

Epilogue: Productive Collisions—Blue-Sky Science and Today’s Innovations



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I hope that readers who have got to this page will have found the present volume as exciting as I found the original workshop on the “Economics of Science” that the Belgium chapter of the London School of Economics (LSE) Alumni co-organised with CERN in Brussels in summer 2019. The LSE is today an established partner of the Future Circular Collider (FCC) Study, following a number of joint activities that the LSE Alumni Association Belgium co-hosted with CERN.

The contributors to this volume hail from the major European Big Science organisations. Academics working in economics and social sciences and representatives from funding agencies and EU institutions, brought alive, here in Brussels, the lasting and far-reaching impacts of Big Science. The workshop was a space for dialogue and exchange of best practices between these Big Science organisations, and I hope that these proceedings will inform the future design of research facilities, and boost their multiple impacts for society. These become evident just as we are seeing the final steps to launch Horizon Europe, one of the world’s most ambitious funding programmes for research and innovation.

The collected essays convey the breadth of the arguments raised at our workshop, along with questions that we still face today as Europe prepares its new multiannual financial framework for innovation and research, including global scientific collaboration. I would like to thank the two editors of these proceedings as well as all the participants at the workshop, and of course Springer for publishing this volume in their series of Science Policy Reports.

As a co-host of the event, I was struck by the widespread sense that Big Science still today faces distrust from taxpayers and decision-makers alike. A sizeable bill that needs to be footed, the prospects of pay-off seem distant and there are oh so many more pressing budget needs.

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H. P. Beck, P. Charitos (eds.), *The Economics of Big Science*, Science Policy Reports, https://doi.org/10.1007/978-3-030-52391-6_19

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We are no strangers to such criticism here in Brussels. In answer, the contributions from the European Space Agency (ESA), CERN and the European Spallation Source (ESS) offer clear evidence that there are many immediate returns for society from the planning, construction and operation of such large-scale research infrastructures—before and beyond the pure scientific knowledge that can be often hard to quantify. Investing in blue-sky research pushes back the frontiers of our knowledge. But such investment also builds a broader ecosystem that includes industry, local communities, citizen scientists and the next generation of experts.

Big Science organisations such as ESA and CERN, are expert practitioners in international idea-pooling and idea-spreading. Fostering universal, inter-disciplinary approaches to discovery and sustaining distributed science work, Big Science organisations leverage their sites as places of citizen science—a place where everyone is welcome and everyone learns new—non-scientists and ‘real’ scientists, start-uppers and students, young and old, people from many nations and backgrounds.

And contrary to their “elite” image in the popular imagination, we have learned how frequently transnational and international Big Science organisations contribute to justice and inclusion, offering opportunities to marginalised and often excluded groups. I find this theme—which emerges especially in the last four contributions to this volume—particularly intriguing, given the multiple crises that Europe has faced in the last years.

As you will have read in this volume, ESA has generated for its partner states socio-economic benefits that match investment Euro for Euro and more. CERN has demonstrated similar benefits: together with its collaborating institutes, laboratories and industrial partners, CERN has spearheaded huge breakthroughs, from the familiar information highway, the World Wide Web, to the very frontiers of human understanding of particle physics—who hasn’t heard of the Higgs boson? These achievements stand as towering monuments to human inquisitiveness and ingenuity.

For those who continue to doubt the value of curiosity-driven investigations, the representatives from European Big Science organisations can also proudly point to spin-off innovations that bear fruit even while the Big Science investigations are underway, in the same way that space exploration and F1 racing technology make our everyday cars safer. One example would be the CERN contribution to proton therapy, a game-changer for some cancer treatments with particle beams and the development of isotopes for medical treatment.

These proceedings have demonstrated the long-term and copious R&D efforts needed to advance new technologies that will allow us to continue the exploration of nature at different scales: from satellite and space missions planned by ESA to next generation radio-telescopes like the Square Kilometre Array (SKA) Project, and from the upgrade of the Large Hadron Collider (LHC), and the planned FCC to spallation sources like the ESS, used for material science and biology.

In addition to research achievements, these projects also offer opportunities to strengthen European, and global, industry through joint co-innovation activities. They are also magnets to attract and develop the next generations of top-flight engineers, scientists and technicians. Fascination with the questions addressed by

scientists working in these projects continually inspire young people and increase the attraction of science and technology more generally. Then, in turn, many of the young professionals trained at Big Science organisations transfer their expertise to other research projects, to industry and to society, at large.

Finally, and this is a particularly important remark for me as an LSE alumna, Big Science is a champion of global and peaceful collaboration. The CERN model offers today a powerful example of international cooperation driven by pure curiosity about our Universe, based on openness and inclusion. The LHC, today the world’s largest scientific facility and largest user community, is the best proof of what humanity can achieve when acting together, and overcoming political and cultural barriers. CERN’s history is closely intertwined with the European project: it remains the prototype for scientific collaboration in Europe. A global flagship hosted by Europe, well-known and well-established inspiration for sister organisations, ranging from astronomy to biology, and spinning out into fields such as the interplay between Big Science and Societal Justice: the theme of the last session of this workshop. I hope that in today’s fractious climate, this volume will inspire continued commitment to global cooperation.

These are among the many reasons that I am proud of the results of the “Economics of Science” workshop reported here; an initiative that brought together the two driving forces that enable all this to happen: the funding agencies and Big Science.

We are lucky to have in this volume the voices of Big Science organisations carried by their people into the EU bubble and beyond.

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