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## Global science organisations: “keep investing in long-term science”

Six leading science organisations<sup>1</sup> from across the world have identified three important principles for continuing and optimising public investment in science and engineering. These principles, addressing complex societal challenges and long-term economic global development, were presented to EU Commissioner for Research, Science and Innovation Carlos Moedas at the organisations’ joint meeting at the EuroScience Open forum 2016 in Manchester, UK.

Our organisations have all been founded out of a conviction that science, technology and innovation are the key to human well-being and the management of our planet. Economic and social development and the environment crucially depend on them, and this includes the education of next generation’s leaders. That is true for countries and regions in all stages of development.

Science is always facing challenges. Today we are particularly confronted with the following:

- Governments and the public at large sometimes do not know what to expect from science or when, grow impatient and turn away. In times of economic crisis many politicians tend to look away from long-term investments, focusing instead on short-term, visible drivers of economic growth.
- While in general public trust in science is high, the understanding of how science works and the necessary conditions for science to thrive are poorly understood. Furthermore, events and beliefs can shatter trust in scientists. The Fukushima nuclear disaster did so for scientists overall in Japan; vociferous denial of climate change science has a similar effect elsewhere.
- The common belief of rigid, cautious governments and risk-taking, growth-driving companies is just a myth: major breakthrough innovations that have generated new business sectors, pioneering companies and economic growth trace their origins to publicly-funded basic research.

Different though our political, social and economic environments maybe, in this globalised world our common interest is to build our future on science, technology and innovation, with long-term basic and frontier research. Future generations in our individual countries and regions and globally should benefit from such a far-sighted approach. This leads us to propose a number of important principles.

### 1. When science is unequivocal, decision makers must act responsibly for the public good.

Science is our best hope of understanding and addressing society’s major challenges. Global availability of research results and data, as well as international cooperation mechanisms must be the common practice. The public and their political leaders can at times find it difficult to make decisions based on evidence arrived at scientifically, but unequivocal science cannot easily be traded off: the public good should come first. COP 21 was a reassuring example.

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<sup>1</sup> American Association for the Advancement of Science (AAAS), Brazilian Society for the Promotion of Science (SBPC), China Association for Science and Technology (CAST), EuroScience, Japan Science and Technology Agency (JST), Korea Foundation for the Advancement of Science and Creativity (KOFAC)

**2. Public investments in R&D should leave plenty of room for basic and frontier research.**

A balanced public investment portfolio in R&D should leave plenty of room for basic and frontier research, much of which is curiosity-driven though often with a clear starting point in addressing societal problems or economic potential. Of course governments also fund applied research to meet public needs, in varying degrees in different parts of the world. However, that is clear and not challenged now, and thus, we call attention to the basic research that requires support.

**3. Governments must support innovation, too, but first of all the science base.**

Governments have a role, too, in facilitating and inspiring innovation. Indirectly, it is through the funding of basic, frontier research that is the source of endless opportunities. Industry generates jobs and growth as well as provides solutions to society's challenges by relying on a solid science base. Maintaining this science base has become the responsibility of the public sector. Companies support and advocate this responsibility of the public sector though not everywhere strong enough. On top, governments have to create the conditions conducive to innovation, such as through public-private partnerships, regulations, incentives or direct financial support for innovative solutions for public missions.

Science and engineering have been great modernizing forces and have greatly improved the quality of life for people in recent centuries. A solid science base also provides the best environment to challenge scientists to 'think out of the box' to help tackle the big issues society is facing. In the world today with precarious stresses of environment and population, the investment in science internationally is more important than ever to ensure sustainable, equitable benefits to all people. Achieving the UN Sustainable Development Goals explicitly depends on a vibrant, productive scientific enterprise.

But we need new forms of cooperation between scientists, the private sector, the public sector and civil society to achieve this. These will be based on effective forms of interdisciplinary cooperation which will have to include the social sciences and humanities and will involve mastering the deep changes data-driven approaches introduce in the traditional ways of science, industry, government and society's institutions. We will all have to learn.