Interim evaluation of the ICT research in the 7th Framework Programme

Catalysing European Competitiveness in a Globalising World

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1 OVERVIEW OF RECOMMENDATIONS

In the view of the current panel, while the ICT Programme retains its full relevance and its solid and largely well-implemented character, the current review stresses the need for three essential sets of action

- Strengthening European ICT research in a globalizing world,
- Exploiting the pervasiveness of ICT via integrated policies
- Sharing risk

STRENGTHENING EUROPEAN ICT RESEARCH IN A GLOBALISING WORLD

1. To support the use of ICT and the competitiveness of European industry, the Commission should continue the ICT Programme in a further strengthened form through the rest of FP7 and into FP8 while ensuring it has the flexibility and interdisciplinarity needed for dynamic and radical ICT innovation.

2. To continue to build a European Research Area that combines the needs and assets of national and European programmes, the Commission should clarify and more clearly communicate how the portfolio of instruments at its disposal is intended to support both ICT Programme and ERA goals. It should, with the Member States, especially address issues of dual management, separate reporting and lack of coordination.

3. To ensure that the ICT Programme contains a good balance between consensus-based R&D and longer-term, more disruptive R&D, the Commission should expand the resources of FET during the second part of FP7 and the scheme should be extended into FP8.

4. To respond to the globalisation of R&D and to make best use of potential global partnerships, the Commission should continue to extend the global reach of the ICT Programme. It should develop a more nuanced strategy that takes account of the differing characteristics and capabilities of various parts of the world. This must be complemented by a proactive policy to ensure EU presence at the leading edge of pre-normalisation and formal standardisation processes.

EXPLOITING THE PERVASIVENESS OF ICT VIA INTEGRATED POLICIES

5. To develop ICT policies and programmes that respond to ICT's pervasiveness across all parts of society and the economy, the Commission should take the lead by establishing an ICT Task Force with members spanning appropriate Directorates General, to coordinate ICT-relevant policy development.

6. To take adequate account of the needs of the demand side, and the potential innovation and policy stimuli it provides, the Commission should ensure that the work of the Task Force is complemented by activities that connect ICT Programme design with wider (especially societal) foresights. It should explore the opportunities to create demand-based measures that open new arenas for innovation and growth by grouping and making visible user needs. DG-Infso should also aim for better coordination with other Directorates General and with ICT user communities in order to deepen the role of the demand side – both public and private – in defining and implementing the Programme and its links to take-up and practice.

7. To make best use of the power of the Higher Education system in spreading innovation and providing the skills and competencies needed for competitiveness, the Commission should incorporate elements in future Calls that encourage participants to develop curricula in new and emerging areas as part of the activities funded.

8. To improve the structure of the ICT Programme, to reach the Programme's immediate ICT objectives and the wider objectives of FP7, the Commission should take two major actions (a) to make greater efforts to reverse the downward trend in industry participation; (b) to incorporate plans for large-scale ICT test beds for advanced services.

SHARING RISK

9. To enable the continued participation of key European players and to make the programme sufficiently attractive to global participants, the Commission must reduce the damaging administrative burden and the growing arbitrariness of auditing practices. It can address this by undertaking a radical overhaul of the financial regulations and their implementation, and ensuring that the underlying principle is one of shared risk and mutual trust.

10. To increase SME participation, in particular, and simplify and reduce the burdens of their participation, the Commission should create a flexible, lightweight and well-defined form of sub-contracting or associate partnership.

11. To reduce the current massive waste of effort in writing good-quality but nevertheless fruitless proposals and to make it more attractive to participate in the Programme, the Commission should test a more sophisticated two-stage application process in part of the Programme. Proposals proceeding to the second stage should have a 30-50% chance of obtaining funding.

2 INTERIM EVALUATION OF THE ICT PROGRAMME IN FP7

Introduction

Information and Communications Technologies (ICT) are inextricably woven into almost every aspect of our working and private lives. Mastering their development, production and use are central to Europe's competitiveness and therefore many aspects of our quality of life.

This Interim Evaluation of the ICT Programme is an input to the Interim Evaluation of FP7 as a whole, which is mandated by the Financial Regulation[1] (Articles 27 and 60) and its Implementing Rules[2] (Article 21). This evaluation serves two major purposes: to provide guidance and steering for the final part of FP7 and to provide input to the design of any successor programme to FP7, since the preparations for this will begin before the end of the current programme. The evaluation builds on the corresponding evaluation of FP6[3] by a panel of experts chaired by Esko Aho. It tackles three broad issues: the extent to which conditions are in place that can lead the programme to produce high quality research; its progress towards its objectives; and the quality of its implementation – especially with respect to simplification of its instruments and procedures.

With a budget of just over €9 billion over seven years, the ICT Programme is the largest single component of the European Union's €50 billion Seventh Framework Programme of Research and Technological Development (FP7). The ICT Programme is intended to contribute to building a single European Research Area (ERA), through the implementation of the i2010 vision of Europe as a single, research-intensive and inclusive information space, and can contribute to the Europe 2020 strategy for emerging from the current economic crisis.

The Aho panel's FP6 evaluation found that the Programme was in many respects well implemented but that more progress was needed in simplification and achieving greater global impacts from the Programme. It said there were opportunities to improve the linkage of the Programme with venture capital, regional innovation and public procurement. It called for a more strategic approach to European standardisation, lead market development and the mobilisation of public-private partnerships.

In the view of the current panel, while the ICT Programme retains its relevance and its solid and largely well-implemented character, the amount of progress made at FP level on the wide-ranging issues raised by the Aho panel in 2008 is at best modest. While there has been some progress in the internal administrative efficiency of DG INFSO, as regards simplification and the audit burdens placed upon participants the Commission has taken significant backwards steps that undermine the long term viability of the Framework Programme. The number of instruments has increased and inconsistencies in governance and administration make it hard to grasp or participate in several at a time. Lack of clear, understandable and, above all, coherently interpreted rules have resulted in a dysfunctional approach to the financial management of EU-funded research. Indeed, post-project auditing practices introduced in the wake of FP6 impose arbitrary and retroactive

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1 Council Regulation no 1605/2002 of June 2002 on the Financial Regulation applicable to the general Budget of ˙the European Communities. (OJ L248/1 16.9.2002)

2 Commission Regulation no 2342/2002 of 23 December 2002 laying down detailed rules for the implementation of Council Regulation on the Financial regulation applicable to the general budget of the European Communities (OJ L357/1 31.12.2002)

3 Esko Aho (Chair), Information Society Research and Innovation: Delivering Results with Sustained Impact, Evaluation of the effectiveness of Information Society Research in the 6th Framework Programme 2003-2006, European Commission, Brussels: May 2008

changes to costing rules resulting in unexpected financial penalties for participants. This negative lottery is reducing the willingness of key players to participate in the Programme and is making more global participation unattractive. It is not 'merely' a matter of imperfect implementation: it is an existential challenge to the Programme itself. The current review of the financial regulations provides a unique opportunity to address the most urgent aspects of simplification, which the Commission should seize with both hands.

STRENGTHENING EUROPEAN ICT RESEARCH IN A GLOBALISING WORLD

The Importance of the ICT Programme for Europe

ICT is a uniquely pervasive set of technologies, affecting every part of the economy, society and our lives. It is vital for the future prosperity of Europe to maintain and strengthen our position at the leading edge of global competition. Continuous, dynamic and radical innovation in ICT production and use is a precondition for continued social and economic development.

ICT is not only important in the high-volume products increasingly produced in low-income countries but is also crucial in the complex systems industries in which Europe continues to excel. Its convergence with other technologies, for example in biology, energy and health, not only underlines its importance but also provides continuing opportunities for European industry and society.

Europe collectively has to maintain the R&D investments needed to operate at the leading edge of ICT development and use.

The FP7 ICT Programme is strongly aligned with current worldwide ICT R&D priorities and reflects technology and market trends in ICT globally. It comprises a mixture of bottom-up and top-down design, responding to European needs for technological and economic development, areas of industrial and technological strength and policy objectives. It focuses on the exploration of new technology paths, targeting areas with high growth potential, and is rooted in a continent-wide consensus-building process with stakeholders.

Technologies and markets change rapidly, so it is crucial for industry, researchers and the Programme itself to be agile. For example, the challenge of creating the future internet requires the ability to develop knowledge and create future standards, and to develop and adopt new technologies. The current reorientation of the Work Programmes[4] illustrates at this interim stage the ability of the Commission to make these kinds of needed adjustments during the second part of FP7 and to keep pace with such changing needs.

Partly because it is difficult in such a Programme to respond to short-term changes in needs, it aimed to fund mid-to-long-term research. This longer-term focus has been aided by changes in procedures for adapting work plans and consortium composition and therefore help sustain longer-term projects.

Recommendation 1:

To support the use of ICT and the competitiveness of European industry, the Commission should continue the ICT Programme in a further strengthened form through the rest of FP7 and into FP8 while ensuring it has the flexibility and interdisciplinarity needed for dynamic and radical ICT innovation.

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[4]   FP7 ICT Work Programme 2011-12 Orientations, Overview, Brussels: DG-INFSO, 21/01/2010

The ICT Programme and the New ERA Instruments

The idea of a European Research Area (ERA) has constantly been evolving since it was launched in 2000. Initially, it involved building critical masses within and between European research organisations in order to be able to compete better at global scale, and creating a 'common market' in knowledge and knowledge services. Today, the idea is much more ambitious – in effect to build a globally competitive Research and Innovation System optimised at the European level, aligning regional and national policies and institutions to this new scale. The EU ERA 2020 Vision therefore has five major components[5]

1. Knowledge Activities: Volume and Quality - "The ERA defines the European way to excellence in research and is a major driver of EU competitiveness in a globalised world"

2. Knowledge Triangle: Flows and dynamics - "Strong interactions within the "knowledge triangle" (education, research and innovation) are promoted at all levels"

3. Fifth freedom: intra and extra-EU openness and circulation - "The ERA provides a seamless area of freedom and opportunities for dialogue, exchange and interaction, open to the world"

4. The Societal Dimension - "The ERA is firmly rooted in society and responsive to its needs and ambitions"

5. Sustainable development and Grand challenges - "The ERA is firmly rooted in society in pursuit of sustainable development"

World-class production and use of ICT supported by advanced ICT infrastructure is a key foundation of such a systemic ERA vision.

Since the start of FP6, when it became possible to use the Framework Programme as one of the tools for implementing ERA, the Commission has experimented with a succession of new approaches – starting with the launch of Integrated Projects and Networks of Excellence, and the promotion of Technology Platforms, and culminating *inter alia* in the Joint Technology Initiatives (JTI), Article 169[6] undertakings, the SET-Plan, the Recovery Plan and the European Institute of Technology. These go well beyond the Framework Programme's traditional focus on collaborative R&D to the promotion of critical mass, consensus-building, agenda-setting and supra-national coordination of research and innovation efforts across Europe. The proliferation of instruments has increased the complexity of developing and implementing the ERA, but on the positive side, means that a large toolkit can be used in a strategic way to implement the vision of ERA and of ICT within ERA. However, it should not be forgotten that the 'traditional' R&D collaboration tools in the ICT Programme have greatly restructured the ICT research landscape over the nearly thirty years of ICT Programmes and continue to be the backbone of the Programme.

5　2020 Vision for the European Research Area, Brussels: European Council Conclusions, December 2008

6　Now Article 185, since the Lisbon Treaty entered into force

The ICT Programme has promoted a wider mobilisation of resources by involving national programmes in the JTIs[7] and in the Ambient Assisted Living (AAL) Article 169 Joint Programme. This is a powerful complement to national efforts, sometimes filling gaps in national programmes, adding research areas that may be lacking at national level and providing access to researchers not able to participate in nationally funded programmes.

A key aspect of these new approaches is the intended delegation of administration, project selection and aspects of funding (especially when obtaining complementary funding from Member States) to the new ERA instruments (PPPs, JTIs, Article 169s …). 'Core' FP participants, who take part in successive FPs, often constitute the backbone for the research in the new initiatives, which allow researchers to strengthen and broaden their R&D alliances with industry participants. Incentives for participation in the JTIs include the ability to influence the research agenda, the opportunity for more horizontal research links (as opposed to vertical supply chain links in traditional cooperative research), more market focused research and, when compared to Eureka, a complementary participant base.

The governance of these joint actions, however, involves fundamental problems. These are mainly related to the dual management structures, the separate reporting requirements of the national and European levels, lack of coordination in the timing of funding decisions between EU and Member State levels and Member States' unwillingness to extend their budget contributions during the life of the JTIs, for example if national participants win a greater-than-expected proportion of the activity in the JTI. The so-called Sherpa Group report[8] on JTIs highlights the diversity of practice among them, the issues they raise about incompatibilities between national- and EU-level funding regulations, processes and practices and the need for a special legal status for the JTIs – both in defining them as legal persons and recognise them in the Financial Regulations.

Most of the new ERA tools are still in an experimental phase. There are inevitably lessons to be learnt with regard to their design and implementation and what can realistically be expected. It is important that the existing mix of instruments be fully utilised – and modified when necessary - before the launch of yet new ones. For example, in the ICT Programme the Networks of Excellence have proved to be much more useful than is generally thought.

Recommendation 2:

To continue to build a European Research Area that combines the needs and assets of national and European programmes, the Commission should clarify and more clearly communicate how the portfolio of instruments at its disposal is intended to support both ICT Programme and ERA goals. It should, with the Member States, especially address issues of dual management, separate reporting and lack of coordination.

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[7]   Unlike in other parts of FP7, the ICT JTIs include national public authorities.

[8]   JTI Sherpas Group, *Designing Together the 'Ideal House for Public-Private Partnerships in European Research*, (mimeo), January 2010

Promoting radical innovation

The change from FP6 to FP7 involved taking a longer-term perspective and therefore enabling more radical as well as more routine innovation. The Commission's process of experimentation and innovation in instruments has focused on its mission to 'structure the ERA' – building consensus and reducing the technical and commercial risks of innovation by agreeing road maps and R&D trajectories. Inevitably, the established, major stakeholders on the European stage dominate these large instruments and the involvement of these 'usual suspects' greatly increases the likelihood that results will be implemented. However, Framework Programme contains limited countervailing activity that would stimulate disequilibrating, disruptive technologies and innovations that can unseat the established players and unleash the development of new industries.

The Programme tackles high levels of technical and commercial risk together with industry and the research community. As in FP6, the level of risk in the projects is high in particular for research exploring new technology paths, such as photonics, nano-electronics, cognitive systems and robotics. However, technical risk is perceived to be lower where the consensus-based strategic agendas have defined the path for development. The Programme therefore needs to be rebalanced by taking on longer-term technology risk in emerging areas.

The recently established European Research Council (ERC) promotes excellent, frontier research, which can, in the longer run, lead to radical innovation. However, the promotion of radical innovation is not its major aim and it is too early to assess the degree to which that will occur. Wider experience of researcher-driven 'basic' research is that there can be links to use but that these can neither be predicted nor planned.

The Future Emerging Technologies (FET) scheme within ICT promotes interdisciplinary, use-orientated research that is fundamental in character. Its combination of open and proactive Calls is unique. FET has served as a pathfinder for future directions of the ICT Programme. Themes developed in FET and now included in the ICT Programme include nanotechnology information devices and nanoelectronics, quantum information processing and communications, computer vision, bio-neuro-ICT, beyond robotics, complex systems, and presence research. FET Flagships are a new development in the scheme: ambitious, large-scale science-driven and goal-oriented initiatives to promote scientific discoveries and technological innovation by federating efforts at the EU, member state and business partner levels. Such Flagships would serve as 'focusing devices' and mobilise efforts in promising and challenging areas using the existing repertoire of instruments.

FET is an ambitious and dynamic part of the ICT Programme and of high importance for its renewal. Not least in the context of the reducing riskiness of the work undertaken elsewhere in the Programme, its role should increase.

Recommendation 3:

To ensure that the ICT Programme contains a good balance between consensus-based R&D and longer-term, more disruptive R&D, the Commission should expand the resources of FET during the second part of FP7 and the scheme should be extended into FP8.

The Global Dimension

The Programme often involves entire supply chains, though the role of end-users (especially from the public sector) is sometimes too limited. Increasingly, it reaches out beyond Europe in order to complete supply chains that would otherwise be incomplete and to promote the development and agreement of advantageous technical standards. However, it does so in a fragmented way, without overall strategy and without sufficiently considering the interplay among globalisation of R&D, regulation, the internal market and standardisation.

Expert panels have repeatedly stressed the need for European research to 'open the European Research Area to the rest of the world'. The approach taken by the Programme of a 'targeted opening' to global players and the relatively limited investment in the specific International Cooperation instruments implies that in mainstream ICT, a very limited number of projects involve collaboration with industry and research leaders at global level. In some areas, this has led to the absence of key competences or links in the value chain because the necessary partner was not present.

Closely related to the enhancement of European competitive advantage at a global scale as well as to the value of research at European level is the reinforcement of the European Single Market. Research in the Programme contributes to pre-normalisation and standardisation. In some areas, strong attention is paid to providing contributions for the development of (global) standards. Much of the research focus is currently on the development of new systems and processes with too little regard for integration and interoperability/backward compatibility.

More Commission support is needed to create coherence among regulations, in particular in relation to the links between the Programme and other policy or regulatory activities at European levels (such as in Ambient Assisted Living or Web-based services). The more pronounced focus on R&D in FP7 compared to FP6 implied a reduction of the funding for actions that targeted knowledge for regulatory activities relevant to market developments, for example in the new societal challenges (notably the Co-ordination and Supporting Actions).

Unlike in the past, today individual nation states have little real power to influence the development of ICT standards. Standards remain extremely important in ICT markets, but they are largely made *de facto* or in informal standardisation *fora* on a global basis and only later ratified by formal standards bodies. Standards define the arenas in which the industry competes. Influence over standardisation therefore provides large potential competitive advantages – and conversely, lack of influence – leaves suppliers trailing behind, trying to catch up with market-leading technology and often carrying an additional burden of licence fees.

Recommendation 4:

To respond to the globalisation of R&D and to make best use of potential global partnerships, the Commission should continue to extend the global reach of the ICT Programme. It should develop a more nuanced strategy that takes account of the differing characteristics and capabilities of various parts of the world. This must be complemented by a proactive policy to ensure EU presence at the leading edge of pre-normalisation and formal standardisation processes.

EXPLOITING THE PERVASIVENESS OF ICT VIA INTEGRATED POLICIES

The ICT Programme and 'Joined Up' Policymaking

The increasing pervasiveness of ICT means that it must be linked to policymaking, both 'horizontally' **across** different sectors of society and 'vertically' through better connection between user needs and communities – including the so-called 'grand challenges' – and the production of ICT. The capacity of the ICT Programme adequately to bridge research and innovation is not wholly clear. Institutional separation at the level of the European Commission between research and innovation militates against this.

Within the European Commission, there is great value in focusing the ICT Programme in a single Directorate General (DG-INFSO) with the specialist capabilities and knowledge to tackle ICT technologies and markets. At the same time, the sectoral expertise of the other Directorates General is vital for the wider use of ICT applications. It follows that the way to get the best from ICT is to use their respective expertise, as could be the case in computer-aided medicine or smart grids. This requires coordination.

In FP7, the Commission has made efforts to improve coordination and reduce duplication with other Community Programmes. However, Europe needs at a higher level to maintain a coherent set of ICT-related policies that span Higher Education, R&D, production, use and the hard and 'soft' infrastructures needed if it is to remain a significant global player. Today, such a coherent set of policies is not in place at any level: regional; national; or European.

Recommendation 5:

To develop ICT policies and programmes that respond to ICT's pervasiveness across all parts of society and the economy, the Commission should take the lead by establishing an ICT Task Force with members spanning appropriate Directorates General, to coordinate ICT-relevant policy development.

Integrating the Demand Side

Historically, the ICT Programme and its predecessors have tended to have a 'technology push' character. Currently, the ICT Programme is well linked to needs and market opportunities in those places where it involves strong stakeholder groups spanning the knowledge triangle and markets. Links to demand are weaker in other areas. Compared with FP6, there is less involvement by actors from non-ICT manufacturing sectors, posing a potential threat to the Programme's relevance to wider applications and end-user communities. Further, the Programme has not adopted other demand-side innovation policies, such as pre-commercial public procurement or fostering the adoption of new standards and regulations (like in environment and energy issues), which are under-used in European ICT policy although they provide significant opportunities.

The Programme also lacks mechanisms to address the much-discussed 'grand challenges'. The Framework programme as a whole needs effective ways to connect its own design to wider processes of foresight, demand analysis or even of demand-based innovation – where demand-side analysis and policy can create new market and innovation opportunities.

Establishing and maintaining European **lead markets** in new and developing areas of ICT is a necessity if Europe is to remain an attractive location for the production of ICT-related products and services and a motor of innovation. Use, as well as production, of advanced systems based on ICT must be a key European policy objective.

These reservations support the Commission's conclusion in its 2009 Communication 'A Strategy for Leadership'[9], where it recognised the need to improve the balance in supply-demand focus, arguing that *"To reinforce its strengths and seize new opportunities in ICT, Europe needs to raise its game. A more efficient and systemic strategy for ICT R&D&I must address both supply and demand, cutting across the innovation cycle and 'knowledge triangle' with more user-producer interactions."*

Recommendation 6:

To take adequate account of the needs of the demand side, and the potential innovation and policy stimuli it provides, the Commission should ensure that the work of the Task Force is complemented by activities that connect ICT Programme design with wider (especially societal) foresights. It should explore the opportunities to create demand-based measures that open new arenas for innovation and growth by grouping and making visible user needs. DG-Infso should also aim for better coordination with other Directorates General and with ICT user communities in order to deepen the role of the demand side – both public and private – in defining and implementing the Programme and its links to take-up and practice.

The ICT Programme and Higher Education

The Higher Education dimension is frequently forgotten in research and innovation policy and is under-emphasised in the ICT programme. Human capital translates new ideas into reality. Research agendas at the interface between society and the Higher Education system provide 'focusing devices' that inform researchers and educators alike about knowledge needs. Higher Education also provides a key dissemination channel for ICT research.

The EIT's KICs are intended to provide one avenue to connect research and innovation with higher education but are limited in the number of participating organisations. In the future, more KIC-like activities will be needed in ICT, linked to key societal and technical challenges. Opening up the Network of Excellence model to global participation would provide an additional way to strengthen the participation of Europe's higher education institutions at the global leading edge of research and education and strengthen the knowledge triangle.

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[9]   "A strategy for ICT R&D and Innovation in Europe: Raising the Game", Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions, COM (2009) 116 final, European Commission, 2009

In parallel, the European Higher Education system must be able to satisfy, in close cooperation with industry, needs for new ICT skills and multidisciplinary competences and constantly to update the contents of its curricula. While it would be inappropriate for the ICT Programme to stray far into Higher Education policy, there is high potential value in including activities in relevant projects that 'bootstrap' changes in Higher Education. This occurs not only at PhD level but also at the level of Bachelors and Masters so that important changes in knowledge introduced via university research become incorporated over time into all syllabuses.

Recommendation 7:

To make best use of the power of the Higher Education system in spreading innovation and providing the skills and competencies needed for competitiveness, the Commission should incorporate elements in future Calls that encourage participants to develop curricula in new and emerging areas as part of the activities funded.

Implementation of the ICT Programme

In a broad sense, FP7-ICT has been well implemented. The participants and projects are of high quality and include leaders in their respective fields. Participants generally achieve their own goals and regard the benefits of participation as bigger than the costs and other drawbacks. Plans for the second part of FP7 reflect socio-economic, business and technology developments.

The Programme has succeeded in creating or strengthening longer-term strategic R&D alliances, contributing to the integration of European research. Projects provide high levels of European added value, fostering coherence among research policies, enabling participants to explore new technologies and markets and obtaining rapid access to expertise. The Programme has been particularly useful for doing research on issues with a pan-European dimension.

As in many other parts of the Framework, the ICT programme involves a strong 'core' of participants that remains rather stable across FPs. They tend to play a 'gatekeeper' role, bringing new research actors into the Programme as well as sustaining existing collaborations in R&D.

The ICT Programme in FP7 involved a broad range of key actors in both scientific fields and the industry sector. European research leaders were well represented**.** While the Programme still attracted many strong industrial teams, the involvement of product/technology users in the manufacturing sectors declined. This trend is a cause for concern.

There were slightly more SMEs participations – especially by high-tech SMEs but also SMEs acting as advanced users – than in FP6. The increase in SME participation was caused by more intensive participation rather than an increase in the number of SMEs involved. SME participation, like that of industry overall, varies significantly among the ICT Programme Challenges.   Close to 30% of the SMEs involved in FP7 mainstream ICT participated also in FP5 and FP6. These organisations are often leaders in their niche markets.

SMEs are significant participants and contributors to the ICT Programme. Specifically tailored risk-sharing finance instruments should be created for advanced users and high-tech SMEs, addressing their small-scale funding needs. While the Risk Sharing Financial Facility (RSFF) may play a useful role in enabling larger organisations to take innovation risk, it is not well adapted to the needs of smaller organisations because the minimum size of loans involved is too large.

The Programme is helping to shape the research community, for example by creating a new highly multidisciplinary research community in the field of the Virtual Physiological Human. During FP6, Networks of Excellence made important contributions to reinforcing the European Research Area in ICT[10]. There were also important examples of support and coordination actions focusing attention on the need for strategic research roadmaps in fields not yet tackled by the European Technology Platforms. It may have been a mistake to de-emphasise these instruments in FP7. Another drawback of FP7 was a less strategic approach to *internal* exchange and dissemination of information as a result of reduced coordination between projects. For example, so-called 'concertation' meetings between projects in similar areas have largely been discontinued.

An important component of the Framework Programme is eInfrastructures, equivalent to approximately 7% of the FP7 budget managed by DG-Infso and including infrastructures such as the extension and development of the pan-European research network GÉANT; deployment and evolution of e-Science Grid infrastructures, meeting the needs of new scientific and engineering communities (including in social sciences and humanities), scientific digital repositories and developing common cooperation with similar initiatives in other continents. Recently, positive decisions have been made to extend GEANT and to launch the PRACE supercomputing project. However, neither the major effort by the European Strategic Forum on Research Infrastructures (ESFRI) to define an infrastructure road map for the ERA nor FP7 itself involves significant new, large-scale ICT test beds for advanced services.

Recommendation 8:

To improve the structure of the ICT Programme, to reach the Programme's immediate ICT objectives and the wider objectives of FP7, the Commission should take two major actions (a) to make greater efforts to reverse the downward trend in industry participation; (b) to incorporate plans for large-scale ICT test beds for advanced services.

SHARING RISK

Simplification of participation in the ICT Programme

Simplification, including reduction of the complexity and cost involved in participating in the FP, has been a key demand of almost every evaluation since the Framework began.

The administrative rules associated with the application process, monitoring, reporting and payment of the Commission's contribution to projects are similarly subject to continuous evolution and continue to vary among instruments, making compliance difficult for any organisation that lacks specialised personnel to deal with the problems. As a result, the FP is for many participants a 'funder of last resort' whose administrative burdens are tolerated only because it is, for certain types of project, the only funder available. 'Core' participants acting as attractors for new participants and key network nodes for existing players, increasingly regard the administrative burdens of the FP as intolerable and are discussing a reduction in their participation.

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[10]   WING FP6 Impact Analysis – Final report, DG Information Society, 2009

While the panel strongly endorses the need for accountability and legality, the EC's post-project auditing campaign against FP6 projects has involved retroactive rule setting that undermines confidence in the Framework and the viability of participation. The auditing process allows wide discretion to produce individual and conflicting interpretations of the cost rules and invokes a degree of precision that is simply spurious in the costing of risky activities with uncertain outcomes. The Financial Regulations involved may well be appropriate for some of the other activities of the European Commission but are grossly inadequate for research and innovation funding.

Simplification of administration is not just a matter of nuisance. In the light of the sluggishness of both the Commission and the Court of Auditors in relation to the need for change, the panel insists that radical reform is urgently needed. Change is a strategic necessity, to ensure the involvement of all the players needed to make the programme a success. This is also of especial importance if Europe wants to attract organisations from outside the EU to participate. The new initiatives such as JTIs and Joint Programming are jeopardised by the complexities and uncertainties imposed through the audit culture associated with the Regulations. Unless radical action is taken similar problems will appear in implementing new PPPs. Similarly, administrative complexity and burdens particularly threaten the participation of SMEs. If complexity excludes key, needed players, the programme will not succeed.

The panel notes that a number of organisations have made useful contributions in defining principles of robust funding, to which the Commission should adhere. It agrees with the thrust of many of these principles and underlines that financing should at least have the following characteristics

- Stability and consistency of rules within and between Framework Programmes

- Simplicity and practicality of administration and accounting

- Consistency between the degree of risk and uncertainty inherent in R&D and the granularity of monitoring and auditing

- Flexibility to make binding changes to contracts in response to emerging research results

- A default assumption of mutual trust among funders and beneficiaries, recognising that the contributions of the beneficiaries tend to constrain moral hazard

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Recommendation 9:

To enable the continued participation of key European players and to make the programme sufficiently attractive to global participants, the Commission must reduce the damaging administrative burden and the growing arbitrariness of auditing practices. It can address this by undertaking a radical overhaul of the financial regulations and their implementation, and ensuring that the underlying principle is one of shared risk and mutual trust.

The application of the financial regulations and over-zealous auditing has a particularly negative effect on SMEs, whose involvement in the programme is often crucial but who are ill equipped to tackle the administrative burdens involved.

Recommendation 10:

To increase SME participation, in particular, and simplify and reduce the burdens of their participation, the Commission should create a flexible, lightweight and well-defined form of sub-contracting or associate partnership.

Reducing the Costs of Participating in the Framework Programme

There is considerable variation in success rates among the different lines of ICT-FP7, but overall the proportion of proposals funded is low. In Calls 1-3, the proportion of proposals that led to contracts was about 15% – almost exactly the same as in FP6 (14.2%). This means that a little over 3,000 proposals were rejected at a cost to the proposers of around €175 million (equivalent to about 14% of the ICT Programme's almost €1.3 bn annual spend).

This panel is not equipped with the technical expertise to make detailed proposals for improvement, but recommends that the Commission review the matter, based on the following starting suggestions.

Recommendation 11:

To reduce the current massive waste of effort in writing good-quality but nevertheless fruitless proposals and to make it more attractive to participate in the Programme, the Commission should test a more sophisticated two-stage application process in part of the Programme. Proposals proceeding to the second stage should have a 30-50% chance of obtaining funding.

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3   APPENDIXES

Appendix A: Tasks of the Evaluation Panel and Working Method

Mandate of the Evaluation Panel

The interim evaluation of ICT research in the 7th Framework Programme is part of the evidence-based interim evaluation of the 7th Framework Programme and its specific programmes building upon the ex-post evaluation of the 6th Framework Programme. Scope of the evaluation was the research activities funded by DG Information Society and Media in FP7. These include the ICT-related research activities in the Cooperation programme ('mainstream' ICT research, the JTIs Artemis and Eniac, and the AAL JP) and the eInfrastructures activities in the Capacities programme.

This interim evaluation serves two major purposes: to provide guidance and steering for the final part of FP7 – in particular to assist with the design of the work programme for the next period, and to provide input to the design for any successor programme to FP7, since the preparations for this will begin shortly and the final evaluation will be carried out only after the start of the new programme.

To satisfy the regulatory requirements, the evaluation must cover three main issues:

- The quality of the research activities under way

- The progress towards the objectives set

- The quality of implementation and management

There is an additional requirement to assess the effectiveness of the efforts made on simplification – looking beyond the implementation at aspects of the programme design.

In order to make these issues operational, a series of specific questions for the panel have been identified:

1. **Quality of the research**

    a) Is FP7 ICT exploiting areas of competitive advantage and at the same time able to adapt to a changing environment and to identify and explore new opportunities?

    b) Does the programme attract the best research teams in Europe? How many of these are recognised as world leaders in their domains?

2. **Progress towards the objectives of the ICT Specific Programme**

    a) How does FP7 ICT contribute to improve the positioning of Europe on the global ICT RTD map?

    b) How is the programme contributing to realise the ERA objectives and its 2020 Vision?

    c) How is FP7 ICT positioned within the overall European innovation system, and how is it expected to contribute to the system?

    d) Is FP7 ICT employing the right mechanisms to help translate research results into innovative products, processes and services?

    e) How does the programme link with other European or national initiatives addressing the "knowledge triangle" of education, research and innovation?

f) Is FP7 ICT resulting in a better support of the broader EU policy agenda, notably economic growth, sustainable development, health, and meeting the challenges of an ageing society?

g) Have the eInfrastructures activities effectively contributed to optimise the use and development of the best research infrastructures in Europe? To which extent has the eInfrastructures approach been expanded to more application-oriented and user-oriented platforms in other sectors?

3. **Quality of implementation**

a) Is the process of formulating and revising the Work Programmes able to accommodate the dynamic nature of the research priorities in ICT and of new political priorities (e.g. Recovery Package)?

b) Is the mix of instruments used and participants involved (industry, public research, academia, SMEs) adequate to achieve the objectives pursued in the various research areas? What effect has the introduction of the JTIs and the Article 169 action and the opportunities offered by the European Research Council and RSFF had on the participation in the co-operative research activities?

c) To what extent can changes in the pattern of participation be linked to the changes in implementation methods introduced within FP7? As an example, what is the perceived impact of the changes in the funding models as compared to FP6 (particularly for SMEs)?

d) Have sufficient efforts been made to ensure that support for SMEs and for large firms is not "compartmentalised" into different measures or tools?

e) To what extent have the changes introduced in FP7, notably the rules for participation, and their implementation in the ICT programme simplified the application, selection and contract management processes? What is the budgetary impact of these changes?

f) To what extent have FP7 management requirements, such as resulted in reducing costs and lowering burdens of participation in the programme? Has the Commission advanced in developing a more trust-based approach towards the participants? If the Commission has not advanced sufficiently, which factors are hindering it?

g) What further improvements of the programme implementation and simplification measures should be considered?

Working Method

The Evaluation Panel started its activities in September 2009. The first phase of the evaluation was focused on the collection of evidence by means of interviews with Commission officials and stakeholders and the analysis of Commission documents and monitoring or evaluation reports. This was done at an individual basis as well as collectively during the monthly meetings.
The second phase of the activities was dedicated to the drawing of the conclusions and the formulation of the recommendations.

Evaluation experts from Technopolis Group supported the Evaluation Panel in its activities by providing the needed background information and setting up a large-scale evidence collection exercise, resulting in the Evidence Report (see Appendix C, separate report).

Commission officials and stakeholders collectively interviewed by the evaluation panel members are:

Commission Officials	
Dirk Beernaert	Head of Unit INFSO G1 – Nanoelectronics
Mario Campolargo	Director INFSO-F - Emerging Technologies and Infrastructures
Jose Cotta	Head of Unit INFSO G3 - Embedded Systems and Control
Peter Diry	Deputy Head of Unit INFSO C5 – Operations for ICT Research and Innovation
Ken Ducatel	Head of Unit INFSO C1 - Lisbon Strategy and i2010
Detlef Eckert	Director INFSO C – Lisbon Strategy and Policies for the Information Society
Konstatinos Glinos	Head of Unit INFSO F3 – Géant and eInfrastructures
Khalil Rouhana	Head of Unit INFSO C2 - Strategy for ICT Research and Innovation
Paul Timmers	Head of Unit INFSO H3 - ICT for Inclusion
Thierry Van der Pyl	Director INFSO G - Components and Systems
Peter Wintlev-Jensen	Head of Sector, ICT and Ageing – INFSO H3
Stakeholders	
Monika Dietl	Director, European Affairs Office, CNRS
Lutz Heuser	Chairman, ISTAG and Vice President, SAP Research
Eddy Roelandts	Vice President Technology &. Environmental Policy, Siemens
Andraz Tori	Founder and Director for Technology, Zemanta Ltd
Jan van den Biesen	Vice President Public R&D Programs, Philips Research
Walter Weigel	Director General, ETSI
Michael Wiesmüller	Federal Ministry for Transport, Innovation and Technology, Austria

Apart of the Evidence Report developed by the support team to the Experts Panel, key documents and reports that were taken into consideration for the evaluation are:

- "A public-private partnership on the Future Internet", Communication from the Commission to the European Parliament, the Council, The European Economic and Social Committee and the Committee of Regions, COM (2009) 479 final, European Commission, October 2009

- "A strategy for ICT R&D and Innovation in Europe: Raising the Game", Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions, COM (2009) 116 final, European Commission, 2009

- Esko Aho (Chair), *Information Society Research and Innovation: Delivering Results with Sustained Impact, Evaluation of the effectiveness of Information Society Research in the 6th Framework Programme 2003-2006*, European Commission, Brussels: May 2008

- FP7 ICT Interim Evaluation - DG-INFSO Self-Assessment, European Commission, DG Information Society and Media, November 2009

- Integrated Programme Portfolio Analysis 2009, European Commission, DG Information Society and Media, September 2009

- JTI Sherpas Group, *Designing Together the 'Ideal House for Public-Private Partnerships in European Research*, (mimeo), January 2010

Appendix B: Summary of Evidence

This annex provides an overview of the evidence collected in the course of the study that was to support the panel of experts in its interim evaluation of ICT research in the 7th FP.

Scope of this evaluation was the research activities funded by DG Information Society and Media in FP7. These include the ICT-related research activities in the Cooperation programme and the eInfrastructures activities in the Capacities programme. In the framework of this study on ICT research in FP7, research funded by DG Information Society in the Cooperation Programme is denominated *"FP7 ICT"* research; research funded in the context of the Capacities Programme is referred to as "eInfrastructures". Wherever relevant, within the FP7 ICT research activities, a further distinction is made between "*FP7 mainstream ICT*", i.e. the core of the FP7 ICT activities, and the "*New Initiatives"*, including the JTIs Artemis and Eniac, and the AAL Joint Programming (JP). The FP7 ICT research constituted the key focus for this study.

In the time period 2007-2009, ICT research in FP7 saw the involvement of 3,319 organisations, accounting for 9,607 participations.

The evidence collected during this study comes from four main sources – the database on projects and participations, a survey of participants, interviews with key players, and an extensive desk research of Commission documents and external settings. Comparative analyses of survey and composition analysis data related to research in ICT in FP5, FP6 and FP7 allowed for the identification of trends over the Framework Programmes.

The findings of the study can be summarised as depicted in the diagram below.

STRENGTHS	WEAKNESSES
Consensus-based programme design	Ongoing drop in industry participation in collaborative research
Mix of technology push and solution (market) pull	More mid-term research & less technical risk than in FP6
Pronounced push for innovation	Few initiatives focusing on knowledge transfer to education
Focus on emerging technologies & novel solutions for mature ones	Demand/user interaction more limited than in FP6
Potentially strong policy mix of complementary funding schemes & initiatives	Persisting issues in bridging research & innovation
Strong core of participants, creating critical mass & ensuring stability	Little global outreach
Research leaders and key actors in various fields and markets of ICT	Continuing barriers for cost savings and lowering of red tape
Multidisciplinary teams with complementary expertise	Ongoing administrative complexity and burdens
Integration of research and industry communities	Structural aversion to risk in the EC financial regulations
Broader mobilisation of resources for R&D at EU level	Diverging funding regimes within and among EC programmes, funding schemes and initiatives
Enhanced co-operation with national research programmes	Diverging interpretations of the financial regulation and rules

OPPORTUNITIES	THREATS
Expansion of FET as pathfinder for emerging technologies	Lock-in
New initiatives as a tool for an improved bridging of research and innovation in specific fields of ICT	Reduced marketability and exploitability of R&D results due to a lack of alignment with user needs
eInfrastructures as tool for the integration of R&D	Weakening of Europe's role in standardisation at global level
Deepening of the role of the demand side in the definition & implementation of the programme	New initiatives jeopardised by dual management
An ICT Task Force to coordinate research programmes	High complexity of the EC-funded ICT research landscape and fragmentation of the research funding
Review of the financial regulations to address the most urgent aspects of simplification	Less involvement of key players, 'core' participants and SMEs due to high costs for participation

The structure of this Summary of Evidence follows the headings and the flow of analysis in the panel report, providing more detailed evidence-based information on the considerations leading to each recommendation.

Strengthening European ICT research in a globalising world

The importance of the ICT Programme for Europe

In this last decade, key priorities in European policy thinking shifted from 'a cheaper, secure Internet, investing in people and skills, and stimulating the use of Internet" to 'creating innovation friendly markets' and a growing attention to the role of demand factors as drivers for change. Research was increasingly expected to take up its societal role and was ultimately called to develop solutions for the emerging societal challenges.

Reflecting the evolution in European policy thinking and the technology and market trends in the global ICT sector, the FP7 ICT Programme applied a *mix of technology push and solution (market) pull* to foster R&D excellence and innovation. Research in FP7 mainstream ICT continued and reinforced the trend in research focus that was visible already in FP6, dedicating even more than in FP6 attention to research exploring **new technology paths**. It targeted emerging as well as existing markets with high growth potentials, taking into due account the areas of European technology and industry strengths. Europe's key technology strengths in ICT are in the fields of communication and network technologies, micro-nanoelectronics, robotics, and embedded systems. Industry strengths are in the field of telecommunication services and network supply. It has also world leadership in ICT application markets such as telemedicine, medical equipment, robotics, automotive and aerospace electronics, amongst others.

The strong push for innovation implemented in FP7 was not limited to an increase in funding for research in emerging technologies. In the other research areas, focusing on more mature technologies, there was a more pronounced focus on developing innovative solutions and applications than in FP6. Stakeholders describe much of the research conducted in those areas as 'exploratory' and throughout all Challenges the majority of participants in the Collaborative Projects (~80%) indicated the exploration of new technology paths as major goal for their participation.

The ICT programme is characterised by a high level balance between **bottom-up and top-down design**, based upon a broad process of consensus building around the research priorities among and with the research and industry communities. Bodies involved in the design process of the Work Programme include the IST Advisory Group (ISTAG), the European Technology Platforms (ETP), the Commission directors and internal correspondents, and the broad participants base through consultation meetings. The Work Programme also builds on direct input from the portfolio analyses, studies on technology and market trends, evaluation and impact analyses, and monitoring reports on the projects.

Participants appreciated the current research focus in the Programme and stressed the relevance of the exploratory actions to be undertaken at European level. The Programme results also particularly useful for research on issues with a pan-European dimension where high-level complementary expertise is needed and where the national programmes often did not have the necessary scope.

In terms of the Programme's ability to **adapt to the particularly fast-changing environment** in the ICT sector, the Programme has adopted the right mechanisms to adapt to changes in the long-term environment, showing an appreciated mix of relative stability in the research lines funded throughout the Framework Programme and agility in acting upon changes in the two-years Work Programmes. The Programme's capability to respond to short-term changes is more often questionable, especially due to the time frame needed for the entire implementation process (from identification of a need or opportunity to the contracting of research). In order to overcome this challenge, the Programme set as strategic objective the funding of mid-to-long-term research. Compared to FP6, however, a clear shift can be noted towards more mid-term research, in all research areas and in particular for the research stakeholders.

In this context, the participants assessed positively the implementation of the new measure that allows for a more extended flexibility in relation to the focus of the research and the constituency of the project consortia as a tool to adapt to changing environments.

The ICT Programme and the new ERA instruments

As in previous FPs, in FP7 the bulk of EU research funding goes to collaborative research, with the objective of establishing excellent research projects and networks able to attract researchers and investments from Europe and the wider world.

One of the factors that have changed significantly since the introduction of FP7 is the **emphasis on co-ordination with national research instruments**. FP7 has a set of objectives designed to increase the level of co-operation between and co-ordination of research programmes carried out at national or regional level in the Member or Associated States, leading to mutual opening up of programmes and development and implementation of joint activities. This may happen through activities within the programme (some CSAs) or in some cases through specific instruments such as the ERA-NETs, Joint Programmes (Article 169) and Joint Technology Initiatives (JTIs). Joint Technology Initiatives combine private sector investment and/or national and European public funding and support large-scale multinational research activities in areas of major interest to European industrial competitiveness and issues of high societal relevance. FP7 also introduced initiatives aiming at *integrating private and public research efforts*. This is the first time that public-private partnerships (PPP), involving industry, the research community and public authorities, were proposed at European level.

The two **JTIs** partly managed by DG INFSO (ARTEMIS focusing on Embedded Computing Systems and ENIAC related to Nanoelectronics Technologies) are rooted in the activities of the European Technology Platforms, set up during the Sixth Framework Programme. The ICT Programme also launched the Ambient Assisted Living (AAL) Joint Programme, a new joint R&D funding activity implemented by 20 EU Member States and 3 Associated States with the financial support of the European Community. Finally, 3 PPPs were launched in 2009, in the context of the Recovery Package.

In general the participants approved and appreciated the scope offered by the Programme from the more basic research in FET, through the mainstream of the FP7 cooperative research to the more market-focused work funded under the JTIs.

However, the current proliferation of new initiatives in European Commission funded research, most of them focusing on the Societal Challenges, constitutes a *risk for fragmentation of European Commission research* funding. Especially participants in FP7 mainstream ICT research (~35% of the survey respondents) ranked the 'complexity of the programme design in terms of variety of instruments and initiatives', the 'difficulty in finding matching funding issues', and the 'fragmentation of the research funding across different actions' among the most important barriers to participation. This regarded in particular participants in the Healthcare and Inclusion Challenges, and research stakeholders more frequently than industry. Stakeholders participating in the JTIs did not particularly perceive it as an issue; they considered these initiatives as clearly complementary to the mainstream research.

In relation to the **'traditional' instruments**, the first 4 calls of FP7 mainstream ICT were characterised by a more pronounced focus on the Collaborative Projects, with a reduction of shares in the budget for all the other funding schemes (compared to FP6).
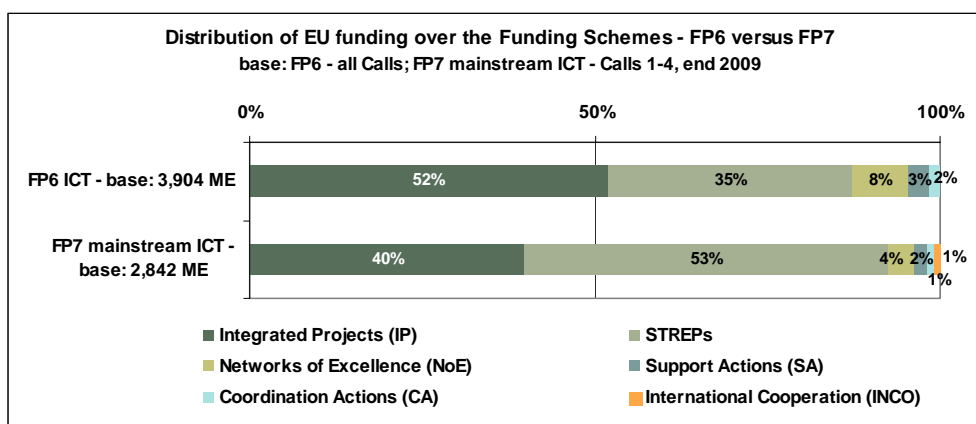
The STREPs became the most funded research instrument, a position that was taken up in FP6 by the Integrated Projects.

This shift in budget allocation needs to be set against the background of the major concern, voiced during and at the end of FP6 of a *risk for 'compartmentalisation'* of the SMEs in the STREPs. SMEs showed a clear preference for the STREPs in FP6, while Large Enterprises opted more frequently for participation in IPs. It was considered that the IPs with their large consortia and more strategic long-term research focus were little aligned with the needs of SMEs.

Interestingly, in FP7 mainstream ICT and compared to FP6, there was a slight increase in the involvement of SMEs in IPs. This change in participation behaviour seems to be related to the more intense involvement of high-tech SMEs in FP7. These organisations are often leaders in their niche markets and already in relation to FP6, the high value of involvement of such SMEs in IPs was pointed out by the participants – both Large Enterprises and SMEs.

The *Networks of Excellence* saw their share in budget drastically reduced in FP7 (4% in FP7, compared to 8% in FP6). A new instrument in FP6, the Networks of Excellence had as 'mission' to foster the integration of research communities. During and at the end of the Sixth Framework Programme, strong doubts arose on their effectiveness, in particular in relation to their success in terms of *durable* integration. The latest assessments, however, draw a more positive picture and consider that in FP6, Networks of Excellence showed their value as platforms for knowledge exchange, strengthening research communities and integrating fields of research – as well as integrating research communities in the NMS within the European ones. The NoEs funded in FP7 show the same (potential) value.

Co-ordination and Support Actions saw their (very small) share of the overall budget slightly reduced compared to FP6. The impression arising is that a strategy of highly focused funding was adopted for the Support Actions, i.e. only in areas where they have proven their relevance. The Co-ordination projects seem to be adopted as instrument especially for the development of strategic research roadmaps in fields that are not yet 'covered' by the European Technology Platforms. Participants considered that this implied a less strategic approach to *internal* exchange and dissemination of information. Furthermore, part of the budget for the CSA (20%) was devoted to actions explicitly focusing on international cooperation.

In line with the expectations, the **New Initiatives** proved particularly valuable in mobilising industry stakeholders in the R&D activities and the development of new products or services. The JTIs succeeded in inverting the research/industry ratio in overall participations that is visible in mainstream ICT research (60/40%); in the AAL JP the research/industry ratio was even 40/40%, with the remaining ~20% of participations taken up by the Public Authorities and NGOs. The New Initiativesy particularly led to an enhanced involvement of SMEs in research at European level, reaching participation levels of 24% in Artemis, 27 % in Eniac, and 33% in AAL (compared to the 16% in FP7 mainstream ICT).
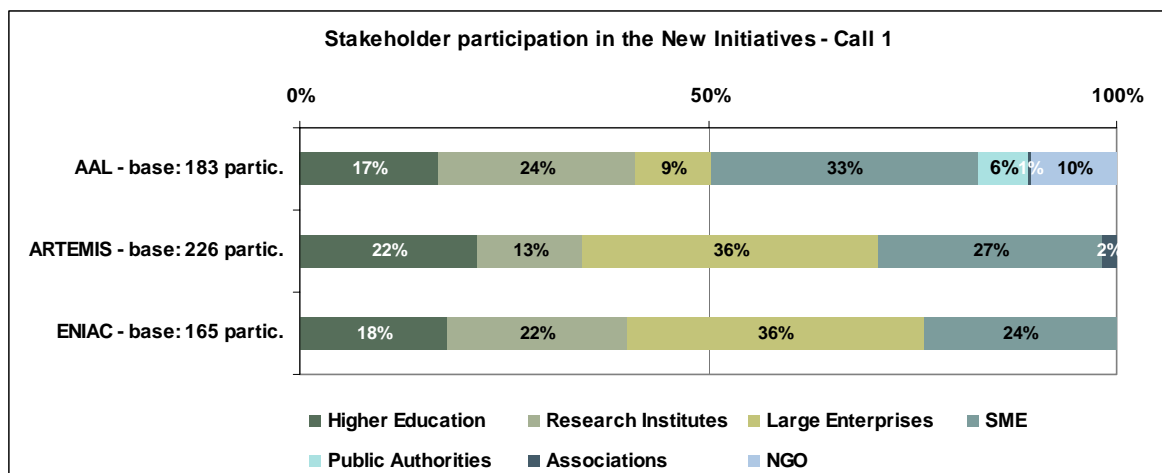
The overall evaluation of the participants on the relevance of the New Initiatives was highly positive. This positive assessment was counterbalanced by the negative evaluation of the current **implementation methods**, and more particularly the difficulties and additional costs caused by the current dual governance – i.e. European and national. Issues mentioned included the dual management structures (in two languages), separate reporting requirements, and the lack of coordination in the timing of funding decisions.

Promoting radical innovation

The ICT programme is characterised by a broad process of consensus building around the research priorities. Already in relation to the ICT Programme in FP6, the WING FP6 ICT Impact analysis came to the conclusion that "The Programme has been able to be effective because it builds upon a shared, market-focused vision that derives from participants' own interests and because it empowers them to implement the vision in the detail. Such a virtuous circle is to a degree risky because it contains a **potential for lock-in**, but properly governed it is very powerful."

A factor that may constitute a risk for lock-in is the influence and importance of the established major stakeholders in the Programme. The Programme is characterised by a **strong 'core' of participants** that took part in successive FPs. 'Core' participants can be found in particular among the Higher Education institutions (~70%), and the research institutes and Large Enterprises – albeit at a slightly lower level (~50%). Interestingly, it includes also ~30% of the SMEs, Public Authorities and NGO/Associations.

These organisations constituted the backbone also for the research in *New Initiatives* and especially for research in the JTIs, which illustrates also their strong involvement in the European Technology Platforms upon which these JTIs were based.
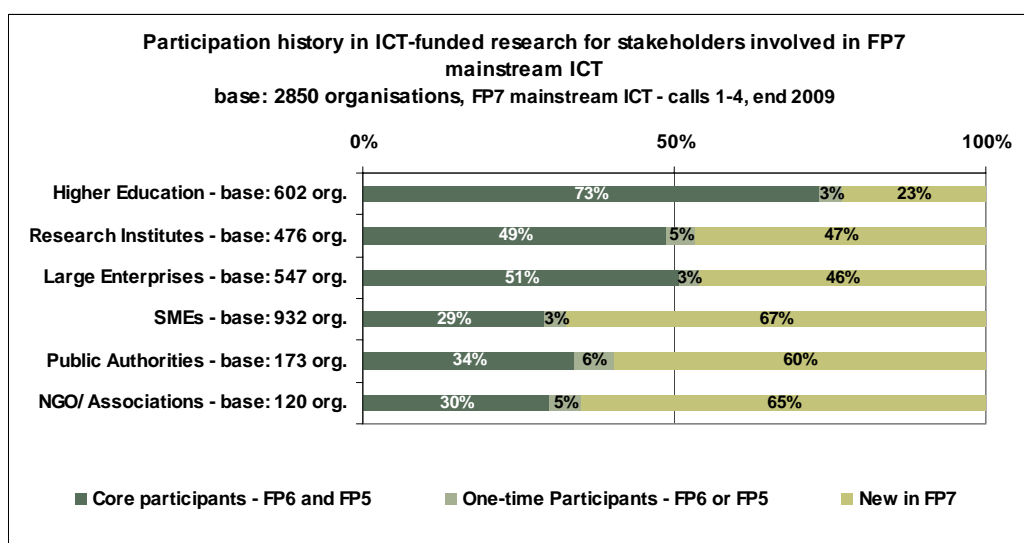

Apart of creating critical mass in specific S&T fields at European level and stability over time, this core group of participants resulted instrumental for the strengthening and expansion of strategic R&D partnership, amongst other by fostering the involvement of new players who in some cases took up important roles in the projects. Half of the participating organisations are new actors in EC-funded ICT research, including close to 70% of the SMEs.

The moderate level of technical risk and duration of the research indicated by the participants should be seen as a warning that a lock-in may currently be in place in FP7 ICT.

The Commission saw its intervention to be relevant especially for the funding of **medium to long-term collaborative research** requiring **risk sharing** with the industry and the research community. In FP7 ICT, however, there was a clear shift from the medium to long-term research in FP6 towards more mid-term research, in all research areas and in particular for the research stakeholders.

Furthermore, while industry participants perceived high commercial risks for their research activities (as was the case in FP6), the technical risks of research in FP7 mainstream ICT were overall considered to be more moderate than in FP6.
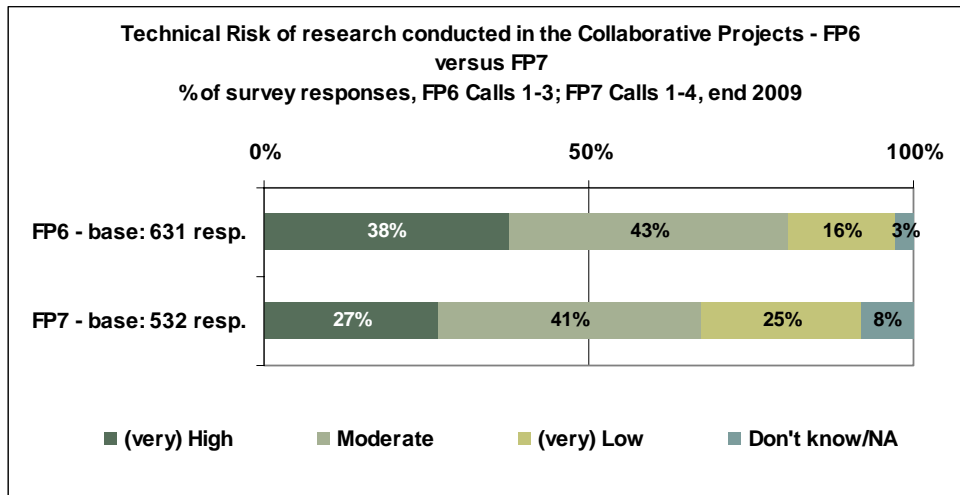
This regarded all Research Areas but particularly the research in the 'Technology/Industry Strongholds' one. This may be related to the fact that research in these fields of ICT targeted mature technology fields and market sectors where the European research community is already highly structured – amongst others around the European Technology Platforms – and where the Strategic Research Agendas have already defined the paths for development, based on consensus among the actors in the field of S&T and industry sectors.

Among the stakeholders, especially the research organisations indicated lower technical risks than in FP6. These stakeholders repeatedly pointed out that too much reliance on industry input for the definition of the research priorities might lead to a focus on 'tomorrow' and not sufficiently on 'the day after tomorrow'.

In the ICT programme, the initiative that explicitly focuses on innovative high-risk ideas is the **FET initiative**. Throughout the FPs, this initiative has proven its importance as facilitator for the timely identification of new emerging technologies, thus avoiding eventual lock-ins. It acted as a precious pathfinder and guaranteed a counterbalance to the eventually more 'conservative' input from the 'established' industry sector. There are numerous examples of current research fields that originated in previous exploratory work implemented in the FET programme; these include, amongst others, research in nanoelectronics, photonics, and robotics/bio-inspired systems.

The global dimension

In this last decade, expert panels and Commission documents increasingly stressed the need for European research to '*open the European Research Area to the rest of the world'* and increase its interaction with research at a global level in order to create synergies and access complementary expertise. The stakeholders largely agreed with this statement. They ranked a stronger collaboration with research centers and key actors in the world among the top factors where development was needed in order to reach excellence in R&D and hoped for an extension of the current international collaboration projects.

So far, the breadth of these global co-operations has been very limited: the share in the overall funding of the Specific International Scientific Cooperation Activities (SICA) and International Cooperation (INCO) projects was ~1%. These projects predominantly acted as 'technology watch' activities. The Commission bases the cooperation in the Framework programme on the establishment of bi-lateral S&T agreements with key third countries and the definition of priority research areas for collaboration. Such **'targeted' opening** implied that in the first 4 calls in FP7 mainstream ICT non-European partners were involved (only) in 14% of the projects. In some research areas, this limited involvement of industry and research leaders at global level caused the absence of key competences or links in the value chain because the necessary industry is not present or not adequate in Europe.

In the context of globalisation of research, the **reinforcement of the European Single Market** is more than ever a factor of crucial importance. The lack of European standards and coherence among national regulations is an ongoing and well-known barrier for the development and uptake of innovation - and ultimately, for Europe's competitiveness at global level.

One third of the participants (32%) felt that more could and should be done in relation to an enhanced *coherence among national regulations.* Commission officials indicated various areas in FP7 ICT where research focuses (also) on providing input to policy makers. However, the limited funding for the Funding Schemes that in previous Framework Programmes focused on knowledge transfer to policy makers (the Co-ordination and Support Actions, accounting for 3% of the budget) leads to the impression that the efforts were minimal – or at the least highly focused on specific issues. In this context one should consider, though, that true progress in this field is depending on the links between the Programme and other policy or regulatory activities at European levels rather than on the contributions by projects. The attainment of more coherent regulations is not necessarily an issue for the Programme itself, but more an issue of the links between the Programme and other policy or regulatory activities at European levels.

The Programme supports the creation of the Single Market predominantly by contributing to *standards development.* The evaluation of the support delivered by the Programme for the development of European standards was variegated depending on the Challenges the stakeholders were involved in: participants involved in the Healthcare and Network & Service Infrastructure Challenges highly appreciated the support of the Programme to foster standard development; in other areas such as Digital libraries & content and Independent living, inclusion & governance, apparently the situation is more problematic.

Overall, stakeholders considered that much of the research focus is currently on the development of systems and processes with too little regard for the integration and the interoperability/backward compatibility. They also stressed the need for the development of global standards, a consideration that was voiced already by their peers involved in FP6 ICT.

Exploiting the Pervasiveness of ICT via Integrated Policies

The ICT Programme and 'Joined Up' Policymaking

In the last decades, advances in ICT such as cost-effective computing, miniaturization, ubiquitous communication, and advanced materials and sensing devices have led to an increasing embedding of electronics in manufactured goods – and an increasing pervasiveness of ICT in general. A telling example of the trends in the market from this perspective is the automotive industry where electronics and embedded software-intensive systems are expected to account for almost all (90%) of future innovation. Some (potential) societal applications of advanced ICT can be found in the language technologies and language-based interactions that will enable an enhanced multilingual access to online content and services; research in robotics and ACS will increase ICT support in fields such as ageing and healthcare; advanced electronic products are enabling monitoring environmental issues via wireless sensor networks, the Internet of Things, advanced mobile communication devices and new health applications.

Such **increasing pervasiveness** of ICT implies also a broad range of (potential) target markets and a high diversity of market actors involved in the production and use of ICT. This is illustrated by, e.g., the wide spread of market actors involved in FP7 ICT, ranging from electronic component manufacturers and systems engineering companies to entities providing social services and NGOs.

The Framework Programme is only one of many mechanisms in place to support research, development and innovation in Europe. Other policies and actions have been set up at European level (both managed by the Commission and by Intergovernmental Bodies) and by Member States. The **ICT research landscape** embraces numerous programmes and initiatives, funded at European or trans-national level. This includes other Directorates General where ICT takes up an increasing role, such as DG Enterprise and DG Transport; the CIP ICT/PSP, the EU-funded innovation support programme for ICT that aims at catalysing innovation take-up through demonstrations and pilots; and the EUREKA programmes, a joint programming of the member states.
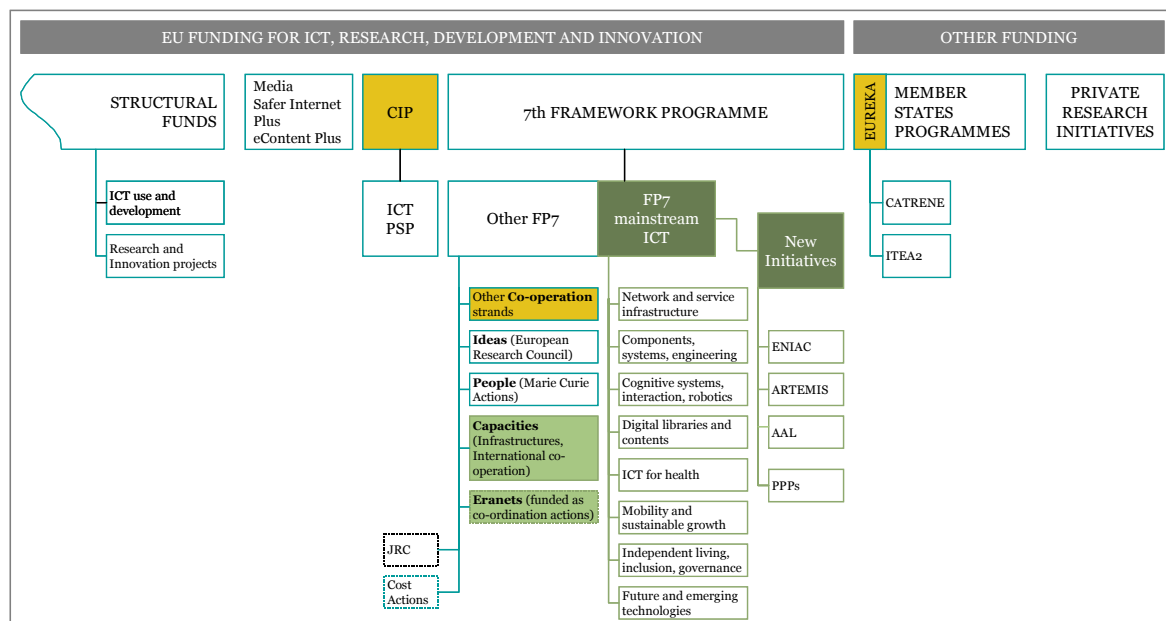
The increasingly broad-ranging importance of ICT implies an enhanced need for **collaboration and coordination**. In FP7, the ICT Programme dedicated due attention to an improvement of the coordination with other Community Programmes. This is illustrated, amongst others, by the Joint calls in the area of Trust & Security and Energy Efficiency. To be mentioned is also the ENIAC JTI that tackled the apparent overlap with research conducted in the CATRENE (a Eureka initiative), with as a first step a joint call for Expressions of Interest.

An improved collaboration and synergy between *FP7 ICT and the CIP IST/PSP* was called for in order to enhance the Programme's capacity to bridge research and innovation. An issue that was raised in the evaluation was the absence of specific demonstration actions other than those embedded in IPs, and a demand for the CIP to provide opportunities for follow-up activities for research projects. To some extent this reflects the development (i.e. the more limited funding compared to FP6) of the Integrated Projects who were supposed to absorb some of these activities. Furthermore, the number of support actions in the form of 'take-up measures' was reduced – even though they continued to be funded in specific fields of research where they had proven to be highly relevant.

Potential synergies with innovation funding actions under the Structural Funds were also raised as an opportunity, but due to the governance structures of the Structural Funds this is more difficult to co-ordinate at European level.

Finally, expert panels and Commission documents increasingly stressed also the need for an improved *coherence and synergy* between *EU and national-funded research*. The participants overall agreed with these considerations: half of the respondents considered a major synergy between EU and national-funded research to be a key factor for the achievement of excellence in R&D; 40% of the participants thought that more could and should be done from this perspective.

In FP7, the Programme acted upon a broader involvement of the national programmes in research at European level, by mobilising them for the activities in the JTIs (in contrast to common practice in the other DGs) and by fostering and supporting the creation of the AAL JP.

It also implemented a broad range of activities at Challenge or WP Objective level, illustrating its commitment in reaching an improved coherence in Europe's research policies - between European and national research policies as well as among the policies in the member states themselves. To cite only a few, the Commission fostered the creation of mirror-groups in specific fields of S&T such as Photonics and National Technology Platforms in order to deepen cooperation with and between national funding agencies; set up coordination activities with national initiatives in fields such as information management; liaised with Member States' representatives which led to the development of common or complementary actions in the eSafety area and cooperates with the ERA-NET Transport; funds a supporting action in the field of ICT for environmental sustainability that is likely to contribute towards an ERA-NET in the field; an ERA-NET action has been started to launch joint calls on FET research topics.

The general opinion of the stakeholders interviewed is that the impact of Programme on the formulation of national programmes is very high, even though national research policies are still often too much 'inward' directed. Some interviewees however felt that there was a lack of a compelling vision in this FP compared to the previous programme. They called for an ICT-centered overarching strategic vision, similar to the FP5/6 Ambient Intelligence one, that would have the capacity to gather research, industry and national policy makers around a common theme.

Integrating the Demand Side

An overall acknowledged critical value of collaborative research – and in particular of the collaborative research implemented in the Framework Programmes – lies in its capacities to enhance the **knowledge and technology flows between the various components of the Innovation System** - across sectors, disciplines, and regions. This is even more so in the era of Open Innovation where industry increasingly builds on the interactions with its network of suppliers, partners in the research system, and customers for its innovation and R&D activities.

It is therefore little surprising that 66% of the participants in mainstream ICT Collaborative Projects indicated in a collaboration between the various actors in the innovation system (research and industry) a key factor for the achievement of excellence in R&D. Half of the participants also considered collaboration in RTD of all actors in the **product/service value chain** (suppliers, intermediate users, end users, etc.). Especially the major industry players attributed high importance here and their assessment of the Programme's support for the attainment of such value chain interaction was mixed: a third of the Large Enterprises considered it sufficient 'to a (very) large extent' and another third 'not at all/to a limited extent'.

Participants pointed at a limited involvement in FP7 ICT of *key immediate or end users* in the Programme, including private enterprises as well as public authorities, NGOs and Industry Associations. The alignment of the research results with the **user needs** was a concern voiced by ~30% of the industry participants in FP7 mainstream ICT research – and in particular by the participants in the Cognitive systems, interaction, robotics; Components, systems, engineering; and Digital libraries & content Challenges. In this context it should be noted that in these Challenges the research stakeholders accounted for at least 60% of the participations. While industry accounted for ~50% of the participations in the Networks and Service Infrastructures Challenges 1 and in Challenge 6 focusing on Mobility, sustainability and energy efficiency, Public Authorities, NGOs and Associations were involved especially in the Independent Living, inclusion & governance and in the Healthcare Challenges (~10% of the participations).
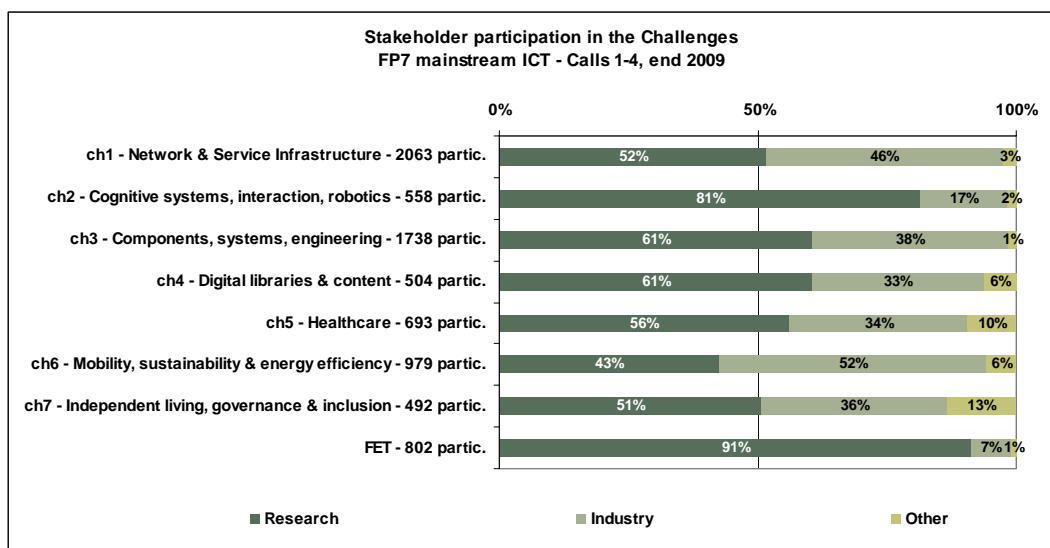
The criticisms by the participants in relation to the involvement of different actors along the value chain, and more specifically the immediate and end users, need to be set against the particular value of such collaboration in order to master the growing complexity in ICT R&D as technologies and markets converge. Thanks to the participation of these actors, based in different countries, valuable technology and market intelligence can be gained. It improves the understanding of customer and supplier needs and allows S&T solutions to be validated, improving the quality of the R&D results and the likelihood of market success.

Compared to FP6, research in FP7 mainstream ICT saw a reduction of involvement by the **product/technology users active in the manufacturing sectors** i.e. manufacturers of Transport equipment, Consumer Electronics, and other consumer goods (from 21% of the participations by market actors in FP6 to 17% in FP7). This change in participation profiles can partially be attributed to the activities of the JTIs, seeing the considerable level of cross-participation by these organisations in research funded in mainstream ICT and the JTIs. There was, instead, a considerable increase in participations by product manufacturers (from 15% of the participations by market actors in FP6 to 24% in FP7).
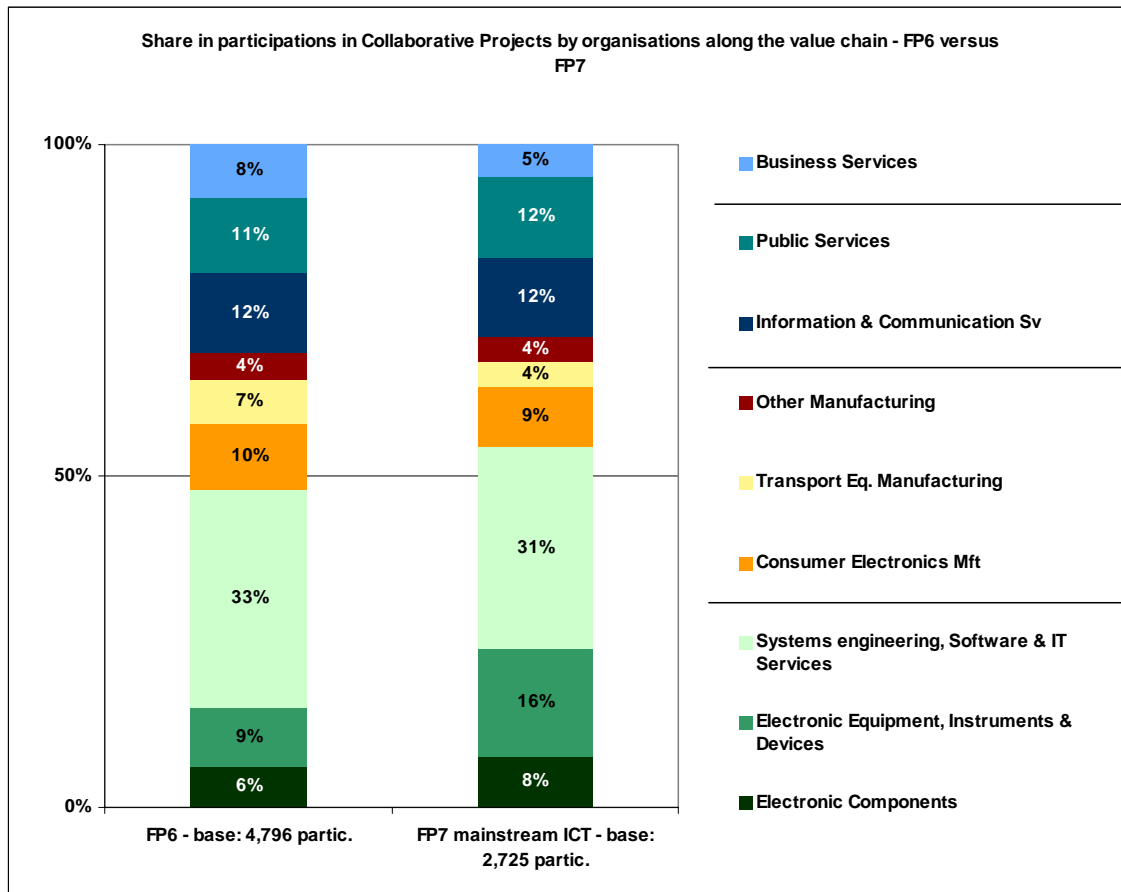
Finally, in FP7 ICT a limited share of the budget was allocated to the funding of Support Actions, i.e. the instruments that in previous FPs were applied (also) for the awareness raising among users and the funding of socio-economic studies. Among all Challenges, the one focusing on Mobility, sustainability and energy efficiency (Challenge 6) allocated the highest share of its budget to the funding of Support Actions, i.e. 5%; in the other Challenges, including the ones focusing on societal applications, the budget for the SAs ranged between 1% and 2%.

The ICT programme and Higher Education

In the FP7 ICT Programme, Higher Education institutions accounted for ~40% of the overall participation and took up a similar share of the overall funding. The majority of these institutions (~80%) were important players in their field at national or European level, showing a high-level involvement of European research leaders in the fields of ICT.

Explicit efforts to transfer knowledge from research and innovation to the **'education'** pillar in the knowledge triangle seemed highly limited. In its Self-assessment report the Commission related on some 'educational outreach' activities implemented, amongst others, in the fields of robotics and photonics. Little evidence was found also on the development of joint European Master Programmes, which constituted in FP6 one of the positive effects of the NoEs.

One should, however, consider that typically, the involvement of Higher Education institutions in collaborative research as such has highly positive effects on the education of PhD students as well as – indirectly - on the quality of the education in the universities through an enhancement of skills and expertise of its staff members. Impact analyses focusing on ICT in FP5 and FP6 all found Education and Training to be one of the most prominent impact areas in the social sphere, indicated in particular by the Higher Education institutions.

Implementation of the ICT Programme

In FP7, and compared to FP6, research in mainstream ICT saw a more pronounced involvement of the research stakeholders, accounting for ~60% of the participations. This was combined with a slight decrease in participation by the industry ones and the Public Authorities. Industry participants in FP7 mainstream ICT accounted for ~3% of the participations; Public Authorities and NGOs/Associations for ~5%. The JTIs succeeded in inverting the mainstream 60/40% research/industry ratio in overall participations; in the AAL JP, the research/industry ratio was 40/40%, with the remaining ~20% of participations taken up by the Public Authorities and NGOs.

The FP7 ICT Programme succeeded in attracting a **broad range of key actors** – in both scientific fields and market sectors and saw a high-level involvement of European research leaders in the fields of ICT. Close to 70% of the Large Enterprises and ~30% of the SMEs considered themselves to be leading or however highly important players at European level. The same was true for ~50% of the higher education institutions and research institutes.

Research in FP7 ICT built on research consortia that showed the **needed multidisciplinary expertise** to ensure the attainment of excellence in R&D and an enhancement of the participants' knowledge base. The overall majority of participants expected attainment of their objective to gain access to complementary expertise, amongst other through the strengthening or creation of long-term strategic R&D alliances - be they industry-science, intra-research or intra-industry collaborations.

The Programme continued its strong support for the creation of the European 'open' innovation eco-system by fostering the creation or strengthening of knowledge networks between and among the industry and research communities, even though the reduced involvement of the immediate and end-users in mainstream research causes some concerns for the supply/demand interactions. It seemed particularly effective in **strengthening strategic collaborations and integrating different research communities.** By setting the focus of the research activities in mainstream ICT on the development of emerging technologies or the opening of new markets for more mature ones (through the development of novel applications), the Commission inevitably exerted a strong push towards integration of the research communities in different disciplines and for the creation of new R&D partnerships – or the expansion of existing ones.

Underlying these efforts to stimulate integration among and between the various components in the Innovation Systems are the Commission's activities implemented in the Networks of Excellence and the Coordination and Support Actions. There was an ongoing support to the ICT-related European Technology Platforms and close inter-linkages between the research activities in specific WP Objectives and the relevant ETPs, as well as support for the development of strategic research roadmaps in fields that are not (yet) 'covered' by the ETPs. NoEs continue their support to the integration of research communities and show also in FP7 a (potentially) high value for the integration of research in the NMS into the European research communities.

The high value of the research - both from an S&T and economic point of view - finds its expression in the strong confidence of the stakeholders - based on their current experience in the projects - that their organisations' **core objectives for participation** will be attained as or more than expected. This regarded 90% of the respondents in relation to the exploration of new technology paths; 75% in relation to the enhancement of their competitiveness; and ~60% regarding the enhancement of their abilities to enter markets new to their organisation. It is also illustrated by the participants' considerable expectations that they will be able to re-use the knowledge gained and technology developed during the projects in other contexts or for the development of other products or services. Expectations for **knowledge and technology exploitation** are particularly high among participants in the JTIs (indicated by ~75%), but are highly relevant also among the participants in FP7 mainstream ICT. We noted, for example, that ~50% of the participants in FP7 mainstream ICT foresaw the re-use of the R&D outputs.

The Programme also seems to have set the basis for a strong **transfer of technology and knowledge** to the national research communities and for a successful **leveraging of follow-on research** to be conducted in-house. Interesting is also the relatively high share of respondents expecting follow-on projects funded through the EU Structural Funds, illustrating the potential spill-over effects to the regions. Finally, ~35% of the respondents expected that the project results would lead to **commercialisation and exploitation** in their organisations. In-house exploitation/commercialisation was indicated most frequently by the Software & IT services providers and the entities active in the Public Services sector.

SMEs are important players in Europe's economy and their involvement in the Programme – in terms of product/technology suppliers as well as users – is critical for the uptake of innovation. As most public research programmes, the ICT programme strived to attract more innovative SMEs with a high growth potential and in FP7 and compared to FP6, the Programme succeeded in reaching a higher involvement of innovative high-tech SMEs. This implied an increase in SME participation in the research areas exploring new technology paths – from 29% of SME participations in FP6 to 36% in FP7 mainstream ICT research.
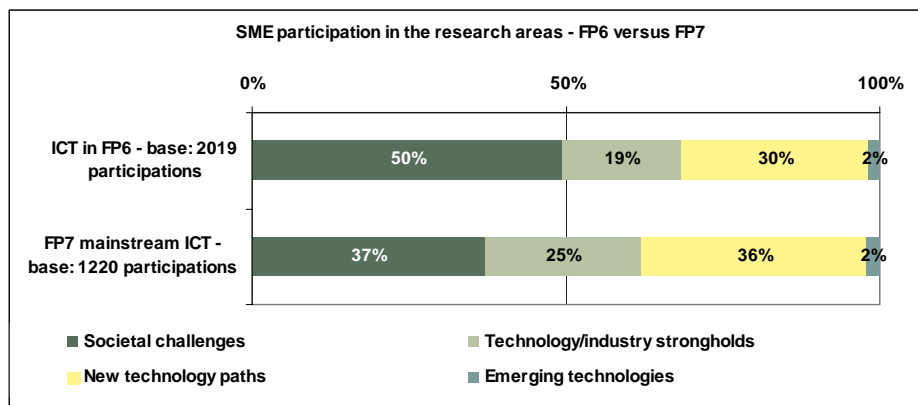
Compared to FP6, research in FP7 mainstream ICT induced a considerably more intensive participation by SMEs manufacturing Electronic equipment, instruments and devices, rising from 9% to 20% of SME participation in the Collaborative Projects. This was accompanied by a reduced share in participation by SMEs active in the Software and IT services sector, i.e. from 68% to 49% of the participations. The share in participations taken up by SMEs users of the products/technologies remained stable (~23%).

The major factor influencing this change in profile of the SMEs was the shift in research focus - at challenges as well as 'objectives' level. As much as the other stakeholders, SMEs indicated the research focus as the primary driver for their participation.

Financial availability is a typical issue for SMEs in relation to product and innovation development and take-up and the SMEs participating in FP7 mainstream ICT Collaborative Projects were divided in their evaluation of the *financial support for product/services development* provided by the Programme: close to half of them (45%) considered such support sufficient to a (very) large extent; 25%, instead, rated it sufficient only to a limited extent or not at all.

It should be noted, however, that the SMEs stressed especially the need for support in the development of new business models, a request that was formulated already by their peers participating in FP6. This need is related to an improved information transfer and awareness on new or future market opportunities.

The overall positive evaluation by the participants– and particularly the industry participants - on the relevance of the Programme and its alignment with industry and societal needs seems contradicted by the **ongoing decline of industry participation** in mainstream ICT *collaborative research* (from 43% in FP6 to 39% in FP7). The concern is that this more limited industry involvement may have implications for the Programme and lead to gaps in the necessary participation.

Stakeholder participation in Collaborative Projects (RTD) over the Framework Programmes
Share in overall participations
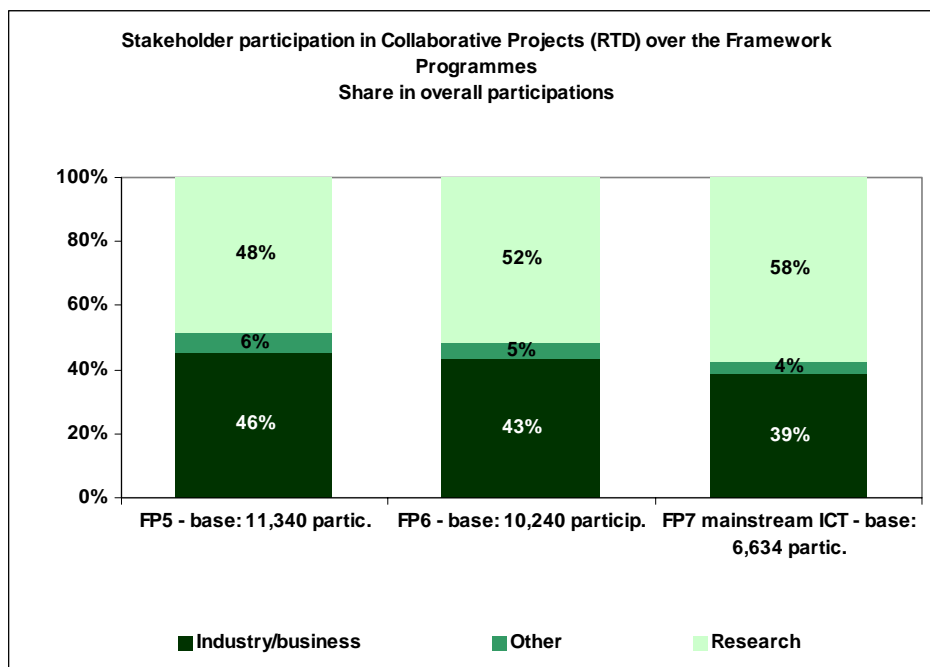
Multiple factors seem to lay at the roots of this participation pattern, including the global competition and the technology & market convergence leading companies to reduce R&D budgets in the EU; the shift in the research focus now targeting more frequently markets that are still emerging; the globalisation of value chains leading to a lack of presence of specific industry actors in Europe.

The FP7 Capacities programme aims to enhance research and innovation capacities throughout Europe and ensure their optimal use. The area of most direct importance to the ICT Programme is '**Research infrastructures'** which aims to optimise the use and development of the best research infrastructures existing in Europe**,** including ICT-based e-Infrastructures. It supports a number of interrelated topics designed to foster the emergence of a new research environment in which 'virtual communities' share and exploit the collective power of European scientific and engineering facilities.

In the time period 2007 – 2009, the eInfrastructures activity in the Capacities programme accounted for an amount equivalent to ~7% of the overall FP7-ICT budget; it deployed a specific funding scheme "eScience Grid Infrastructure" for more than 60% of the 47 projects funded in this activity during the time period 2007-2009. The other projects in this activity were Co-ordination and Specific support actions.

The role of e-Infrastructure is growing; they form an integral part of all research infrastructures, which essentially require computing, data management, network and application development services. They are emerging as effective and valuable facilitators for the integration of research programmes and physical linkage of research communities, thus enhancing the flow of knowledge in the innovation systems - in Europe and abroad.

Commission officials and experts highlighted the successful implementation of the Grid Infrastructures and Geant projects and the importance of the activities in the scientific data domain to overcome fragmentation in heterogeneous data repositories and to enable the research communities to better manage, use, share and preserve data. FP7 is currently extending the scope for the Grid projects, serving research communities in a broad range of disciplines ranging from astronomy to finance, from humanities to epidemiology.

The Expert Group on Research Infrastructures identified several recommendations for e-infrastructures; one of them was the need to put emphasis on the development of integrated e-infrastructure based services (e-Science services) for researchers, addressing common needs of different scientific communities and enabling the sharing of resources among them.

Sharing Risks

Simplification of participation in the Programme
Simplification, including reduction of the complexity and cost involved in participating in the FP, has been a key demand of almost every evaluation since the Framework began.

Although the 2008 Ex-post evaluation of FP6 IST concluded that the investment was well managed and was effective in reaching its goals, and even with the improvements introduced with the launch of FP7, the Panel called for simpler and more flexible funding mechanisms by developing a more **trust-based approach** towards participants. Interviewees during this study reiterated this need for a trust-based approach – reflecting both scientific and managerial risk.

The issues surrounding this relate to the Commission's own governance structures, processes and policy delivery mechanisms; in particular this covers **the EC Financial Regulation**. This has meant that while the Framework Programme has striven to introduce measures that should simplify and clarify matters for participants, many of these have proved unworkable in practice because of a particularly narrow interpretation imposed on them by the financial departments of the Commission. While one might understand the reasoning behind this approach, it remains the case that while it is in place the measures proposed for simplification will not be able to make any substantial advances. It is clear that the Financial Regulation plays a key part in limiting the potential to simplify the implementation of the Programme.

An example is the obligation imposed on the JTIs to implement the provisions of the EC's Financial Regulation while - in principle - the approach that the Member States and participating companies should carry out the accounting control with a minimum of intervention at the Community level has been implemented. This causes limitations and rigidities that have been criticised repeatedly in interviews and the survey.
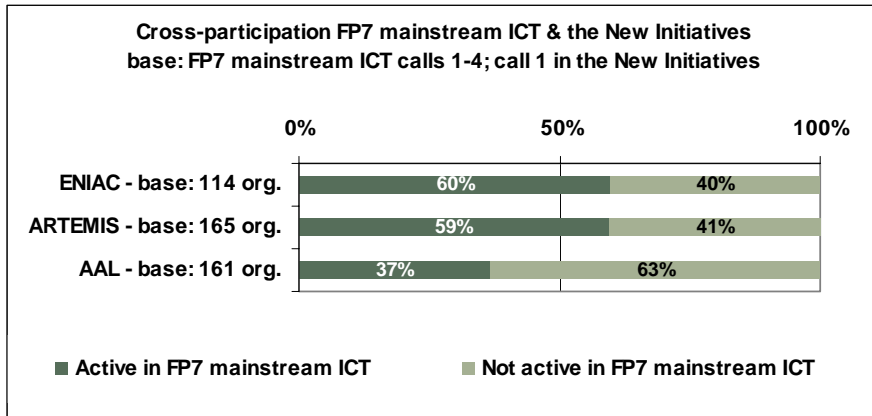
One of the factors limiting the efforts in simplification in their impact relates to the multiplicity of funding programmes at EU level (not to mention national and regional programmes). There is a clear demand for **a more coherent approach** to funding for the different elements of the innovation process. Funding regimes show –sometimes quite significant - divergences within and among the various programmes, funding schemes, and initiatives.

Examples include:

- The replacement of the concept of "actual, necessary and economic costs" with the concept of *"actual costs incurred"* according to participants' usual accounting principles and also their usual management practices has been implemented in the grant agreement, but there have been differences in the interpretation across different areas of the programme.

- The *more extended use of flat-rate financing* within a simplified framework of forms taken by Community Financial Contributions has been implemented for some Co-ordination/Support Actions, even though it is much more limited than was perhaps expected. This is due to interpretations of the limitations arising from the financial regulations. It has also been introduced for Networks of Excellence but only actually implemented in limited manner, and eligible costs still have to be justified.

- The difficulties with the *simplified definition of eligible costs* appear to lie not with the definition of costs but with the interpretation of eligibility and how this is assessed. It seems that there are variations between different parts of the Commission in how the definitions are applied.

It is clear that the complexity in funding regimes and the diverging interpretations of the financial regulations throughout the multiple programmes and initiatives at EU level constitutes a particular burden for participants operating across the programme, or even within a programme but in different funding schemes or initiatives.

In this context one should also consider that especially the 'core' participants show a strong **cross-participation** profile and are involved in multiple instruments. They therefore have to deal with multiple regimes within the FP. These organisations form the backbone not only for the FP7 mainstream ICT research, but also for the New Initiatives: 60% of the organisations active in the JTIs participated also in FP7 mainstream ICT research – all of them 'core' participants. The same accounted for ~40% of the organisations involved in AAL.

Cross-participation FP7 mainstream ICT & the New Initiatives
base: FP7 mainstream ICT calls 1-4; call 1 in the New Initiatives

	0%	50%	100%
ENIAC - base: 114 org.	60%		40%
ARTEMIS - base: 165 org.	59%		41%
AAL - base: 161 org.	37%		63%

■ Active in FP7 mainstream ICT   ■ Not active in FP7 mainstream ICT

Many organisations also participate in non-FP programmes of the EC, further increasing the complexity they have to address. The potentially high level of cross-programme participations by organisations involved in FP7 mainstream ICT is illustrated in the relatively strong FP7 mainstream ICT/CIP cross-participation: one in four (single) organisations that were 'represented' in the questionnaire survey and were participants in FP7 mainstream ICT stated an involvement also in CIP (any of the three CIP programmes). Such cross-participation was particularly high among the Higher Education institutions and the Large Enterprises (~30%), but was indicated also by ~20% of the SMEs.

There is concern over different interpretations of the **auditing rules**, within DG Infso, between DGs and also between the Project Officers and the financial authorities. It is not clear how auditors will interpret, for example, the application of the costs based on the organisations' accounting systems or the definition of the eligible costs ex-post.

Problems are now arising with retrospective interpretations of rules at audit in FP6. Since there are fewer audits at intermediate stages in FP7, this is leading to concerns that this will be problematic at the end of projects. Given the experience of FP6 audits currently under way, there are concerns that there may be retrospective interpretations by auditors which are not consistent with those accepted during the life of the project.

Larger participants may view this complexity in funding regimes and divergences in interpretations of financial regulations as a cost, rather than a barrier, but for smaller firms they can represent an insurmountable problem.

Reducing the costs of participating in the Framework Programme
Measures that were successfully implemented in FP7 ICT, aiming at costs savings and a lowering of the red tape included

- The streamlining of the process of submission through the full introduction of the *Electronic Proposal Submission System* (EPSS). The savings here lead through into a saving of effort in the evaluation process due to the elimination of working with original paper proposals

- The *Unique Registration Facility* (URF) that enables organisations to introduce administrative documents only once for multiple proposals. In addition to the savings to participants in reducing the effort of providing identification documents - monitoring and evaluation data will be substantially improved for FP7, especially as regards the previously vexed question of identification of SMEs

- The ***removal of ex-ante financial viability checks*** for organisations requesting an EC funding lower than €500K, interesting 80% of the participations

- The ***Financial Guarantee fund***, replacing the collective Financial Responsibility that constituted a problem in FP6, affecting especially SMEs but also other partners sharing such potential liability

- The ***removal of the need for audit certificates*** on an annual basis for cumulative funding of under €375,000, interesting 65% of the participations

- Introduction of ***electronic submission and reporting tools*** has been well received within ICT – although both the project officers and the participants report some teething problems initially. However, the online reporting tool is well regarded and seen as much superior to the on-line tool being used in other areas of the programme. In this context, the existence of multiple reporting tools is possibly not an advantage for participants operating across the programme.

The overall view of the participants was that there was indeed some improvement in a lowering of the administrative burden, but one in three survey respondents gave a negative evaluation on the efficiency of the new measures in reducing the costs of the application processes and participation as such.

In FP7, the **preparation of proposals** remained a very costly process – not least because changes in the application processes were to a large extent outweighed by the decreasing probability of having a project accepted.

Interviewees repeatedly reported an **increased competition for EC funding** in FP7, lowering the chances of success for the proposals and thus the potential Return of Investment for the application process. Among the 3,170 proposals received for the first 3 calls of FP7 mainstream ICT, only 538 (i.e. 17%) led to the positive conclusion of a contract, despite the fact that 50% of the eligible proposals were considered during the evaluation process as 'above threshold'.

In other words, only one third of "good quality proposals" resulted in a contract.

Various factors play a role here, including the quality of proposals received, the over-subscription rates (large number of proposals compared to a limited budget in the action lines), and the clarity of the action line description.

In this context, the request for a two-stage proposal process has been raised before, and was again a strong theme in the interviews.