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IEŚ
7/2022
POLICY PAPERS

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2022 7


IEŚ
7/2022
POLICY
PAPERS

Publishing series IEŚ Policy Papers
Number 7/2022
Series editors Beata Surmacz and Tomasz Stępniewski

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Copyright Instytut Europy Środkowej I Institute of Central Europe
ISBN 978-83-66413-82-5
Published and edited
Instytut Europy Środkowej I Institute of Central Europe
ul. Niecała 5
20-080 Lublin
www.ies.lublin.pl
Cover design and typesetting www.targonski.pl
Cover photo © Sergey Nivens | shutterstock.com
Print www.drukarniaakapit.pl

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Executive summary

- Science diplomacy is an analytical category and practice that emerged and operates at the intersection of science and foreign policy. Activities classified today as science diplomacy come from a centuries-old tradition and have long been conducted by states at the international level.
- Both state and non-state actors are involved in science diplomacy practices. However, science diplomacy refers only to those activities which take place with the participation of states. This distinguishes science diplomacy from international scientific cooperation, which can take place with or without involvement of state actors.
- Science diplomacy models are diverse. What gives a country's science diplomacy its unique characteristics are its history and culture, which shape its institutions, for example its diplomatic service. As in many other areas of public activity, there are "national styles". Although science diplomacy state models – especially those of states with long-standing experience in conducting science diplomacy – should be perceived as a source of good

practices for states which are at the conceptual stage of defining their science diplomacy.

- The United Kingdom, France and Hungary have a long tradition of using science and international scientific co-operation as a platform or an instrument in launching, sustaining and regaining interstate relations, presenting and promoting their assets and potential abroad and influencing foreign actors.
- The United Kingdom's science diplomacy practice has a long tradition and includes diverse legal and institutional solutions. Undoubtedly, its particularities are influenced by historical experience, especially the construction and functioning of the British Empire, geopolitical changes after the Second World War, the decline of overseas power and change in the global position of the state, European integration and withdrawal from membership in the European Union.
- The distinguishing features of the British science diplomacy model: it does not prioritise objectives within the triad of attractiveness/access, cooperation and impact; strong links between science and politics (including foreign policy). The UK has a long tradition of including expert knowledge in the decision-making process. This implies extensive institutional and organisational structures of science in diplomacy, for example by using the function of a science advisor in each government department; the British system of science and higher education is characterised by the so-called scientific spirit; the UK's science diplomacy is global.
- France is one of the relatively small number of countries that claim to conduct science diplomacy and devotes to it

substantial financial and human resources. The state is aware how to use the tools of science diplomacy to bridge science, technology, and foreign affairs.

- The main objectives of France's science diplomacy: asserting its presence in international arenas where global issues are debated; spreading influence through its renowned research centres; supporting innovation by French companies; engaging the scientific community in research for development; affirming its inclusion in the European research arena; deepening its relations with countries with high scientific and technological potential; strengthening its commitment to the developing world.
- Hungarian science diplomacy is concentrated on facilitating internationalization of Hungarian science but also on strengthening the image of the state in the international arena. In foreign policy strategy, the functions of science diplomacy appeared primarily in relation to Hungarian centres abroad, thus emphasising the continuation of "good pre-war practices".

Chapter 1

Monika Szkarłat

The science diplomacy of the United Kingdom

An analysis of the United Kingdom (UK) shows the essence of science diplomacy as a category that emerged and operates at the intersection of science and foreign policy. In the UK, appreciation of the importance of scientific knowledge was a product of the desire to explore the world. The emergence and functioning of the overseas British Empire was largely made feasible due to expert support, i.e. the use of scientific knowledge in decision-making or the exploration and acquisition of control over unknown territories. On the other hand, the emphasis on the pragmatism and utilitarian nature of science that characterised the UK's scientific sector was reinforced by the overseas aspirations of the British. This was a contribution to the development of scientific research in disciplines such as biology, geography, cartography, meteorology, oceanography, geology, natural history and many others, which gained access to natural resources located on several continents[1].

[1] J. M. Hodge, *Science and Empire: An Overview of the Historical Scholarship*, in: J. M. Hodge and B. M. Bennett (eds.), *Science and Empire. Knowledge and Networks of Science across*

For the scientific world, the British colonies became a "living laboratory" from where research material was drawn. At the same time, the incremental increase in knowledge of the new territories was a conditioning factor for the expansion and maintenance of control over the colonial empire. The concomitance between the beginning of the Scientific Revolution and the Age of Enlightenment with overseas empire building is not coincidental. Science was one of the instruments for extending control over overseas territories, which has – more broadly – strategic and economic significance[2].

The collaboration between the government and scientists was based on a shared desire to create a British system of world science. Initially, these were informal and non-institutionalised networks, operating in this format until the end of the 18th century. In the following century, the evolution of collaborative networks sought to give them an institutional structure and a link to the state administration. At the beginning of the 20th century, scientific and technical departments, universities, institutes, research centres and professional scientific networks began to be established in Britain and the colonies, based on the principles of a common scientific culture. At the same time, there were efforts – not entirely successful – to create a centralised system of coordination for the science sector of the British Empire. In the middle of the 20th century, these efforts were abandoned in favour of scientific cooperation within national or international research networks[3].

the British Empire, 1800-1970, Palgrave Macmillan UK, 2011, pp. 3-30.

2 D. M. Headrick, *Power over Peoples. Technology, Environments, and Western Imperialism, 1400 to the Present*, Princeton University Press, Princeton and Oxford 2012.

3 J. M. Hodge, op. cit., p. 20.

Yet another effect of the British colonial empire was the emergence of a "sense of Britishness" among its inhabitants as a consequence of the introduction of a uniform model of education and science in all institutions of higher education and science. British administration sought to maintain and develop a sense of the exceptionality of the British academic model in opposition to those of Germany and France[4].

The importance of scientific knowledge in the process of building and managing Britain's overseas empire has consequences in the present. The British model of science and education is characterised by the so-called scientific spirit, which manifests itself in a high level of respect for science, expertise and representatives of the scientific community. On the other hand, the transparency, reliability and effectiveness of British science makes the presence of scientific knowledge in politics – including that directed outwards – and in other spheres of social life a permanent phenomenon, distinguishing this country from others. It is also an important argument in building the state's image as a trustworthy partner in international politics. Another benefit is the increase in the country's attractiveness as a place where it is worth undertaking education or developing a scientific career[5].

Belief in the importance of scientific knowledge in the decision-making process has accompanied the institutions

[4] B. M. Bennett, *The Consolidation and Reconfiguration of 'British' Networks of Science, 1800-1970*, in: J. M. Hodge and B. M. Bennett (eds.), op. cit., pp. 30-45.

[5] J. Knight, *Knowledge Diplomacy. A Bridge Linking International Higher Education and Research with International Relations*, "Discussion Paper" 2018; O. Krasnyak, *National Styles in Science, Diplomacy, and Science Diplomacy: A Case Study of the United Nations Security Council P5 Countries*, Brill Research Perspectives in Diplomacy and Foreign Policy, 2018.

responsible for foreign policy since their inception. The British Foreign Office, established in 1782, has always cooperated with the scientific community, which was regarded as an indispensable element in shaping the state's external policy. While activities falling within the definition of science diplomacy have been undertaken for centuries, deliberate science diplomacy is regarded as having been carried out in the UK since 2009 when the post of chief science adviser was created at the Foreign Office. Since its inception, one of its priorities has been to strengthen the position of science as an instrument of foreign policy and a tool of diplomacy. This function was embedded in the institutional structure of scientific advisers, later becoming the Civil Scientific Service (1945), which since 2008 has operated as the Government Science and Engineering Network. In 1964, Sir Solly Zuckerman was appointed as the first Chief Scientific Adviser to the government[6].

State institutions responsible for foreign policy can take advice from internationally known, reputable think tanks. This includes the Royal Institute of International Affairs, also known as Chatham House, which has been in existence since 1920. The International Institute for Strategic Studies was established in 1958, and since the 1960s, expert and academic activity has been carried out by the Institute for Defence and Security Studies of the Royal United Services Institute, which has been in operation since 1831[7].

[6] Government Office for Science, *Future of the civil service: Making the most of scientists and engineers*, URN BIS/13/594ES, 2013.

[7] M. Garnett, S. Mabon and R. Smith, *British Foreign Policy since 1945*, 1st Edition, Routledge, New York 2018.

The redefinition of the concept of British foreign policy that followed the end of the Second World War and the disintegration of the British overseas empire and in the subsequent decades of the 20th century was based, among other things, on the assumption that Britain's global position had changed and on the conviction that Britain would act as a strong regional rather than global player. After the end of the Cold War, this approach was exhibited particularly forcefully by British foreign policy analysts. A realistic perception of Britain's position in the global balance of power, in which its role was diminished, was predominant. Integration with the European Community became an argument for greater leverage and an emphasis on Britain's European identity. In the second decade of the 21st century, foreign policy commentators began to pay attention to Britain's role as a thought-leader in the international community. This involved building the image of a country that was a pioneer and a conduit offering solutions to the challenges of the modern world, for example environmental, economic and health threats[8].

The consequences of Britain's exit from the European Union (EU), known as "Brexit", are one of the most important current challenges facing British diplomacy. The requirement to adapt to the new reality also applies to the science and higher education sector, which has strong links with the EU (financial, organisational) and with individual member states. A shared priority for the government and the academic community is to create the legal and institutional

[8] J. Pamment, *British Public Diplomacy and Soft Power. Diplomatic Influence and the Digital Revolution*, Palgrave Macmillan, 2016.

conditions that will limit the negative effects of Brexit and maintain relations with scientific institutions of EU states. UK scientists are an important and desirable partner in international research and development endeavours. Globally, the UK population accounts for 0.9% of the world's population, 4.1% are employed in science and higher education, and UK's R&D expenditure accounts for 2.7% of global R&D expenditure[9]. Meanwhile, 10.7% of the world's citations refer to British authors, 15.2% of the articles with the highest citation index are by British authors, 50% of scientific texts published by British authors have co-authors from abroad, 72% of British researchers participate in international scientific mobility, and 20 Nobel Prize winners have come from the UK since 2001[10].

The cited figures demonstrate the high position of UK science in world rankings. This might suggest that withdrawal from the EU is not a significant negative variable. However, this is not a zero-sum situation. Experts at the Royal Society have pointed this out by stating that 33.5% of co-authored scientific texts are the result of collaborations between UK researchers and scientists from other EU countries or countries associated with the Horizon 2020 Framework Programme (now Horizon Europe). In comparison, 17.6% were co-authored with researchers from the US[11]. The UK is also one of the largest beneficiaries of grants from the

9 The Royal Society, *Submission to the House of Commons Science and Technology Select Committee Brexit Science and Innovation Summit*, London 2018.

10 HM Government, Department for Business, Energy & Industrial Strategy, *International Research and Innovation Strategy*, 2019.

11 The Royal Society, *Royal Society Submission to the Sir Adrian Smith Call for Evidence on Future Frameworks for International Collaboration on Research and Innovation*, London 2019.

European Research Council and the Marie Skłodowska-Curie Actions[12] (MSCA). Currently, as an associated country in Horizon Europe, the UK continues to have access to funding from the European Research Council, MSCA, the European Innovation Council and other research funding tools[13].

The normative dimension of British science diplomacy

The UK does not have a science diplomacy strategy articulated in a separate document. Moreover, in the most important strategic documents, i.e. the Industrial Strategy, the Research and Innovation Strategy (documents of 2020, 2021), or the development strategy "Build Back Better: Our Plan for Growth" issued in 2021, the term is not used even once. Nevertheless, there are clearly defined objectives, instruments and examples of activities that fall under the umbrella of three types of science diplomacy, namely science in diplomacy, science for diplomacy and diplomacy for science.

The UK's science diplomacy objectives fall into all three categories: "attraction/access" (building the image of the country as a place that is attractive and offers optimal conditions for conducting scientific research, developing scientific careers; access to resources of other countries, including access to human resources), "cooperation" (activities for

[12] The Royal Society, *Why the UK Must Associate to Horizon Europe*, 2019, https://royalsociety.org/topics-policy/publications/2019/why-the-uk-must-associate-to-horizon-europe/ [06.06.2022].

[13] The Royal Society, *The Value of Applying for EU Research Funding: Case Studies*, https://royalsociety.org/topics-policy/projects/brexit-uk-science/horizon-europe-funding-schemes/ [06.06.2022].

the internationalisation of science) and "impact" (science as an instrument for influencing foreign and other sectoral policies)[14]. The objectives are intertwined and mutually interdependent.

The UK's attractiveness and credibility are confirmed by statistics. The country ranks highly in global and European innovation rankings and aims to maintain this position. The higher education, science and innovation sector is seen as an important resource and an instrument of soft power. The time horizon adopted is 2030; by then, the UK intends to be widely recognised as a super power in the science and technology dimension. The aim is also to remain at least third in the world in R&D activity. Priority will be given to developing innovation capabilities in areas such as AI[15]. The UK government is committed to increase investment in research and development to 2.4% of GDP by 2027. There will be at least £800 million to launch the Advanced Research and Invention Agency (ARIA) designed to support the experimental phase of technological breakthroughs and basic research. The UK is intended to be the best place for the most outstanding scientists and inventors from around the world. The recently established Office for Talent and the introduction of the Global Talent Visa are intended to help achieve these goals, as well as the Graduate Route, a facility dedicat-

[14] T. Flink, U. Schreiterer, *Science Diplomacy at the Intersection of S&T Policies and Foreign Affairs: Toward a Typology of National Approaches*, "Science and Public Policy" 2010, no. 37(9), pp. 665-677.

[15] HM Government, *Global Britain in a Competitive Age. The Integrated Review of Security, Defence, Development and Foreign Policy*, March 2021, https://assets.publishing.service.gov. uk/government/uploads/system/uploads/attachment_data/file/975077/Global_Britain_in_a_Competitive_Age-_the_Integrated_Review_of_Security__Defence__Development_and_Foreign_Policy.pdf [11.06.2022].

ed to foreign graduates who have completed their studies in the UK and would like to stay in order to start their careers. In addition, international research partnerships between the UK and partners around the world will be aimed at scientific and technological development. One such example was the creation of the Technology Envoy position in the US to represent UK interests in Silicon Valley. Among the forms of official development assistance (ODA) is to support and provide expertise and scientific knowledge on the implementation of the sustainable development goals (SDGs) in developing countries[16].

The priority enshrined in the "Build Back Better: Our Plan for Growth" strategy is to maintain a high position in the category of attractiveness of the research and higher education system and to strengthen it. It was also stressed that leaving the EU provides a new opening and an opportunity for the science and higher education sector to move towards building international leadership on a global scale. This should be achieved through continuous improvement of the country's attractiveness as a reliable partner and a desirable destination for the most talented scientists and students from all over the world, changes in law to strengthen innovation, and openness to those who will help building the country's innovative potential[17].

The other objective is to maintain a high position in international innovation rankings. This includes, for example, the Global Innovation Index, which compares countries on

16 Ibid., pp. 37-45.

17 HM Treasury, *Build Back Better: Our Plan for Growth*, March 2021, CP 401, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/969275/PfG_Final_print_Plan_for_Growth_Print.pdf [10.06.2022], p. 12.

their innovation capacity. The United Kingdom ranks fourth in this index out of 132 economies analysed[18].

Similar priorities are enshrined in the "UK Research and Development Roadmap" issued in July 2020. It is assumed that by 2030, the UK is to become the most innovative country in the world. A knowledge-based economy requires world-class scientists to participate in its creation, the most advanced research infrastructure, and international cooperation to attract, among others, future Nobel Prize winners. The role of government institutions, including the diplomatic service, is to support UK universities and other research institutions in their efforts to attract foreign investors[19].

The Innovation Strategy also refers to the UK's aspirations to become a global innovation hub by 2035. The government pledges a record increase in R&D investment to £22 billion a year. The UK wants to continue to actively participate in R&D projects funded by the EU Framework Programmes. In addition, the creation of governmental and institutional strategic agreements has been announced to provide the basis for in-depth and long-term research and innovation cooperation. The aim is also to support universities and research institutions in developing their own cooperation networks. In addition to the repeatedly listed cooperation with the EU, a new strategic partnership with African countries was highlighted. Moreover, the relevance of bilateral part-

[18] S. Dutta et al. (eds.), *Global Innovation Index 2021. Tracking Innovation through the COVID-19 Crisis*, World Intellectual Property Organization, Geneva 2021, p. 165.

[19] HM Treasury, *Build Back Better: Our Plan for Growth*, March 2021, CP 401, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/969275/PfG_Final_print_Plan_for_Growth_Print.pdf [10.06.2022], p.12.

nerships with Canada, the USA, China, India, Japan, South Korea, Singapore and Israel were pointed out, as well as the 17 agreements funded by the Newton Fund[20].

The strategy will be implemented through the diplomatic network, particularly members of the Science and Innovation Network, Her Majesty's Trade Commissioners, British Council Foreign Offices, UK Research and Innovation (UKRI). There is also a clear statement in the strategy to support and create facilities for science and higher education institutions and companies with research and innovation activities to establish contacts with foreign partners. Such tasks will be carried out by the staff of the Network for Science and Innovation, which consists of more than 100 offices located in 40 countries[21].

International scientific cooperation – bilateral and multilateral – represents one of the components necessary for becoming a world leader in science and technology. However, certain conditions must be met, including the protection of intellectual property or sensitive data. Therefore, a "Trusted Research" framework has been set up to support scientists in the process of assessing and managing the risks of scientific research. In this regard, the government cooperates with foreign partners, among other aspect being working within the framework of the formula for sharing intelligence between the countries that make up the Five Eyes Alliance (the UK, the USA, Canada, Australia and New Zealand)[22].

[20] Ibid., p. 39.
[21] Ibid.
[22] Ibid., p. 44.

Withdrawal from the European Union, the war between the Russian Federation and Ukraine, and the threat to health and economic security posed by the SARS-COV-2 pandemic, create an extremely challenging environment for decision-making. In such an environment, the importance of scientific knowledge and collaboration with experts increases. This applies, for example, to the immediate response to the health crisis and the search for responses in the form of medicines or a vaccine for COVID-19, the disease caused by the new coronavirus. The research, innovation and higher education sectors will be important pillars in the UK economy's recovery from the COVID-19 pandemic and in defining the UK's new role as a former member of the EU.

A significant step, from the perspective of the UK economy as well as the research sector, was the conclusion in December 2020 of the EU-UK Trade and Cooperation Agreement and Joint Declaration on Participation in Union Programmes. The provisions of the Joint Declaration allow UK researchers to participate in the EU's ninth framework programme Horizon Europe as an associated country. This includes access to all research funding streams in the European Union, as well as the right to lead and participate in research consortia as a member of project teams. Furthermore, the agreement provides for the participation of UK scientists in Euratom Research and Training, the International Thermonuclear Experimental Reactor (ITER) facility, the Copernicus Earth observation programme, and the EU's Satellite Surveillance and Tracking services[23].

[23] The Royal Society, *Brexit and UK science*, https://royalsociety.org/topics-policy/projects/brexit-uk-science/ [14.06.2022].

The institutional and operational dimension of British science diplomacy

The institutional dimension of UK science diplomacy is constituted by the institutions of government, particularly the Department for Business, Energy & Industrial Strategy (BEIS) and the Foreign & Commonwealth Office (FCO), as well as their subordinate units. These include executive bodies reporting to BEIS, such as UKRI, which brings together nine research councils (the Arts and Humanities Research Council, the Biotechnology and Biological Sciences Research Council, the Economic and Social Research Council, the Engineering and Physical Sciences Research Council, Innovate UK Council, the Medical Research Council, the Natural Environment Research Council, Research England, and the Science and Technology Facilities Council)[24]. Subordinate bodies of the FCO are the Wilton Park executive agency and the British Council. The Science and Innovation Network (SIN) is coordinated jointly by BEIS and the FCO[25].

The institutional and organisational framework of science diplomacy in the UK is also provided by government institutions that carry out tasks in the area of science in diplomacy, i.e. providing the expertise necessary for decision-making. These are the Chief Scientific Advisers, who are attached to each government department and who are led by the Chief Scientific Adviser to Her Majesty's Government, who is also head of the Government Office for Science

[24] UK Research and Innovation, *Council members*, https://www.ukri.org/about-us/how-we-are-governed/council-members/ [14.06.2022].

[25] HM Government, *Departments, agencies and public bodies*, 2022, https://www.gov.uk/government/organisations [23.05.2022].

and vice-chairman of the Science and Technology Council, based in the Office of the Prime Minister[26].

The government's Office for Science includes subordinate units such as the Science Emergency Advisory Group, the Science Capabilities and System Team, the Team on Scientists and Engineers Employed by Government, and the Future Research Team[27].

Additionally, the system is made up of academies of sciences that are independent of government. This category includes the Royal Society, the Royal Society of Edinburgh, the Welsh Science Society, the Royal Irish Academy, the Academy of Medical Sciences, the British Academy, and the Royal Academy of Engineering. These are organisations that represent the UK scientific community, which is also the subject of science diplomacy. Therefore, the final category of stakeholders is public and private universities, research and science institutes, research teams and individual scientists[28].

Research, innovation, intellectual property, space, and technologies (including agro-technologies) fall within the remit of the BEIS Undersecretary of State, who works with the Director General for Industrial Strategy, Science and Innovation at BEIS responsible for tasks in the area of international scientific and innovation cooperation and research. Management of the higher education sector falls under the

[26] HM Government, *Council for Science and Technology*, 2022, https://www.gov.uk/government/organisations/council-for-science-and-technology [23.05.2022].

[27] HM Government, *Government Office for Science*, 2022 https://www.gov.uk/government/organisations/government-office-for-science [23.05.2022].

[28] Ibid.

Department of Education[29]. The subordinate bodies of BEIS, the FCO and the bodies working with them, most notably the Government Office for Science, the Science and Technology Council and the Science and Innovation Network, form the institutional framework of UK science diplomacy in its top-down dimension (those actors who have the legitimacy to represent and pursue the interests of the state). Entities categorised as active in the bottom-up dimension are academies of science, universities, research institutes, research and development companies and individual scientists.

Activities falling within the definition of science in diplomacy are carried out by the Government Office for Science, which is chaired by the Chief Scientific Adviser to Her Majesty's Government. The Office, together with the Chief Adviser and subordinate advisers in the various government departments, ensure that the Government's law-making has access to the highest level of expertise. The Office is also consulted in the process of recruiting candidates for Chief Scientific Advisers and coordinates their inter-ministerial cooperation. The Office also acts as the secretariat of the Science and Technology Council, which is an advisory body to the Prime Minister. The Chief Scientific Advisers employed in the various government departments are usually experienced scientists who work with other stakeholders in science and innovation policy, for example the UKRI Research Councils. Their activities can be reduced to an advi-

[29] HM Government, Department for Business Energy & Industrial Strategy, *UK Research and Development Roadmap*, 2022, https://www.gov.uk/government/publications/uk-research-and-development-roadmap [30.05.2022].

sory function, but they also act as a link between the worlds of science and politics[30].

The FCO Wilton Park Executive Agency is responsible for ensuring dialogue between the various stakeholders in the international decision-making process and the participation of representatives of the scientific community. The agency is tasked with creating conditions for the exchange of views and the development of joint conclusions on issues common to the international community (e.g. combating the effects of climate change, overcoming threats to public health or sustainable development). The agency is a platform that facilitates and supports the process of international negotiations with the participation of British experts and scientists[31].

The Science and Innovation Network carries out activities falling under all subcategories of science diplomacy. It provides support and facilitates international links between the UK science and innovation community and partners abroad, which is the essence of science diplomacy. The network's staff strive to ensure that the UK and its science and innovation sector are seen as a reliable, credible partner that meets standards of scientific excellence. Maintaining an image of leadership in the area of innovation is achieved by, among other things, promoting the participation of British

[30] HM Government, Government Office for Science, *Guidance for government Chief Scientific Advisers and their Officials. Chief Scientific Advisers and their Officials: An Introduction*, January 2020, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/856166/chief-scientific-advisers-and-their-officials-an-introduction.pdf [08.08.2022].

[31] Wilton Park, *An Executive Agency of the Foreign and Commonwealth Office. Annual Report and Accounts 2019-20*, September 15, 2020, https://www.gov.uk/government/publications/wilton-park-annual-report-and-accounts-2019-to-2020 [30.05.2022].

experts in international decision-making bodies or pushing for solutions to global problems proposed by British research centres. These activities, classified as science in diplomacy and science for diplomacy, are aimed at influencing the international environment[32] [33].

There are also numerous initiatives that combine development policy objectives with science. In this case, scientific cooperation is an instrument for achieving the objectives of development policy or foreign policy. As noted, the purpose of activities, for example, joint scientific projects or mobility of scientists and students, is to improve or maintain relations with the recipient state of these endeavours. Such is the case with countries such as India, South Africa, Israel, Argentina, the Russian Federation and Turkey, among others, as cooperation with them falls into the category of complicated relations. Despite difficult diplomatic contacts, all these countries are interested in intensifying scientific cooperation[34].

In practice, the link between development policy and science is manifested through a variety of initiatives in the nature of well-established financial programmes and tools, as well as ad hoc actions. In 2015, the UK government declared that 0.7% of GNI would be allocated to official development assistance. One consequence of this decision was the launch of new ventures in international scientific cooperation. These include the Newton Fund (£735 million),

[32] UK Science and Innovation Network, https://www.gov.uk/world/organisations/uk-science-and-innovation-network [10.06.2022].
[33] D. C. Clary, *A Scientist in the Foreign Office*, "Science & Diplomacy" 2013, no. 2(3), pp. 1-3.
[34] The Parliamentary Office of Science and Technology, https://post.parliament.uk/ [10.06.2022].

which funds capacity-building and collaboration activities as well as support to overcome challenges in countries categorised as emerging economies. The research and innovation partnerships that are created with Newton Fund resources require a comparable financial participation from the involved countries[35].

Resources from the Fleming Fund (£195 million) are used for research on antimicrobial resistance. Similarly, the Ross Fund provides funding for research to develop medicinal products to combat infectious diseases in developing countries. The Global Challenges Research Fund has a budget of £1.5 billion to be used to strengthen capacity and capability to respond effectively to emergencies. Meanwhile, funding from the Ernest Rutherford Fund (£100 million) covers the cost of bringing in the brightest scientists from third countries. It is complemented by funding from charitable organisations: for example, CARA (Council for At-Risk Academics) and Scholars at Risk provide assistance to members of the world's scientific community whose safety or well-being is at risk. Assistance is provided both to those who remain in their country of origin and to those who wish to leave it and settle in the UK. In 2018, the creation of 12 Global Research Centres was announced, with the UK government investing £200 million through grants offered by UKRI[36].

The crisis triggered by the Russian Federation's aggression in Ukraine has received a response from the international scientific community. Both the UK government and

[35] Newton Fund, https://www.newton-gcrf.org/newton-fund/ [12.06.2022].
[36] Houses of Parliament, Parliamentary Office of Science and Technology, Science Diplomacy, no. 568, 2018.

organisations representing science have presented their position on the issue. This includes the joint position of the G7 academies of science of March 2, 2022[37] or the response of George Freeman MP, Minister for Science, Research & Innovation, in which the Minister unequivocally condemns the aggression of the Russian Federation against Ukraine and announces measures in the form of a support package of £3 million to help Ukrainian scientists in a threatening situation. At the same time, all institutional cooperation and implementation of joint research projects with partners from the Russian Federation has been suspended. This also applies to R&D activities undertaken with Russian companies. The restrictions introduced are intended to have a negative impact on all entities linked to the Russian authorities, but they are not intended to penalise individual Russian scientists or inventors[38].

The Royal Society, in cooperation with and at the initiative of the Polish Academy of Sciences, the National Academy of Sciences of Ukraine, the US National Academy of Sciences, the German National Academy of Sciences Leopoldina, the Royal Danish Academy of Sciences and Letters, the ALLEA European Federation of Academies of Sciences and Humanities after a meeting on 2 June 2022 in Warsaw, worked out a plan to support Ukrainian science

[37] *Joint Statement by the National Academies of the G7 States on Russia's Attack on Ukraine*, March 2, 2022, https://royalsociety.org/news/2022/03/joint-statement-academies-g7-states-on-russias-attack-on-ukraine/ [14.06.2022].

[38] Department for Business, Energy & Industrial Strategy, *Research and innovation sanctions on Russia and support for Ukraine*, March 27, 2022, https://www.gov.uk/government/news/research-and-innovation-sanctions-on-russia-and-support-for-ukraine [14.06.2022].

in order to rebuild after the war. There are 10 points in the plan, including the maintenance of affiliation of researchers from Ukraine who are temporarily abroad to help them later return to work at their home institution; the creation of financial tools dedicated to young researchers, also taking into account the possibility of remote work; initiating the funding of joint research projects involving researchers still residing in Ukraine; provision of access to scientific infrastructure abroad or free access to electronic databases of scientific journals; discounts or fee waivers for participation in scientific conferences or membership in international scientific associations; grants to research institutions, laboratories in Ukraine to rebuild infrastructure damaged by the war, and creation of a council to coordinate the above activities in order to ensure maximum efficiency and impact[39].

[39] J. Duszyński, M. McNutt, A. Zagorodny, *A Future for Ukrainian Science*, "Science", June 13, 2022, https://www.science.org/doi/10.1126/science.add4088 [14.06.2022].

Chapter 2

Pierre-Bruno Ruffini

The science diplomacy of France

Science diplomacy encompasses a complex set of practices that stand at the intersection of science and foreign affairs. This field can be analysed from two perspectives. The first considers the great challenges which the planet and the whole of humanity are facing, and which require significant scientific work both to establish diagnoses and to seek solutions. This first perspective, which one could describe as universalist, is central to what is understood today by "science diplomacy". But another approach exists, starting from the foreign policy interests of states. From this more traditional perspective, science diplomacy is one dimension, among others, of national diplomacy. Science diplomacy as an object of study is complex, due to the coexistence of these two complementary visions, each of which has its own logic, objectives, agendas and specific instruments. This analysis falls within the scope of national approaches to science diplomacy. It explores the

intentions and achievements of France, a country that stands out for its engagement in science diplomacy[1].

According to the most widely used criterion, nominal GDP, France is the seventh-largest power in the world. With 179 embassies and permanent representations, its diplomatic network is the third largest in the world. A permanent member of the UN Security Council with a strong army, France can influence the affairs of the planet. It ranks fourth for the number of scientific Nobel Prizes and ninth in scientific publications[2]. Thanks to its culture, France ranks sixth in soft power country classifications[3]. The country's influence goes beyond what its economic rank, size, and population would seem to predict. But what place does science occupy in its foreign policy?

France is a country that utilises science diplomacy to bridge science, technology, and foreign affairs, and devotes to it substantial financial and human resources. France is part of the relatively small number of countries that claim to conduct science diplomacy, to which it devotes substantial financial and human resources. As a research question, French science diplomacy has been addressed in a few books or articles dealing with broader issues. An insightful view of the peculiarities of France's science diplomacy was

1 The analysis updates and extends an expertise published in "Science & Diplomacy" in June 2020, https://www.sciencediplomacy.org/article/2020/frances-science-diplomacy [08.08.2022].

2 Observatoire des Sciences et Techniques, *La Position Scientifique de la France dans le Monde et en Europe, 2005-2018*, Hcéres, Paris 2021.

3 Brand Finance Nation Brands 2021, *Global Soft Power Index – The Most Comprehensive Research Study on the Perception of Nation Brands*, https://brandirectory.com/softpower/ [08.08.2022].

given by Flink and Schreiterer[4]. Lane addressed the subject from the more general angle of France's presence in the world in terms of cultural and scientific activity[5]. A short paragraph was devoted to France in van Langenhove's study of strategic tools for science diplomacy[6]. Ruffini provided a detailed analysis of science attachés at French embassies[7]. From an historical perspective, Krasnyak identified the inseparability of the French state and science and the central role of culture in France's diplomacy in the shaping of the country's science diplomacy[8]. Taking into account the particular insights provided by each of these sources, the present analysis draws on recent data and observations and gives an updated, comprehensive and systematic view of the science diplomacy of France. We will first describe the objectives and instruments of France's science diplomacy, then turn to its organization and resources, before stressing some of its distinctive features and paradoxical aspects.

4 T. Flink, U. Schreiterer, *Science Diplomacy at the Intersection of S&T Policies and Foreign Affairs: Toward a Typology of National Approaches*, "Science and Public Policy" 2010, no. 37(9), pp. 665-677.

5 P. Lane, *French Scientific and Cultural Diplomacy*, Liverpool University Press, 2013.

6 L. van Langenhove, *Tools for an EU Science Diplomacy*, Publications Office of the European Union, Luxembourg 2017.

7 P.-B. Ruffini, *Science and Diplomacy: A New Dimension of International Relations*, Springer Cham, 2017.

8 O. Krasnyak, *National Styles in Science, Diplomacy, and Science Diplomacy*, Brill, Leiden 2018.

The objectives and instruments of the science diplomacy of France

Whatever country is considered, the existence of genuine national science diplomacy depends on two conditions: there must be a strategy carried by the government, and adequate resources must be devoted to its implementation. France meets these two conditions.

The French approach to science diplomacy was officially laid out in the 2013 report *Science Diplomacy for France*[9]. Strategic guidelines are reissued by the Minister of Foreign Affairs during a general meeting in Paris each July which brings together all counsellors and attachés involved in cultural and scientific cooperation at French embassies. These efforts are made in line with the country's research strategy, led by the Ministry of Higher Education, Research, and Innovation. In 2009, France adopted a National Strategy for Research and Innovation[10], which was enshrined in 2013 and is presented every five years by the government to Parliament. A Planning Act for Research over the period 2021-2030 was passed in 2020.

Asserting France's presence in international arenas where global issues are debated, spreading influence through its famous research centres, supporting innovation by French companies, engaging the scientific community in research for development: these are the main objectives of France's science diplomacy. On the international scene, France aims to affirm its inclusion in the European research area, deepen

[9] Ministry of Foreign Affairs – Directorate General of Global Affairs, Development and Partnerships, *Science Diplomacy for France*, Paris 2013.

[10] Ministry of Higher Education and Research, *National Research and Innovation Strategy*, Paris 2010.

its relations with countries with high scientific and technological potential, and strengthen its commitment to the developing world[11]. France's science diplomacy includes a "diplomacy for science" component, which aims to increase the mobility of researchers and the attraction of foreign talent and supporting international cooperation. It also includes a "science for diplomacy" component, where science and research help to achieve the country's geopolitical objectives. The latter are reaffirmed each year by the President at the Ambassadors' Conference and they are the structuring drivers of France's foreign policy: defending democracy, human rights and the rule of law; promoting a cooperative approach to global challenges, especially on climate change and health; supporting the Sustainable Development Goals; defending multilateralism; strengthening the Franco-German axis in European affairs; and maintaining a privileged relationship with countries in the South, particularly French-speaking former colonies.

For implementing the national strategy of science diplomacy, the public authorities – the Ministry of Foreign Affairs, first and foremost – use instruments to attract foreign researchers, promote cooperative research endeavours, and maintain influence through the promotion of the French language and the diffusion of ideas and norms.

Attracting foreign talents in order to train the political, economic, and scientific elites of tomorrow falls under a broad vision encompassing university and science diplo-

[11] In the budget of the state devoted to external action, the "Programme 209" is directed towards the objective of "Solidarity with developing countries", which includes all of the former colonies of France.

macy. In November 2018, the "Welcome to France" action plan set an ambitious goal of attracting 500,000 foreign students by 2027. To support this policy, many publicly funded scholarships are awarded each year on a competitive basis. After declining by around 40% over the last ten years, the number of grants awarded has stabilised since 2017 at around 10,000 beneficiaries. This however, is only half the number supported in the United Kingdom, and a third of those in Germany.

The "Initiatives of Excellence" (IDEX) programmes, which aim to create world-class research universities, are part of this effort to attract or retain foreign researchers. Similar strategies are also implemented by universities and public research institutes such as the National Centre for Scientific Research (CNRS, one of the world's leading research institutions) and the National Institute of Health and Medical Research (INSERM). The National Research Agency manages a programme called "Hosting High-level Researchers". A residence permits valid for up to four years was established in 2016 for such purposes. Two programmes for hosting foreign researchers stand out because of their strong political and diplomatic dimensions. The first is the "National Programme for the Emergency Reception of Scientists in Exile" (PAUSE): this programme is open to researchers fleeing wars and dictatorships. It was launched thanks to initial funding from the Ministry of Research, and is cofinanced by universities and research institutions as well as through corporate sponsorship. At the end of 2020, PAUSE had been effective in supporting the reception of 222 at-risk foreign researchers, mostly from the Middle East and Mediterranean countries.

This programme is fitting for a country viewed as an initiator of the enlightenment and modern-day human rights.

The second is "Make Our Planet Great Again". Following the US withdrawal from the Paris Agreement on climate change in June 2017, France immediately invited researchers, students, entrepreneurs and others to join it to lead the fight against global warming. From 2017 to 2021, the total number of foreign researchers and international students that were hosted in France under this programme amounted to 255. This may seem modest, but it is above all the diplomatic significance of the programme that must be considered. Drawing on the success of the COP21 held in Paris in 2015, France has the ambition of exercising leadership in the fight against climate disruption. The programme is one of the manifestations of France's renewed influence in climate diplomacy.

Finally, several programmes mix science and innovation, such as the NETVA (New Technology Venture Accelerator) programme which since 2014 has supported more than 160 young start-ups in their discovery of innovation ecosystems and technological markets in the United States[12], and the "French Tech Ticket" which since 2015 has supported the installation in France of more than a hundred foreign start-ups. Together with the "French Tech Communities" that facilitate networking between digital ecosystem start-ups in almost a hundred cities around the world, they aim

[12] Les succès des startups NETVA en 2022, https://france-science.com/les-succes-des-start-ups-netva-en-2022-1/ [07.07.2022].

to raise the image of France as being at the forefront of innovative digital technology[13].

As international scientific cooperation continues to develop, international publications by French researchers involving at least one foreign co-author have increased steadily. In 2020, copublications with foreign institutions accounted for 65.3 % of France's total scientific publications[14].

The USA is France's leading scientific partner: in 2020, it accounted for 26.3% of French international copublications, followed by the United Kingdom (19.9%) and Germany (18.6%)[15]. Government-to-government agreements with many countries support scientific cooperation efforts. With the competitive "Hubert Curien programmes", the Ministry of Foreign Affairs finances the outward mobility of researchers with a view to launching new bilateral or regional scientific cooperation. Such partnerships have been established with some 60 countries. Each year, they represent more than 2,000 projects and generate more than 10,000 transfers of French and foreign researchers.

Scientific cooperation within Europe is particularly fruitful. In recent years, France has received approximately 10% of the funding for the EU Framework Programme for Research and Innovation (nearly €1 billion a year), behind only Germany and the United Kingdom prior to Brexit. In the field of humanities and social sciences, a traditional focal point for French research, science diplomacy takes advantage of 27 joint research institutes abroad, working under the dual

13 La French Tech, https://lafrenchtech.com/en/ [07.07.2022].
14 As calculated by HCERES-OST from OST and Web of Science data bases.
15 Ibid.

authority of the Ministry of Foreign Affairs and the CNRS. The only such network in the world, it develops research programmes relevant to host countries (e.g. political sociology in contemporary Turkey; religion in Russia). Another area of French excellence, archaeology, occupies a special place due to its long-standing proximity to diplomacy. Excavations are funded by the Advisory Commission for Archaeological Research Abroad under the Ministry of Foreign Affairs. One hundred and sixty-two archaeological missions have been financed in 2022 in 73 countries, including training for host country nationals. France's efforts to repatriate to Africa art and cultural artifacts acquired as a result of colonialism fall under science diplomacy applied to cultural heritage.

"Diplomacy of influence" is often referred to in France's official discourse and was the subject of a roadmap issued at the end of 2021[16]. The promotion of the French language, especially through the Organisation Internationale de la Francophonie and related institutions, is one of its major levers, as is the broader diffusion of ideas and norms. The exercise of influence serves the power interests of France by allowing it to weigh in on international debates. It also promotes the attractiveness of its territory. In the country's science diplomacy, influence is exercised through three levers in particular:

International expertise. Through the dissemination of standards, working methods and good practices, international expertise is a vector of influence particularly sought after by France, whose diplomacy has traditionally displayed objectives relating to promoting solidarity with developing

[16] Ministère de l'Europe et des Affaires Etrangères, *Feuille de route de l'influence*, Paris 2021.

countries. The active wing of French policy in this area is Expertise France, a public agency of international technical cooperation placed under the dual supervision of the Ministry of Foreign Affairs and the Ministry of the Economy and Finance, that has a portfolio of more than 500 projects in a hundred countries.

Hosting international organisations. France hosts 28 international organisations, of which 10 have missions at least partially in the field of science and technology. UNESCO, ITER (the International Thermonuclear Experimental Reactor, under construction in the South of France) and the European Space Agency are among the best known of these organisations. Another lever of influence is that arising from the presence of nationals in international organisations. The Ministry of Foreign Affairs, which is very aware of the importance of this issue, offers various training programmes to French candidates who engage in recruitment competitions for executive positions in international organisations.

The follow-up of alumni. When returning to their country of origin, foreign students or researchers are potential ambassadors of the land that temporarily hosted them. Based on this analysis, the objective is to organise the follow-up of those who have attended French universities or research institutes. Thanks to the France Alumni digital platform, and with the support of its embassies, France maintains ties with its former foreign students. By 2022, this network covered 128 countries and had more than 340,000 members.

Organisation and means

When analysing science diplomacy from a national perspective, centre stage is given to the public actors in charge of defining and implementing both the foreign policy and the research strategy of the country. France's science diplomacy is driven from Paris, but also relies on a particularly dense network of counsellors and scientific attachés at embassies.

In the capital, two ministries are at the forefront of France's science diplomacy: the Ministry of Europe and Foreign Affairs (MEAE), which leads the national diplomacy, and the Ministry of Higher Education, Research and Innovation (MESRI), in charge of the development and conduct of research policy. Without downplaying the role of the latter, which contributes funding for scientific cooperation and supports international bottom-up research initiatives, it is the Ministry of Foreign Affairs that uses science diplomacy to advance national interests through science and research on the world stage.

Within the Directorate-General of the Ministry of Foreign Affairs, the impetus comes from the Directorate of Culture, Academic Research and Cooperation, and more specifically from a sub-directorate entirely dedicated to higher education and research. In this body, approximately 40 people work on issues related to science and technology and oversee all science diplomacy activities, in concert with other ministerial directorates for matters pertaining to the economy, development or global public goods. The sub-directorate coordinates the network of scientific counsellors and attachés posted in the embassies.

Since 2010, France has had a Delegate Ambassador for Science, Technology and Innovation, whose mission is to

promote French scientific and technological excellence and to highlight the national research strategy at the international level[17]. Other delegated ambassadors – who are not career diplomats – deal with more specific themes, such as the oceans, the poles or climate.

France is a country where diplomacy took scientific and technological issues into account at an early stage. Historically, the strongest manifestation of the commitment of the Ministry of Foreign Affairs (MFA) is the methodical and abundant assignment of science counsellors and attachés in the diplomatic network. In 2021, France's MFA employed 156 staff in its scientific network, with science counsellors, science attachés and deputy science attachés distributed across more than 60 different countries. Science counsellors and attachés are seconded by their university or research institution, and deputy science attachés are young graduates ("international volunteers")[18]. About one third of science attachés and international volunteers share their time between science and technology-related issues and university cooperation[19].

The posting of science counsellors and attachés at embassies is part of the long historical tradition of French cultural action abroad that started at the end of the 19th century with the creation of French cultural centres and schools and the birth of the network of Alliances françaises[20]. Fol-

17 The position has been occupied since its creation by Dr Catherine Bréchignac, a renowned physicist, who was Permanent Secretary of the Academy of Sciences from 2011 to 2018.

18 In addition to this diplomatic network, some research institutions such as CNRS and INSERM, as well as some major universities, have their own representative offices abroad.

19 These data were obtained from the Ministry of Foreign Affairs.

20 For a general presentation, see P. Lane, op. cit.

lowing the creation of a first science attaché position at the French Embassy in the Federal Republic of Germany in 1955, regular openings of new positions from 1963 onwards built an impressive network. At the end of the 1980s, the MFA had 12 counsellors and 34 scientific attachés spread over 27 embassies. By comparison, the United States, Germany and the UK had science attachés at 22, 9 and 5 embassies, respectively.[21] In five countries (Germany, Japan, Russia, the United States and the United Kingdom), there exists today a "service for science and technology" at the embassy, with a science counsellor heading a team of one or more science attachés, international volunteers and administrative staff. At the embassies in other countries, science and research issues are addressed by one or more science attachés or international volunteers, who are in the embassy's cultural service under a counsellor for cooperation and cultural affairs.

Relative to other countries, significant human resources are devoted to science and research at French embassies. This is first of all due to the historical size of the diplomatic network of France. But it is also due to the importance given to cultural cooperation, which is understood to dovetail with the scientific domain, as described below. But following cutbacks in public expenditure, this network has drastically contracted, like all of the other sectors of diplomatic activity. While today there are five services for science and technology, there were ten such services in 2010. In the countries where they disappeared, their activities have been

[21] I. Inserra, *La diplomatie par la science de la France – Le rôle et la place des attachés scientifiques en ambassades 1955-2015*, unpublished master's thesis, Sorbonne Université, Paris 2015.

integrated into the cultural service, following the standard pattern in force at French embassies. However, relative to other countries, the human resources devoted to science and research at French embassies remain significant.

Particularities and paradoxes of France's science diplomacy

What gives a country's science diplomacy its unique colour is the history and culture specific to that country that shape its institutions: for diplomacy, as in many other areas of public action, there are "national styles". In this last section, these elements of style specific to French science diplomacy are presented and critically commented on.

The significant role of public authority

France is an administratively centralised country where public authorities exercise much influence over economic and social life. The relationship between the state and science has been historically strong, important milestones being the creation of the CNRS in 1939 and the Gaullist support in the 1960s for the space and nuclear industry, key sectors in foreign policy. The gross domestic spending on R&D amounted to 2.35 % of GDP in 2020, of which a third was public expenditure[22]. Universities are almost all public. Impulses from the top tend to dominate in the mix of top-down/bottom-up research initiatives.

[22] From OECD data base, https://data.oecd.org/rd/gross-domestic-spending-on-r-d.htm [08.08.2022].

However, there is a paradox: the importance of public funding for research and the centrality of public institutions do not mean that scientific issues are always properly integrated by policymakers and political elites. A possible explanation is the way in which members of the French political elite are trained, without familiarity with the scientific process and without much contact with the world of research. Still, the political world and the world of research interface through institutions such as the Prime Minister's Strategic Research Council or the French Academy of Sciences, which advises the government. A Parliamentary Office for the Evaluation of Scientific and Technological Choices has been created by law, with the mission of informing deputies and senators of the consequences of scientific and technological choices. But these bodies are not designed to quickly respond to high-level scientific advice as is practised, for example, by the Chief Scientific Adviser to the Foreign and Commonwealth Office in the United Kingdom or the Science and Technology Adviser to the US Secretary of State. Such positions do not exist in France, where scientific advice and evidence plays a smaller and less systematic role in informing policy. The Delegate Ambassador for Science, Technology, and Innovation and the Counsellor for Education, Higher Education, Research, and Innovation in the office of the President do provide advice at the highest executive level. But what seems to be missing is a continuing relationship with science.

Still, the advice of renowned scientists is solicited on a case-by-case basis. In response to the COVID-19 pandemic, a scientific council was set up "to inform public decision-making in the management of the health situation

associated with coronavirus". A COVID-19 Analysis, Research and Expertise Committee was established by the President of the Republic to advise the government on treatment and testing. Could this experience raise public decision-makers' awareness of scientific and technological issues, and reverse the judgment of a former Secretary of State in charge of Higher Education and Research who claimed that "the place of science in society is not understood – and therefore not handled – by the greater part of the political class in France"[23]?

Areas of privileged presence and influence

The geographical priorities of France's science diplomacy say the most about its underlying geopolitical intentions. Priorities can be fluid, as the MFA targets countries with whom France might explore new avenues of cooperation or strengthen existing ones. An example is the presidential visits in recent years in Iran, Iraq and Saudi Arabia, which have occasionally given impetus to France's science diplomacy in this region of the world. But over the longer term, the geographic orientations are driven by the aim of developing scientific relations with leading scientific countries, whether developed or emerging, with particular attention paid to Europe and the countries of the global south.

France, one of the founding countries of the European Community actively supports the use of European research policy as a tool for integration. The relationship with Germany has occupied a privileged place since the Franco-German treaty of 1963. In Horizon 2020, German teams are

[23] Interview with Secretary of State Thierry Mandon, *Les évolutions de la recherche dans le monde*, "Hérodote" 2018, no. 1(168), p. 93.

present in seven out of ten projects involving at least one French team[24]. A Franco-German university was created in 1997 as a network that today gathers together more than two hundred institutions from both countries. And it was at the French Embassy in the Federal Republic of Germany that the first-ever scientific attaché position was created.

French science diplomacy is also oriented towards the global south. Prestigious research centres such as the Pasteur Institute, the Research Institute for Development (IRD) and the French Agricultural Research Centre for International Development (CIRAD) have 69 offices in 47 countries, including 39 in the global south. The public agency Expertise France operates in about a hundred foreign countries, 80% of which are in Africa or the Middle East.

By increasing research capacity and supporting the development of regional centres of expertise, France continues to cultivate its traditional zone of influence inherited from the colonial period in French-speaking Africa and the Indian Ocean. This commitment is part of a wider strategy of influence in the global south, combining humanitarian action, efforts toward political stabilization, and a fight against brain drain and radicalization[25].

Science diplomacy, in the shadow of cultural diplomacy?

France's culture enjoys worldwide acclaim. It is its hallmark and the major asset of its soft power, a complex alchemy

[24] Ministry of Higher Education, Research and Innovation, *Higher Education and Research in France – Facts and Figures*, Paris 2017.

[25] Speech by Clélia Chevrier-Kolačko, Deputy Director of Culture, Academic Research and Cooperation at the Ministry of Foreign Affairs, October 5, 2017, www.youtube.com/watch?v=hgjhAbbvp8M [08.08.2022].

combining the arts, lifestyle, the flavour of the language, intellectual productions, and the values of individual freedom. The strength of French culture translates directly into the strength of its cultural diplomacy, which has historically been at the heart of its diplomacy of influence.

The importance of the "cultural" in embassies is visible in their organization. The creation in 2010 of the French Institute, a public operator of foreign cultural action, has confirmed and reinforced the degree to which the vector of culture, in all its forms, is a primary pathway of influence. In the national budget, science diplomacy is included in the programme "Cultural diplomacy and influence" (Programme 185, which had a €715 million budget earmarked in 2021, with €88 million for "Higher education and research"). Actions relating to science and research are part of a broader, all-inclusive approach. In different situations or for different countries, the best mix of artistic, linguistic, scientific and academic cooperation must be designed. This is reflected in the contemporary definition of French diplomacy, described as overarching or "global" diplomacy[26].

But putting culture at the forefront poses a risk for French science diplomacy, in that it could remain in the shadow of cultural diplomacy. In the embassies, and with the exception of the few countries where a fully functioning scientific service has been maintained, it is the cultural service, headed by a cultural adviser, which deals with science and technology issues. But these advisers, "whose profile is still often predominantly cultural, tend to devote themselves

[26] See the report *MAEDI 21 – Global Diplomacy for the 21st century*, Paris 2015.

more spontaneously to the cultural policy of the post"[27]. On another note, thus positioned in the orbit of culture, science diplomacy may be less able to address innovation, a key part of its mission, and one that would bring it closer to the economic service of the embassy. This atypical proximity in the embassies between the scientific field and the cultural field is unique to France and contrasts with the organization of other countries, which engage diplomatically in research and innovation through specialised entities: the United Kingdom's Science and Innovation Network is separate from the British Council and the German Houses of Research and Innovation are separate from the Goethe Institute. Switzerland's Swissnex outposts connect the country with the world's innovation hubs, and this model might serve as a source of inspiration for France.

Conclusion

With its scientific and diplomatic assets, is France able to cope with the current health emergency? The COVID-19 pandemic has revealed the challenges that states face in coordinating their actions and highlighted the need for better science-policy interfaces. In early April 2020, France launched the "COVID-19 – Health in Common" initiative to address the health crisis in the most vulnerable countries in Africa, the Indian Ocean, the Caribbean and the Middle

[27] Ministère de l'éducation nationale, Ministère de l'enseignement supérieur et de la recherche et Ministère des affaires étrangères, *La coordination de l'action internationale en matière d'enseignement supérieur et de recherche*, rapport à Monsieur le ministre des affaires étrangères et Madame la ministre de l'enseignement supérieur et de la recherche, Paris 2014, p. 100.

East. Later in April, France's President Emmanuel Macron presented the "Access to COVID-19 Tools", a global initiative on diagnostics, treatment and vaccines at a conference which included several heads of state and government as well as major global health stakeholders. Through its Minister of Foreign Affairs, France has also launched the idea of an international science – policy interface for infectious diseases modelled on the Intergovernmental Panel on Climate Change (IPCC). In May 2020, France proposed with Germany an initiative for European recovery from the coronavirus crisis, which includes an increase in European R&D for vaccines and treatments and for the establishment of common European standards for health data interoperability. These initiatives are in line with the principles which guide the diplomatic action of France: multilateralism, solidarity with the poorest countries, and support for a European response.

The question finally arises: Is France's science diplomacy well equipped for facing the challenges of the future world? In the scientific and academic globalization process, the share of emerging countries in the production of new knowledge is growing. There is fierce competition between countries to attract foreign talent, students and researchers. To meet these challenges, to maintain its rank and continue to exercise its historic role of influence, France is adapting its strategy, as evidenced by the launch in 2018 of the "Welcome to France" action plan. France has long been very visible in international fora for major health, environmental and security issues. But it is through its investment in the field that France's science diplomacy is distinguished from that of its foreign counterparts. In many capitals, French science counsellors and attachés are more numerous than

those posted in the embassies of other world powers. Within a diplomatic network which assigns great importance to cultural action, the commitment to science diplomacy is an essential lever for France, a great country of culture, to be recognised also as a great country of science.

Chapter 3

Anna Umińska-Woroniecka

The science diplomacy of Hungary

The purpose of this analysis is to identify the solutions operating within Hungary's contemporary science diplomacy model. The discussion is centred on two aspects of this model: institutional and operational, with a particular focus on the changes implemented in the last decade.

An analysis of the Hungarian model of science diplomacy requires an understanding of the origins of the country's activities. It is worth noting that the Hungarian government's organised efforts to disseminate Hungarian scientific output have their origins in its foreign policy strategy, including foreign cultural and scientific policy, during the period when Hungary had the most limited resources of so-called hard power. A substantial decline in Hungary's international position following the adoption of the Treaty of Trianon[1] prompted those in power to reorient their foreign

[1] As a result of the Treaty of Trianon signed between Hungary and the Entente states in 1920, Hungary lost more than 60 per cent of its population and almost two-thirds of its territory.

policy and make greater use of foreign policy instruments, targeting cultural resources, including those from the fields of science and education[2]. The tools of science diplomacy used included international agreements, the establishment of institutions responsible for science funding, the creation of positions, as well as separate institutional structures. This was intended to lead to an improvement in Hungary's international position, responding to the country's needs and national interests.

The origins of the Hungarian model of science diplomacy

This idea of incorporating scientific exchange and cooperation in establishing relations with citizens of foreign countries was born on the eve of the First World War. The then government of the Kingdom of Hungary initiated the process of appointing foreign missions to act as scientific and cultural centres abroad.

The origins of government cultural and scientific establishments abroad date back to 1916[3] when the world's first Hungarian Institute of Science was opened in Constantinople.

Recalling the genealogy of the state's organised activities in the field of science diplomacy, the contribution of the Hungarian Academy of Sciences, established in 1825, cannot be overlooked. The Academy's mission initially fo-

[2] A. Wojciuk, *Imperia wiedzy: Edukacja i nauka jako czynniki siły państw na arenie międzynarodowej*, Wydawnictwo Naukowe Scholar, Warszawa 2016.

[3] Z. Zéman, *The New Hungarian Model in Hungarian Economic Science Higher Education*, "Civic Review", vol. 13, 2017, Special Issue, pp. 271-280.

cused on scientific development of Hungarian universities and popularisation of the Hungarian language[4].

In the inter-war period, the Hungarian government became the first country in the region to develop the use of scientific achievements for foreign policy purposes. In addition to the institutionalisation of scientific exchanges, specialised centres were established abroad which, under the name of Collegium Hungaricum, actively promoted scientific cooperation. Following the First World War, the first missions were established in Vienna, Berlin and Paris. They also served as expert units, providing information on the scientific, technological and economic potential of the host countries.

Efforts aimed at strengthening Hungary's international position, through the tools of science diplomacy, continued throughout the 1950s and 1960s. Since the 1960s, foreign scientific and educational policy has regained prominence in the state's foreign policy strategy. The Ministry of Foreign Affairs (MFA) was in charge in this sphere, cooperating with stakeholders in higher education. In doing so, Hungary demonstrated the strongest tendency among other countries in the region to institutionalise scientific and educational relations. Hungarian scientists were among the first of the Eastern Bloc countries to benefit from exchange programmes organised by the Fulbright Foundation. In the documents of the 1970s, there also appears a proposal to include Hungarian Nobel Prize winners in the state's external impact (in the sciences, 13 Hungarians had received

[4] J. Pótó, M. Tolnai et al. (eds.), *Understanding the Hungarian Academy of Sciences: A Guide, Hungarian Academy of Sciences*, Budapest 2002, pp. 1-92.

the prize). Benefiting from previous experience, new institutions responsible for initiating and implementing international scientific and academic exchanges were established. Academic exchanges were managed by the International Centre for Hungarian Studies founded in 1983 (known as the Centre for Hungarian Lectures until 1989). The government in Budapest also maintained the existence of Hungarian institutions based abroad in the form of the Collegium Hungaricum, but their activities in Western countries were limited.

The post-1989 adaptation to European standards was an important step in the internationalisation of higher education. Providing universities with autonomy went hand in hand with the establishment of new institutional structures responsible, among other things, for international scientific and academic cooperation, such as the Conference of Rectors of Hungarian Universities. The Hungarian Academy of Sciences also continued its mission. The role of private universities cannot be overlooked, among them the Central European University, launched in 1991.

Dimensions of Hungarian science diplomacy

Examining Hungary's contemporary model of science diplomacy requires taking into account two dimensions: institutional and legal, and practical (operational). Within the framework of the former, in addition to analysing the formation of institutional structures involved in the creation and implementation of Hungarian science diplomacy, it is worth recalling the provisions of normative acts regulating the basis, scope and instruments of this diplomacy,

as well as the measures and priorities of Hungarian foreign policy and science policy. On the other hand, an analysis of the practical dimension is based on a compilation of figures regarding the degree of internationalisation of Hungarian science. An equally important aspect of the operational dimension remains the science funding system, as it determines to a large extent, along with human capital, the effectiveness of science diplomacy.

Cross-referencing the two dimensions with the objectives of science diplomacy, as formulated in the field of diplomacy studies, will make it possible to indicate the extent to which the measures taken by Hungary are aimed at strengthening the country's international position and its power to influence broader foreign audiences[5].

Institutional and legal dimension

The term science diplomacy (*tudomány diplomácia*) first appeared in Hungarian documents and normative acts in the second decade of the 21st century. In accordance with the MFA's approach, science diplomacy was considered "one of the forms of scientific presence in the state's foreign policy"[6]. The pre-war traditions of Hungarian representations abroad were updated in the context of state-implemented science diplomacy. Hence, the starting point in the approaches adopted by the MFA was initially to narrow down science diplomacy to one field of activity, i.e. the activities

[5] T. Flink, U. Schreiterer, *Science diplomacy at the intersection of S&T policies and foreign affairs: Toward a typology of national approaches*, "Science and Public Policy" 2010, no. 37(9), pp. 665-677.

[6] Tudodiplomacia, Info Parlament, Budapest, March 19, 2021, p. 3.

of science diplomats employed in representations abroad or existing science cooperation facilities abroad.

The normative framing of science diplomacy in Hungarian foreign policy should be seen in the perspective of two complementary acts: the Foreign Service Act and the Order regulating the status of science and technology diplomats. Under the provisions of the Act, the responsibilities of members of the foreign service include tasks undertaken in the framework of scientific cooperation and the dissemination of Hungarian scientific and technological achievements abroad. And these tasks are of crucial importance for the shaping of Hungary's image abroad. Article 11 of the Act indicates that diplomats performing functions in the field of science and technology are appointed by the Minister of Foreign Affairs in cooperation with the President of the National Fund for Research and Development (*a Nemzeti Kutatási, Fejlesztési és Innovációs Alapból*, NKFI). The head of the ministry also directs the diplomats' activities, only narrowly assisted by the Fund's executive body. The mode of appointment, as well as the status of diplomats, is set out in detail in the 2016 Order. According to its provisions, persons occupying the positions of science and technology diplomats (*Tudományos és technológiai szakdiplomaták*, so-called TeT) are obliged to collect information on the scientific and R&D policy of the host country, prepare contracts and agreements related to scientific and technological cooperation, and prepare and organise delegations with representatives from the fields of science and technology. If one adds to these promotional activities among investors and strategic partners, as well as the support of innovation and technology transfer together with the promotion of scientific research

results, the purpose of the activities of the diplomats, who in fact perform diplomatic promotional functions, becomes clear. The question remains open as to whether it is possible for professional diplomats to fulfil such tasks as required by the Act, or whether recruitment should be carried out taking into account the human resources of the science and higher education spheres. It would seem to be optimal if, instead of one-person posts, teams could be set up to complement each other's skills.

When juxtaposing the provisions of the aforementioned Act and Order listed acts with the provisions of the foreign policy strategy adopted in 2011, it can be indicated that the regulation of the status and tasks of those responsible for the implementation of science diplomacy was aimed at strengthening the image of the state in the international arena[7]. The orientation towards soft power resources (culture, science, technology) was intended as a response to a deterioration in Hungary's international position linked to the regime changes pushed by Viktor Orban's government. It cannot be overlooked that in the foreign policy strategy, the functions of science diplomacy appeared primarily in relation to Hungarian centres abroad, thus emphasising the continuation of "good pre-war practices".

There was a significant change in the framing of the science diplomacy category with the adoption of the 2014 Law on Research, Innovation and Development. Following solutions established and implemented in other countries, the act was adopted, initiating the creation of an institution

[7] *Magyar külpolitika az uniós elnökség után*, Budapest 2011, p. 17, http://eu.kormany.hu/download/4/c6/20000/kulpolitikai_strategia_20111219.pdf [31.05.2022].

and the reform of units already in place, the carrying out of tasks in the area of innovation, science and development, and distribution of financial resources, with a particular focus on the internationalisation of research. This included a government commitment to create an R&D strategy and, above all, an obligation to "create, operate and finance a unified system of institutions" (Article 4(1)) and to provide publicly funded support for R&D and innovation, primarily from the National Fund for Research, Development and Innovation (NKFI). The Act adopted by Parliament sets out the objectives and operating principles of the Fund, which formally began its activities in 2015. Notable is the connection of the Fund's activities with the economic development of the state and the subordination of its operation to both the ministries of science and the economy. In the Act, the extent to which the Fund is to be responsible for activities in the sphere of science diplomacy has been clarified. The NKFI is obliged to act in consultation with the minister responsible for foreign policy in establishing and strengthening European and international cooperation in terms of research, development and innovation policy. In addition, the NKFI is responsible for the implementation of intergovernmental scientific and technological agreements, cooperating with the relevant bodies in doing so. Its task is also to professionalise the management of scientific and technical diplomatic activities, which fulfils the rationale of science in diplomacy. It is impossible to ignore, in the context of the Fund's operation, the strategy adopted in 2013: the National Research and Development Strategy, which was to be implemented by 2020. The 2020-derived version formulates recommendations until

2030. Both documents declared the inclusion of Hungarian stakeholders as equal participants in the global innovation process. Centralisation of all public tasks related to innovation was a consequence of the adopted solutions. The NKFI bodies answer only to the Prime Minister, and their key task is to distribute EU structural funds for R&D and national innovation funds[8]. The NKFI also supports applicants for funding directly from the EU and is the main national contact point for delegates and advisory group members in the EU's Horizon 2020/Horizon Europe strategy. It is therefore unique compared to its counterparts in other EU member states[9].

The legislation introduced contributed to the redefinition of science diplomacy, significantly expanding its personal and material scope. After all, it was recognised that an important component of the activities implemented by the state is the creation of an institutional framework that ensures a coherent as well as efficient model of science diplomacy, which, in addition to professional diplomats, includes scientific and research units and government agencies responsible for the development of knowledge and innovation sectors. Undoubtedly, this has also had an impact on the legitimacy of action taken by entities outside the foreign service.

Hence, central to the science diplomacy performed is the mission of the Hungarian Academy of Sciences. The policy paper published in 2019 indicates that the Academy uses the

[8] V. Jóźwiak, *Hungary Looks to Revise Its Research, Development and Innovation Strategy*, "Bulletin PISM" no. 42(1113), 42(1615), March 12, 2018.

[9] *Peer Review of the Hungarian Research and Innovation system Horizon 2020 Policy Support Facility*, European Commission, 2016.

tools of science diplomacy to help create a positive international image for the Hungarian scientific community and Hungary, building on its membership "in the World Science Forum, international academic associations and other international partnerships". It was recognised that participation in networks remains an important tool of the science diplomacy pursued by the state. In its activities, there was an emphasis on disseminating research results, attracting foreign partners and including Hungarian researchers in the international "scientific circuit".

From the analysis of normative acts and documents, it is apparent that the institutional dimension of the Hungarian model was based on three pillars. The first pillar was the establishment of an institution whose remit would include the functions of science diplomacy, as well as the remodelling of existing structures by increasing the scope of activities in the realm of science diplomacy tasks of entities such as the Academy of Sciences and research institutes. Developing a network of science diplomacy entities, foreign missions and scientific attachés at diplomatic missions abroad is to be the second pillar. On a normative level, the remit of the entities included in Hungary's science diplomacy is defined. The third pillar of science diplomacy can be considered to be the intensification of the state's activities in the area of science policy, which is combined with the centralisation of the distribution of funds and deeper government intervention in research and development processes.

The omission in the normative acts of an important component of scientific diplomacy, consisting of the acquisition of expertise for the implementation of the state's foreign

policy, on the other hand, is noteworthy. Only a provision on the possibility of hiring experts appeared in the Foreign Service Act, while other acts made no mention of their role. In the 2011 foreign policy strategy, this element appeared as part of an intention to cooperate with the academic community. An intensification of contacts with "government" experts was also declared.

The operational dimension

Within the framework of science diplomacy, activities are undertaken simultaneously by various government agencies and research units, with the MFA performing a coordinating function. Correlating the objectives of the activities with the implementation of the state's foreign policy justifies this solution. In addition, it is the MFA that is responsible for the institutionalisation of scientific relations with other countries, including through the activities of science and technology diplomats. The government, government agencies and research institutes are party to more than 40 agreements, among which are those concerning scientific cooperation in general as well as cooperation in fundraising (for example, with South Korea).

The NKFI has a key position in the area of R&D. The Fund's operational activities include coordination of joint R&D activities with partner countries, including exchanges of experts; preparation and management of joint proposals; organisation of joint scientific/project events; representation of the R&D sector at meetings of the Joint Economic Committees; and coordination of the work of TéT's career diplomats in cooperation with the MFA and the Prime Mi-

nister's Office[10]. The fund is equally focused on academic excellence, supporting start-ups, increasing investment in innovation by small and medium-sized enterprises, and attracting the R&D centres of global corporations. The strategy identifies priority sectors, these being ICT, biotechnology, cognitive technologies and nanotechnology. However, the strategy does not specify how innovation policy is to be implemented. These elements can be found in other strategic documents, including the 2016 National Strategy for Industrial Development (the so-called Irinyi Plan).

The primary purpose of the NKFI's operation remains the distribution of funds for research and development. Researchers also obtained R&D funds from external sources, primarily budgetary outlays. According to the R&D strategy developed for the period 2012-2020, budget resources were expected to increase and the task of distributing them was taken over by the NKFI. The Fund's figures show that over a seven-year period (2010-2017), the financial outlay provided by the institution tripled. While in 2010 the amount was around 24 billion forints, in 2015 just after the Fund's establishment it was 53 billion, while in 2016 the amount increased to 80 billion forints. The same trend occurred with the implementation of the 2020 strategy. Recalling the structure of R&D funding, it can be pointed out that in the second decade of the 21st century, Hungary planned to raise an amount of up to 80 billion forints, whereas, from national resources, the Fund distributed 70 billion forints in the first three years of its operation.

[10] J. Palinkas, A Tudományos és Technológiai (TÉT) attasék konferenciája 2017. July 3-4, 2017, Budapest.

As far as the practical dimension of science diplomacy is concerned, units dedicated to science and technology issues at diplomatic missions play an equally important role. Hungary, like other countries without an extensive organisational structure for science diplomacy, creates science advisor positions only in embassies located in so-called strategic locations. For Budapest, the key locations may therefore be: Berlin, Brussels, London, Paris, Moscow, New York, San Francisco, Beijing, Tel-Aviv, New Delhi, Seoul and Tokyo. Identifying specific locations as strategic is also validated by the programmes and projects carried out in cooperation with scientific units from the selected countries. Joint R&D projects are being implemented with Israel and India with financial support totalling 300 million forints, China (250 million forints), Iran, Thailand, Vietnam (180 million forints), among others. Strategic partners from Russia and Turkey also appear in the documents. Science and technology diplomats are responsible for the implementation of the project on the part of the Hungarian government. In this context, it is worth noting the 2019 announcement posted on the foreign ministry's website of a vacancy for the post of science diplomat at Hungary's diplomatic representation in Beijing. Among the requirements for candidates, it mentions having a scientific degree and experience in research and industrial innovation. The necessity to have "many years of experience in the foreign service" was indicated at the same time, which basically eliminated candidates from outside the MFA from the recruitment process. The tasks of the diplomat, on the other hand, corresponded to the catalogue indicated above: the preparation of cooperation agreements in the field of research and development

in cooperation with the Ministry of Economy, as well as the organisation and arrangement of domestic and foreign visits and delegations.

As a third dimension, science diplomacy appears in the context of the organised activities of other state and non-state actors. The solutions adopted in the field of science, research and development, have effectively reduced the importance of their contribution to the tasks of science diplomacy over the past five years. This goes hand in hand with the elimination from Hungarian higher education of academic and research entities that do not align their activities with the requirements of the government's R&D policy.

Hungary's activities in the process of implementing science diplomacy are characterised by a significant degree of centralisation. Furthermore, the participation of experts in the formulation and implementation of foreign policy has been limited. This may have had the negative effect of weakening the credibility of Hungarian science diplomacy. The lack of involvement of non-governmental actors may have adversely affected the results of science diplomacy, especially regarding partners among which non-governmental actors and entities are dominant, or those who conduct R&D activities with only limited participation of governmental agencies. One weakness of the Hungarian science diplomacy model, despite its long-standing traditions, seems to be the lack of a long-term strategy for the development of a network of science and technology diplomats. Moreover, the functioning of the Collegium Hungaricum, the Ballasi Institute and dedicated positions in diplomatic representations may lead to duplication of tasks in the area of science diplomacy. Constraints in the coordination of these units

may also lead to such duplication and sometimes even competition in their fulfilment.

Meanwhile, awareness of the relevance of internal conditions determining the scope of science diplomacy is diminishing. Systematic increases in R&D spending can positively influence the scale and scope of the activities carried out. Moreover, statutory regulation of the institutional system involved in shaping the state's science policy may, in the long term, contribute to the development of coherent mechanisms in the area of R&D, and consequently increase the possibilities of influence through the instruments of science diplomacy.

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7/2022

2022

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ISBN 978-83-66413-82-5
9 788366 413825
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