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COMMISSION STAFF WORKING DOCUMENT

Executive Summary of the Impact Assessment

Accompanying the document

Proposal for a

DECISION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the participation by the European Union in a European Metrology Programme for Innovation and Research (EMPIR) undertaken by several Member States

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This Executive Summary outlines the main findings and conclusions of the Impact Assessment (IA) report accompanying the Commission Proposal for a decision on the follow-up to the European Metrology Research Programme (EMRP) undertaken by several Member States. This follow-up was requested by the EU Member States participating in EMRP and confirmed by the release of their draft programme 'European Metrology Programme for Research and Innovation (EMPIR)' and national financial commitments of 28 countries.

Metrology is the science of measurement and includes all theoretical and practical aspects of measurement. At the core of metrology is the definition, realisation and dissemination of units of measurement and their link to base units (kilogram, metre, second, kelvin, etc.). National Metrology Institutes (NMIs) are in charge of providing the necessary research and infrastructure and of implementing it on the basis of institutional funding from central government agencies or ministries.

1. PROBLEM DEFINITION

1.1. Responding to the metrology research & innovation challenge

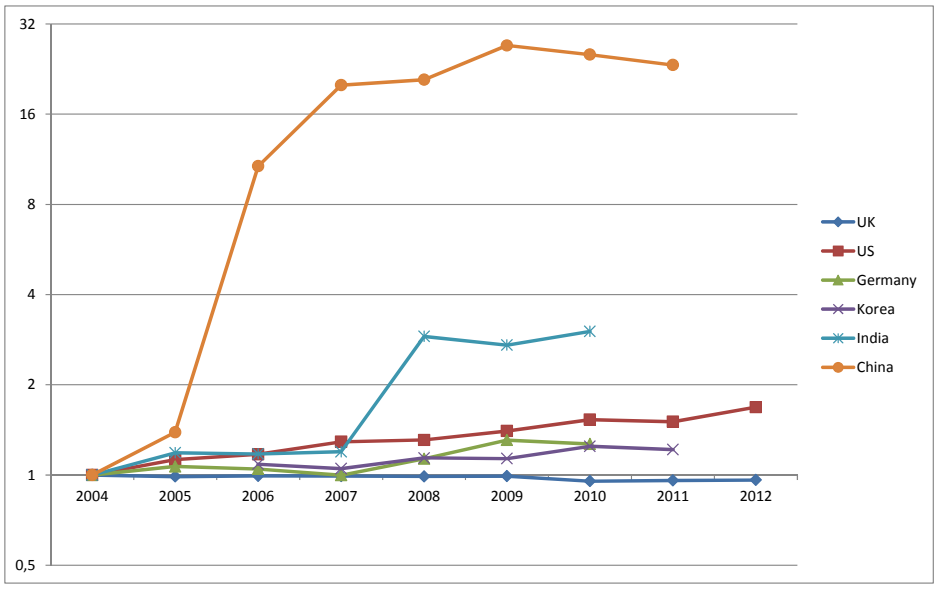
The central nerve in the spine of our high-tech world is metrology, the science of measurement. Every aspect of our daily lives is affected by metrology. Increasingly precise, reliable measurements are essential to drive innovation and economic growth in our knowledge-based economy. Reliable, traceable measurement allows the wider scientific community to build better instruments and to do better science. It opens up new territory for industry, creating space and opportunity to innovate. It crucially underpins and advances understanding and agreement in global challenges such as health care and climate change.

Solving major societal challenges often relies on metrology solutions. This is particularly the case in health, environment and energy, but also applies to other areas, e.g. transport (automated guided vehicles, emission reductions), agriculture (food safety) or secure societies (chemical and radiation measurements, improving data security).

All governments in technologically-advanced countries support a metrology infrastructure because of the benefits it brings and its strong character as a public good that justifies public intervention. Major economic powers in the world are increasing their investment in metrology research and related infrastructures. China, for example, increased national investment in metrology R&D between 2001 and 2007 by a factor of 25 — albeit from a low base. The US is committed to doubling the budget for the National Institute of Standards and Technology (NIST) by 2017.

Figure 1 shows the strong rise in investment in metrology in some major economies over recent years.

Figure 1: Investment in metrology: comparison of change (internal data NPL, UK)



Taking into account the level of investment in metrology and its role in promoting scientific excellence and industrial competitiveness, a single Member State or even a group of countries acting together could not compete in the global context.

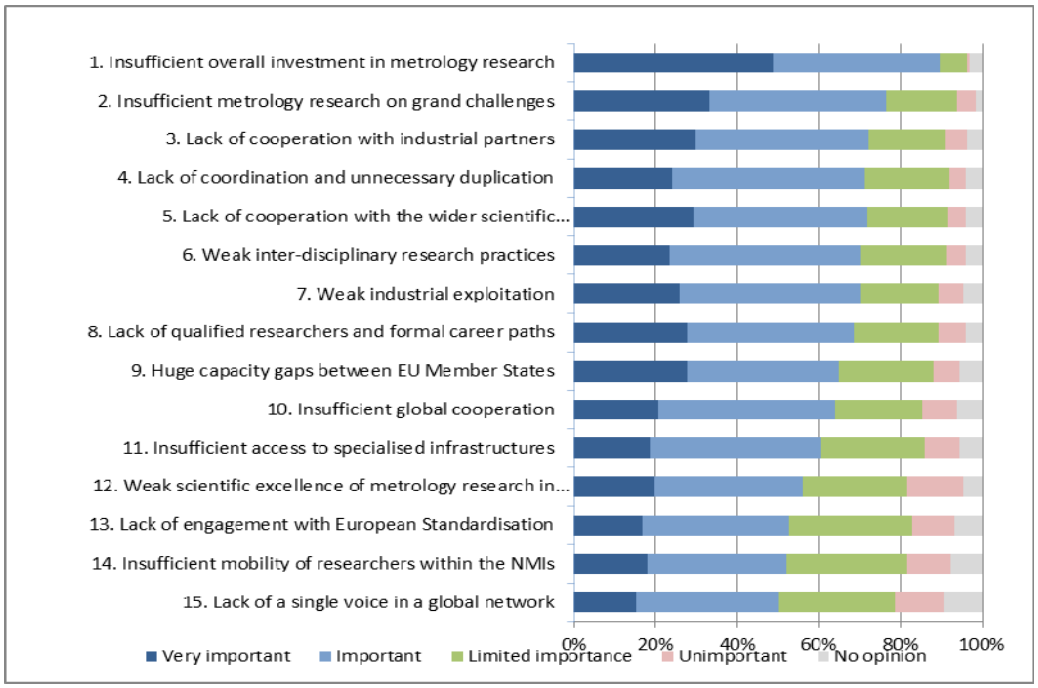
1.2. Key problems and their drivers

The result from the Public Consultation[1] held on this issue has provided clear feedback on problems that need to be solved both in general and for different stakeholder groups and confirms the results of the mid-term evaluation of EMRP.

There was almost unanimous agreement (97%) on the **importance of metrology research** for addressing grand challenges; for the European economy and industrial competitiveness; and for European policies, standardisation and regulatory work. The majority also agreed with **15 specific underlying problems** (50% to 90% agreed these were 'important' or 'very important').

[1] See http://ec.europa.eu/research/consultations/pdf/empir-survey-final-report.pdf for the full report

Figure 2: Results from the public consultation: problem statements for the European metrology research system in order of importance



The two main problems that a future initiative has to address can be summarised as follows:

(1) Underexploited potential to have a greater impact on growth and socio-economic challenges

- ***Metrology needs to make a greater contribution to economic development***, through post-research activities that reduce the barriers and risks to exploitation of metrology research through new-to-market products.
- ***The metrology community should enable better and/or faster regulations and standards***, by providing the often-missing independent scientific input on measurement methods and their limitations.
- ***Metrology research needs to become more interdisciplinary and open to the wider science base;*** only further modernisation of the metrology system towards interdisciplinary and opening to the wider science base can ensure that it will deliver better measurement technologies for societal challenges such as health, energy and the environment.

(2) Fragmentation and structural weaknesses of the European metrology research and innovation system

- ***The development and exploitation of new measurement technologies in Europe needs to be more coordinated and inclusive***, to reduce unnecessary duplication and enable the less research–intensive NMIs to reduce the knowledge gap and thus better position themselves to support national socio-economic development priorities.
- ***Europe needs to ensure global leadership and develop a coordinated strategy*** Europe needs to develop a coordinated strategy to cooperate at programme level with the rest of the world on metrology research in a way that provides broader economic advantages and enables Europe to speak with one voice and demonstrate leadership in addressing global metrology challenges.

1.3. Public intervention at EU level is fully justified

Public intervention at EU level is necessary to bring together compartmentalised national research programmes, to help design common research and funding strategies across national borders, and to achieve a critical mass of actors and investments required for tackling important metrology challenges, thereby increasing the cost-effectiveness and impact of European activities and investments in this field.

The initiative is embedded in the Treaty's objectives to strengthen the EU's scientific and technology bases (Art. 179.1 TFEU), and to develop a European research area based on cooperation among researchers across borders (Art. 179.2 TFEU), such as through the EU participation in research and development programmes undertaken by several MS (Art. 185 TFEU).

The European strategy for smart, sustainable and inclusive growth — EUROPE 2020 — sets the agenda for European research & innovation for the coming years. Several of the flagship initiatives of that strategy are affected by metrology research, including 'Innovation Union', 'A digital agenda for Europe', 'Resource efficient Europe' and 'An industrial policy for the globalisation era'.

In the current initiative, EMRP Member States and their NMIs, together with the dedicated implementation structure EURAMET, have proved that a lightweight governance structure can deliver efficient, effective implementation of the programme. The improved successor programme EMPIR would also respect the subsidiarity principle, as Member States would be responsible for developing their joint strategic work programme and all operational aspects.

The role of the EU is to ensure improved coordination, to help achieving critical mass and aligning national and European strategies, raising the efficiency of public spending, as well as ensuring synergies with EU policies and contributing to the priorities of Horizon 2020.

1.4. EMRP: Key achievements and lessons learned

The current EMRP initiative is a joint European metrology research programme implemented by 22 NMIs. It is based on Article 185 of the Treaty on the Functioning of the European Union (TFEU), which, in implementing the multiannual Framework Programme, makes it possible to coordinate national research programmes. The current programme has a total public budget of €400 million for a duration of five years, with matching contributions from the participating countries and the European Union.

The interim evaluation has recognised the value of the initiative: '*The Panel had a common view that the Article 185 is an almost perfect instrument for joint programming within the metrology community due to the long-term national funding commitments, the relatively homogenous national structures and the pre-existing networking frameworks.*'

The main shortcomings of EMRP are a limited opening of the NMIs to excellent science outside the NMIs and insufficient capacity building. Furthermore, the lack of dedicated instruments to support innovation and regulatory/standardisation roadmaps limits industrial exploitation, and thus the broader economic impacts.

2. OBJECTIVES

2.1. General Objectives

In line with the Europe 2020 strategy, the Innovation Union flagship initiative, Horizon 2020 and ERA, the overarching goal of the future initiative is to address the challenges that the European Metrology Research System is facing and to fully exploit the benefits of improved measurement solutions for Europe.

Thus, the general objectives are to:

(1) **Provide appropriate, integrated and fit-for-purpose metrology solutions** supporting innovation and industrial competitiveness, as well as measurement technologies addressing societal challenges such as health, environment and energy including support to policy development and implementation (GO1)

(2) **Create an integrated European Metrology Research system** with critical mass and active engagement at regional, national, European and international level (GO2)

2.2. Specific objectives

To achieve the general objectives and to ensure a high level of scientific, financial and managerial integration in all relevant activities, as well as a high impact, the following specific objectives and related benchmarks have been set:

- **Boost industrial uptake and improve standardisation:**
    - At least €400 m of European turnover from new or significantly improved products and services that can be attributed to the research activities of EMPIR and its predecessors;
    - At least 60 % of CEN/CENELEC /ISO/IEC Technical Committees and equivalent standardisation bodies with potential to benefit directly from EMPIR projects to engage with the programme.
- **Underpin a coherent, sustainable and integrated European metrology landscape** to fully exploit the EU potential:
    - Maintain a level of at least 50 % of dedicated national metrology research investments in Europe being coordinated or influenced via the programme;
    - All European NMIs and their designated institutes interact with the programme;
    - European leadership in at least 20 % of international metrology committees[2].

[2] E.g. in the committees of the meter convention: www.bipm.org/en/committees .

2.3. Operational Objectives

From the above Specific Objectives follow six Operational Objectives:

- **Establish common agendas with strong integration** of basic research as well as challenge-oriented metrology research via common priorities and joint calls with excellence-based project selection (OO1);
- **Support innovation-related activities** through the development of new technologies, industry-driven joint research projects and industrial uptake. This requires a systematic technology screening of projects and at least 20% industry-driven research (no dedicated module under the present EMRP) (OO2);
- **Increase immediate relevance for policy makers and standardisation bodies** At least 10% is dedicated to normative research, compared to 0% in EMRP (OO3);
- **Open the programme to the relevant scientific communities** and raise awareness and involvement of European technology and research organisations. This means at least doubling the participation of non-NMI/DI scientists in the programme (OO4);
- **Support capacity-building in developing NMIs**, in particular by assisting national authorities to fully exploit the use of structural funds and other relevant programmes. The expectation is to increase the leverage of EU structural funds and other programmes, from 0% to 10% of the co-investment in EMPIR (OO5);
- **Strengthen European leadership** through EURAMET and **foster global cooperation**. This should lead to at least two structured cooperations with major metrology actors outside Europe (e.g. US, Canada) (OO6).

3. POLICY OPTIONS

The following three main policy options have been identified for a successor to EMRP:

Under **Option 1,** *('No dedicated EU action')* EU participation to EMRP would be discontinued after the end of its current funding phase in 2013. Furthermore, no dedicated provision would be made in EU research policies, programmes or funding to support EMRP objectives.

Option 2 *('Business as usual — EMRP2')* would continue with an identical initiative focused entirely on coordination and integration of fundamental and challenge driven research. This would include some calls on industry relevant topics.

Option 3 *('Improved Article 185 initiative — EMPIR'* would build on the success of the EMRP by implementing a more ambitious and inclusive Article 185 initiative that is aligned with the Europe 2020 objectives as a ***European Metrology Programme for Research and Innovation (EMPIR).*** The improvement from EMRP to EMPIR consists of a stronger focus on innovation and industrial uptake, entirely new support for standardisation and dedicated capacity building, and links to other funding sources, such as structural funds, in order to support participating states with incomplete or emerging metrology systems, to allow them to close the gap with established metrology systems.

4. COMPARISON OF OPTIONS

The analysis of impacts on the six operational objectives as well as the analysis of the economic, social, environmental, and other impacts provides the basis for a comparison.

Figure 2: Comparison of impact of the options on achieving the six Operational Objectives (OO) and on economic, social, environmental and other impacts

	Option 1: No dedicated EU action	**Option 2: EMRP2**	**Option 3: EMPIR**
OO1 Integration	Low/Medium	**Very High**	High
OO2 Innovation	Low/Medium	Medium	**High**
OO3 Policy relevance	Low/Medium	Medium	**Very High**
OO4 Opening programme	Low	Medium	**Medium/High**
OO5 Capacity Building	Low	Low/Medium	**Medium**
OO6 Global cooperation	Low/Medium	Low/Medium	**Medium/High**
Economic Impacts	Low	Medium	**Medium/High**
Social Impacts	Medium	Medium/High	**High**
Environmental Impacts	Low	**Medium/High**	**Medium/High**
Impacts on European Research and Innovation Policy	Low	Medium/High	**High**
Efficiency	Very Low	High	**Very High**
Administrative burden	High	Medium	**Medium**

5. PREFERRED OPTION

Option 3 is clearly the preferred option, after consideration of effectiveness in achieving the objectives, efficiency, as well as coherence across all criteria. This is fully supported by the results of the public consultation (93% of all responses rate the option 'very suitable' or 'appropriate'). This option will build on the previous achievements of EMRP, with continuity of current activities and their implementation in the new programme, while allowing a smooth integration of additional activities right from the start so as to addressing problems that could not be addressed with the set-up of the current initiative.

The actual budget allocation will be subject to the outcome of the Horizon 2020 decision. Participating countries have already presented financial commitments in excess of €300 million. With matching contributions from the EU, this would result in a €600 million programme with calls over seven years, corresponding to an increase of the annual budget by 7% (€85.7 million per year) compared to the current programme EMRP.

6. MONITORING AND EVALUATION

The creation of an appropriate monitoring and evaluation system at programme and project level will enable sound assessment of whether the EMPIR programme is on track and successfully achieving its objectives. The evaluation framework would be composed of the following:

- Annual reports on the implementation of the programme, providing detailed information on its performance and progress towards meeting its objectives and targets, based on predefined indicators.
- A mid-term evaluation, carried out by an independent expert panel convened by the European Commission, conducted no later than 2018, with a specific focus on implementation to that date, the quality of research and innovation, progress towards the objectives and targets set, and recommendations for possible improvements.
- At the end of the Union participation in EMPIR, an independent final evaluation, reviewing the achievement of objectives, outcomes and impacts.

A comprehensive set of indicators underpinning the specific and operational objectives has been developed and is presented in the IA report.