

KEY FINDINGS AND RECOMMENDATIONS FROM THE EVALUATION REPORT

Innovations in Information and Communication Technologies (ICT) are vital to Europe's competitiveness and economic welfare. They form the foundation for a knowledge-based economy: their development and use is crucial to sustaining growth and productivity. Investment in information society research and technology development has therefore rightly been a thematic priority in the 6th Framework Programme for Research and Technological Development (IST-FP6) – allocated €4B from 2003 to 2006.

This evaluation of the IST thematic priority has looked at how effective the research has been at creating new knowledge and innovation, as well as converting these innovations into economic growth and welfare through Europe's broader innovation systems.

The research investment has been well managed and has been effective in reaching its goals. However, improvements can be made in the flexibility and simplification of the funding mechanism, and in strengthening the global impact of European research in this area. More flexibility in programme administration can help attract more new high-growth companies. Most of the Panel's recommendations regarding the management of the research could be implemented by the Commission within the duration of the 7th Framework Programme (in 2010 to 2013).

Other recommendations may require a more long-term effort and/or reach beyond the domain of the Framework Programmes at a more strategic and political level. The extent to which new knowledge and skills created in Europe are exploited in Europe depends on a broad portfolio of policies and measures which affect the innovation "eco-system". Systemic change is needed to remove barriers to innovation and promote stronger interactions between users, researchers and business - notably in regional innovation systems.

The evaluation has identified a number of opportunities to improve the environment for innovations from ICT research in the European Framework Programmes. Greater synergies are needed with venture capital investment; with regional innovation strategies and with public procurement. A more strategic, European level, approach is needed to standardisation, lead market development and the mobilisation of public-private partnerships, as in the Joint Technology Initiatives launched as a result of activities in the 6th Framework Programme.

1. MANAGEMENT OF THE EUROPEAN RESEARCH INVESTMENT

1.1. Utility and sustainability – the role of IST-FP6

Much of the research funded by the EU under IST-FP6 would not have been undertaken, or only undertaken in a much reduced form, without European support. IST-FP6 has therefore played a significant role in taking research activities to European and global levels. This is especially true when effectiveness requires critical mass, broad discussions and "new eyes" on a problem, or when research needs to be shared with an advanced group of experts in the field.

The achievements have high sustainability. Participants gain significant benefit from strengthened networks, new knowledge and skills. The networking effects are crucial, with many participants developing long-lasting collaboration. Some of these networks have become stable structures that form the core of wider collaborative environments, such as European Technology Platforms. As a result, JTIs have been introduced as a way of strengthening public-private partnerships in research at the European level. The new JTIs on nano-electronics and "embedded systems" are good examples of how the Framework Programme will have a positive long-term impact.

<p>It is recommended that efforts are made to continue to consolidate public-private partnerships of a more permanent nature, such as JTIs, from the 7th Framework Programme.</p>
--

1.2. Effectiveness – the impact of IST-FP6 research

Overall, the participation rate of small companies (SMEs) has been sustained at over 20%, which is well above the 15% target set by the European Parliament and the Council. However, the involvement of high-growth companies in the programme remains low. This raises questions about the degree to which the Framework Programme is attractive and accessible to high-growth companies, and the degree to which participation in it assists access to venture capital and to European and global markets.

Both small and large firms are required to create the optimum environment for SME growth, and financing mechanisms should be open to both. Both types of firms have their role in the innovation eco-system and each is important to the other. It is positive that the collaborative research in the Framework Programme enables small and large companies to work together in most projects. However, the smaller "targeted research" projects must not become a special instrument for SMEs and larger Integrated Projects must not be overly dominated by large enterprises.

It is recommended to continue the effort to ensure that support for SMEs and for large firms is not "compartmentalised" into different measures or tools.

Research networks created through participation in European projects have increased the effectiveness of knowledge transfer among organisations and the speed of diffusion of information, as well as the mobility of human resources. Changes in research partnerships as a consequence of participation in the Framework Programme are one of the areas where the impact of EU investment is most visible. Many participants report that the strong networks created during the Framework Programme will continue as the basis for their future research cooperation.

Much of the research is "far from the market" or basic research, and commercialisation of new products and services is not a direct objective. Little has been done recently to link participants to the venture capital community. A facility to promote such links was beginning to be developed in the period up to the year 2002, but largely vanished with the economic downturn immediately thereafter. It is time to consider reintroducing one or more instruments for this purpose.

A platform should be created within the scope of the 7th Framework Programme for new and high-growth companies to meet venture capital investors.

In section 2.1 further recommendations are made to strengthen this link and to stimulate subsequent market innovations.

International cooperation between the EU and China, India and Africa has been strengthened and 60% of the top-25 global innovation-leaders are involved in the programme. Integrated Projects have been effective in connecting European IST research to the world innovation system. However, international co-operation should also be used to bring the best science and technology of the world to European researchers, so that they can build upon it. It is therefore recommended to further globalise the Framework Programme, as elaborated below.

1.3. Globalising the Framework Programme

Europe cannot afford to be an RTD "Fortress". European researchers need to be partners with the best in the world, whether they are from inside or outside of Europe. There is a need to open up further to the world so that developing European research and innovation can draw upon the best minds and the best ideas, regardless of their origin. In addition, some technologies developed in Europe will need to be commercialised in other markets, in collaboration with non-European firms, to the eventual benefit of European companies and consumers.

If the best researchers from around the world participate in the Framework Programme, it will also become more attractive for the best European researchers. This is particularly relevant for highly innovative smaller high-growth firms which are not currently well

represented in the programme. Giving them the opportunity to work with the world's best researchers and innovators would increase their motivation to take part in the programme.

Although cooperation, in particular with Asia and Africa, has been strengthened, the Panel recommends that these efforts are taken even further in order to make the programme truly global:

Encourage participation from outside Europe in all projects. Participation from both developing and industrialised non-European countries should be encouraged.

Internationalise the advisory system – e.g. the IST Advisory Group - by including top scientists and engineers from around the world

Reflect the latest international developments and challenges in the work programme. A more flexible approach may be needed to integrate new, interesting developments in the field faster.

Focus the research effort on creating and sustaining world leadership where Europe already has a comparative advantage and where Europe has a new opportunity to take the lead. Europe should be selective and not attempt to become world leader in every area

1.4. Relevance and strategic impact – IST-FP6 and wider EU objectives

IST research investments in 2003-2006 have contributed to sustain and create European world leadership in some research areas, although not always translated into lead market capabilities in ICT and applications. IST-FP6 has reinforced market leadership in mobile communications and research leadership in high-speed networking, GRIDs, advanced robotics and audiovisual systems. World leadership has been achieved in the development and use of high-speed e-Infrastructures for science and research. In these areas, opportunities have been created for new entrants (notably SMEs) in addition to the continued participation of leading companies. Support to emerging technologies has created world leadership in quantum communications, nano-electronics and complex systems.

The successful development of high-speed electronic networks (eInfrastructures) has demonstrated the importance of European intervention in infrastructure development. These initiatives have created European world leadership.

The e-infrastructures approach should be expanded to more application-oriented and user-oriented platforms in other sectors.

The European Research Area has been strengthened, especially through Integrated Projects, Networks of Excellence, and the clustering of projects. European Technology Platforms have extended cooperation beyond the individual projects financed under the IST-FP6. They have fostered wider synergies with national and private-sector initiatives and have been an essential step towards new Joint Technology Initiatives (JTIs). These are an incentive for industry and Member States to increase their R&D funding. They provide a way of creating new partnerships between publicly and privately-funded organisations involved in research, focusing on areas where research and technological development can contribute to European competitiveness and improving the quality of life. They can therefore be seen as a pioneering approach in pooling public and private research efforts and they have become an integrated part of the 7th Framework Programme.

Both JTIs and "living labs"¹ have the potential to further strengthen the innovation process in other areas. They represent a more "systemic" approach by bringing together the supply side (enterprises and researchers) and the demand side (users and public authorities). JTIs and "living labs" could also be used as vehicles for targeted public procurement of innovation. However, the Panel is concerned that JTIs may be subject to overly-strict EU administrative

¹ Living labs are city- level centres of innovation and experimentation, generally in mobile technologies and applications, bringing together users and developers to create and test ideas and products.

controls which may inhibit innovation and participation of innovative companies, as has been the case for the Framework Programme.

The Panel recommends that accounting control in JTIs is carried out by Member States and participating companies, with a minimum of intervention at the Community level.

1.5. Efficiency – cutting red tape

It is important to pursue the goals of the research in a cost-effective manner. Further efforts are needed on simplification and reduction of administrative burdens of the Framework Programme, both for participants and for the Commission. They have not been significantly reduced in the 6th Framework Programme, because of the unfamiliarity with the new instruments and the large number of partners in Integrated Projects and Networks of Excellence. Some improvements have been made in the transition to the 7th Framework Programme, but there is a need for further simplification and increased flexibility. The Commission should explore options for further simplification.

1.6. Simplifying management

The measures taken by the Commission to ensure responsible use of public funds can often inhibit the programme from reaching its full potential, for example many of the most innovative companies – in particular high-growth SMEs – are discouraged from participating in the research programme because of the cumbersome procedures for both application and implementation.

The system of evaluation of proposals can discourage newcomers: feed-back on the quality of applications to unsuccessful proposers is reported by participants as poor compared with communication from private sector funding sources; a consensus-based evaluation process tends to result in projects offering incremental developments rather than radical innovations; and it is difficult to attract the best scientists from industry as evaluators.

While these are common problems in all public research funding, some were exacerbated in the 6th Framework Programme by the introduction of new instruments and increased overheads linked to the management of very large project consortia.

The Panel strongly recommends developing a more trust-based approach towards participants at all stages. The existence of a few unfortunate examples should not be allowed to stand in the way of innovation. Specific elements in the development of such an approach are detailed below.

Efforts should be made to both simplify and introduce flexibility in the three key phases of the project lifecycle – the application, the evaluation of proposals, and the management of funded projects:

At the application stage, it is recommended:

To require shorter proposals with fewer details of work packages and a focus on the appropriateness of partnerships, in particular the inclusion of highly innovative participants.

At the evaluation of proposals stage, it is recommended:

That more complete and helpful feedback is made available to proposers whose ideas are not funded.

To test a new approach whereby proposals are not fully evaluated initially. All applications passing a few basic checks should be given a small amount of "seed funding" for an exploratory phase. After this, exploratory projects with successful results would be selected for full project funding. Financing projects based on actual performance rather than promises and reputation could both reduce the initial paperwork and be a viable way of attracting innovative (small) companies which would not otherwise consider applying for Community funding.

To explore expanding the two-step evaluation procedure from the Open part of the "future and emerging technology" area to other parts of the programme - prospective participants first provide a broad outline of their project idea, and only provide a more refined plan once they are selected. This may increase the workload for the Commission in the early phases, and lengthen the evaluation process, but it will significantly reduce the burden on the research community of preparing proposals.

At the stage of project management, the main problem is the rigidity of carrying out the research according to a fixed schedule and with a partnership established in advance. It is therefore recommended:

To optimise reporting, which is time-consuming and may be untimely, and allow the participants to report when there is something to report.

To allow the refocusing of the research on different priorities if this becomes necessary during implementation.

Similarly, to allow more flexibility in the composition of partnerships during the project, including the possibility of changing partners if the research takes a direction which would benefit from new partners or replacement of partners.

2. BROADER POLICY RECOMMENDATIONS: REALISING THE FULL BENEFIT IN GROWTH AND WELFARE THROUGH THE EUROPEAN INNOVATION ECO-SYSTEM

ICT is an enabling, pervasive technology, whose benefit depends on a dynamic "eco-system" of RTD and innovation. Supply-side support alone to RTD, such as that of the Framework Programme, is not sufficient. It is also necessary to improve the linkage of RTD into the innovation "ecosystem" in Europe. The approach to innovations must be to simultaneously "push" through RTD and "pull" through market demand and public services, with efforts needed simultaneously at national/regional level and at the European level.

For these reasons, the Panel has devoted a significant part of their evaluation to those factors which determine the outcomes and impact of European research. Many of the Panel's recommendations therefore relate to systemic measures which lie outside the Framework Programme management, but which must be associated with it. There are several areas in which an effort should be made, but the Panel has focused on two key issues:

- Developing new markets, and
- Improving European infrastructures and interoperability.

2.1. Developing new markets

Innovation needs new capital investment. However, venture capital is less available in Europe than in the USA. During most of the 6th Framework Programme, the availability of early stage (seed and start-up) venture capital in the EU15 was approximately half of that in the US. In addition, European public authorities do not fully utilise their considerable purchasing power to foster innovation through procurement of innovative services and technologies.

Although knowledge flows in both directions between the EU and the US, there is a net flow from Europe to the US. Thus, while enterprises often choose Europe as a location for R&D, commercialisation of their research results in many cases takes place in the US, a tendency further supported by the fact that the top 50 global companies in the ICT sector are predominantly American or Japanese.

To improve the "ecosystem" of R&D and innovation in Europe, the demand for innovative solutions and the financing of high-growth innovative enterprises must be increased.

Strengthening the demand for innovative solutions

To ensure that R&D results are converted into growth and benefit for society, there is a need for an accompanying multifaceted, demand-oriented effort.

The Panel recommends a more strategic use of standardisation to create new EU-wide markets. Standard-setting is needed as a tool for pulling through innovations and creating viable markets for new products and services.

The public sector has the potential to create demand for innovative goods and services. Public procurement currently accounts for approximately 17% of Europe's GDP. Historically, it has been one of the strong drivers of innovation and take-up of new technologies. However, Europe is lagging behind the US, where public procurement plays a key role in innovation. Thus, there is potential for significantly greater value to be generated by the Framework Programme research through increased public procurement of innovation at regional, national and EU level. At the same time, it should be emphasized that research and procurement of innovation should not focus only on products, but also on the development of new, innovative services.

The Panel welcomes the recent Commission Communication on pre-commercial procurement, and recommends that new initiatives are taken to allow public authorities to procure the development of innovative goods and services.

Increasing the availability of financing

Europe lags behind the US in the availability of finance to support the growth of companies. Not enough venture capital is available in Europe and many technologies and services with commercial potential, developed by small, highly innovative European firms, attract US investment. The growth benefits of these firms are effectively relocated from Europe to the US. Europe needs to be competitive not only in technology development but also in the availability of capital for innovation and growth. We must secure European resources for these companies to grow. This will also secure a new base of innovative companies capable of participating in Framework Programmes. Business angels, seed capital and full-scale venture capital need to be available in order to have a well-functioning financial market for innovation and growth.

The European single market needs to be made more effective for business angels and venture capitalists, and European investment funds need to be more effectively utilised to pull through innovations from the Framework Programmes.

2.2. Improving European infrastructures, standards and interoperability

The development of cross-border infrastructure, interoperability and, in some sectors, standards, is one of the areas where true European added value can be achieved.

In some cases, the market takes care of the development of de facto standards through competition. However, national regulations and practices can constitute barriers to the development of European and global standards. This fragments markets and prevents European companies from reaping the full benefits of a single European market.

A more strategic approach to standardisation at the European level, when this cannot be left to market forces, focused on interoperability and development of standards where there is a well-documented need for coherent innovative services and European leadership, will be in the broader public interest.

The interconnection of large regional and national eInfrastructures should be further developed. EU-wide platforms and infrastructures are needed in sectors such as eGovernment (especially procurement), eHealth (cross-border applications), logistics and transport. Framework RTD should be complemented by other measures, in particular public procurement at both national and European level.