How Does Science Diplomacy Cope with Challenges Facing Diplomacy More Broadly?

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"...if only the theory of statecraft and diplomacy had kept pace with the times".[1]

Contemporary diplomacy is characterised by change. In the modern globally interconnected world, a 'traditional' approach to diplomacy, occurring solely between governments, is no longer sufficient to solve transnational issues from climate change to pandemics that confront modern-day states. Interest in science diplomacy as a mechanism to respond these transnational issues has developed over the last decade.

Diplomacy more broadly can be characterised as "a set of processes and structures, bilateral and multilateral, relating to communication, negotiation and information sharing between sovereign states".[2] Hedley Bull's anarchical society theory applies social dimensions of the international system of states into an idea of international society, where "a group of states, conscious of certain common interests and common values, form a society in the sense that they conceive themselves to be bound by a common set of rules in their relations with one another...",[3] so that there are standards by which interrelationships can evolve and be mediated. This includes protocols for diplomatic engagement and a set of expectations that surround sovereignty and common norms such as respect for obligations to international agreements and treaties.

In parallel to traditional diplomatic practice, there has been increasing recognition of the ability of science to create a coalition of support, to lay foundations for conflict resolution, or to build trust between nations. This trust is derived from the 'universality' of science where the values of transparency and rationality can transcend borders, politics, culture, and religion. Science in its true form delivers information that is evidence-based, not emanating from personal opinion or suspicion, nor swayed by authority. The concept of science diplomacy has developed to encompass interactions on various levels from state-based to those including international and non-state actors. Science diplomacy is the use of "international scientific cooperation to foster communication and cooperation among the peoples of diverse nations and to promote greater global peace, prosperity and stability".[4] The UK Royal Society has defined three categories of science diplomacy to reflect its various applications at the domestic, bilateral and multilateral levels: science in diplomacy: *informing foreign policy objectives with scientific advice;* diplomacy for science: *facilitating international science cooperation;* and, science for diplomacy: *using science cooperation to improve relations between countries*.[5]

As science diplomacy becomes increasingly popular, and traditional approaches of diplomacy use science diplomacy in emerging ways, the question of whether the two forms of diplomacy cope and respond in the same ways to the challenges faced by contemporary diplomatic practice becomes prudent. In order to address the question '*How does science diplomacy cope with the challenges facing diplomacy more broadly?* ', it is necessary to compare the context, trends and contemporary challenges facing diplomacy more broadly at four levels: domestic, bilateral, multilateral, and polylateral (meaning the inclusion of civil society and other non-state actors). The polylateral level is an important inclusion as scientists often represent research institutions and academia independent of the state.

In this essay, I shall argue that at each level, the actors and diplomatic activity are hindered by various contemporary

challenges both political and practical in nature and that science diplomacy operates at these levels to varying degrees. The first three sections of the essay will examine the common challenges that contemporary diplomacy and science diplomacy are facing at the level of state-based interaction. At first glance, challenges of diplomacy are dictated by the overall direction of domestic foreign policy objectives and the success of science diplomacy is dependent on the specific foreign policy that states chose to pursue. Next for consideration is that defence and protection of sovereign interests is often privileged over diplomacy issues in bilateral approaches, affecting the influence of science diplomacy. Thirdly, when multiple states interact within a framework, such as that of international law, the facilitation of diplomatic activity and the positive application of science diplomacy is aided. However, if states evade international obligations by remaining outside these structures, it can hinder diplomatic engagement between states and ultimately the depth to which science can inform these relations.

At the fourth level of interaction, broad diplomatic practice faces the challenges of integrating and working effectively with a diverse cast of relatively new non-state, or polylateral, actors, with each group of actors employing their own strategically different approaches to achieve their own objectives. In contrast, the inherent nature of collaborative science research lends itself to successful diplomatic activity between actors outside of the state-centric remit. As a result participants in science diplomacy already have experience in collaborating across sector boundaries, generating greater success in integrating activities with multiple state parties. However, the main challenge lies in understanding the effectiveness of this action, which is highly problematic to qualify.

Finally, by using the interrogative lens of past science diplomacy achievements, areas in which science diplomacy in the future will have a key role can be proposed. This includes examination of governance of international areas beyond national jurisdiction and using diplomacy to encourage science literacy in developing nations. The essay concludes, that while there is much potential long-term benefit in the application of science diplomacy to transnational issues, science diplomacy is not a panacea for all inter-state relations.

How Science Diplomacy Approaches Domestic Issues

One of the key challenges for diplomatic activity is the way in which states set their foreign policy objectives and the funding they make available for the associated activity. A change in government or shifting domestic priorities, by extension, impacts the international science diplomacy agenda. Before even being able to interact on a global level, science faces impediments from ‘strategic’ political goals and resource limitations on the domestic stage.

A critical step for science diplomacy is the framing and contextualising of science and technology priorities within domestic foreign policy.[6] Practises and approaches to science differ greatly between states; domestic governments will define science objectives and its application according to national, and sometimes ‘parochial’, interests.[7] A 2012 survey of science diplomacy across six countries by Tim Flink and Ulrich Schreiterer revealed a skew in underlying rationale of states to engage in science diplomacy.[8] Expansion of political influence was a key driving factor for the United Kingdom (UK) and the United States of America (USA). In contrast, it was shown that Switzerland, France, Germany, and Japan primarily used science and technology as a way to access new markets and innovative developments in R&D, and to produce and promote their high-tech products, in the process, emphasising higher education and research. Despite increasing recognition of the importance of science and technology, a disconnect exists between science advancement and foreign policy that can be described as, at best, “fuzzy”.[9] The disparity of political agendas and the lack of mechanisms to enable effective dialogue between scientists and policy makers at a domestic level impacts, and undermines, the ability of science to adequately inform foreign policy objectives

Overall there are many factors, including policy disagreement between parties, which can result in science diplomacy being overlooked as a serious diplomatic tool. A prudent example of short-sighted political vision and unsuccessful integration of an innovative international science strategy into domestic foreign policy, is the two acts that were rejected by the US Congress in 2012 which focussed on improving science diplomacy opportunities. The ‘International Science and Technology Cooperation Act of 2012’ (H.R. 5916) and the ‘Global Science Program for Security, Competitiveness, and Diplomacy Act of 2012’ (H.R. 6303) aimed to “increase the coordination and support for US science diplomacy in developing countries, such as low- or lower-middle-income countries, countries with a

Muslim majority, and countries in the Middle East and Sub-Saharan Africa".[10] Despite the potential to increase the number of diplomatic envoys of American researchers travelling and partnering with scientists in these countries, the bills were never passed. Existing political disagreement on other policy matters were cited as the reasons that caused a 'gridlock' in Congress and resulted in their failure to be enacted.[11]

Image and reputation are known to be exceptionally powerful in inter-state relations. For states with strength in the science, technology and innovation sector this can translate into an expression of a state's 'soft power'.[12] Strength in science builds soft power, which holds a unique place in transnational interactions, due to the recognition of science as a universal activity that can often transcend the political interests of the state.[13] The power of reputation generated through trustworthy science can also counter negative perceptions and can result in an increase of political goodwill amongst adversarial nations. A survey of Islamic countries demonstrated that while overall they held an unfavourable view and low level of trust for the USA and its policies overall, in contrast, these same states had a high level of respect and admiration for American science and technology.[14]

However, this form of soft power will only be useful if it is consistent. Globally, domestic government budgets are being slashed affecting science, technology, and innovation initiatives across academia, research organisations and the private sector. Even though the Australian Government earmarked 10 million dollars for a new Australia-China Science and Research Fund in the recent budget announcement, the Government failed to reinstate funding for pre-existing international (mainly European-based) collaborations.[15] Such disproportionate cutbacks fail to demonstrate how the Australian Government intends to deliver on its key priorities in the 2014-2016 Public Diplomacy Strategy to "promote a positive image of Australia and strengthen people-people ties through [...] science diplomacy initiatives".[16] Not only are such cuts to these resources reckless, they can translate into a strain on science-based state relations.

The effect of termination of funding at a domestic policy level is of serious concern due to the potential ramifications for science diplomacy. Even simply the perception of the absence of funding can impede international collaborative efforts. German researchers, for example, have a strong interest, and sufficient resources available for bilateral collaboration, in the area of mineral resource geo-location in Western Australia. Dr Anne Braun, Science Counsellor of the Embassy of the Federal Republic of Germany in Australia, reported that the perception alone that co-funding was unavailable on the Australian side has been sufficient to deter German researchers from speculating on possibilities for joint collaboration.[17] This observation raises the question of the degree to which intellectual capital could be lost as a result of missed joint research and development opportunities.

In summary, domestic foreign policy objectives set the tone for diplomatic interaction, yet can equally be the source of its challenges. Objectives will either impinge upon, or enhance, the opportunities for science diplomacy. When science diplomacy is supported it can positively influence the view of citizens of a foreign state, despite widespread negative attitude. In contrast, when unsupported, science diplomacy can impact future collaborative relationships at the bilateral level.

Science Diplomacy Reaching Beyond Political Borders for Bilateral Collaboration

The second key area of diplomatic challenges emerges when state engage at a bilateral level. Building and maintaining international relations is increasingly more complex with diplomatic interactions needing to take into account vastly different priorities of multiple ministries.[18] Behind bilateral science diplomacy ulterior motives, driven by the protection and assertion of sovereignty, play out whilst the potential erosion of state sovereignty imposes another level of complexity within the science diplomacy dialogue.

Science diplomacy can offer a mechanism to build trust, create dialogue and allow access between nations. Vaughan Turekian and Norman Neureiter argue that effective science diplomacy was at its peak during the Cold War.[19] At a time of heightened inter-state tensions, when very few citizens of the USA were permitted to enter the Soviet Union science provided the conduit for researchers to travel and work alongside their Russian, relationships that were seen as central to building trust and maintaining communication channels between the two countries.[20] The situation in Iran and North Korea are contemporary examples of this type of initiative. Notwithstanding, this

lauded success in science diplomacy, states are not always at ease about establishing these forms of bilateral science connections.

In the contemporary context, bilateral engagement is affected by internal interests of the state. The Royal Society of London argues that "interest in science diplomacy is growing at a time when international relations are changing",[21] however tension exists between the desire to share knowledge and the fierce protection of national interests.[22] In the pursuit of profit for research and development, searching for the competitive edge and its financial return will always create internal conflict "between national commercial interests and ambitions for between nations". [23] These hidden hostilities have a wider impact on state relations, impeding the flow of science innovation to actual science developments; the pharmaceutical industry is a strong example of such obstacles.

Assertions of sovereignty, particularly the closing of borders and increasing security restrictions for travel, all take a toll on bilateral relations for science diplomacy. Peer-to-peer exchange, including conference attendance is the most common, basic-level of science diplomacy and it typically still continues to occur in the face of 'political posturing' between states, trade embargoes and other foreign policy issues.[24] Article 13 of the Universal Declaration of Human Rights[25] badges *Freedom of Movement* as a human rights issue, in reality, however, this is not always guaranteed. In particular, after the terrorist attacks on 11 September 2001 in the USA, more stringent travel restrictions and access to visas have been put in place. Travel has become increasingly problematic for scientists from Islamic countries visiting the UK and the USA.[26] Conversely, some states maintain strict control of the movement and activity of their researchers "out of fear that they will reveal embarrassing information about their country or that they might not return",[27] posing further practical concerns such as potential isolation or manipulation by the state.

The research subject matter itself can also pose perceived threats to states; all science is not created equal. Specific areas of research can raise security concerns for receiving states where the field of research is perceived to have a 'dual use', such as nuclear physics and microbiology, which have potential applications to chemical or biological weapons, or even terrorism.[28] In 2006, an American visa was initially denied to a senior Indian scientist due to concern over potential application of his research to chemical weapon development; the visa was later issued, ahead of a presidential visit by George W. Bush in the weeks which followed.[29] Regardless of potential legitimate state concerns, responses, such the latter, must be considered wisely. The ramifications can be politically costly and increase strain on relations between states if unfounded or poorly handled.

Overall, while the notion of protecting state sovereignty is central in bilateral activities diplomacy is affected by the extension of this notion to science diplomacy leading to scientists and their research being under greater scrutiny. The challenge of ensuring rational decisions, to protect a states' interest and its citizens, needs to be balanced with initiatives to enhance collaboration and share science knowledge between nations. This synergy has a higher importance when states are required to act beyond their territorial frontiers and engage in multilateral fora. Critically, a means of structuring international political interaction is needed to support and advance science diplomacy in this arena.

Science Diplomacy in a Multilateral Forum

At this point in time the world is facing common threats like at no other period in human history. Globalisation, in terms of instantaneous communication and rapid transportation, means the issues faced in one area are no longer constrained by political boundaries.[30] Global problems including climate change, food and energy security, and pandemics, require a transnational response that is fundamentally reliant on science and technology to resolve them.[31] Yet to bring states together to address these transnational issues, science knowledge needs to be clear and delivered from within a framework which states can operate and respond.

These global problems are complex and science and technology expertise is often missing from ministries of foreign affairs and development agencies. Furthermore, Daryl Copeland argues "science and technology issues are largely alien to, and almost invisible within, most international policy institutions",[32] this creates a further impediment to sound understanding of science and technology decision-making policy directives. Consequently, modern diplomacy

is seeing the rise of the 'technocrat' at multilateral meetings where specialist knowledge is required, yet where such knowledge is often beyond the level of detail held by the average career diplomat.[33] A diplomat is only as good as their information and connection with the world around them, and, moreover, there is a distinct "scarcity of science and technology-capable diplomats around the world".[34] Subsequently, delegations participating in multilateral meetings are ill-equipped to deal with the complexities of science and technology issues at the multilateral level. In addition, there is a lack of high-level scientists skilled in political or diplomatic areas. This can be explained by the difficulties faced by researchers in taking time out of their competitive careers, where promotion is heavily linked to active research projects and the number of annual scientific publications.[35]

Global political undertaking is required to advance diplomacy for science. The 1987 Montreal Protocol on Substances that Deplete the Ozone Layer[36] provides a symbolic representation of the impact of science as a diplomatic instrument for multilateral dialogue to protect the global environment. Since its inception 197 Parties have ratified the Montreal Protocol and as a result of the collective international effort to phase out the use ozone-depleting substances, their use has been reduced by 98 per cent.[37] Nevertheless, in the process of advancing other science causes, evidenced-based lobbying can be derailed because in multilateral fora there is often more at stake than scientific accuracy. This scenario has been encountered in the climate change negotiations where "national interests tend to trump broader objectives"[38] and a vocal minority with powerful commercial influences have hindered progress.[39] Despite promising beginnings of the Kyoto Protocol[40] in proposing legally binding greenhouse gas emission reduction targets and international emissions trading schemes, the Kyoto Protocol has failed to deliver on many levels. Due to the protracted nature and the variegated processes undertaken during its preliminary negotiations, the Protocol was unable to achieve consensus on the key set of objectives with an agreed means by which they would be achieved.[41] The scientific basis was subsumed by domestic interests and instead, unable to agree, states heavily compromised on the proposed binding emission targets.

The complexities of operating in a multilateral arena also rely on established rules and regulations. Norms derived from international law applied through treaties, conventions and agreements ratified by states provide the structure that allows science diplomacy to operate and inform the actors of multilateral fora.[42] Yet, due to the self-enforcing nature of this same framework, states can evade international responsibility or choose to not submit themselves to international jurisdiction.

However where law and justice can intervene on issues, with the support of scientific evidence, the outcome can be powerful. In the case of *Whaling in the Antarctic (Australia v. Japan: New Zealand intervening)* [43] submitted to the International Court of Justice (ICJ) scientific research, including non-invasive genetics from Australian Antarctic Division researchers, played a crucial role as proof of an alternative research approach for ageing whales as opposed to the lethal measures used by the Japanese.[44] Without this systematic application of science as supportive evidence it would have been difficult for Australia to intervene on a bilateral level. Even so, the resolution of this issue had to be raised in a multilateral forum to achieve its outcome.[45] Nevertheless, this court ruling was *only* made possible as Japan is a signatory to the Rome Statute to the International Criminal Court and was willing to submit itself to the ICJ and its rulings.[46] The challenge remains for states external to the jurisdictional framework. In addition, whether such a ruling can still constrain a state's behaviour is a weakness of the system that impacts the role science and technology can play in multilateral approaches.[47]

Overall, the challenges for diplomacy at the multilateral level are magnified with the addition of multiple states and their differing views and priorities. For science diplomacy, providing adequate resources to inform and support these multilateral fora can be difficult. However, when science diplomacy can exploit the existing framework of international law, the results can be amplified. In order to address scientific interests at local, regional or global scales, customised approaches are required. These ultimately come full circle to be dictated by the domestic foreign policy priorities of each state.

While some authors believe that states will remain the most important players in international relations, states increasingly have to adapt to their concept of sharing the 'stage' with many other governmental and non-governmental actors.[48] Thus in the contemporary setting, the focus is shifting from the traditional practice of state-based diplomacy to an inclusion of relations between states and other entities at the polylateral level, providing a new

suite of challenges for diplomatic activities.

Science Diplomacy for the People by the People

Global civil society is changing the face of diplomacy by challenging the 'traditional' practice of state-based diplomacy. Previously, the ministries of foreign affairs around the world have been the primary actors in diplomatic relations.[49] Yet in the contemporary setting, with instant access through social media to news and foreign affairs and modern international travel, the boundaries of diplomatic activities are becoming increasingly blurred. This can mean that these ministries and their diplomatic envoys no longer hold primary responsibility for inter-state relations.[50] Now the greatest challenge for diplomacy is the rise of the polylateral, non-state actors, their diverse modes of dialogue, and the 'unfamiliar' mechanisms through which they operate.[51] States now require greater responsiveness and the ability to evolve new outlooks to develop more effective cooperation and integration with these non-state actors.

In contrast to traditional state-based diplomatic dialogue, the phenomenon of establishing working relationships with non-state entities is inherent in the *modus operandi* of the science discipline as a whole.[52] In the contemporary setting, many actors across local, national and international levels have long held crucial roles in science diplomacy ensuring that the freedoms of scientists are upheld and that researchers continue to act as champions for their cause. For example, international governmental, non-governmental and academia-based science bodies have formed to improve the "provisions of science and technology advice to multilateral negotiations",[53] "engage policy makers in science diplomacy",[54] and to bring together the relevant actors to "identify areas where science cooperation can help build trust and foster intercultural understanding".[55]

Even though science diplomacy has entrenched links across civil society, the challenge for science diplomacy lies in its delivery and effectiveness. Its impact is not easy to measure and there is no 'handbook' for science diplomacy, nor a formula or evidence-based method that can be relied upon.[56] Flink and Schreiterer argue that the discipline of science diplomacy is "in stark contrast to more conventional policy fields" due to its lack of consistency and consensus in its definition and application.[57] The tools, approaches and projects undertaken are as varied as the domestic political culture and science policies of states around the world. As a result, efforts to create templates or advocate a 'best practice' for science diplomacy are ultimately futile. This lack in clarity of a key term of analysis is a distinct disadvantage.

Further challenges lie in selecting the most relevant action to take for the greatest effect and in the difficulties faced in evaluating the overall impact and reach of these interventions. Joseph S. Nye argues public diplomacy is "measured by minds changed and not dollars spent".[58] As a subset of public diplomacy, scientific engagement may sometimes only occur between select researchers in highly specialised fields or between hundreds of scientists at international conventions. Yet evaluation of attitudinal change is difficult because it is attempting to track change in perceptions and awareness; elements that are intangible and fluid in nature.[59] Furthermore, difficulties lie in the fact that the impact of activities undertaken in the guise of science diplomacy may not be known for years following an initiative. Therefore the extent to which the scientific community and, states at large, are directly impacted is difficult to determine and the power of science diplomacy is hard to accurately quantify.

To summarise, while diplomacy more broadly faces integration challenges with the modern-day variety of non-state actors, science diplomacy is well-placed to take advantage of the shift in actors. Drawing on experience from research intuitions, universities and other non-governmental organisations, there is vast experience of working outside the system of states and the ability to readily engage and establish science collaborative programs across borders. The lingering challenge is evaluating tangible results of attitudinal change from science diplomacy initiatives and how these activities can be applied to the greatest effect in the future.

Potential Application of Science Diplomacy

The world has changed in the decades since the end of the Cold War and is going to change in ways we do not yet understand in the decades to come. In our globalised world, while contemporary science diplomacy is effective in

many areas Flink and Schreiterer warn against relying on science diplomacy as a "panacea" for all conflict resolution. However, areas for future opportunity lie in a) the balancing of sovereign interests in 'international zones' and b) accelerating the advancement of developing nations.

A globally significant use of science diplomacy at an international scale was the resolution of territorial disputes in Antarctica, preserving it as a place for peace and science, through the Antarctic Treaty in 1959.[60] The development of the Antarctic Treaty required international cooperation and legal ingenuity not seen in previously during that era.[61] The precedent of international collaboration was driven by the protection of the conduct of science research. The Treaty an example of high-level cooperation between states in the name of global stability and is an enduring legacy of what can be achieved through science diplomacy. Through this experience, states have demonstrated a capacity to build an effective foundation of trust for future challenges in the governance of international areas that are beyond the jurisdiction of any one state, such as the Arctic, deep sea, outer space and the high seas. However the success of these outcomes will be highly dependent on the acumen of the diplomatic negotiation team, requiring both political savvy and comprehensive appreciation and application of science knowledge, understanding, and diplomacy.

There is also a large knowledge gap between developed and developing nations. This creates a huge potential for science diplomacy to be the conduit for lasting partnerships with developing states to build bridges of trust and transfer of knowledge. Policy and practical changes can have a much greater impact where governments apply science to aid delivery program or infrastructure. In 2006 the US Department of State launched a digital portal known as the Iraqi Virtual Sciences Library.[62] This initiative connects the majority of Iraqi research institutes and universities with full access to an extensive collection of science and engineering journals. In combination with international research initiatives, such as collaboration to bring low-cost infrastructure for wireless connection two remote parts of Africa,[63] the potential to use of science as a proxy for improved education and literacy is vast. Closing the 'digital divide' as a means to help provide the scientific currency and practical tools to lift these states out of poverty will provide immeasurable assistance to help such states grow their economies and trade.[64]

Conclusion

In conclusion, this essay has shown that diplomacy and science diplomacy are inevitably vulnerable to the machinations of states and the repercussions of this interaction at the domestic, bilateral and multilateral levels. Given the political reality of domestic politics, long-term investment may be sacrificed for short-term gain. Assertions of sovereignty directly influence bilateral diplomatic endeavours, while the salience of international law weighs heavily into multilateral outcomes. Nevertheless, polylateral interactions with non-state actors provide a pertinent platform for science diplomacy to flourish. Even in the absence of mechanisms to evaluate the impact of science diplomacy, future areas of vast potential for the application of science primarily lies in the governance of international zones and the spread of science through innovative solutions to the developing world. This more strategic approach will allow science diplomacy approaches to maintain their relevance in a contemporary globalising world while ensuring actions are targeted and effective.

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