EUROPEAN INDUSTRIAL LEADERSHIP IN ICT

Report of the CSF/Horizon 2020 Workshop held in Brussels on 29 June 2011
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1 MANAGEMENT SUMMARY

**European Leadership in ICT is important both for industrial strength in the global market and for the support of solutions to societal challenges**

Europe's competitiveness must be strengthened by sufficient investment in ICT as an enabling technology, supported as a free standing area in the next EU framework. Research, Development and Innovation (R&D&I) must see generic ICT and application-driven ICT as start and end of one process. ICT research and innovation must include both horizontal (generic) and vertical (application-driven) activities: They are not orthogonal, but rather complement, enable and drive each other.

**EU support to ICT research and innovation must cover the full innovation cycle**

It is important to establish powerful industrial policy and demand-side measures such as pre-commercial procurements and revise IP regimes to foster a successful innovation cycle. The gap between pre-competitive R&D and products must be bridged, including also support to e.g. customer pilots and pilot lines for fabrication. The entire process shall be made short, simple and commensurate with the type of innovation. The transition between the different phases of the R&D&I cycle must be smoothened, and compartmentalization of roles/actors must be avoided. Access to these instruments shall be made attractive for SMEs.

**Focus support on key ICT research & innovation challenges**

The programme shall leverage European strengths, such as the capability of management and evolution of very complex systems. It shall ensure strong support to communications & computing, systems & components, content & semantics, dependability, usability & utility. Actions shall also aim at global leadership in 'Social Innovation', as the social dimension of technical innovation becomes increasingly visible and important; involve new, non-conventional actors. The Future and Emerging Technologies (FET) scheme should be continued and strengthened with new initiatives.

**The programme shall offer both roadmap-based initiatives and open, fast-track and dynamic funding schemes and instruments**

Open, fast-track and dynamic schemes for innovation detection, amplification, and acceleration shall be created. Common EU-wide services and platforms in cross-border, co-funded initiatives and partnerships that require matching funds from the Member States shall be developed. Public-Private Partnerships are excellent set-ups for road-map based initiatives. For co-funding schemes that require matching funds from the Member States, improvements in implementation must be found to create efficient cross-border collaboration.
2 CONTEXT AND INTRODUCTION

The European Commission organises a series of informal workshops in order to discuss with key stakeholders the specific objectives and areas that should be addressed in the Common Strategic Framework (CSF) for EU research and innovation funding, labelled “Horizon 2020”. This workshop discussed potential activities under the broad domain of Information and Communication Technologies (ICT). ICT is one of the enabling technologies which underpins industrial competitiveness across a range of existing and emerging sectors and which can be applied to address multiple societal challenges. It is important for Europe to maintain and build global leadership in this domain.

After introductory presentations of the results of the CSF Green Paper Consultation, on the recommendations from the ICT Advisory Group (ISTAG) and from the High-Level Expert Group on Key Enabling Technologies (KET) during the morning sessions, chaired by INFSO Deputy Director General Zoran Stancic, the core of the meeting was organised around 5 key questions for discussion by the audience and the DG INFSO Directors responsible for ICT under FP7 in the afternoon sessions.

The following 5 questions were sent to participants prior to the meeting:

Question 1 – Discussions chaired by Megan Richards, Dir INFSO D:
How to best address Research, Development and Innovation (R&D&I) on generic ICT versus application-driven ICT? What are the links to societal challenges?

Question 2 – Discussions chaired by Khalil Rouhana, Dir INFSO E:
How to best cover the full innovation cycle, from frontier research, to industrial research, to innovation activities?

Question 3 – Discussion chaired by Mario Campolargo, Dir INFSO F:
What are the new research challenges to be addressed and the impact to be targeted? Are there any “negative” priorities which should not be addressed anymore at European level?

Question 4 – Discussion chaired by Thierry Van der Pyl, Dir INFSO G:
What funding schemes and instruments are the most relevant ones for implementation, e.g. PPPs (Public-Private-Partnerships), open schemes?

Question 5 – Discussion chaired by Willy Van Puymbroeck, Head of Unit INFSO H5:
EU versus Member States priorities - what are the best means for co-ordination (e.g. joint programming)?

These 5 key questions were discussed and generated valuable input for the CSF content and form. A short summary of the key workshop results was presented by the rapporteur, Dr. Frank J. Furrer, and was discussed by the audience at the end of the workshop.

1 The objective of the meeting was neither to take decisions nor to reach consensus, but to provide the Commission with expert input for their work.
KEY POINTS OF THE MORNING PRESENTATIONS

3.1 Zoran Stančič: “Towards a Common Strategic Framework for EU Research & Innovation Funding”

This first presentation set the scene, introduced the time-table and explained the paradigm of and the reasons behind the CSF. The extensive feedback received on the CSF Green Paper was summarised:

- Overwhelming support for bringing research and innovation together in a Common Strategic Framework to enhance impact
- Main message to support all stages in the innovation chain
- Simplification is a key priority for all stakeholders
- Strong calls to maintain continuity for the successful elements of current programmes, e.g. collaborative research as the core, European Research Council, Marie Curie
- EU funding should be tied closely to societal challenges and EU policy objectives
- Widespread view that the CSF will need both curiosity-driven and agenda-driven activities, working in tandem
- Recurring message to be less prescriptive and more open, with sufficient scope for smaller projects and consortia
- Shared view that all SMEs with innovation requirements should be able to benefit.

The 5 key questions (listed above) to be discussed in the afternoon sessions were introduced and explained.

3.2 Lutz Heuser: “10 Key Recommendations for ICT Research & Innovation in the next EU Framework Programme”

The 10 recommendations from the ICT Advisory Group (ISTAG) delivered a strong message on why and how ICT funding should be organized in the next framework programme in order to significantly improve the impact, contribute to the solution of societal challenges and support science and innovation.

The 10 recommendations are:

1. Strengthen Europe’s competitiveness by investment in ICT as an enabling technology – keep ICT as a free standing area in the CSF with sufficient budget allocation
2. Aim at global leadership in Social Innovation and create a ‘Balanced Progress’ framework
3. Enlarge the stakeholder community as new, non-conventional actors become increasingly important
4. Focus on Europe's strategic strength to manage complex systems and environments
5. Ensure the dependability of ICT with next generation of infrastructures
6. Unleash the potential of a more rigorous end-to-end supply chain in R&D & innovation in ICT by bridging the gap between pre-competitive R&D and products
7. Create open fast-track schemes for innovation acceleration, amplification, and detection
8. Continue and strengthen the Future and Emerging Technologies (FET) scheme with new initiatives
9. Develop common EU-wide services and platforms in cross-border, co-funded initiatives and partnerships, and re-think the set-up of schemes involving Member State funds
10. Embrace ambiguity and unpredictability and enable a dynamic agenda


The first part of this presentation introduced the High Level Groups Key Enabling Technologies (HLG KET’s) timeline and KET’s phase 2 methodology. The second part gave an interesting update on KET’s global playing field, including the “Advanced manufacturing initiative in US”, an “Analysis of public supporting measures to RDI (in third countries)” and the “Balance between basic and applied research”. The third part presented targeted proposals and recommendations, covering “A single and fully-fledged KET’s innovation policy at EU Level to pass across the ‘valley of death’”, “A comprehensive strategic approach to a KET’s policy at EU level”, “Combined financing to promote RDI investments in KETS” and concluding by a “Follow-up”. Mr. Crean showed some serious challenges and a number of European omissions made in the past and how non-European countries (especially the far east) are shortening the distance to Europe in some important key indicators (such as the number of new patents, the production volume) backed by convincing figures. In the HLG’s conclusions the way to maintain and improve Europe’s competitiveness in many of the important playing fields was formulated in 11 recommendations:

1. **Make KETs a technological priority for Europe**: An integrated KETs policy should be implemented. KETs should be visibly prioritised in EU policies and financial instruments and the European Investment Bank group should pro-actively support KETs initiatives in Europe

2. **The EU should apply the TRL scale R&D definition**: The EU should align its R&D&I activities on the TRL (Technology Readiness Level) scale. The Commission should also systematically apply this definition in order to include technological research, product development and demonstration activities within its RDI portfolio

3. **Fully exploit the scope of relevant R&D definitions**: The EU should apply R&D definitions in its programmes which support the full and simultaneous implementation of the three pillar bridge model along the innovation chain, from basic research, through
technological research, product development and prototyping up to globally competitive manufacturing

4. **KETs state aid provisions:** The EU and Member States should firmly rebalance their R&D&I funding in KETs-related programmes towards technological research, product development (including pilot lines, prototypes, first-in-kind equipment and facilities and demonstrator activities). In particular in the future CSF, the EU should set indicative targets for the percentage of funding dedicated to basic research, technological research and development activities.

5. **A strategic approach to KET’s programmes:** The European Commission should define and implement a strategic, industry driven and coordinated approach to KET’s programmes and related policies across EC R&D&I funding programmes and instruments (such as CSF, ERDF).

6. **Establish an appropriate set of rules to implement KETs programmes:** The European Commission should adapt its selection criteria and implementation rules in the CSF programme to maximise its impact on the value and innovation chains. In particular, a "value chain correctness" criterion should be added.

7. **Combined funding mechanisms:** The EU should introduce a tripartite financing approach based on combined funding mechanisms involving Industry, Commission, and national authorities (Member States and local government), when required by the high costs of the KETs R&D&I projects, and put in place the appropriate program management and mechanisms to allow the combination of EU funding (CSF, structural funds), to enable the optimum investment in significant KET pilot line and manufacturing facilities across Europe.

8. **KETs state aid provisions:** The EU should adapt state aid provisions to facilitate R&D&I activities and large-scale investment in KETs, in particular through the introduction of a matching clause in the EU state aid framework across the board, review of the scaling-down mechanism for larger investments, increased thresholds for notifications, faster procedures and the use of projects of common European interest.

9. **Globally competitive IP policy in Europe:** The selection criteria and terms of the consortium agreements of EU R&D&I funding programmes should be amended to ensure that participating consortia have a clear and explicit plan for both the ownership of and first exploitation of IP resulting from the project within the EU. It should explicitly include provisions similar to those of the "Bayh-Dole Act" and "Exception Circumstances" – like provisions to encourage the first exploitation and manufacturing of products based on this IP within the EU.

10. **Build, strengthen and retain KETs skills:** The EU should create a European Technology Research Council (ETRC) to promote individual excellence in technologically focused engineering research and innovation and establish the appropriate framework conditions through the ESF regulation in order to support KETs skills capacity building at national and regional level.

11. **A European KETs observatory and consultative body:** The European Commission should establish a European KETs Observatory Monitoring Mechanism tasked with the mission of performing analysis and a “KETs Consultative Body” comprised of stakeholders across the entire innovation chain to advise and monitor the progress in
Europe of the HLG KET recommendations towards the development and deployment of KETs for a competitive Europe this should include all relevant data regarding policies and strategies evolution outside EU.

For more details please refer to the report available on the KET High Level Group website (http://ec.europa.eu/enterprise/sectors/ict/key_technologies/kets_high_level_group_en.htm).

The following 5 sections report on the most important issues raised and discussed during the afternoon working session.

4 QUESTION 1

How to best address Research, Development and Innovation (R&D&I) on generic ICT versus application-driven ICT? What are the links to societal challenges?

4.1 Summary of Plenary Discussions

- Generic ICT research and innovation should remain a sufficiently funded research and innovation area producing enabling technologies. If this is not done, Europe cannot continue its successful track of innovation and could become a market for non-European suppliers.
- ICT research and innovation must be based on European strengths, such as the capability of management and evolution of very complex systems (“systems-of-systems”, SoS, such as urban management) and the dependability of ICT.
- ICT by itself is a societal challenge, e.g. new ICT functionality triggering social change (such as search engines, social networks, WIKIs, ...).
- ICT research and innovation must strongly involve additional stakeholders (e.g. societal researchers). ICT research and innovation is not any more a purely technical activity, but must be driven by societal needs and industrial exploitation.
- ICT research and innovation must include both horizontal (generic) and vertical (application-driven) activities. They are not orthogonal, but rather complement, enable and drive each other.

4.2 Additional/detailed Comments

- New ways to support SME’s are needed. SME’s need short cycles.
Improving efficiency would require the ability to stop, reorganize or change projects “on the run”

EC projects should in some institutionalized way get into close, cooperative contact with comparable centres of excellence worldwide

FET should be continued – looking beyond current ICT mainstream activities for future FETs

Next framework should focus not only on technical research, but also increasingly on societal research, Systems-of-Systems, services, content and massive information handling, etc.

The FP7 instruments in place are not sufficient. They need targeted extensions, modifications and simplification

International collaboration should be strengthened

Missing part in FP7: Not all stakeholders involved, “bad statistics”, e.g. low involvement of societal scientists and researchers

The ISTAG recommendations are a very important input. They should feed not only into the next R&I framework, but also into other EC activities and priorities

Application-oriented research should also be directed by market focus (expected commercial impact).

The project durations should be aligned to the innovation cycles (e.g.: new radio systems > 3 years, new services = very short)

Societal challenges can be solved by existing technology. Agenda-driven technology research is therefore very important also

If more manufacturing is to stay in Europe a powerful industrial policy and IP strategy is urgently needed

5 QUESTION 2

How to best cover the full innovation cycle, from frontier research, to industrial research, to innovation activities?

5.1 Summary of Plenary Discussions

- A powerful industrial policy – especially to support commercial exploitation, such as manufacturing or IP exploitation – is required to really implement a successful innovation cycle (such as financial incentives to build manufacturing facilities in a region)

- Exploit pre-commercial public procurement schemes to stimulate deployment of R&D results

- Develop and enforce a European intellectual property (IP) policy (“copy the US”)
• Provide a way and instruments to cover the full innovation cycle, starting with basic research (where necessary) and going to full industrial exploitation. Make this process short and simple enough to really generate competitiveness (commensurate with the type of innovation). Must include early contact with potential investors

• Smoothen the transition between the different phases of the R&D&I cycle. Avoid compartmentalization of roles/actors

• Make access to these instruments attractive for SME’s (Not only on paper, but by individualized and targeted support)

• There was broad agreement on the common message from ISTAG and the HLG KET, stressing that there is the need to cover the end-to-end value chain. As opposed to other areas, in ICT the "Product" and "Production" goals would not just be "manufacturing", but could as well be deployment in EU-wide services and platforms and joint pre-commercial procurement of complete systems to address societal challenges.

5.2 Additional/detailed Comments

• The market incentives for the exploitation of FP7 projects are insufficient. The formation of start-ups is not sufficiently encouraged (IP protection, venture capital involvement, entrepreneur-spirit development etc. mostly not here)

• European law and society often punish risk taking – this is highly adverse to commercial exploitation. This already starts during evaluation: Member states want to see results and therefore ask for guaranties for the success of the projects. No risk – no gain!

• Keep the good work on research – make the transition process to industrial exploitation more smooth and comprehensive. Show more courage in supporting incremental research

• Strict compartmentalization of roles may severely hinder the innovation process. Try to make close contact between researchers and investors (venture capital) as early as possible. Make this a mandatory part of the process.

6 QUESTION 3

What are the new research challenges to be addressed and the impact to be targeted? Are there any "negative" priorities which should not be addressed anymore at European level?

6.1 Summary of Plenary Discussions

• Systems-of-systems (SoS) paradigms, theory and implementation & evolution. Base not only for technical systems, but especially for societal systems supported by ICT (urban management, FEV), as well as services
Future low-power, low-cost sensors, communications and computing technologies. Low-power architectures, technologies, systems and integrated circuits.

Focus research on meaning/semantics, not only HW & SW. Issue: “big data” and how to deal with it (including how to manage, process and understand the data), also covering language technology.

Future Internet (enabling Internet-of-things, smart cities, smart electricity, smart traffic, ...)

Research into “simplicity and ease of consumption”. Many of our systems are unnecessarily complex (use collaborative, multi-stakeholder approach)

Dependability: Protect our ICT infrastructures (especially the Web, grid, industrial controls, transportation systems, emergency systems, ...)

Methods and processes to foster reuse and improve/maintain quality

Eliminate inflexibility and align with the innovation cycle

Take into account also the cost of deployment of a technology when making decisions

Avoid investing in “lost battles”, but invest in emerging new paradigms, maintaining subsequent sustainability for industry and users

6.2 Additional/detailed Comments

Earlier all photovoltaics + photonics manufacturing was in Europe. Today all of it is in far east because of their consistent and consequent industrial policies

A comprehensive, complete landscape of current and future research should be drawn up and the fields of investments should be identified

Carry out an analysis of ICT needs in vertical sectors, such as transportation, medicine, education etc.

7 QUESTION 4

What funding schemes and instruments are the most relevant ones for implementation, e.g. PPPs (Public-Private-Partnerships), open schemes?

The chair introduced the theme and presented a baseline for discussion, starting situation in FP7 (see Figure 7-1):
Public Private Partnerships in FP7

Figure 7-1: Funding landscape in FP7

For Horizon 2020, one potential way forward would be to distinguish as follows between contractual PPPs and institutionalised PPPs:

1. **Contractual PPPs:**
   - Formalised governance (written agreement on roles & commitments)
   - Implementation in house or by Executive Agency
   - Regular assessment against key performance indicators

2. **Institutionalised PPPs:**
   - Managed by a “PPP body”
   - Possible financial involvement of Member States
   - Regular assessment against key performance indicators

Five criteria for justifying a PPP set-up could be:

1. Scale and impact on industrial competitiveness and sustainable growth
2. Added value to act at European level and to address socio-economic issues
3. Long term commitment from all parties, based on a shared vision
4. Scope of RTD, innovation and market access objectives
5. Scale of resources involved and strength of the resource commitment from the partners for the chosen period.

7.1 Summary of Plenary Discussions

- Funding schemes and instruments must cover education, research and innovation (including exploitation). Must include higher risk appetite in evaluations and in funding decisions
- The matrix of instruments vs. challenges (competitiveness, societal issues, science) shown in the chair’s presentation is a good starting point. Should be overlaid with what should be achieved and where to put the resources
- Projects must have a critical size/mass, otherwise they cannot generate a significant impact
- Develop common EU-wide services and platforms in cross-border, co-funded initiatives and partnerships.
- PPPs are excellent set-ups for road-map based initiatives. However, they may not be optimal for all of these and may need other set-ups
- Create open, fast-track and dynamic schemes for innovation detection, amplification, and acceleration.
- Different principles/rules governing the various instruments will make their use by smaller companies very hard. Unify them! On the other hand, over-simplification may lead to unfocussed instruments
- For co-funding schemes that require matching funds from the Member States, improvements in implementation must be found to create efficient cross-border collaboration.

7.2 Additional Comments

- Project should allow different time scales from idea to product: 3 months ... 3 years, spin-off funding should be possible while a project is running. Also projects should be re-organisable during their lifetime
- A word of caution: Discontinuing current programs (such as Artemis) will certainly lead to a significant loss of knowledge, time, lessons learned etc.
8 QUESTION 5

EU versus Member States priorities - what are the best means for co-ordination (e.g. joint programming)?

8.1 Summary of Plenary Discussions

- Joint programming and joint funding are not the same! Make their advantages and disadvantages very clear and transparent
- Combine the funding, not pool the funding – preferably based on tripartite funding (industry – commission – national authorities)
- Basically, the tripartite model PPP (industry – commission – national authorities) works. It has some flaws which should be corrected (such as divergence and instability of national rules, budget horizon, accounting practices, refunded cost, ...)
- Artemis was the first, full legal framework for implementing joint programming and was an indispensable (difficult) precondition for its implementation

9 WORKSHOP CONCLUSIONS AND RECOMMENDATIONS

A number of highly valuable, well-founded findings and recommendations are available to guide the design of the next EU framework funding framework.

The workshop did not have the goal to achieve agreements on individual findings or recommendations, but to provide the Commission with open, fair and substantiated feedback related to 5 key questions. This goal has been achieved thanks to a numerous, highly competent and active audience.

The workshop outcome can be summarized in 10 points:

- European Leadership in ICT is important both for industrial strength in the global market and for the support of solutions to societal challenges
- Strengthen Europe’s competitiveness by sufficient investment in ICT as an enabling technology, supported as a free standing area in the next EU framework
- ICT research and innovation must include both horizontal (generic) and vertical (application-driven) activities: They are not orthogonal, but rather complement/enable/drive each other
Focus on Europe’s strategic strength to manage large, heterogenous and complex systems, and ensure strong support to communications & computing, systems & components, content & semantics, dependability, usability & utility

Aim at global leadership in 'Social Innovation', as the social dimension of technical innovation becomes increasingly visible and important. Involve new, non-conventional actors

Continue and strengthen the Future and Emerging Technologies (FET) scheme with new initiatives

A powerful IP policy and industrial policy and demand-side measures such as pre-commercial procurements are required to implement a successful innovation cycle

EU support to ICT research and innovation must cover the full innovation cycle. Bridge the gap between pre-competitive R&D and products, including also support to e.g. customer pilots and pilot lines for fabrication. Make this process short and simple and commensurate with the type of innovation

Create open, fast-track and dynamic schemes for innovation detection, amplification, and acceleration

The programme shall offer roadmap-based initiatives. Develop common EU-wide services and platforms in cross-border, co-funded initiatives and partnerships for co-funding schemes that require matching funds from the Member States. For co-funding schemes that require matching funds from the Member States, improvements in implementation must be found to create efficient cross-border collaboration.

10 REFERENCES

- Workshop presentation by Zoran Stančič: Towards a Common Strategic Framework for EU Research & Innovation Funding
- Workshop presentation by Lutz Heuser: Recommendations from the ISTAG advisory group, June 2011
- Workshop presentation by Gabriel Crean: Update on High-Level Group – Key Enabling Technologies, 29.6.2011
- Workshop presentation by Thierry van der Pyl: Funding Schemes for PPPs, June 2011
WORKSHOP AGENDA

WORKSHOP ON EUROPEAN INDUSTRIAL LEADERSHIP IN ICT

29 June 2011, B-1160 Brussels
Avenue de Beaulieu 25, Room 0/S1

10h30 – 12h30 Setting the scene: The CSF Green Paper Consultation – results and next steps (Zoran Stančič, Deputy Director General, DG INFSO)

Report from ISTAG (Lutz Heuser, CEO at AGT Group (Germany) GmbH and CTO at ATS Group GmbH)

Report from the High Level Group on Key Enabling Technologies (Gabriel Crean, Vice-President CEA Technologies)

Questions and discussion

12h30 – 13h30 Sandwich lunch

13h30 – 16h30 Discussion of questions (chaired by the ICT Directors)

(a) How to best address R&D&I on generic ICT versus application-driven ICT? What are the links to societal challenges? (Megan Richards, Director INFSO D)

(b) How to best cover the full innovation cycle, from frontier research, to industrial research, to innovation activities? (Khalil Rouhana, Director INFSO E)

(c) What are the new research challenges to be addressed and the impact to be targeted? Are there any “negative” priorities which should not be addressed anymore at European level? (Mario Campolargo, Director INFSO F)

(d) What funding schemes and instruments are the most relevant ones for implementation, e.g. PPPs, open schemes? (Thierry Van der Pyl, Director INFSO G)

(e) EU versus Member States priorities - what are the best means for co-ordination (e.g. joint programming)? (Willy Van Puymbroeck, Head of Unit INFSO H5)

16h30 – 17h00 Conclusions
Summary of findings by the rapporteur (Frank J. Furrer)

Workshop chaired by Zoran Stančič (Deputy Director General, DG INFSO)
12 APPENDIX 1: WORKSHOP PICTURES

This appendix presents some pictures taken during the workshop.

Figure 12-1: Zoran Stančič during his introductory presentation

Figure 12-2: Lutz Heuser presenting the 10 ISTAG recommendations
Figure 12-3: Gabriel Crean talking about the HLG findings for Key Enabling Technologies

Figure 12-4: The numerous and active audience