

SCIENCE & DIPLOMACY



A quarterly publication from the AAAS Center for Science Diplomacy

Tom C. Wang, Claire Craig, Mahlet N. Mesfin, and Luke Clarke, “Beyond the Political Moment: Strengthening Science-Trade Ties,” *Science & Diplomacy*, Vol. 7, No. 2 (June 2018). <http://www.sciencediplomacy.org/editorial/2018/beyond-political-moment-strengthening-science-trade-ties>.

This copy is for non-commercial use only. More articles, perspectives, editorials, and letters can be found at www.sciencediplomacy.org. SCIENCE & DIPLOMACY is published by the Center for Science Diplomacy of the American Association for the Advancement of Science (AAAS), the world’s largest general scientific society.

Beyond the Political Moment: Strengthening Science-Trade Ties

Tom C. Wang, Claire Craig, Mahlet N. Mesfin, and Luke Clarke

In recent years, global trade policy has risen to the top of the political agenda on both sides of the Atlantic. Since taking office in 2017, the Trump administration has initiated a dramatic change in U.S. trade relationships, including withdrawal from the Trans-Pacific Partnership (TPP), renegotiation of the North American Free Trade Agreement (NAFTA), and a revisiting of the broader role of trade in national security. In the United Kingdom, the 2016 vote to leave the European Union was underpinned by a campaign emphasizing the importance of UK negotiation of its own trade deals with the rest of the world. The UK now faces an unprecedented task of negotiating and renegotiating trade deals with multiple nations on hundreds of topics, including essential agreements on air services to allow British planes to land in other countries, nuclear accords for trade in spare parts and fuel, and regulatory cooperation arrangements.¹

Tom C. Wang is the chief international officer of the American Association for the Advancement of Science (AAAS) and director of its Center for Science Diplomacy.

Claire Craig is the Chief Science Policy Officer at the Royal Society.

Mahlet N. Mesfin is deputy director of the AAAS Center for Science Diplomacy.

Luke Clarke is Head of International Affairs (Commonwealth, Americas, and Africa), at the Royal Society.

In parallel with the headline attention garnered by trade are the ways science and technology have fundamentally changed, and are changing, the nature of trade. Trade is no longer primarily about shipping physical products around the globe—it is increasingly characterized by a vast rise in the use of data. In 2014, the added value to the global economy of cross-border data flows was estimated to be \$2.8 trillion, slightly more than the \$2.7 trillion added by global trade in goods.² By the end of 2016, companies and individuals were sending twenty times more data across borders than they did in 2008. Concurrently, rapid advances in fields such as synthetic biology are posing new challenges to regulations and intellectual property.

Many of these new and innovative products do not obviously fit into the various national and international systems of tariffs often at the center of trade discussions. At the same time, tariffs—despite the recent activity in the United States, China, and other countries—may become less important relative to non-tariff barriers such as international standards, which have grown over the last fifty years to encompass a whole range of products from shoes to Wi-Fi networks. These standards likewise take into account best practices in areas as diverse as road safety and medical packaging.³

For these reasons, among others, the need today is stronger than ever to forge closer links between the worlds of science and trade. This was likewise one of the main conclusions from the 5th Neureiter Science Diplomacy Roundtable,⁴ which was co-organized by the Royal Society and the American Association for the Advancement of Science (AAAS), publisher of *Science & Diplomacy*, and held in London in October 2017.⁵

Links Past and Present between Science, Technology, and Trade

The relationship between science and international trade dates back centuries. Benjamin Franklin, one of the founders of the United States, as well as a Royal Society Fellow, was a leading advocate for free trade.⁶ Then, in the nineteenth century, the UK Board of Trade sought advice from the Royal Society on meteorology, particularly in forecasting storms, an essential consideration for Britain's ocean-based trade.⁷

Stepping forward into our current century, many areas covered by trade agreements fall within the domain of science and technology (S&T) policy. Indeed, much discussion surrounding trade agreements concerns technological, health, safety, and environmental standards, all of which are and should be informed by science. Recently, various trade policies and restrictions have been based on differing interpretations of the evidence regarding food safety. Namely, the United

States and Australia imposed food-irradiation requirements on mangos imported from South Asia,⁸ while Chinese traders enforced restrictions on genetically modified organisms, canceling orders of U.S. corn.⁹

S&T will play an increasingly significant role in shaping future trade, with one driver being the dynamic pace of scientific and technological innovation. Given this reality, participants at the October 2017 Neureiter roundtable argued that current bilateral and multilateral trade regimes remain, for the most part, slow and ill-suited to adapt to new forms of cross-border economic activity.¹⁰

One example that illustrates this point involves the rise of data and the digital economy over the last decade. The rules that underpin the World Trade Organization (WTO), including the General Agreement on Trade in Services, were negotiated and agreed upon in 1995. This took place before the key events that led to the commercialization of the internet.¹¹ At that time, the internet had fewer than two million users, as compared to the 3.7 billion users today.¹² A recent report by the Digital Catapult, a UK technology agency, noted an “alarming absence of data-related provisions in international trade agreements.”¹³ Yet new structures are rapidly emerging. For example, the Chinese business leader Jack Ma has been in talks with the World Trade Organisation (WTO) on setting up an electronic world trade platform (eWTP) to help simplify the growing number of international e-commerce transactions.¹⁴

The Data Revolution Driving Change in Traditional Trade

The data revolution is not just transforming and driving growth in the global economy; it is also forcing a fundamental reconsideration of categories such as services, goods, and manufacturing. These designations are becoming increasingly blurred for digital products—from software, film, and music distributed over the cloud, instead of physically, to data and its cross-border flows as a basis of value for business models underlying Amazon, Facebook, Google, and other major tech companies. “Smart” products like cloud-connected exercise monitors and autonomous robotic vacuum cleaners span the virtual-physical divide as well. Such products include advanced software that enables functionality and data collection. This functionality can be altered from the cloud, and the collected data can generate its own value when analyzed in aggregate.¹⁵

Privacy concerns (e.g., the European Commission’s recent affirmation that personal privacy is “nonnegotiable” with any country with which it might reach a trade deal)¹⁶ and the need for public trust (e.g., overall governance of data management and use to ensure trust)¹⁷ are only two additional considerations. Trade-related issues, meanwhile, arise from how to designate countries of origin

with respect to the location of the data or company, and the rights of data subjects versus the rights of the manufacturer to the data.

Some experts even argue that the evolution of data in trade highlights the need to rethink the concept of national borders.¹⁸ Blockchain technology—the creation of decentralized, cryptographically secure ledgers, of which Bitcoin is the best-known example¹⁹—is capturing the attention of the supply-chain industry and border and customs authorities, given its potential to help process transactions, share secure data, and identify counterfeit or contraband products.²⁰ These developments are likely to have increasing relevance for how borders are managed in the future, with the role of technology in border controls having already featured prominently in the Brexit debate.²¹

Equipping Scientists to Contribute

With S&T issues embedded in many aspects of contemporary trade policy—as products traded, components in trade strategy, and tools to support implementation of agreements—scientists, engineers, and technologists must become more actively engaged in these issues. Some of the ways they can do so are as follows:

Setting Standards

One extensive existing role for scientists involves the setting of standards, which support product safety, promote international trade, and ensure product consistency for consumers. The United States has sent delegations of scientists to the International Organization for Standardization, still known by its earlier acronym ISO, with a commitment to uphold standards based on science.²² The UK's National Physical Laboratory led the development of the world's first ISO standards for the use of graphene, a two-dimensional material with a wide range of potential applications.²³ There is a clear need for scientists to help inform international trade by contributing to such standards. This independent process involves multiple stakeholders and can address technical challenges outside formal intergovernmental or diplomatic channels. The resulting standards can help shape a much-needed common language between the science and trade communities.

In addition, regulatory scientists at government agencies such as the U.S. Food and Drug Administration (FDA), UK Medicines and Healthcare products Regulatory Agency (MHRA), and UK Food Standards Agency (FSA) carry an important role in developing approaches to assess regulated products. However, they have a specific focus and the wider research community is invaluable in advancing the science. Information exchange and collaboration between regulatory and basic science actors is therefore of great value in informing trade policy.

Government Service

Scientists and engineers can also play valuable roles by serving directly in government trade organizations, especially through offering counsel on technical matters. Indeed, direct involvement in policy careers constitutes a growing trend that allows scientists to apply their expertise to wider societal issues. In the United States, the forty-five-year-old AAAS Science and Technology Policy Fellowships program places scientists and engineers into the federal government to assume various policy roles. Some of these fellows have ended up in positions dealing with trade policy, and several alumni have served in venues such as the Office of U.S. Trade Representative, working on issues from sanitary and phytosanitary standards and chemical regulations to intellectual property and e-commerce. The Royal Society has recently established a similar scheme, enabling its research fellows to undertake a secondment within a science policy environment.²⁴

One finding from these fellows' experiences involves the benefit of understanding both the regulatory and trade perspectives, sometimes from rotations through these distinct roles, bridging regulatory agencies and trade policy organizations.

Other than direct placement in trade organizations, various means have surfaced to ensure a close connection between the science and trade communities. One growing trend entails the establishment of chief scientist positions in government ministries; considering a chief scientist or technologist position in a government's trade ministry would likewise be worthwhile. The United Kingdom recently established such a role in its newly formed Department for International Trade.²⁵ Scientific advisory bodies likewise can be created for specific governmental or other organizations, which help provide a diverse set of expertise, often covering specific issues on request. International organizations with established scientific advisory boards include the United Nations,²⁶ and a national example is the Science Board of the U.S. FDA.²⁷ Finally, certain trade-focused discussions have enabled scientist input on the negotiation process. For example, the Convention on Biological Diversity has had observer status at the convention of the WTO Committee on Trade and Environment in both regular and special sessions, and participates in information exchange and technical assistance.²⁸

Evidence Synthesis

Yet another way scientists can help ensure trade policy is based on the best available evidence is through evidence synthesis.²⁹ This refers to the bringing together of information from a range of sources and disciplines to inform debates and decisions on specific issues. Evidence synthesis can inform trade policy through timely, unbiased summaries provided to policymakers covering all the

available evidence on a given topic. Recently, the Royal Society and UK Academy of Medical Sciences published a report proposing a set of principles encompassing the fundamental features of good synthesis to inform policy making.³⁰

Science Diplomacy and Trade

The recent debates about globalization, nationalism, and protectionism also highlight how the S&T enterprise will be increasingly affected by trade policies and agreements in the coming years. The previously proposed, and now stalled, Transatlantic Trade and Investment Partnership (TTIP) between the United States and EU could have included government procurement and support of commercial research and development.³¹ In the current renegotiation of NAFTA, assessing the value of R&D in automobile manufacturing is a notable sticking point in the discussions.³² For the United Kingdom, global trading arrangements after Brexit will need to take into account issues in S&T, research, and the new globalized world; perhaps this is partly why a new UK Board of Trade was first convened in October 2017 at a robotics lab at the University of Bristol.³³

Governments around the world are reassessing their positions on globalization. Science and technology is a global enterprise that increasingly underpins and drives modern global trade. Scientists and engineers have an opportunity and obligation to offer their expertise in supporting how the world arranges its trading relationships, and the trade community should make use of the opportunity to work together.

Endnotes

1. Paul McClean, "After Brexit: The UK Will Need to Renegotiate at Least 759 Treaties," *Financial Times*, May 30, 2017, <https://www.ft.com/content/f1435a8e-372b-11e7-bce4-9023f8c0fd2e>.
2. James Manyika et al., *Digital Globalization: The New Era of Global Flows* (San Francisco: McKinsey, 2016), <https://www.mckinsey.com/business-functions/digital-mckinsey/our-insight...>
3. For more information, see International Organization for Standardization, <https://www.iso.org/benefits-of-standards.html>.
4. Since 2012, the AAAS Center for Science Diplomacy has hosted roundtable discussions named in honor of Norman P. Neureiter, a pioneering science diplomat who served as the first Science and Technology Advisor to the State Department.
5. 5th Neureiter Science Diplomacy Roundtable: "Science & Technology and the Frontiers of 21st Century Trade Policy" <https://royalsociety.org/~media/policy/Publications/2017/report-of-5th-...>
6. "But the Work Shall Not Be Lost. American Innovator: The Life of Benjamin Franklin," exhibit materials, April–July 2006, <http://britishlibrary.typepad.co.uk/files/americaninnovator.pdf>.
7. T. H. Farrer et al., "Correspondence between the Board of Trade and the Royal Society in Reference to the Meteorological Department," *Proceedings of the Royal Society of London* 14 (1865): 306–19, <http://rspl.royalsocietypublishing.org/content/14/306.short>.
8. Tushar Pawar, "Exporters Eye Rise in Mango Shipments," *Times of India*, March 26, 2018, <https://timesofindia.indiatimes.com/city/nashik/exporters-eye-rise-in-ma...>
9. Hallie Gu and Dominique Patton, "China Traders Cancel U.S. Corn Cargoes on Tighter GMO Controls, Buy from Ukraine: Sources," Reuters, February 9, 2018, <https://www.reuters.com/article/us-china-corn-imports-gmo/china-traders-...>
10. Royal Society/AAAS, "Science & Technology and the Frontiers of 21st Century Trade Policy," 5th Neureiter Science Diplomacy Roundtable, London, October 5, 2017, <https://royalsociety.org/~media/policy/Publications/2017/report-of-5th-...>
11. These include: the removal of National Science Foundation restrictions on internet use for commercial purposes; the "browser wars" that resulted from the founding of Netscape; and the rapid entry of tens of thousands of firms into online commerce: see Shane Greenstein, "Commercialization of the Internet: The Interaction of Public Policy and Private Choices or Why Introducing the Market Worked So Well," in *Innovation Policy and the Economy*, vol. 1, ed. Adam B. Jaffe, Josh Lerner, and Scott Stern (Cambridge: MIT Press, 2001), available at <http://www.nber.org/chapters/c10779.pdf>.
12. Usman Ahmed, Brian Bieron, and Gary Horlick, "Mode 1, Mode 2, or Mode 10: How Should Internet Services Be Classified in the Global Agreement on Trade in Service" *Boston University International Law Journal: Current Topics in International Law*, November 24, 2015, <https://www.bu.edu/ilj/2015/11/24/mode-1-mode-2-or-mode-10-how-should-in-...> "Internet Users," internet live stats, <http://www.internetlivestats.com/internet-users/>.
13. See Catapult Digital, <https://www.digicatapult.org.uk/news-and-views/publication/uk-data-econo...>
14. See Forbes, <https://www.forbes.com/sites/alexcapri/2017/01/12/alibaba-can-a-chinese-...>
15. At \$2.8 trillion in 2014, global flows of data exerted a larger impact on world growth than traditional goods flows: see Manyika et al., <https://www.mckinsey.com/business-functions/digital-mckinsey/our-insight...>
16. Mehreen Khan and Jim Brunsten, "EU Trade Policy Is Being Dragged into the Digital Age," *Financial Times*, February 12, 2018, <https://www.ft.com/content/ed7e8902-0f8c-11e8-940e-08320fc2a277>.
17. British Academy/Royal Society, *Data Management and Use: Governance in the 21st Century* (London, June 2017), <https://royalsociety.org/topics-policy/projects/data-governance/>.
18. Royal Society/AAAS, <https://royalsociety.org/~media/policy/Publications/2017/report-of-5th-...>
19. Klint Finley, "The Wired Guide to Blockchain," *Wired*, February 1, 2018, <https://www.wired.com/story/guide-blockchain/>.
20. Aaron Stanley, "Supply Chain Titans, U.S. Chamber Eye Blockchain for Global Commerce," *Forbes*, May 22, 2018, <https://www.forbes.com/sites/astanley/2018/05/22/facilitate-trade-protec...>
21. Lisa O'Carroll, "Technology Cannot Make Post-Brexit Irish Border Frictionless, Says Academic," *Guardian*, March 7, 2018, <https://www.theguardian.com/politics/2018/mar/07/technology-cannot-make-...>
22. Wanida Lewis, "Standing Up for Science-Based Standards at the International Standards Organization (ISO)," *DipNote* (blog), June 2, 2017, <https://blogs.state.gov/stories/2017/06/02/en/standing-science-based-sta...>
23. National Physical Laboratory, "First Graphene ISO Standard Published to Boost Commercialisation," updated October 16, 2017, <http://www.npl.co.uk/news/first-graphene-iso-standard-published-to-boost...>
24. "Policy Secondment Programme," Royal Society, <https://royalsociety.org/grants-schemes-awards/policy-secondment-programme/>.
25. Richard Johnstone, "Department for International Trade Names Its First Chief Scientist," *Civil Service World*, October 30, 2017, <https://www.civilserviceworld.com/articles/news/department-international...>

26. Kai Kupferschmidt, "UN Names New Science Advisory Board," *Science*, October 21, 2013, <http://www.sciencemag.org/news/2013/10/un-names-new-science-advisory-board>.
27. "Science Board to the Food and Drug Administration," U.S. Food and Drug Administration, updated January 31, 2018, <https://www.fda.gov/AdvisoryCommittees/CommitteesMeetingMaterials/Scienc...>
28. "Cooperation with WTO," Convention on Biological Diversity, <https://www.cbd.int/incentives/coop-wto.shtml>.
29. William J. Sutherland and Claire F. R. Wordley, "A Fresh Approach to Evidence Synthesis," *Nature*, June 20, 2018, <https://www.nature.com/articles/d41586-018-05472-8>.
30. "Evidence Synthesis," Royal Society, <https://royalsociety.org/topics-policy/projects/evidence-synthesis/>.
31. Trans-Atlantic Business Council, "Innovation as a Key in the Transatlantic Trade & Investment Partnership (TTIP)," September 2, 2015, <http://www.transatlanticbusiness.org/wp-content/uploads/2014/05/TABC-upd....>
32. "Cars Block the Road to a Renegotiated NAFTA," *Economist*, February 1, 2018, <https://www.economist.com/news/finance-and-economics/21736173-agreeing-n....>
33. Gov.uk, "International Trade Secretary Dr. Liam Fox Convenes a New Board of Trade to Ensure the Benefits of Free Trade Are Spread throughout the UK," press release, October 12, 2017, <https://www.gov.uk/government/news/international-trade-secretary-dr-liam....>