

DG Information Society

# Ex-post Evaluation of the IST Thematic Priority in the 6th FP

Evidence Synthesis Report

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## **1. Introduction**

This report presents a synthesis of the evidence gathered for the evaluation of the IST Thematic Priority of the 6<sup>th</sup> Framework Programme for Research (IST-FP6). The evidence collected for and findings of this ex-post evaluation are intended to be used in the ex-post evaluation of the 6th FP, which is scheduled for 2008-2009; the interim evaluation of the ICT theme of the 7th FP; the assessment of the progress of i2010 and feed into the preparation of the mid-term review report planned for 2008.

The main body of the report is structured around the evaluation questions, providing answers to the questions on the basis of the evidence collected, reviewed and analysed for this evaluation. The report draws upon previous working documents produced by the support team (review of the evidence base from October 2007 and the report on the preliminary findings from the interviews from January 2008), as well as additional interviews carried out since January and a number of reports which have become available during the last few months, not least DG INFSO's Self-Assessment Report.

This report is thus intended to provide the foundation for the Panel's final evaluation report, laying the ground for the strategic recommendations which will emerge from the last phase of the Panel's work.

The methodology applied for the collection and review of the evidence is outlined in Annex 3 to this report.

Before turning to the detailed assessment of the evaluation questions (chapters 3-7), the main findings are summarised in the following chapter.

## 2. Key findings and conclusions

In this chapter, the key findings and conclusions emerging from the synthesis of the evidence are summarised.

### 2.1 Relevance and strategic impact

The IST Thematic Priority of the FP6 has contributed to **EU strategic objectives and policies**. IST-FP6 has contributed to reinforcing **world leadership**, setting standards and keeping EU researchers at the forefront of research in a number of strategic areas. Another priority is the **strengthening of the European Research Area**, where the clustering of projects and the establishment of European Technology Platforms in FP6 has extended collaboration beyond what can be achieved in international projects. Greater synergy has been created between EU and national research activities. Within the Future and Emerging Technologies area, the development of ERA has been strengthened by structuring and strengthening the research capacities in areas such as nano-electronics and robotics. The introduction of new instruments (IPs and NoEs) has contributed to creating **more intense and more complete collaboration** than in the previous FPs. Further, FP6 has been the stimulus and foundation for forming nine European Technology Platforms (ETP), two of which have now become Joint Technology Initiatives.

However, the overall objectives for the information society (such as the Lisbon and Sustainable Development Objectives) cannot be reached through research alone, as some of the research performed under the IST priority will only be usable if complementary policy instruments are developed and effectively used.

In terms of **DG INFSO strategic objectives and policies**, the IST-FP6 has largely contributed to the i2010 initiative, as it has been the source of ideas and mobilisation for an increased number of policy initiatives in the i2010 framework.

IST-FP6 research has also supported **other EU actions and policies**. For instance, the IST research in eGovernment has provided a basis for policy initiatives concerned with areas such as company registration and customs procedures in Commission services such as DG MARKT and DG TAXUD. RTD in the area of environmental monitoring and disaster management has also had a positive effect, as the interoperability between information systems has been enhanced, and data collection, data integration and data access as well as monitoring capacities have been strengthened.

### 2.2 Efficiency

The overall conclusion regarding the efficiency of management and key implementation processes is that the IST Thematic Priority was **implemented and managed efficiently** and, according to several stakeholders, even one of the better managed thematic priorities in FP6.

There are, however, certain concerns relating to key issues, in particular the high **oversubscription** rates. These are seen as a waste of resources, both on the part of the applicant organisations and the Commission. On average, less than 1 in 6 project proposals were funded, and there is thus a **need to consider alternative procedures** in order to ease the burden related to the preparation and evaluation of proposals.

The **time to contract** from proposal submission was reported to be **longer in FP6 than in FP5**, although it was gradually reduced over the course of the programme. This seems to be largely **attributable to the introduction of the new instruments** (IPs and NoEs) which turned out to be a challenge in terms of unfamiliarity with and, to some extent, lack of clarity of, the new instruments which also added complexities in terms of much larger numbers of participants in individual projects. Regarding the **cost of programme management**, this was assessed as reasonable (corresponding to international standards) early in the programme, but there is a lack of evidence to allow for a more in-depth evaluation of this issue.

As for the **evaluation of proposals**, the length of the evaluation process was generally considered reasonable by stakeholders, but some concerns were reported regarding the **quality of proposal evaluation**, in particular in terms of the consistency of the quality of feedback to proposers and, to some extent, the impartiality of evaluators.

Previous analyses of the **costs of participation** have concluded that the application costs and risks of participation in the FP are unreasonably high and the high cost of making a proposal has been identified as one of the main barriers to participation. Stakeholder interviews partially supported this, but also revealed differences between participants. While the bigger participants often reap the benefits of previous experiences with research programmes and usually have a support team to deal with administrative and legal questions, which makes the preparation of a proposal more efficient, smaller participant organisations with less experience and fewer specialised administrative resources perceive the costs and burdens as being much larger. However, participants generally do not consider the cost of submitting proposals excessively high in relation to individual (successful) proposals; the problem is that many proposals are not successful. As for management of projects, largely the same differences between large and small participants can be detected. However, a large majority of participants, both large and small, state that **participation is worthwhile since the benefits exceed the costs**, especially in the longer term.

The **administrative burdens have not been reduced**; in fact, the burden in FP6 has been heavier than in previous Framework Programmes, mainly due to the introduction of the new instruments (cf. above), and certain changes in modes of implementation.

The **new instruments** (IPs and NoEs) turned out to be a challenge both for the Commission and for the stakeholders. Concerns have been raised that the new in-

struments were not appropriate for SMEs and new Member States, especially due to the large size of the consortia and the projects. Although overall SME participation increased in IST-FP6, **SMEs were underrepresented in both IPs (slightly) and in NoEs (considerably)**. Interviewees from the research community directed criticism at the uncertainty related to the purpose and functioning of the new instruments but also stated that the lack of experience in running very large projects and consortia showed itself in the beginning of the programme, but levelled out towards the end of the programme. Whereas the big size of the NoEs and IPs was criticised by many, it was also reported that when the rules were clarified, especially the Networks of Excellence turned out to be an excellent instrument for networking, both for academia and for industry.

Only 22% of **innovative ICT SMEs** have received funding from research and innovation programmes, and **only around 5% of SMEs holding highly cited ICT patents have participated in FP6**. In IST-FP6, the level of participation of SMEs has been sustained at more than 20% of participants (although fewer in the new instruments, as mentioned above), but interviews with **SME participants** showed that they were **not very growth-oriented**. Most of the evidence points in the same direction: that although a reasonable number of SMEs participate in the programme, it seems that there are major barriers to involving the most innovative and growth-oriented SMEs. The long time-to-market and the complexities of participating in FP6 projects are some of the barriers most often cited, but barriers also include concerns over lack of IPR protection. SMEs from New Member States and third countries furthermore mention lack of trust within the consortia as a barrier.

### 2.3 Effectiveness

The **relevance and utility of the Work Programmes** has been ensured through extensive consultation processes and the priorities have been influenced by advice from ISTAG, ISTC, industry and the research community, and often built on strong existing initiatives in previous FPs and elsewhere. It has been suggested that the work programmes are sometimes too inflexible and that new, interesting developments should be integrated into the work programmes faster, especially in fast-moving fields, where better outcomes might be achieved with a more flexible approach. However, there are also numerous examples of areas where the Work Programmes were adjusted as a reaction to changes in the technological development or to cover different important aspects of a certain area.

In terms of **scientific and technological** results, 74% of FP6 projects applied for patents or published articles and papers in 2006, up from 69% in 2005. Project participants mostly state that the scientific and technological results obtained are prototypes, working pilots and the like, input to new directions for their ongoing research, and absorbing (complementary) knowledge from other participants. The majority of the participants stated that research conducted in the FPs is basic research, meaning that satisfactory (and realistic) outputs for the participants were prototypes and new ideas that can be developed further afterwards.

**International cooperation** between the EU and China, India and Africa has been **strengthened** as the number of participations have nearly doubled since FP5, funding to third countries increased by a factor six, and the number of collaborative links has increased tenfold. The total funding allocated to third countries during FP6 reached €40 Million (approx. 1% of total funding), up from only €7 Million in FP5.

IST-FP6 has attracted 60% of the top-25 **global leaders** within innovation. Their participation in IPs has been very effective at connecting European IST research participants to the rest of the world.

At the level of participant organisations, international cooperation gives better access to information and channels for dissemination, in particular for academia. Participants report that international collaboration creates a bigger critical mass and more European awareness, and increases the quality of the output. Some respondents consider **the international aspect to be the biggest advantage** of the Framework Programme.

FP6 research networks **increase the effectiveness of knowledge transfer** among organisations and a fast diffusion of information within the network. **Networking effects** are indeed perceived by numerous interviewees as the most significant impact of their participation in FP6. The big size of IP and NoE consortia provide participants with an increased international network in which to disseminate project results, gain new knowledge and find cooperation partners for future commercialisation. The large networks have however in some cases turned out to be counterproductive to innovation in smaller organisations, as some SME participants have experienced that being a part of a huge consortium diminished their possibilities to contribute to the research and to propose more innovative lines of research.

When it comes to whether participants enter **new fields of science and technology** as a result of their participation in FP6, the picture is very mixed. A little less than half of the interviewees had entered new fields of science and technology while others instead expanded their existing fields of research into new directions or improved the existing research.

The **mobility of skilled human capital** across organisations is an important source of knowledge diffusion and recombination. IST-FP6 has **contributed to the human resource mobility within the European research community** by being able to attract key actors to the projects. Many of the IST-RTD hubs can be characterised as Mobility Hubs, representing a high mobility of researchers and strategically positioned in the flows of knowledge, embodied by researchers and scientists.

Most of the project participants, large and small, have experienced **enhanced staff skills and knowledge** as a result of participation in FP6. The biggest advantage seems to come from the extensive cooperation with the other members of consortia, bringing about complementary expertise, know-how and knowledge exchange. Especially the Networks of Excellence have presented a good way for knowledge exchange and for increasing the mobility of the younger researchers

A mixed picture emerges when it comes to **commercialisation of products and services**. On the one hand, some project participants report that IST projects are too focused on research, leading to a lack of support to deployment activities and market commercialisation. On the other hand, specific new products or processes did result from IST research projects. In these cases, IST networks have helped project participants gain a better understanding of the market, although some criticism has been expressed about the lack of sufficient infrastructure for supporting market introduction of the application created in the IST project.

The indications that some of the research is "far from the market" is supported by the fact that the "patenting intensity ratio" (the ratio of patents to investment in RTD) in the IST programme is very much lower than for ICT research in general, and that the ratio has actually decreased considerably from FP5 to FP6. (NB! This figure needs to be updated, as there is evidence that the situation improved in 2006)

#### 2.4 **Utility**

Much of the research conducted within the framework of the IST Thematic Priority would not have been conducted at all if the projects had not been selected for FP6 support. This is often directly related to the need for funding, but participants also mention that some results require critical mass, broad discussions or need to be exhibited early to an advanced group of experts in the field, and that Community research programmes are a very important means for accessing these. Interviews with unsuccessful proposers also show that in many cases, ideas are readjusted to a smaller scale, perhaps without (or reduced) international co-operation, and funding applied for in national programmes. In some cases, elements of the unsuccessful proposals have been realised with in-house funding.

In terms of utility of the programme to the research community, impacts on patterns of trans-European interaction can be identified within the IST research community. These patterns present themselves in the form of research networks and "networks of innovation". The IST programmes **create linkage additionality** by adding new and complementary links to existing linkages. Taking part in FP6 has especially been a connecting factor for the participants from the new Member States, who through their participation have been able to multiply their connections within the European research community.

#### 2.5 **Sustainability**

Most participants in the IST-FP6 benefit significantly from their participation in terms of **strengthened and broadened networks, new knowledge and skills** as well as improved reputation through their participation in the programme. These **impacts are of a kind that does not disappear immediately after the EU support has ceased**. Again, the networking effects seem to be crucial, as many participants have developed long-lasting collaborations and conducted projects together after FP6. Many of these **networks** (which in some cases originated in earlier FPs) have by now **become stable structures that form the core of wider collaborations**, such as European Technology Platforms.

An interesting result from FP6 is the introduction of **Joint Technology Initiatives** (JTI) as a way of **realising public-private partnerships** in research at European level, mainly arising from the European Technology Platforms. The first two JTIs, ARTEMIS and ENIAC, combine a critical mass of national, EU and private resources and are excellent examples of how the IST research activities will have continued impacts in the long term at European level.

### **3. Relevance and strategic impact**

#### **3.1 Contribution to the EU strategic objectives and policies**

When discussing the IST thematic priority of the 6<sup>th</sup> FP's contribution to the EU strategic objectives and policies, it is relevant to look at if and how it contributed to the Lisbon and sustainable development strategic objectives and policies. The main objectives of the 6th Framework Programme are to strengthen the scientific and technological bases of Community industry and encouraging it to become more competitive at international level, while promoting research activities deemed necessary by virtue of other Community policies.<sup>1</sup> These objectives are implemented through three main blocks of activities: focusing and integrating European Research; structuring the European Research Area; and strengthening the foundations of the European Research Area.<sup>2</sup>

The Five-Year Assessment (1999-2003) of European Information Society Technologies concluded that the activities carried out under the IST Thematic Priority corresponded to objectives set for implementation and to the mandate given to DG INFSO for the implementation of the programme. Thus, the IST Thematic Priority can be said to have contributed to the strategic priorities of the FP6.

##### **3.1.1 Creating and sustaining world leadership**

FP6 has contributed to reinforcing world leadership in areas such as telecommunications and audiovisual systems by opening opportunities for new entrants, notably SMEs<sup>3</sup>.

The FP6 research on RTD on broadband access has continued to be of major strategic impact. Areas where European researchers and companies continue to have world leadership and set global standards include mobile 4G systems, ultra-wideband radios and satellite broadcasting. Also the work on content and knowledge technologies such as digital preservation places EU at the forefront of research<sup>4</sup>.

##### **3.1.2 Strengthening the European Research Area and the collaboration within ERA**

The clustering of projects and the establishment of European Technology Platforms in FP6 has extended collaboration beyond what can be achieved in international pro-

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<sup>1</sup> Decision No 1513/2002/EC of the European Parliament and of the Council of 27 June 2002 concerning the sixth framework programme of the European Community for research, technological development and demonstration activities, contributing to the creation of the European Research Area and to innovation (2002 to 2006).

<sup>2</sup> The Sixth Framework Programme in brief. December 2002.  
[http://ec.europa.eu/research/fp6/pdf/fp6-in-brief\\_en.pdf](http://ec.europa.eu/research/fp6/pdf/fp6-in-brief_en.pdf)

<sup>3</sup> European Commission, DG INFSO: Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007.

<sup>4</sup> Ibid.

jects, and has fostered wide pre-competitive contributions to dissemination as well as synergies<sup>5</sup>.

On the basis of the first call of FP6 one can say that the ICT programmes have contributed strongly to building parts of ERA *avant la lettre*.<sup>6</sup> This has been accomplished for example by creating greater synergy between EU and national research activities and by integrating the research into a smaller number of multi-disciplinary research projects, as a result of introducing new instruments in the FP6. In more practical terms, the Five-Year Assessment also mentions the IST Event as a means to strengthen the ERA, as it connects the different actors in the European IST landscape and enables integration and networking across the Thematic Priority area.<sup>7</sup>

Within the Future and Emerging Technologies area, several proactive initiatives have contributed to the development of ERA by structuring and strengthening the research capacities in areas such as nano-electronics and robotics, thus contributing to making Europe a world leader in these areas.

The new instruments in FP6, namely the Integrated Projects (IP) and the Networks of Excellence (NoE), have contributed to creating more intense and more complete collaboration than in the previous FPs<sup>8</sup>. This is further supported in the interviews with participants, where it is stated that especially NoE is a very good instrument for networking and dissemination. The Commission's Self-Assessment further states that the new instruments have managed to bring together key RTD players in key areas, and the most important national research centres in Member States participated in the IST-RTD network of the EU. Also, when comparing FP6 with national research programmes, it can be seen that FP6 is much more effective in facilitating industry-university cooperation, connecting research in different themes and disciplines, and integrating new Member States, patent holders and SMEs. This can also be confirmed by the interviews with participants where it is stated that FP6 acts as a facilitator for contacts to universities and industry in Europe that would not have emerged in national programmes. Furthermore, the results emerging from FP6 would usually not have been achieved to the same extent with national partners only. This is due to the fact that participants learn from each other's core competencies and ways of doing research, and that knowledge of a certain field can be limited in scope within country borders.

IST-RTD in FP6 has contributed to increased cohesion between the European and national programmes. For instance, ERA-Nets have brought together national RTD funding agencies to explore the potential for harmonisation and integration of national programmes and EU-funded programmes. Also, in Grid technologies, a co-

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<sup>5</sup> Ibid.

<sup>6</sup> Five-Year Assessment: 1999-2003. Research and Technology Development in Information Society Technologies. Final Panel Report 01/2005, p. 43.

<sup>7</sup> Five-Year Assessment: 1999-2003. Research and Technology Development in Information Society Technologies. Final Panel Report 01/2005, pp. 7 & 34.

<sup>8</sup> European Commission, DG INFSO: Self-Assessment

ordination action has strengthened collaboration between researchers in national and EU-funded research programmes within the area<sup>9</sup>.

The IST Thematic Priority in FP6 has been the stimulus and foundation for forming nine European Technology Platforms (ETP), and one of these, ARTEMIS, has now established Joint Technology Initiatives in the 7<sup>th</sup> FP<sup>10</sup> through a Council Regulation adopted on 20.12.2007. Over 650 companies participate in the nine ETPs.

However, the Five-Year Assessment (1999-2003) concluded that the overall objectives for the information society (such as the Lisbon and Sustainable Development Objectives) cannot be reached through research alone, as some of the research performed under the IST priority will only be usable if complementary policy instruments are developed and effectively used. Furthermore, the overall policy mix should be improved.<sup>11</sup> In contrast, a study conducted in 2004-2005 shows that the introduction of IST has a substantial influence on the Lisbon and Sustainable Development Objectives. There is strong evidence that investment in IST contributes to economic growth, more and better jobs, social inclusion and environmental improvements. However, the potential to contribute to economic growth is reduced without organisational change and other innovations. Furthermore, there is evidence that introduction of ISTs in some cases cause environmental problems, for example because of the effects of the technology itself.<sup>12</sup>

### 3.2 Contribution to the DG INFSO strategic objectives and policies

With respect to the DG INFSO strategic objectives and policies, the most relevant policy to examine for the IST Thematic Priority is the i2010 initiative, and especially the second pillar on investment and innovation in research. In general, it can be seen that the IST Thematic Priority in the 6<sup>th</sup> FP has largely contributed to the i2010 initiative, as it has been the source of ideas and mobilisation for an increased number of policy initiatives in the i2010 framework.

The IST Thematic Priority (IST-RTD) has provided ideas and a framework for collaboration with and between the stakeholders in each of the three pillars<sup>13</sup> of i2010. The European Commission has initiated 34 policy initiatives during 2004-2007 as a result of the developments in the IST-RTD in FP6. IST-RTD has influenced the reform of the eCommunications regulatory framework and the Public Sector Information Directive in the first pillar. In the second pillar, the IST Thematic Priority of the 6<sup>th</sup> FP has provided new knowledge for innovation, including eTEN and eContent*plus*. In the third

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<sup>9</sup> European Commission, DG INFSO: Self-Assessment

<sup>10</sup> <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/07/191>.

<sup>11</sup> Five-Year Assessment: 1999-2003. Research and Technology Development in Information Society Technologies. Final Panel Report 01/2005, pp. 20 & 55.

<sup>12</sup> Preliminary analysis of the contribution of EU Information Society policies and programmes to the Lisbon and Sustainable Development Strategies. Final Report C2660, May 2005, pp. 2-3.

<sup>13</sup> Pillar 1 is the Single European Information Space, Pillar 2 concerns Investment and Innovation in Research, and Pillar 3 refers to Inclusion, Better Public Services and Quality of Life.

pillar, IST-RTD has directly supported co-ordinated actions with Member States and stakeholders, such as the i2010 Digital Library initiative<sup>14</sup>.

The evidence base reveals some key figures concerning the project participants' views of the contribution of their projects to the i2010 objectives. The project participants in more than half (55.7%) of the IST projects completed in 2005 considered that they have had either a strong or a medium impact in contributing to a better quality of life for the citizens, thus contributing to the i2010 objective of improving the quality of life.<sup>15</sup> However, this figure includes both FP5 and FP6 projects and in 2006, the figure had dropped significantly, to 41.9%<sup>16</sup>.

### 3.2.1 **i2010 Pillar 1: Single European Information Space**

Under the i2010 Pillar 1, IST-RTD has supported the development of the Single European Electronic Market as research into broadband networks has enabled further capacity increase, thereby enabling novel applications in areas such as telemedicine. Also, the wireless part of this work has been largely recognised as an international benchmark of the state of the art in this field. This has enabled the EU to play a significant role in the formulation of global standards in a number of domains such as 4G Mobile and satellite broadcast, which again enhances the commercialisation prospects for the industry in EU.

IST-RTD has also enabled further work in RTD on network audiovisual systems, contributing to increased availability of online content while at the same time protecting users' and right holders' interests. This work under pillar 1 has also impacted quality of life, which initially is targeted under pillar 3, in terms of enabling novel approaches to education, health, culture and the like<sup>17</sup>.

Another pillar 1 topic is the work on interoperability. The IST-RTD of the 6<sup>th</sup> FP has contributed to this development in the fields of software and networked enterprise. Software developments now enable interoperability across multiple content and network platforms, and a platform for companies to discuss interoperability issues in their business relationships has been established.

### 3.2.2 **i2010 Pillar 2: Investment and innovation in research**

The largest contribution of the IST Thematic Priority in the 6<sup>th</sup> FP has been under the 2<sup>nd</sup> pillar which aims to strengthen innovation and investment in research. The second priority of i2010 focuses on the EU's research and development instruments and sets priorities for cooperation with the private sector to promote innovation and technological leadership. The aim is to:

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<sup>14</sup> European Commission, DG INFSO: Self-Assessment

<sup>15</sup> Implementation of IST-RTD in 2005. Analysis of the output and impact indicators –Main findings, p. 6.

<sup>16</sup> Implementation of IST-RTD in 2006. Analysis of the output and impact indicators –Main findings, p. 5. Also this figure includes projects from both FP5 and FP6.

<sup>17</sup> European Commission, DG INFSO: Self-Assessment

- strengthen European research in ICT through the Research Framework Programme, the European Technology Platforms and Joint Technology Initiatives with specific proposals for Joint Technology Initiatives on nano-electronics (ENIAC3) and on embedded systems (ARTEMIS4), for decision by the Council
- make innovation and research policies more efficient, so that there is not the present disconnect between research and innovation, and so that innovation potential can be both identified and developed (for instance, via the ICT Policy Support Programme in the Competitiveness and Innovation Programme - CIP)<sup>18</sup>

IST-RTD has provided the new knowledge on which innovations can build, including the eTEN programme (now integrated into CIP) and eContentplus. A European network of Living Labs has been established, combining research, development and innovation<sup>19</sup>. The aim of the labs is to facilitate interaction between various stakeholders such as users, buyers, entrepreneurs, scientists, engineers and policy makers.

### 3.2.3 **i2010 Pillar 3: Inclusion, better public services and quality of life**

The research conducted in the IST Thematic Priority of FP6 has contributed to a number of action plans, including the eGovernment Action Plan, the eAccessibility Action Plan and the eInclusion Action Plan. Regarding the eGovernment Action Plan, research carried out in FP6 has contributed to defining priorities and identifying legislative or infrastructural gaps for implementing the 3<sup>rd</sup> pillar policies. The research has furthermore contributed to policy initiatives on electronic identities, electronic and pre-commercial procurement and the like. With respect to eAccessibility and eInclusion, the research carried out in FP6 has contributed to the development of innovative ICT-based applications such as automatic surveillance to support web accessibility, and the "Design-for-all"-concept. The latter has subsequently been incorporated into the revised EU Public Procurement Directives and supported by an EU mandate to the European Standardisation Organisations<sup>20</sup>.

The research conducted under the IST Thematic Priority in FP6 has also supported the creation of a Digital Library<sup>21</sup>, by using the research and development on RTD on digital content carried out in FP6 and using it to digitise cultural material. The Digital Library initiative is an example of collaboration between cultural heritage institutions and providers of technology-based services, and gives high visibility to digital libraries research through the launch of the European Digital Library. Development of

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<sup>18</sup> European Commission, DG INFSO: Self-Assessment

<sup>19</sup> European Commission, DG INFSO: Self-Assessment

<sup>20</sup> European Commission, DG INFSO: Self-Assessment

<sup>21</sup> Digital Libraries - COM(2005) 465; Commission Recommendation on the digitisation and online accessibility of cultural material and digital preservation (2006/585/EC); Council Conclusions on the Digitisation and Online Accessibility of Cultural Material, and Digital Preservation (2006/C 297/01), and Communication from the Commission on scientific information in the digital age: access, dissemination and preservation. COM(2007) 56.

technologies for "digital preservation" must be coupled with regulatory developments such as mandatory deposit and archival of digital information, in order to create new markets for digital preservation and archival services<sup>22</sup>.

Within the area of Radio Frequency Identifiers (RFID), the research carried out in FP6 has developed and enhanced communication facilities to all researchers across Europe. RFID research has moreover contributed to making RFID systems more pervasive in enterprise systems, thus increasing business efficiency<sup>23</sup>.

New collaborative working technologies for eWork have been developed as a result of the IST-RTD research in FP6, which aims at underpinning efforts to reduce the digital divide and support eInclusion. Technologies such as Open Source architecture and tools developed within the area of software technologies have among other things facilitated co-operation and knowledge-sharing among European SMEs, enabling these to overcome the digital divide.

Improving access to information is also one of the i2010 objectives under pillar 3. From the review of the evidence base, the IST projects seem to contribute to this objective, as 60.2% of the IST projects in 2005 considered that they contribute to improving access to information.<sup>24</sup> However, again this figure includes both FP5 and FP6 projects, and as with the above-mentioned figures on quality of life, the trend is declining in 2006 as only 37.3% of the IST project participants here considered their projects as having strong or medium impact in contributing to improving access to information.<sup>25</sup>

### **3.3 Complementarity with other actions and activities**

When discussing the relevance of the IST Thematic Priority in the 6<sup>th</sup> FP, it is appropriate to assess the extent to which the IST Research has been complementary and coherent with other actions and activities undertaken by the Commission.

In identifying other i2010 actions and activities with which the IST Research could have been complementary and coherent, the Commission has collected a list of all i2010 actions between June 2005 and March 2007. The Commission divides the i2010 actions in 13 different groups<sup>26</sup>:

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<sup>22</sup> European Commission, DG INFSO: Self-Assessment

<sup>23</sup> European Commission, DG INFSO: Self-Assessment

<sup>24</sup> Implementation of IST-RTD in 2005. Analysis of the output and impact indicators –Main findings, p. 8. Also this figure includes projects from both FP5 and FP6.

<sup>25</sup> Implementation of IST-RTD in 2006. Analysis of the output and impact indicators –Main findings, p. 5. Also this figure includes projects from both FP5 and FP6.

<sup>26</sup> Commission Staff Working Document. Accompanying document to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. i2010 – Annual Information Society Report 2007. COM (2007) 146 final, Volume 2.

1. Review of regulatory framework for electronic communications
2. Making spectrum management more efficient
3. A consistent internal market framework promoting the development of high quality and innovative information society and media services
4. Strategy for a secure European Information Society – increasing trust and confidence
5. Strengthening European Research through Framework Programmes
6. Making innovation and research policies more efficient
7. Promoting eBusiness solutions
8. Further development of eAccessibility and a comprehensive eInclusion strategy
9. Promoting ICT-enabled public services (eGovernment and eHealth)
10. Ageing Well in the Information Society
11. Intelligent Car
12. Digital Libraries
13. ICT for sustainable growth

The Commission's Self-Assessment report states that IST Research in FP6 has provided a valuable basis for other policy initiatives. For instance, the IST research in eGovernment has provided a basis for policy initiatives concerned with areas such as company registration and customs procedures in Commission services such as DG MARKT and DG TAXUD.

RTD in the area of environmental monitoring and disaster management has also had a positive effect, as the interoperability between information systems has been enhanced, and data collection, data integration and data access as well as monitoring capacities has been strengthened. Developments include decision support, early warning and response systems, and sensor networks for disaster management, which have all contributed to the Sustainable Development Strategy and strengthened Europe's capacities for Global Monitoring of the Environment and Security (GMES) and the Global Earth Observation System of Systems (GEOSS). Related research connecting ICT to European Environmental Policies, has supported the implementation of European Commission Directives such as the Water Framework Directive and the Inspire Directive<sup>27</sup>.

Also within DG INFSO, the IST Thematic Priority in FP6 has supported policy development, as IST research has strengthened the concept of pre-commercial procurement of innovation (also known as PCP). The IST research in FP6 has supported the concept of PCP, which is to stimulate Europe's capacity to turn its research achievements into concrete innovation opportunities. Furthermore, these developments have led to inter-service work between DGs RTD, COMP and MARKT.

International Co-operation has also been strengthened in FP6. Especially IPs have been effective at connecting European ICT research participants to the rest of the world. International cooperation between the EU and China, India and Africa has been strengthened as the number of participations nearly doubled since FP5, funding to third countries was higher and the number of collaborative links has increased. This will be elaborated more in chapter 5.1: Results of the programme.

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<sup>27</sup> European Commission, DG INFSO: Self-Assessment

## 4. Efficiency

### 4.1 Efficiency of management and key implementation processes

The main question under this heading is whether the IST Thematic priority was pursued in a cost-effective manner. In answering this question, we start by outlining some key figures concerning the implementation of the programme.

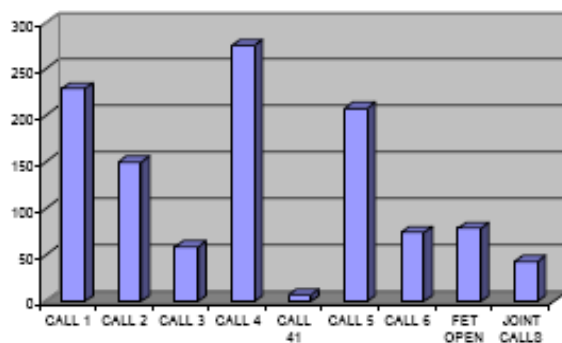
#### 4.1.1 Implementation of the programme

The IST thematic priority programme was based on the methodology of an evolving work programme. Two different work programmes were adopted during the course of the programme, in 2003-2004 and 2005-2006. Both work programmes were updated twice.

These work programmes were implemented through nine calls for proposals, including six regular calls covering a wide spectrum of areas, and three specialised calls, cf. table 3.1, below. The research community responded to these calls with a total of 7110 proposals, out of which 1125 projects received funding.<sup>28</sup> With fewer than 1 in 6 proposals being selected for funding, there was a high degree of "oversubscription" in most calls.

1125 projects were launched within the framework of the IST Thematic priority, for a total Community funding of more than 3.88 B€. The total cost of these funded projects is estimated to be approx. 6 B€. The largest call, both in terms of funding and number of projects was the 4<sup>th</sup> call with a dedicated budget of 1,068 M€ for 277 projects. The number of projects and participations per Call is presented below together with the amount of funding per Call.

Figure 4.1 Number of projects per call (total 1125)



Source: IST Programme. Integrated Programme Portfolio Analysis 2006. European Commission Working Document 19 June 2007, p. 9

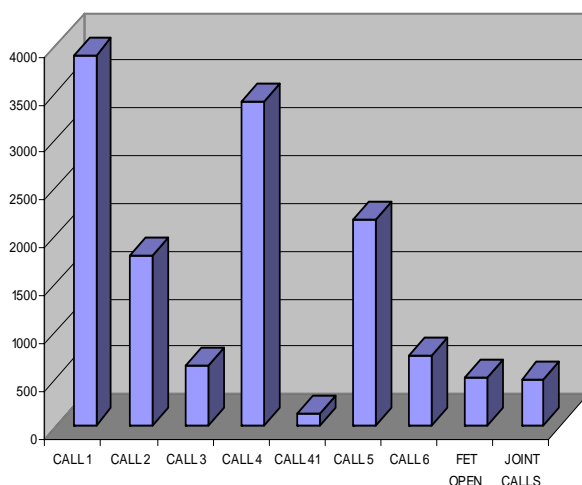
<sup>28</sup> IST Programme. Integrated Programme Portfolio Analysis 2006. European Commission Working Document 19 June 2007, p. 9; and Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 15. The number of projects receiving funding differs slightly from one source to another. We have chosen to use the data from the Integrated Programme Portfolio Analysis 2006, according to which 1125 projects received funding.

Table 4.1 **Number of participations per call with funding**

<b>Call</b>	<b>Participations</b>	<b>Funding</b>	
CALL 1	3872	1064	M€
CALL 2	1782	524	M€
CALL 3	628	111	M€
CALL 4	3401	1068	M€
CALL 41	116	51	M€
CALL 5	2165	669	M€
CALL 6	738	154	M€
FET OPEN	501	125	M€
JOINT CALLS	472	119	M€
Grand total	13675	3885	M€

Source: IST Programme. Integrated Programme Portfolio Analysis 2006. European Commission Working Document 19 June 2007, p. 9. FET Open was a Call for research on Future and Emerging Technologies with continuous submission throughout the programme. Joint Calls mean the multiple Calls between priority 2 (IST) and priority 3: Nanotechnologies and nanosciences, knowledge-based multifunctional materials, and new production processes and devices (NMP) of the sixth Framework Programme. Call 41 was a Call with only one strategic objective: Networked Audio Visual Systems and Home Platforms.

Figure 3.2: Number of participations per call



Source: IST Programme. Integrated Programme Portfolio Analysis 2006. European Commission Working Document 19 June 2007, p. 9.

### Instruments

FP6 was characterised by a change in the available instruments. Two new instruments were introduced, namely Integrated Projects (IPs) and Networks of Excellence (NoEs). Hence, the instruments used in the FP6 for implementing the thematic areas were as follows:

"Traditional" Instruments	New Instruments
Specific Targeted Research Projects (STRePs)	Integrated Projects (IPs)
Co-ordination Actions (CAs)	Networks of Excellence (NoE)
Specific Support Actions (SSAs)	Article 169 (but not much in use) <sup>29</sup>

Source: Cordis

The most common instrument was STReP, which was used in slightly more than half of the funded projects (625). The new instruments, IPs and NoEs, had 234 and 59 projects respectively. The number of SSAs was also fairly large (147), while CAs are less frequent (60 CAs launched).

<sup>29</sup> This instrument requires co-operation at the level of national governments. It aims at integrating whole national or regional programmes on a particular topic by their joint implementation, e.g. through harmonised work programmes and common, joint or co-ordinated calls for proposals. See: Cordis, <http://cordis.europa.eu/fp6/instruments-print.htm>.

Table 3.3: **Number of projects and amount of funding per instrument**

Instrument	STReP	IP	SSA	CA	NoE	Total
Number of projects	625	234	147	60	59	1125
Funding per instrument % of total: 3.88 B€	35	53	3	1	8	100
Average funding per project (M€)	2,2	8,8	0,8	0,9	5,3	-
Average funding per participant	266.491 €	427.169 €	98.515 €	79.857 €	169.695 €	289.098 (global average)

Source: IST Programme. Integrated Programme Portfolio Analysis 2006. European Commission Working Document 19 June 2007, pp. 9-10, 13, and 15.

When it comes to the budget, most of the funding was allocated to IPs (53%) and STRePs (35%). These two instruments together also represented the majority of all the projects (76%). NoEs received 8% of the funding, leading to 61% of the funding being allocated to the new instruments. This ratio comes down from 75% in Call 1 to 66% in Call 2, around 60% in Call 4, 51% in Call 5 and only 23% in call 6. Call 41 was limited to new instruments. According to the Commission's Self-Assessment, this diminishing trend does not necessarily have to be negative, as it could be attributable to an early saturation of the research capacity in specific sectors.<sup>30</sup> It is also evident that only a limited number of structuring Networks of Excellence can be launched in any given domain.<sup>31</sup>

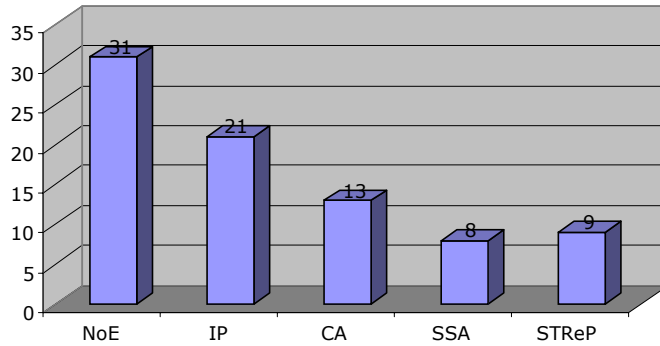
The introduction of Networks of Excellence and Integrated Projects led to projects involving a larger number of participants than in FP5. Whereas the number of partners in STRePs is similar to that in FP5 (on average 9 partners per project), NoEs included in average 31 and IPs 21 partners. CAs and SSAs have in average 13 and 8 participants respectively. The largest Networks of Excellence, EPOCH (Cultural Heritage) and Kaleidoscope (e-Learning) had 86 and 76 participants respectively. There are also examples of Integrated Projects with a very large number of participants, for example BeINGRID (74 participants) and CVIS (67 participants).

The new instruments have also led to lengthened projects in terms of time. Networks of Excellence have an average length of 43 months, IPs last on average 39 months while STRePs have an average length of 33 months.

<sup>30</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 33.

<sup>31</sup> IST Programme. Integrated Programme Portfolio Analysis 2006. European Commission Working Document 19 June 2007, p. 10.

Figure 3.3: Average number of participants per project

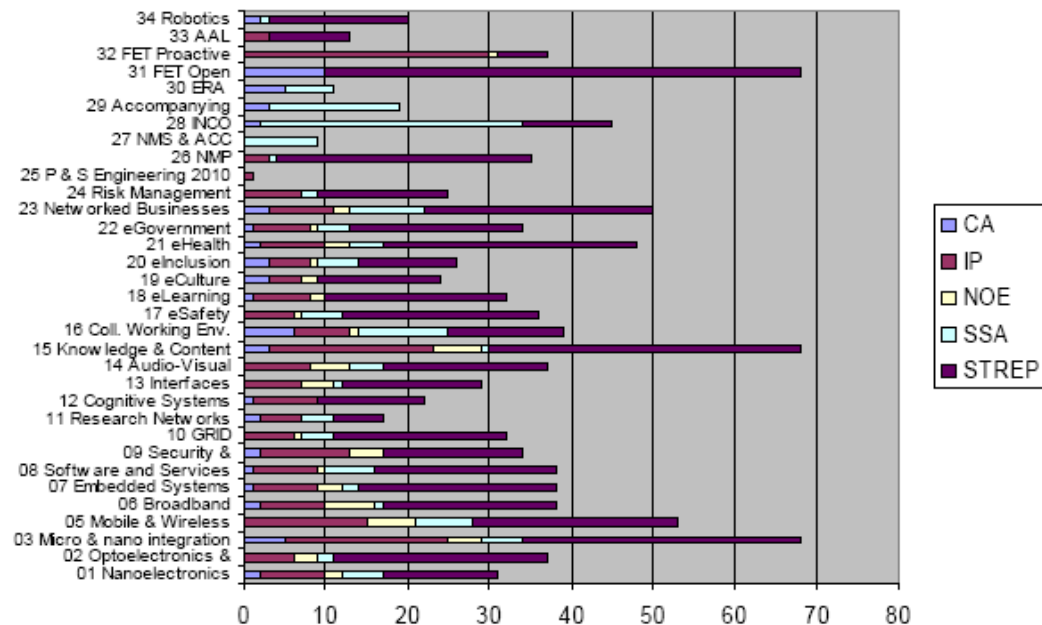


Source: IST Programme. Integrated Programme Portfolio Analysis 2006. European Commission Working Document 19 June 2007, p. 13.

### Coverage of areas

The IST thematic priority calls covered 33 different strategic objectives, some of which were addressed in multiple calls over the programme. Figure 3.4 below shows an overview of the number of projects and the types of instruments that were used in these projects over the course of the programme.

Figure 3.4: The number of projects per aggregated strategic objective



Source: IST Programme. Integrated Programme Portfolio Analysis 2006. European Commission Working Document 19 June 2007, p. 11

Apart from the Future and Emerging Technologies (FET) open calls, the largest number of projects are found in the areas of Micro-Nano integration, Knowledge and Content, Mobile and Wireless, Networked Business and eHealth.

#### 4.1.2 **Efficiency of Management**

The overall conclusion which emerges from the evidence concerning the efficiency of management is that the IST Thematic Priority was implemented and managed efficiently; both participants and members of the ISTAG and IST Committee state that IST was one of the better (or best) managed thematic priorities in FP6.

It is however possible to identify certain concerns related to a number of key issues, in particular the high oversubscription rates, which are seen as a waste of resources on the European level, both on the part of the applicant organisations and the Commission. On average, less than 1 in 6 project proposals were funded, although this ratio varies considerably between areas.<sup>32</sup>

The time to contract from proposal submission was reported to be longer in FP6 than in FP5; while the time in FP5 was in average 238 days, the average time to contract over FP6 was 293 days, which was however reduced to 230 for the last Calls. This has been explained in terms of the unfamiliarity of the new instruments and the addition of a "hearing" of the proposers of these measures at the short-listing stage of the evaluation and selection procedures.<sup>33</sup>

One criticism that was present broadly in the evidence base and interviews concerned the administration and the rules of participation related to the new instruments. The Commission has also admitted that the new instruments presented "a non-negligible challenge, both in the Commission and to stakeholders."<sup>34</sup> The situation did, however, seem to improve towards the end of the programme.

When it comes to the real costs of programme management, it has been assessed that the 7.5% of the programme budget used for administrative costs of implementing the IST RTD in FP5 and in the first Call of FP6 corresponds to the international standards for the management of this type of programmes.<sup>35</sup> Thus, the management of the programme seems to be efficient based on this assessment. However, updated figures have not been available. Thus, there is no evidence on, e.g., how the use of the new instruments has affected the share of the budget used for administrative costs.

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<sup>32</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 15.

<sup>33</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 31.

<sup>34</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 32.

<sup>35</sup> Five-Year Assessment: 1999-2003. Research and Technology Development in Information Society Technologies. Final Panel Report 01/2005, p. 18.

#### 4.1.3 **Evaluation of proposals**

The findings concerning the evaluation of proposals can be divided into two different categories: the length of the evaluation and selection process, and the quality of the evaluation feedback.

The evidence (interviews with proposers, both participants and proposers who did not receive funding) suggests that the length of the evaluation process does not seem to be an issue of concern. It is however evident that the actual length of the process differs a lot from one proposal to another and that an evaluation time of 2-3 months is acceptable to the research community. Anything longer than that is criticized by the stakeholders.

Multiple concerns related to the quality of evaluation could be identified. On the basis of the qualitative interviews, it seems that the quality of the evaluation depends to an important extent on the evaluator. The feedback varies a lot from one proposal to another and the quality is according to the respondents not consistent.

A clear difference can be identified between the bigger project participants and SMEs when it comes to the perceived quality of feedback received from the evaluators. None of the SMEs thought that the feedback was inadequate or insufficient, whereas many complaints were raised especially by the top-25 hubs. This difference could be explained by the fact the SMEs are more rarely project coordinators, and often only taking part in one or two projects, without much experience on failed project proposals.

There were also concerns about the possibility that evaluation is not always impartial, as the limited number of experts in certain fields in Europe means that sometimes proposals are evaluated by one of the biggest competitors in the field.

Several ways to improve the evaluation process have been proposed, including:

- The coverage of all the strategic objectives could be enhanced by changing the evaluation process so that proposals are evaluated as a portfolio of projects, rather than each proposed project being considered in isolation.<sup>36</sup>
- Improvement of the evaluation process can also be used as a means to increase the rate of for example SMEs taking part in IST projects. A network evaluation in the field of IST suggests that more flexible and relatively fast procedures of proposal evaluation would, together with revising the rules defining the financial viability of contractors, shift the emphasis from tangible assets to intellectual and knowledge related assets and thus potentially increase the rate of participation of innovative SMEs in IST projects.<sup>37</sup>

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<sup>36</sup> External Monitoring of the FP6 IST Thematic Priority. Synthesis of the Reports of the Independent Monitoring Panels. December 2006, pp. 2 & 7.

<sup>37</sup> Evaluating the Effectiveness of European ICT RTD and Innovation Systems, p. 9.

#### 4.1.4 **Costs of participation and management**

The costs of participation and management are here roughly divided into two different categories: costs related to the submission of a proposal that arise before taking part in the programme; and costs related to the management and administration of the project arising after the project proposal has been approved.

##### **Costs of submitting a proposal**

Two overall views can be identified concerning the costs of submitting a proposal in the IST thematic priority:

- Costs are reasonable seen in relation to the funding that the approved projects will receive, but
- Costs are very high in relation to the probability of success

This was clearly suggested in the evidence base, where for example the evaluation of the effectiveness of the new instruments in the sixth Framework Programme<sup>38</sup> stated that the application costs and risks of participation are unreasonably high and that a mismatch between the expectations of the participants and the reality has led to preparation costs that are not realistic for many participants. Similarly, the high cost of making a proposal was identified as one of the main barriers to participation.

The statement was supported by the qualitative interviews, which also revealed that there are significant differences between the smaller participants and the bigger organisations; the bigger participants usually have a support team to deal with the administrative and legal questions, which takes the burden off of the researchers and thus lowers the costs of participation, in terms of researcher manpower. The overhead becomes extensive when the researchers have to take care also of the administrative and legal questions related to proposal writing, as is often the case in smaller participant organisations with (usually) less experience and fewer specialised administrative resources. However, the interviews also to a large extent confirm that participants do not in general consider the cost of submitting proposals excessively high in relation to individual (successful) proposals; the problem is that many proposals are not successful.

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<sup>38</sup> Evaluation of the effectiveness of the New Instruments of Framework Programme VI. 21 June 2004. The information is based on a review of the first calls of the FP6.

“There were a lot of administrative tasks, but they were reasonable. It was also a new consortium and much time was invested in defining the procedures, synchronising and gaining common ground, and FP6 cannot be blamed for this. This contributed to a better mutual understanding and a better understanding of FP6, and today we cooperate with consortium partners on other projects and proposals. Today, writing proposals is relatively fast so the great amount of time spent on coordination in FP6 has paid off in subsequent projects.”(SME, industry)

### **Project management and administration**

When it comes to project management and administration, the main conclusion seems to be that the overhead costs are very high in the short term, but you get more out of the participation in the long term, which makes the costs reasonable.

Most comments relating to project management and administration refer to the reporting requirements that all the project participants have to fulfil. There are two main kinds of reporting: content reporting, which concentrates on the research results, and financial reporting. For the most part, the participants understand the need for reporting, but reporting is taking time away from the initial goal of the projects, namely research. A significant number of respondents indicated that reporting has on many occasions diminished the productiveness of their research.

What comes out clearly both from the evidence base and the qualitative interviews, is that the costs of project management and administration differ greatly between a) project coordinators and b) project participants, on the one hand, and a) organisations with additional administrative staff and b) smaller organisations that have limited, or no administrative staff, on the other hand. Much depends thus on the availability of a good support team and extra manpower. If those are not in place, the costs tend to be high especially to the project coordinator.

It was suggested that if participation in a project is a strategic choice for the organisation, it is a valuable investment to be a project coordinator. In these cases the costs are considered to be reasonable in relation to the outcome.

“Being a project coordinator took a lot of time and effort, but in return I have gained access to the “inner circle” on the European level. This is why I consider that the administrative work I have put on the FP6 projects has been valuable. More effort is however required if I intend to stay in the ‘inner circle’.” (Top-25 hub, research centre)

In the beginning of FP6, the participants expressed concerns about the increasing size of consortia leading to increased management effort and responsibility. There was a concern that the funding for this management aspect was being reduced rather than increased to cope with increased need.<sup>39</sup> The interviews verify the increased management effort related to the new instruments. It has however also been suggested that when it comes to reporting, the “smaller” projects, such as STRePs, are more burdensome on the project participants because the workload is divided between fewer organisations than in the new instruments.

Many interviewees commented on the fact that the costs of participation depend on the cooperation in the consortia. If the cooperation between project partners works well and the deliverables are of good quality and submitted on time, the time spent on administration and management can be reasonable.

#### 4.1.5 **Progress made towards simplification and reduction of administrative burdens**

The participants confirm the Commission’s statement<sup>40</sup> that the administrative burden in FP6 has in fact been heavier than in previous Framework Programmes. This has been caused for example by the unfamiliarity of the new instruments, the large number of partners in IPs and NoEs and certain modes of implementation, such as the requirement for a detailed 12/18 month work plan, the complicated structure of proposals and the requirement for audit certificates.<sup>41</sup>

An important suggestion made by several interviewees is that the burdens could be redistributed and minimized (for unsuccessful proposers) by removing from the proposal-writing phase administrative tasks that are not strictly necessary before the project has been selected. This includes for example contract specifications and distribution of manpower.

As in many cases beforehand<sup>42</sup>, the introduction of a two-step application procedure was suggested in many interviews. Many participants believe that this system would minimise the wasted effort and lower the costs for those participants whose proposals are not supported. From the Commission’s point of view, this would however very likely multiply the number of applications and thus prolong the time to evaluate,

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<sup>39</sup> Monitoring Strategy and Requirements for IST-RTD in the sixth Framework Programme. Revised Final Report. Part A, Management Report. 08/2004 Version 1.0, p. 16.

<sup>40</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 33.

<sup>41</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 33.

<sup>42</sup> See for example Monitoring Strategy and Requirements for IST-RTD in the sixth Framework Programme. Part B Theme 1. The Use of the FP6 Instruments. Analysis Report on FP6 Participation. Revised Report Version 1.0 08/2004, p. 69; and Monitoring Strategy and Requirements for IST-RTD in the sixth Framework Programme. Part B Theme 1. The Use of the FP6 Instruments, Involving SMEs in the IST Thematic Priority. Revised Report Version 1.0 08/2004, p. 24; and External Monitoring of the FP6 IST Thematic Priority. Synthesis of the Reports of the Independent Monitoring Panels. December 2006, pp. 2 & 7.

without providing a guarantee of increased quality in the proposals. The two-step procedure would nevertheless reduce the costs of preparing a proposal significantly. The two-step procedure is already at use in the FET Open scheme, where short proposals are evaluated remotely and anonymously, followed by full proposals that are evaluated with standard procedure. This has proven very effective for the proposers as it gives a deadline-free mechanism for screening initial ideas without burdening consortia with writing full proposals. The double evaluation process did however require significant extra efforts from the Commission services.<sup>43</sup>

Administrative tasks in connection with preparing a proposal and obtaining funding may for example be related to personal and institutional identification, requirements related to financial capacity (e.g. guarantees, requirements for the company's financial strength), requirements for structure and contents of the proposal (number of questions, how much information is required), networking with partners and network coordination. It is however important to differentiate between administrative tasks that are reasonable and necessary, for example for security reasons or for ensuring a good proposal, and administrative burdens, i.e. tasks that are more burdensome than strictly necessary. An interesting finding is that most SMEs interviewed understood the need for all the administrative tasks. They do however pose a significant burden on the small organisations that do not have the possibility to hire additional administrative staff to take care of the administration. This is why the number of SMEs suggesting that the administrative tasks would prevent them from participating again in the programme was significantly higher than that of the top-25 hubs.

In 2004, a significant difference between the EU15 participants on the one hand, and the participants from the new Member States, on the other hand, was detected. The respondents from the new Member States did not consider administrative burdens as a major barrier for the participation in the programme, seeing other factors as more significant, whereas for the EU15 respondents this issue was of high priority.<sup>44</sup> While the qualitative interviews did not reveal drastic differences in this regard, a difference does exist, indicating that the additionality that participation brings to the organisations from the new Member States is seen to be of high significance.

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<sup>43</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, pp. 30-31.

<sup>44</sup> Monitoring Strategy and Requirements for IST-RTD in the sixth Framework Programme. Revised Final Report. Part A Management Report. 08/2004 Version 1.0, p. 16.

## 4.2 **Appropriateness and clarity of the legal framework and the instruments; funding; participation**

### 4.2.1 **The legal framework and the instruments**

#### **Legal framework**

The Commission assesses the legal framework and the new “grant agreements” to be satisfactory and the rules for participation and the model contracts to be better than in FP5.<sup>45</sup> This is supported by the qualitative interviews with programme participants. The majority of interviewees are of the opinion that the rules of participation were well defined and clear. There are however some differences in the answers of the SMEs and top-25 hubs. SMEs, on the one hand, often state that it has not been necessary for them to understand the rules of participation as they have received help from the project coordinators and other project partners. Top-25 hubs, on the other hand, suggest that understanding the rules becomes easier as a result of experience gained. Furthermore, the bigger participants often have a separate administrative or legal unit taking care of the tasks related to the rules of participation.

A little less than half of the respondents (both participants and non-participants) stated that the rules of participation were unclear in one way or another. The issues that need clarification include for example:

- The definition of financial rules and the outputs required in terms of deliverables.
- The conditions relating to technical competence and resources.
- Consortium size.

The general view of the respondents was nevertheless that any unclear points or questions could be discussed with the Commission officials.

#### **Instruments**

In FP6, the number of projects has gone down while the average size of the projects has gone up. In comparison to FP5, the number of projects has been reduced by a factor of more than 2.5. This has led to an increased number of participants in each project in comparison to FP5 and increased thus the possibility for interaction be-

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<sup>45</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 31.

tween IST research institutions. Hence, the Commission assesses the FP6 portfolio as being more strongly concentrated, better structured and more integrated.<sup>46</sup>

In addition to changing the size of the IST projects, the new instruments have also led to projects that will be active for a longer period of time. The increased length of the projects is very much in line with the FP6 goals of operating with longer-term projects; a departure from multiple project funding in favour of coherent and long-term research activities was a special aim of Integrated Projects and Networks of Excellence.<sup>47</sup>

Concerns have been raised that the new instruments are not appropriate for SMEs and new Member States, especially due to the large size of the consortia and the projects<sup>48</sup>. This is especially true for the IPs. However, particularly ISTC and ISTAG believed that the new instruments should not be abandoned but that, rather, they were still in a maturing phase and had to be further developed. The idea was to further refine the objectives of the instruments later on during FP6.<sup>49</sup>

The new instruments did however prove to be a challenge both for the Commission and for the stakeholders. The Commission admits that an adaptation period was needed both for the Commission and for the research community in order to find the optimal way to implement the research activities with the help of the new instruments.<sup>50</sup> This is supported by the qualitative interviews with the research community. The interviewees directed criticism at the uncertainty related to the purpose and functioning of the new instruments. It was however stated by many participants that the lack of experience in running very large projects and consortia showed itself in the beginning of the programme, but levelled out towards the end of the programme.

Whereas the big size of the NoEs and IPs was criticised by many, there were also multiple participants who said that when the instructions and rules were clarified, especially the Networks of Excellence turned out to be an excellent instrument for networking, both for academia and for industry.

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<sup>46</sup> ERAnets Evaluation of NETworks of Collaboration Among Participants in IST Research and their Evolution to Collaborations in the European Research Area. Final Report 03/2005, p. 15; and IST Programme. Integrated Programme Portfolio Analysis 2006. European Commission Working Document 19 June 2007, p. 4.

<sup>47</sup> Participating in European Research. A guide for applicants under the sixth Framework Programme for European Research & Technological Development (2002-2006). 2<sup>nd</sup> edition, 2004, p. 13.

<sup>48</sup> Cf. e.g. the Five-Year Assessment and the Monitoring Reports from Technopolis

<sup>49</sup> Five-Year Assessment: 1999-2003. Research and Technology Development in Information Society Technologies. Final Panel Report 01/2005, p. 21-22.

<sup>50</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 32.

“When the Networks of Excellence work, they work really well. They are probably the best instrument for dissemination and networking – about sharing things, mobility between organisations, discussing future research areas, integrating with the industry etc.” (Top-25 hub, university)

The qualitative interviews supported only partly the concerns raised in the evidence base about the abilities of the SMEs and the new Member States to participate in the IPs and NoEs. The statistics, however, show a different picture. Whereas the SME share of funding has in fact grown from around 15.3% in the first call of ICT in FP6 to close to 22 % in the last one, the SMEs are overrepresented in STRePs in comparison to IPs. The shares of SME funding within the total funding per instrument are above the 15% target for the “traditional” instruments, but the IPs are slightly below the overall 15% target and NoEs reach only 6,5%.<sup>51</sup> This means that even though SME participation has not decreased, it is clear that the new instruments are not equally attractive for the SMEs as they are for larger organisations.

Probably due to the significant changes caused by the new instruments, the comments related to the “traditional” instruments received from the interviewees were limited. The traditional instruments seem to be functioning well. The comments about **STRePs** were exclusively positive, stating that the required consortium size is appropriate, that STRePs are focused enough and easy to manage. **Coordination Actions** were suggested to be a wonderful instrument, which makes the research community communicate. The most respondents commenting the **Specific Support Actions** were SMEs, who have as their main task to provide dissemination services to their members or other companies in their home country. For these organisations, the SSAs continued to be the main instrument of interest.

#### 4.2.2 **Funding**

The key evaluation question in relation to funding is whether funding was adequate. This question is complex; what is “adequate” when it comes to funding? One of the key indicators of this is whether there were enough funds to retain a reasonable share of the proposals that were found to be qualified and eligible for funding.

Especially the ICT Committee members interviewed pointed to the high oversubscription rate – only one in six proposals funded – as a major cause for concern. Given that many more than one-sixth of proposals pass the evaluation threshold (i.e.

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<sup>51</sup> IST Programme. Integrated Programme Portfolio Analysis 2006. European Commission Working Document 19 June 2007, pp. 19-20.

they are of sufficient quality to merit funding), this would indicate that there is a clear need for more funding.<sup>52</sup>

It was proposed by a member of ISTAG Committee that in order to increase the impact of the IST funding, schemes should be developed to massively support the market introduction of selected promising innovative technologies, and that something similar to the US DARPA funding scheme to develop promising innovations is clearly needed.

“We had a problem in FP5 and some of FP6, where we went in on 20% management costing – we lost on that. It is better now with the 75% of full costs in FP7. But the EU still doesn’t understand some of the ways universities work – e.g. in the UK, we work with “full costing”. ... When shortfalls in terms of real costs are limited, we can manage it – but we are probably at the limit now.” (Top-25 hub, university)

#### 4.2.3 Participation

##### Project participants

4,641 organisations are involved in the IST thematic priority through more than 13,675 participations in projects. 43% of the participations are from governmental organisations, 14% from private non-profit organisations and 39% from private commercial organisations. The funding is divided rather evenly between governmental organisations (39%) and private commercial organisations (42%).<sup>53</sup>

The most active participants are involved in a very large number of projects. Fraunhofer Gesellschaft from Germany has been most the active with 246 participations in projects, followed by Siemens group (132) and Centre national de la Recherche Scientifique (CNRS) from France (130).<sup>54</sup>

On average 20.6% of the participating organisations have been SMEs, representing on average 16.2% of funding. 85% of the projects had at least one SME participant.

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<sup>52</sup> For example in Call 4 the ratio of proposals being recommended for funding to submitted proposals is for STREPS around 1 in 6, whereas the ratio for IPs and NoE is closer to 1 in 4. This indicates that many good STReP proposals are left without funding. See: External Monitoring of the FP6 IST Thematic Priority, 4th Call. Independent Monitoring Panel Report, June 2005, p. 11.

<sup>53</sup> IST Programme. Integrated Programme Portfolio Analysis 2006. European Commission Working Document 19 June 2007, p. 16.

<sup>54</sup> IST Programme. Integrated Programme Portfolio Analysis 2006. European Commission Working Document 19 June 2007, p. 17.

SMEs, however, mostly take part in one project only (82% of SMEs compared to 65% of other participants).<sup>55</sup>

### **Geographical coverage**

Of the 4,641 organisations taking part in the IST thematic priority, 3,974 came from the 27 Member States of the European Union. 302 organisations belong to Associated Countries (AC) and 43 to Accession Countries (ACC).<sup>56</sup>

The countries receiving most of the funding from the programme are Germany, with 20.5% of the total funding, France (13.2%), UK (11.6%) and Italy (10.2%). These are also the countries with most participations in the IST thematic priority.

In terms of financial contribution, 92% of funding is allocated to Member States while AC countries receive around 6% of the budget and ACC countries receive 0.35%.

Third countries were involved in the IST projects through a total number of participations of 484, representing 3.5% of all the participations. The funding received by third country participants was approx. 40 M€, which represents approx. 1% of all the funding. The countries participating most actively in the IST thematic priority were China (102 participations), United States (45), Russian Federation (38) and Brazil (30). All in all 55 third countries were represented in the programme.<sup>57</sup>

### **Networks**

The so-called network hubs are an important part of research and deployment networks. Hubs can be defined as nodes with a large number of connections that play the role of network connector. Network hubs are characterised by two different types of indicators: degree centrality and betweenness of centrality.<sup>58</sup> Research shows that different types of organisations play the role of Network Hubs in IST-RTD Programmes and Hubs are rather evenly distributed among companies, higher educa-

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<sup>55</sup> IST Programme. Integrated Programme Portfolio Analysis 2006. European Commission Working Document 19 June 2007, pp. 4 and 23.

<sup>56</sup> Associated countries: Iceland, Israel, Liechtenstein, Norway and Switzerland. Accession countries: Croatia and Turkey.

<sup>57</sup> IST Programme. Integrated Programme Portfolio Analysis 2006. European Commission Working Document 19 June 2007, pp. 24-26.

<sup>58</sup> Degree centrality is in general defined as the number of lines incident with a node. In the context of IST research organisations where nodes represent organisations, degree centrality is therefore defined as the number of other organisations with which the focal organisation has a relational tie. Betweenness centrality is a measure of the influence a node has over the spread of information and knowledge through the network. The basic idea is that a node, which lies on the information path linking two other nodes, is able to exercise a control over the flow of knowledge within the network. Formally, it is defined as the fraction of shortest paths (i.e. the minimum number of lines connecting two nodes) between node pairs that pass through the node of interest. See: CESPRI: Evaluation of progress towards a European Research Area for Information Society Technologies. January 2006, p.12.

tion institutes and public research centres. Research networks are however dominated by higher education and research institutions, whereas deployment networks are dominated by industry.<sup>59</sup> The main hubs in the IST Thematic Priority are Fraunhofer Gesellschaft from Germany, CNRS from France, Siemens group and Ecole polytechnique fédérale de Lausanne<sup>60</sup> (a full list of the Top-25 hubs is included in Annex 6).

## **SMEs**

SMEs play a vital role with regard to innovation in the ICT industry, but most of these companies do not participate in research and innovation programmes. As indicated by the Study on Innovative ICT SMEs in Europe<sup>61</sup>, only 22% of ICT SMEs received such funding in the past three years. The funding that these SMEs are most likely to receive stems from national research programmes (10.4%) and Community funded research programmes (8.9%).<sup>62</sup> 42% of innovative ICT SMEs do however identify the global or EU markets as their most important target market in terms of geographical scope compared to 57% who mainly address national or local markets.<sup>63</sup> This shows that many innovative ICT SMEs are in fact competing with the best in the most aggressive international markets, but their low participation in Community funded research programmes may indicate that they do not feel in need of expanded international cooperation networks, available through participation in for example FP6.

The SMEs interviewed stated different reasons for their participation in FP6. Some have as their overall strategy to extend their business activities to the European market, and they use the participation in FP6 as a tool for achieving this goal. Other participants are more interested in a certain type of technology and finding out that research is being conducted in this field within the framework of FP6. The degree of proactivity also differs widely; some were invited by other organisations to take part in consortia but there are also examples of SMEs who are first movers in their own field of expertise and have been speaking for their field to be included in the framework programmes.

In the IST Thematic Priority of FP6, particular attention has been given to ensure the participation of SMEs in the Calls. It can be seen from the Commission's Self-Assessment report that the level of participation of SMEs has been sustained at over

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<sup>59</sup> CESPRI: Networks of Innovation in Information Society Development and Deployment in Europe. Final Report, January 2007, p. 6; and CESPRI: Evaluation of progress towards a European Research Area for Information Society Technologies. January 2006, p. iii.

<sup>60</sup> Source: DG INFSO based on network analysis of participant data.

<sup>61</sup> IDC EMEA: Study on Innovative ICT SMEs in Europe (EU 25). Final Study Report D 5.3. 31 October 2007.

<sup>62</sup> IDC EMEA: Study on Innovative ICT SMEs in Europe (EU 25). Final Study Report D 5.3. 31 October 2007, pp. 36-37.

<sup>63</sup> IDC EMEA: Study on Innovative ICT SMEs in Europe (EU 25). Final Study Report D 5.3. 31 October 2007, p. 24.

20% of participation, well above the 15% target set by the European Council and the European Parliament for FP6. Moreover, SMEs participating in FP6 patent more than most SMEs. However, it is also noted in the Self-Assessment report that only around 5% of the European SMEs holding highly cited ICT patents have participated in FP6, which is explained by the relatively long time-to-market in the FPs.<sup>64</sup> This is supported by the findings from the qualitative interviews, which show that the long time-to-market was one of the main reasons for non-participation among the non-participant SMEs interviewed. The participant SMEs, on the other hand, were almost exclusively of the opinion that the long time span for the projects is suitable. It seems thus that the SMEs taking part in the programme understand and accept the characteristics of the public research programmes that are better suited to sustain longer-term innovation strategies than to fund short-term innovation projects, and do not hold unrealistic expectations as to the goals of the different instruments.<sup>65</sup>

FP6 support to RTD in areas such as networked enterprise has opened up opportunities for SMEs by e.g. allowing a number of SMEs to position themselves as credible vendors of advanced content and knowledge management solutions, thus enabling them to create their own customer base. Also, the FP6 support to software technologies in areas such as open source software and SOA has opened up opportunities for new players, particularly innovative SMEs, in the software domain.<sup>66</sup>

It was also shown by the study on Innovative ICT SMEs in Europe<sup>67</sup> that the SMEs declaring high or medium growth are more likely to have received funding from research/innovation programs at the national or European level. Participation in these research programmes is seen as an important marker of the existence of an innovation strategy and an orientation towards research investments by the company.

The interviews with SME organisations (a mixture of commercial enterprises and research institutes) carried out for this evaluation do not support this picture to a very large extent. Most of the participating SMEs only expected to grow very modestly in size over the next 5 years. In general, the SMEs did not plan to develop new business lines, but rather to develop and enhance the existing ones instead. This finding should however be seen in the light of the fact that many projects involving SMEs developed research pilots and prototypes, and the SMEs often included the research conducted in the company's own research. Hence, growth as a result of participating in FP6 may be difficult to assess in the short term. Some SMEs however also stated that the FP6 project was not their main line of research, and only something they participated in as they had been asked by existing business partners. These SMEs often saw the FP6 project as a "hobby" and did not immediately combine the research conducted in FP6 with the research taking place in their company. This could also explain the lack of expectations for growth in the participating SMEs.

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<sup>64</sup> DG INFSO: Self-Assessment, pp. 20-21.

<sup>65</sup> See also IDC EMEA: Study on Innovative ICT SMEs in Europe (EU 25). Final Study Report D 5.3. 31 October 2007, p. 38.

<sup>66</sup> DG INFSO: Self-Assessment, p. 21.

<sup>67</sup> IDC EMEA: Study on Innovative ICT SMEs in Europe, p. 27.

## Key players

Another interesting question concerns the participation or non-participation of the leading players in the field. It seems that the IST Thematic Priority has at least partly reached its goal in this regard. 62% of the participants in the first two calls felt that all or most of the leading European players were present in their consortium, and only 4.5% did not feel that there were leading players present.<sup>68</sup> Furthermore, 15 out of 25 Global IST partner network hubs take part in IST-RTD networks.<sup>69</sup>

## Reasons for participation

The main reasons for participation stated by the participants interviewed for this evaluation can be divided into four different categories: result-driven reasons, funding-driven reasons, networking-driven reasons and reasons related to continuity.

*Results* - A number of interviewees stated that a reason for taking part in FP6 was that they were interested in developing their technology in a certain field or into a specific direction. This field/direction being part of the IST Thematic Priority made them apply for funding. The result-driven organisations often put a lot of weight on the ability of the consortium to submit a successful proposal.

*Funding* - Many respondents identify the possibility to receive funding as the main reason for participation in FP6. This explanation is often explained by dissatisfaction with or lack of funding on the national level. Especially in the case of the top-25 hubs, participation is often seen as a way to fund more off-track and speculative research, which deviates from the "standard" research directions within these organisations.

*Networking* - For many organisations taking part in FP6, the programme presented an interesting possibility to network with the research community. Networking is seen as a significant way of disseminating and gaining knowledge, of testing new ideas and of being aware of the trends in the research. In these cases the participants are often more aware of the consortia profiles, and seek to take part only in consortia that fulfil their expectations when it comes to the project partners.

*Continuity* - For a number of respondents, participation in FP6 was a natural continuation from participation in previous Framework Programmes. Participation is continued because the research in the field has not been brought to an end, or participation is seen as a tradition.

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<sup>68</sup> Monitoring Strategy and Requirements for IST-RTD in the sixth Framework Programme. Part B Theme 1. The Use of the FP6 Instruments. Analysis Report on FP6 Participation. Revised Report Version 1.0 08/2004, p. 25.

<sup>69</sup> CESPRI: Evaluation of progress towards a European Research Area for Information Society Technologies. Technical Report, November 2005, p. 60. See the list of the Global IST partner network hubs in Annex 5.

## **Barriers to participation**

Both the evidence base and the qualitative interviews have revealed a number of barriers to participation. The barriers are often directly related to the costs of participation and management, such as extensive reporting and audits. These issues have already been discussed above.

The costs of participation and management would however not prevent most respondents from applying again to Community funded programmes. Other barriers mentioned by the respondents was for example the difficulty to find suitable consortia and to encourage other organisations (newcomers) to join the consortia.

### *SMEs*

The complexities related to participation in FP6 form a barrier to participation for the first-time SME participants. Specifically for FP6, the provision for joint financial liability proved to be initially counterproductive for SMEs, because it led to some organisations being reluctant to take risks with weaker partners<sup>70</sup>. Participant SMEs stated in interviews that it was more difficult for small companies to have their ideas recognised in the consortia because the unwillingness to take risks on the part of the other partners leaves less room for suggesting new, innovative ideas.

As mentioned above, many innovative SMEs have chosen not to participate in the programme especially because of the long time-to-market. Further reasons for non-participation in IST-RTD research programmes have been identified in the Study on Innovative ICT SMEs in Europe, which shows that in addition to the known barriers of complicated procedures and expensive application procedures, the non-participant SMEs are worried about the lack of protection for intellectual property of high-tech SMEs as well as about the lack of SME specific funding programmes<sup>71</sup>.

### *New Member States and third countries*

Interviews with participants from the new Member States and third countries revealed that especially SMEs from these countries have experienced barriers to participation in the form of lack of trust within the consortia. The interviewees reported that there was a need for the organisations to first gain the trust of the other project partners in the network before they could become fully accepted partners. Furthermore, the respondents from new Member States and third countries mention lack of language skills as an important barrier to participation.

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<sup>70</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 31.

<sup>71</sup> IDC EMEA: Study on Innovative ICT SMEs in Europe (EU 25). Final Study Report D 5.3. 31 October 2007, p. 38.

## 5. Effectiveness

### 5.1 Results of the programme

The objectives of the Thematic Priority and the Work Programmes have in most cases been met.

The different research priorities of the IST Thematic Priorities are:<sup>72</sup>

1. Applied IST research addressing major societal and economic challenges
2. Communication, computing and software technologies
3. Components and Microsystems
4. Knowledge and interface technologies
5. IST future and emerging technologies

The focus of IST in FP6 is, according to the IST Work Programme (WP) 2005-2006, on the future generations of technologies integrating computers and networks into the everyday environment, thus providing access to a multitude of services and applications through easy-to-use human interfaces.

With respect to the specific – or strategic – objectives, the IST WP 2005-2006 continues to focus on a limited set of strategic objectives, in order to ensure concentration of effort and critical mass. The strategic objectives are essential to reach the IST goals in FP6 and aim at reinforcing European strengths in areas where Europe has established leadership as well as seizing new opportunities and ensuring co-evolution of technologies and applications. The Strategic Objectives address technology components, their integration into systems and platforms as well as the development of innovative applications and services. They are therefore interlinked and should not be seen as separate isolated activities<sup>73</sup>.

#### 5.1.1 Scientific and technological results

The number of patents and scientific papers that the projects have resulted in can be used as an indicator of the scientific outputs of the FP6 projects. In 2005, 9% of the FP6 projects applied for at least one patent. At the same time, 69% of the FP6 projects produced at least one scientific paper presented at an academic event, and 54% of the projects published at least one academic article in a refereed journal. In total, 69% of the FP6 projects applied for patents or published articles and papers in 2005.<sup>74</sup>

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<sup>72</sup> Council Decision of 30 September 2002 adopting a specific programme for research, technological development and demonstration: 'Integrating and strengthening the European Research Area' (2002-2006).

<sup>73</sup> [ftp://ftp.cordis.europa.eu/pub/ist/docs/ist\\_wp-2005-06\\_final\\_en.pdf](ftp://ftp.cordis.europa.eu/pub/ist/docs/ist_wp-2005-06_final_en.pdf).

<sup>74</sup> Implementation of IST-RTD in 2005. Analysis of the output and impact indicators –Main findings, pp. 2-5.

In 2006 the percentage of the FP6 projects having applied for at least one patent increased to 11%. Meanwhile, 71% of the projects produced at least one scientific paper presented at an academic event, and 53% of the FP6 projects published at least one academic article in a refereed journal. This gives a grand total of 74% of FP6 projects having applied for patents or published articles and papers in 2006.<sup>75</sup> Hence, the number of FP6 projects applying for patents or publishing articles appears to have increased during FP6, which is a positive development in the scientific output.

From the interviews it can be seen that the project participants largely state that the scientific and technological results obtained are prototypes, working pilots and the like, input to new directions for their ongoing research, and absorbing (complementary) knowledge from other participants. The majority of the participants stated that research conducted in the FPs is basic research, which might be commercialised at a later stage in some of the participating companies. Hence, good (and realistic) outputs for the participants were prototypes and new ideas that can be developed further afterwards. A large number of project participants also continued to work together afterwards and 66% of the organisations interviewed reported to have continued their research in-house. In case of the top-25 hubs, the corresponding number was 74%, whereas only 50% of the SMEs interviewed reported continued research in-house.

### 5.1.2 **International cooperation**

#### **Socio-economic effects**

The work programme 2003-2004 contained three different ways in which the international cooperation should be promoted within the IST Thematic Priority<sup>76</sup>:

1. The opening of "Focusing and Integrating Community Research" to third country organisations with substantial funding
2. Specific measures in support of international co-operation
3. International activities under the heading of Human Resources in the specific programme for research, technological development and demonstration "Structuring the European Research Area"

Furthermore, several Strategic Objectives in work programme 2005-06 called for specific activities to support international cooperation, for example in Mobile and Wireless Systems beyond 3G and ICT Research for innovative government.<sup>77</sup> Five additional activities in support of intentional cooperation, such as International Co-

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<sup>75</sup> Implementation of IST-RTD in 2006. Analysis of the output and impact indicators –Main findings, pp. 3-4.

<sup>76</sup> Information Society Technologies Work Programme 2003-2004, p. 65.

<sup>77</sup> European Commission: Information Society Technologies 2005-2005 Work Programme.

operation on Digital TV Broadcasting and Interactive Applications, were introduced in the fourth update to the work programme.<sup>78</sup>

Representing one of the Thematic Priorities within the goal of "Focusing and Integrating Community Research", IST work programmes also included funding directed to third countries. According to the Programme Portfolio Analysis, the total funding allocated to third countries during FP6 reached €40 Million, which represents ~1% of the total funding. This is an improvement compared to FP5, where third countries only received €7 Million in project funding<sup>79</sup>. The number of third country participants represented 3.53% of all the participants<sup>80</sup>, which indicates that third countries were more actively represented in smaller scale projects, when it comes to funding.

International cooperation between the EU and China, India and Africa has been strengthened as the number of participations have nearly doubled since FP5, funding to third countries increased by a factor six, and the number of collaborative links has increased tenfold.<sup>81</sup> To substantiate this point, in FP5 2 Indian organisations were involved in ICT proposals and none were funded, whereas 101 Indian organisations participated in proposals in FP6 and 22 went on to being part of funded projects.<sup>82</sup> Certain areas such as 4G mobile systems, extended home networks, Grids, and Mobile TV have stimulated international cooperation and aimed at reaching global standards. This has implied that key players have established partnerships with third countries such as China, Korea and Japan. Research has in this connection supported an international system in which European Industry is an important player.<sup>83</sup>

IST-FP6 has been effective in attracting more than half of the top-25 global leaders within innovation, which are hubs of the global innovation networks in this area.<sup>84</sup> In this respect participation in IPs has been very effective at connecting European IST research participants to the rest of the world.

International cooperation with developed countries such as the USA and Japan continued within the framework of the Intelligent Manufacturing Systems (IMS) initiative, according to the Commission's Self-Assessment report. Five regions are engaged in the initiative, including EU, Japan, Korea, Switzerland, and the US. How-

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<sup>78</sup> Information Society Technologies Work Programme. Fourth Update (Commission Decision C(2005)4006 of 18 October 2005).

<sup>79</sup> IST Programme. Integrated Programme Portfolio Analysis 2006. European Commission Working Document 19 June 2007, p. 151.

<sup>80</sup> IST Programme. Integrated Programme Portfolio Analysis 2006. European Commission Working Document 19 June 2007, p. 26.

<sup>81</sup> Self-Assessment, p. 27.

<sup>82</sup> EuroIndia 2004 Cooperation Forum on the Information Society Feedback and Impact: 9<sup>th</sup> Basic Review.

<sup>83</sup> Self-Assessment, pp.27-28.

<sup>84</sup> CESPRI: Evaluation of progress towards a European Research Area for Information Society Technologies. Technical Report, November 2005, p. 60.

ever, only two new IMS projects were launched in FP6 – partly due to the fact that no particular budget was set aside for IMS.<sup>85</sup>

### **Organisational effects**

For the interviewed project participants, the international cooperation was both an important incentive for participation and a useful impact resulting from FP6. The experiences of international cooperation are especially important to the academia, as international cooperation gives better access to information and channels for dissemination. Many of the companies participating in FP6 are already international and thus international cooperation is incorporated into their everyday activities also without FP6.

International cooperation is also very important for the participants from smaller countries, where the expertise and potential market for commercialisation are limited. Moreover, the international collaboration is reported to create a bigger critical mass, to give more European awareness, and not least to increase the quality of the output. Some respondents consider the international aspect to be the biggest advantage of the Framework Programme. Participation gives the organisations a broader picture of the state-of-the-art research in all the EU countries and also in countries outside the EU.

International cooperation does however also make project management more difficult, mostly because of distances and all the travelling that is required, but also because cooperation with people from different countries and cultures can require extra work to put together the consortia agreements (from the legal point of view) and to agree on the modes of cooperation.

Especially respondents from the new Member States report that they have experienced through the international collaboration that they are not alone in the world and that new opportunities have arisen thanks to international collaboration.

#### **5.1.3 Knowledge transfer and innovation**

The knowledge transfer and innovation capabilities of the IST Thematic Priority can be measured particularly through network analysis. The evidence base indicates that FP6 research networks increase on the one hand the effectiveness of knowledge exchange among organisations and on the other hand a fast diffusion of information within the network.<sup>86</sup>

'Gatekeeper' organisations – simultaneously Global Hubs and IST-RTD Hubs – are the most effective organisations in terms of enriching the network with new knowledge and facilitating the dissemination of knowledge among network members. IST-RTD Hubs are more effective than other IST-RTD participants in terms of both pro-

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<sup>85</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 28.

<sup>86</sup> Networks of Innovation in Information Society Development and Deployment in Europe. Final Report 01/2007, p. v.

ducing and disseminating new knowledge. In addition, IST-RTD Hubs contribute to the dissemination of knowledge by playing a key role in the mobility of inventors among European IST organisations.<sup>87</sup>

Knowledge transfer and innovation is also one of the areas where the “behavioural additionality” (changed RTD behaviour as a consequence of participation in public-funded research activities, cf. section 1.1) and network effects are most visible. Thus, the different types of effects that we analyse below manifest themselves primarily in the behaviour of the organisations participating in the programme.

### **Network effects**

The qualitative interviews support the findings from the evidence base, pointing to the importance of networks in increased knowledge transfer and innovation. Networking effects are indeed perceived by numerous interviewees as the most significant impact of their participation in FP6. The big size of consortia resulting from the introduction of the new instruments and importance of international consortia provide the project participants with an increased international network in which to disseminate project results, gain new knowledge and find cooperation partners for future commercialisation. It was also stated that the cooperation in FP6 is much stronger than for example within the framework of EUREKA.

“We are now collaborating increasingly with EU academia and research institutes. This brings much openness to the research community and gives a lot of new information.”  
(Top-25 hub, industry)

The large networks have however to some extent turned out to be counterproductive in terms of innovation in smaller organisations. Some SME participants have experienced that being a part of a large consortium diminished their possibilities to contribute to the research and to propose more innovative lines of research.

The positive impacts of the networks are however not only limited to increased knowledge transfer and innovation. It has also been suggested by many participants that the strong networks created during FP6 will continue as the basis for future research cooperation. This will be discussed in further detail in relation to the issue of sustainability later in this report.

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<sup>87</sup> Evaluation of Progress towards a European Research Area for Information Society Technologies. Final Report 01/2006, p. iv.

### **New fields of science and technology**

In terms of knowledge transfer and innovation, project participants were asked whether they have entered new fields of science or technology as a result of their participation in FP6. The main result from the interviews is that the majority of the respondents have in fact *not* entered new fields of science and technology, but rather expanded their existing fields of research into new directions or improved the existing research. This has been the case for both bigger organisations and SMEs. Some state that the research has become more interdisciplinary, which gives new perspectives to research. Sometimes, the way that the research is organised does not however leave room for entering new fields of science and technology. Especially some research centres have a very clear domain of activity and they do not deviate from this domain, which makes it difficult for FP6 to influence the introduction of new fields of science and technology

A little less than half of the interviewees had however entered new fields of science and technology. Examples of new fields taken up include construction of digital libraries, robotics linked to neuroscience, eLearning, sensor networks within the communications area, complexity science, and more generally (particularly for universities) moving from basic research into concrete applications.

“As a direct result of the FP6 project, a group from my Institute now works on the construction of digital libraries, which is a completely new field for us.”  
(Top-26 hub, research centre)

The international collaboration is in this respect highlighted by several project participants as being of importance to the possibilities of entering new fields of science as technology, as they can draw on research expertise from different cultures and different knowledge.

### **New R&D management processes**

Another way of determining if the knowledge transfer and innovation has been improved is by looking at whether the participants have instituted new R&D management processes in their organisations as a result of their participation in the programme.

The majority of the interviewees did not institute new management processes in their organisation as a result of FP6. This is mainly due to the fact that the organisations have rather rigid research domain areas structured independently of research projects. Projects funded in e.g. FP6 support these research areas, not the other way around. However, a few participants state that they did this in earlier FPs, but not in FP6. The rather few organisations that *did* change their R&D management processes state that the FP6 projects have left marks on the management procedures internally, especially in terms of a more active management than before. Others state that they have taken “the best from both worlds” and integrated it into existing

management systems. One university states that it now works more with industry, which gives a more dynamic environment at the university and can contribute positively to future innovation.

The lack of new R&D management processes was especially clear among the SMEs interviewed. Even if it would seem to be easier for smaller companies to adopt new ways of working and new management processes, it seems that the impacts of participation in FP6 are rather limited in this area and do not affect the main modes of working either in the SMEs.

#### 5.1.4 **Human resources development, enhanced knowledge base and mobility**

##### **Mobility of researchers**

Human resource development and mobility of researchers and scientists are among the types of behavioural additionality that can arise as a result of publicly supported research projects. In the general introduction to the work programme 2003-2004, mobility of researchers is mentioned as an essential part of the project proposals, particularly with a view to the successful creation of the European Research Area.<sup>88</sup> The mobility of skilled human capital across organisations is also an important source of knowledge diffusion and recombination.<sup>89</sup> The mobility of researchers is dealt with especially in the network analysis report by CESPRI.<sup>90</sup> According to that report, the key organisations, identified as IST-RTD Hubs (cf. above), play an important role in the mobility of European researchers. The research was conducted by analysing Mobility Network relations, which arise from cross-organisational mobility of scientists and researchers. Hence, the IST Thematic Priority has contributed to the human resource mobility within the European research community by being able to attract key actors to the projects. Many of these key actors are characterised as Mobility Hubs, which represent a high mobility of researchers and which are strategically positioned in the flows of knowledge, embodied by researchers and scientists.<sup>91</sup> A couple of interview respondents (from universities/research institutions) also mention the mobility aspect as an important feature of IST-FP6 participation, in particular for young researchers gaining access to network partners who may be able to offer opportunities not otherwise available in their "home" organisation.

##### **Organisational effects**

Clearly most of the project participants interviewed have experienced enhanced staff skills and knowledge as a result of participation in FP6. This has been the case both for bigger participants and for SMEs. The biggest advantage seems to come from the extensive cooperation with the other members of consortia, which brings about complementary expertise, know-how and knowledge exchange. Especially the Networks of Excellence have presented a good way for knowledge exchange and for increasing the mobility of the younger researchers (cf. above).

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<sup>88</sup> Information Society Technologies Work Programme 2003-2004, p. 67.

<sup>89</sup> Evaluation of Progress towards a European Research Area for Information Society Technologies. Final Report 01/2006, p. 10.

<sup>90</sup> Ibid.

<sup>91</sup> Ibid., pp. v & 28.

Participation in FP6 is also reported to improve the possibilities for educating young researchers and Ph.D. students. The way in which industry and academia build consortia within FP6 is according to the many respondents from academia an excellent way for Ph.D students to become aware of the activities of the industrial players, because many of them will later on be working for industrial companies. Participation has also resulted in research staff of the industrial participants acquiring Ph.D.s and thus accumulating and enhancing the knowledge within the company.

Many participants are also of the opinion that the participation in a consortium has increased the quality of research and having to deal with deadlines and working in a team brings about more structure and different kinds of responsibilities.

“Seeing how other people work and discussing with other parties and labs, knowing about their different ways of working and exchanging information have all provided a very positive experience for my staff.”  
(Top-25 hub, research centre)

In terms of enhanced knowledge base, we can look at whether the participants consider that their abilities to produce or deliver products, processes or services has been enhanced. Most universities and research centres have not experienced this kind of impact from participation in FP6. Mostly this is however due to the fact that the amount of products, processes or services produced by these institutions is limited, and the research results are often seen as human capital. This shows that the impacts of participation in FP6 differ between organisational types, as industry participants often say that their ability has indeed been enhanced, mostly due to the knowledge gained. In many cases it is however difficult to say which abilities have been enhanced due to research carried out internally and which are an impact from participation in FP6.

“Our ability to produce or deliver new products has mainly been enhanced indirectly in terms of understanding new technologies. We have achieved additional knowledge, which is a very important result, also for future commercialisation.”  
(Top-25 hub, industry)

- 5.1.5 **Supporting and enhancing coordination and coherence of research activities**  
There are indications that FP6 networks both support and enhance coordination and coherence of research activities by creating interconnectedness between the projects

and the project participants. This measure decreases the amount of overlapping between the projects.<sup>92</sup>

## 5.2 Relevance, utility and consistency of the work programmes

Two work programmes were adopted during the course of the programme, in 2003-2004 and 2005-2006. Both work programmes were updated twice. According to the Commission's Self-Assessment report, they have remained relevant to the scientific and technological developments in the period. Furthermore, they have reflected the advice given from ISTAG members and the Strategic Research Agendas emerging from European Technology Platforms. Further, the Work Programmes have been in line with the mainstream and emerging R&D technologies and with the IST Thematic Priority specifications.

The priorities set in the Work programmes have been influenced by advice from ISTAG, ISTC, project reviews and the like.<sup>93</sup> This extensive consultation led as previously mentioned to a limited set of strategic objectives in order to ensure concentration of effort and critical mass. The Work Programmes were moreover formulated in close consultation with industry and the research community, and often built on strong existing initiatives in previous FPs and elsewhere. In this connection, the Work Programmes recognised areas where strong initiatives were already present as the WPs could (or should) do little to change these, but rather ensure cohesion to the work undertaken in these areas. In other focus areas the work programmes have helped to focus and align priorities and thereby bring cohesion to the work<sup>94</sup>. However, concerning the *coherence* of the work programmes, monitoring panels observed considerable variation in the extent to which the specific technical objectives in the work programmes were sufficiently clear and up-to-date to stand alone. They also observed variation in the way additional explanation, guidance, and additional interpretive material was provided to proposers and to evaluators.<sup>95</sup>

The Five-Year Assessment Report suggests that the work programmes are sometimes too inflexible when it comes to new developments and that new, interesting developments in the field should be integrated into the work programmes faster.<sup>96</sup> The Commission's Self-Assessment report partly confirms this, especially in fast-moving fields, and claims that better outcomes might be achieved with a more flexible approach. However, there are also numerous examples of areas where the Work Programmes were adjusted as a reaction to changes in the technological develop-

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<sup>92</sup> ERAnets Evaluation of NETWORKS of Collaboration Among Participants in IST Research and their Evolution to Collaborations in the European Research Area. Final Report 03/2005, p. xi.

<sup>93</sup> ISTAG, ISTC, ETPs that were launched during the course of FP6, project reviews, analysis of impacts of completed projects, analysis of the result of previous IST calls – particularly the Integrated Project Portfolio Analysis (IPPA).

<sup>94</sup> European Commission, DG INFSO: Self-Assessment of the Effectiveness of IST-RTD in the 6th FP.

<sup>95</sup> External Monitoring of the FP6 IST Thematic Priority. Synthesis of the Reports of the Independent Monitoring Panels. December 2006, p. 6.

<sup>96</sup> Five-Year Assessment: 1999-2003. Research and Technology Development in Information Society Technologies. Final Panel Report 01/2005, p. 19.

ment or to cover different important aspects of a certain area. Among these were the Grid research objective, where focus was shifted in order to extend the applicability of Grids to applications and services business and industry, ICT for the environment, where successive WPs had different focus in order to cover various aspects that required attention, and Research under Cognitive Systems, where focus was shifted due to the technological development, to name a few. Technologies developed and results achieved were constantly assessed through periodic reviews, monitoring of work within European Technology Platforms and the like<sup>97</sup>. It should here be noted that the Work Programmes also evolves if for instance it is uncovered that a certain area has its own, established research centres in the EU, as was the case with the European Automotive industry.

The Work Programmes contribute to better define and focus the research topics, which is important with the limited available budget. In this respect, the tighter focus of EU support in FP6 has reflected many key areas of scientific and technological advance, albeit some have been deselected due to budget restraints<sup>98</sup>.

### 5.3 **Exploitation of the research results**

Only about half of the funded projects have ended by the end of 2007, which means that it is to a large extent too early to discuss the exploitation of results.

#### 5.3.1 **Commercial products and services**

The exploitation of project results does not only take the form of immediate commercialisation of technologies.<sup>99</sup> This is also stated in section 5.1.1 on Scientific and Technological results, above. The Self-Assessment report exemplifies that within the area of personal health monitoring, one project has piloted a number of solutions leading to one partner launching a platform on which the results can be exploited commercially.

The major results are however at the systemic level. An example is the Internet Protocol Multimedia Subsystem which is the control system of choice for multi-media services.

The picture provided by the evidence base is, at best, mixed. On the one hand, some project participants report that IST projects are in some cases too focused on research, leading to a lack of support to deployment activities and market commercialisation. On the other hand, specific new products or processes did result from IST research projects, especially in cases where projects had an explicit goal of product development or deployment. In these cases, IST networks have often helped project participants gain a better understanding of the markets that they are preparing products for.

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<sup>97</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6

<sup>98</sup> Ibid.

<sup>99</sup> Ibid., p. 38.

In some cases criticism has however been expressed about the lack of sufficient infrastructure for using and introducing into the market the application created in the IST project.<sup>100</sup> Also, when the project participants were asked in 2005 about their own assessment of their project's impact on the creation of new products or services, 74% estimated to have a medium or strong impact on the creation of new products and services.<sup>101</sup> In 2006, the corresponding figure had dropped to 60%.<sup>102</sup>

On the basis of the qualitative interviews, it is clear that commercialisation of the research results differs greatly between industry and academia. Companies commercialise project results as products, whereas universities and research centres almost exclusively commercialise the results in the form of spin-off companies. In many cases, the universities do not commercialise the results in any way and give the possibility to the industrial partners in the projects instead.

In the case of the FP6 projects, it is mostly too early to tell whether the results will be commercialised or not. This was the case both for the bigger partners and for SMEs. Especially industry does however expect the results to be commercialised at one point. For many SMEs interviewed, the results of participation are not commercial products and services, but dissemination and creation of networks.

"I cannot say yet whether the results of FP6 will be commercialised or not. The projects finished about 10 years ago are creating business now, the FP6 project will take 4-10 years to materialise. In some cases there is even research that was conducted 20 years ago that is materialising now."  
(Major industry participant)

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<sup>100</sup> Networks of Innovation in Information Society Development and Deployment in Europe. Final Report 01/2007, pp. 14-15.

<sup>101</sup> Implementation of IST-RTD in 2005. Analysis of the output and impact indicators –Main findings, p. 6. Also this figure includes projects from both FP5 and FP6.

<sup>102</sup> Implementation of IST-RTD in 2006. Analysis of the output and impact indicators –Main findings, p. 5. Also this figure includes projects from both FP5 and FP6.

<sup>103</sup> Implementation of IST-RTD in 2005. Analysis of the output and impact indicators –Main findings, p. 2. **NB! This figure needs to be updated, as there is evidence that the situation improved in 2006.**

### 5.3.2 **Developing new regulations and supporting the definition of new or revised policy**

#### **Contributing to standardisation and new regulations**

Contributions to international frameworks and standardisation bodies are now among the most important routes to European leadership in new global markets. The range of such bodies has increased enormously during the 5th and 6th FPs. For example, projects concerned with environmental monitoring have contributed specifications to the Open Geospatial Consortium, and projects concerned with monitoring the transport of dangerous goods have engaged with the UN-ECE Regulatory Committee. As a consequence, this Committee is exploring, together with DG TREN, the setting up of a legal basis for possible mandatory system deployment of the monitoring platform developed within the research theme<sup>104</sup>.

Interviews also reveal that some projects, especially within the communications area, have been actively involved in feeding into standards and standardisation organisations. A project can also influence regulation directly. An example of this is satellite digital multimedia broadcasting (projects MODIS, MAESTRO) – these projects influenced very much the spectrum for how this kind of services was organised. Parts of the project involved regulators directly.

Very few SMEs reported having contributed to standardisation. It has however been part of some projects and it has also been used as a way of promoting project results. There was however a case of an SME in a new Member State, who had gained an influential status towards the government and had been involved in creating technology strategies with the government in order to improve the public services.

There is however an important problem related to the capabilities of the project participants to contribute to standardisation. It is the goal of the Commission that the FP projects should contribute to creating standards for Europe. However, it is the organisations themselves that are asked to propose standardisation. In the case of companies, there is little incentive to propose standardisation on behalf of a project with their main competitor looking over their shoulder, as the company would want to keep the IPR to themselves. For the same reasons, many companies do not declare patents in projects, but declare them in the company's own name, as they are unwilling to share their knowledge and hence lose their IPR. It is thus difficult to meet Commission objectives for standardisation, as this is definitely not the goal of the companies.

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<sup>104</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 9.

## 6. Utility

### 6.1 Additionality

An important aspect connected to the utility of the programme is to what extent the research outcomes of the funded activities would have been achieved without the IST Thematic Priority. Overall, based on interviews with the research participants, we can say that much of the research conducted within the framework of the IST Thematic Priority would not have been conducted at all without funding from FP6. This is often directly related to the need for funding in the organisations, but some participants mention also that some results require critical mass, broad discussions or need to be exhibited early to an advanced group of experts in the field. The Community research programmes are a very important means for accessing these.

Some participants do admit that they would most likely have attained the same results, but research would have been slower and more difficult without Community funding.

An interesting comparison can be made by looking at what happened to the project proposals of the unsuccessful proposers (non-participants above threshold) after the rejection. We can see that most ideas have been readjusted to a smaller scale and funding has been applied for in the national programmes. In some cases, parts of the projects have been realised with in-house funding.

“The ideas remained the same, but we reworked the structure and language and submitted the project in national calls. The biggest difference from the EU-calls and the national ones is that you cannot bring the entire consortium which means that you have to rework the scope of the project.” (non-participant above threshold, SME)

On a more technical level, the Commission has identified certain areas where such development would not have been possible without IST Thematic Priority activities. Community funding has enabled major new business initiatives to take off, as an example it is mentioned that the collaborative RTD on wireless sensor networks has led to major breakthroughs and the start-up of a new company, Particle GmbH. Furthermore, the RTD support in the IST Thematic priority has enabled the development of technologies to manage and control spectrum usage in heterogeneous systems.<sup>105</sup>

A conclusion that can be drawn is that the IST Thematic Priority is in most cases an indispensable tool for realising the research plans. The (unsuccessful) proposed research activities are often not dropped - clearly indicating that participants are seri-

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<sup>105</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 41.

ous about their project proposals - but without IST-FP6 funding, activities are conducted on a smaller scale without the international element. In the case of the more adventurous research conducted by the bigger organisations, this is often not conducted at all without the help of the FP6.

## 6.2 **Utility of the results to the research community**

While it is still too early to discuss the impacts that the IST research may have on particular social groups, economic sectors or regions, we can identify some impacts on patterns of trans-European interaction within the IST research community. These patterns present themselves in the form of research networks and "networks of innovation". It is in general the consensus among scholars and policy makers that networks are the single most effective way to encourage the development of new knowledge and to diffuse this knowledge into products and services.<sup>106</sup> The vision of networked knowledge economy is central to the Lisbon Objectives.<sup>107</sup> It has indeed been found that the Community-funded IST research has had a very positive effect for the network connectivity of the European ICT-sector. The IST programmes create linkage additionality by adding new and complementary links to existing linkages and thus change the patterns of trans-European interaction within the IST research community.<sup>108</sup>

It is possible to point out some ways in which IST research, and especially IST research networks can affect regions or local communities. The participation of multinational organisations and companies in IST research gives also the possibility for their local and often smaller subsidiaries to gain access to research networks. Furthermore, many SMEs that participate in the IST Thematic Priority are deeply rooted in their own local community. These small companies are very efficient when it comes to for example building relationships with the local or regional authorities.<sup>109</sup>

The view of the Commission is that the IST Thematic Priority has been effective in including the major national research centres and in linking universities and businesses, connecting different themes and disciplines and integrating new Member States, patent holders and SMEs<sup>110</sup>. The interviews give us a similar picture, showing that the IST cooperation has strengthened the cooperation within the existing networks, but also added further linkages to new Member States and third countries.

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<sup>106</sup> CESPRI: Networks of Innovation in Information Society Development and Deployment in Europe. Final Report, January 2007, p. v.

<sup>107</sup> RAND: ERAnets Evaluation of NETworks of Collaboration Among Participants in IST Research and their Evolution to Collaborations in the European Research Area (ERA). Final Report, 31 March 2005, p. xi.

<sup>108</sup> RAND: ERAnets Evaluation of NETworks of Collaboration Among Participants in IST Research and their Evolution to Collaborations in the European Research Area (ERA). Final Report, 31 March 2005, p. 35. It has to be taken into account that this study only covers the first two Calls of FP6.

<sup>109</sup> CESPRI: Networks of Innovation in Information Society Development and Deployment in Europe. Final Report, January 2007, p. vi.

<sup>110</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 6.

Taking part in FP6 has especially been a connecting factor for the participants from the new Member States, who through their participation have been able to multiply their connections within the European research community.

### 6.3 **Unexpected results and impacts**

As a general remark it can be seen that the IST Thematic Priority projects are planned on such a detailed level that most research does not create unexpected results or impacts. Most project participants say that in research you almost always know more or less what to expect, which is why it is not very common to encounter unexpected results or impacts. There are, however, a few unexpected results and impacts that can be identified after all.

#### **On organisational level**

In terms of unexpected results occurring on the organisational level, the participants mentioned for example that the collaboration with project partners was much closer than expected and resulted in new ideas and a number of interesting contacts that were not foreseen.

#### **On research result level**

Some of the results produced by the IST research activities can be assessed as unexpected. This has happened for example as a result of interaction between disciplines in some larger IPs dealing with a very low power variant of Bluetooth communication.<sup>111</sup> Another example is that project clusters have led to the emergence of new topics, such as "flexible electronics". Furthermore, the European equipment manufacturers and network operators have changed their considerations of different communication modalities as separate and competing units towards a unified vision that converges mobile, wireless and broadband communications.<sup>112</sup>

One interesting impact of the research activities in the field of eHealth is that the results achieved in the projects have, according to the Commission, resulted in larger than expected interest on the part of the pharmaceutical industry that is a new participant in the field of IST-RTD.<sup>113</sup>

Finally, perhaps as a result of the new instruments, the concept of Global Virtual Research Communities has emerged from the FP6. Global Virtual Research Communities aim at linking advanced science to its supporting and underlying infrastructures so that the best minds and the best science projects will work on the best research infrastructure.<sup>114</sup>

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<sup>111</sup> Integrated Project MiMOSA-BTLEE. See: Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 Oct 2007, p. 43.

<sup>112</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 43.

<sup>113</sup> Ibid., p. 43.

<sup>114</sup> Ibid., p. 43.

## 7. Sustainability

The impacts of the programme in terms of international cooperation, knowledge transfer and innovation as well as human resources and mobility show us that most participants in the IST Thematic Priority benefit from their participation significantly in terms of strengthened and broadened networks, new knowledge and skills as well as improved reputation through their participation in the programme. These impacts are of a kind that does not disappear immediately after the EU intervention or support has ceased.

The networking effects of participation in FP6 seem to be one of the main drivers behind continued effect of IST research activities. Many participants have developed long-lasting collaborations and conducted several projects together after FP6. Many of these networks have already been in place during several framework programmes and have by now become very stable structures that are forming the core of wider collaborations, such as European Technology Platforms (ETP) or frameworks, such as eSafety Forum. Moreover, the common research agendas that have been established for example through Networks of Excellence or European Technology Platforms will live beyond FP6 and generate RTD activity and deployment of RTD-derived technologies and applications.<sup>115</sup>

A very interesting result from FP6 is the introduction of Joint Technology Initiatives (JTI) as a way of realising public-private partnerships in research at European level. The JTIs arise mainly from the work of the above-mentioned European Technology Platforms. The JTI ARTEMIS combines, for the first time, a critical mass of national, EU and private resources within one coherent, flexible and efficient legal framework. It aims also at increasing R&D investment in Europe by providing incentives for industry and Member States to increase their R&D expenditure.<sup>116</sup> This is an excellent example of how the IST research activities have continued impacts in the long term at European level.

The vast majority of the participants also state that participation in FP6 has improved prospects for participating in other IST RTD projects, most notably in FP7. Research conducted in FP6 laid the ground for the projects pursued in FP7 or national research programmes. This does however not indicate whether such research would also be conducted in the absence of EU funding. Instead, we can look at whether the participation in FP6 improved the prospects for conducting follow-on RTD projects in-house. Here the majority of the interviewees assessed the impacts of participation to have been positive in this regard. Some participants had already

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<sup>115</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 44.

<sup>116</sup> Proposal for a Council Regulation on the establishment of the "ARTEMIS Joint Undertaking" to implement a Joint Technology Initiative in Embedded Computing Systems. COM (2007) 243 final, 15 May 2007, p. 2.

started follow-on projects in-house and others had scheduled such projects to be started. FP6 was reported to be used as a forum for developing new ideas, or testing ideas of ongoing research, which are subsequently developed and incorporated in follow-on projects.

Furthermore, participation in FP6 has in most cases led to an improved image or increased visibility for the organisation. This has for its part served as a tool for more active cooperation with new partners, who have approached the organisations thanks to the improved image or increased visibility. It is also possible that the visibility that the IST research has gained during and after FP6 has led to subsequent research in organisations that did not take part in the programme. For example some FET initiatives in FP6, like Bio-ICT and quantum computing, have been followed by the US National Science Foundation (NSF) and DARPA. Furthermore, the way of funding research through Future and Emerging Technologies-approach has recently been followed by NSF. This shows an example of longer-term research having long-lasting impacts beyond specific projects and programme themes.<sup>117</sup>

An important impact is also that research itself has had an effect on the nature of and need for research. In certain fields, research results have indicated new challenges that have to be dealt with within the framework of different types of research. An example of this is that the ICT-Bio convergence led to numerous challenges for ICT in the areas of security and privacy, middleware for "Health-grid" applications, simulation and visualisation of disease related processes.<sup>118</sup>

However, the lack of EU intervention and support would in many cases slow down the speed of innovation and keep many organisations from conducting basic research that deviates from the main research directions of the participating organisations. For the participating SMEs, Community funding has been one of the main drivers for innovation. It has however been indicated that the most innovative SMEs do not take part in the EU research programmes and prefer funding from other, and perhaps faster sources. In the case of the bigger organisations, the absence of EU funding would most likely mean that access to new ideas and innovation would become the privilege of a handful of large organisations, the European dimension would be lost and the flow of new ideas from universities and research centres to the industry would be interfered.<sup>119</sup>

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<sup>117</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 45.

<sup>118</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 45.

<sup>119</sup> Self-Assessment of the Effectiveness of IST-RTD in the 6th FP. Ex-post Evaluation of the IST Research in FP6. Working draft 24 October 2007, p. 44.

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## Annex 2: List of evaluation questions

### 1. Relevance and strategic impact:

- a. Has the IST Thematic priority of the 6th FP contributed to the EU strategic objectives<sup>120</sup> and policies, notably the Lisbon and Sustainable Development ones? And how?
- b. Has the IST Thematic priority of the 6th FP contributed to the DG INFSO strategic objectives and policies, notably the i2010 initiative? And how?
- c. To what extent has the IST Research been complementary and coherent with other i2010 actions and activities?

### 2. Efficiency

- a. Was the IST Thematic priority pursued in a cost-effective manner?<sup>121</sup>
- b. Was the legal framework (Rules of participation, Model contract, IPRs, etc.) appropriate to the needs of the stakeholders? Were the implementation measures and processes operated in a clear and transparent manner?<sup>122</sup>
- c. Have the IST research activities constituted the best way of obtaining the objectives set?

### 3. Effectiveness:

- a. Were the overall and specific objectives of the IST Thematic priority of the 6th FP, and of the work programmes met<sup>123</sup>?

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<sup>120</sup> The objectives of the 6<sup>th</sup> FP were to strengthen the European Research Area and the scientific and technological basis of European Industry and encourage its international competitiveness, and to promote research activities in support of other EU policies.

<sup>121</sup> This question will address the efficiency of management (budget implementation, time to contract, etc.) and of key implementation processes such as the evaluation of proposals. It will also examine: (a) the costs of participation (e.g. preparing a proposal) and management (e.g. project management and administration), (b) progress made towards simplification and (c) reduction of administrative burdens.

<sup>122</sup> This question will examine whether the rules for participation, 'instruments' and modalities for implementation were well defined and appropriate; whether the processes were defined and operated in a clear manner; whether the levels of funding and other available resources were adequate; and whether the targeted research communities were able to respond appropriately (incl. an analysis of the reasons and factors effecting their participation and non participation).

- b. How relevant, coherent and useful were the work programmes?
- c. How consistent were the work programmes with the objectives of the IST Thematic Priority?
- d. Were the results of the IST research effectively exploited as commercial products and services, used in developing new regulations or did they support the definition of new or revised policy at Member State, EU or international level?

**4. Utility:**

- a. Has the IST Thematic Priority of the FP6 been relevant to the key scientific and technological advances made in the field during the relevant time period?
- b. What research outcomes would not have been achieved without the FP IST Thematic priority?
- c. Have the IST research activities produced unexpected results?
- d. Have the research activities funded under the IST thematic priority corresponded with needs, problems and issues over and beyond those embodied in stated objectives?
- e. Are the results, their effects and impacts globally satisfactory from the point of view of direct or indirect beneficiaries<sup>124</sup>?
- f. Have some IST research activities had other unexpected positive or negative impacts?

**5. Sustainability:**

- a. Are the effects of the IST research activities likely to continue into future in the absence of EU intervention or support<sup>125</sup>?

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<sup>123</sup> This question will examine the major results in terms of scientific, technological and socio-economic outputs; in terms of international co-operation, knowledge transfer and innovation, human resources development and mobility, and in terms of supporting and enhancing co-ordination and coherence of research activities.

<sup>124</sup> This question will assess the impacts on the patterns of trans-European interaction within the IST research community, or directly on the IST research stakeholders or on special social groups, economic sectors or regions (inside or outside EU).

<sup>125</sup> This question concerns the continued impacts at macro-level (e.g. on economic and social cohesion e.g. employment, competitiveness, better living conditions, etc.) or at micro-level (e.g. infrastructures, productivity, etc.) in the medium- and long-term and at global, Europe, MS, and regional levels. In particular, it concerns the extent to which the IST research activities permanently integrated and strengthened the European Research Area for IST and the impact of IST research collaboration on other EU or national/regional or business initiatives.

## Annex 3: Methodology

This report focuses on answering the evaluation questions which have been structured under the following headings:

- Relevance and strategic impact
- Efficiency
- Effectiveness
- Utility
- Sustainability

The full list of evaluation questions can be found in Annex 1.

The evaluation is based on two main types of sources:

- An “evidence base” of documents of relevance to the IST Thematic Priority, consisting of both general documentation and reports/analyses prepared in the context of the on-going evaluation activities.
- Structured interviews with programme participants and other stakeholders

### 7.1.1 Evidence base

A large amount of written material has been reviewed in order to gather evidence for this evaluation. A full list of these documents can be found in Appendix A. All documents were thoroughly and systematically screened, and information deemed of relevance for answering one or more evaluation questions was identified and extracted. Although the list of material is very long, a few reports in particular have provided important evidence input to the evaluation. These key documents include:

- DG Information Society: *Five-Year Assessment, 1999-2003. Research and Technology Development in Information Society Technologies* – thorough review of the last part of FP5 and the first calls of FP6.
- DG Information Society: *Self-Assessment of the Effectiveness of IST-RTD in the 6<sup>th</sup> FP (2007)* – document prepared by DG INFSO especially for this evaluation.
- DG Information Society: *IST Programme. Integrated Programme Portfolio Analysis 2006 (2007)*
- IDC EMEA: *Study on Innovative ICT SMEs in Europe (EU 25) (2007)* – a study commissioned by DG INFSO.

### 7.1.2 Interviews

A large number of interviews have been carried out by the support team, using structured interview guides which allowed for aggregation and comparison of data. Examples of interview guides are included in Annex 3.

The table below provides an overview of the number and distribution of interviews on the different categories of respondents.

Table 0.1 Overview of interviews (status)

Type of respondent	Interviews conducted/ written responses received
Top-25 participants	27
Participant SMEs	10
Non-participant SMEs	2
Non-participants above threshold	12
ISTAG Committee	3
ISTC Committee	5
<b>Total</b>	<b>59</b>

Three main categories of respondents were selected for interviews: participants in the programme, non-participants, and members of the ISTAG and ISTC Committees.

#### Participants

The two main types of participants interviewed included most of the top-25 “hubs” of the programme, i.e. the most connected organisations, identified through a network analysis, and SME participants.

*The network hubs* (most connected organisations) are an important part of research and deployment networks. Hubs can be defined as nodes with a large number of connections that play the role of network connector. Both private companies, higher education institutes and public research centres are among the Network hubs in IST-RTD programmes. On the other hand, *SME* organisations (for the purposes of this evaluation encompassing both companies and other types of research institutions and organisations) are often – but not always – among the less connected participants and thus represent the other end of the spectrum.

Interviews with participants focused on programme implementation and management (including proposal evaluation), and on results and impacts for the individual organisation – with particular emphasis on “behavioural additionality”, i.e. the types of effects that have been defined as “*the difference in firm behaviour resulting from the intervention*”<sup>126</sup> – in other words, whether participation in R&D projects with public subsidies influences the R&D-related behaviour of the participating organisations.

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<sup>126</sup> Georgiou L, *Evaluation of Behavioural Additionality*, Irish national policy and advisory board for enterprise, trade, science, technology and innovation, 2003

Thus, impacts on networking, knowledge acquisition, and human resources were explored, along with effects in terms of commercialisation and the added value of international collaboration. For SME participants (including smaller research organisations), the particular barriers for smaller organisations towards participation were also explored, along with their growth expectations.

### **Non-participants**

Two groups of non-participants were targeted for interviews:

*Non-participants "above threshold"* - organisations having participated in a proposal which was evaluated as fulfilling the quality criteria (i.e. above the evaluation threshold), but which were not retained for support due to lack of funding. These organisations were primarily targeted to find out what happened to these projects – did they get funding from other sources, were they re-submitted in a later call, etc. They were also asked a number of questions about the management aspects, in particular the evaluation of proposals, in order to serve as a sort of "control group" to supplement the views of participants (funded projects).

*Innovative SMEs who have not participated in FP6:* A list of the most innovative SMEs in Europe was provided by CESPRI (Università Bocconi). From that list, a number of relevant ICT companies were selected and contacted for interviews, focusing on the subject of why they had chosen not to participate in the IST-FP6 programme (as it happens, it turned out that some of the contacted companies actually had participated in either FP5 or FP6, and thus very few relevant interviews could be carried out).

### **Committee members**

The members of the ICT Committee (Member State representatives) and the ISTAG Committee were presented with a number of questions about the implementation and achievements of the programme as well as forward-looking, strategic aspects, and asked for written contributions.

## Annex 4: List of interviewees

Organisation	Name of interviewee	Position	Interview date
<b>Top-25 Hubs</b>			
CENTRE FOR RESEARCH AND TECHNOLOGY HELLAS	Dimitros Tzovaras	Senior Researcher	19.12.2007
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	Jacqueline Nadel	Research director	05.02.2008
COMMISSARIAT A L'ENERGIE ATOMIQUE	Laurent Herault	Director of Strategic Communication Programme	14.12.2007
CONSIGLIO NAZIONALE DELLE RICERCHE	Donatella Castelli	Senior Researcher	03.01.2008
ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE	Daniel Thalmann	Professor of Computer Science, Director of the Virtual Reality Laboratory	08.01.2007
EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH	Luc Van Gool	Professor	20.12.2007
FRANCE TELECOM SA	Marylin Arndt	Head of a research group	04.01.2008
FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V.	Kay Matzner	Project manager	14.12.2007
FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V.	Mikhail Smirnov	Senior researcher	17.12.2007
IBM CESKA REPUBLIKA, SPOL. S R.O.	Jan Sedivy	Research manager	14.12.2007
IBM ISRAEL - SCIENCE AND TECHNOLOGY LTD	Bilha Mendelson	Manager of Code Optimization and Quality Technologies Department	07.01.2008
IBM RESEARCH GMBH	Jan Camenisch	Head of Research	20.12.2007
INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET EN AUTOMATIQUE	Nozha Boujemaa	Director of Research - Head of the <u>IMEDIA</u> Research Group	21.12.2007
INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET EN AUTOMATIQUE	Christine Guillemot	Director of Research	03.01.2008

<b>Organisation</b>	<b>Name of interviewee</b>	<b>Position</b>	<b>Interview date</b>
INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS	Gregoris Mentzas	Director, Information Management Unit	08.01.2008
KATHOLIEKE UNIVERSITEIT LEUVEN	Jos Dumortier	Research director	03.01.2008
KUNGLIGA TEKNISKA HÖGSKOLAN	Henrik Christensen	Head of Department for the Centre for Autonomous Systems	20.12.2007
KUNGLIGA TEKNISKA HÖGSKOLAN	Kerstin Severinson Eklundh	Professor and Head of Department	04.01.2008
LUCENT TECHNOLOGIES NEDERLAND BV	Jeroen Wellen	Project manager	13.12.2007
LUCENT TECHNOLOGIES NETWORK SYSTEMS UK LIMITED	Angeliki Alexiou	Technical Manager	19.12.2007
SIEMENS HOME AND OFFICE COMMUNICATION DEVICES GMBH & CO. KG	Olaf Bigalke	Project manager	17.12.2007
TELEFONICA INVESTIGACION Y DESARROLLO SA UNIPERSONAL	Paulo Villegas Núñez	Technology expert, research consultant	10.01.2008
THE UNIVERSITY OF SURREY	Barry Evans	Director of Centre for Communication Systems Research and Pro-Vice Chancellor for Research & Enterprise	04.01.2007
THE UNIVERSITY OF SURREY	Graham Reed	Professor, Head of Department	07.01.2008
UNIVERSITAET STUTTGART	Stefan Wesner	Deputy Director	18.12.2007
UNIVERSITAET STUTTGART	Jörg Wrachtrup	Professor of physics, Director of the Department of Physics	21.12.2007
VALTION TEKNILLINEN TUTKIMUSKESKUS	Arto Maaninen	Technology Manager	04.01.2008
<b>Participant SMEs</b>			
ASOCIATIA ROMANA PENTRU INDUSTRIA ELECTRONICA SI SOFTWARE	Alexandru Silviu Borcea	Project manager	28.01.2008
AXSIONICS AG	Lorenz Muller	Chairman	07.02.2008
CENTER OF INFORMATISATION OF THE SPHERE OF CULTURE	Nadezhda Brakker	Senior expert	30.01.2008
FUNDACION ROBOTIKER	Enrique Areizaga	Responsible for one line of telecom	01.02.2008

<b>Organisation</b>	<b>Name of interviewee</b>	<b>Position</b>	<b>Interview date</b>
SCIENTER SOCIETA CONSORTILE A RESPONSABILITA LIMITATA	Claudio Dondi	President of the Board of Management	19.02.2008
STICHTING SMART HOMES	Ad Van Berlo	R&D manager	30.01.2008
TEKNOLOGIAKESKUS HERMIA OY	Petri Räsänen	Programme manager	29.01.2008
TOVEK SPOL SRO	Jiri Splichal	Technical officer	05.02.2008
T-SOFT SPOL SRO	Jaroslav Pejcoch	President and co-owner	13.02.2008
VIRTECH LTD	Vesselin Spiridonov	CEO	04.02.2008
<b>Non-participants above threshold</b>			
BRUNEL UNIVERSITY	Takebumi Itagaki	Lecturer	08.01.2008
BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS	Tamas Szabados	Associate professor, Department of Mathematics	21.12.2007
FONDAZIONE I.S.I.	Enrico Scalas	Assistant professor, Department of Physics, University of East Piemonte	03.01.2008
HELB-INRACI: HAUTE ECOLE LIBRE DE BRUXELLES ILYA PRIGOGINE-INSTITUT DE RADIO CINEMATOGRAPHIE	Eddy Goray	Department Manager	03.01.2008
INNO AG	Franck le Gall	Senior consultant	17.01.2008
INSTITUT FRANÇAIS DU TEXTILE ET D'HABILLEMENT	Eric Boudon	Research director	10.01.2008
INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET EN AUTOMATIQUE	Valerie Issarny	Research Director	04.01.2008
INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS	Dimitrios Kalogeras	Research Associate	03.01.2008
INTERACOUSTICS A/S	Erik Nielsen	Project manager	09.01.2008
TECHNICKA UNIVERZITA KOSICIACH	Dusan Simsik	Professor in medical engineering	21.12.2007
UNIVERSITY OF TORINO	Pietro Terna	Professor and vice director of Dept. of Economic and Financial Sciences	07.01.2008
XLAB D.O.O.	Gregor Pipan	CEO of XLAB Research	04.01.2008
<b>Non-participant SMEs</b>			
DAON	Martin Walsh	Chief legal counsel	06.12.2007
EKAHAU OY	Antti Korhonen	CEO	12.12.2007

## **Annex 5: Interview guides**

### **Project participants (not SMEs)**

Name of the interviewee, organisation and interview date

#### **Background**

1. What is your position within the company/organisation (title, department)?
2. (If not known): Which FP6 projects have you participated in and which funding instruments were used in these projects?
3. What is/are the role(s) of your company/organisation in the consortia in which you participate?
4. Do you and/or your company/organisation have experience from participation in other IST RTD projects (FP7-6-5-4 etc)?
5. Background information about your organisation:
  - Size
  - Products/activities
  - Geographical location(s)
  - Which department(s) is/are typically involved in IST RTD projects? Is participation centralised (e.g. in a research department) or do several units participate?
  - How many people from your company take part in EU-funded research projects?

#### **Preparation of proposal**

6. Which factors made you decide to participate in FP6?
7. Were the rules of participation well defined and clear to you, especially in terms of:
  - Definitions, for instance of instruments, contracts, participants etc.
  - Independence of legal entities
  - Number of participants in each project and their place of establishment
  - Rules for participation by legal entities from third countries
  - Rules for participation by international organisations other than European interest organisations

- Conditions relating to technical competence and resources
8. Were the costs of preparing the proposal reasonable compared with the results obtained/expected?
  9. Have you experienced that submitting a proposal has been made more simple during the course of the programme (only applicable if you have participated in several projects)
  10. Did you experience any barriers towards participating in the programme in terms of:
    - Lack of networks
    - Lack of knowledge internally in the company
    - Bureaucracy/Administrative burdens
  11. Administrative tasks (or burdens) in connection with preparing a proposal and obtaining funding may e.g. be related to:
    - i. Personal/institutional identification
    - ii. Requirements related to financial capacity (e.g. guarantees, requirements to the company's financial strength)
    - iii. Requirements for structure and contents of the proposal (number of questions, how much information is required)
    - iv. Networking with partners, coordinating the network.
    - v. Other? – specify

Which of these requirements do you find reasonable/necessary (for security reasons or for ensuring a good proposal), and which (if any) do you find unreasonable - i.e. more burdensome than strictly necessary?

Do you have any specific suggestions for what could be done to make the administrative tasks lighter?

12. Would any of these barriers prevent you from applying again?

### **Evaluation of proposal and feedback**

13. To what extent were you satisfied with the speed of the evaluation of the proposal?
14. Did you receive adequate feedback from Commission officers on evaluation of project proposals?

### **Participation/implementation**

15. Were the instruments and modalities for implementation well defined and appropriate?
16. Do you consider the costs of participating in the programme reasonable, compared with the output - in terms of time spent on coordination, project management, administration?
17. Did you find the reporting requirements in FP6 projects appropriate in terms of frequency, scope, level of detail etc.? (If not, please specify what you thought could be improved)
18. Could the costs of participation prevent you from applying again in a later FP?
19. Have you experienced that managing the programme has been made simpler during the course of the programme (only applicable if you have participated in several projects)
20. Do you consider that the programme procedures take a too long time, especially in terms of being able to introduce the research results on the market?

### **Dissemination**

21. To what extent were your project results disseminated:
  - To other project participants
  - To business partners
  - In scientific and technological journals
  - Other, please specify:

### **Results and impacts**

22. What did your company/organisation expect to get out of the participation in the project? Has this been achieved?
23. Has the participation brought about results that you did not expect beforehand – positive as well as negative?

*Behavioural additionality - Potential areas of behavioural effects: (FOCUS SHOULD BE ON RESULTS/EFFECTS **ACHIEVED**, NOT EXPECTED)*

### **Network effects**

24. Did participation in the FP6 result in any of the following impacts on your organisation?

- i. More collaboration with existing partners
- ii. Improved access to complementary expertise
- iii. The ability to form new R&D partnerships and networks
- iv. Did this ability result in improved R&D linkages with universities, research institutes, and/or business organisations?
- v. Improved commercial linkages with other organisations
- vi. The formation of new business entities

### **Knowledge acquisition – Acquired competences**

25. As a result of participation in FP6, did you enter any new field(s) of science and technology?
26. As a result of participation in FP6, did you institute new R&D management processes in your company?
27. As a result of participation in FP6, has your ability to produce or deliver new products, processes or services been enhanced?
28. Did participation in FP6 improve the prospects for participating in other IST RTD projects?
29. Did participation in FP6 improve the prospects for conducting follow-on RTD projects in-house?

### **Human resources - improved skills**

30. Did participation in FP6 enhance the skills within your company and the competences of your R&D staff; or in other ways increase your knowledge base?

### **Market position**

31. Did your participation in FP6 improve your competitive position with respect to one or more of the following:
  - Improved market share?
  - Access to new markets?
  - Stronger position in existing markets?
  - Enhanced reputation and image?

### **Commercialisation**

32. Did participation in FP6 improve the prospects for commercialisation and exploitation of results? Did you effectively exploit the results of the IST research as commercial products and services?

**Output additionality**

33. What is the probability that your organisation would have attained the same or greater impacts in the following areas in the absence of Commission funding for your project? [to the interviewer: refer to the results and impacts already discussed]

**International collaboration**

34. Compared to undertaking the project with partners from the same country, what kinds of influence did international collaboration have on the impacts discussed? [to the interviewer: refer to the results and impacts already discussed]

**No or limited effects**

35. If no or limited effects – what was the reason (company characteristics, limited amount of funding, etc.)
36. Other impacts you would like to mention, or other comments about the programme?

**Project participants (SMEs)**

Name of the interviewee, organisation and interview date

**Background**

1. What is your position within the company/organisation (title, department)?
2. Which FP6 projects have you participated in and which funding instruments were used in these projects?
3. What is/are the role(s) of your company/organisation in the consortia in which you participate?
4. Do you and/or your company/organisation have experience from participation in other IST RTD projects (FP7-6-5-4 etc)?
5. Background information about your organisation:
  - When and how (briefly) was the company established (what was the business idea)?
  - What is your main business today?
  - How many employees does the company have today?

- Where do you expect your company to be in 5 years from now?
  - a. How many employees do you expect to be?
  - b. What will be your main business?
  - c. Will you have developed more business lines?
- What are your overall ambitions for the firm?
- Which department(s) is/are typically involved in IST RTD projects? (Is participation centralised - e.g. in a research department - or do several units participate?)
- How many people from your company take part in EU-funded research projects?

### **Preparation of proposal**

6. Which factors made you decide to participate in FP6?
7. Were the rules of participation well defined and clear to you, especially in terms of:
  - Definitions, for instance of instruments, contracts, participants etc.
  - Independence of legal entities
  - Number of participants in each project and their place of establishment
  - Rules for participation by legal entities from third countries
  - Rules for participation by international organisations other than European interest organisations
  - Conditions relating to technical competence and resources
8. Were the costs of preparing the proposal reasonable compared with the results obtained/expected?
9. Have you experienced that submitting a proposal has been made more simple during the course of the programme (only applicable if you have participated in several projects)
10. Did you experience any barriers towards participating in the programme in terms of:
  - Lack of networks
  - Lack of knowledge internally in the company
  - Bureaucracy/Administrative burdens
11. Administrative tasks (or burdens) in connection with preparing a proposal and obtaining funding may e.g. be related to:
  - i. Personal/institutional identification
  - ii. Requirements related to financial capacity (e.g. guarantees, requirements to the company's financial strength)

- iii. Requirements for structure and contents of the proposal (number of questions, how much information is required)
- iv. Networking with partners, coordinating the network.
- v. Other? – specify

Which of these requirements do you find reasonable/necessary (for security reasons or for ensuring a good proposal), and which (if any) do you find unreasonable - i.e. more burdensome than strictly necessary?

Do you have any specific suggestions for what could be done to make the administrative tasks lighter?

12. Would any of these barriers prevent you from applying again?

#### **Evaluation of proposal and feedback**

- 13. To what extent were you satisfied with the speed of the evaluation of the proposal?
- 14. Did you receive adequate feedback from Commission officers on evaluation of project proposals?

#### **Participation/implementation**

- 15. Were the instruments and modalities for implementation well defined and appropriate?
- 16. Do you consider the costs of participating in the programme reasonable, compared with the output - in terms of time spent on coordination, project management, administration?
- 17. Did you find the reporting requirements in FP6 projects appropriate in terms of frequency, scope, level of detail etc.? (If not, please specify what you thought could be improved)
- 18. Could the costs of participation prevent you from applying again in a later FP?
- 19. Have you experienced that managing the programme has been made simpler during the course of the programme (only applicable if you have participated in several projects)
- 20. Do you consider that the programme procedures take too long time, especially in terms of being able to introduce the research results on the market?

#### **Dissemination**

21. To what extent were your project results disseminated:

- To other project participants
- To business partners
- In scientific and technological journals
- Other, please specify:

**Results and impacts**

22. What did your company/organisation expect to get out of the participation in the project? Has this been achieved?

23. Has the participation brought about results or consequences that you did not expect beforehand – positive as well as negative?

*Behavioural additionality - Potential areas of behavioural effects: (FOCUS SHOULD BE ON RESULTS/EFFECTS ACHIEVED, NOT EXPECTED)*

**Network effects**

24. Did participation in the FP6 result in any of the following impacts on your organisation?

- i. More collaboration with existing partners
- ii. Improved access to complementary expertise
- iii. The ability to form new R&D partnerships and networks (did this ability result in improved R&D linkages with universities, research institutes, and/or business organisations?)
- iv. Improved commercial linkages with other organisations
- v. The formation of new business entities

**Knowledge acquisition – Acquired competences**

25. As a result of participation in FP6, did you enter any new field(s) of science and technology?

26. As a result of participation in FP6, did you institute new R&D management processes in your company?

27. As a result of participation in FP6, has your ability to produce or deliver new products, processes or services been enhanced?

28. Did participation in FP6 improve the prospects for participating in other IST RTD projects?
29. Did participation in FP6 improve the prospects for conducting follow-on RTD projects in-house?

**Human resources - improved skills**

30. Did participation in FP6 enhance the skills within your company and the competences of your R&D staff; or in other ways increase your knowledge base?

**Market position**

31. Did your participation in FP6 improve your competitive position with respect to one or more of the following:
- Improved market share?
  - Access to new markets?
  - Stronger position in existing markets?
  - Enhanced reputation and image?

**Commercialisation**

32. Did participation in FP6 improve the prospects for commercialisation and exploitation of results? Did you effectively exploit the results of the IST research as commercial products and services?

**Output additionality**

33. What is the probability that your organisation would have attained the same or greater impacts in the following areas in the absence of Commission funding for your project? [to the interviewer: refer to the results and impacts already discussed]

**International collaboration**

34. Compared to undertaking the project with partners from the same country, what kinds of influence did international collaboration have on the impacts discussed? [to the interviewer: refer to the results and impacts already discussed]

**No or limited effects**

35. If no or limited effects – what was the reason (company characteristics, limited amount of funding, etc.)
36. Other impacts you would like to mention, or other comments about the programme?

## **Non-participants above threshold**

Name of the interviewee, organisation and interview date

### **Background information**

1. What is your position within the company/organisation (title, department)?
2. (If not known): Which FP6 projects have you applied for that passed evaluation threshold but were not retained for funding? (interviewee should find this out beforehand)
3. Do you and/or your company/organisation have experience from participation in other IST RTD projects (FP7-6-5-4 etc)?
4. Background info about your organisation:
  - Size
  - Products/activities
  - Geographical location(s)
  - Which department(s) is/are typically involved in IST RTD projects? Is participation centralised (e.g. in a research department) or do several units participate?
  - How many people from your company take part in EU-funded research projects?

### **Preparation of proposal**

5. Were the rules of participation well defined and clear to you, especially in terms of:
  - Definitions, for instance of instruments, contracts, participants etc.
  - Independence of legal entities
  - Number of participants in each project and their place of establishment
  - Rules for participation by legal entities from third countries
  - Rules for participation by international organisations other than European interest organisations
  - Conditions relating to technical competence and resources
6. Were the costs of preparing the proposal reasonable?
7. Have you experienced that submitting a proposal has been made more simple during the course of the programme (only applicable if you have participated in several projects)

8. Were there any main barriers towards participating in the programme in terms of:

- Bureaucracy
- Administrative burdens
- Lack of knowledge internally in the company
- Lack of networks

9. Would any of these barriers prevent you from applying again?

### **Evaluation of proposal and feedback**

10. To what extent were you satisfied with the speed of the evaluation of the proposal?

11. Did you receive adequate feedback from Commission officers on evaluation of project proposals?

12. Were the instruments and modalities for implementation well defined and appropriate?

### **After rejection**

13. What happened to the ideas that were submitted in proposals but did not retain funding?

*To the interviewer: the options below are some of the possibilities – you may use these to structure the answer, or to prompt the respondent:*

- *Proposal re-worked and submitted in a later FP call (reworked how? – consortium, contents). Any success?*
- *Proposal (reworked and) submitted to another national or European programme – which? Any success? (and if reworked, how?)*
- *Elements of the proposal integrated into other proposal(s) and submitted in other FP call (which?) or to another programme (which?)*
- *Co-operation with consortium partners continued in other projects*
- *Proposal completely abandoned*

## Non-participant SMEs

Name of the interviewee, organisation and interview date

*In the cases where possible responses are supplied, the interviewer will let the interviewee provide the answer him/herself and categorize the answer afterwards. Only if the interviewee cannot answer or if the answer is unclear, the interviewer will use the different answer possibilities to prompt the interviewee.*

1. Are you familiar with the FP6 programme?

- Yes, participated
- Yes
- To some extent
- No

Please elaborate: (If interviewee has *participated* in FP6, ask which project/programme [IST?] and see if you can get an appointment for a "participant" interview instead).

2. Have you participated in earlier Framework Programmes (FP5, FP4 or the like) or other EU-funded research?

- Yes
- No

Elaborate if relevant (which programme, what came out of it):

For the interviewer: Important to try to find out a couple of names of the programmes where the company has participated. In many cases they have turned out to be FP6 programmes even if the interviewee did not know it!

3. Do you participate in research collaborations with other companies?

- Yes, previously but not right now
- Yes, currently
- No, and have never considered it
- No, but have considered it

Please elaborate (why/why not, which type of collaboration, which type of partners, etc.):

4. Have you considered participating in FP6:

- Yes [go to question 5]
- No [go to question 6]

5. What stopped you from participating?

- Not enough information provided
- Lack of relevant network
- Lack of resources internally in your company
- Lack of knowledge internally in your company
- Work Programme did not match competences
- Participation requires too much administration/non-research work
- Programme procedures take too long time (we need to get our products to the market quickly)
- Other, please specify

Please elaborate:

6. Why did you not consider participating?

- Lack of knowledge about FP6
- Lack of relevant network
- Lack of resources internally in your company
- Lack of knowledge internally in your company
- Work Programme did not match competences
- Participation requires too much administration/non-research work
- Programme procedures take too long time (we need to get our products to the market quickly)
- Other, please specify

Please elaborate:

7. What would it take to make it interesting for you to participate in the Framework Programmes for research?

## Annex 6: Top-25 Hubs in the IST Thematic Priority

Connectedness ranking	Organisation
1	FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V.
2	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE
3	SIEMENS GROUP (including subsidiaries)
4	ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE
5	CONSIGLIO NAZIONALE DELLE RICERCHE
6	INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS
7	KUNGLIGA TEKNISKA HÖGSKOLAN
8	TELEFONICA INVESTIGACION Y DESARROLLO SA UNIPERSONAL
9	UNIVERSIDAD POLITECNICA DE MADRID
10	VALTION TEKNILLINEN TUTKIMUSKESKUS
11	FRANCE TELECOM SA
12	INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET EN AUTOMATIQUE
13	EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZÜRICH
14	UNIVERSITAT POLITECNICA DE CATALUNYA
15	UNIVERSITÄT STUTTGART
16	ALCATEL-LUCENT (including subsidiaries)
17	COMMISSARIAT A L'ENERGIE ATOMIQUE

18	KATHOLIEKE UNIVERSITEIT LEUVEN
19	THALES
20	THE UNIVERSITY OF SURREY
21	UNIVERSITY COLLEGE LONDON
22	CENTRE FOR RESEARCH AND TECHNOLOGY HELLAS
23	BUDAPESTI MUSZAKI ES GAZDASAGTUDOMANYI EGYESULET
24	IBM (including subsidiaries)
25	CENTRO RICERCHE FIAT SOCIETA CONSORTILE PER AZIONI

Source: European Commission, DG INFSO.

## Annex 7: Top-25 Global partnership network hubs

Rankover	Group	Country	IST-RTD participation
1	MICROSOFT CORP.	US	Yes
2	IBM	US	Yes
3	HEWLETT-PACKARD	US	Yes
4	HITACHI, LTD	JP	Yes
5	NEC CORP.	JP	Yes
6	SUN MICROSYSTEMS INC.	US	Yes
7	AMERICA ONLINE INC.	US	No
8	INTEL CORPORATION	US	Yes
9	ORACLE CORP.	US	Yes
10	FUJITSU LTD	JP	Yes
11	CISCO SYSTEMS INC.	US	Yes
12	NETSCAPE COMMUNICATIONS CORP.	US	No
13	MOTOROLA INC.	US	Yes
14	TOSHIBA CORP.	JP	Yes
15	COMPAQ COMPUTER CORP.	US	No
16	MITSUI & CO LTD	JP	No
17	COMPUTER ASSOCIATED INTL INC.	US	No

18	SOFTBANK CORP.	JP	No
19	SUMITOMO CORP.	JP	No
20	COMMERCE ONE INC.	US	No
21	ITOCHU CORP.	JP	No
22	MITSHUBISHI CORP.	JP	Yes
23	SAP AG	DE	Yes
24	ARIBA INC.	US	No
25	LUCENT TECHNOLOGIES INC.	US	Yes

Source: CESPRI: Evaluation of progress towards a European Research Area for Information Society Technologies. Technical Report, November 2005, p. 60.

