

## **ANNEX I – TERMS OF REFERENCE**

### **1. Name**

**Foresight on Key long-term Transformations of European systems: Research, Innovation and Higher Education (KT2050)**

### **2. Context and background information**

In application of Art 40 (e) of REGULATION (EU) No 1290/2013 laying down the rules for participation and dissemination in 'Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)', the Commission will appoint a list of independent experts to bring available evidence on the issue of '*Foresight on Key long-term Transformations of European systems: Research, Innovation and Higher Education (KT2050)*' and advise on the design of the Union research and innovation policy.

The appointment will be financed according to the provisions of the Societal Challenge 6 Work Programme 2014-2015, 'Other Actions: I–Actions to foster innovation policies: strengthen the evidence-base for R&I policy making; 9: Strategic Programming in Horizon 2020'.

The role of foresight as a key tool of the strategic programming process is defined in the Specific Programme of Horizon 2020:

'Detailed priority setting during the implementation of Horizon 2020 will entail a strategic approach to programming of research, using modes of governance aligning closely with policy development yet cutting across the boundaries of traditional sectorial policies. This will be based on sound evidence, analysis and *foresight*, with progress measured against a robust set of performance indicators'.<sup>1</sup>

### **3. Purpose, objectives and scope**

The main purpose of the expert group is to support the strategic programming process of EU Research and Innovation policy by using foresight knowledge to underpin the development of future priorities.

The objective is to explore possible future institutional evolutions, in research, innovation and higher education, in order to be able, in the context of the strategic programming of EU Research and Innovation policy, and in particular in the context of Horizon 2020, to define better the strategies, interventions and policy priorities that will mobilize effectively science, industry, government and society at large in research, higher education and innovation to address societal and economic challenges and opportunities.

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<sup>1</sup> COUNCIL DECISION of 3 December 2013 establishing the specific programme implementing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) and repealing Decisions 2006/971/EC, 2006/972/EC, 2006/973/EC, 2006/974/EC and 2006/975/EC, OJ L 347, 20.12.2013.

The interactions between research, education and innovation are a critical factor in contemporary economic growth and competitiveness, and lie at the heart of the Europe 2020 Strategy. Horizon 2020 aims at a broad and seamless approach to innovation, that is not limited to supporting research activities, but also covers processes, systems or other approaches for bringing new products to the market, including by recognising European strengths in design, creativity, services and the importance of social innovation. In particular the European Institute of Innovation and Technology (EIT) establishes knowledge and innovation communities (KICs) that fully integrate research, innovation and education into a “knowledge triangle”.

The content and institutional settings of research, innovation and higher education are undergoing important transformations driven by processes of globalization, population changes and technological developments. Research, in the public and private sector is an expanding activity being radically reshaped in the phenomenon termed “Science 2.0”. Higher Education is also radically reshaped as its emphasis turns towards social integration and life-long learning in the context of an increasingly globalized economy characterized by diversity and increasingly rapid change. New innovation models (e.g. open innovation, social innovation, sweeping innovation, frugal innovation etc.) link the new skills and knowledge structures with economic performance in the changing context, which involves increasingly diverse effectiveness and efficiency criteria (including for example sustainability, environmental friendliness, health and quality of life considerations etc.).

The complexity of influences at work requires cross-cutting foresight to maximize the impact of national and EU efforts, in particular of H2020, on economic competitiveness, effective responses to societal challenges, and well-being in Europe.

### **Task description**

The experts will review existing foresight and draw implications for EU policy in the field of research and innovation, considering scenarios for each of the three areas and the way in which Europe’s strengths and weaknesses may evolve in the context of globalization, population changes and ever faster technological change.

In particular the group will:

- 1) Review the implications of trends in globalization, population changes, and technological change for research, innovation and higher education, bringing together available foresight evidence. It will address questions such as:
  - a. What are the prevailing trends in the institutional set-ups of research, innovation and higher education (including for example IPR, financing and regulatory regimes, roles of private and public sectors, embeddedness in regional systems, role of policies for economic and social cohesion etc.)? Are there any key future events, milestones, tipping-points that may precipitate evolutions?
  - b. What are the most important challenges, risks and opportunities for Europe in the three domains? What are possible, likely and desired responses? What are the most important uncertainties that would affect the outcomes<sup>2</sup>?

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<sup>2</sup> Uncertainties can be used as dimensions for the development of scenarios

- 2) Draw, on the basis of available material, future scenarios for research, innovation and higher education based on the most important influences of the three drivers (globalization, population changes, and technological change) and the uncertainties that these influences engender. The scenarios could highlight potential wild-cards that may precipitate or alter the course of important transformations involved in the scenarios. In drawing the scenarios the experts should address questions such as
  - a. What are possible levels/degrees of Europeanization (as opposed to nationalization, globalization for each of the three areas)?
  - b. What are likely institutional forms and levels of institutional differentiation and variety? What are likely and desirable degrees and dimensions of specialization (e.g. profiling of universities)?
  - c. What kind of rules of ownership of knowledge we may expect? For example, what are possible modes for distributing rights over economic returns from machine-generated knowledge?
  - d. How would institutional developments affect European competitiveness?
  - e. How would they affect regional development, labour-mobility and other policy areas?
  
- 3) Analyze the scenarios to identify important strategic considerations for Research and Innovation policy and propose possible priorities and recommendations for linking research, innovation and higher education. In analyzing the scenarios the experts should address questions such as:
  - a. What are key challenges and opportunities / strengths and weaknesses for institutional forms combining higher education, research and innovation in Europe?
  - b. What could be uniquely European models of global success (e.g. equivalent to the uniquely American Silicon Valley/Boston models)
  - c. What could and should be done now to prepare for the new environment and promote efficient and effective structures for the future?

#### **4. Working approach and methodology**

The work of the group will be based on available evidence and existing knowledge. The group will not carry out research. It will combine the expertise of its members and knowledge and information that the members have access to.

The report of the group will have the form of a collective work (of about 50 pages long) and include an executive summary of less than 5 pages that would be suitable for policy makers, drawing out the salient points of the analysis and listing out any policy lessons and recommendations.

The work of the group will be coordinated by a Chairperson, who will be assisted in this task by a rapporteur. The Chairperson will be responsible for the agenda of the meetings of the group and for coordinating the discussions.

The group will decide by consensus. If a consensus cannot be reached, the Chairperson may decide to record the controversy and develop the majority and the minority opinion in the

report.

The group will be in regular exchange with the Research, Innovation and Science Policy Experts High Level Group (RISE). In particular the group will include two Members of Rise who will act as ambassadors between the two groups.

### **5. Distribution of work among the experts**

The **Chairperson**, for up to 20 working days, will **coordinate the work of the expert group, organise the workshops, and steer the discussions**. The Chairperson will have the overall responsibility for the process and the editorial responsibility for the report of the group.

The **Rapporteur** will be responsible for the production of the report of the group. For up to 34 working days, he will prepare the report of the group, building on a draft report structure following workshop 1 and building into it contributions of the experts and the discussions in the meetings of the group.

Each **member**, for up to 12 days each, will take part in the meetings of the group, prepare evidence and develop contributions to the meetings and to the report as agreed within the group.

The RISE HLG “ambassadors”, for a maximum of 2 days each, will take part in one meeting of the group, and contribute relevant insights from the work of RISE. The ambassadors are not expected to make written contributions.

Each member of the expert group will take an active part in deliberations, commenting on presentations, and on the written contributions, including through written comments.

### **6. Meetings, reporting and deadlines**

The group will meet 4 times in Brussels (tentatively 1 October 2014, 30/31 October 2014, 1 December 2014 and 15 January 2015).

The first meeting will be dedicated to finalizing the work-plan of the group, identifying evidence needed and potential contributions for each member and deciding on a plan for those contributions to take place. In particular the first meeting will be used to develop a baseline understanding of the EU system of Research, Innovation and Higher Education (including the national systems from a European perspective), a first approximation to the potential challenges and opportunities, and on the scope of, and methodology for, the scenarios.

The second meeting will be dedicated to developing more in depth understandings of trends and to reviewing the implications of trends in globalization, population change and technological change for education, research and innovation, and to defining the scenarios to be developed.

The third meeting will develop the selected KT 2050 scenarios and consider their implications for European Research and Innovation policy in general and H2020 in particular.

The fourth meeting will finalize the scenarios and develop further the implications for current Research and Innovation policy in the EU and the any resulting policy recommendations.

Following this last meeting, the rapporteur will finalize the report of the group and, with the

approval of the Chairperson submit it to the Commission. A draft should be submitted 2 weeks after the last meeting, and a final version should be submitted within 2 weeks after the receipt of comments by the Commission.

The final report might be proposed for publishing via the Editorial Partnership of the European Union's Publications Office ([http://publications.europa.eu/partner\\_corner/edit\\_partner/index\\_en.htm#](http://publications.europa.eu/partner_corner/edit_partner/index_en.htm#)).

## **7. Experts' profile**

The experts cover the domains of the future of Research, Innovation and Higher Education, and bring in perspectives from government, public sector, and industry.

In particular, each expert brings in expertise focussed in one of the three domains but in conjunction with at least one more of the three domains. Effort has been made to select experts that have played important roles in recent relevant foresight exercises in the context of EU programmes and the OECD.

Knowledge in the area of national and European research and innovation policies, programmes and systems has been an important concern as well as previous experience in the field of FLAs and their impact.

## **8. Expert short biographies**

<b>Name</b>	<b>Nationality</b>	<b>Affiliation</b>	<b>Short biography</b>
Richard Hudson	US	Science Business	<ul style="list-style-type: none"> <li>• Managing Director, Science-Business</li> <li>• A leading science and technology journalist in Europe for more than 30 years</li> <li>• Managing editor of The Wall Street Journal Europe from 1997 to 2003</li> </ul>
Apostolos Dimitropoulos	EL	Independent	<ul style="list-style-type: none"> <li>• Special Adviser at the University of Athens</li> <li>• Special Adviser to the Greek Minister of Education</li> <li>• Officer of the Greek Agency for Quality Assessment in Higher Education</li> <li>• Expert in reform of Higher Education systems and journalist</li> </ul>
Kristian Borch	DK	Technical University of Denmark	<ul style="list-style-type: none"> <li>• Senior Researcher. Foresight methodologist.</li> <li>• Foresight and socio-technological aspects of emerging technologies, especially in biotechnology, agriculture and food production.</li> <li>• Foresight activities for the Danish government, the Nordic Council of Ministers, the EU Commission</li> </ul>
John Smith	UK	European Universities Association	<ul style="list-style-type: none"> <li>• Senior Adviser</li> <li>• Previously Deputy Secretary General of EUA with responsibility for research and innovation.</li> <li>• Fellow of the Gulbenkian Foundation and Visiting Professor in European Science Policy at the Instituto Superior De Ciencias Do Trabalho E Da Empresa (ISCTE) of the University of Lisbon</li> <li>• Previously Executive Director of the Vienna Institute for Human Sciences</li> </ul>
Jordi Molas Gallart	ES	CSIC/INGENIO	<ul style="list-style-type: none"> <li>• Research Professor at the Spanish Council for Scientific Research (CSIC), working at INGENIO / Polytechnic University of Valencia.</li> <li>• Fellow of SPRU, University of Sussex</li> <li>• Expert in science and technology policy; innovation and foresight</li> </ul>
Jerome Glenn	US	The Millennium Project	<ul style="list-style-type: none"> <li>• Co-founder (1996) and director of The Millennium Project (on global futures research) and co-author of the annual State of the Future of the Millennium Project for the past twelve years.</li> </ul>

			<ul style="list-style-type: none"> <li>• Washington, DC representative for the United Nations University and executive director of the American Council for the UNU 1988-2007</li> </ul>
Marijk van der Wende	NL	Vrije Universiteit Amsterdam	<ul style="list-style-type: none"> <li>• Professor in higher education</li> <li>• Honorary professor at the Centre for Higher Education Policy Studies (CHEPS) at the University of Twente.</li> <li>• Founding Dean of Amsterdam University College an international liberal arts &amp; science college</li> <li>• Past President of the Governing Board of the Programme on Institutional Management in Higher Education (IMHE) of the OECD.</li> <li>• Member of the International Advisory Board of the Centre for the Study of World Class Universities, Shanghai Jiao Tong University, Member of the Higher Education Authority Ireland, Member of the Scientific Board of the Dutch Military Academy, and member of various national and international editorial boards.</li> </ul>
Muriel Desaeger	BE	Toyota Motor Europe	<ul style="list-style-type: none"> <li>• Senior Principal Technologist</li> <li>• Energy Research Group / In charge of energy strategy, foresight and future mobility and future business opportunities</li> <li>• General Manager / Advanced Technologies</li> </ul>
David Charles De Roure	UK	University of Oxford	<ul style="list-style-type: none"> <li>• Professor of e-Research</li> <li>• Director of the Oxford e-Research Centre</li> <li>• Co-Director of the Institute for the Future of Computing in the Oxford Martin School.</li> <li>• From 2009 to 2013 he held the post of National Strategic Director for e-Social Science.</li> <li>• Supernumerary Fellow of Wolfson College, Oxford</li> </ul>
Jana Kolar	SL	MORANA RTD, d.o.o.,	<ul style="list-style-type: none"> <li>• Owner and CEO.</li> <li>• Member of the Board of the EIT</li> <li>• Director General of Science in Technology at the Ministry of Higher Education, Science and Technology in Slovenia (2009-11),</li> <li>• Chair of the board of Slovenian Technology Agency (2011) and a member of the board of Slovenian Research Agency (2009-11).</li> </ul>
Ulrike Felt	AT	University of Vienna	<ul style="list-style-type: none"> <li>• Professor of Science and Technology Studies and head of Vienna STS department.</li> <li>• Visiting professor in a number of institutions, among them at GERSULP/Université Louis Pasteur (Strasbourg), at the Centre Interuniversitaire pour la Recherche en Science et Technologie, Université du Québec à Montréal, at the Maison des Sciences de l'Homme in Paris, at the Collegium Helveticum, ETH Zurich and at the STS group at Harvard</li> <li>• Member of EURAB in 2006/2007</li> <li>• Expert in science and technology dynamics</li> </ul>
Aldo Geuna	IT	University of Torino	<ul style="list-style-type: none"> <li>• Professor of Economics at the Department of Economics and Statistics Cogneiti de Martiis, University of Torino</li> <li>• Fellow of the Collegio Carlo Alberto.</li> <li>• Visiting Professor at Stanford Institute for Economic Policy Research (SIEPR), University of Stanford.</li> <li>• Senior Lecturer at SPRU, University of Sussex,</li> <li>• Senior Research Fellow at RSCAS - Robert Schuman Centre for Advanced Studies - European University Institute</li> <li>• Research Fellow at BETA, Université Louis Pasteur (Strasbourg), and at MERIT, Maastricht University.</li> <li>• Expert in the socio-economic analysis of university research behaviour and its links to innovation and economic growth.</li> </ul>
Kurt Deketelaere	BE	University of Leuven	<ul style="list-style-type: none"> <li>• Professor of law</li> <li>• Secretary-General of the League of European Research Universities (LERU)</li> <li>• Chief legal advisor (2004-2007) and the chief of staff (2007-2009) of the Flemish Minister for Public Works, Energy, Environment and Nature.</li> <li>• Honorary professor of law at the University of Malta and the University of Dundee,</li> </ul>

Rajneesh Narula	NL	University of Reading	<ul style="list-style-type: none"> <li>• Professor of International Business Regulation</li> <li>• Director of the John H. Dunning Centre for International Business at the Henley Business School,</li> <li>• Previously held positions at the Copenhagen Business School, University of Oslo, BI Norwegian School of Management, the University of Maastricht, Rutgers University, and the United Nations.</li> <li>• Expert on the internationalisation of innovation, R&amp;D alliances, emerging economies, and the role of multinational firms in industrial development.</li> </ul>
Krzysztof Gulda	PL	PL Independent	<ul style="list-style-type: none"> <li>• Vice-chair of the European Research Area and Innovation Committee (ERAC)</li> <li>• member of Science Policy Committee - advisory body to the Polish Minister of Science and Higher Education</li> <li>• Former Director, Department of Strategy, Ministry of Science and Higher Education, Department of Innovation and Department of Economy Development, Ministry of Economy in Poland</li> <li>• Expert in development of national and regional innovation strategies with strong focus on horizontal relations between innovation and other polices including research, entrepreneurship, human development, intellectual property and sustainable industrial policy.</li> </ul>
Petra Schaper-Rinkel	DE	Austrian Institute of Technology (AIT)	<ul style="list-style-type: none"> <li>• Senior Scientist in EU projects on science, technology and innovation policy and foresight.</li> <li>• Senior lecturer at the Technical University of Berlin and a project manager at Freie Universität Berlin</li> <li>• In addition to holding research positions and lecturer positions at Humboldt University, Freie Universität Berlin, Technical University of Berlin and the University of Innsbruck, she also designed and managed governmental programs to support microsystems and other technologies at VDI/VDE-IT, a project management organization commissioned by the German Federal Ministry of Education and Research (BMBF).</li> <li>• Expert in innovation, science and technology studies (STS), the political implications of emerging technologies, technology assessment, foresight methods and forward looking activities</li> </ul>
Stephanie Daimer	DE	Fraunhofer Institute for Systems and Innovation Research ISI	<ul style="list-style-type: none"> <li>• Senior researcher and project manager</li> <li>• Coordinator of the Visions of the European Research Area (VERA) Project</li> <li>• Research Fellow at the University of Konstanz and the German Research Institute for Public Administration Speyer.</li> <li>• Expert in European Research Policy and foresight.</li> </ul>
Gill Ringland	UK	Sami Consulting	<ul style="list-style-type: none"> <li>• CEO and Fellow of Sami</li> <li>• Member of RISE and previously member of EFFLA</li> <li>• Fellow of ICL and Fellow of the World Academy of Art &amp; Science</li> <li>• Past Member of SRC's Computing Science Committee and of Council of the Economic and Social Research Council.</li> <li>• Past Director of Strategy at ICL plc</li> <li>• Expert on Foresight methods</li> </ul>
Anna Tschaut	CH	University of Applied Sciences and Arts Northwestern Switzerland	<ul style="list-style-type: none"> <li>• Research coordinator</li> <li>• Member of RISE</li> <li>• Secretary and policy officer EURODOC</li> <li>• Member of EFFLA</li> </ul>