Report on the European Commission's Public On-line Consultation

"Shaping the ICT research and innovation agenda for the next decade"

Open 4 September - 7 November 2008

Executive Summary

In search of the best strategies to boost Europe's leadership in ICT research and innovation in the next decade, the European Commission launched a public consultation.

The consultation asked four main questions:

1. What are the main **challenges** ahead for ICT research and innovation? As the ICT revolution continues, what are Europe's key priorities for research and innovation?
2. How, and in what fields, should **Europe aim to lead**? Europe has world industrial and technological leaders in key fields such as telecommunications and embedded systems. How can advances in these areas be reinforced and what new areas should a leadership profile be sought?
3. What is the role of **public policy** in putting Europe at the forefront of ICT innovation? How can research policy be consolidated to create a European market for ICT innovation? How can complementary policy fields such as standardisation, licensing and intellectual property regimes be adapted to support the early commercialisation of research results?
4. What features need to become available for Europe to adopt a more **systemic approach** for ICT?

565 contributions from industry, ICT experts, policy-makers and the wider public will be fed into a renewed strategy for ICT research and innovation, to be unveiled in spring next year.

The most important societal challenges identified requiring ICT innovations are energy efficiency, environmental sustainability and health and social care systems. Web-based services are expected to be the principal business application driving ICT development. The expected top three consumer markets are access to information, social networking and on-line administration.

> *… the most important challenge over the next decade will be the competitiveness of the European knowledge economy in the face of competition from emerging economies … ICT needs to take a lead role in the global sustainability problem … Europe has been and can continue to be a leader …* [quotes from free text comments]

For the supply industry there is no specific barrier to development which stands out from the mass. For SMEs development it is the difficult access to private financing for innovation. The market development clearly suffers from the market fragmentation, the unfavourable business environment, lack of interoperability and weak public procurement of innovative products and services. Unattractive careers are identified as the major hurdle for increasing the number of ICT researchers in Europe.

> *… if the EU is serious about being a global leader in the knowledge society it needs to provide the best "fundamentals": skilled workforce, ICT infrastructure, innovation climate … governments and industry should jointly support better marketing of careers in ICT to young people (and their parents) …*

Embedded systems are identified as the major EU technological strength. Industrial strengths are telecom equipment and services. Industrial weaknesses are computing hardware, software products and consumer electronics. The analysis of the results confirms the lack in entrepreneurship in Europe and the unwillingness to take risk. The EU strengths lie in a skilled workforce and good ICT infrastructure.

> *… it is important that Europe focuses on new technologies and new markets, not on trying to create European rivals to technologies that already have sufficient momentum to be effectively global and unstoppable … Europe's success will depend on being able to cut through the old silos of technology and create programmes that are flexible and responsive and permit and encourage innovative research …*

Tax incentives and public financing of R&D are the top suggestions for how best to increase Europe's attractiveness to private investments. EU-supported collaborative projects are the

favoured approach to public-private partnerships followed by Joint Technology Initiatives and ETPs.

> *… Europe should devote greater efforts to innovation to ensure that research results find a market … industry needs a stable and certain regulatory environment in order to invest on a long-term basis and consequently to achieve innovation … keep it (laws, rules, public processes) simple …*

Increased coordination between EU, national, regional programmes and the structural funds for R&D and the development of common visions on ICT R&D between Member States are emphasised. Excellence of clusters can best be assured by concentrating the efforts spend on research and education facilities and by encouraging researchers to move between industry and academia.

> *… we need a European strategy with clear priorities and not sprinkling of funds … the real competition is not between EU Member States but between Europe and other regions like the US and China … a more coherent and synchronised R&D funding approach across EU Member States is needed …*

The public sector should be more active in taking up innovative solutions and should be encouraged through showcases and pilots to demonstrate innovative solutions. This would also favour better coordination of ICT innovation across the EU. Closer collaboration should occur between procurers, suppliers and policy makers and awareness of about the possibilities to procure R&D services should be raised. At EU level active standardisation policies should be developed and regulatory measures are needed to favour market development. When asked about existing links and exchanges between ICT R&I policy makers and public authorities in charge of providing innovative solutions for public services most participants don't know. The same is the case when asked about the utility of current instruments and policy to launch large scale projects cutting across the supply and demand.

> *… innovation has to be more market pull rather than technology push … demand-side factors (user innovation, market development, societal challenges) are main drivers of innovation … both a more market-oriented approach and higher public sector leadership can address Europe's competitive positions …*

Introduction

This consultation was run in the context preparing the Communication from the European Commission on “A strategy for ICT R&D and Innovation in Europe”, planned for February 2009.

The purpose of the Consultation was to gather input from ICT R&D and innovation suppliers, users and policy makers for shaping a renewed ICT R&D and innovation strategy for Europe. The consultation was open from 4 September to 7 November 2008.

The questionnaire had four main sections – (1) trends and changes in ICT, (2) strengths and weaknesses on both the demand and supply side, (3) solutions that public policies could offer, and (4) systemic approaches for ICT. The report follows this structure.

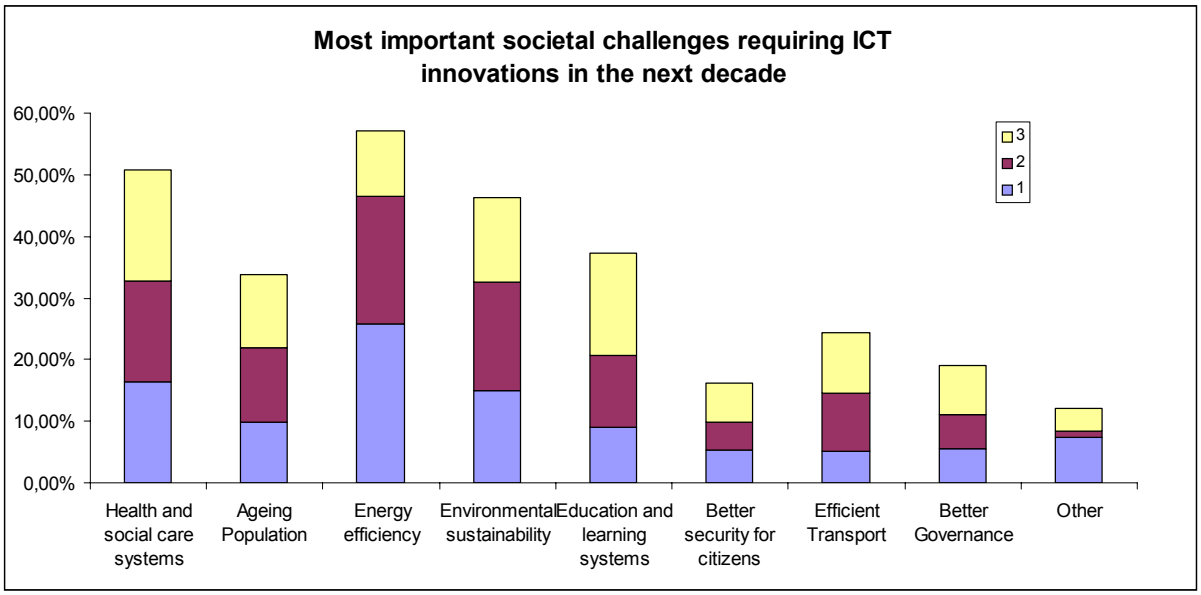
Of 567 replies received, 565 were unique and correct. An analysis of the participants profile can be found in chapter 5 below.

For the majority of the questions the participant was asked to select three options and rank them from 1 to 3 in order of importance. The results of these questions are represented by bar diagrams with three colours corresponding to the number of times the option was ranked 1st, 2nd and 3rd. Other types of questions and diagrams are explained individually.

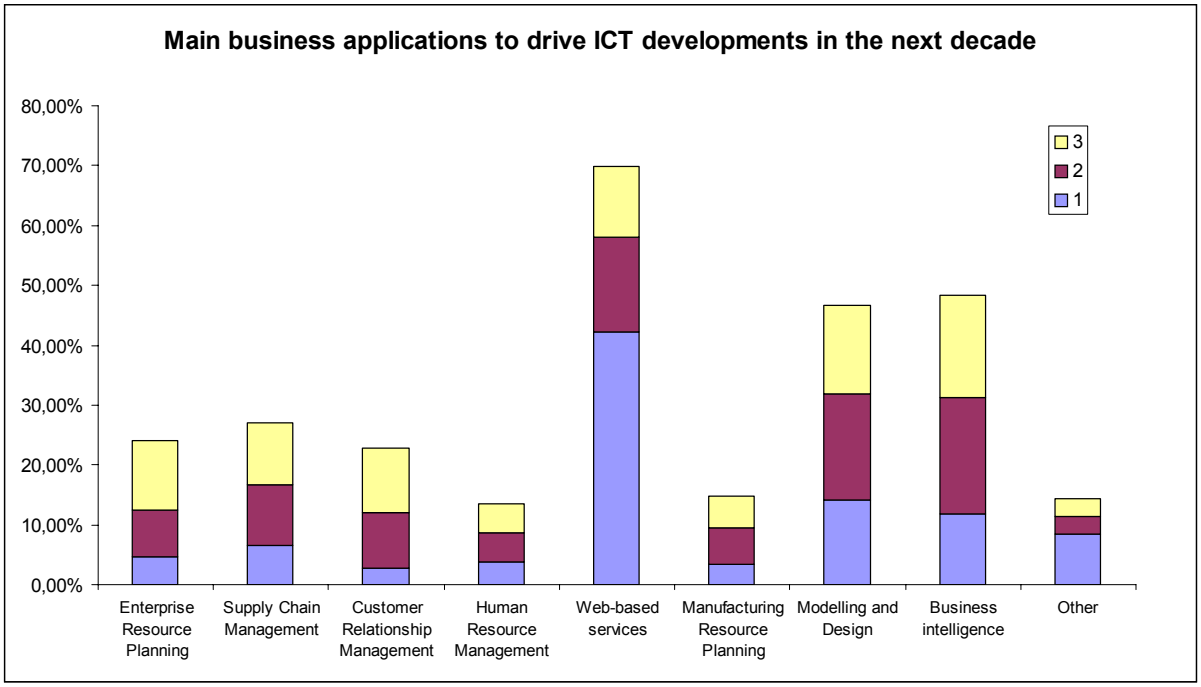
1. "Changes in ICT" and "ICT for Changes"

The ICT sector will be undergoing important changes linked to the evolution of technology, to market developments, to changes in the business environment, societal and citizen needs, and changes in policies and regulations.

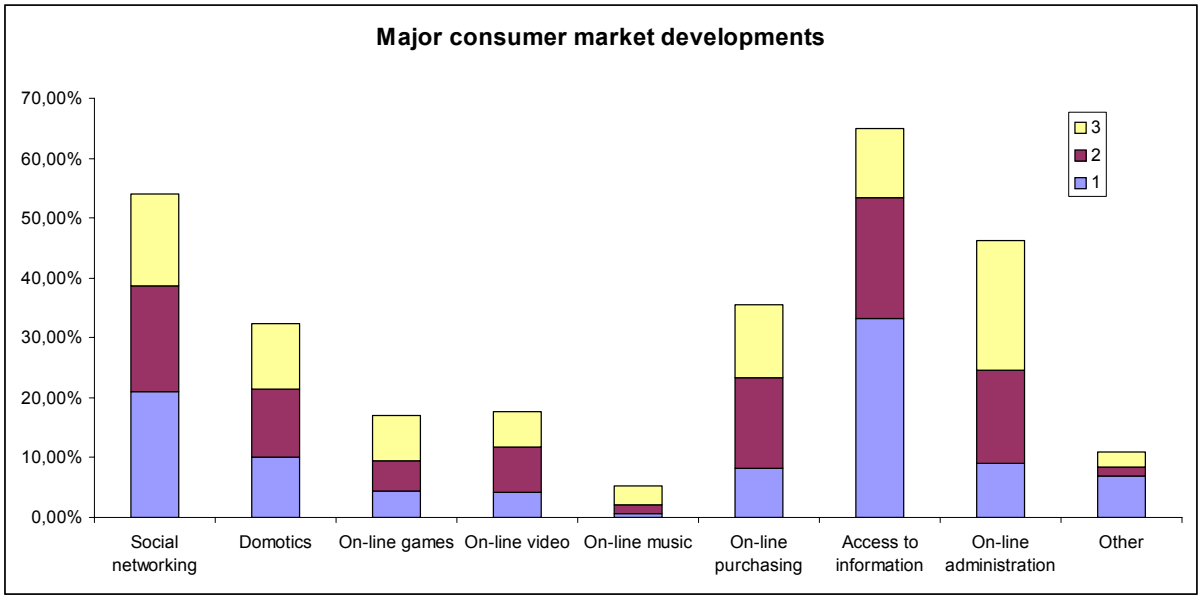
The questions are: What are the main societal challenges requiring ICT innovations? The main business applications? The main consumer market developments? The most important technology developments? The main source of evolutions and disruptions?



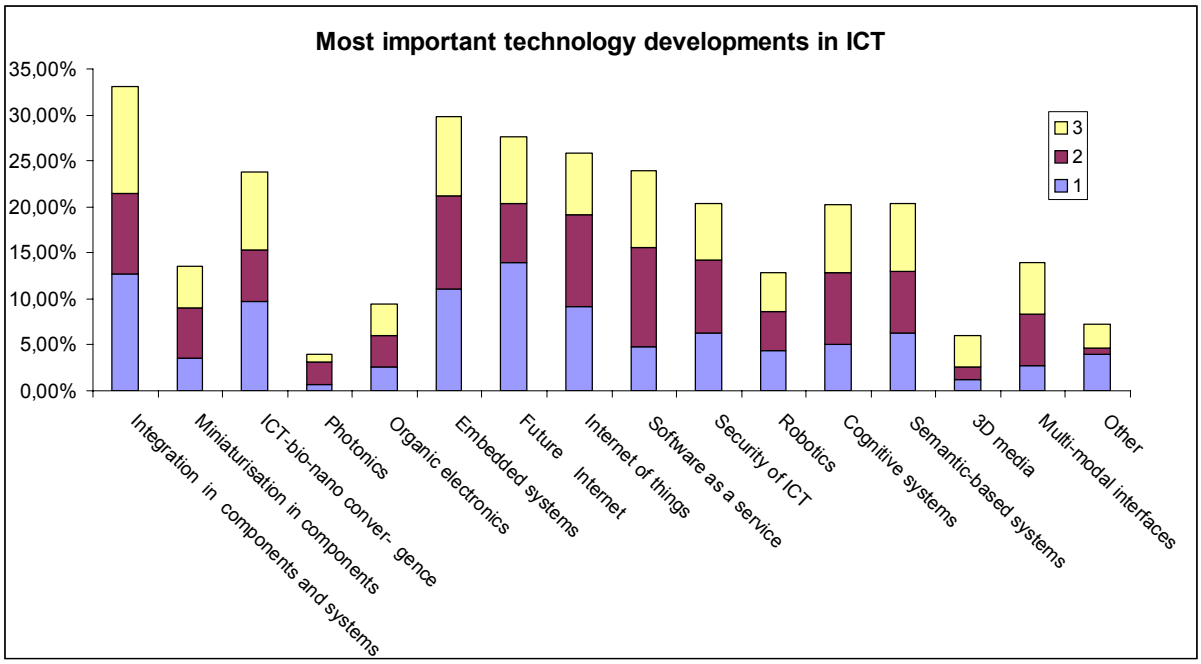
Respondents rated "energy efficiency and environmental sustainability" as well as "health and social care systems" highest for what concerns societal challenges requiring ICT innovations. Third comes "education and learning systems", ahead of challenges in security, transport and governance.



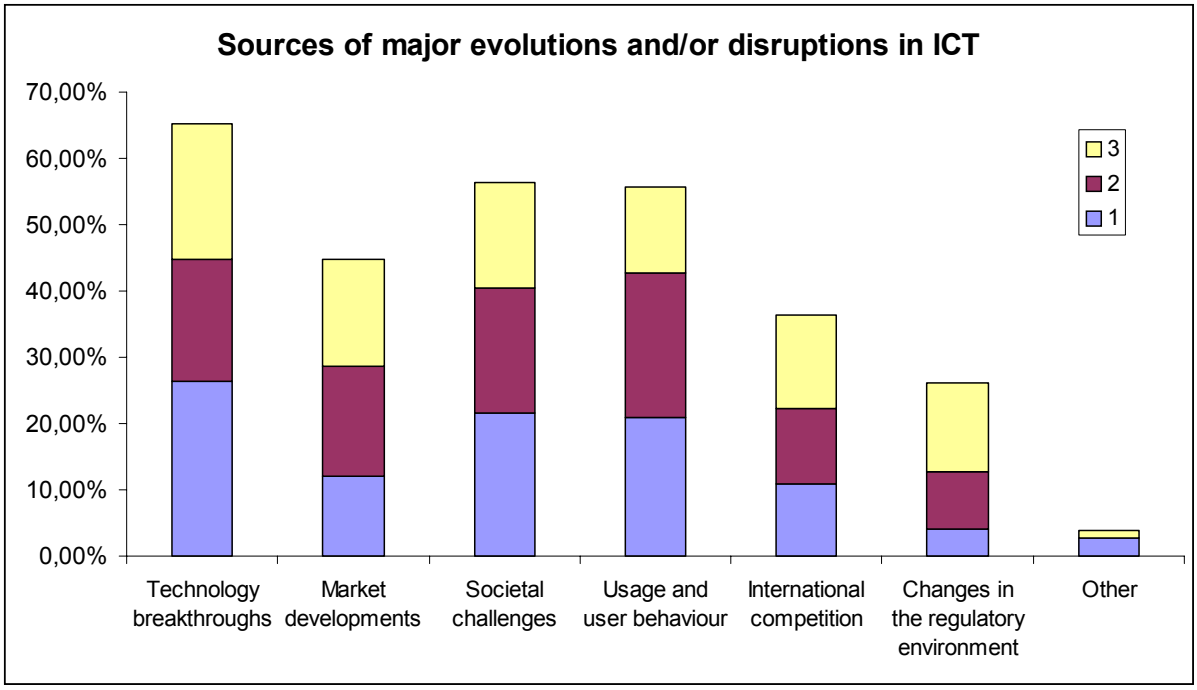
For the major business applications identified as drivers of ICT developments, "Web-based services" is in a clear pole position, not only in total number of replies but also with respect to the number of times it was chosen as first priority. It is followed by "modelling and design" and "business intelligence" applications, ahead of more traditional business applications like ERP, SCM, CRM, HRM and MRP.



For the major consumer markets, "on-line games, video and music" score relatively low. The top three in this category are "access to information", "social networking" and "on-line administration", followed closely by "on-line purchasing" and "domotics".



For the technology developments there are no outstanding peaks in the answers. A few technologies get low replies corresponding to the smaller constituency and higher specificity of the subject in this field, while topics around the "Future Internet", "Internet of Things", "Software as a Service" and "Security of ICT" cover a wider domain.



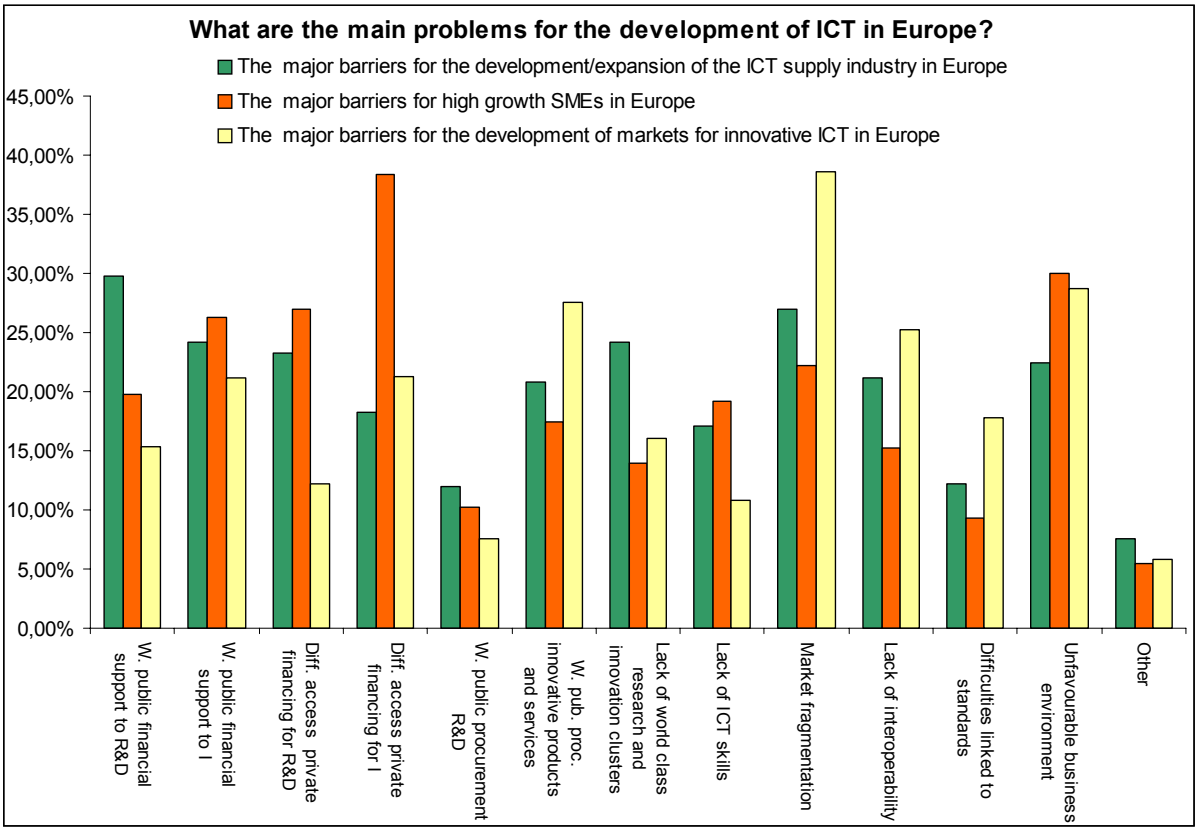
With respect to sources of major evolutions or disruptions the topscorer is "technology breakthroughs", reflecting the profile of the respondents. This is followed by "societal challenges" and "usage and user behaviour". "Changes in the regulatory environment" are seen as relatively less important.

2. "Can Europe lead in ICT?"

Europe has strengths and weaknesses in ICT. Globalisation and the emergence of competing regions are threatening the position of ICT industry in Europe and providing opportunities for new developments. Despite a very strong presence in some key ICT sectors, very few EU innovative SMEs in ICT have been able to become world leaders over

the last decades. Despite very high quality research and innovation clusters, Europe is not well-represented in the list of worldwide top clusters.

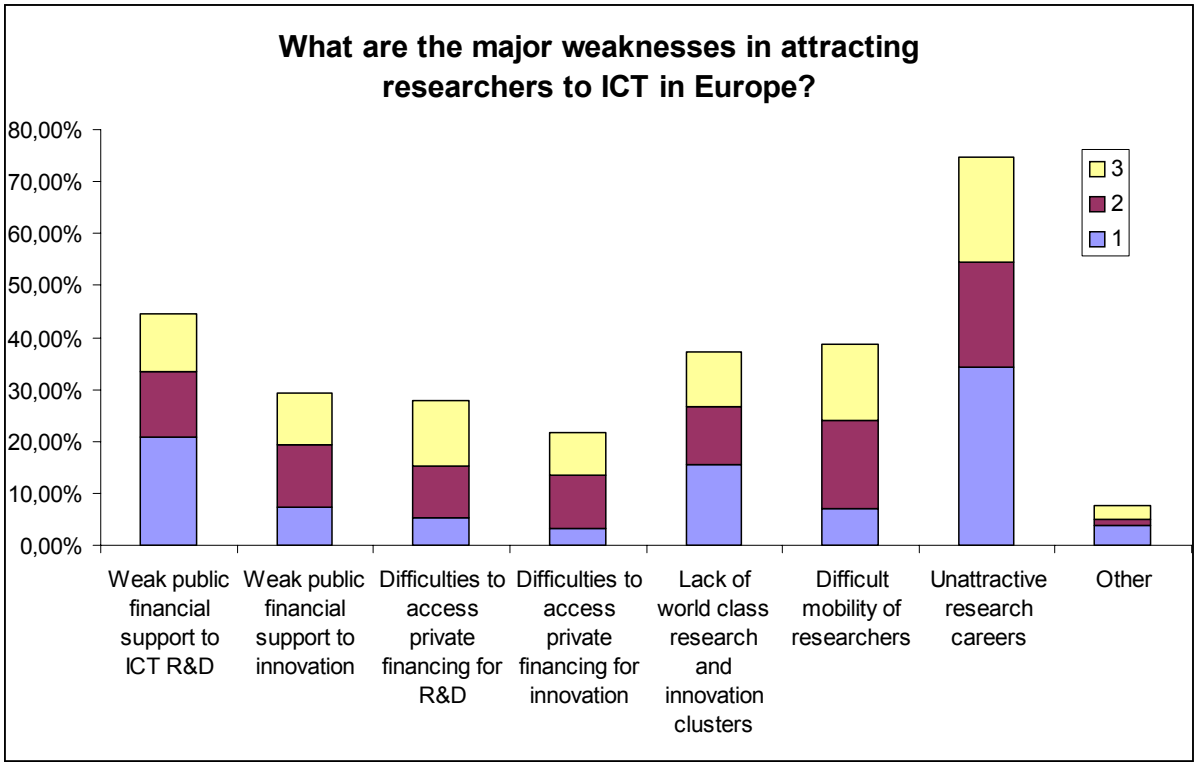
The questions are: How, and in what fields, should Europe aim to lead? What are the main problems for the development of ICT in Europe? Major weaknesses in attracting researchers to ICT? Europe's main technological and industrial strengths and weaknesses? Right framework conditions?



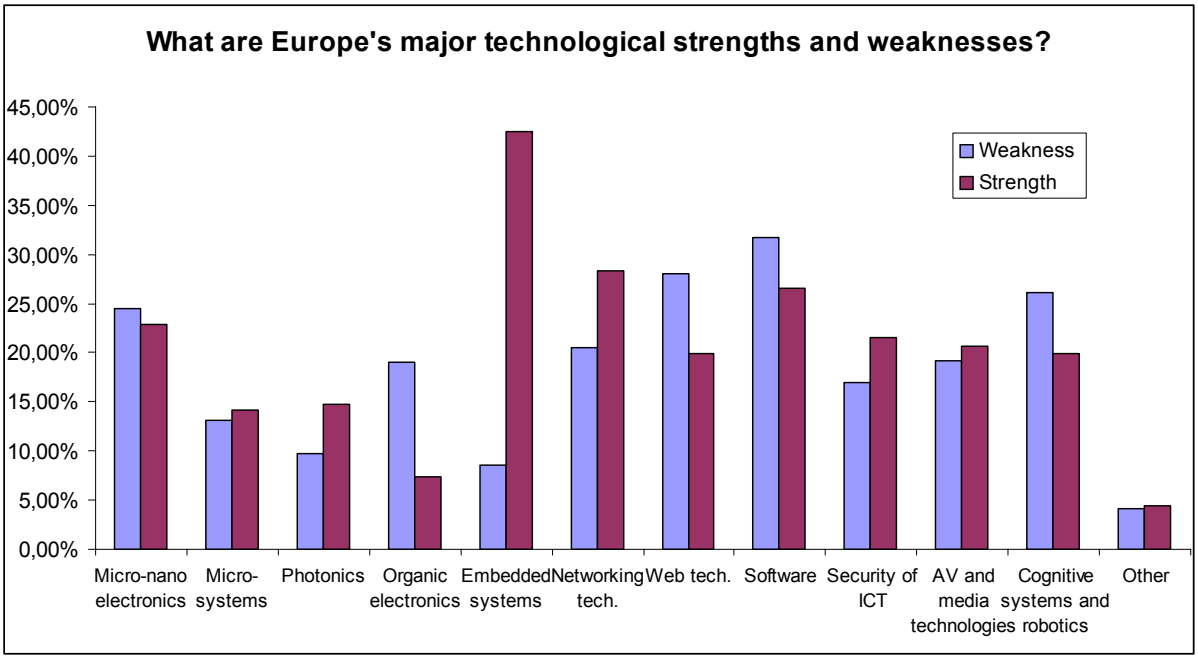
Respondents did not single out one main barrier for the development of the ICT supply industry in Europe. "Weak public financial support to R&D and innovation", "difficult access to private financing for R&D and innovation", "weak public procurement", "lack of knowledge clusters and skills", "market fragmentation and unfavourable business environment" are all important barriers. "Difficulties linked to standards" do not seem to be a major concern.

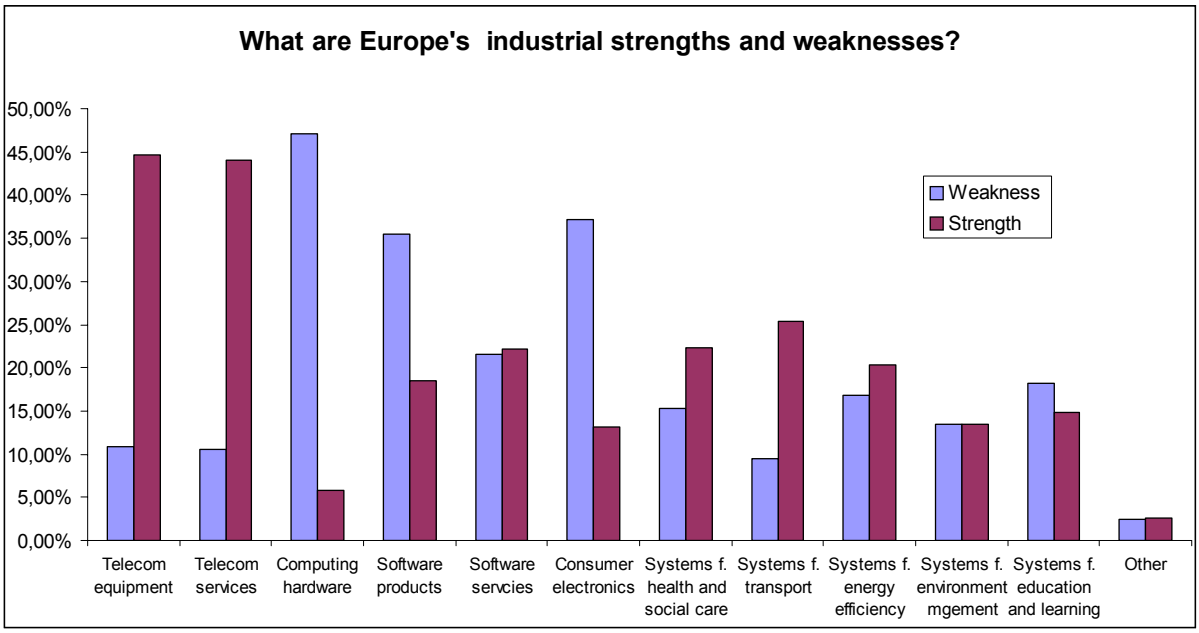
For the growth of SMEs, the major barrier identified is "difficult access to private financing for innovation". The second is "unfavourable business environment", followed by "weak public financial support to innovation" and "difficult access to private financing for R&D".

The market development clearly suffers from the "market fragmentation", followed by the "unfavourable business environment" and the "weak public procurement of innovative products and services" and the "lack of interoperability".

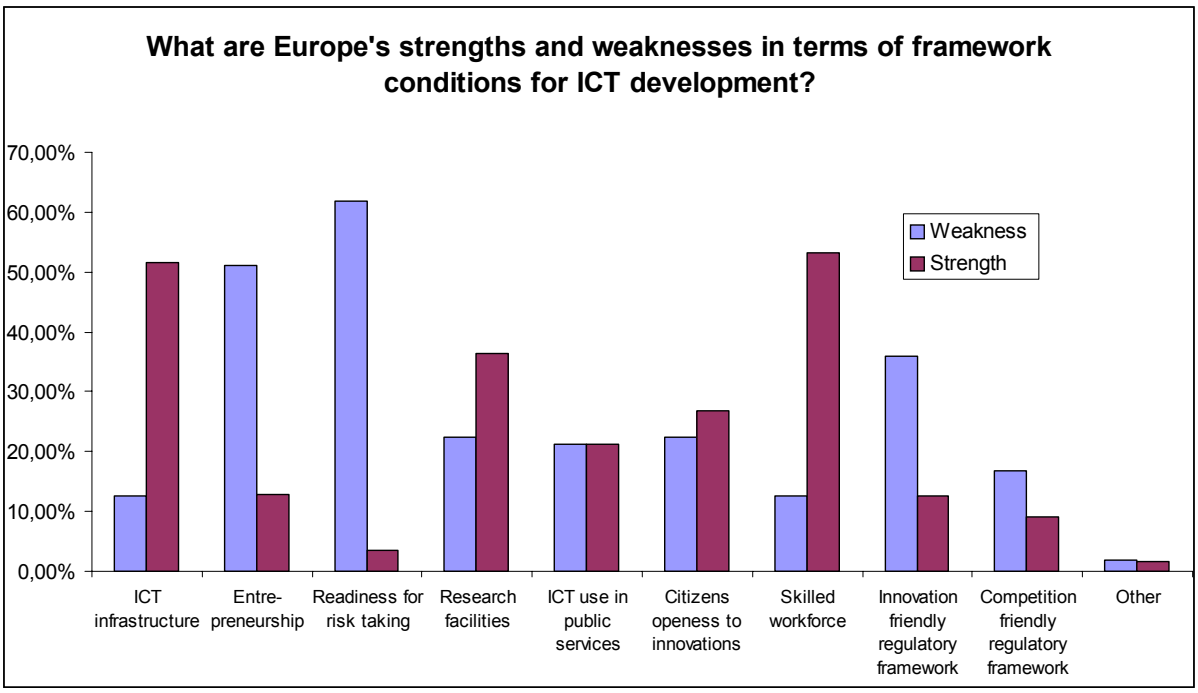


The main weakness in attracting researchers to ICT in Europe is clearly the "unattractive research careers". Other factors such as "weak public or private financing", "lack of world-class clusters" or "difficult mobility" are seen as less relevant.





What are Europe's main industrial and technological strengths and weaknesses? Clear agreement about our technological and industrial strengths in "embedded systems" and "telecom equipment and services", and respondents also concur on strengths in "systems for transport". The identified weaknesses are "computing hardware", "software products" and "consumer electronics".

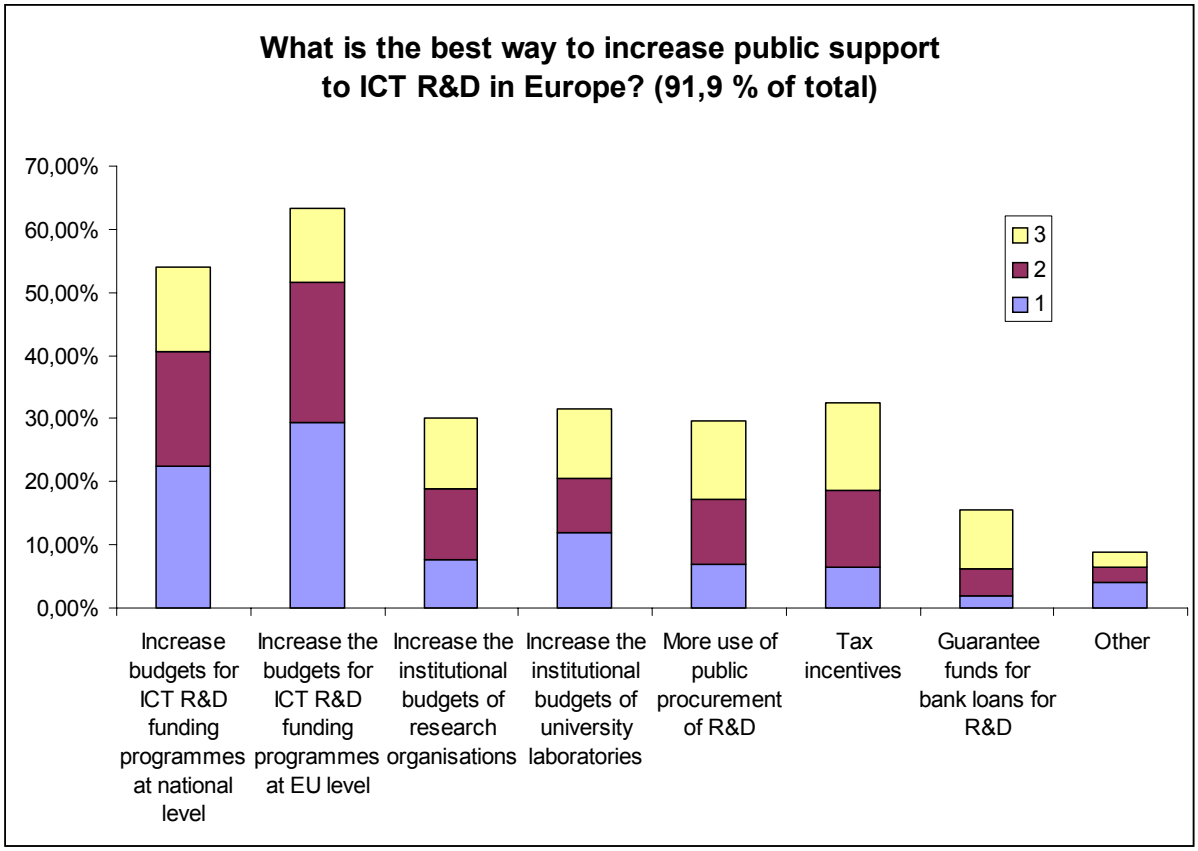


Asked about the framework conditions for ICT development, the respondents point to "entrepreneurship" and "readiness for risk taking" as the major weaknesses. Europe also lacks an "innovation friendly regulatory framework". On a positive side, the "skilled workforce" and the "ICT infrastructure" are clear recognised strengths.

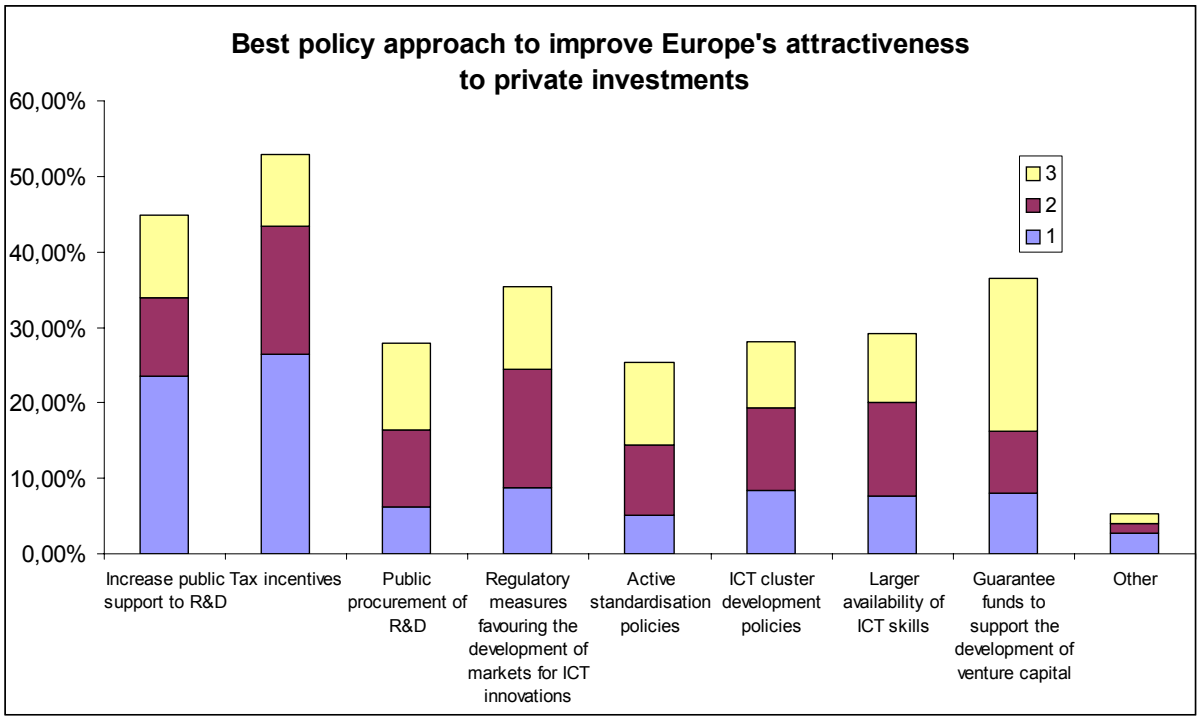
3. "What public policy for European leadership in ICT?"

The evaluation report on the effectiveness of ICT research in FP6 of the Aho panel recommended a more "systemic" policy for ICT research and innovation in Europe in order to be able to strengthen and capitalise on the knowledge created in research labs.

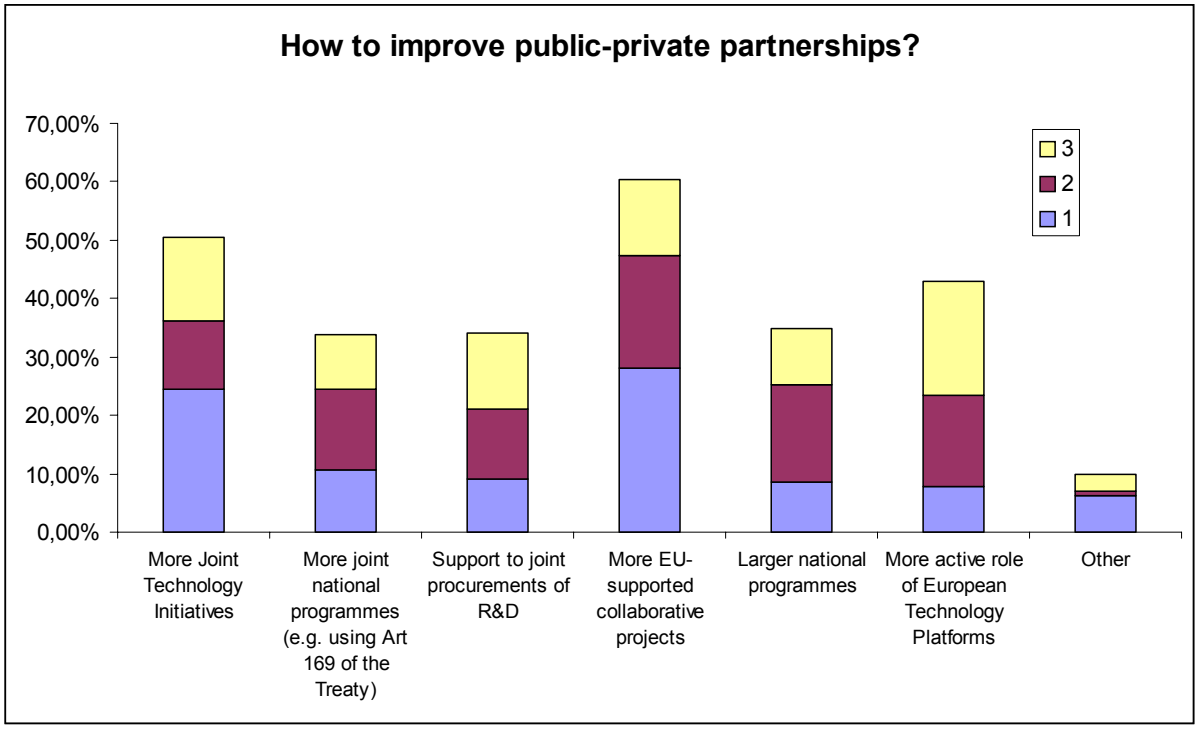
The questions are: How should public support to R&D be increased? How to become more attractive to private investments? How to improve public-private partnerships? How to improve coordination of efforts across Europe? How to ensure excellence in clusters? How to stimulate uptake?



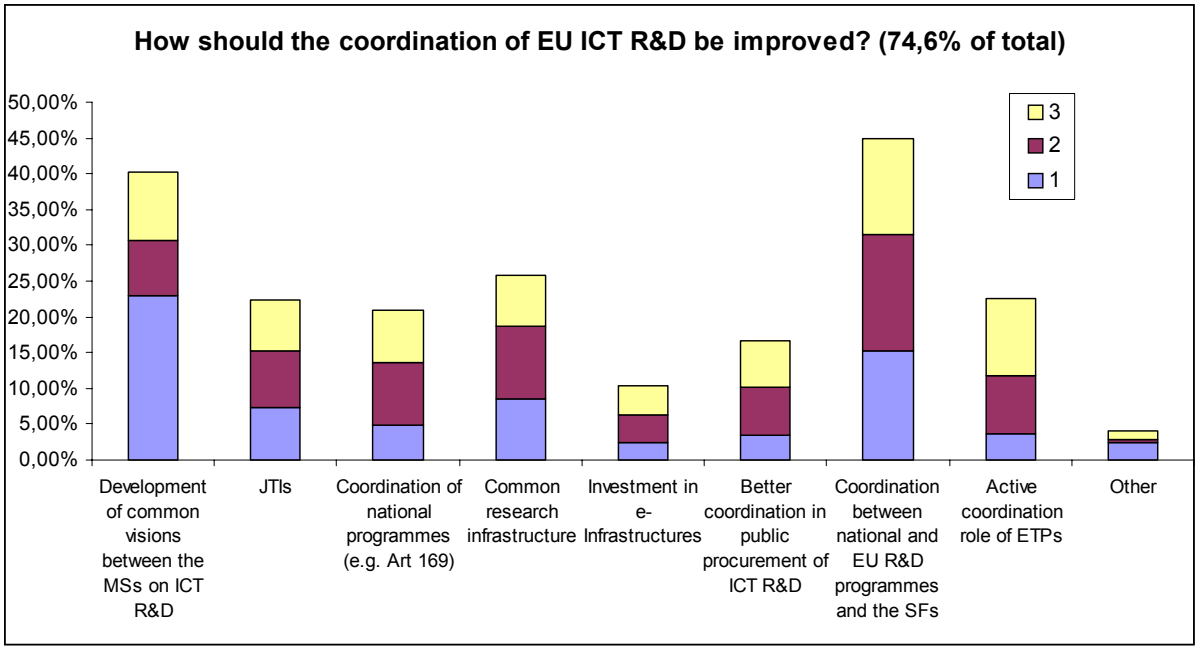
There is still a strong agreement (92%) that public support to ICT R&D in Europe should increase. How to do it?: "Increased budgets for national and EU-level R&D programmes" comes first, reflecting the profile of the respondents. Relatively high priority is also attached to an "increasing use of public procurement of R&D" as well as "tax incentives".



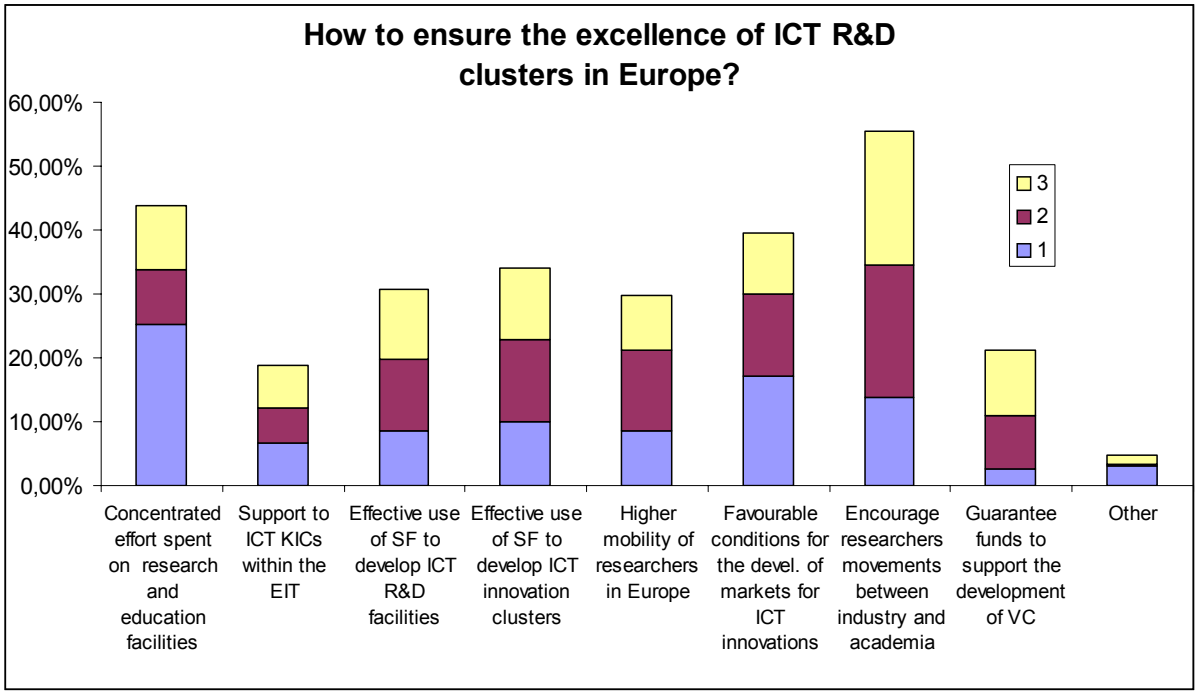
"Tax incentives" and "public support to R&D" are the top suggestions for how to best improve Europe's attractiveness to private investments. These are followed by "regulatory measures for market development" and "guarantee funds for the development of venture capital". Again, "public procurement of R&D" receives a relatively high score.



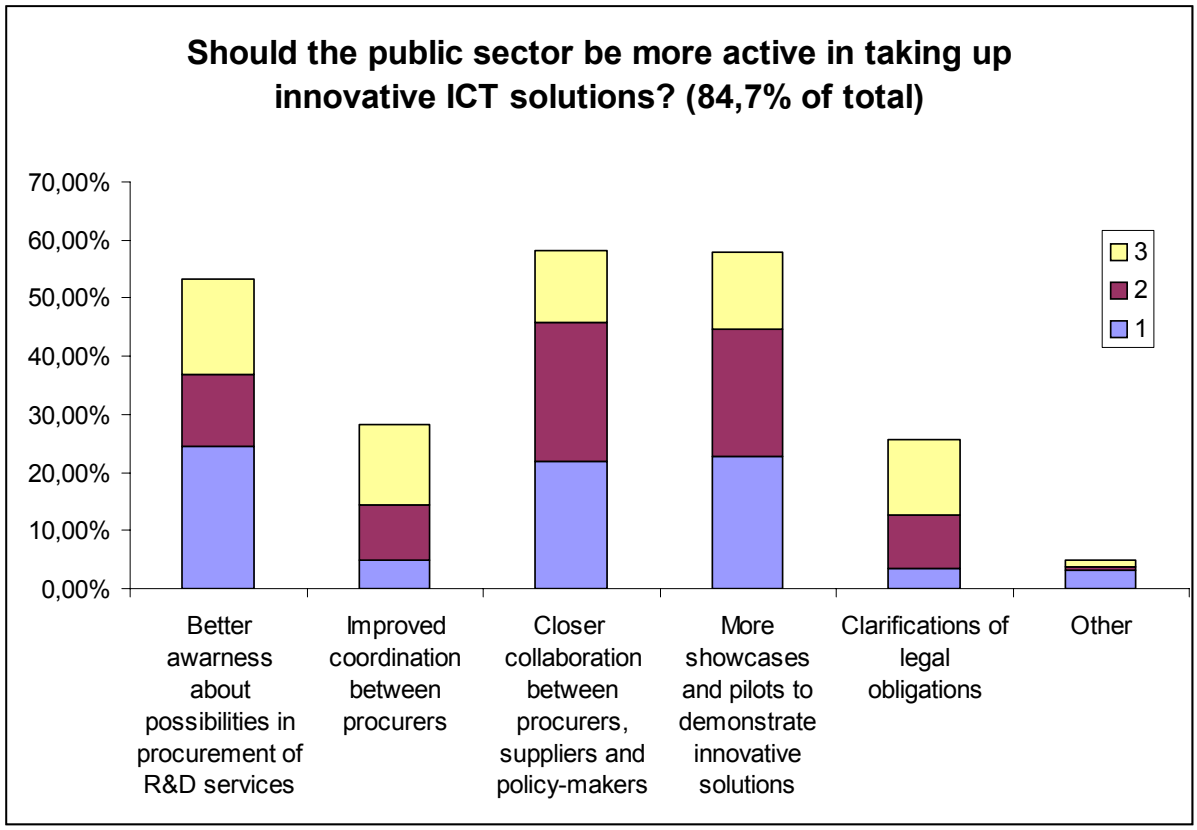
"EU-supported collaborative projects" is the favoured approach to improve public-private partnerships, reflecting the profile of the respondents. "Joint Technology Initiatives" comes second, judged more effective than the use of Art 169 in this perspective, and third comes a "more active role of ETPs".



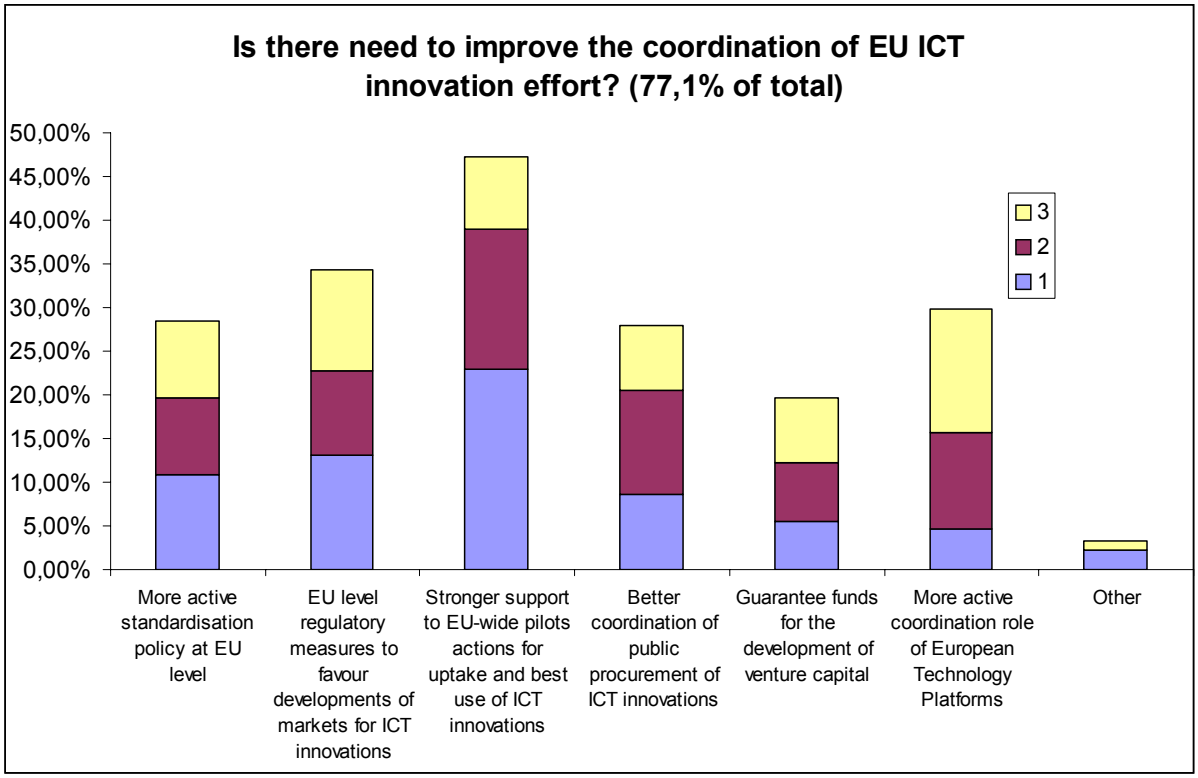
There is still a strong agreement (75%) that coordination of EU ICT R&D should be improved. The "coordination between national and EU R&D programmes and the structural funds" is given the top priority. The other strong suggestion is the "development of common visions on ICT R&D between Member States". This option is the first ranked choice for many of the participants. Art 169, JTIs or ETPs score equal in this perspective, indicating that they all fulfil some kind of coordination role, but that there is still room for improvement.



According to the replies, ensuring excellence of clusters can best be done by "concentrating the efforts spent on research and education facilities" – the first choice of most participants. Scoring highest overall is the "mobility of researchers between industry and academia" which is seen as more important than "mobility of researchers throughout Europe".



There is a strong agreement (85%) that the public sector should be more active in taking up innovative ICT solutions. Three options stand out as the preferred ones: "more showcases and pilots to demonstrate innovative solutions", "closer collaboration between procurers, suppliers and policy makers" and "raising awareness about the possibilities in procurement of R&D services".

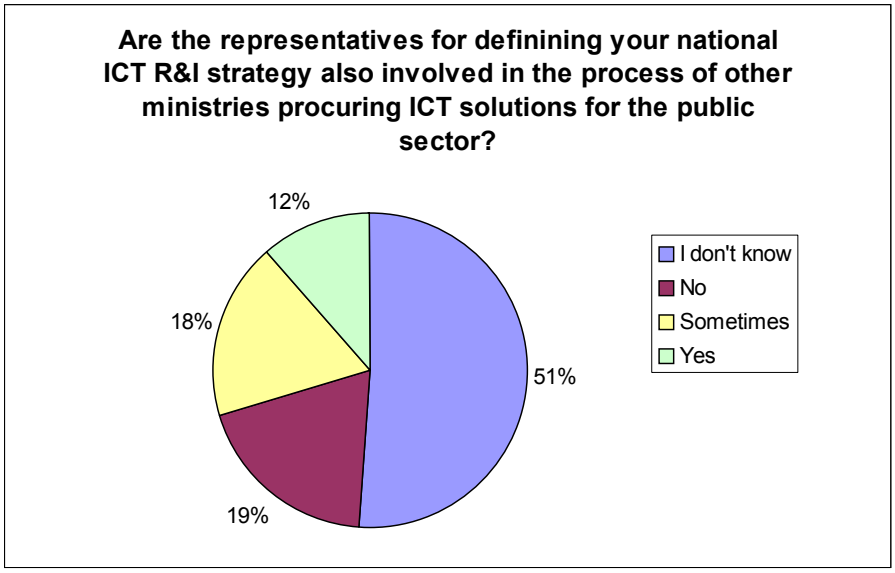


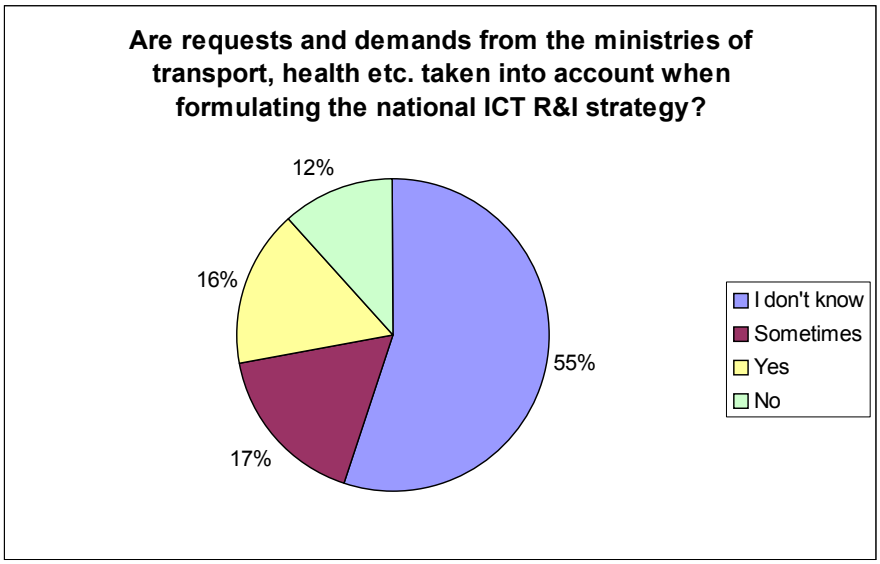
There is also a strong agreement (77%) that the ICT innovation effort should be better coordinated in the EU. Also here a wish for "stronger support to EU-wide pilot actions for uptake and best use of ICT innovations" get support from most participants, often as the first choice. The second highest score is the option "EU level regulatory measures to favour market development" followed by a wish for a "more active standardisation policy at EU level". The "coordination role of ETPs" is also seen as important.

4. "Adopting a more systemic approach for ICT in Europe"

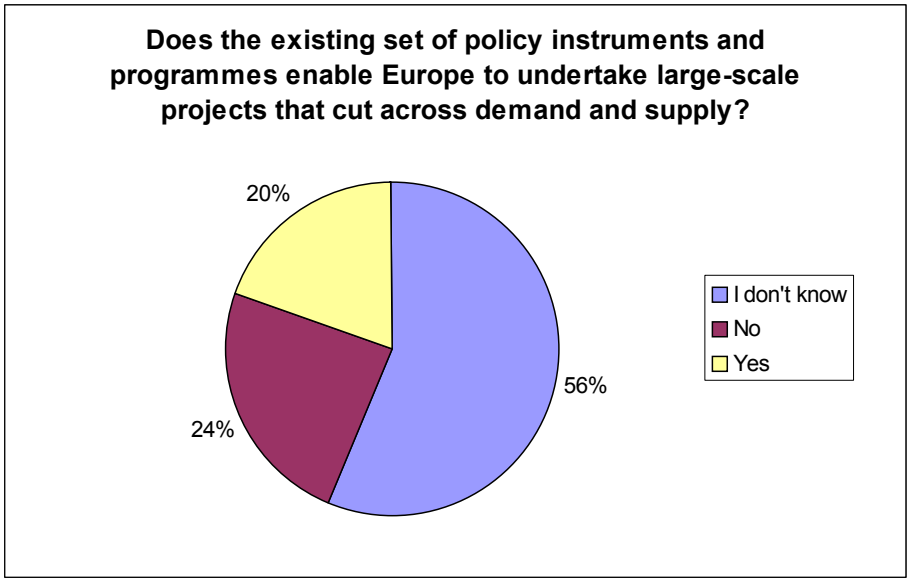
To conduct research and innovation policies that cut across demand- and supply-side measures, it is essential to foster inter-ministerial/agencies coordination. For instance, it is sometimes claimed that there is little communication between the public authorities in charge of ICT R&D (ministries, agencies) and those in charge of providing innovative ICT-based solutions for citizens in areas such as transport, health, etc. (policy-makers, procurers).

The questions are: Is it the case that there is little interaction between producers and users of ICT innovations in public markets? What features need to become available for Europe to adopt a more systemic approach for ICT?





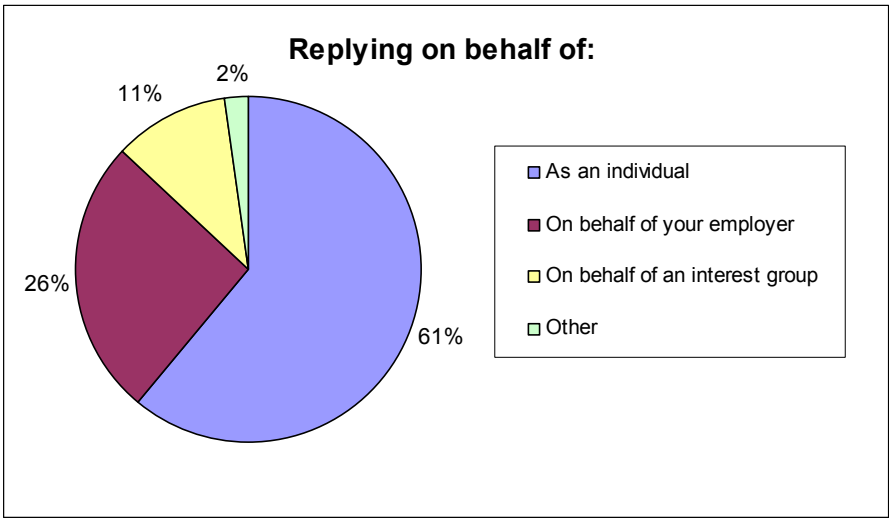
The replies show that most respondents are not aware of the situation. Those that have insight have seen cases with cross-involvement of users/procurers and producers/suppliers, as well as cases with little or no interaction.

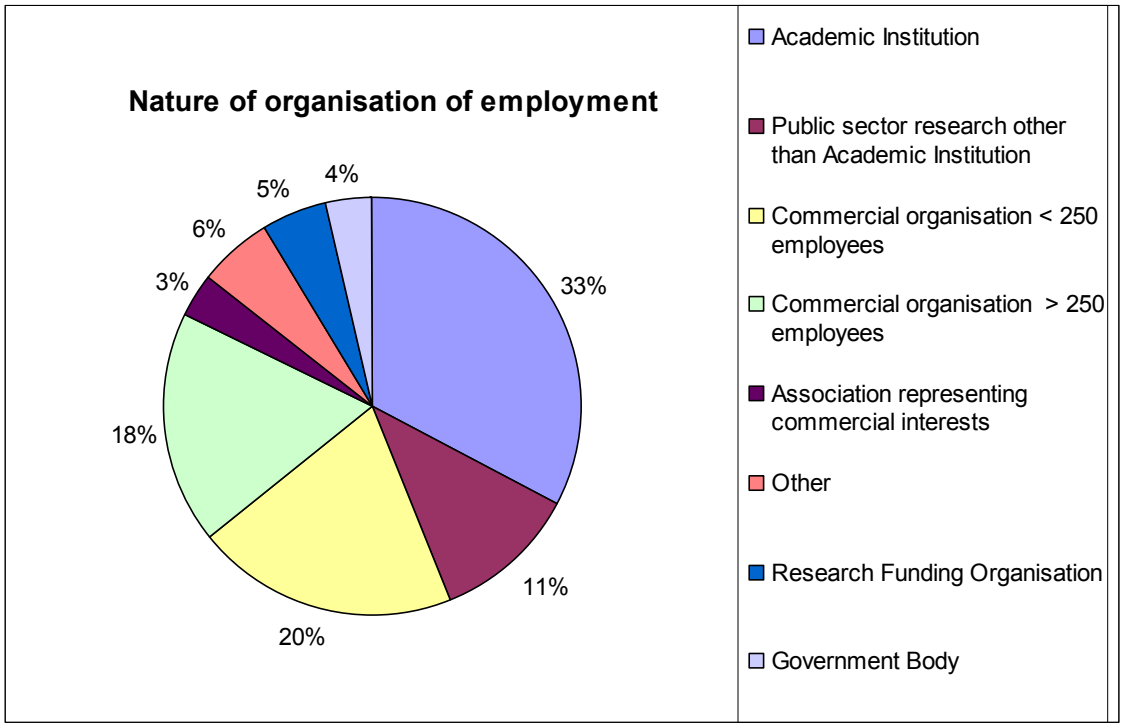


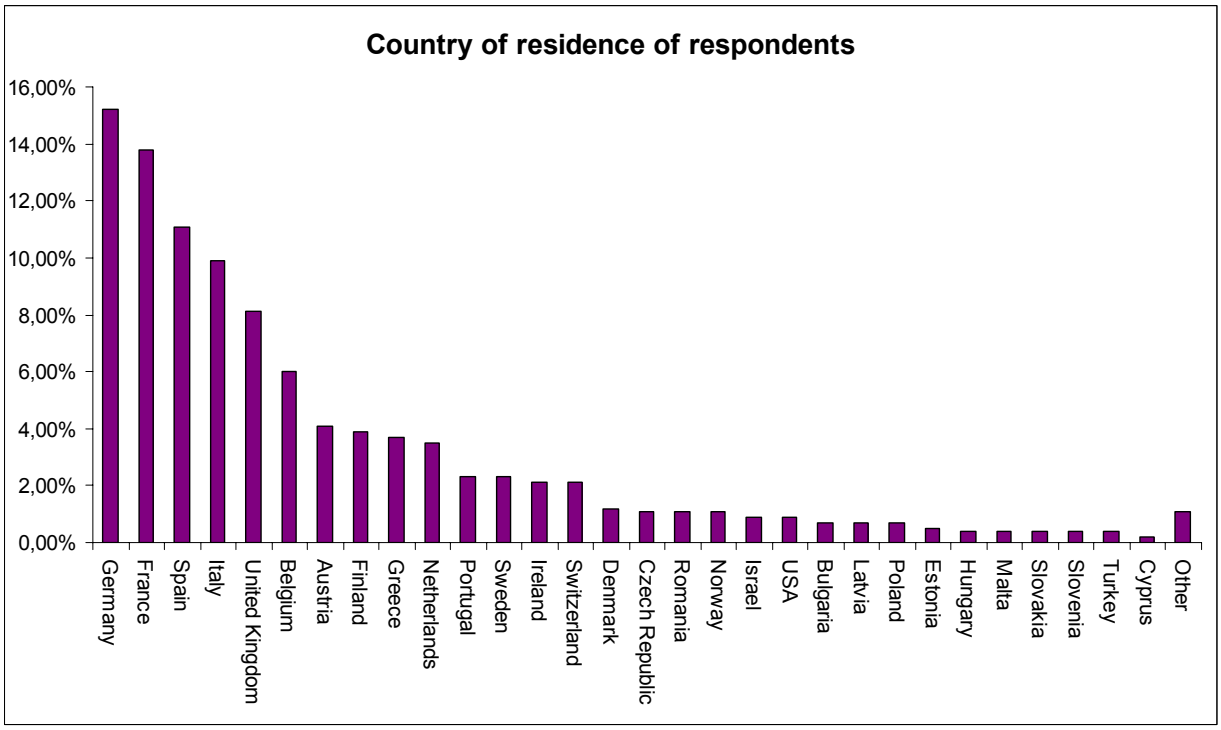
For the last question, if current policy instruments and programmes enable Europe to undertake large-scale, cross-cutting supply-demand projects", the majority replies that they don't know. Analysing the data by nature of organisation/employment shows a stronger than average negative opinion from SMEs and large industry about the capacity of existing instruments.

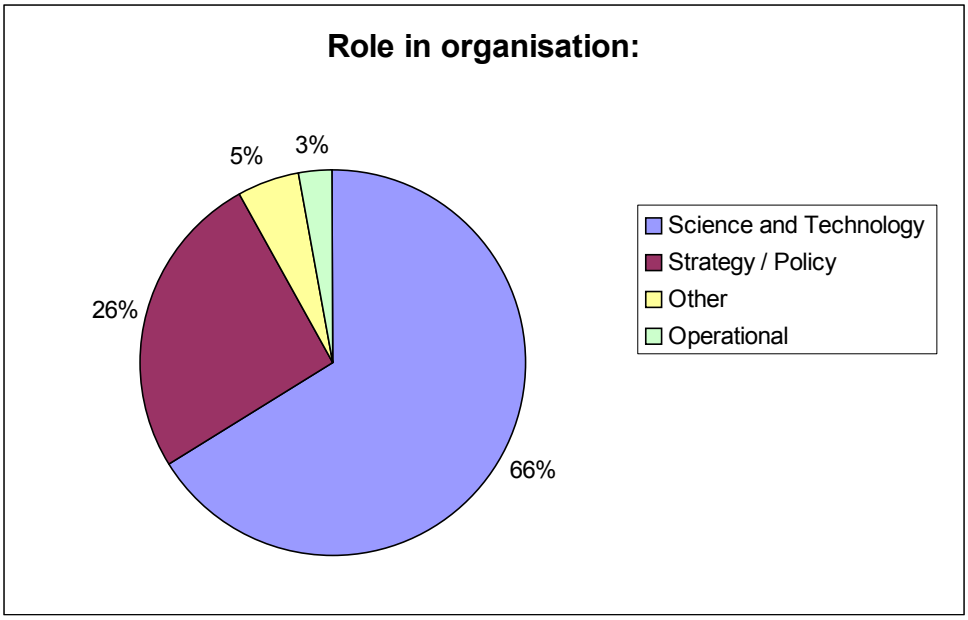
5. Respondents profile

The profile of the respondents reflects that of the ICT Framework Programme constituency with half of the replies coming from industry and half from academia.




Nature of organisation of employment
33%
11%
20%
18%
3%
6%
5%
4%
Academic Institution
Public sector research other than Academic Institution
Commercial organisation < 250 employees
Commercial organisation > 250 employees
Association representing commercial interests
Other
Research Funding Organisation
Government Body


Country of residence of respondents
16,00%
14,00%
12,00%
10,00%
8,00%
6,00%
4,00%
2,00%
0,00%
Germany
France
Spain
Italy
United Kingdom
Belgium
Austria
Finland
Greece
Netherlands
Portugal
Sweden
Ireland
Switzerland
Denmark
Czech Republic
Romania
Norway
Israel
USA
Bulgaria
Latvia
Poland
Estonia
Hungary
Malta
Slovakia
Slovenia
Turkey
Cyprus
Other


Role in organisation:
5%
3%
26%
66%
Science and Technology
Strategy / Policy
Other
Operational