



On the importance of funding basic natural science

Basic science is valuable to modern society and contributes significantly to economic, cultural and social development. Those engaged in fundamental research have the obligation to explain to governments, agencies, and tax payers the importance of support for basic science, even in a time of austerity. The present document aims to provide simple clear arguments for all scientists, policy makers and stakeholders of the importance of funding basic natural science.

Understanding Nature

Human beings are fundamentally curious, driven to understand the basic laws of nature. Sharing knowledge and discovery lead to human progress. All fields of physics, in their own right and through their links to other sciences and to society, make major contributions to developments in all areas. The knowledge and discoveries are propagated through thousands of graduate students worldwide, contributing to a common human culture. Dissemination of knowledge and our understanding of nature lead to progress in technology, culture and society.

Origin of progress

Fundamental science has always been at the origin of major progress in applied science, providing long term benefits to society. Without fundamental research there would be no new materials, no new medicines, and no new electronic devices.

The subtlety of nature often escapes human understanding, which makes it impossible to predict applications from scientific breakthroughs. Plausible and well-meaning attempts to steer basic research into predictable applications are not necessarily successful. Indeed funding science based only on market demands and new trends would limit science to short term needs and would prevent unforeseen advances and breakthroughs. Fundamental science is essential to the future of society.

Driving Innovation

Basic research 'irrigates' the general area of technology and helps to push back the limits of existing technology by inspiring entrepreneurs who might

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see new possibilities where policy makers and scientists do not. It drives innovation within high-tech companies that build equipment, continuously improving performance. These benefits are then transferred to the general public with direct impact in our quality of life. Advances in frontier research and technology, which are openly accessible to the public, motivate future generations of scientists and engineers, needed in academia, industry and public service.

Open Society

The global nature of science provides an example of an open society, which should abolish boundaries between countries, political systems, religions, races and classes. This happens formally within the structure of international collaborations, and informally whenever experts interact at conferences, workshops, by email or video links. The development of the World Wide Web occurred at CERN because of the need for communication between people, without technical barriers, and this has had a massive impact on humanity.

Conclusion

Basic research continues to ask the questions that are part of human culture. It does so as a collective endeavour and it is appropriate that it be funded collectively. This financial support will enhance the general scientific infrastructure, and lead towards international co-operation. Researchers have demonstrated their ability to plan and reach ambitious goals, efficiently, and within budget constraints. Indeed, resources are allocated to projects on a competitive basis and following serious scientific evaluation processes, making sure that funds are invested on the most promising projects. History has shown the need for both large and small scale projects, with either low or high risk, providing the required flexibility and freedom to the researchers for exploiting their creativity and sense of innovation. These are all good reasons to fund basic research. We therefore urge all governments to develop strategies that strongly support science and innovation, and which recognise the link between fundamental scientific challenges of our time and a healthy knowledge-based economy.