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from: Secretary-General of the European Commission,
signed by Mr Jordi AYET PUIGARNAU, Director

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to: Mr Uwe CORSEPIUS, Secretary-General of the Council of the European
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Assessment Accompanying the Communication from the Commission
"Horizon 2020 - The Framework Programme for Research and Innovation";
Proposal for a Regulation of the European Parliament and of the Council
establishing Horizon 2020 - The framework Programme for Research and
Innovation (2014-2020);
Proposal for a Council Decision establishing the Specific Programme
implementing Horizon 2020 - The Framework Programme for Research and
Innovation (2014-2020);
Proposal for a Council Regulation on the Research and Training Programme of
the European Atomic Energy Community (2014-2018) complementing the
Horizon 2020 - The Framework Programme for Research and Innovation

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COMMISSION STAFF WORKING PAPER

EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT

Accompanying the

Communication from the Commission 'Horizon 2020 - The Framework Programme for Research and Innovation';

Proposal for a Regulation of the European Parliament and of the Council establishing Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020);

Proposal for a Council Decision establishing the Specific Programme implementing Horizon 2020 – The Framework Programme for Research and Innovation (2014-2020);

Proposal for a Council Regulation on the Research and Training Programme of the European Atomic Energy Community (2014-2018) complementing the Horizon 2020 – The Framework Programme for Research and Innovation

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EXECUTIVE SUMMARY

1. PROBLEM DEFINITION

The problem that requires action

In this the second decade of the 21st century, on the backdrop of a changing world order, Europe faces a series of crucial challenges: low growth, insufficient innovation, and a diverse set of environmental and social challenges. Europe 2020, the EU's comprehensive long-term strategy, recognizes these challenges and argues that Europe faces a moment of transformation.

The solutions to all of these problems are linked. It is precisely by addressing its environmental and social challenges that Europe will be able to boost productivity, generate long-term growth and secure its place in the new world order.

The key problem driver

Science and innovation are key factors that will help Europe to move towards smart, sustainable, inclusive growth, and along the way to tackle its pressing societal challenges. But Europe suffers from a number of critical weaknesses in its science and innovation system which contribute to the above problem.

The key driver of the problems is Europe's structural innovation gap: compared to its competitors, Europe's patenting performance is weak and it lags behind in developing new products, new processes and new services. To boost productivity and growth, it is critically important to generate breakthrough technologies and translate them into new products, processes and services. Europe has taken an early technological lead in many key technology areas, but in the face of growing competition its advantage is tenuous, and has not translated into an innovative and competitive lead. A timely and targeted European policy is needed for bridging the "valley of death" if Europe is to remain competitive.

The underpinning structural problem drivers

This key driver is underpinned by the following structural problem drivers:

- Insufficient contribution of research and innovation to tackling societal challenges
- Insufficient technological leadership and innovation capability of firms
- The need to strengthen the science base
- Insufficient cross-border coordination

The policy context

The EU recognizes the urgency of the situation, and is responding with new policy strategies. Europe 2020 and the Innovation Union initiative have clearly signalled the EU's intention to rise to the challenge. Europe 2020 focuses on achieving smart growth, while the Innovation Union sets out measures to contribute to this aim, including increasing investment, refocusing R&D and innovation policy on major societal challenges, and strengthening the links from frontier research right through to commercialisation. In addition, the European Council has

called for a completion of the European Research Area by 2014 in order to create a single market for knowledge, research and innovation, which will require both funding and non-funding measures.

A key challenge for the EU in implementing its strategy will be to build a next-generation expenditure programme which matches this level of ambition in both its budget and its aspirations.

2. ANALYSIS OF SUBSIDIARITY

EU right to act

The EU's right to act in this area is set out in the Treaty on the Functioning of the European Union and its objectives are cited under Article 179 and Article 180 (for research) and in Article 173 for the competitiveness of industry. The European Atomic Energy Community Programme (2014-2018) complementing Horizon 2020 has its legal basis in the Euratom Treaty (see in particular Article 7).

The need for public intervention, subsidiarity and European Added Value

There is a clear case for public intervention to tackle the problems above. Markets alone will not deliver European leadership. Large-scale public intervention through both supply and demand measures will be needed to overcome the market failures associated with systemic shifts in basic technologies.

However, Member States acting alone will not be able to make the required public intervention. Their investment in research and innovation is comparatively low, is fragmented and suffers from inefficiencies - a crucial obstacle when it comes to technological paradigm shifts. It is difficult for Member States on their own to accelerate technology development over a sufficiently broad portfolio of technologies, or to tackle the lack of transnational coordination.

As highlighted in the proposal for the next Multi-annual Financial Framework, the EU is well positioned to provide added value, through measures to coordinate national funding, which restructure more efficiently the European research and innovation landscape, and through implementing collaborative research and mobility actions, which generated critical mass.

Experience from previous programmes

A next generation programme should build on the experience from past Framework Programmes for Research and Technological Demonstration (FP), the Competitiveness and Innovation Programme (CIP), and the European Institute of Technology and Innovation (EIT) (see Annex 1 for a detailed analysis). Over several decades, EU programmes have funded Europe's best researchers and institutes, and produced large-scale structuring effects, scientific, technological and innovation impacts, micro-economic benefits, and downstream macro-economic, social and environmental impacts for all EU Member States.

However, important lessons can be learned from the past, including academic insights and stakeholder feedback (Chapter 1). Research, innovation and education should be addressed in a more coordinated manner and research results better disseminated and valorised into new products, processes and services. The intervention logic should be more focused, concrete, detailed and transparent. Programme access should be improved and participation increased from start-ups, SMEs, industry, less performing Member States and extra-EU countries. Monitoring and evaluation need to be strengthened.

3. OBJECTIVES

In order to tackle the problems identified above, the following objectives have been set.

The general objective of the next EU spending programme for research and innovation will be to contribute to the objectives of the Europe 2020 strategy and to the completion of the European Research Area.

In order to achieve this general objective, there are five specific objectives:

- *Strengthen Europe's science base by improving its performance in frontier research, stimulating future and emerging technologies, encouraging cross-border training and career development, and supporting research infrastructures*
- *Boost Europe's industrial leadership and competitiveness through stimulating leadership in enabling and industrial technologies, improving access to risk finance, and stimulating innovation in SMEs*
- *Increase the contribution of research and innovation to the resolution of key societal challenges*
- *Provide customer-driven scientific and technical support to Union policies*
- *Help to better integrate the knowledge triangle - research, researcher training and innovation*

These objectives, and a number of operational objectives, are detailed in chapter 3 of the report.

4. POLICY OPTIONS

The options considered were designed and evaluated in relation to stakeholders' views, the problems and the objectives above. They take into account some key parameters set out in the EU budget review: the need to focus on instruments with proven European added value, to develop a more results-driven approach, to leverage other public and private funding, and to design EU instruments that work together in a single strategic framework.

This Impact Assessment considers four policy options:

Business-as-usual (BAU): maintaining the current plurality of programmes for R&D and innovation: In this scenario, the three main existing EU sources of funding for research and innovation - FP7, the innovation-related part of the CIP, and the EIT - are simply carried forward into the next multiannual financial framework as separate instruments, and in their current formats.

Improved business-as-usual: loose integration and stand-alone simplification (BAU+): In this scenario, FP7, the innovation-related part of the CIP, and the EIT remain separate instruments and retain their current formats but are put together under a 'common roof'; loose coordination mechanisms are established between them. The implementing modalities of each programme are simplified separately, but no single set of simplified rules, funding schemes, support services etc. applies across the three programmes.

Horizon 2020 - Establishing a single strategic framework for Research and Innovation: In this scenario, FP7, the innovation-related part of the CIP, and the EIT are fully integrated into a single unitary framework: Horizon 2020, The Framework Programme for Research and

Innovation. The current separation between research and innovation activities is eliminated. Horizon 2020 sets out three strategic policy objectives: raising and spreading the levels of excellence in the research base; tackling major societal challenges; and maximising competitiveness impacts of research and innovation. Horizon 2020 is structured around three priorities which link directly to these aims. The selection of actions and instruments is driven by policy objectives and not by instruments. Horizon 2020 also integrates a major simplification and standardisation of funding schemes and implementing modalities across all areas.

Bring to an end EU level R&D financing and re-nationalise R&D and innovation policies: The renationalisation option consists of discontinuing EU research and innovation programmes and of spending those funds at Member State level. A discontinuation option, which is assessed to a lesser extent, consists of discontinuing EU research and innovation programmes and not spending those funds at Member State level either.

5. COMPARISON OF OPTIONS

How the options were compared

The four policy options were compared along a range of key parameters relevant to assessing public intervention in research and innovation:

- clarity of focus of the intervention
- quality of the intervention logic
- extent to which the intervention achieves critical mass at both programme and project level
- extent of flexibility associated with the intervention
- extent to which it promotes excellence
- accessibility and reach
- degree of stakeholder support
- impact on SMEs
- extent to which the intervention promotes knowledge triangle and broader horizontal policy coordination
- impacts of the intervention – structuring, leverage, innovation, economic and competitiveness, social, environmental, and EU policy impacts
- cost-effectiveness

The comparison along these parameters was done using a range of evidence including: ex-post evaluations; foresight studies; analyses of FP and Community Innovation Survey data; science, technology and innovation indicators; econometric modelling; reviews of academic literature; competitiveness studies; expert hearings etc.

Comparison of options and assessment of cost-effectiveness

Horizon 2020 emerges as the preferred option. It was also endorsed as the preferred option in the 29 June 2011 Commission Communication on the next Multi-annual Financial Framework 2014-2020. This option has clarity of focus and a well-developed intervention

logic. Like the BAU option, it achieves critical mass at programme and project level. It also enhances the promotion of scientific and technological excellence and allows for more flexibility. Levels of administrative burden would be reduced drastically, significantly improving accessibility and increasing stakeholder support. Knowledge triangle and broader policy coordination are enhanced through a single framework seamlessly integrating research, education and innovation aspects and explicitly defining links with other policies. SMEs would benefit in particular from administrative simplification and closer knowledge triangle coordination particularly concerning research and innovation finance. S&T and innovation impacts would be enhanced through the seamless support from idea to marketable product, stronger output orientation, better dissemination of results, clearer technological objectives, enhanced industrial and SME participation and thus better leverage, the funding of demonstration activities, and innovation financing and support. Enhanced scientific, technological and innovation impacts would translate into larger downstream economic, competitiveness and social impacts (see Box), as well as environmental and EU policy impacts. Horizon 2020 also maximises cost-effectiveness (see chapter 5). On the cost side, its far-reaching integration, simplification and harmonisation will reduce costs for the Commission and for applicants. At the same time, the Horizon 2020 option maximises the benefits through a close integration of research, innovation and training. This will provide the best approach for ensuring that investments made at EU level in research projects are fully valorised into patents and new products, processes and services.

Quantifying economic, competitiveness and social impacts

The enhanced scientific, technological and innovation impacts produced by Horizon 2020 should translate into larger downstream economic and competitiveness impacts. It is estimated that by 2030 it could generate the following impacts over and above the BAU option:

- Horizon 2020 will stimulate Europe's economic growth, generating 0.53 percent of extra GDP.
- It will also enhance Europe's competitiveness, increasing its exports by 0.79 percent, and reducing its imports by 0.1 percent.
- It will create jobs for Europe's citizens, increasing employment by 0.21 percent.

Under the renationalisation and discontinuation options, the effects would be weaker compared with the BAU option by 2030:

- Renationalisation would reduce GDP by 0.04 percent, cut 0.06 percent off exports, have no effect for imports, but would lead to a job loss of 0.01 percent.
- Discontinuation would shave 0.39 percent off GDP, decrease exports by 0.58 percent, and raise imports by 0.05 percent, while producing job losses of 0.19 percent.

Comparing the positive effects of the Horizon 2020 option with the negative effects of the discontinuation option demonstrates its true added value:

- By 2030, it is expected to generate an extra 0.92 percent ($0.53+0.39$) of GDP, 1.37 percent ($0.79+0.58$) of exports, -0.15 percent ($0.10+0.05$) of imports, and 0.40 ($0.21+0.19$) percent of employment.

The BAU+ option would allow for some alignment of objectives and achieve a certain degree of simplification producing positive effects on administrative burden, accessibility, reach,

structuring effects, leverage effects, innovation impacts and downstream economic, social, environmental and EU policy impacts.

In the case of the renationalisation option, it would be more difficult to orient Europe's research and innovation programmes on commonly agreed objectives while critical mass and excellence would be compromised. The quality of the intervention logic, the level of flexibility, accessibility and reach, and the extent of knowledge triangle and broader horizontal policy coordination could in theory be enhanced more easily at national or regional level though this is not the case now and would involve important trade-offs. This would compromise the return on investment in research as scientific, technological and innovation impacts would be reduced, which would translate into smaller economic and competitiveness, social, environmental and EU policy impacts.

A summary of the comparison of options is given in the table.

Impacts of the BAU+, Horizon 2020, and renationalisation options compared to the BAU option

| Dimension | BAU+ | Horizon 2020 | Renationalisation |
|--|------|--------------|-------------------|
| Effectiveness | | | |
| <i>Focus</i> | + | ++ | +(1) |
| <i>Intervention logic</i> | = | + | +/(2) |
| <i>Accessibility, reach</i> | + | ++ | ++(4) |
| <i>SMEs</i> | + | ++ | ++(5) |
| <i>Excellence</i> | = | + | - |
| <i>Critical mass</i> | = | = | - |
| <i>Structuring effect</i> | + | ++ | - |
| <i>Leverage effect</i> | + | ++ | - |
| <i>Innovation impact</i> | + | ++ | - |
| <i>Economic and competitiveness impact</i> | + | ++ | - |
| <i>Social impact</i> | + | ++ | - |
| <i>Environmental impact</i> | + | ++ | - |
| <i>Impact on EU policy</i> | + | ++ | - |
| Efficiency | | | |
| <i>Reduction of administrative costs</i> | + | ++ | ++(3) |
| <i>Reduction of participation costs</i> | + | ++ | ++(3) |

| Coherence | | | |
|---|---|----|-------|
| <i>Knowledge triangle coordination</i> | + | ++ | +/(2) |
| <i>Broader horizontal policy coordination</i> | = | + | +/(2) |
| <i>Flexibility</i> | = | + | ++(3) |

Notes: (1) Easier to focus programmes, but more difficult to focus them on pan-European objectives; (2) In theory, easier to achieve/enhance; in practice, mixed Member State and regional performance; (3) but reduced critical mass, excellence; (4) but reduced critical mass and ability to pool resources; (5) but reduced access to foreign partners, capabilities, markets.

Under Horizon 2020, only those kinds of activities will be supported that have passed the European added value test. The criteria for allocation and details on implementation are presented in the report. Under the proposal on the next MFF, the funding for Horizon 2020 amounts to €80 billion (constant 2011 prices), which represents a 46 percent increase with respect to comparable funding under the MFF 2007-2013 (constant 2011 prices).

6. MONITORING AND EVALUATION

The new system for the evaluation and monitoring of Horizon 2020 will be based on a comprehensive, well-timed and harmonised strategy, with a strong focus on throughput, output, results and impacts. It will be supported by an appropriate data archive, experts, a dedicated research activity, and increased cooperation with Member States and Associated States, and it will be valorised through appropriate dissemination and reporting.