CHAPTER 6

The Other Europe of Big Science: Historical Dynamics and Contemporary Tendencies

This book investigated the founding histories of two collaborative Big Science facilities in Europe: the ESRF (European Synchrotron Radiation Facility) in Grenoble, France and the European XFEL (X-ray Free-Electron Laser) in Schenefeld, Germany. These projects constitute two cases within a much broader portfolio of Big Science projects with very different scientific purposes that were established over the course of the second half of the twentieth century and the early twenty-first century in Europe.

This book tried to advance the study of the history and politics of Big Science in mainly two regards. First, it proposed the conceptual stance of the other Europe to describe, study and understand the historical development of Big Science collaborations in Europe, as well as to characterise their roles within the varied European scientific and political landscapes. This approach relates to several scholarly perspectives in history and sociology that promote a more nuanced investigation of the historical developments of and in Europe, in which the history of the EEC/EU does not necessarily coincide with that of Europe. Rather, these approaches have highlighted that science, (large) technologies and infrastructures have played crucial and decisive roles in creating, shaping and projecting different kinds of Europe. The conceptual approach of the other Europe can be summarised as follows: Although formally disentangled and institutionally independent from mainstream political integration processes and mechanisms within the EEC/EU, the history and politics of intergovernmental
and collaborative Big Science projects in Europe do not stand apart. But they can be characterised as an alternative road to European integration and as crucial aspects of political and scientific activity in the recent history of Europe that mirror patterns and dynamics of bilateral and multilateral alliance-building, deal-making, controversy and compromise.

Second, this book also provided very detailed insights into the founding histories of the ESRF and the European XFEL. Importantly, it could be illustrated for both cases that national interests and strategies matter greatly to commit to collaborative Big Science efforts. This confirms what John Krige equally pinpointed namely that: “[c]ollaboration, then, and European scientific collaboration in particular, is not undertaken at the expense of self-interest; it is rather, the pursuit of one’s interest by other means.”² For instance, intergovernmental negotiations were often shaped by national political agendas and priorities, as well as broader package deals and the pursuit of so-called tit-for-tat strategies. Similarly, bargaining on a site, financial contributions and voting procedures that were recurrent issues during the founding phases of the ESRF and the European XFEL testified of usual power plays within these and similar multilateral settings. To the extent that bilateral and multilateral alliances constituted a key aspect, which has mainly driven and shaped the course of events, this also brings the unavoidable symbiosis between Big Science and politics back to geopolitical realities.

To summarise, the other Europe apparently exists for Big Science in Europe, and this other Europe mainly consists of alternative dynamics and developments beyond mainstream European politics and integration. These dynamics are thus different from those so far foregrounded by historians, sociologists or political scientists studying European history and integration, but they are important to understand the history and politics of Europe in all their complexity.

For instance, what has been characterised as a rocky relationship with the United Kingdom does not only refer to major political difficulties that surrounded initial EEC membership applications of the country in the 1960s, its subordinated role under French power plays in European politics or the withdrawal of the United Kingdom from the EU in early 2020 following a referendum in 2016. But such and similar difficult relations also run as a red threat through the founding phases of the ESRF and the European XFEL. For instance, with regard to the establishment of the ESRF, the initially proposed financial contribution from British governmental representatives was perceived as far too low by other participants,
which caused severe controversies among the collaborating countries (see Sect. 4.5). In the case of the European XFEL, the sudden withdrawal of the United Kingdom from the project in late 2009 due to a national (funding) crisis put the whole effort into trouble (see Sect. 5.5). With regard to the roles of France and Germany in the early history of the ESRF, these two countries paved the way for others to join by deciding in October 1984 on initial funding and a site in Grenoble (see Sect. 4.4). This certainly was a usual bilateral demonstration of political strength and unity in Europe at a time when the two countries had also played key roles in challenging a period of deep European crisis in the early to mid-1980s (see Sect. 4.4.1). In the case of the European XFEL, Germany and Russia together pledged the necessary initial funding, after other potential partners had shown reluctance and reserved to support the project (see Sects. 5.5 and 5.6). The dominating role of Germany and Russia in the project also illustrates that the bilateral relations of the two countries constitute a major, albeit uneasy, cornerstone of the political and diplomatic landscape of Europe in the post-Cold War.

Similar dynamics and patterns can also be revealed with regard to controversy and compromise on site selection, voting procedures and financial shares (see Sects. 2.1.3, 4.3 and 5.5). With regard to the site selection process during the founding phase of the ESRF, the partner countries of the project clearly proposed and/or accepted those sites either that were located on their own national territory or that they regarded as the most beneficial ones. For instance, France proposed Strasbourg and later Grenoble, whereas Italy went for Trieste, and Denmark for Risø. Germany supported the candidature of Strasbourg because it is located very close to the French-German border. The United Kingdom proposed Daresbury but also agreed on Grenoble because this meant a co-location with the ILL, in which the United Kingdom participates as one out of three members. The Nordic countries Sweden and Norway supported the Danish application of Risø obviously because it was located close to their own countries. With regard to the site selection for the European XFEL, there seemingly was no extensive site selection process, but there was not much doubt that the free-electron laser would be closely connected to the TESLA linear collider at DESY in Hamburg. It can only be speculated to what extent the absence of any site selection process impacted the attitude of many potential partner countries that were reluctant to join the project (see Sect. 5.5). Why should they substantially fund a project that would not be located on their own territory and to which their scientists would
clearly have access depending on the successful peer-review process of their applications?

With regard to the increasingly important role of Russia in European Big Science collaborations, the end of the Cold War certainly had a role to play. Russian membership in the European XFEL project or a similar effort, as well as a substantial financial contribution of a similar scale, would certainly have been unthinkable a few decades earlier, for instance, in the founding phase of the ESRF during the late Cold War. The large Russian contribution to the European XFEL project, which became financially dominated by Germany and Russia, is not only a visible testament of how the end of the Cold War translated into re-framed alliance-building on the European continent. But it also illustrated how the crucial political importance of Russia for post-Cold War Europe resonated in scientific collaboration, making Germany and Russia close partners in both politics and Big Science. Moreover, there is much to suggest that Russia participates in the European XFEL project, as well as in similar other projects, such as FAIR or the ESRF, because all of these projects were located in Western Europe. It seems reasonable to argue that for Russia, investment in (Western) European Big Science projects carried strong territorial and/or spatial implications, namely, that political commitment to these Big Science facilities also constituted a projection of national power and security interests in the post-Cold War. Moreover, it was (and remains) a strategy for the country to ask for a return of investment on national Big Science projects planned to be built on Russian territory in the context of the Russian Megascience Initiative (see Sect. 5.6). But while Russia’s full membership in Big Science collaborations in Europe only during the very recent decades became an accepted new reality of post-Cold War Europe, scientific collaboration between East and West was not at all absent during the Cold War. In contrast, major research institutes such as CERN or DESY maintained a lively exchange of scientists and ideas with the Soviet Union throughout the Cold War. The contours of these efforts were, however, also bound to the political contexts of their time, which partly explains why East/West collaboration during the Cold War remained to be based on individual initiatives and smaller projects, and could not escalate to the intergovernmental level.

Certainly, as has been illustrated throughout this book, politics are key. But exclusive emphasis on political aspects misses to take into account other crucial concerns: First, personal ties played fundamental and decisive roles in the founding phases of the ESRF and the European XFEL. From
personal initiatives of scientists such as Heinz Maier-Leibnitz or Björn Wiik, the influential voice of personalities such as the politician Louis Mermaz, to the role of administrators in the ministries and governments such as state secretary Frieder Meyer-Krahmer or general director Hermann Schunck—all of whom played decisive roles in making the ESRF or the European XFEL a reality. Second, the use of particle accelerators not for particle physics research but for research with synchrotron radiation became an increasingly demanded technology and experimental resources throughout the last decades. This development did not only alter the scientific landscapes in Europe with several new, dedicated synchrotron radiation sources that were built from the late 1980s and early 1990s onwards. But is also resonates a new line of political reasoning in the post-Cold War that preferred application-oriented experimental research at, for instance, synchrotron radiation sources or free-electron lasers, over fundamental investigations in particle physics because the former connects more closely to solving the grand challenges of today, and to an ever-more strategically oriented science policy regime (see Sects. 5.4 and 2.2).

With regard to the role of the EEC/EU, it can be argued that the EEC lacked any competences to shape the creation of the ESRF in the late 1970s and mid-1980s. Based on the findings in Chap. 4, it can, however, be argued that the French-German partnership filled this gap (as it had often done in the past). The two countries acted as a catalyst, as science administrator Pierre Papon called it, for the construction of a European space for research. Since the early 2000s, the EU started to implement several measures, strategies and tools that unfolded in what can be characterised as Research Infrastructures (RIs) policy. However, apart from partly funding the preparatory phase of the European XFEL project, the EU did not have a role to play in the project’s early history. But political interest in the issue of Research Infrastructures (which partly overlaps with that of Big Science) probably links to changing roles of science, technology and research in the post-Cold War period, namely their more strategic role for and within economy and society, and their potential usefulness for creating commercial applications and for solving grand societal challenges (see Chaps. 1 and 2).

The discussed aspects of the founding phases of the ESRF and the European XFEL are, however, not only tales of the recent past of Europe. But current developments equally testify how Big Science is unavoidably linked to European and international politics and diplomacy. This is not
only because politics heavily matter in collaborative Big Science but also, as mentioned above, because governments and administrators expect these projects to nowadays play decisive roles in economy and society.

For instance, in the mid-2010s, Hungary encountered severe difficulties in providing its annual membership fees to the ESRF. This situation was not necessarily due to a lack of budget but rather to the political situation in Hungary at that time. The country experienced a strong anti-European political climate and authoritarian political regime after Hungarian Prime Minister Victor Orban had climbed to power in 2010. Public funding, so it seems, was not to support a collaborative European effort. Another example is the recent withdrawal of Russia from its application as an associate country of CERN in order to negotiate a new agreement that should give the country “a special status for participation in the experiments.” The agreement, moreover, “will include CERN’s involvement in construction of mega science facilities in Russia.” Similarly, when Russia became a full member of the ESRF project in 2014, contributing 6 per cent of the operation costs, this led to a large re-allocation process resulting in lower contributions by other European members of the project. Both examples further support one of the main findings and core messages of this book, namely, that national politics and policies matter significantly for an understanding of the patterns and dynamics of collaborative Big Science projects in Europe. After the withdrawal of the United Kingdom from the European XFEL project in 2009, the British flag was nevertheless displayed among the flags of the other member countries during the European XFEL’s opening ceremony in September 2017. This happened before the country officially re-joined the project in 2018. Despite the anecdotal character, this example is a strong sign that although politicians and governmental representatives could not agree on formal membership and official contribution, scientists apparently kept on collaborating.

With regard to the very recent Brexit, the exit of the United Kingdom from the European Union in early 2020, it is certainly too early to assess the full consequences for scientific collaboration in Europe. But it should be borne in mind that previous scholarly research illustrated that the United Kingdom has always been both a crucial and an uneasy partner in Big Science collaborations in Europe. In light of the recent COVID-19 pandemic, it can only be speculated how and to what extent Big Science facilities will have a role to play. This particularly matters in two regards.
First, single-sited Big Science facilities, such as synchrotron radiation sources or free-electron lasers, are geographically bound because they host large scientific instruments that are unable to move. Yet, in turn, they require people to re-locate for the purpose of conducting experiments. But the need to collaborate on site and to travel in order to arrange and manage experimental settings seemingly runs counter the call for physical distancing. Second, it is questionable how and to what extent COVID-19-related research at Big Science facilities may (or may not) match the high political expectations that were put on these and similar projects in recent decades. Policymakers and governments claimed in recent years that these projects should considerably contribute to the solving of urgent societal challenges such as climate change, health or energy security that sociologist Olof Hallonsten characterised as a “political hype”\(^9\) rather than a sustained assessment of the real capabilities and limits of these and similar scientific projects.

**Notes**

1. See, for example, T. Misa and J. Schot, “Inventing Europe: Technology and the Hidden Integration of Europe.” *History and Technology* 21, no. 1 (2005); H. Trischler and H. Weinberger, “Engineering Europe: Big Technologies and Military Systems in the Making of 20th Century Europe.” *History and Technology* 21, no. 1 (2005); F. Schipper and J. Schot “Infrastructural Europeanism, or the Project of Building Europe on Infrastructures: An Introduction.” *History and Technology* 27, no. 3 (2011); K. Patel, “ Provincialising European Union: Co-Operation and Integration in Europe in a Historical Perspective.” *Contemporary European History* 22, no. 04 (2013), 650.

2. J. Krige, “The Politics of European Scientific Collaboration.” In *Companion to Science in the Twentieth Century*, eds. J. Krige and D. Pestre (London: Routledge, 2003), 900.

3. P. Papon, “L’Espace Européen de la Recherche (1960–1985): Entre Science et Politique.” In *La Construction d’un Espace Scientifique Commun? La France, la RFA et l’Europe après le “Choc du Spoutnik”*, eds. C. Defrance and U. Pfeil (Bruxelles, New York: P.I.E. Peter Lang, 2012), 42.

4. See, Petition of the Hungarian Synchrotron Committee at [change.org: Stop Hungary’s withdrawal from the European Synchrotron Radiation Facility](https://www.change.org).
5. Joint Institute for Nuclear Research, “Russia and CERN are Working Out a New Format of Cooperation,” News Release (14 March 2018).
6. TASS, “New Agreement with CERN to be Signed in 2018 – Russia’s Education Ministry,” News Release, 10 March 2018.
7. J. Amos, “XFEL: Brilliant X-Ray Laser Comes Online.” BBC News, 1 September 2017.
8. See, for example, K. C. Cramer, “The Role of European Big Science in the (Geo)Political Challenges of the Twentieth and Twenty-First Centuries.” In Big Science and Research Infrastructures in Europe, eds. K. C. Cramer and O. Hallonsten (Cheltenham: Edward Elgar, 2020).
9. O. Hallonsten, “Research Infrastructures in Europe: The Hype and the Field.” European Review 28, no. 4 (2020).

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**Miscellaneous**

Petition of the Hungarian Synchrotron Committee at change.org: *Stop Hungary’s withdrawal from the European Synchrotron Radiation Facility*. Online available: https://www.change.org/p/government-of-hungary-hungarian-academy-of-sciences-stop-hungary-s-withdrawal-from-the-european-synchrotron-radiation-facility, last accessed 30 March 2020.