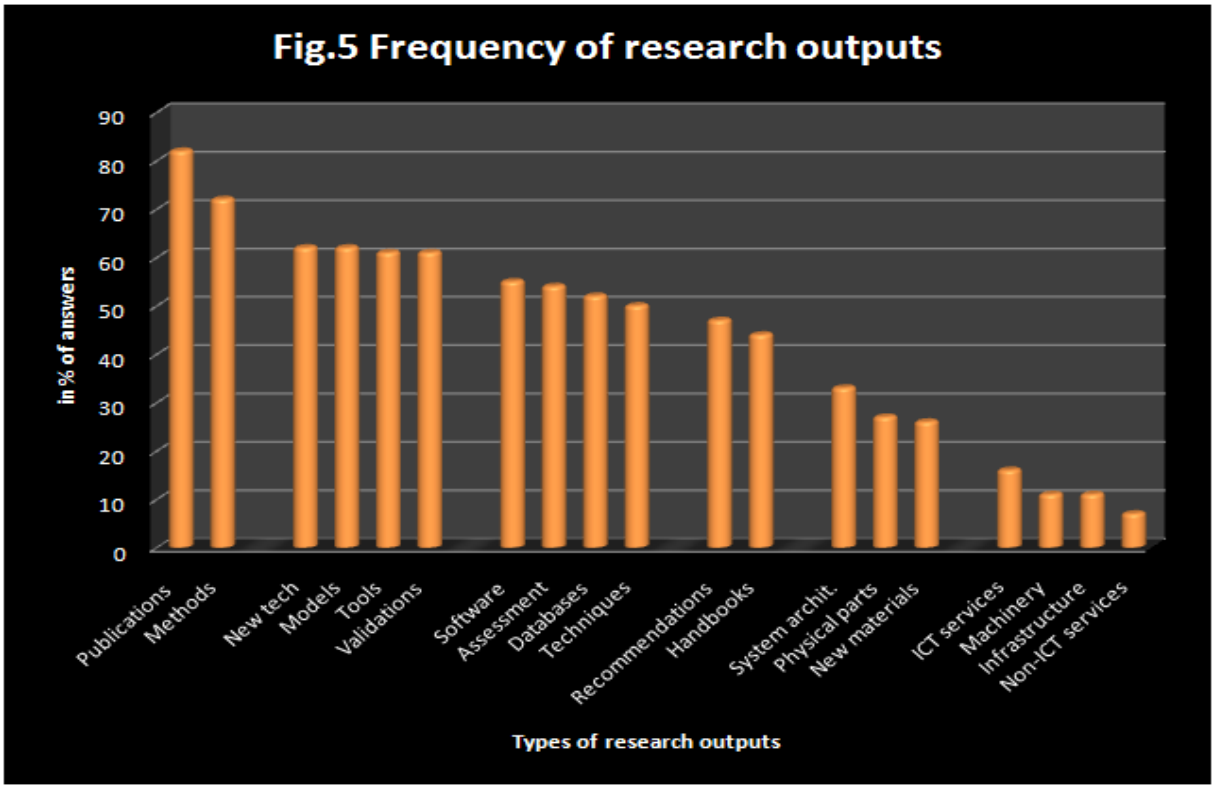


Fig.5 Frequency of research outputs
in % of answers
90
80
70
60
50
40
30
20
10
0
Publications
Methods
New tech
Models
Tools
Validations
Software
Assessment
Databases
Techniques
Recommendations
Handbooks
System archit.
Physical parts
New materials
ICT services
Machinery
Infrastructure
Non-ICT services
Types of research outputs

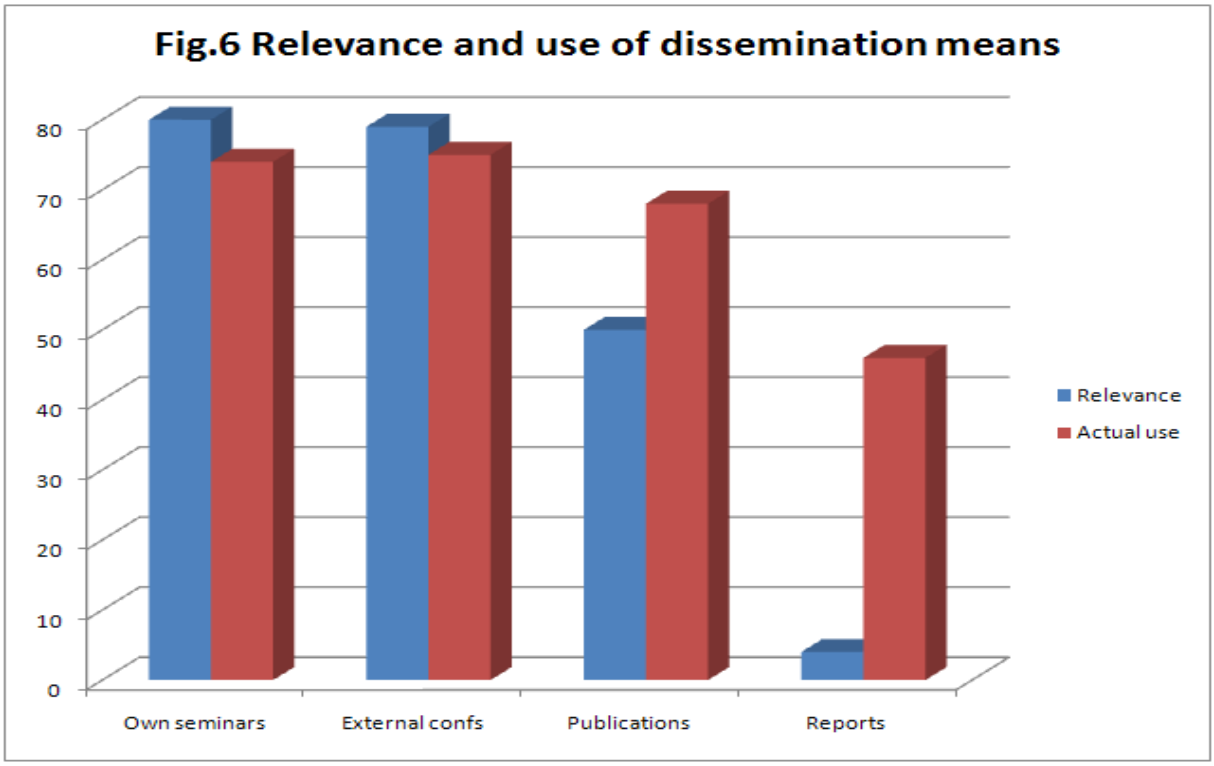


Fig.6 Relevance and use of dissemination means
80
70
60
50
40
30
20
10
0
Own seminars
External confs
Publications
Reports
Relevance
Actual use

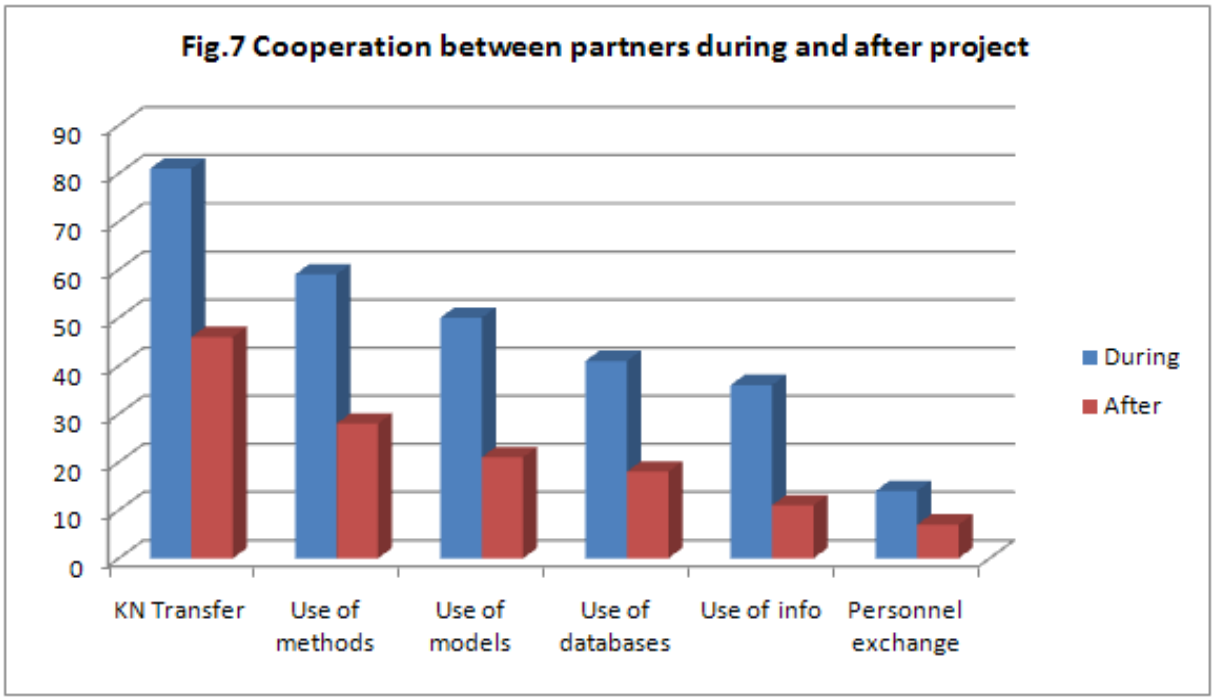
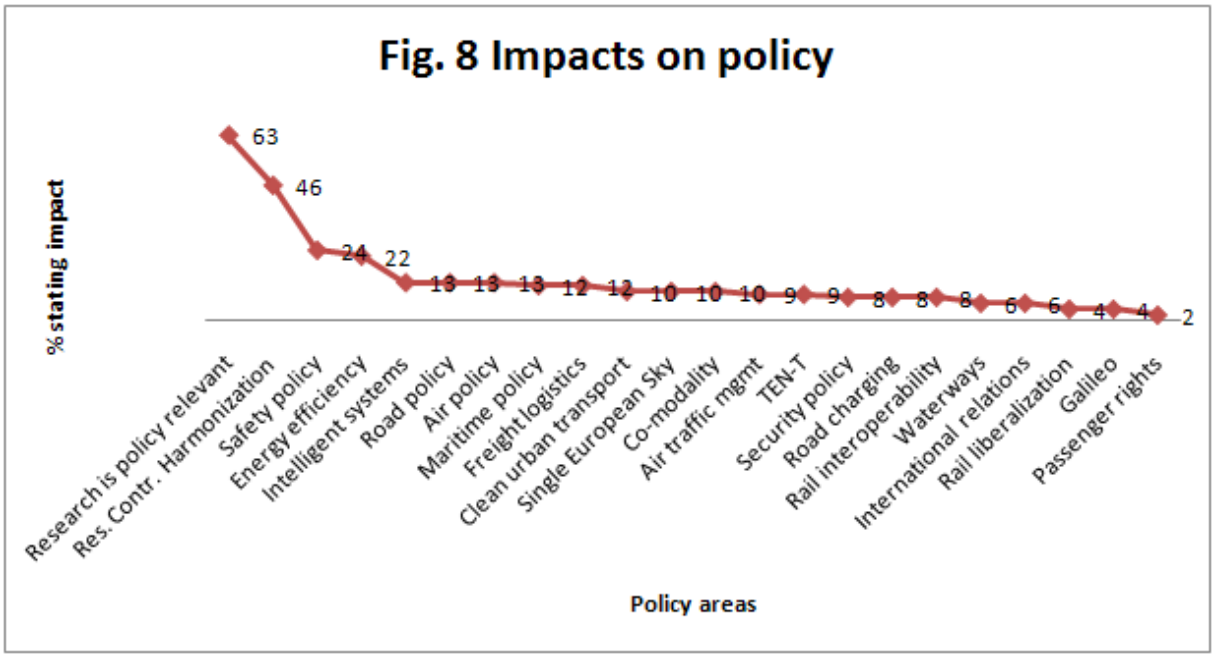


Fig.7 Cooperation between partners during and after project
90
80
70
60
50
40
30
20
10
0
KN Transfer
Use of methods
Use of models
Use of databases
Use of info
Personnel exchange
During
After



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