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Inspiring and Completing European Innovation Ecosystems

BLUEPRINT

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Foreword

by Damien English, T.D., Minister for Skills, Research & Innovation, Ireland

The first report of the HLG, which was discussed at the informal Competitiveness Council under Ireland's EU Presidency last year, was well received. There was a broad consensus that better innovation policy is not just a function of money spent on research activities or other programmes, but that non-financial means of support are at least as important. Encouraged by the reaction to the initial report, the HLG has now produced a follow-up report, or Blueprint, with proposals for actions and tools to further develop and complete the European Innovation Ecosystem.

Ireland has very much welcomed the opportunity to contribute to the development of this Blueprint on how best to shape the European Innovation Ecosystem. From the outset, our particular focus has been how to optimise the benefits of research investment for European jobs, growth and society. I am pleased to see that the High Level Group on Innovation Policy Management has set this as a cornerstone of its recommendations.

I commend all those who have contributed to the development of the Blueprint and its mission 'The promotion of the Common Good and the launch of a new period of prosperity for Europe and its citizens'. I thank the Italian EU Presidency, the HLG and the secretariat for advancing this very valuable work, which will inform one of the most important debates we face within the Union on an optimised Innovation Ecosystem that delivers societal benefits, economic growth and jobs.

Damien English, T.D.

Minister for Skills, Research and Innovation, Ireland

Foreword

by Senator Stefania Giannini, Minister for Education, Universities and Research, Italy

The Polish Presidency of the Council must be congratulated for its foresight in launching the High Level Group on Innovation Policy Management in December 2011. The condition of the European economy by now is such that daring creative thinking, followed by actions, is most needed.

We are grateful to the Irish Presidency of the Council for having continued the work of a unique, independent, tripartite group of experts from Governments and Commission, which also involved innovative companies and reputed academics.

The Italian Presidency has made it one of its important tasks to complete the work of this group and to facili-tate its final report, a blueprint with concrete reform proposals to stimulate innovation and competitiveness and to nurture interdependent innovation ecosystems. 'Competitive collaboration' should be Europe's innovation mantra.

Job creation is now a pressing priority, and must be achieved by unlocking the potential of European research and innovation in all market value chains. This requires also strong actions to innovate education systems and to make entrepreneurial education a part of it. Another key step refers to making the European Research Area more competitive and to improve working conditions throughout Europe, also by stimulating strong industry-research networks and concentrating resources on impactful European industrial research projects. Of equal importance is the need for better coherence between European and national policies, and a more open mind-set towards the challenges of a global, digitalized economy.

In this direction, the role of research in society must be substantially updated. It is not only a matter of effectively communicating the impact of science in society, but of tightening the gap between scientific endeavors and global risk management, making science more accountable towards its impact on citizens' actual lives.

Many thanks to the members of the High Level Group who offered their valuable time and inputs for the benefit of us all. I hope that this initiative will bring concrete results and that the Commission and the Council will study the recommendations with an open mind and concern for the future of our societies.

Senator Stefania Giannini

Minister for Education, Universities and Research, Italy

2014 Presidenza Italiana
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dell'Unione Europea

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Secretary-General

- ***Stefan Schepers,*** former Director General, European Institute of Public Administration

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Message to the reader

This Blueprint aims to contribute to the European market of ideas. It is the work of a group of people who are aware that profound contextual changes, such as the rapid digitalisation of the economy and society, more than ever require innovative thinking. The members of the High Level Group on Innovation Policy Management (HLG) were driven by a concern to stimulate growth and employment through systemic and all-encompassing innovation.

The method the group used to bring creativity and serendipity was innovative in itself: working in an independent, tripartite group of senior civil servants drawn from the European and national administrations, experts and managers from leading innovative companies and prominent scholars from academia. The Polish EU Council Presidency, who initiated this project, and the Irish Presidency who continued it, invited them to 'think outside the box' which many believe is indispensable in Europe today.

In accordance with the concept of collaborative governance, which we favour, our recommendations and ideas are not addressed to specific institutions in the EU or Member States' governance systems. Rather, in line with our approach to consider and unfold the eco-systems of innovation prevailing in Member States and the EU, it is up to the European Council, the individual Council formations, the Commission and national governments to decide what to do and how.

The members participated in their personal capacity. All recommendations for action and all ideas for further consideration have not always been agreed on by all members. Therefore, the final version of the Blueprint, based on a broad consensus, is written under the responsibility of the chairman and the secretary general of the HLG.

Klaus Gretschmann
Chairman

Stefan Schepers
Secretary General

Executive Summary

This Blueprint is the sequel to the first HLG Report and Recommendations of June 2013[1] .

Its aim is as follows: in order to favour an 'innovation renaissance', the Blueprint provides the indispensable steps for the development and completion of European Innovation Ecosystems where governments, business, academia and citizens can interact to foster creative and bold thinking and a flexible, dynamic, stimulating and enabling environment allowing for innovation to drive economic growth, the creation of jobs, ground-breaking research and new solutions for societal and welfare challenges.

The Blueprint is the product of a pioneering, independent and tripartite High Level Group from government, business and academia, uniquely qualified for thinking outside the box. It contains a whole series of hands-on recommendations for policymakers in the European Council, the individual Council formations, the Commission and the governments of the Member States aimed at unleashing the European innovation potential.

Back in 2011, it was the Polish Presidency of the EU who launched this initiative. The Group produced its first report in June 2013 claiming the need to move towards an all-encompassing European Innovation Ecosystem and presented its recommendations to the informal and formal Competitiveness Councils under the Irish Presidency.

Given the widespread positive reception, the Group was asked to reconvene for a second phase, in a slightly modified composition, with the specific objective of producing a follow-up report with practical proposals for actions and tools to unfold and complete the European Innovation Ecosystem. In December 2013 the government of the Republic of Ireland launched this second phase, which was concluded in Rome under the patronage of the Italian Presidency in July 2014.

The Blueprint is the outcome of deliberations of the High Level Group during its mandate.

The recommendations are divided into three parts: the first part is focused on how best to shape the EU Innovation Ecosystem in order to make it competitiveness-proof, the second part deals with social innovation as a means to bolster unintended side-effects and to make citizens more inclined towards innovation and the third part centres upon how to make the system of EU governance more innovation-conducive. All recommendations for action and ideas for further examination are meant to be practical, actionable and forward looking

In part I, the HLG recommends setting coherent and compelling criteria for making the EU Innovation Ecosystems flourish. We plead for a broader view on IPR, beyond the sheer patent system, and we argue that public procurement needs urgent and full application of the new rules in order to make use of its inherent innovative potential. We advise a more innovative approach to sustainable growth based on resilience in ecosystems, with a focus on research and innovation and collaboration between stakeholders for problem management. We argue for broadening the traditional R&D funding to products and services, as well as to public-private-people partnerships (PPPPs) and business-university partnerships (BUPs). We also think that we could make better use of existing funding and recommend a tax policy to stimulate innovations, as well as a wider variety of funding mechanisms.

In part II we deal with the problem that every innovation carries both desired and unintended collateral effects. Innovations may create disruptions unsettling many, whilst benefitting others, creating uncertainty and resistance among large sections of society. Therefore, both corporations and governments share a common concern for healing and for out-balancing the potential, mostly temporary undesired social effects. In order to tackle this problem, we suggest including and enlarging 'social innovation' in EU Innovation Policy Management

1 *See High Level Group, Innovation Policy Management: Report and Recommendations, Brussels June 2013*

Schemes. Next to communicating the beneficial effects of innovation, innovating education at all levels and stimulating entrepreneurship and social responsibility by all stakeholders seem to be indispensable elements of making EU Innovation Policy more socially acceptable.

Part III touches upon a very sensitive dimension of the EU Innovation Ecosystems: the traditional EU system of governance, which in itself is not always prone and conducive to innovation policy nor adapted to the digital age. The EU of today which has acquired and been assigned numerous competences in many areas appears in urgent need of all-encompassing governance innovation. Between the traditional Community Method and the Open Method of Coordination, it requires new instruments for innovative Collaborative Governance. The ideas and options which we point out do not require Treaty changes, though in the long run a review of the division of competences between EU institutions and Member States as well as between private and public actors may be unavoidable.

Our ideas and recommendations involve the following, interdependent elements for improvement: the regular use of European Council meetings for a comprehensive discussion of a citizen centred theme; measures to reduce the innovation divide in the Single Market and assistance in building national innovation ecosystems; measures to radically improve policy coherence and impact assessments, through the design and implementation of new models for impact assessments; the option to create a EU Commission Vice-President(s) without portfolio, responsible for strategic collaboration, mentoring and coherence in Innovation Policy Management; the strengthening of the role of independent, outside-the-box advice; the regular discussion of innovation ecosystems' development in joint and inclusive Council meetings; a review of the 'comitology' procedures and a rapid and significant reduction of regulatory rigidities and costs.

The recommendations are meant for all those who bear responsibility for setting the parameters/ framework of growth, prosperity and innovation right: heads of states and governments, Ministers of the Economy, Competitiveness, Industry and Research, and others, as well as the European Commission and the European Parliament. Some ideas and recommendations are specifically targeted at institutions or Member States' governments. Moreover, many ideas and recommendations are addressed to stakeholders such as business, academia and civil society organisations, taking account of their role and importance in interactive and collaborative innovation ecosystems. Some ideas are far-reaching and may primarily serve to stimulate further discussion on the marketplace of ideas about the future of Europe.

And last but not least, the Blueprint puts forward important proposals regarding:

1. the interaction between the private and the public sectors, as well as with academia and the research world;

2. recommendations aimed at fully unfolding the potential of Public-Private-People Partnerships (PPPPs).

High hopes prevail to use the present momentum, which the imminent changes in EU institutions provide to inspire and complete Europe's Innovation Ecosystem. Therefore, the group has suggested a very ambitious yet tentative 'roadmap' for putting some of its recommendations on track covering mainly the next three years.

The roadmap lays out a kind of master plan, starting with experimenting and field-testing novel forms of collaborative governance and measures to improve policy coherence within and between EU institutions. It also suggests pondering improved forms and formats for impact analyses of sorts. All of this may translate into the longer term development of networks of research and industrial cooperation, new funding possibilities and better science communication, just to name a few.

Member States' governments as well as future EU Presidencies may wish to draw from the many ideas laid down in our blueprint. That such an approach will require long-term political commitment from many actors in the Innovation Ecosystem, rather than just hip-shooting and then putting it in a drawer to rest goes without saying!

The Blueprint preserves one crucial mission: the promotion of the Common Good and the launch of a new period of prosperity for Europe and its citizens.

The mission and challenge: fixing the broken looking-glass and making Europe a place to prosper

'The Union's aim is to promote peace, its values and the well-being of its peoples' This is how article three of The Treaty of the European Union describes the ultimate goal of the European Union (EU). It is also the final objectives of innovation policy. It guided the work of the HLG.

The key concerns of citizens today are the future of their children, employment, their living conditions and social protection as well as the preservation of their natural environment. To better safeguard them, the EU should focus on sustainable growth and competitiveness through overarching innovation. This can and should be done within the confines of the Treaty.

We can no longer see our world nor proceed towards a bright future through the prism of the old economic, social and political paradigms based on the concepts and practices of the 1950s. We need a re-designed, modernized, more pragmatic and pro-active attitude in and about the EU. Unprecedented scientific and technological change and globalisation are forcing Europe to fundamentally adapt to the open, digital economy and society.

The EU has served the people very well. However, digitisation throughout the economy and society now demands a fundamental re-thinking of policies and methods of operation. The EU and the Member States need an overarching focus on innovation. Experiments and radical reforms must be inspired, consulted, implemented and completed to allow comprehensive innovation ecosystems to promote and expedite Europe's competitiveness. The status quo is the danger, everything else is an opportunity. Only innovation and competitiveness will allow Europe's cherished and exemplary societal models and citizens' adherence to be maintained. If well managed, they will reduce the fear large sections of society have of the future and the ensuing Euro scepticism. Self-commitment from all policy-making actors to arrange for all-encompassing innovation in all policy areas is an indispensable pre-condition. Foresight, evidence based and lateral thinking is badly needed to correctly define the relevant problem(s) and lay the basis for effective policy innovations.

In a world of vastly greater mobility of the factors of production, traditional welfare provisions will depend greatly on the right framework conditions for growth, competitiveness and innovation. Current societal challenges, for example public health, education, pensions or care for a growing proportion of elderly people, will require early and smart adaptations of Europe's welfare systems in order to overcome existing and potential defaults and make them fit for the future.

This is the key challenge for the next five years and beyond. Meeting this objective will greatly improve the credibility of the EU, citizens' trust in their governments and increase social acceptance of innovation.

The independent tripartite High Level Group (HLG) was first mandated by the Polish EU Presidency to 'think out of the box'. It outlined a fresh approach to unfold all-encompassing European Innovation Ecosystems in its first report (June 2013). We need to abandon the current linear thinking and

'silo-approaches' which are so characteristic of the industrial economy era and the accompanying administrative and political organisations. We need to optimise the entire value chain from research to market and cross-fertilisation between sectors. Complexity, inter-action, feedback, adaptability and cross-fertilization, but also transformability, evolution and reform, are all staples of the digital age we have now entered. But we must not forget that the digital economy has to be seen as an enabler of, rather than an alternative to traditional industrial and manufacturing economy.

Against this background the Irish and Italian governments, as well as representatives of the EU institutions encouraged the HLG to continue and enlarge upon its analysis and recommendations. Whereas the main pillar of analysis during the first phase of our workings was the Innovation Ecosystem approach, the main pillar in phase two was 'Resilience Thinking'.

Resilience Thinking helps us understand how our activities in one part of the innovation ecosystem affect other parts and vice versa how we best engage and incentivize stakeholders and how we design fair and robust, efficient and democratic structures of governance to get the innovation ecosystems rolling. Since in a complex system everything is connected to everything else, what is required for management is 'requisite simplicity'.

Its fundamental requirements are:

1. *System thinking;*
2. *Adapting structures, procedures and rules;*
3. *Managing complexity in interacting systems to unfold Europe's vast but partly unused innovation potential.*

Moreover, this places an emphasis on learning, experimentation, reviewing existing rules and structures and embracing change. Digitalisation in economy and society will add a new quality and will continue to advance new, open governance, which is needed to ensure maximum benefit for all.

Against this background, we suggest a whole series of (interdependent) recommendations meant primarily for European institutions and national governments but also intended for companies, academia and other actors. The interactive nature of innovation ecosystems essentially calls for action, responsibility and involvement from all stakeholders. It means that many recommendations have several addressees, rather than targeting just one or a very limited audience. We have focused on what to achieve, why and how in order to make innovation part of the DNA of the EU system.

The 'sine qua non' of workable innovation

As the Innovation Scoreboard 2014 rightly states, innovation is a tool leading to sustainable growth and competitiveness: it fosters value creation, increases employment, supports empowerment and addresses major societal challenges. There is a strong correlation between an innovation-friendly environment and an above-average economic performance at micro and macroeconomic level[2]. It is no coincidence that the best innovation performing countries are also among the countries with the strongest performance in competitiveness, growth and employment. They also enjoy high rankings of citizens' happiness.

Although there is no single way to achieve top innovation performance and each country has its own specificities, certain similarities have been found between the most innovative countries: efficient and coherent governance tool sets, innovation strategies and modes of funding, excellence in research, public-private partnerships and university-business

2 *See European Commission (2013), Innovation Union Scoreboard 2013; INSEAD (2012), The Global Innovation Index 2012: Stronger Innovation Linkages for Global Growth; Institute for Management Development (2012), IMD World Competitiveness Yearbook 2012, 24th edition, Lausanne, Switzerland; and World Economic Forum (2012), Global Competitiveness Report 2012-2013*

cooperation, together with commercialisation of new know-how.

Evidence from the best innovation systems suggests that the efforts which countries undertake (input) are rewarded in terms of improved innovation outputs and activities that create value. R&D expenditure and well-targeted business accelerators have a significant impact on research output and quality as well as on companies' growth, job-hiring and new-to market product innovations. The country systems performing well at innovation and competitiveness have some of the highest R&D expenditures and benefit from a strong operational network of R&D inputs. However, this is not enough. A simple increase in R&D expenditure will not necessarily lead to growth and the creation of quality jobs. There is a need to integrate ex-ante and ex-post evaluations and to ensure that R&D investments are transformed into the market context. This requires the development and steering of a more complex ecosystem as a whole which centres on citizens and society.

In this respect, an analogy with innovation-management at company level should serve as an inspiration. It is innovation that enables companies to transform themselves in line with competition challenges and existing or newly created consumer demands. Moreover, by bringing innovation to the market, firms facilitate economic growth and subsequently employment and significant improvements to the people's lives. The spillover effects – direct and indirect employment – of this process are dispersed throughout the economy. The impact provides a strong rationale for the re-design of systems which reorient policies and funding modes towards giving innovation a new drive. It should not be overlooked that monopolies and cartels stifle innovation and fair and open competition stimulates it.

Look in the rearview mirror: what's been put on track and what's still missing

The recent reforms of the Eurozone governance and many aspects of the EU2020 Strategy are steps in the right direction. However, the proper framework conditions for competitiveness and innovation and therefore for growth and job creation, are still partly absent because of a lack of clear, upfront problem definition and target setting which leaves too much space for institutional self-interest and policy delusion. Allocation of financial resources to boost innovation is partly anchored in old paradigms. Nevertheless these policy measures are the seeds of innovation ecosystems which now need to be developed further.

The key problem in the EU is not money, but the effects of silo thinking and institutional egotism in public administrations, though companies or business associations as well as civil society and their organisations are not immune to it either. Helped by the complexities of the EU system, this can lead to interest capture instead of a focus on the Common Good.

Several initiatives and policies related to Innovation have their origin in EU Institutions, with different Directorate Generals in the Commission leading their design and implementation. Among the more cross-cutting ones, the following can be identified:

- **Europe 2020**: Europe 2020 is a 10-year strategy aimed at boosting and strengthening the European economy. Europe 2020 includes seven 'flagship initiatives': three for smart growth (Digital Agenda for Europe, Innovation Union and Youth on move), two for sustainable growth (Resource-efficient Europe and industrial policy for the globalisation era) and two for inclusive growth (Agenda for new skills and jobs and European Platform against poverty). Within each initiative, both the EU and national authorities have to coordinate their efforts so that they are mutually reinforcing.

- **Innovation Union**: the Innovation Union is one of three flagship initiatives for smart growth envisaged by the Europe 2020 strategy. The Innovation Union contains over thirty action points focusing on three objectives: helping Europe to evolve into a world-class science

performer; removing obstacles to innovation and changing the way the public and private sectors work together. The strategy is implemented through different instruments which among others include the Horizon 2020 framework programme. DG Research and Innovation oversee the programme.

- **Horizon 2020**: this research and innovation programme which is part of the Innovation Union Flagship initiative, is the largest of its kind ever adopted by the EU, with a budget of nearly € 80 billion over 7 years (2014-2020). The main drive behind the programme is fostering excellence in science, promoting industrial leadership and tackling societal challenges. The programme devotes particular attention to climate action, resource efficiency and sustainable agriculture and secure societies. The European Institute of Innovation and Technology (EIT) and the Joint Research Centre (JCT) contribute considerably to coordinating the efforts of different knowledge communities and provide impact assessment. The programme is chiefly run by the Directorate General for Research and Innovation.

- **European Research Area (ERA)**: its aim is to strengthen the scientific and technological bases in Europe by achieving free circulation of researchers, scientific knowledge and technology and to encourage more competitiveness. Since its inception in 2000, the programme set concentrated on improving multilateral cooperation in industrial, health, environmental and socio-economic research. Its purpose is to increase the competitiveness of European research institutions by bringing them together and encouraging more inclusive working methods. The programme falls under the responsibility of DG Research and Innovation.

- **European Innovation Partnerships (EIP)**: the EIPs focus on societal benefits and a rapid modernization of the associated sectors and markets. EIPs bring together national and regional efforts in R&D and demand-side measures under the general supervision of DG Research and Innovation. EIPs aim at to streamline, simplify and improve existing instruments and initiatives and, if necessary, complement them with new actions. The initiative's main objective is to step up research and development efforts, coordinate investments in demonstration and pilots, anticipate and fast-track any necessary regulation and standards and mobilize demand. At the moment, the initiative focuses on five main sectors: Active and Healthy Ageing, Agricultural Sustainability and Productivity, Water, Raw Materials and Smart Cities.

Questions remain about the effectiveness for competitiveness due to systemic problems and fragmentation of the EU initiatives, their implementation across the different Directorates General and the varying degree and sometimes even absence of their integration within innovation ecosystems in Member states. In particular:

- Too much funding goes to traditional sectors instead of research and development in new and emerging sectors. It is too research oriented and does not sufficiently focus on the entire innovation value chain, from research to market, increasing the risk that research funded with public money never reaches the market because of multiple, but mainly regulatory, obstacles, or that it is even commercialised elsewhere.

- Despite its increase, the EU's research budget itself is too small compared to public funding of research in competing economies such as the USA, Japan, China, or compared to the aggregate public funding of research in the Member States. Countries and companies all too rarely reach the 3 percent target.

- National governments still operate too much in isolation from each other and from the EU research programming, sometimes ignoring global industry value chains, though Horizon 2020 goes in the right direction. Occasionally they also seem to decide on policies without taking into account the effects on neighbouring economies, with a risk of weakening the Single Market or the Monetary Union.

- The potential double output of some research spending, for defence and civil applications which is an important component of innovation in the USA, is missing, weakening the European and national return on investments.

- The EU budget is fragmented over many sectors, projects and countries which seems more politically driven than opting for a careful selection of two or three priorities based on truly common interests.

- Due to a lack of systemic approach, there continues to be fragmentation between the regulatory work and research investments, leading to potentially damaging obstacles to access in markets. In particular for new technologies, the parallel design of new regulatory concepts and trajectories seems to be missing. This breaks up the innovation value chain, reducing the efficacy of the research investments.

- Despite improvements in the Horizon 2020 approach, red tape and blocking IPR protection have maintained doubts from leading innovative companies about participating, while for some SMEs participation in EU funded programmes may have become their *raison d'être*. On-going simplification of the programmes needs to be pushed further, in order to avoid waste of resources or obstacles for start-up entrepreneurs, precisely the group which should be supported.

- Fragmentation is increased within the Commission, between DGs and their individual research planning, sometimes top down and with little relevance to innovation in markets and the weakness of overall steering and coordination, leading to insufficient cross-fertilisation and overarching priorities. Too much planning instead of experimentation and trials in the real world lead to unaffordable delays.

- Some important policies are full of contradictions and political show, without evidence-based analysis and calculated targets, leading to no or meaningless output, worsening problems in other sectors and negatively affecting macro-economic targets.

- Measures to control and reduce public spending have led to institutional deficiencies for knowledge transfer in several Member States and ill-fitting human and financial resources to properly develop, manage and promote innovation policies.

- The involvement of companies seems weak in many programmes which means that there is an insufficient bottom-up, market driven approach and occasionally even waste on politically fancy projects driven by lobbies without accountability for economic growth and employment.

- Consultation mechanisms with business and academia seem fragmented, with insufficient criteria and incentives to attract advice from leadings scientists (Nobel Prize winners and similar) and top scientific institutions. All too often, nationality appears to be a driving criterion.

- Independent post programme impact assessment of their contribution to problem solving and to innovation and competitiveness in markets seems weak.

- A grand, cross-sector industrial project, with global competition potential seems missing.

Where to go from here: shaping and unfolding innovation ecosystems

The EU has only one main *raison d'être*: to substantially contribute to the Common Good by supplementing the efforts made by Member States where collective actions are the only way forward in the present context. While innovation is unanimously considered a key element to foster growth and prosperity in the EU, the recent decline in Europe's innovation record demonstrates that Europe is far from achieving its full potential, despite the initial steps in the right direction.

The answer to this situation is the development and completion of innovation ecosystems in inter-dependent European and national contexts. This means creating a framework where industries, entrepreneurs, citizens, governments and centres

of knowledge interact alongside the lines of complexity, cooperation, competence, competition and communication to achieve solutions, with a focus on people in the real world.

The concept of the innovation ecosystem[3] perceives innovation as the result of the 'right' interaction among actors in order to turn an idea into a solution or bring a product or service onto the market. Ecosystems of innovation are driven by economic, social, ecological or political challenges. They are primarily national, even regional and sometimes local, with a European addition for common challenges. It is essential that they are able to interact fluidly as open networks. They provide answers, deliver arguments and ensure public acceptance as a generic resource and an indispensable necessity.

The key objective is to embed innovation policies and activities into a flexible, dynamic, stimulating and enabling environment, by creating and promoting ecosystems of innovation. This is meant to create added value for society by enhancing the quality of life of its citizens and the competitiveness of its enterprises, through intelligent interaction between a broad variety of stakeholders and the use of multiple instruments from the toolbox. Central elements in the innovation ecosystems are manifold: laws, regulations, voluntary agreements and codes of conduct, government support, ideas, education and entrepreneurial spirit, university systems, media and public support and communication, social reputation of scientists and researchers, corporations, SMEs and business infrastructure, etc.

This ecosystem model can be achieved through the systematic and radical deepening, widening and completion of traditional EU and national innovation policies, through the creation of innovative, collaborative governance models and methods. In order to guarantee the functioning of the system, a complete revision and continuous monitoring of the methods, procedures and output of governance within the various EU institutions and all Member States, as well as of the interaction between themselves and between them and the EU institutions, must also be achieved.

Building on those elements, the ecosystems will promote creative and bold thinking, free from bureaucratic constraints and a one-sided focus on regulation, able to achieve innovative solutions and capable of addressing new challenges as well as developing alignment with stakeholders.

In addition to removing all European and national, even regional, legalistic obstacles to innovation and modernising governance methods and tools for an open innovation approach, the completion of the European innovation ecosystems demands evidence-based policy making and transparency in order to encourage public acceptance and support.

This approach finds support in the Dublin Declaration on Innovation (2013). It highlighted how modern innovation and technology can help turn research into profits and tackle unemployment in Europe. The Declaration calls for stimulating collaboration between citizens, businesses, universities and governments and for moving from the ERA towards European innovation eco-systems.

This blueprint for successful innovation ecosystems provides specific steps and recommendations for policymakers, both at European and national level, but also for companies, citizens and other stakeholders on how to move towards this European ecosystem to inspire, develop or complete the embryonic and diverse ecosystems in the EU. Therefore the recommendations are interconnected and complementary.

The blueprint is divided into three parts:

The first part focuses on Innovation and Competitiveness, the second part deals with innovation for social acceptance, connectivity and inclusiveness, and the third part centres on how to make the system of EU governance more innovation-conducive. In all three parts we tackle the issues of what should be done, why it is necessary and how it can be achieved. A road map for implementation completes the blueprint.

3 *See the first Report of the High Level Group on Innovation Policy Management for a on overarching analysis of the emerging European ecosystem of innovation concept*

I. Innovate the competitiveness framework

"Innovation distinguishes between a leader and a follower"

(Steve Jobs, inventor)

The Single European Market itself is one outstanding driver for innovation, for corporations and start-ups alike, but it needs urgent completion and proper implementation in order to ensure an innovation-conducive playing field. There are strong public and private research capabilities in Europe, but a lot of potential value cannot be realized due to slow commercialisation. There is a lot of entrepreneurial spirit out there, but it meets quite some obstacles. Risk aversion in Europe is higher than in other parts of the world. Social innovation presents opportunities that go unused, users can play a role, but equally important is forward-looking interaction between public authorities and suppliers. There is no shortage of money, but it is not used efficiently enough due to fault lines in the EU system and between Member States in spite of successful experiences. Sector policies and cross-fertilisation need to be brought in line with overarching political priorities. To harvest more value out of our potential, we need to fully develop or complete both the European and the national innovation ecosystems.

Recommendation 1.1: set criteria for ecosystem development and completion

A series of criteria need to be developed to guide priority setting in order to move towards such European innovation ecosystems which is a shared responsibility of all the actors in it, be they the Commission and governments, companies or research centres. Crucial questions to ask and elements to scrutinize include:

- Does the Innovation Ecosystem create synergies with or between national innovation ecosystems and does it facilitate and increase their efficacy?
- Does it respond to a strategic, common European challenge?
- Does it draw on the aggregate societal demand in Member States and does it involve citizens in the innovation processes?
- Does it have significant effects on growth and employment, if not in the short term, at least medium to long term and in which sectors?
- Does it have a positive effect on the Single Market for enterprises in all sectors, including in removing obstacles to market and on global competitiveness?
- Does it stimulate entrepreneurship and create space for experimentation?
- Does it contribute to the modernisation of the welfare systems of the Member States?
- Does it improve ecological sustainability without hindering competitiveness?
- Does it build on existing knowledge-based and

industrial strongholds or develop radical new ones and stimulate cross-fertilisation across sectors?

- Does it contribute to collaboration and the alignment of interests between the public sector, private sector and knowledge institutions?

The more of these questions are answered with a YES, the closer to perfection an innovation ecosystem is!

Recommendation 1.2: strengthen mutuality between key components in innovation ecosystems

The advancement, fostering and maintenance of innovation ecosystems require achieving a shared vision and mutual understanding as well as collaboration and alignment of long-term objectives and standards in order to ensure true commitment to change. This must be the overarching approach to developing strategies which take account of the specificities of each sector and of their interconnections.

1.2.1 Stimulate co-creation and a learning mind set among innovation actors

- A more open and diversity stimulating recruitment policy in public administrations and in private enterprises will deliver positive results and stimulate innovations in the longer term. Creativity, initiative and experimentation, transparency and stakeholder collaboration need to be rewarded through innovations in human resources management.

- In the short term, executive development efforts must be made primarily in public administrations to foster understanding of the impact of new technologies, of (incremental and radical) innovations in all sectors of the European economy involving cross-fertilisation and inter-sector developments. Special capabilities are required for coaching innovation in the age of digitalisation of the whole economy and society.

- Companies, the principal partner for public authorities for competitiveness and employment, should mirror the effort in the public sector, to include public policy challenges in their strategy development and to investigate their public value[4], in order to bring a more cooperative and aligned business-government interaction and culture

1.2.2 Achieve alignment between market and policy actors

- There is often little synchrony between business strategies aimed at global markets and policy cycles aimed at national elections. While these dis-synchronies are inevitable in democratic market economies, they can constitute a systemic weakness for long-term investments in research and innovation. Some of Europe's competitors, operating with different government models and in different cycles, do not face such difficulties to the same extent. It is therefore important to explore the bottlenecks for R&D&I upfront, for each sector and inter-sector.

[4] *The concept of public value draws on the work of Peter Gomez and Timo Meynhardt and measures the impact of companies and organisations on wider society beyond mere economic results or financial gains. Accordingly, public value also takes into consideration moral, political, utilitarian and hedonistic aspects of value creation for the community and society as a whole. Cf. Meynhardt/Gomez/Schweizer: The Public Value Scorecard: what makes an organization valueable to society? In: Performance 6 (2014), No. 1, p. 5.*

Recommendation 1.3: facilitate co-creation for global competitiveness

In order to be competitive in a globalised and ever more competitive environment, companies, large and small, increasingly cooperate and enter into partnerships, often also with public authorities or user groups. These partnerships allow them to reduce the uncertainty of R&D investments, minimise R&D (transaction) costs and exploit complementary know-how. Risk can be shared, costly duplication of efforts avoided, innovative products and technologies more rapidly developed and user reactions can be tested.

1.3.1 Align competition law application with companies' innovation objectives

- To facilitate cooperation between companies, the way in which competition law is applied in the EU should be aligned with Europe's innovation objectives. The Commission could act more in line with enabling rather than controlling business co-operation for the sake of promoting innovation efforts, allowing experiments in company cooperation, in particular in the R&D&I phase.

1.3.2 Use competition law to stimulate innovation by eliminating rent-seeking

- European competition law can play a useful role in stimulating innovation by eliminating monopolies and cartels and all forms of rent-seeking which distort the market functioning and cause inequalities in society. The Commission should put more emphasis on ex-post verification in cases where competition law has been violated or market competition restricted rather than prohibiting cooperation endeavours a priori when they can have a positive effect on innovation.

1.3.3 Facilitate academia-company cooperation

- More than ever, the university of the future has three key tasks to fulfil: education, research and entrepreneurship. Research cooperation with companies will benefit all three tasks. Cooperation should go beyond technical and scientific knowledge creation and extend to social sciences in order to enhance the public and social value of joint research projects.

- Networks are key in the digital economy. They will naturally emerge bottom-up; but a top-down approach may sometimes be needed and may be complementary. The EU and/or interested groups of Member States (variable geometry should apply) or even wider groups, such as Eureka, should support emerging or potential ecosystems by incentivising and facilitating cooperation between companies and universities and by jointly eliminating obstacles, including traditional mind-sets and mobility of human capital from abroad.

- The networks that could benefit most from steering from the top would be those aiming at developing a new 'grand European project' (such as Airbus, ITER, etc.) However, it is essential that in developing such a project only qualitative criteria of a European character are applied and national criteria are sidelined and abandoned. It could be helpful to seek the advice of non-European experts and universities. In the Single Market, Member States will profit from such projects, even if they are not directly involved.

- The idea of 'big projects' is worth considering serving as an integrator of innovation ecosystems in the Single Market. But it is only worthwhile if from the start such projects are carried out without 'national' considerations, and are focussed purely on research and the global market. Therefore strict quality criteria must be established up-front, by a group of experts which include non-Europeans too. Such projects can serve not only to keep high added-value jobs in Europe, but also to attract top talents from outside. Project design and development should be done transparently and with stakeholder involvement. Ideas mentioned but not further developed concern health (e.g. brain), energy (e.g. CO2 capture and use, electricity storage) and digital networks (e.g. big data analytics). Special attention should be given to the uptake of new or emerging technologies in traditional sectors

including promotion and development in indigenous industries and to social innovation which has a huge potential for cross-sector cooperation.

Recommendation 1.4: broaden the public funding approach

A principal challenge to innovation financing in Europe is a severe fragmentation of funding mechanisms, sources and approaches alongside overly bureaucratic procedures, rather than a lack of funding as such. The EU and Member States must improve the way funding is channelled into innovative activities, while keeping an eye on market diffusion and business opportunities.

1.4.1 Broaden the traditional R&D funding to include products and services, processes and intangibles

- This is already laid out in Horizon 2020, but this approach should become good practice in all funding schemes and strategies by the EU and Member States. What is required is a widening of R&D funding instruments and their integration with enterprise policy.

- In particular they should help to create open innovation ecosystems.

1.4.2 Provide support for funding public-private-people partnerships (PPPPs)[5] and business-university partnerships (BUPs)

- Deepening and widening current initiatives of the Commission, the EU and Member States in particular need to incentivise universities to spend a meaningful part of public research funding in PPPPs and BUPs and to jointly seek rapid elimination of impediments.

- Such funding can help to align contrasting stakeholder agendas with a company's commercial objectives and with government policy objectives. In innovation ecosystems, collaboration between science and industry is key to gaining a competitive edge. Cross-border cooperation between research centres should be based on intrinsic needs which are not created artificially to fulfil EU funding requirements.

1.4.3 Create new mechanisms for incubator and seed capital

- New mechanisms for incubator and seed capital should be designed to attract more capital in the real economy. Depending on the risks involved, this requires public co-funding.

- The creation of independent seed capital fund(s) with public money should be considered. It should be managed by private experts to ensure financial expertise, a strong science base and market orientation. Such a fund should provide up to 80 percent in seed capital, in the form of a loan repayable at an attractive interest rate if the product or service enters the market. If a newly created company – thus financed - were later sold to a non-European company, there should be a high enough compensation and return to the seed capital fund.

- A fund specifically to support private investors in high-risk innovation projects and that operates with various forms of capital provisions could be very useful.

1.4.4 Offer innovation bonds by expert bodies and innovation financing agencies

- 'Innovation bonds' could prove useful during the present 'credit crunch' and could be offered by expert bodies and innovation financing agencies created by Member States for the careful vetting of innovation projects and their feasibility. Those projects deemed solid and attractive would receive the right to issue long-term 'innovation

[5] *Based on the principle of public-private partnerships (PPP), public-private-people partnerships (PPPP, or P4) directly include and engage people as major stakeholder in both designing and implementing PPP schemes. PPPPs thereby apply a bottom-up and participative strategy making people and civil society more visible in collaborative undertakings.*

bonds' at a fixed interest rate which, although low, would provide a positive real rate of return.

1.4.5 Increase European research funds through institutional austerity measures

Available European funds can be significantly increased through budgetary re-allocation in those EU institutions and projects that have exceeded their validity date and whose contributions and benefits have turned negligible or negative. The funds can also be increased by reducing the many satellite institutions and centres once created for political reasons where an independent audit shows a lack of economically useful output. Both efforts should be undertaken within a short timeframe.

- European publicly funded bodies, regardless of their nature, should only be set up with precise targets, independent, transparent annual evaluation and in some cases even limited timeframes (sunset-clause), in order to ensure that they remain strategically agile and vigilant to deliver added value to the economy and society. Renewal of their mandate and funding must depend on meeting well defined targets.

- Research funds could also be strengthened by channelling penalties from competition violations to novel and innovative enterprises.

- In light of public budget shortages, special attention should be paid to the important role of defence R&D, since defence spending has many civil and innovation spin-offs and offers competitive advantage for quite some companies. But the EU must secure better conversion of military R&D spending to civil use since it could increase the competitiveness and efficiency of all R&D funding.

1.4.6 Develop a portfolio approach for European research funds

- More of the available funds might be spent through a portfolio approach. The energy and digital sectors, but also the space or health sectors offer some scope for it. Europe may be behind some of its competitors in ICT, but it can still 'leap frog', given a concentration of its capabilities. This may be a way to help co-shape innovation ecosystems, stimulate forward-looking policy planning and facilitate buy-in of stakeholders.

- In any case, the present dispersive spending methods which aim to ensure that everyone gets something ('the juste retour' in terms of the EU budget), abets a waste of public resources. Procedures must be established to eliminate this outdated approach.

1.4.7 Adjust taxation strategies to ensure sufficient capital allocation for productive investments

The tax systems of Member States can be a powerful policy instrument for supporting innovation and can be used to reduce its investment costs. Macro-economic policy, taxation and monetary policies together should ensure that there is sufficient capital allocation for productive investments. Escape routes and tax loopholes should be closed, yet an incentive-compatible return on investment should be ascertained. Tax policies should help favour long-term investments in innovation over short-term and speculative ones.

- Efforts should be made to provide well focussed tax benefits related to the costs of promoting innovation (expenses towards experimental development, basic and applied research and related supporting activities, etc.).

- Innovation will also benefit from accelerated depreciation schemes for innovation-related capital and reduced labour taxes on scientists and researchers. Zero rate and reduced rate VAT and lower corporate tax rates for innovation-related profits may lend themselves as instruments for promoting innovations. In particular very young enterprises would see their potential enhanced.

- The taxation on IPR has become a global tax competition issue. It would be in the collective interest of Member States to ensure a level European playing field and seek ways to avoid leakage of IPR out of Europe for tax reasons.

Recommendation 1.5: take an inclusive view of intellectual property

Strong and effective IPR are crucial in an innovation ecosystem. The EU's current system of IPR protection needs considerable improvement: it is complex, fragmented and expensive. It fails to provide legal certainty, it allows data leakage in certain procedures and it is not up-to-date to deal with new technologies and their rapid evolution and penetration.

With regard to patents, major problems for the up-take of innovation arise with regard to high costs and complex procedures for companies to patent innovation, legal uncertainty due to different legal frameworks in the Member States and EU and the European Patent's Office's increasing incapacity to handle its rapidly growing workload. Consequently, it reduces the opportunities for developers and users of technology to launch creations on markets, in particular in a cross-border context.

1.5.1 Implement a truly European patent system

- The EU must implement and enforce without any further delay the European patent system including a truly European patent to establish greater harmonisation, legal certainty and reduce administrative hurdles and costs.

- In order to facilitate co-creation, an open approach must be envisaged. It will help and support the opportunities for developers and users of technology to launch creations on European markets first.

1.5.2 Regulate the ownership of data

- The ownership of data must be regulated: it cannot be considered automatic and users/ consumers must be given clear and easy choices to opt in or out of potential uses of their personal data.

- IPR on life and nature itself should be forbidden because they must be considered common goods. Only when there is a proven and significant scientific intervention can the latter be protected. But in that case there should be clear rules for sharing the benefits with local communities. The EU should elaborate a policy which can serve as a global standard.

1.5.3 Exploit other forms of IP protection and strike a balance between protecting knowledge and disseminating it

- The EU must broaden its focus and look beyond patents to ensure adequate protection of all forms of intellectual property: brands (including cultural and local brands), geographical indications (except their potential use as a protectionist tool), trademarks, data and copyrights. Intellectual property must be tailored to the needs and requirements of individual sectors. Particular attention must be paid to Europe's competitive position in design, creativity, history and culture-based innovation and branding.

- Furthermore, the EU must strike the right balance between protecting knowledge and disseminating it. Intangible knowledge and skills must be solidly protected from unauthorised exploitation in order to reward innovative ideas and discoveries, maintain and increase business' competitiveness and provide incentives for investment in innovative R&D.

- Along with the classic four freedoms of the Internal Market, the free movement of knowledge must be further enabled and access to it facilitated in order to process and implement this knowledge for the creation of new knowledge and innovation in the most efficient way.

1.5.4 Vigorously address the issue of counterfeiting with conditions in trade agreements

- The EU must resolutely address the problem of counterfeiting and illegal imports at the source by making it a key condition in trade agreements with third countries. It should enforce respect for all forms of intellectual property in the new media and elsewhere. This may help to protect

innovations from imitation by international competitors.

- The EU and Member States should ensure that the IPR of all money spent, including scholarships abroad, remain or return here and that commercialization takes place in Europe.
- Given the value loss caused by counterfeiting for European companies and employment, R&D investment in new technologies to avoid it should be considered.

Recommendation 1.6: expand the use of public procurement to promote innovation

This is undoubtedly a key support mechanism for innovation ecosystems. Given the importance of the public sector in Europe, public procurement can provide a major stimulus for bringing cooperative suppliers and pro-active users together, for ensuring consumer added value, for bringing innovation rapidly to market and for knowledge transfer and for keeping high value-added jobs in Europe. This should be stimulated using existing EU methods and funding and new ones (collaborative governance) across the Single Market and at all levels of public administration and in all sectors.

The recent EU public procurement reforms need rapid and full implementation and strong political support. So does the Platform on PP which should network actively with major innovation ecosystems and their key actors.

There is vast scope for innovation and public budget savings too by breaking down artificial barriers between (parts of) defence and civil procurement.

1.6.1 Develop an innovative cost-benefit approach in public procurement

- Any surplus price in a given innovative public procurement project is often a very useful investment if one looks at the whole life cycle, the improvement of public services and transversal benefits in other economic sectors. Innovative ways can be found with corporations to ensure that successful launches also provide a return for cooperative public authorities. This similarly supports cost reduction and standardisation of welfare provisions which not only helps competitiveness but also public budget saving.
- By bringing stakeholders together, public authorities from various Member States can develop joint public procurement and have a significant impact on innovation. This is an important element in the Single Market. Moreover, faster commercialisation is much needed for Europe's competitiveness and employment creation and in this way they can help companies and operate a virtuous circle.

1.6.2 Use public procurement to create demand for innovative goods and stimulate research and knowledge transfer

- Smart customers are just as important as smart suppliers in terms of ensuring innovative outcomes of public procurement processes. The Public Procurement Platform could help to design qualitative criteria for how to increase technical know-how and its availability, how to ensure that potential customers are aware of new solutions and services and how to e-manage the processes.
- Public procurement can also help to develop open innovation ecosystems through cooperation across borders between regional and local authorities to help create and rapidly enlarge the markets for innovation, to enable user engagement and co-creation in the spirit of the quadruple helix innovation (Dublin Declaration on Innovation).
- Criteria and targets should be better used by public authorities to ensure that a certain part of public procurement budgets is targeted directly at innovative solutions together with measurement indicators. Having more challenging desired outcomes and up-front transparency will help to

avoid risk-aversion. It would also support innovative solution finding since it allows suppliers to be more creative. A clear identification of these public procurement offers within public budgets as 'innovative public procurement' can raise awareness of their relevance among stakeholders.

1.6.3 Use public procurement to support a SME sector engaged in research and innovation and provide early markets for lead users

- Only a very small part of Europe's large SME sector is engaged in research and innovation. A more significant part plays a role in innovation as suppliers to large corporations or in niche markets and in traditional sectors. Innovative SMEs and start-ups need to be nurtured by ensuring that they can take part in public procurement early on and that standard setting, regulations and procedures do not hinder risk-taking and growth. The requirement that companies should have a number of years of existence makes little sense in fast developing sectors and other criteria about company solidity must be established.

- Innovative activities are also promoted by allowing different SMEs to work on finding a solution for a project, even though only one solution is chosen in the end. The de-selected innovative solutions might still represent the desired option in other contexts.

- A special effort needs to be made to facilitate lead markets for innovative goods and services and for the growth of start-up companies in innovative sectors through light touch regulation or restricted application during a well determined phase of their development.

II. Innovate for social acceptance, connectivity and inclusiveness

"I do not understand why people would be scared of new ideas. I'm scared of the old ones."

(John Cage, American composer)

Every technological advance, every innovation carries societal effects and radically new technologies and processes - such as ICT - have radical effects on society. They create disruptions which unsettle many people, whilst benefitting others. Not knowing beforehand who will win and who will lose, citizens are afraid and shy away from risks and hazards coming along with innovation, particularly when benefits are not immediately clear to them. Notably, they are afraid of unanticipated effects and potential dangers to their own working and living conditions.

Therefore, both governments and corporations should share a common concern for compensating for and out-balancing the negative social effects of any innovation within reasonable limits. Primarily by focussing as much on delivering public value as on short-term profitability; secondly by providing novel frameworks for societies to adapt and for economies to function in the general interest. If this cannot be achieved, reticence and resistance to innovation and challenging fault lines will arise, such as tensions between the smart and knowledgeable users of the Internet and those lacking the skill-sets to do so and between those benefiting from innovations and those who may lose in terms of jobs and security. Social protection and helping people to cope with the unintended side effects of change processes is primarily a responsibility of Nation States.

But collaborative governance methods amongst EU Member States and between them and the EU can be a great help to move more efficiently and rapidly towards the unavoidable adaptation measures. Though the above problem was not strictly part of the requests made to the HLG, it was deemed so important that a number of recommendations on social adaptation, inclusiveness and connectivity have been included in this blueprint. After all, citizens and users are fundamental driving forces behind innovative activities. They must therefore become an integral part of the innovation process by being involved in co-shaping and determining what value an innovation should deliver to the intended user.

Recommendation 2.1: give the problem of scepticism, fears and worries on the part of the citizens vis-à-vis innovation a prominent place in Innovation Ecosystems

Whereas invention is only a scientific act that in itself does not provide the ability to transform lifestyles, innovation is the implementation of a discovery that comes with a lot of intended and unintended effects. It is therefore a social process that permeates society, politics and institutions

In the Schumpeterian theory, innovations cause

'disruptions' (creative destruction) which become the main cause of both the growth of new industries and companies and the demise of old ones. For some, direct and indirect consequences will be desirable whilst others will suffer. Notably, citizens are afraid of un-anticipated effects, 'surprise' and potential dangers to their own working and living conditions. Any innovation policy and business strategy needs to take account of such 'problems of acceptance' and 're-distribution of opportunities and risks' by adapting and providing new fitting structures and measures for social bolstering, inclusiveness and connectivity.

Recommendation 2.2: include and enlarge 'Social Innovation' in Innovation Policy Management Schemes

Social innovations encompass novel strategies, concepts, ideas and institutional arrangements that help boost the social well-being of citizens and social groups. In generic terms, social innovation is about how we can improve societies' capacities to solve present and future social problems. It is about new methods to mobilize the ubiquitous intelligence that exists within any society. Examples abound: social entrepreneurship, social media, new ways of self-organized social protection, non-profit enterprises, the share economy, empowering of social groups, new human networks, etc.

Features of modern society - for example, high levels of education or new information and communication technologies, especially social networking and new media - are making social innovation a widespread and powerful force in shaping societies. Still, until 2011 there was no ecosystem to support social innovation and little support for the innovators themselves. Today, however, we find the flagship programme 'Innovation Union Europe 2020' in which the EU-Initiative 'Social Innovation Europe' plays a prominent role. For this we recommend enlargement!

Recommendation 2.3: develop an inclusive approach to innovation to address social inequality and poverty

According to the World Bank, inclusive innovation not only increases productivity and competitiveness but also plays a crucial role in addressing problems of inequality, poverty and uneven initial endowment[6]. Governments have a key responsibility in this regard, as they must create an enabling environment that facilitates, finances, incentivises and commercialises innovative products and solutions, not least through cooperation and collaboration. At the end of the day, government's central objective must be to utilise innovation to share its benefits equally with all groups of society and help serve people's needs at the base of the social pyramid.

In order to realize this recommendation, the HLG recommends to:

2.3.1 Create an inter-institutional agreement to safeguard, enhance and innovate national welfare societies and share experiences

- Governance arrangements appropriate for a digital economic context should be made to ensure that the objective to safeguard, enhance and innovate national welfare societies is made an equal priority and that it is taken fully into account in all policy areas. Respecting Treaty provisions, collaborative governance methods need to be developed to share experiences and peer review reforms. However, a balance needs to be found between fixing detailed European rules and the

[6] *World Bank 2012*

great diversity in the Union because it can stifle social and economic innovation.

2.3.2 Improve and innovate welfare systems through careful impact assessment of proposed policies and regulation

- While respecting the competences of the EU and Member States, the new format of the Impact Assessment as proposed should also include a full assessment of whether and how proposed policies and regulations impact national welfare state systems.

- Early estimation of collateral impacts key social protection provisions by Member States will allow designing more comprehensive European policies, reducing potential antagonism, boosting creativity and transversal and vertical collaborations throughout the EU system.

- In addition, it can lead more rapidly to innovation in those systems through stimulation of research and the use of public procurement in order to achieve multiple related objectives in innovation ecosystems.

2.3.3 Improve welfare systems through the use of digitalization and innovation to reduce running costs

- Innovation and especially digitalization, can strongly contribute to reducing the running costs of welfare systems, thus mitigating budget pressures and enhancing competitiveness in delivering high-quality services to citizens at low costs.

- In line with the ambitious objectives of Horizon 2020, the European Commission and the Member States should collaborate to bring the advantages of public cost reduction and improved products and service delivery to citizens as soon as possible. The improvement of larger data sets ('big data') could bring considerable advantages in terms of cost-effectiveness and operational efficiency in a broad variety of sectors, healthcare being just one of them. The achievement of this goal would allow the EU to take a global lead in this domain, attracting the rest of the world to align to EU standards.

- European welfare states and their public finances are currently under pressure from budget constraints and a lack of innovation capacity. Innovation can be encouraged and activated through novel forms of co-operation between companies and public authorities in innovation partnerships to deliver new welfare services. Such arrangements could involve experimental initiatives enabling companies, in close cooperation with the public sector and users, to search for innovative solutions to societal challenges. The development of a more holistic and value-based procurement model, rather than price-driven ones, could make it easier to integrate consumer experience in areas such as healthcare, social care, elderly care or education.

Recommendation 2.4: innovate education at all levels

Europe's significant strengths are its cultural diversity and its intellectual force which are pivotal to enabling creativity and innovation at the micro-level. Likewise, the general attitude in Europe towards technology is positive and quality-oriented. Europe's education systems should allow it to provide high-skill labour and attract the most creative researchers worldwide. An open attitude and attractive conditions are therefore essential.

To realize this recommendation, the HLG recommends to:

2.4.1 Conciliate traditional curricula with innovative, 'skills'-oriented ones based on continuous learning and life-long education

- The European education paradigms need to be reviewed with the aim of reconciling traditional curricula with a system more attentive to scientific, technological and entrepreneurial education as well as to continuous, life-long education and learning. This will result in the creation of an approach which is fit for a rapidly changing economic context and the digital economy.

- It requires fostering more positive attitudes towards entrepreneurship and risk taking, encouraging creativity instead of conformity. Education policies need to better introduce creative practices and methods in teaching. Focus must be given to training teachers to increasingly use thinking tools which trigger creativity and at the same time improve their general technological and IT knowledge. To this end, business actors should not act as mere passive 'financiers' but engage actively as partners with education institutes in order to give students and researchers a comprehensive view of the innovation value chain and entrepreneurship. Involvement from businesses is fundamental in providing guidance on entrepreneurial aspects such as how to develop and manage start-ups.

- Alongside the promoting of digital skill at all education levels, is the need to overcome the skills gap in advanced manufacturing and engineering. Innovation and the industry transition towards advanced and high-quality manufacturing ('factory 4.0') require capabilities and knowledge of manufacturing management principles and technological components, preferably from an intersectional perspective. Learning of these dimensions would help develop skills in problem-solving and solution-finding, both essential in enabling the innovation required to meet the present and future needs of businesses and public sectors.

2.4.2 Stimulate systems of apprenticeships based on existing best practices and re-evaluate polytechnic education

- In order to contribute to solving unemployment among the young, cooperation and collaboration should be launched between the Commission and the Member States as well as between the Member States themselves to develop an EU-wide system of apprenticeships based on already existing best-practice experience.

- Polytechnic schools can provide useful education leading to much needed job opportunities, but they sometimes have an image and funding problem. Efforts should be made to re-evaluate them and prepare them to deliver for the needs of the digital economy. Incentives could also be put forward to better encourage students to engage with industry research which often is lagging behind.

2.4.3 Promote digital education and Massive Open Online Courses (MOOC)

- Digital education will make the classic education system increasingly obsolete. Drawing on evolving technological progress and its influence on citizen's behaviour and needs, Europe should assign greater priority to ICT and promote Massive Open Online Courses (MOOC), an online university tool and engagement platform aimed at participation and open access via the web. Besides offering traditional course materials such as videos and problem sets, MOOCs provide forums which stimulate interactive participation among students, professors and teachers. If well combined with some of the traditional educational tools, MOOC could promote the skill sets demanded, but also more specific skills relating to entrepreneurship, digital know-how and technological and innovative advancements.

2.4.4 Develop teleworking

Instead of moving workers, the digital economy makes it possible to move the work. Teleworking has the potential to create employment and enhance the connectivity of workers as well as increase global scouting through expanding recruitment processes to the global level where a broader pool of knowledgeable workers is available. However, there are multiple obstacles to be removed before this potential to create employment can be fully used and certain sectors, such as those linked to ICT and education, might be more suited for teleworking.

Recommendation 2.5: stimulate research and incentivise researchers at all levels

2.5.1 Provide incentives for researchers to focus on emerging sectors

- Encourage researchers to engage in 'Creative system disruption' (report from Key Technologies Expert Group, DG Research 2005) where researchers focus on emerging sectors where research is lacking and where Europe can potentially take a leading role through research and innovative activities.

2.5.2 Facilitate cross-border research

- One of the most crucial components of the success of the European Research Area (ERA) is an adequate flow of competent researchers with high levels of mobility between institutions, sectors and countries. Programmes such as the Marie Curie Actions or Erasmus are an important first step in the right direction but still do not provide comprehensive solutions for problems such as complex provisions regarding the cross-border taxation, health insurance and social security of mobile researchers or inconsistency in the area of family benefits and pension rights which arise from regulatory fragmentation in the Member States.

2.5.3 Provide greater assistance for mobility of researchers

- Inter-continental mobility and cooperation of researchers is crucial in facilitating networking, spillover and the transfer of scientific knowledge between researchers from different regions and continents. Europe must widen up the ERA to the world, with special emphasis on highly innovative countries and must actively scout for excellent researchers and offer attractive conditions to work within the Union.

- In parallel, the EU must actively encourage stronger participation of private companies within the ERA, in particular emerging new innovators and SMEs, in the form of public-private partnerships and cooperation between research centres and enterprises. It is also important to enhance intersectional innovation capacity by better linking together researchers from different sectors, since many innovative breakthroughs take place at the intersection of sectors, fields and cultures.

- The European IPR system must ease the sharing of knowledge for participants in the ERA. It would be useful to build a support infrastructure to share information across the EU to facilitate the way data is stored, shared, used and re-used as well as networking and interaction. More focus must also be given to support inter-university cooperation and networking which facilitates knowledge transfer of key aspects on innovation management and industrial research between universities of excellence and those universities lagging behind.

- Incentives should be developed for scientists to also be more entrepreneurial and to move into business or governance and back. This would help to bridge the gaps that sometimes exist between science and markets and societal improvements resulting from their work.

2.5.4 Create an open portal providing peer-reviewed and evidence-based information

- To restore trust in science and encourage more evidence-based policy making, an online portal should be created to provide peer-reviewed and evidence-based information to citizens, policymakers and media alike. Together with a reformed Impact Assessment, this will also contribute to increasing innovation acceptance and will help to avoid that constructed risk dominates public debates.

2.5.5 Launch an initiative to form a group of top-level research institutes to support competitive networking and cross fertilization

- A major strength of competitive innovation

ecosystems relies upon their capacity to achieve high-level cross-fertilization and networking, in particular since top research and higher education institutions act as a kind of innovation hub or flagship. Though on average such a capacity inside the European Union is not dramatically low, it nevertheless needs to be improved quite massively. Its academic fabric could and should contribute faster, better and at a lower cost – including in terms of public funding – in combining research and education and cross-fertilizing the innovation ecosystem of the future.

- More specifically, an initiative should be launched as soon as possible to support the emergence of a critical mass of top-level research universities and technology institutes evidencing the potential to play a focal role in the European and national innovation ecosystems. They would be selected whatever their institutional status and the country where they are located. They would be chosen according to five main requirements:
  - Their current academic production in research and education already satisfies international top-level quality criteria in a sustainable way.
  - They evidence the skills and ability to bridge with enterprises and other stakeholders of the innovation ecosystem (policymakers, socio-economic actors, other universities).
  - They are active in fields that are key for the coming years.
  - They successfully operate with interdisciplinary frameworks.
  - They propose research agendas sensitive to innovation requirements and achievements.
- This programme would give support and allocate relevant means - with a mid-term perspective - as any successful ecosystem-building policy requires. It should be supervised by a specific agency. Its members would basically be independent top-level academics and successful science managers from the business world. They would not act as representatives of member states or of the EU Commission. Its officers would work full time and be appointed for a time period of +/-six years. The agency would have full responsibility for handling and allocating its budget based on contributions from EU institutions, Member States and the private sector.

III. Innovate governance tools and mechanisms: towards an innovative governance system for tomorrow's challenges

"Ever tried, ever failed. No matter.
Try again, fail again. Fail better."

(Samuel Beckett, Nobel Prize Literature)

To stimulate growth and employment through the promotion of innovation carries inevitable institutional consequences. The groundwork and principles of EU policy making were established in the 1950s in a Community of six and later nine Member States with the aim of integrating national goods markets. In contrast, the EU of today which has acquired and been assigned competences in many more policy areas (from service markets, labour markets, financial markets to research, enterprise, trade, competition, health, social and environment policies), appears in urgent need of a profound and all-encompassing governance overhaul. Between the traditional Community Method and the Open Method of Coordination, it requires new instruments for Collaborative Governance[7] .In present circumstances, this should be done and can be done without Treaty changes, though in the long term a review of the division of competences between EU institutions and Member States as well as between private and public actors in line with economic and societal requirements will be unavoidable.

At the moment, EU governance is excessively focussed on regulation and not enough on mentoring, collaboration, stewardship and peer review. The latter are essential to complete and manage the complexities of innovation for sustainability and competitiveness and to move towards a European innovation ecosystem as an overarching entity bringing together the different national innovation ecosystems effective in the EU.

Therefore, it is necessary to complement the European governance system based on the so-called 'Community Method' with methods of open, collaborative governance, less hierarchical and legalistic, more suited to manage innovation complexity. Stewardship of innovation policy may stay with the Commission, but if it does not wish to use its right of initiative, any Member Government, business or academic stakeholder could initiate and coach such collaboration. Variable geometry should be used more often, given the diversity in the EU of 28, provided it remains open and transparent in its goals and working methods.

In addition to removing all obstacles to innovation and modernizing methods and tools for innovation policy, completion of the European innovation ecosystems is imperative for reaping the benefits of innovation and to marshal public acceptance and support.

[7] *Over the past few decades, a new form of governance has emerged to replace hierarchical, adversarial and managerial modes of policy making and implementation. Collaborative governance, as it has come to be known, brings public and private stakeholders together in a collective forum with public agencies to engage in consensus-oriented decision making. This definition involves six criteria: (1) the forum is initiated by public agencies or institutions, (2) participants in the forum include non-state actors, (3) participants engage directly in decision making and are not merely "consulted" by public institutions, (4) the forum is formally organized and meets collectively (5) the forum aims to take decisions by consensus (even if consensus is not achieved in practice), and (6) the focus of collaboration is on public policy or public management. Cf.: Chris Ansell, Alison Gash (2008): Collaborative Governance in Theory and Practice, Journal of Public Administration Research and Theory, Vol. 18, pp 543–571*

Recommendation 3.1: establish an overarching focus on citizen-centred themes

For a variety of reasons, the EU has become widely unpopular with its Member States, companies and citizens. This is not merely due to the fall-out from the financial and Euro crises, but rather the Union suffers from self-inflicted damage resulting from its contested goals and top-down, centralized and legalistic actions. Contrary to its lip service, the EU – it seems – no longer has a shared mission which is supported by the majority of its citizens, while companies find it a less attractive place to invest and to do business. The best young entrepreneurs often leave. It increasingly deviates from the aggregate priority concerns of citizens which are prosperity, growth, employment and safety and security as well as democratic self-determination in a rapidly globalising world and from the essential needs of companies for competitiveness in a global economy.

EU policy making must again become people centred as it once was designed as a grand project to make wars obsolete and preserve peace among the people of Europe. This is the overarching challenge for the coming decade: to rebuild confidence by being people centred and ready to innovate and reform its structures and processes according to peoples' preferences and concerns.

Against this background the HLG recommends to:

3.1.1 Regularly use a European Council meeting for a comprehensive discussion of a citizen centred theme

- With a multi-disciplinary and multi-perspective preparation and taking inspiration from the best thinkers worldwide, EU Heads of States and Governments may wish to devote analysis and discussion to individual themes and problems close to the heart of the people of Europe during selected summits. This will help to increase the EU's attractiveness and credibility and instil novel and innovative ideas into the EU policymaking process at the highest level.

3.1.2 Reduce the innovation divide and assist in building national innovation ecosystems

- The Commission Innovation Scoreboard and the more comprehensive Global Innovation Index show great disparities between Member States (including regions and cities), affecting the Single Market and the joint position in the global economy. A special effort needs to be made urgently to ensure that all Member States catch up with developing innovation ecosystems, as part of a European ecosystem and that they create the conditions for knowledge-based growth and for continuous improvements in innovation governance.

- To achieve this will require decisions about how best to combine for research excellence and wider stimulation of research potential (promising in development) and the functioning of the innovation value chain (from research to market). The EU may need to recognise also those who will be excellent tomorrow. Plans for a 'stairway to excellence' in EU policies primarily target newer member states and it is unclear where this leaves southern Europe often suffering from cut-backs in research budgets. A tripartite group involving multi-disciplinary academic experts, business representatives and senior civil servants may assist those governments and administrations below the innovation average with what to do and how in order to catch up.

Recommendation 3.2: radically improve policy coherence

There is an urgent need for mechanisms to overcome systemic fragmentation, duplication and even contradiction, in the design and implementation of innovation policy inside EU institutions, between

Member States and EU institutions, but also between companies and public authorities and between administrations and civic societies.

In particular, Europe needs an inclusive approach to promote innovation in the Member States and the EU and between them, together with a new all-encompassing tool kit to ensure coherence between all the policies and actions in an innovation ecosystem.

The key challenges of the future, for example resource efficiency, modernisation of education and social protection provisions, new materials development, energy savings (in particular electricity storage and CO2 storage and use), new communication and networking infrastructures, the development of closed industrial systems or research of the brain, all require transversal policy making and collaboration between the Commission, governments and stakeholders and in particular industry and research centres.

Governance capabilities need to be continually refined to meet present day needs and adapt to new technologies, in particular e-governance. Better framework conditions and alignment between European and national policies aimed at stimulating innovation require horizontal, vertical, temporal and systemic coherence.

In order to fulfil this need, the HLG recommends considering the following:

3.2.1 Create Commission Vice-Presidents without portfolio, responsible for strategic collaboration, mentoring and coherence

- In the Commission, the overarching priority of innovation and competitiveness should be entrusted to a Vice-President, whose core team should comprise other Commissioners with responsibilities directly relevant for innovation policy. This Vice-President should not have a specific portfolio but should be in charge of ensuring strategic collaboration, mentoring and coherence.

- Similarly, other Vice-Presidents without portfolio can be charged to ensure strategic collaboration, mentoring and coherence over other areas (such as sustainability, inclusiveness).

- Finally, given that research networks are global, a Commissioner could be given a geographic responsibility, in cooperation with the EEAS, for permanently scouting for research and innovation developments in the world and for developing strategic cooperation with other regions on specific grand R&D&I challenges (for example with Africa on water) which can boost research & innovation and economic and trade relationships.

3.2.2 Develop regular peer-review mechanisms among Member States

- Peer reviews of governance quality have proven useful in other parts of the world; they can be in Europe too. In order to stimulate the further development and completion of innovation ecosystems in all Member States, to learn from best practice, to ensure maximum use of capacities available in individual countries, business sectors and research centres and to bring maximum cross-fertilization, for the benefit of all in the Single Market, a coherent peer-review mechanism should be elaborated. However, without a strong political commitment for change the effects of peer review and similar mechanisms will be negligible.

3.2.3 Strengthen the role of independent advice as a meaningful input for policy improvement

- Functioning innovation ecosystems require regular, open dialogue and alignment processes between the interests of various stakeholders. This would entail a new governance culture and methods. Constructive criticism should serve as a contribution to more effective problem solving. Therefore, experts with different multi-disciplinary and multi-experience backgrounds must be involved regularly to provide the inputs necessary for taking decisions of high quality and social acceptance.

- The former decision of the outgoing Commission President to appoint a Chief Scientific Adviser should be maintained. But the role should be strengthened and enlarged to oversee the elaboration and application of new methods of impact assessment of EU legislation as a key input for improving policy and regulatory quality. The

CSA's task should also involve the tracking and tracing of forefront scientific development, surveying and overviewing science and innovation communication and delivering foresight studies. All works and recommendations of the CSA must be public, including any dissenting opinions.

- The STAC (Science and Technology Advisory Council) should enlarge its perspective from new technologies and new scientific developments to the entire innovation value chain. It should also include experts on strategic governance, management and on social sciences in order to stimulate multi-disciplinary thinking and advice.

3.2.4 Re-organize and strengthen existing innovation steering structures and mechanisms for the development of innovation ecosystems

- The EU and its Member States need mechanisms to stimulate alignment, create or complete the innovation ecosystems and overcome multiple fragmentations. To achieve this objective, there should be a clearly defined mechanism with overarching responsibility for innovation and competitiveness within the EU institutions and each Member State.

- This collaborative steering mechanism responsible for innovation ecosystem emergence and completion should, in particular:

  - Focus on the 'innovation quadruple helix[8]' (where Government, Academia, Industry and Citizens collaborate to drive structural changes far beyond the scope any one organization could achieve on its own) which is the basis for open innovation.

  - Set up a network of formal and informal, public and private sector actors whose activities and interactions initiate, import, modify and diffuse new technologies.

  - Support individual actors whose incentive structures and competencies determine the rate and direction of technological learning.

  - Oversee the elimination of all barriers to innovation with a strict timeframe.

  - Allow the emergence of kernels for change and islands of experimentation and ensure their influence on other sectors if proven beneficial.

  - Create and facilitate experimentation and prototyping in real world settings, including in policy making.

  - Challenge the independent advisory groups for novel ideas and methods, bold association thinking and foresight.

  - Coordinate their efforts with the needs of preservation and modernisation of welfare societies.

- These mechanisms must guarantee overall coherence between countries, sectors, networks, clusters, departments and their rules and actions. They must address the innovation ecosystem in its entirety to ensure that the innovation-policy-mix is coherent. They will also have a major role to play in the alignment of perceptions, preferences and objectives regarding innovations, technologies and institutions and in ensuring institutional adaptability to change and the resilience required.

- Given the overall high professional quality of the Commission administration, advisory groups are only useful if they bring truly independent, creative, 'outside the box', multi-disciplinary, transversal thinking to those operating the system. They should not necessarily be permanent or allowed to prolong their operation beyond their original mandate[9].

- A temporary, inter-disciplinary brain trust should be set up, to advise on an overarching approach to innovation and consisting of individuals drawn from (innovative) business sectors and academia

[8] *The Innovation Quadruple Helix refers to an innovation concept where government, academia, industry and the citizens work together to drive structural changes beyond the scope of what an organisation could achieve by its own. See the Dublin Declaration on Open Innovation 2.0 for additional information at http://www.slideshare.net/DCSF/martin-curley-closing-final*

[9] *Therefore, the members of the HLG decided to set an example and not accept a Presidency suggestion for another mandate*

(such as experts in innovation economy, management and stewardship, education, strategy, collaborative governance methods, etc.), but also from civil society organizations, all operating independently and in their own name, chosen (also from non-EU countries) on the sole basis of competence and experience. This 'brain trust' should provide advice on managing the complexities of innovation and the multiple interfaces, converting various perspectives into a coherent approach, facilitating social acceptance, guarding strategic agility and a bottom-up approach, redesigning collaborative governance tools and peer-review mechanisms; scanning and converting innovation perspectives; redesigning stakeholder involvement; review of impact assessments; innovation in welfare societies.

3.2.5 Regularly discuss innovation ecosystems development in joint and inclusive Council meetings

- At EU level, a mechanism should be modelled on the Ecofin Council, though with adaptations, perhaps through a regular merger of the Research and Industry parts of the Competitiveness Council' (InnoComp) which would exercise overarching responsibility for innovation ecosystems in the EU and its Member States and for their effective interactions.

- It should make a six-monthly review of progress, amongst other things using reporting from the peer-review mechanism and the innovation ecosystems steering & coordination mechanism and an annual science progress report from the CSA.

- Given the macro-economic importance of innovation, there should be an effective cooperation between these two Councils (EcoFin and InnoComp). The key role is transversal coordination and alignment of various ideas and measures.

Recommendation 3.3: foster the dedication, involvement and commitment of all stakeholders in innovation policy

Helping to address innovation as an interactive system for value creation requires the redesign of policies and strategies relevant for innovation in the EU, in the Member States and in their interface. This requires firm guidance from the top but also strongly decentralized interaction and collaboration among all stakeholders. Innovative methods are needed to build consensus on strategic issues and pathways.

The enhancement and advancement, the fostering and maintenance of innovation ecosystems requires guidance, leadership and stakeholder engagement that go beyond traditional hierarchical procedures and established practices. In the same vein, the tools need to reach beyond the technocratic and mechanistic stakeholder consultations which are routine in EU procedures and involve the representative stakeholders which can truly contribute to problem solving.

It is necessary to develop a learning mind-set both for individual actors and institutions and for stakeholders. Cross-disciplinary research and multi-experience inputs, as well as open-mindedness and incentives and finally tolerant handling of failures, will be necessary elements in the process of unfolding strategic innovation capacity. Reducing conflicts in priorities is a key ingredient for creating positive cumulative effects in any innovation ecosystem.

In order to achieve significant improvements, the HLG recommends:

3.3.1 Go beyond outdated bureaucratic procedures and develop new forms of collaborative governance, in line with the requirements of open innovation

- In addition to the so-called Community Method which serves specific purposes, collaborative governance methods can better serve other objectives, in particular the stimulation and completion and coaching of innovation ecosystems. It demands a different mindset from

those involved, be they Commission or governments, business, academia or civic society organisations, a focus on outcomes and not on procedures and legalistic frameworks, on trust and not on hierarchy, on aligning perspectives and interests among stakeholders, sensitivity to interrelated factor, on transparency and priority for evidence-based analysis.

- Collaborative governance arrangements go beyond the traditional interactions between EU, stakeholder groups and other actors of the innovation ecosystem, in that rules are produced jointly, in an open and institutionalised collective decision-making process that is deliberative and that builds on consensus. In these kinds of governance settings, stakeholders are encouraged to take responsibility and ownership of the rules agreed upon which again helps to increase transparency, democratic legitimacy and accountability of the decisions made and incentivises the owners of the decisions to ensure proper implementation.

- Collaborative governance refers to a series of methods to achieve public objectives through (transparent and open) alignment and cooperation between stakeholders which seeks to combine the non-hierarchical characteristics, collaboration and peer review, of the Open Method of Cooperation with the stewardship inherent in the Community Method, though without its regulatory outcomes. It well suits the variable geometry among governments provided for in the Treaties and today's challenge of managing complex system dynamics, but in most cases also requires the involvement of the two key actors for innovation, namely business and research centres. It does not aim at regulation, though this may be part of it, but at a collective outcome achieved through the (inter)actions of the individual actors in the process.

- Instead of merely consulting stakeholders, the EU should give them the opportunity to actively engage in co-shaping legislation. Collaborative governance implies that private actors, including citizens, engage with public ones in a direct and formal fashion and not merely on an advisory or consultative basis. This requires quality of dialogue between decision makers and enterprises, logical alignment, including openness to consider a different approach and the quality of engagement of internal and external stakeholders.

- However, no method will produce a constructive process and outcomes if there is no trust between the key actors themselves or among them and those affected by it. Trust must be nourished, but the process can be helped by the reality check which a good IA provides and by objective agenda setting and procedures which avoid manipulation.

3.3.2 Develop a merit-based and result oriented Human Resources Policy

- Revise human resource policies in EU institutions and Member States with more diverse recruitment, in order to bring a variety of disciplines and professional experiences together. Movement between public administrations (EU and national ones), academia and business should be facilitated and encouraged by change of rules.

- In addition, a result-based promotion system should bring cultural change in public administrations, in order to adapt mental maps to the requirements of new leadership and management of collaboration with stakeholders in the digital age, when linear thinking has to make place for complexity management, transparency and communication.

3.3.3 Review 'comitology' procedures

- While respecting the necessary checks and balances, the system must be made transparent and accountable. The members of each committee, advisory group or task force should be made public, together with regular updates on procedures and calendar for decisions. This information should be made public in a user-friendly database/portal accessible to all EU citizens.

- At the start and before final decisions are made, a method of consultation (e.g. hearing) with the addressees of the new regulation needs to be developed. Concrete operational proposals made by stakeholders need to be considered and in case of non-acceptance, justification must be provided.

3.3.4 Give priority to informed choice and own responsibility at the expense of hierarchical and authoritative approaches

- To a large extent public credibility of European policy-making and its social acceptance depends on alignment processes between stakeholders and on giving priority to informed choice and own responsibility. Lobbies for single issues are not necessarily representative of the views and expectations of the majority of citizens. This requires a change of paradigm in certain policy areas which tend to favour a hierarchical and authoritative approach while intruding on personal lifestyle and consumer choice. It would reduce antagonism towards the EU if it focussed on grand, common interests and left many other issues to Member States better placed to deal with social and cultural diversity and collateral attitudes.

Recommendation 3.4: reduce regulatory rigidities and costs to stimulate innovation

Well-crafted regulations can help to create markets and new business opportunities and provide incentives for innovative undertakings. However, regulatory rigidity and the associated burdens and costs for businesses which weigh even more on SMEs and innovative start-ups, result from the specific procedures of policy and rulemaking in the EU, from the lack of comprehensive and independent Regulatory Impact Assessments, from fault lines within the EU institutions as well as between them and national governments (and in some cases regional governments), from ineffective alignment of discordant positions and sometimes from unconstructive lobbying by civic society organisations and business alike.

In order to reduce regulatory rigidity and costs to stimulate innovation, the HLG recommends to:

3.4.1 Strengthen current regulatory simplification efforts with a sector approach and add clear timelines

- Decisive efforts have already been made to improve regulatory simplification at EU and Member State level, for example in the work of the High Level Group of Independent Stakeholders on Administrative Burdens (2011) or the European Commission's Regulatory Fitness and Performance Programme (REFIT), initiated in December 2012 which are an important first but belated step in the right direction. Regulatory fragmentation and inconsistency remains a major problem in the EU and the perceived administrative burdens for companies, most notably those in their start-up phase and early years, are still extremely high. Likewise and as the European Commission itself states, the process needs 'constant reinvigoration to keep up the momentum[10]' . However, the process also needs cooperation from and with national and in some countries regional, authorities which also bear responsibility for the heavy regulatory burdens and costs on industry and services in Europe.

3.4.2 Update regulation and implementing guidelines more rapidly on the basis of scientific developments

- Maintaining existing regulations for too long or pursuing the same regulatory trajectory can create obstacles for new market entrants and hinder innovation in the Single Market. This creates a competitive disadvantage in the medium and long term. Methods must be developed that allow a more rapid adaptation and possibly change or even elimination of regulation in accordance with the most up-to-date scientific and technological developments.

- Simplify, merge or abolish the vast number of advisory groups of all kind to strengthen

[10] *COM(2013) 685 final: http://ec.europa.eu/smart-regulation/docs/20131002-refit_en.pdf*

coherence. Re-organise their remit and composition and give them a sunset clause as a rule.

- However, set up temporary new task forces for each economic sector to advise the European Commission and Council with the specific task of simplifying and streamlining rules and regulations, bottom-up, to re-interpret their application in accordance with economic realities and eliminate them if necessary. Such task forces should comprise experts from large corporations and SMEs in the specific sector concerned, as well as independent experts in management and digitalisation.

- Strongly consider concrete operational proposals from the addressees of the regulation concerned and if they are not taken up, justification must be provided to the Competitiveness Council. Priority should be given to the digitalisation of procedures to simplify them, speed them up and increase user-friendliness. A strict timetable needs to be established and outcomes need to be made an integral part of the annual evaluation of EU officials and of career prospects.

- Allow and encourage policy and regulatory experimentation and prototyping to foster innovation. One cannot be efficient in the digital global economy with the methods inherited from the past.

3.4.3. Adapt regulatory requirements to facilitate growth of innovative SMEs

- A small part of SMEs, only around 1 percent, delivers innovative activities in a market context. This group of SMEs not only needs extra targeted funding, but also space for experimentation and an adjusted regulatory framework to support its development throughout Europe. In order to protect innovative SMEs from regulatory obstacles, especially in their early phase and eliminate artificial barriers for their development into mature companies, the EU should examine a new approach for applying the precautionary principle in the experimental phase.

Recommendation 3.5: implement a new model for impact assessments

Policies and regulations must be based on evidence to be effective and receive adherence. Great improvements have been made in the way Impact Assessment was introduced in EU policy making. Despite severe structural deficiencies in its conception, development and consistency throughout the decision-making process requires a new conception of how and by whom, Impact Assessment should be carried out.

A significant effort should be made for independent continuous impact assessments, reviewing whether regulatory trajectories decided on long ago have delivered the desired outcomes or are in need of change, taking into account feedback from industry and society, new scientific and technological developments and effects on competitiveness.

A two-step (national & European), bottom-up approach needs to be designed to facilitate dialogue upfront which is necessary to build trust, credibility and acceptance through informed choice and alignment of various perspectives and interests. Key to this is acceptance that there are multiple impacts with different feedbacks within interacting economic and ecological systems and that these can differ within Member States, in Europe as a whole, in markets and societies and individuals, the so-called quadruple helix.

This will contribute to Europe's competitive advantage by improving the coherence and inclusiveness of policies and regulations and putting the focus on outcome instead of procedure.

3.5.1 Establishment of an independent European Impact Assessment centre, based on a network of top research centres

- While respecting the prerogatives of the institutions, it is essential that impact assessments are carried out independently and continuously at every stage of the co-decision process, by a network of research centres selected only on the basis of excellence and not necessarily based in the EU. Therefore an independent European Impact Assessment institution or mechanism should be set up to ensure more effective and transparent policy making and disclosing complex, interrelated effects from legislation on the economy and society. Impact assessments are very important to avoid that measures in one sector, or a lack of them, create a domino effect in others.

- The procedure to select the research institutions that will cooperate with the new IA institution could be assisted by the Chief Scientific Adviser (CSA), focussing only on globally recognised academic quality criteria. Also, a re-structured Joint Research Centre could be a useful partner for the CSA.

- Research institutions carrying out national IA of EU proposals need to operate transparently according to the same criteria as applied at EU level, with stewardship being provided by the CSA. Their sources of funding should be disclosed when selected to be part of this network and as a rule research institutions from another Member State(s) should also be involved in such work.

- A positive list of research centres for European IA work should be easily accessible to the public and updated by the CSA on a very regular basis.

- In order to ensure real independence, the European IA institution or mechanism should be self-funded through an endowment grant provided jointly by governments and companies.

3.5.2 Include new criteria in Impact Assessments

- Clear priorities for impact assessment need to be established, such as policy and sector interfaces, checking the impact on monetary and macro-economic policy, on innovation and creation of global competitive advantage, on employment, on EU and national research funding, potential outcomes and market access, on the welfare state (social protection) mechanisms and their funding, on regulatory stability and impact on long-term investments in many industry sectors. It should also evaluate the effects of rules and their application (or lack of it) in other major economies because this often creates competitive disadvantage. Once the evidence has been produced, all those affected by its possible implementation should be actively involved, allowing them to comment and advise and offer proposals.

- Extensive and solid competitiveness proofing, often neglected in practice, should be made a priority by the Commission President and Secretary General and ensured in all impact assessments. The competitiveness proofing should check whether proposed or already existing regulation negatively impacts competitiveness, and if so, measures must be taken immediately to revise or eliminate such regulation.

- R&D&I policies should focus on creation and on exploitation; an over-emphasis on inputs will not necessarily lead to innovation in markets. Therefore, impact assessments of programmes need to show if and how they will stimulate innovation in reality. They equally need to address properly potential issues of innovation acceptance which would stimulate inter-disciplinary research (between social & natural sciences).

- Equally important are experimentation and prototyping which are key components of a forward-looking IA process. Ideally, IA must become an iterative process.

3.5.3 Conduct Impact Assessments at all stages of the legislative process and in all regulatory and policy decisions

- On request, systemic impact assessment should be triggered using a formula that ensures rapid policy-making involving the institutions, Member

States and external stakeholders throughout the decision-making process.

- Regulatory Committees ('comitology') also need to take account of the impact assessment made at the start of the regulatory process and of any intermediate IAs. They must also take ex-ante relevant, independent scientific advice throughout their deliberations, via the Chief Scientific Adviser of the Commission, in particular when new technologies, their likely evolution and their impact are concerned. Implementation guidelines in comitology should also be screened by Impact Assessments to check whether they are compatible with desired outcomes.

3.5.4. Apply risk-benefit analysis and reality checks in addition to theoretical models

- The benefits of a given product or policy need to be researched in equal measure as its potential risks, including the risks of non-action. Therefore, Impact Assessments need to include a risk-reward ratio (RRR) which is applied rationally in business economics and, instinctively, by citizens in daily life.

- This approach demands the involvement of research and business up front in order to define a possible risk in real operating contexts and to develop appropriate risk management methods, as well the rewards of different forms of intervention in the quadruple helix.

- This analysis must be made in the context of their real operations and usage and not (only) in theoretic modelling. It must be complemented by social science research in order to increase public knowledge.

Recommendation 3.6: innovate by means of resilience policy and ensure better science communication

The EU should maintain its global leadership in ecological sustainability, both from the public and private angles. However, sustainability is not single, but plural, as there are several additional dimensions to sustainability: economic sustainability, such as the creation of comparative advantages and social and cultural sustainability, an integral component of welfare societies and of national identities.

Therefore the present, mainly regulatory approach of the EU to ecological sustainability needs to be enriched and enlarged with new models, based on the latest scientific insights. Resilience theory is a way to describe and understand the complex dynamics which are triggered when we change one parameter politically without taking account of the whole ecosystem. We'll need to consider restoration, stressor reaction, self-adaptation, or self-restoration, even evolution. Resilience thinking seeks to understand the life cycles and complexity of ecosystems (including the innovation ecosystems!) in order to better manage them, placing specific issues within a comprehensive context.

This opens a vast new space for scientific research and innovation in both the public and private sectors which may lead to new insights in systemic risk and how to deal with it. However, not only academic research needs to be involved, also 'experts in the field', those operating in these ecosystems which have acquired a practical understanding which complements academic research.

A new approach is important for two reasons: to achieve sustainability and greening of the economy more efficiently and to avoid competitive disadvantages: over half of industrial production costs in Europe are related to its legalistic sustainability policies, while some key competitors have few or no concerns about it, leading to price competition and negative effects on employment.

3.6.1 Apply new findings and methodologies to the precautionary principle

- The precautionary principle is a cornerstone of policies aiming at sustainability in all areas, but its effectiveness and acceptability depends, first of all, on correctly defining the issue.

- Given the complexity of all systems, single-issue approaches must be replaced by multidimensional ones. These should be included in the IA together with practical solution finding: resilience science focuses on steering the dynamics in complex systems to preserve or restore their ecological sustainability, instead of dealing with issues in isolation from each other. Europe's 'ban it' regulatory approach must be replaced by an 'innovate and manage it' collaborative governance approach.

- This requires new collaborative mechanisms between stakeholders (research, business and responsible citizen organisations), with a focus on how research and technological innovation can solve specific issues or manage related inevitably to all economic and human activity and which can create new competitive advantages simultaneously. This requires change in existing regulations to create more space for issue management, or at least a more open minded, reality-based interpretation of its application.

3.6.2 Develop a portal to provide peer-reviewed and evidence-based information

- To restore trust in science, a portal should be created to provide peer-reviewed and evidence-based information to citizens and media alike. This will help to bring more innovation acceptance too and avoid constructed risks dominating the debates.

3.6.3 Establishment of an independent body or network to ensure proper scientific information and communication in the media

- Given the rapid development of scientific discoveries and widespread difficulties of understanding for non-scientists, there should be an independent body, or network of such bodies already operating in some Member States, in order to ensure proper scientific information and communication in the media.

3.6.4 Engage business scientists and other societal players alongside academic scientists in agency studies

- The various agencies that have been set up by the EU in order to provide independent scientific advice for regulatory implementation operate in a theoretical vacuum if they do not have access to real world developments. This leads to insufficiently multi-dimensional advice, ignoring the realities and missing opportunities for innovation through the combination of various perspectives.

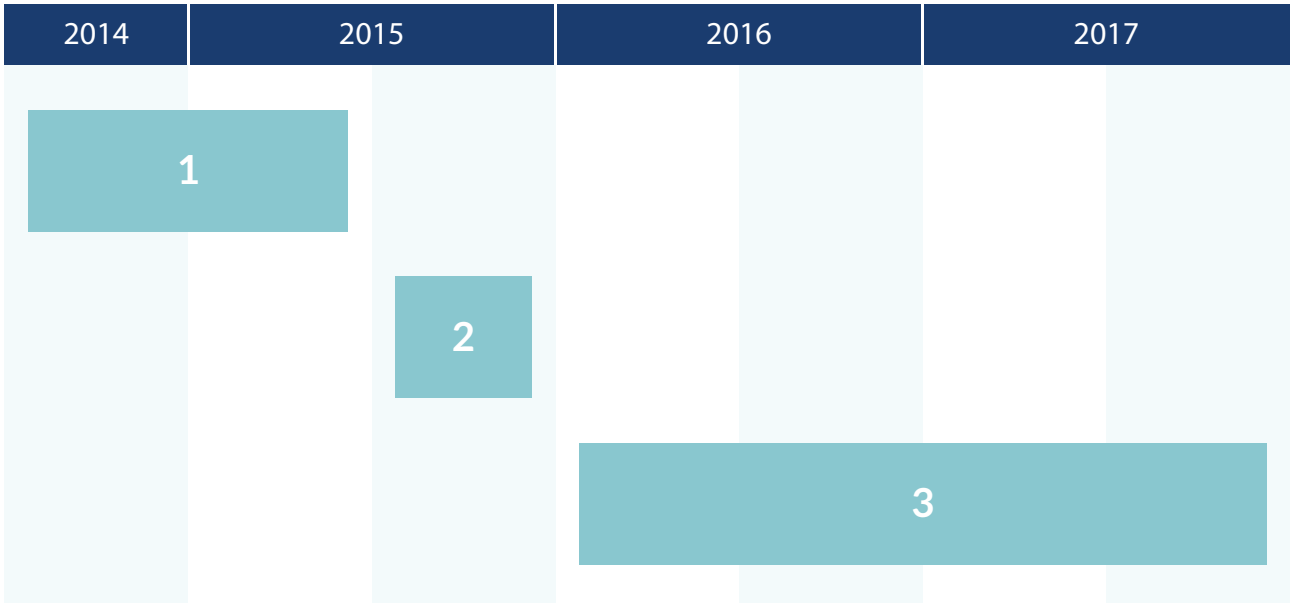
- Therefore, procedures must be adapted to engage mixed academic-business research teams, open to other relevant societal players linked to the issue at stake, during the first phase of work, followed by independent peer review. On this basis, the actors can then prepare a final, comprehensive, theory and reality-based input for the regulators.

ROADMAP

The peoples of Europe and their citizens demand and expect peremptory actions from their authorities to solve the growing problem of unemployment and to bring back growth. As increasing deficit spending is impossible in times of financial crises and limited budgets, the only viable method are timely and radical reforms. These need be based on promoting innovation of all kinds wherever possible.

Against this backdrop, the HLG recommends concrete timelines, which will allow citizens and politicians to judge achievements and to recreate confidence, which is by itself the most important intangible asset for growth.

The roadmap suggested below can also serve as a yardstick for the evaluation of reforms to complete innovation ecosystems in Europe in 2016.



1 *2nd semester 2014 - 1st semester 2015*

Together with the start of the new Commission, the HLG recommends to:

- Start with preparations and endeavors to improve policy coherence and to deliberate on some of the reforms proposed in the domain of the Commission and the Competitiveness Council.
- Follow-up with consultations on how to improve independent advisory services.
- Set up a task force to develop ideas and making proposals to launch one grand European (man-on-the-moon type) project with a high innovation capacity and transversal economic effects.
- Envisage and prepare a European Council meeting on further designing, developing and completing innovation ecosystems with a view to stimulating growth, jobs prosperity and well-being and follow-up in the Member States.

2 2nd semester 2015

In view of the forthcoming review of the Horizon 2020 program, the HLG recommends to:

- Start experimenting with and field-testing novel forms and elements of collaborative governance.
- Improve the present form and function and ponder novel criteria, design and structures of impact assessments.
- Try to find consensus on and implement significant regulatory innovations.
- Start processes for new leadership and new forms of collaboration.

3 1st semester 2016 - 2nd semester 2017

Policy management reforms can now be followed by implementing other recommendations:

- Facilitate industrial cooperation
- Support the building of strong industry networks
- Improve funding policies
- Review IP
- Review public procurement
- Ensure better science communication
- Focus on education

While the HLG is aware that this is a most ambitious reform blueprint, it can be achieved provided strong leadership for change and motivation by European and national politicians, officials, business-leaders and representatives of the civil society supporting it can be ascertained.

The reward for everybody will be great: a renewed confidence of Europe's citizens and a renewed attractiveness in a reconditioned EU, ready for the challenges of the global, digital world ahead.

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