Coordination of the European Future Internet Forum of Member States

D4.3 – International Workshop 1: Research Councils

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1. Introduction

The ceFIMS Coordination Action began in September, 2010, and runs for 30 months. The project provides functional ongoing support to the European Member State Future Internet Forum (FIF). ceFIMS facilitates FIF activity by providing a Secretariat and support structure and by maintaining the ceFIMS Future Internet web-portal: www.cefims.eu. ceFIMS will help foster and support knowledge sharing via the FIF to maximise synergies between EU and Member State investments in Future Internet research.

As part of its work, ceFIMS is engaging with research councils and funding agencies from across Europe to identify common areas of interest, and explore the nexus between national research activities and those funded through European research programmes (especially in the context of FP8). To establish a working group of research councils and funding agencies, ceFIMS held a plenary workshop and break-out sessions with representatives from 17 different Member States[1] on May 19th, 2011. The agenda and attendee list for this event are contained in Appendices A and B, respectively, of this report.

The workshop started work on collaborating and finding synergies in the field of the Future Internet between the various funding agencies (from basic to applied research) in Europe. It also included presentations from the European Commission on the Innovation Union initiative and the 'Green Paper' consultation, and an invited speaker on the current FP8 roadmapping. During the workshop, research councils and funding agencies had an opportunity to: network and meet their peers from other Member States; identify potential collaboration topics; and, discuss synergies with EU-funded research. Additional issues discussed included: finding a common European theme for trans-national collaboration; mechanisms to achieve this; Joint Programming and ERA-NET+; etc.

2. Context

A number of presentations were made to frame the discussions at the workshop. These included key-note speeches on current FP8 roadmapping activities, the INFINITY PPP project, and a European Commission perspective on the Innovation Union initiative and 'Green Paper' consultation.

2.1. FIA Research Priorities Roadmap for FP8

The Future Internet Assembly (FIA) Research Roadmap for FP8[2] captures the ideas and contributions of the FIA community on the important research topics that should be addressed within FP8. They are broadly

[1] Other Member States sent their apologies

[2] http://fisa.future-internet.eu/index.php/FIA_Research_Roadmap

grouped around three main concerns: economic and business interests; societal interests and challenges; and, technical disruptions and capabilities.

The roadmap originates from a multi-disciplinary community of researchers, working on all aspects of the Future Internet and meeting to share and discuss ideas through the FIA. Of primary concern in the roadmap is the identification of research that can be carried out in the second half of this decade and which will have an impact in 2020 and beyond. (For 'impact' read products, services, systems, and capabilities, which come to market and are deployed in this timeframe). In this context, the roadmap identifies broad challenges and gaps, as well as solutions and research needs.

While the roadmap is a consultation document, six research priorities have been selected in its first draft:

- Beyond Converged Infrastructure
- Exploiting Networked Data: the Internet's natural resource
- Securing the Future Internet: infrastructures, applications, data, users
- Networked Interaction: people, data, content, spaces
- Augmenting Worlds: making the Internet work for us
- Internet-style Innovation: future & emerging applications & services

2.2. INFINITY PPP Support Action

INFINITY[3] is a Future Internet PPP Support Action, which will identify existing and emerging Future Internet infrastructures and pilot projects across Europe. The project began in May, 2011, and it will engage with infrastructure owners and application developers—building as far as possible on existing data, information, projects and programmes—to create a new repository of infrastructure capability and capacity. It is doing so in the context of creating an international community to collaborate and deliver the Future Internet.

INFINITY's chief objectives include:

- Identify, analyse and catalogue existing and emerging advanced experimental infrastructures;
- Establish a Web Repository that describes available infrastructures as a 'living organism';
- Put in place a partnership and relationship liaison strategy between external Future Internet initiatives and the infrastructure owners and operators, local/regional authorities, stakeholders and end-users;
- Establish interactions with public authorities at EU, national, regional and local levels;

[3] http://www.fi-infinity.eu/

— Develop interactions with industry involved in public/private and private infrastructures and other experiments;

— Analyse results from PPP Phase 1 "Use Case scenarios and early trials" to prepare for the integration of identified infrastructures and SME innovation in Phase 2.

INFINITY has a number of different stakeholders who will be impacted by the project's work: *infrastructure owners* will gain access to new European-scale markets; *public agencies & end-users* will see new service platforms as a result of the data repository and information-sharing; *PPP use case projects* will be able to integrate infrastructures to support their Phase 2 trials; and, *PPP core platform project FI-WARE* will receive more support to reach its desired level of virtualisation. These are just some of the headline impacts INFINITY will make.

2.3. EC Context: Innovation Union, Green Paper, Consultation

The EU2020 Strategy has objectives for smart, sustainable and inclusive growth. As well as headline targets such as 3% of GDP invested in R&D, it also includes a *Digital Agenda for Europe*, and *Innovation Union* and *Industrial Policy* flagships.

The Innovation Union sits under the objective of 'Smart Growth'. It is complementing the European Research Area (ERA), involving joint programming with Member States and regions, and launching 'European Innovation Partnerships' between the EU and national levels. It is also improving framework conditions in which businesses can innovate by means of a single EU Patent, improved access to capital, faster establishment of interoperable Standards, making full use of public procurement, etc. Additionally, the Innovation Union is strengthening and further developing the role of EU instruments to support innovation and promoting knowledge partnerships between education, business, and research & innovation stakeholders.

Also under the remit of 'Smart Growth' is the Digital Society and in particular, the Digital Agenda. The Digital Agenda for Europe contains seven action areas: a vibrant digital single market; fast and ultra-fast Internet access; research & innovation; trust & security; interoperability & standards; enhancing digital literacy, skills & inclusion; and, ICT-enabled benefits for EU society.

The 'Green Paper on Common Strategic Framework' is a consultation process on major improvements to future EU research & innovation funding for the next EU Budget (2014+). It will cover the Framework Programme (FP), the Competitive & Innovation Framework Programme (CIP) and the European Institute of Innovation & Technology (EIT) in a Common Strategic Framework. It will include a coherent set of funding instruments (incl. innovation) and will simplify procedures and rules. The 'Green Paper' is addressed to all stakeholders (research & business, public & private, large & small, expert & general public, individuals &

organisations, etc.) and seeks opinion on the proposed improvements and the priorities of the Common Strategic Framework[4] – ahead of the EC's formal proposals which will be presented at the end of 2011.

A number of consultation questions arise – in particular around the issues of working together to deliver on EU2020 (e.g. how to best pool resources?), tackling societal challenges (e.g. balance between curiosity-driven & agenda-driven activities), strengthening competitiveness (e.g. supporting SMEs), and strengthening the science base & the ERA (e.g. Marie Curie actions?).

Some feedback has already been received in this 'Green Paper' process from the IST Advisory Group, ETPs, KETs, and various submitted position papers. The next steps involve analysing all contributions, a major event to conclude the consultation process (10th June, 2011) and then inputting to the Commission proposals. Legislative decisions on the Common Strategic Framework will be taken by the Council and the European Parliament in 2012-2013, with the Framework coming into place from 2014 onwards.

3. Potential Collaboration Topics

Participants at the workshop broke out into four groups of 8-10 people – each with its own dedicated Chair and rapporteur. The group discussions centred on two main potential collaboration topics: themes & content, and funding & cooperation mechanisms. Barriers identified in each area were also recorded.

Keywords, conclusions and the main issues and opportunities in Member States would be the outcomes of these break-out discussions. These results were presented to a plenary session of all participants at the end of the workshop.

The following section categorises the discussions captured during the break-out sessions:

3.1. Themes & Content

3.1.1. High Potential Areas

The themes and content areas with high potential break down into three categories: underlying and enabling technologies; use cases and applications; and, those whose pan-European appeal renders them high potential.

3.1.1.1. Underlying/Enabling Technologies

The fundamentals of the Internet could usefully be revisited. This does not necessarily mean a total clean-slate approach, but it does call for a re-examination of primary Internet elements – including security,

[4] The deadline for contributions passed on 20th May, 2011.

mobility, languages, etc. Suitable testbeds could be used, in this regard, to jointly investigate enablers (e.g. IPv6) and potential applications (e.g. social networks, home environments, health, new media, etc.).

Generating energy in a more efficient manner to power ICT demands is another area that holds high potential. Such *green ICT* would complement many of the *smart energy* initiatives currently in place, where energy distribution and consumption are monitored by autonomous management systems. This green ICT would require collaboration with a number of research disciplines, including materials science, etc.

3.1.1.2. Use Cases & Applications

A 'smarter', more dynamic Internet should be able to adopt and evolve as time progresses. Advances in augmentation, reasoning and the semantic web could lead to programmable architectures that would deliver services-on-the-fly to users. A dynamic approach to contacting applications areas (e.g. the oil industry) directly also offers potential, as do education services – where there is scope to develop digital library content and multimedia platforms.

In general, use cases and applications have different potential and support in different Member States. For example: tourism and health in Spain; bio-informatics and ICT-agriculture (sensor networks) in Latvia; energy, sustainability and climate change in Sweden. The following section, conversely, addresses a number of applications that have potential for development on a pan-European scale.

3.1.1.3. Pan-European

A number of specific Member State initiatives could be developed and aligned in a pan-European environment. These include: Germany's recently rolled out e-identity management system; Hungary's National Technology Platform[5], which allows its researchers to engage more easily with their peers in other Member States; Romania's single sign-on facility, giving access to e-infrastructure.

Networked, open data also has potential, but it must be in an interoperable format to advance current data-sharing efforts. Additionally, novel business models are required to fulfil this area's potential and move it beyond the domain of Governments and public bodies.

Europe's diversity presents a number of high potential areas. *Standards*, for example, could be developed and robustly tested across Europe's heterogeneous landscape. The diverse expertise available across different Member States' Science Agencies could also be taken advantage of, should the EU and/or other Member States require specific consultation. Furthermore, having a large number of Member States means there is potential to develop several small clusters of Member States who could work together on pilot

[5] A number of other Member States also have National Technology Platforms in place

initiatives and subsequently report on what issues (barriers, time-scales, objectives, mechanisms, etc.) might need to be resolved at EU level.

3.1.2. Multidisciplinary vs. Technology-only Approach

The EU 2020 Digital Agenda, with its commitment to reducing the digital divide, provides the background to the multidisciplinary[6] aspect of this potential collaboration theme. Care must be taken, however, to balance technology-driven and user-driven developments, since too much consultation may lead to inertia and the loss of competitive position. Indeed, a number of Member States expressed primary interest in technical advances such as infrastructures, testbeds, routing, etc.

Additionally, involving uses in a multidisciplinary approach can be difficult. To this end, a non-hierarchal, user-centric framework might be useful. Such a framework could give rise to a two-way interaction between providers and users, and would circumvent traditional approaches, where rigid domains restrict innovation. Agile development, for example, could be examined in this regard since it would iteratively take account of user needs.

Finally, a multidisciplinary approach should encompass sociological culture barriers, ethics, sector-specific applications and horizontal applications. These are rarely addressed in unison, however, and there is opportunity here (e.g. for SMEs) to develop business models to fill this gap.

3.1.3. Living Labs vs. Testbeds Approach

More information is required on current testbed infrastructures available across Europe. The recently started INFINITY PPP project[7] is addressing this gap in knowledge and it will present its findings in due course. There is a school of thought, however, that says we should actually move away from testbeds (in isolation) and consider the Internet a living labs testbed itself. This approach would help involve users and could test the market to identify barriers. Testbeds can again be restrictive or limited in this regard, and, therefore, a living labs approach might better support innovation and new businesses.

Parallels exist between this potential collaboration theme and the 'multidisciplinary vs. technology-only' theme. While a multidisciplinary approach is generally advised, there will be some issues that will only be resolved through technology. Likewise, while a living labs approach may be the ideal in many instances, issues will still arise where testbeds will provide the solutions.

Note however that Europe has a natural advantage with regard to any living labs approach, since it comprises a large number of heterogeneous users.

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[6] Sociology, economics, law, psychology, ethics

[7] See **Section 2.2** above

3.2. Funding & Cooperation Mechanisms

3.2.1. Member State interaction with PPP

Though the PPP projects have only recently started, each Member State is monitoring their progression. Openness is a keyword here, and Member States expect their interaction with the PPP process to evolve as the projects make progress.

3.2.2. Making Use of Structural Funds

Using structural funds for ICT research is a recurring topic. One suggestion to achieve this is to ear-mark a portion of structural funds and then establish appropriate metrics to monitor the use of same. For example, metrics could include: number of new start-up companies, number of PhDs trained, type of products developed, etc. This approach may require EU-level direction, however, and could see the setting up of a pilot national strategic project for 'Future Internet Structural Funds'.

3.2.3. Basic research vs. public-private research

Some Member States have two separate research funding agencies: one for basic research and another for closer-to-market projects. Additionally, some funding agencies for basic research do not set rigid research priorities (outside of general smart-transport, smart-cities, smart-grids objectives), but rather set national programmes. This allows them to remain open and react faster to changes in commercial technology advances. In this regard, Strategic Research Agendas are becoming less relevant than Research Roadmaps.

Basic research may no longer be a goal in itself, but it may be an enabler for new knowledge and, hence, new technology innovation. The challenge remains to convert research into new business. Ultimately, an appropriate balance must be found between basic and public-private research – depending on where priorities/funding lie.

3.3. Barriers

3.3.1. Fragmentation & Duplication

Europe's strength lies in its diversity. Care must be taken though to avoid fragmentation and subsequent duplication of effort across Member States. Structured coordination is vital to ensure Europe does not fund and develop the same technology twice. Consolidated infrastructure may also result from such coordination.

A lack of dissemination can lead to a number of potential barriers to collaborative development, including:

- Member States not seeing value in trans-national collaboration;
- Poor visibility of EU projects and achievements in Member States and vice versa: such awareness could allow Member States to focus on niche areas which complement larger, EU-wide work (e.g. create applications to work on EU-wide platforms);
- Perception of a lack of coordination between EU research/Standards and those of USA, Asia;
- Perceived gap between top-down, regulated R&D and grassroots activities.

A formal mechanism to feed research outputs from Member State programmes into the EU framework could help address shortcomings in dissemination. Similarly, a common language or set of definitions could increase data-sharing across Europe.

3.3.2. Bureaucracy & Legislation

To increase research collaboration, a number of bureaucratic and legislative issues must be addressed. Some more obvious issues include cross-border data-sharing agreements and Intellectual Property Rights (IPR). Also, in some instances, regulation time-scales are mismatched with technology developments, meaning that regulators cannot keep pace with (and therefore cannot introduce) new technologies when they appear.

3.3.3. Miscellaneous

Assorted barriers to the development of Europe's Future Internet include:

- *A lack of domain expertise in specific instances*: this presents an opportunity for a multidisciplinary approach. A mismatch sometimes exists also between domain expertise and decision-makers.
- *Cost of network access*: this can be prohibitively high and thus, impede research.
- *Future budgets not guaranteed*: agreement often only exists on specific research themes, but not on the term/availability of the required funding.

4. Conclusions

This workshop report describes preliminary European Future Internet research issues, with respect to potential joint-initiatives and -investments between Member States, and between the EU and Member States. The ***themes***, ***funding mechanisms*** and ***barriers*** listed will act as a basis for advancing discussions

between the various stakeholders involved, including FIF Members, Research Councils & Funding Agencies, and EU programme managers.

Particular thematic discussion points include revisiting primary Internet elements like security, languages & mobility, generating green ICT energy, extending the semantic web & augmentation, developing specific Member State initiatives on a pan-European stage, and taking advantage of Europe's diversity to advance Standards. Member States may also find common ground in their approach to Future Internet development. Some favour a multidisciplinary style while others concentrate more on technology advances. Similarly, some Member States prefer a living labs approach as opposed to the testbed approach preferred by others. These choices are not mutually exclusive and varying degrees of emphasis may provide opportunities for collaboration.

The recently started PPP projects also provide potential for enhanced cooperation between Member States and the EU. Though it is early in this new PPP process, each Member State is monitoring its progress, with some already trying to identify topics in the use case projects that might relate to their own areas of interest. An additional area for potential collaboration could be the use of Structural Funds to complement other streams of research funding. Member States may also find they have similar views on basic versus public-private research, and on whether research priorities or research roadmaps better suit their needs.

Barriers to developing a Future Internet in Europe are varied. They range from fragmentation and duplication of effort to various legislative issues such as cross-border data-sharing agreements and Intellectual Property Rights. Improved dissemination of research results and achievements would also remove potential barriers to greater cooperation between Member States.

4.1. Next Steps

The Budapest workshop saw the public launch of the ceFIMS Working Group, which will have a number of individual clusters and champions as envisaged in the Working Group Terms of Reference. The primary objective of the Working Group is to support the development of the project's roadmap; the first interim roadmap will:

- Evaluate progress to-date in identifying synergies towards an Future Internet ERA-NET+;
- Analyse barriers to achieving an Future Internet ERA-NET+;
- Propose a strategy for overcoming these barriers; and thereby,
- Identify a process for the realisation of a Future Internet ERA-NET+, as well as measures for greater collaboration between PPP projects and Member State activities.

In this context, the first task for the Working Group will be to provide feedback on a discussion document arising from this workshop report. The discussion document will be based on the 'potential collaboration

topics' identified in **Section 3** of this report and it will serve as the first step towards ceFIMS first interim roadmap.

Champions will be identified from within the Working Group and they will further develop specific aspects of the discussion document. It is envisaged that the champions will present 'their' sections of the roadmap to the workshop ceFIMS will host in Poznan, immediately after which the interim roadmap will be finalised.

Appendix A. Agenda

Date: Wednesday 18th May 2011, 09:00 - 12:30

Venue: Main and Mirrored Rooms, Gerbeaud House, Budapest, Hungary

(1) Introduction (09.00 – 09.15)

- ***Dr. Willie Donnelly (Coordinator ceFIMS & Head of Research WIT)***
  - **i.** Introduction to the Project
  - **ii.** Objectives of the Meeting

(2) Commission Speaker (09.15 – 09.30)

(3) Future Internet Research Roadmap (09:30 – 09:45)

- ***Dr. Nick Wainwright (Chair of UK Future Internet Strategy Group / HP Labs)***

(4) Introduction to the work of the Break out Groups

- ***Drs. Sjoerd Meihuizen (Netherlands Organization for Scientific Research) and Dr. Edina Nemeth (National Innovation Office Hungary)***
  - **i.** Potential synergies between research programmes and currently-available instruments **(09:45-10:00)**

(5) Break out Groups (10:00 – 10:30)

- This break out session will mainly focus on choosing a thematic area within the Future Internet domain for European cooperation. Which thematic area could be addressed by the various Member States and has considerable potential for pan-European cooperation?

(6) Feedback to the Plenary Session (10:30 – 10:45)

(7) Coffee Break (10:45 – 11:00)

(8) Break out Groups (11:00 – 11:30)

- This break out session will mainly focus on reflecting on the right instrument / governance for organising cooperation between the various funding agencies, ministries and other organisations in the field of the Future Internet.

(9) Feedback to the Plenary Session (11:30 – 12:00)

(10) Final Comments: Agreements, Tasks and Planning (12:00 – 12:30)

Appendix B. Attendance

List of participants at ceFIMS/Research Councils workshop, 18th May, 2011

Name	Organisation	Member State
Marius Nicolaescu	Executive Agency HERI Funding	Romania
Florin Anton	University Politehnick of Bucharest	Romania
Rimvydas Simutis	Lithuanian Science Council	Lithuania
Piotr Kepski	Ministry of Science & Higher Education	Poland
Cezary Mazurek	Poznan Supercomputing and Networking Center	Poland
Christoph Peschke	Project Agency in DLR	Germany
Luis Magalhaes	Knowledge Society Agency (UMIC)	Portugal
Ana Ponte	Knowledge Society Agency (UMIC)	Portugal
Rihards Balodis-Boluzs	University of Latvia	Latvia
Inara Opmane	University of Latvia	Latvia
Joost van der Vleuten	Ministry of Economic Affairs	Netherlands
Robert van der Drift	Dutch Science Foundation	Netherlands
Sjoerd Meihuizen	Dutch Science Foundation	Netherlands
Jesus Cañadas	Ministry of Industry	Spain
Julian Sesena	AMETIC NCP ICT	Spain
Sandra Collins	Science Foundation Ireland	Ireland
William Donnelly	Waterford Institutre of Technology	Ireland
Fergal Ward	Intune Networks	Ireland
Latif Ladid	University of Luxembourg	Luxembourg
Apkady Zaslausky	Lulea University of Technology	Sweden
Peter Nou	Vinnova	Sweden
Pauli Kuosmanen	TIVITT	Finland
Till Christopher Lech	The Research Council of Norway	Norway
Maurizio Pilu	Technology Strategy Board	United Kingdom
Sauder Bottha	Hungarian Innovation Office	Hungary
Edina Nemeth	Hungarian Innovation Office	Hungary
Ioannis Askoxylakis	Forth - ICS	Greece
Arnaud Riviere de la Souchere	French Ministry for Economy	France
Patrick Schouller	French Ministry for Economy	France
Andrew Houghton	European Commission	*N/A*
Petronela Burceag	European Commission	*N/A*
Brian Foley	WIT / ceFIMS project	*N/A*
Kieran Sullivan	WIT / ceFIMS project	*N/A*
Nick Wainwright	HP Labs / EFFECTS+ project	*N/A*
Federico Alvarez	INFINITY PPP project	*N/A*
Jacques Magen	INFINITY PPP project	*N/A*