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# SCIENCE DIPLOMACY REVIEW

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# Science Diplomacy Review


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# EDITORIAL

With rapid technological advancements and ongoing geopolitical conflicts, science diplomacy emerges as a significant tool for fostering international cooperation, addressing global challenges and shaping sustainable future. Emerging technologies and their governance has also become a contested terrain for techno-geopolitical dominance. The rise of techno-nationalism and techno-sovereignty bolsters technological self-reliance, strengthening national security and economic resilience. But, these can fragment the global innovation ecosystem and undermine multilateral cooperation. Science diplomacy can play a key role in navigating through these by building a bridge between nations and enabling dialogue.

Through informed international policy making, pragmatic and agile regulatory framework for emerging technologies, science diplomacy can provide a medium for strengthening diplomatic ties between nations and building greater science-based and informed consensus on issues which are transnational and those concerning global commons. However, for this, science diplomacy needs to be inclusive and also take into account diverse context specific issues and challenges. As science remain the basis of finding solutions to the climate change, biodiversity loss, pollution, future disease outbreaks and pandemics, etc., science diplomacy can be leveraged to build the S&T capability of countries lagging in these spheres. Mega science projects and global science infrastructures will be instrumental for shaping S&T ecosystem in the Global South.

The present issue focuses on several important issues including the need for capacity building in science diplomacy. The paper by S.K. Varshney and N.K. Prasanna emphasises the critical need for an International Pandemic Treaty, particularly in light of the systemic deficiencies in global health governance exposed by the COVID-19 pandemic. The authors advocate for strengthened international cooperation to address structural inequities and ensure cohesive responses to future global health crises. Highlighting the interconnectedness of public health, this paper underscores that equitable guidelines, transparent data-sharing, and collaborative preparedness are essential in addressing future pandemics.

The paper by Parsifal F. Islas Morales et al. critically interrogates the historical and cultural roots of science diplomacy, tracing its roots to 17th-century ideological developments. The analysis challenges the presumed neutrality of evidence-based policy and questions the legitimacy of science

diplomacy as a tool divorced from its political and cultural dimensions. It ultimately advocates for re-evaluating science diplomacy against the peace-oriented origins of modern diplomacy, exemplified by the Peace of Westphalia.

The perspective by Dr Arabinda Mitra's highlights India's advancements in frontier technologies, its dynamic start-up ecosystem, and the strategic use of science, technology, and innovation for health diplomacy, notably through initiatives like Vaccine Maitree.

This issue also features two reports on science diplomacy courses. The first by Francesca Tolve gives an account of the Geneva Science Diplomacy Week 2024, organised by the Geneva Science and Diplomacy Anticipator Foundation (GESDA) and United Nations Institute for Training and Research (UNITAR), which focuses on anticipatory approaches to global challenges, ethical considerations in emerging technologies, and the importance of multilateral cooperation for sustainable development. The second course, reported by Sneha Sinha and Nidhi Singh, covers the 2024 AAAS-TWAS Course on Science Diplomacy. This programme emphasises the increasing necessity of global collaboration to address complex transnational challenges, focusing on inclusivity and bridging divides between the Global North and South.

Besides these, a review of China's Space Programme: From the Era of Mao Zedong to Xi Jinping by Anupama Vijayakumar is also published in this issue.

We look forward to your comments and suggestions.

PAPER

# International Treaty on Global Pandemics to Face Future Pandemics

SK Varshney* and NK Prasanna**,#

SK Varshney

NK Prasanna

## Introduction

Even if few countries were initially exposed to viral attacks earlier, more regions around the world are gradually becoming vulnerable to experience pandemics and their repercussions. The COVID-19 pandemic brought attention to and stressed the need for re-evaluation of our health policies (Michie, 2024). The problems and challenges confronting the global governance of international public health are on the rise, emphasizing the critical need for stronger international collaboration and resource-sharing to combat health threats. People at large should be made more aware of the realities, as the saying goes, "No one is safe until everyone is safe". This serves as a constant reminder that new SARS-CoV-2 variants still exist as long as the virus is allowed to spread in uncontrolled regimes across the world.

The COVID-19 pandemic unveiled significant gaps in the worldwide health care system in terms of preparedness and response mechanisms. It highlighted the inadequacies of international collaboration and the urgent need for a comprehensive pandemic treaty. Despite the pressing need for such a framework, negotiations among World Health Organization (WHO) member states reached an impasse in the summer of 2023, leaving the global community at a critical juncture. This paper explores the reasons behind the stalled progress of a pandemic treaty and emphasises the necessity of establishing equitable guidelines to safeguard against future pandemics. In May of 2023, member countries approached the deadline to craft a pandemic treaty aimed

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at overcoming these systemic challenges. Expectations were high that the treaty would establish unified protocols for pandemic preparedness, equitable vaccine distribution, and transparent data sharing. However, negotiations faltered as countries grappled with divergent national interests, economic constraints, and competing geopolitical agendas. Reasons for the Stalled Negotiations are due to 1) Divergent National Interests, 2) economic constraints and priorities. Rising geopolitical tensions further complicated consensus-building during the treaty negotiations (Huang et al., 2024). Nations faced challenges in collaborating due to existing tensions regarding trade, diplomacy, and historical grievances. The increasing divide between blocs, such as those led by advanced economies and emerging markets, stalled the negotiations, hampering the ability to establish a cohesive, collective approach to pandemic response. This fragmentation mirrors the broader geopolitical landscape, where systemic competition impedes cooperation. On the other side, many low-income countries are striving to assert their interests and needs on the global stage. They find themselves in a vulnerable position, struggling to navigate the challenges they face, from economic instability to public health crises. Ultimately, the existing geopolitical dynamics not only impede their capacity to negotiate effectively but also exacerbate the hardships. The lessons learned from the outbreak of COVID-19 pandemic dictate the urgency of a pandemic treaty. A pandemic treaty can provide a roadmap for countries to follow, ensuring that they are prepared to respond effectively and collaborate transparently in times of crisis. It also serves as a blueprint for addressing global inequities in health resources.

Recently, the viral zoonotic disease known as monkeypox—which is another infectious disease that spreads from animals to humans—was identified as an international public health emergency concern since it was endemic to Africa (PHIEC) (Upadhayay et al., 2022). Monkeypox, although historically endemic to certain regions, has now been reported

**Figure 1: Global Support for a New Pandemic Treaty**


***Source:*** Health Policy Watch: Creator: Svet Lustig Vijay

in multiple countries, demonstrating that we cannot afford to be complacent in our preparedness and response efforts (Fig. 1). To face the regular frequency of these dangers and adverse effects, countries must work together more closely to accelerate global research by sharing the data and necessary raw materials and creating a coordinated global response. This acts as a road map to recover from the pandemic and allows for timely interventions and better tracking of the disease's spread.

## Need for Technology Transfer

The "transfer of technology" has emerged as a pivotal and contentious issue in the context of global health, particularly in the production of vaccines, diagnostics, and new drugs. This transfer encompasses both "soft technology," which includes the critical know-how necessary for developing a product, and "hard technology," representing the physical infrastructure, such as factories and specialized equipment, needed for production. As the world grapples with health emergencies, such as pandemics, the ability to rapidly and effectively transfer these technologies has profound implications for public health equity.

The process of transferring technology is often fraught with challenges, primarily because the majority of pharmaceutical advancements and technologies are concentrated in the Global North (Evaborhene et al., 2023). Intellectual property holders, often situated in wealthy nations, possess the proprietary knowledge that is vital for vaccine and drug production. This creates a scenario where countries in the Global South, despite having the need and potential workforce to manufacture these crucial medical technologies, struggle to gain access to the necessary knowledge and infrastructure. This inequity in access to technology not only hampers the ability of these countries to respond to health crises but also exacerbates existing disparities in healthcare outcomes between different income levels.

To address these challenges, there is a growing call for policies that facilitate technology transfer. Such initiatives could involve public-private partnerships, international collaborations, and supportive regulatory frameworks that prioritize the sharing of technology across borders. By enabling the Global South to access both the soft and hard technologies essential for vaccine and drug production, the international community can enhance global health security. In doing so, it is crucial to navigate the complexities of intellectual property rights while fostering an environment that encourages innovation and equitable access, ultimately leading to a more resilient global health landscape.

## Current Framework for Strengthening International Cooperation in Universal Public Health

In a recent annual meeting, the World Health Assembly (WHA) agreed on a series of important amendments to the International Health Regulations (2005) (IHR) and made firm commitments to finalise and complete the negotiations on a global pandemic agreement by 2025. These amendments will enhance global health security, monitoring, and preparedness for public health emergencies, such as pandemics.

## World Health Assembly (WHA) and Its Role

WHA is the decision-making body of the World Health Organization (WHO). The annual convening of delegations from

all WHO member states held every year at the WHO headquarters in Geneva, Switzerland, emphasizes the importance of international collaboration in addressing global health challenges (Wood, 2023; Kitamura et al., 2013). As an important body in the international health community, the WHA holds key responsibilities in deciding on the organization's policies, appointing the Director-General of WHO, administering financial policies, and reviewing and approving the proposed programme budget. These functions are instrumental in ensuring the effectiveness and success of WHO in its mission to promote health, keep the world safe, and serve the vulnerable.

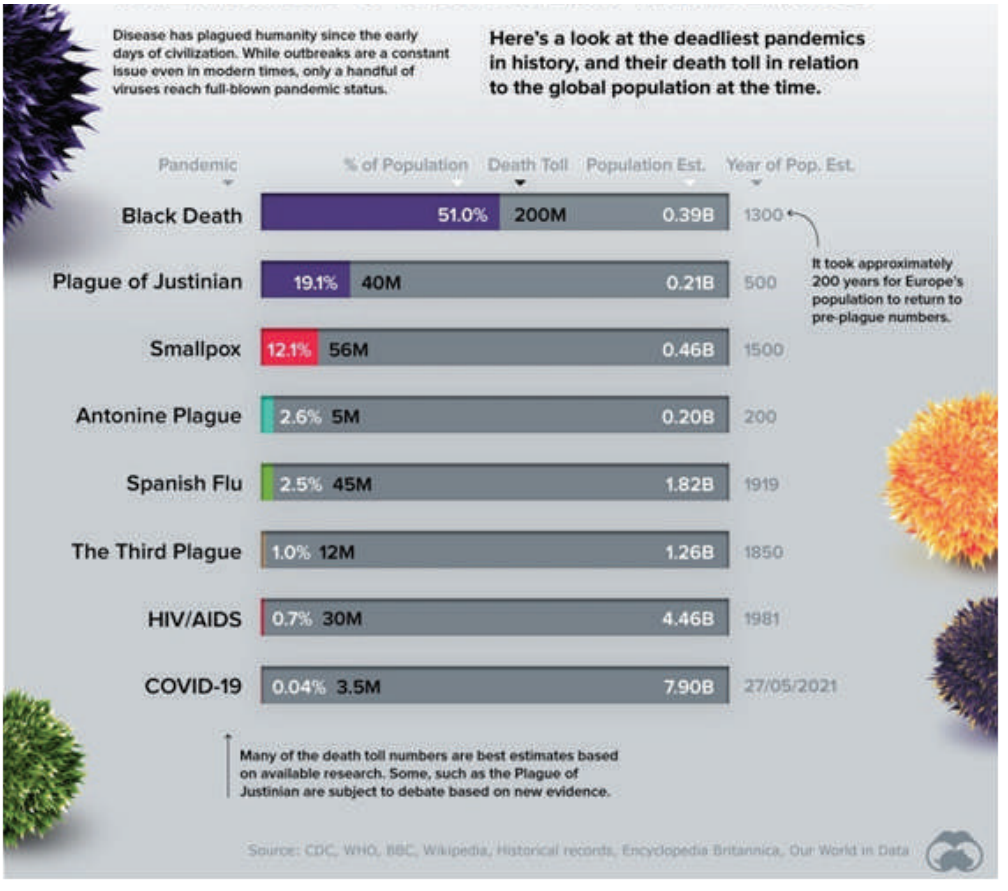
## International Health Regulations (IHR)

The International Health Regulations (IHR)1969, is an instrument of international law (Gostin & Katz, 2016; Katz and Allen, 2009). This was last updated in 2005. About 196 countries, including India, have entered into IHR to develop and recognize potential public health emergencies around the world. According to IHR, all countries can identify, evaluate, report, and respond to public health events. The main aims of international collaboration are to safeguard and stop the spread of disease globally and to keep it under control (Juneja et al., 2023). It offers a comprehensive legal framework with laws and regulations that outline nations' rights and duties in managing medical emergencies and life-threatening conditions that might spread across international cross borders. The World Health Organization (WHO) is given the authority to serve as the main global monitoring system by IHR. The Regulations also outline the specific criteria for deciding whether a particular incident satisfies the PHEIC definition (Mullen,2020). The updated regulations of IHR broadened the scope of public health events to include not only infectious diseases but also other health emergencies such as chemical, biological, radiological, and nuclear (CBRN) incidents. Comprehensive revision continues to expanding the scope to all public health threats. In 2014, the Ebola outbreak highlighted the need for rapid response mechanisms. Fast forward to 2020, the unprecedented ferocity of Covid-19 pandemic tested the IHR framework revealing both strengths and weaknesses.

## Critical Challenges and Pressing Issues Posed to the Healthcare Sector in Global World

Although IHR is ratified by 196 countries and has been addressing a systematic and comprehensive framework to deal with a pandemic, there are still several gaps. The essential capabilities of the governments to anticipate and respond to health emergencies are not accurately reported. Sharing information on local outbreaks with the WHO is frequently delayed. This slows down the global response, as it occurred in the case of COVID-19 (Fig 2). The lack of a rigid implementation of government policies is the root cause of the gap. One of the important steps in IHR regulations is primarily focused on preventing the spread of infections and detecting them as early as possible. The IHR is governed by the Ministries of Health of the member states (Gostin and Katz., 2016). The lack of stronger political will, particularly to devote funds and resources that may strengthen crucial capacities in accordance with the guiding principles of the IHR, typically has little impact on the underlying problem of the health ministries. Despite efforts by WHO to come up with better ways to track state compliance with IHR, little has changed. The readiness of member states and countries for responsiveness does not seem to have been significantly impacted by these IHR-related measures. COVID-19 has demonstrated that IHR still needs revision, which is why negotiations for a new treaty are currently taking place.

**Figure 2: World's Deadliest Pandemics**




***Source:*** https://www.visualcapitalist.com/worlds-deadliest-pandemics-by-population-impact/

## The Risk of Biological Warfare

As technology has advanced, possible bio-terrorism threatens mankind (Yassif et al., 2023; Rathish, 2023). According to the WHO, biological and toxin weaponry are either living creatures that are intentionally manufactured and deliberately released to infect and kill people, animals, or plants, such as viruses, bacteria, or fungi, or living organisms that produce poisonous substances.

Antimicrobial resistance (AMR-drug resistance) is a natural occurrence that lowers the efficiency of medications, making it harder or impossible to treat infections and disorders that can be slowed down but not stopped (Salam, 2023). According to the WHO, due to a lack of comprehensive assessment, AMR is one of the top 10 global public health risks to humans' health) (Mohan Naghvi, 2022). During the United Nations General Assembly (UNGA) High-Level Meeting on antimicrobial resistance (AMR), Indian Union Minister of State for Health and Family Welfare Anupriya Patel stressed India's commitment to addressing AMRand prioritised inter-sectoral collaboration as part of its updated (National Action Plan) NAP-AMR 2.0 and clean India mission. She emphasised the urgent necessity for

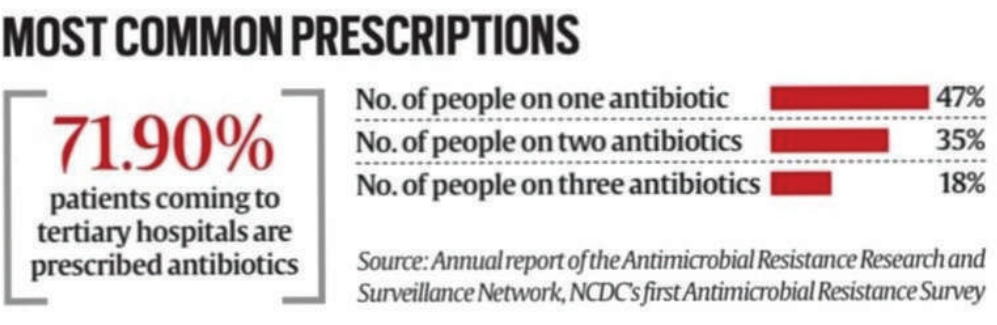
global cooperation in confronting the growing threat of antimicrobial resistance. The misuse and excessive usage of antimicrobials are the primary key factors in the development of drug-resistant pathogens. By implementing common guidelines for antibiotic use, we can better regulate and monitor the administration of antibiotics (Shrestha et al., 2023). It is crucial for all stakeholders, including healthcare professionals, veterinarians, and policymakers, to collaborate in establishing these guidelines. By doing so, we can ensure that antibiotics are used responsibly and judiciously, safeguarding their effectiveness for future generations (Figs 3 and 4).

## Global Alliance for Chronic Diseases (GACD)

GACD is a collection of publicly funded research agencies that support innovative research collaborations to address the prevention and treatment of chronic diseases in vulnerable populations (Ramani-Chander et al., 2023).As non-communicable diseases such as heart disease and diabetes continue to pose a significant global health challenge, we need to understand that it is crucial for organizations to work together to share

**Figure 3: Most Common Pathgens Found in India**

| Type of facility | Most commonly isolated pathogen | What the pathogen does | Resistance |
|---|---|---|---|
| ICU | *Acinobacter baumannii* | It can cause pneumonia, infections of the blood, urinary tract, and on wounds. It is becoming an important hospital-derived infection. | Continues to have 88% resistance to third-line, strong antibiotics like carbapenem |
| Wards & OPD | *E. coli* | May cause diarrhoea, UTI, pneumonia, and sepsis | Continues to show increased resistance to most classes of antibiotics, including carbapenem for which it went up from 18.6% in 2017 to 37.3% in 2023 |

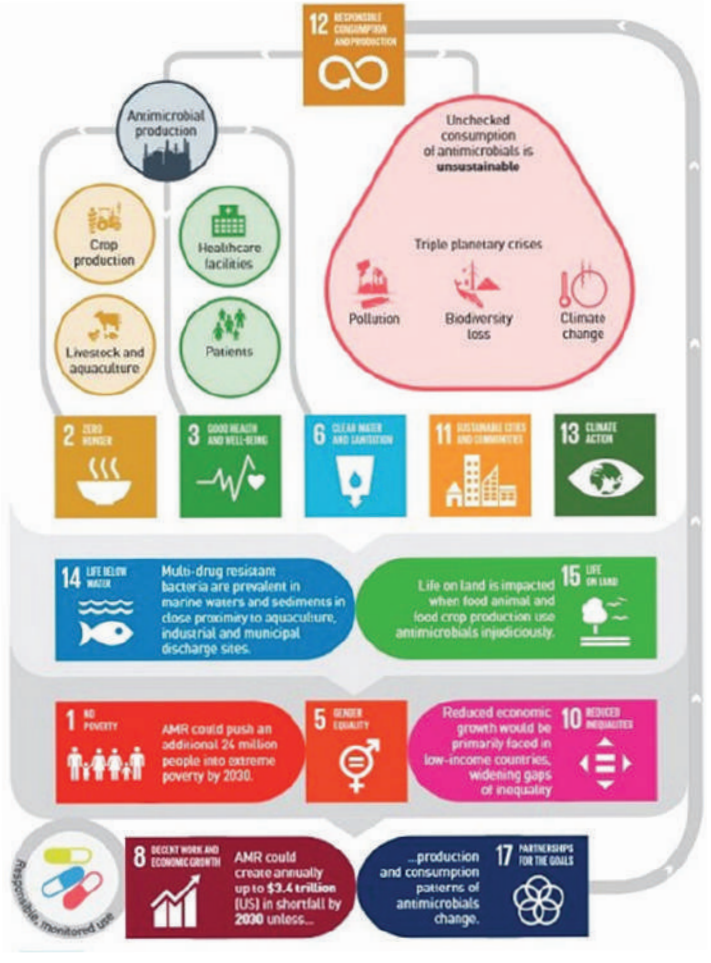


knowledge and best practices. Cooperation in the area of chronic disease management (NIH. 2024) can greatly benefit from knowledge sharing, particularly in the areas of prevention, treatment, and lifestyle interventions. By exchanging experiences and successful strategies, countries can learn from each other and contribute to more effective disease management on a global scale. The Global Alliance for Chronic Diseases (GACD) serves as an excellent example of how collaboration can make a meaningful impact in addressing these pressing health issues.

## The role of Multilateral Agencies on development and diplomacy

Key multilateral organisations, including the World Health Organization (WHO), United Nations International Children's Emergency Fund (UNICEF), United Nations Population Fund (UNFPA), and Joint United Nations Programme on HIV/AIDS (UNAIDS), are pivotal in addressing specific health issues such as child health, reproductive health, and HIV/AIDS. The WHO functions as the primary coordinating body for global

**Figure 4: Antimicrobial Resistance: A Global Threat | UNEP - UN Environment Programme**



health efforts within the United Nations framework. Its responsibilities encompass establishing international health standards, offering technical support to countries, and overseeing the global response to health crises (Ruger, and Yach, 2009).

## Global Health Initiatives (GHIS)

GHIS are strategic programs designed to tackle specific health challenges that are addressed through targeted programs known as global health initiatives (J.P. Koplan et al., 2009). The most notable examples are the Global Fund to Fight AIDS, Tuberculosis, and Malaria. GAVI, the Vaccine Alliance focuses on increasing access to immunization in low-income countries, both of which are essential in combating these pressing health issues.

## Public-Private Partnerships (PPP) Paradigm

The concept of Public-Private Partnerships (PPP) has emerged as a significant model for fostering collaboration across multiple sectors—governments, non-governmental organisations (NGOs), and the private sector. Working together enables the efficient pooling of resources and expertise to tackle complex challenges that are beyond the reach of any single entity. (Rajabi et al., 2021; Doucet et al., 2024) A prominent example of this collaboration is the Bill & Melinda Gates Foundation, which works to enhance health outcomes globally. (Denmark, 2024) Through partnerships with governments, health organizations, and other philanthropic entities, this foundation has invested heavily in initiatives aimed at combating infectious diseases, improving maternal and child health, and promoting access to vaccines and essential healthcare services in underserved populations around the world.

PPP initiatives leverage the unique strengths of each sector: government bodies provide regulatory frameworks and public resources; NGOs offer specialised knowledge and community engagement, while private companies bring innovation, efficiency, and investment capabilities. This synergistic relationship can lead to more effective and sustainable solutions, particularly in areas such as infrastructure development, healthcare, education, and environmental sustainability.

## The Impact of Regional Organisations on International Relations

Regional entities such as the Pan American Health Organization (PAHO) for the Americas (PAHO,2024) and the African Union are instrumental in coordinating health initiatives within their respective regions, thus reinforcing global health efforts tailored to local needs (Ana et al., 2021). So, the existing framework for global health cooperation is a complex network of multilateral agencies, international regulations, targeted health initiatives, public-private partnerships, and regional organizations, all working collaboratively to address health challenges worldwide (Jones, 2022).

## Lack of Global Cooperation and Collaboration

During the COVID-19 pandemic, high-income countries failed to share vaccines, medications, and diagnostics fairly, and the rest of the world was vulnerable to any consequences and injustices of such inequalities, ultimately leading to viral variants(Hameed et al., 2022). Due to patent restrictions, in a sizeable portion of the globe where vaccination rates are lower

than normal and still there are pockets of unvaccinated people.

## Benefits of a Global Pandemic Treaty

The World Health Assembly conducted a special session in December 2021—the organization's second special session since its founding in 1948—and decided to create a worldwide pandemic treaty to "strengthen pandemic prevention, preparedness, and response. An Intergovernmental Negotiating Body (INB) will be responsible for drafting and negotiating a treaty under Article 19 of the World Health Organisation's (WHO) Constitution (Syam, and Tellez, 2024). The World Health Organisation (WHO) has a pivotal role in coordinating international health initiatives and responding to health emergencies. Article 19 of the WHO Constitution permits the World Health Assembly (WHA) to adopt regulations concerning quarantine measures that are applicable to all member states. In this context, the intergovernmental negotiating body (INB) seeks to develop a comprehensive treaty aimed at better preparedness and response to future pandemics and other global health threats.

The primary objective of the INB is to draft a legally binding instrument that outlines the responsibilities of WHO member states in preventing, preparing for, and responding to health emergencies. This includes issues related to equitable access to vaccines and medical resources, surveillance and reporting obligations, and strengthening health systems globally. The INB consists of representatives from WHO member states, who are appointed based on their expertise and experience in public health and international law. The negotiating body is designed to be inclusive, ensuring that the voices of low-income and middle-income countries are heard throughout the negotiation process. During this phase, the process of drafting the treaty involves several stages:

1. **Consultations:** Initial consultations are held with stakeholders, including member states, international organisations, non-governmental organizations (NGOs), and civil society actors to gather diverse perspectives and input.
2. **Drafting Guidelines:** Based on consultations, the INB develops initial guidelines and outlines the structure of the treaty.
3. **Negotiation Sessions:** The INB conducts multiple sessions, allowing member states to negotiate text, make proposals, and amend provisions.
4. **Final Drafting:** Upon reaching consensus, the INB prepares a final draft, which is then submitted to the World Health Assembly for approval.
5. **Adoption and Implementation:** Once approved, member states are encouraged to ratify the treaty and implement its provisions at national levels.

One of the foremost challenges and considerations is ensuring political will and diverging interests among member states by committing to a legally binding treaty. Countries have varying interests, especially regarding issues like intellectual property rights, equitable vaccine distribution, and funding mechanisms.

## Ensuring Equity, Balancing National Sovereignty and Global Responsibilities

Equitable access to health resources is a critical consideration in the treaty's negotiation process. The INB must ensure

that provisions address the needs of low- and middle-income countries, which often have less capacity to respond to health emergencies. Many times, the member states may be reluctant to cede aspects of their sovereignty to a global framework. In this process, the INB must navigate these concerns while emphasising the collective benefits of cooperation in public health. The main anticipated impact is the successful implementation of the treaty drafted by the INB to create a framework for more coordinated and collaborative global health governance. This can lead to improved responses to future health emergencies and better preparedness.

## Enhancing Transparency and Accountability

A legally binding treaty can facilitate greater transparency and accountability among member states regarding their commitments to health security. This can foster trust and cooperation in global health initiatives.

One of the primary benefits of a legally binding framework is it obligates member states to openly share critical information regarding their health capabilities, resources, and challenges. This transparency is pivotal in enabling nations to understand and address health threats more effectively, as it allows for an assessment of both strengths and weaknesses in global health preparedness. In addition to fostering transparency, a legally binding treaty can also promote accountability. When countries are held responsible for their commitments, they are more likely to take the necessary actions to protect public health. This accountability can manifest in various forms, such as regular reporting, peer reviews, and mechanisms for assessing compliance with treaty obligations. By holding nations accountable, the treaty serves to reinforce the importance of collective responsibility in addressing global health issues. Furthermore, the enhanced trust that arises from greater transparency and accountability can lead to improved cooperation among member states. When countries are open about their health security efforts and held accountable for their actions, it encourages collaboration and sharing of best practices. This cooperative spirit can strengthen global health initiatives, helping to create more robust systems for responding to health emergencies, whether related to infectious diseases, natural disasters, or other public health threats.

## Supporting Sustainable Development Goals (SDGs)

The treaty can align with the broader objectives of the Sustainable Development Goals (SDGs), particularly Goal 3, which aims to ensure healthy lives and promote the well-being of individuals of all ages. This commitment is not limited to merely improving healthcare systems but encompasses a holistic approach that includes addressing social determinants of health, ensuring access to essential health services, enhancing mental health care, preventing communicable and non-communicable diseases, and advocating for health education. By aligning with this goal, the treaty can contribute significantly to fostering a healthier, more equitable world where every individual, regardless of their age, has the opportunity to lead a fulfilling and vibrant life free from preventable ailments and suffering.

So, the establishment of the Intergovernmental Negotiating Body (INB) represents a vital moment in the evolution of international health law and governance. By negotiating a treaty under Article 19 of the WHO Constitution, the INB has the potential to address

the systemic weaknesses revealed by past health crises and create a robust framework for global health security. Despite the challenges ahead, the INB's ongoing work symbolises a commitment to collective action, resilience, and shared responsibility in safeguarding public health worldwide.

Article 19 states that any item under the Organization's purview may be the subject of conventions or accords that may be adopted by the Health Assembly (Gostin et al., 2023). Such conventions or agreements may only be adopted by the Health Assembly with a 2/3 vote. The second such initiative under Article 19 will be this one. The WHO Framework Convention on Tobacco Control, which came into force in 2005, was the first aspects including data exchange, genome sequencing of newly developing viruses, equitable distribution of vaccines and medications, and related global research are anticipated to be covered by the new pandemic treaty (Roemer et al., 2005). This treaty might also improve the ability of many nations, particularly those with low and middle-income countries, to manufacture vaccines, medicines, and diagnostics built by of a global commitment of resources, knowledge, and technology transfer. Example, the Convention on Biological diversity or the Vienna convention for the protection of the ozone layer. These are the forums that created the trust and timely negotiated specific objectives. Montreal Protocol on substances that deplete the ozone layer and the Nagoya Protocol on access to and sharing of genetic resources that come later are a few excellent examples and played an instrumental role in global pandemics (Farias, 2023).

International environmental agreements have become fundamental tools in the global effort to address pressing challenges such as climate change, biodiversity loss, and health emergencies, including pandemics. Two notable examples are the Montreal Protocol, adopted in 1987, and the Nagoya Protocol, which was established much later in 2010. The Montreal Protocol has successfully phased out many substances responsible for ozone layer depletion, contributing significantly to the recovery of this critical atmospheric shield. The Nagoya Protocol, on the other hand, addresses the need for fair and equitable sharing of benefits arising from the utilisation of genetic resources, emphasizing sustainable practices that can indirectly help avert health crises.

## The Impact of the Montreal Protocol

The Montreal Protocol emerged in response to growing concerns over ozone layer depletion caused by chlorofluorocarbons (CFCs) and other ozone-depleting substances (ODS). The protocol established legally binding commitments for countries to phase out the use of these substances, leading to a remarkable reduction in their atmospheric concentrations. The success of the Montreal Protocol is evidenced by the anticipated recovery of the ozone layer, which is projected to return to its pre-1980s levels by the middle of the 21st century. By effectively safeguarding the ozone layer, the Montreal Protocol contributes to a marked reduction in the incidence of diseases exacerbated by increased exposure to UV radiation. Studies have shown that with the recovery of the ozone layer due to the phasedown of ODS, there will be significant long-term health benefits, including a forecasted decrease in skin cancer cases, lessening the burden on healthcare systems and enhancing the overall health of populations worldwide.

## Role in Global Health and Pandemics

The indirect benefits of the Montreal Protocol extend to public health. The ozone layer protects life on Earth from harmful ultraviolet (UV) radiation, which is linked to skin cancer, cataracts, and other health issues. By safeguarding the ozone layer, the protocol plays a vital role in reducing the incidence of diseases exacerbated by increased UV exposure. Moreover, the lesson learned from the implementation of the Montreal Protocol is to contribute to the preparedness for a global pandemic. The protocol was developed and adopted in response to a pressing global environmental crisis, and it exemplifies the importance of timely action based on scientific consensus. This spirit of urgency and collaboration that defined the protocol's creation can serve as a valuable blueprint for future responses to health crises, such as pandemics. In the face of emerging infectious diseases, the Montreal Protocol underscores the necessity of global solidarity and cooperation. It highlights that effective responses to health emergencies rely not only on individual countries taking proactive measures but also on robust international partnerships and the sharing of knowledge and resources. The emphasis on scientific consensus, as seen in the protocol's ratification process, reinforces the idea that public health actions should be grounded in sound research and evidence.

## The Nagoya Protocol: Objectives and Significance

The Nagoya Protocol was adopted to enhance the fair and equitable sharing of benefits derived from genetic resources. It establishes a framework that ensures the rights of countries to regulate access to their genetic resources while defining the responsibilities of users. By promoting sustainable use and conservation of biodiversity, the Nagoya Protocol aims to support both ecological integrity and equitable benefit-sharing.

## Contribution to Public Health and Pandemics

The connection between genetic resources, biodiversity, and public health is increasingly recognized, particularly in the context of the emergence of zoonotic diseases. Access to genetic resources can facilitate research and development of vaccines, medicines, and technologies vital for addressing health challenges, including pandemics. By ensuring that countries are compensated fairly for the use of their genetic resources, the Nagoya Protocol incentivises the conservation of biodiversity, which is crucial for maintaining ecosystems that support human health. Furthermore, the protocol encourages collaboration between nations, researchers, and indigenous communities, fostering a holistic approach to health that integrates traditional knowledge with scientific research. This collaborative framework is essential in the face of global health threats, as it can lead to innovative solutions that respect local cultures and practices.

## Synergies between the Protocols

The Montreal and Nagoya Protocols exemplify how international treaties can synergize to protect both the environment and public health. The successful implementation of the Montreal Protocol has established a precedent for global cooperation, providing valuable insights that can be applied to the objectives of the Nagoya Protocol. Both protocols highlight the importance of scientific research in informing policy decisions and the need for data sharing in combating pandemics. The collaborative spirit cultivated through these agreements fosters a culture of mutual

trust and respect, essential for addressing global challenges that transcend national borders. These two protocols represent the two exemplary cases of international governance addressing environmental and health-related issues. Their combined efforts underscore the significance of global cooperation in the face of shared challenges, such as global pandemics. By striving for environmental sustainability and equitable resource sharing, these protocols contribute to the foundational elements of public health, underscoring the interconnectedness of human well-being, biodiversity, and ecological health.

As the world faces increasing threats from climate change, biodiversity loss, and emerging infectious diseases, the principles established by the Montreal and Nagoya Protocols serve as vital frameworks for future international cooperation. Policymakers and stakeholders should harness the lessons learned from these agreements to forge an integrated approach to environmental protection and public health that champions sustainability, equity, and resilience in the face of global challenges.

## DOHA Declaration

The Doha Declaration, articulated during the Fourth Ministerial Conference of the World Trade Organization (WTO) in 2001, remains a pivotal text concerning trade policies, particularly in the context of health-related technologies and regional trade agreements. It emphasises the need for clarity and improved procedures regarding existing WTO regulations related to these agreements. The current challenges posed by the COVID-19 pandemic, coupled with requests from countries like South Africa and India to waive patent rights for COVID-related technologies, further underscore the urgency of addressing these concerns. Additionally, the World Health Organization (WHO) has initiated discussions for a Global Pandemic Treaty to enhance international cooperation and preparedness in the face of emerging health crises. The implications of the Doha Declaration, the ongoing patent discussions, and the proposed Global Pandemic Treaty ultimately highlight the necessity for a collaborative and equitable approach to trade and health.

## The Doha Declaration and Regional Trade Agreements

The Doha Declaration asserts the importance of regional trade agreements (RTAs) within the framework of the WTO. It urges members to clarify and enhance regulatory norms and procedures related to these agreements while recognizing their growing prevalence in international trade. As Abbott (2022) notes, the expansion of RTAs necessitates a thorough examination of how these agreements align with WTO principles, ensuring that they do not undermine the multilateral trading system. As global trade dynamics shift toward regionalism, it becomes crucial to balance these agreements' advantages and the need for fair competition and regulatory coherence. The Doha Declaration's emphasis on transparency and the necessity of aligning RTAs with broader trade rules can lead to more sustainable trade practices and heightened cooperation among member nations.

## Patent Rights and Access to COVID-19 Technologies

The ongoing discourse surrounding patent rights and access to COVID-19 vaccines and treatments reflects the underlying tensions in international trade and health policies. South Africa and India have spearheaded requests to the WTO to abandon patent rights related to COVID-19 technologies, advocating for broader access to these essential resources for developing countries. The reluctance of the WTO to grant this waiver has sparked

widespread debate about the intersection of intellectual property rights and public health.

The debate centres around the principles of justice and fairness, as countries with limited access to medical technologies struggle to combat the pandemic effectively. The Doha Declaration originally recognized health as a fundamental human right, implying that trade regulations should not hinder access to essential health resources (Syed, 2024). The situation calls for a re-evaluation of the balance between protecting intellectual property rights and ensuring equitable access to life-saving technologies for all nations.

## The Global Pandemic Treaty

In acknowledgement of the need for enhanced global preparedness for future pandemics, the WHO has initiated the development of a Global Pandemic Treaty. This treaty aims to create a framework for international cooperation, focusing on sharing information, resources, and technologies to mitigate the effects of pandemics effectively. The approach emphasises principles of justice, fairness, mutual support, and health for all, which are integral to addressing health crises in an interconnected world.

The International Negotiating Body (INB) has been tasked with drafting this treaty, with an expected completion date set for May 2024. The deliberations surrounding the treaty present an opportunity to integrate lessons learned from the COVID-19 pandemic into a cohesive global health strategy. By addressing the gaps in international cooperation and the disparities in access to health technologies, the Global Pandemic Treaty could pave the way for a more equitable health landscape.

The Doha Declaration has significant implications for contemporary issues in trade and health, particularly concerning regional trade agreements and access to essential medical technologies. The ongoing discussions surrounding patent waivers for COVID-19 technologies highlight the urgent need for a balanced approach that harmonises trade regulations with public health imperatives. Furthermore, the proposed Global Pandemic Treaty represents a crucial step toward strengthening international cooperation and preparedness in the face of future health crises. As negotiations progress, it is vital to prioritise principles of justice, fairness, and mutual support to build a resilient and equitable global health infrastructure. Through collaboration and commitment, the international community can navigate the complexities of trade and health to ensure a healthier future for all.

According to the Doha Declaration, Negotiations must focus on "clarifying and upgrading norms and procedures under the existing WTO regulations about regional trade agreements; the growth of regional trade agreements must be considered during the negotiations. (Abbott, 2022) A request from South Africa and India to relinquish patent rights on Covid-related technologies has not yet been accepted by the WTO. A Global Pandemic Treaty, in recognition of the need to further strengthen international cooperation to ensure better preparedness and a balanced response to emerging pandemics, WHO has started the process of establishing and ratifying a new international treaty. This acknowledgement of the necessity further helps to improve international collaboration. It also promotes the principles of justice, fairness, mutual support, and health for all.

This treaty would be created through the deliberations and discussions of an International Negotiating Body (INB), with the specific intention of wrapping up the process by May 2024. To address possible threats and risks like animal-human-ecosystems interface, a coordinated collaborative, interdisciplinary, and cross-sectoral approach is required to face future pandemics.

Building a consensus framework through an incremental approach through continuous dialogue and collaboration within international forums can facilitate the exchange of best practices, experiences, and strategies among nations. The future prospects of a global pandemic treaty are promising yet fraught with many challenges. The ongoing discussions and efforts to establish a comprehensive framework for pandemic preparedness and response are essential to prevent future health crises. By addressing key issues such as equity, coordination, research collaboration, and accountability, the global community can move closer to a robust treaty that enhances global health security. Ultimately, the success of such an initiative will hinge on the political will of nations, commitment to cooperation, and recognition of the shared responsibility towards safeguarding global health.

## Potential Consequences of Delaying a Pandemic Treaty

The urgency to pass the proposed pandemic treaty is underscored by the escalating threats posed by climate change, biodiversity loss, and chemical pollution, all of which are interconnected factors that contribute to the emergence of potential new pandemic risks. As human activities continue to alter land use and encroach upon natural habitats, the interactions between humans and animals are intensifying, heightening the risk of zoonotic spillovers that can ignite new infectious diseases. This is a clarion call for immediate action, as we need effective governance structures in place to anticipate and mitigate the impacts of future pandemics rather than responding reactively after the fact.

The COVID-19 pandemic has starkly highlighted the inadequacies of our existing international frameworks, particularly in terms of pandemic preparedness and response. While we have established norms regarding pandemic influenza, the global response to COVID-19 revealed significant shortcomings in these expectations, as countries struggled to cooperate and adhere to agreed-upon protocols. This inconsistency in behaviour not only compromised public health responses but also weakened the trust between nations—a vital element for effective international collaboration in times of crisis.

Ultimately, the pandemic treaty represents more than just a regulatory measure; it serves as a foundational step toward rebuilding trust and restoring a sense of shared responsibility among countries and international institutions like the World Health Organization (WHO). By establishing clear norms and expectations concerning pandemic preparedness, we can foster a more cooperative global environment that prioritizes collective action and knowledge sharing, which are essential for tackling future health threats. Time is indeed of the essence; the longer we delay in formalising these agreements, the greater the risk we inherent for ourselves and future generations as we continue to navigate the complexities of our changing world.

## Recommendations: Need for Treaties for Global Good

The first goal should be the early detection and prevention of pandemics. This might be accomplished by strengthening the country reporting process, using joint external reviews and frequent follow-ups. Ensuring equitable and fair universal access to vaccines, medicines, and diagnostics is necessary to combat future pandemics. (Worsley-Tonks, 2022) There is a need to ensure better surveillance of pandemic risks, such as increasing laboratory and surveillance capacity required to identify animal diseases in all countries and increasing global cooperation between research institutions worldwide. This will facilitate the gathering of worldwide data, which will help in a better understanding of the disease and better coordination and collaboration of international funding for core capacities. This will ensure a better health care system in developing or impoverished countries also. To share the risks brought on by infectious disease epidemics, a new pooled insurance mechanism may be formed. At the same time, this finance mechanism would be used to promote adherence to a worldwide pandemic treaty. We all, citizens of high and low-income countries, feel safe in time to come from any zoonotic disease or any bio-terrorism (Worsley-Tonks et al., 2022).

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PAPER

# Utopism in Science Diplomacy: A Critical Review of Its Origins

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## Introduction

It is intriguing to consider the convergence of diplomacy and science as a unified concept. It is worth asking whether diplomacy can be considered a scientific discipline or whether science can be regarded as diplomatic.

In 2010, the Royal Society of London, the world's oldest continuously active scientific society, published a manifesto entitled "New Frontiers in Science Diplomacy" (New frontiers in science diplomacy, 2010). This form of diplomacy is based on the prioritisation of "scientific evidence" in government decisions, with a clear distinction between scientific evidence and political action as a means of representation and social transformation.(Ruffini, 2017; Islas-Morales et al., 2020). Implied is a replacement of political discourse with lobbying through "science diplomacy" which may reflect dissatisfaction with traditional political action. For scientists to participate in decision-making, it is considered more effective to act as emissaries, interacting with stakeholders, rather than recognising themselves as political agents.(Islas-Morales et al., 2023; Ledgerwoodand, 2018; Langenhove, 2016; Ruffini, 2017).

The replacement of critical discursive elements with positive narratives and the idea that the legitimacy of public policy can stem, not necessarily from scientific knowledge, but from the prioritisation of evidence over discourse: numbers,

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not words, could be considered a utopia. The aspiration of many societies has been to establish a government based on scientific evidence, which they perceive to be the most reliable source of information for determining public interest. There is no doubt that public policies can benefit from scientific information. However, science cannot be expected to fulfil the desire for the public interest, which is essentially subjective. Moreover, it would be a mistake for policymakers to assume that science is neutral and devoid of a political dimension, both in terms of the actors involved and the institutions that shape it (Philippart, 1975; Saltelli and Giampietro, 2017; Agassi, 1986).

Consequently, although initially optimistic and positive, science diplomacy fails to acknowledge the political dimension of science by replacing it with what is commonly referred to as evidence-based policy. Could this be a result of historical roots and a utopian-hegemonic way of thinking, rooted in the cultural context of Anglo-Saxon "science diplomacy"?

The 2010 manifesto makes reference to the early international relations of the Royal Society in the 17th century, suggesting that they may be considered precursors to the contemporary phenomenon of "science diplomacy". It is important to note that many of the utopian elements (postulates and contradictions) of 21st-century science diplomacy are not new and date back to the 17th century, with the ideology among the founders of the Royal Society. (Keller and Penman, 2015). This paper aims to provide a critical examination of this period, focusing on its utopian elements and associated geopolitical interests. It seeks to contrast the concept of science diplomacy with the historical reference point of modern diplomacy, namely the Peace of Westphalia of 1648 (a 17th-century process).

## Origins of Anglo-Saxon Science Diplomacy

### *The Royal Society and the New Philosophy*

The Royal Society of London, established in 1660, represents the first public institution of science in the modern era. This landmark event was sponsored by King Charles II of England (MacLeod, 2010). Was this an act motivated by altruism? The institutionalisation of science in the context of the modern state implies the recognition that science has utility for the public interest or the monarch in power. The 17th century saw the advent of the Scientific Revolution in Europe. This era had previously witnessed the Renaissance in Italy and already had a grasp of the first scientific revolutions exemplified by Copernicus and Vesalius (Greenwood, 2015). This begs the question of what political interest a nascent science, the new philosophy, could represent.

The greatest political potential of the new philosophy was to challenge the established order and its dogmas, thereby legitimising new forms of power. At the time, Europe was experiencing the schism of the Protestant Reformation, and the authority of the Vatican was waning. A bipolar Europe was thus formed, with two distinct confessions: Catholics and Protestants. Both sought political representation from monarchies. (Dixon, 1996; Sabine and Russell, 1946). In this context, new ways of thinking about the world were sometimes permitted and sometimes suppressed. Intellectual history

recognises the scholastic philosophers who were oriented towards the Catholic Counter-Reformation on the one hand, and the empirical philosophers who were promoted by some Protestant states on the other. In seeking protection, both epistemic communities attempted to be useful to those in power (Wippel and Wolter 1969; Tumbleson, 1996). Those who claimed freedom were persecuted on both sides, as evidenced by the case of Giordano Bruno (Bahar, 2010). This process permitted the secularisation of an increasing number of areas of public life while simultaneously facilitating the reinterpretation of religious dogma into new political doctrines, such as the Reason of State in Protestant kingdoms. In this context, the establishment of the Royal Society represents the utilisation of science as an instrument, wherein the interconnections between "scientific" philosophers serve as conduits, not necessarily of diplomacy, but of intelligence that fortifies states that are unilaterally confronted (Gascoigne, 1999; Miller, 1999).

### *Protestant Historical and Cultural Context*

The historical and cultural context of 17th-century Protestantism in England was characterised by a radical transformation in the perception of knowledge and truth. The Protestant Reformation and the Renaissance had a profound impact on the way in which Western society understood the world. They led to a separation of knowledge and faith and a shift in the understanding of divine truth towards a more human and natural realm. This paradigm shift enabled reason and intelligence to become foundational tenets of Protestant culture. The nascent rationality, still shaped by traditional customs and esoteric beliefs, sought to comprehend both nature and God, resulting in a reinterpretation of the relationship between humanity and the divine (Deason, 1985; Mason, 1953).

René Descartes, from his Catholic standpoint, employed the deductive method and placed great trust in innate ideas, asserting that truth could be reached through clear and distinct rational thought. His cogito ergo sum ("I think, therefore I am") marked the advent of modern philosophy and influenced political and social thoughts throughout Europe, advocating for dialectics in research and decision-making. While the Baconian programme of English empiricism did not explicitly adopt his philosophy, Cartesian dialectic played a role in establishing the "climate of opinion" conducive to the formation of the first scientific academies. Members of the Royal Society, such as Robert Boyle and John Wallis, engaged with Descartes' ideas, adapting and critiquing them. Descartes' contributions to analytical geometry and his mechanistic approach influenced research and scientific methodology, fostering modern thought. English criticism against him came principally from him, recognising divinity as the final cause beyond the comprehension of science while English philosophers were anxious that his work should be in service of confirming the Christian faith (Armitage, 1950; Damião, 2018; Scholz, 1920; Harrison, 2007).

Conversely, empiricism, as espoused by the likes of John Locke, is predicated on the assumption that all knowledge is derived from sensory experience. This philosophy rejects the notion of innate ideas and asserts that the human mind at birth is a tabula rasa, a blank slate upon which experience imprints

knowledge. This empirical perspective, which emphasises on observation and experimentation as the foundations of knowledge, had a significant impact on the evolution of science and political philosophy in Protestant countries. The defence of empiricism and scepticism towards absolute truths resulted in greater tolerance and plurality in the political realm, thereby reinforcing the liberal principles that advocate for equality, individual freedom and the rejection of the divine origin of power. Consequently, the practices and power structures in Protestant Europe were shaped, but not completely, by rationalism and empiricism that promoted a vision opposed to catholic scholastics and dogma (Rosenblatt, 2006).

The figure of John Dee provides a vivid example of how these new currents of thought, still steeped in with magic-religioius beliefs, were operationalised in practice and integrated into the daily lives and political landscape of the time. Dee, a mathematician, astrologer, and alchemist, made a significant contribution to advances in navigation and technique in England, while his astrological advice continued to be valued by the Queen. His practical approach and commitment to educating sailors, craftsmen, and technicians demonstrated the importance of applying theoretical knowledge to material reality, thereby enhancing England's maritime and economic power. This pragmatism resonated with the Protestant beliefs of the time, which placed great value on reason and intelligence as divine tools to achieve the nation's destiny (French, 2013; Miller, 1999).

The introduction of Renaissance Neoplatonism in England during the reign of Henry VIII proved to be a significant catalyst for the cultural transformation that was to follow. The Venetian theologian Francesco Giorgi, who advised the king on his divorce from Catherine of Aragon, introduced ideas that challenged traditional conceptions of authority and knowledge. The dissemination of this new knowledge was facilitated by the advent of the printing press and theatrical works, especially those of Shakespeare. However, it was the reading of the Bible that truly spurred a cultural revolution. The necessity to comprehend the Holy Scriptures led to a significant increase in literacy, particularly among the middle classes. This, in turn, gave rise to an unparalleled demand for scientific and educational books, reflecting a desire for practical and systematic knowledge that transcended intellectual elites (Gortari, 1957).

The integration of the state and intelligence apparatus within 17th-century diplomatic practices was also reflected in the realms of politics and religion. For instance, Queen Elizabeth I, advised by John Dee, employed her image as a deified monarch to offset and neutralise the competing forces vying for power. The deification of the Queen was a means of overcoming social, cultural and religious prejudices and divisions, thereby consolidating her authority and Protestantism as a distinctive feature of English identity (Beck, 2011; Keller and Penman, 2015).

## Geopolitical Interests and Scientific Diplomacy

### *Scientists and Protestant Rulers*

During the 17th century, Protestant realms offered an environment of greater freedom and patronage for communities of empiricist philosophers influenced by figures such as René Descartes, John

Locke, and John Dee. These philosophers, regarded as the fathers of early chemistry and physics, received support from rulers such as Charles II of England and Frederick III of Schleswig-Holstein-Gottorf, who shared military, economic, confessional, and philosophical interests. Frederick III was a utopian and Protestant prince-elector of the Holy Roman Empire, while Charles II was concerned about the technical superiority of the Spanish Armada and sought to establish an intelligence apparatus in the scientific-philosophical realm (Rosenblatt, 2006; Keller & Penman, 2015).

The formation of the Royal Society was preceded by the activities of several prominent figures in the scientific community, including Robert Boyle, Samuel Hartlib, John Dury, Isaac Newton, and Robert Hooke. Prior to its establishment, these scientists constituted one of the "Invisible Colleges," which, upon receiving patronage from Charles II, would subsequently evolve into the Royal Society. Furthermore, an important relationship of scientific and political collaboration emerged between the Duchy of Schleswig-Holstein and the Kingdom of England, known as the London-Gottorf correspondence (MacLeod, 2010);Keller and Penman, 2015; Gascoigne, 1999).

Samuel Hartlib, of Anglo-Prussian descent, and John Dury were pivotal figures within this intelligence network. A noteworthy figure within this network was Frederick Clodius. Despite not making significant scientific discoveries, he can be regarded as one of the pioneering "intelligencers" of the modern era. In 1651, Clodius was dispatched by the Duke of Gottorf to the United Provinces of the Netherlands and subsequently to England and Scotland, with the objective of establishing a network of scientific contacts that could prove advantageous in terms of practical inventions and political thought. Clodius established connections with the intellectual communities of the period, encompassing both Catholic and Protestant perspectives. (Young, 2018; Keller and Penman, 2015).

By 1650, Dury, Hartlib, and Clodius, already members of the Invisible College, which was the precursor to the Royal Society, drafted a treaty project in London for the benefit of Protestant interests. This was known as the "Christiana Societas Pactum." The treaty was subsequently ratified a year later and formalised an intelligence network with the objective of strengthening the position of Protestant states against Catholics. During the same period, Clodius entered into matrimony with Hartlib's eldest daughter (Bakker, 2007; Keller and Penman, 2015 ;Hoppen, 1976).

## *The Christian Society Pact in Service of State Intelligence*

The "Christian Society Pact" represents the utopian and Protestant thinking of the time, seeking to legitimise the political superiority of Protestant doctrine over the forms of power and knowledge from Catholic and Muslim cultural spaces. As stated by the proponents of the pact, its objective was to establish a network of intellectuals who would provide Protestant kingdoms with epistemic, theoretical, and scientific reinforcement in the exercise of their forms of government: quodconjunctisoperisdeinceps re publicoutilesprocurare (Miller, 1999; Keller & Penman, 2015).

> Matters useful to the state (whether for the implantation and

> propagation of virtues in the souls of men, or for the expelling of diseases; or for the lessening of public crimes, or for the alleviation of poverty and the promotion of industry in general) that seem worthy of being communicated to rulers and leaders of commonwealths, shall be communicated to the Duke of Holstein firstly and before [all] others, and only through Master Clodius; whereas those matters which are to be brought to the English Commonwealth, shall be communicated only through Master Hartlib; and those which are to be offered to the Protestant churches, only through Master Dury.

The London-Gottorf correspondence and the so-called Hartlib Papers have revealed that the 1652 Christian Society Pact was driven by a profound concern that the applications of new philosophical ideas serve Protestant countries and remain beyond the reach of Catholic realms. This was motivated, at least in part, by the desire of Protestant states to gain primacy in this knowledge, exploiting the censorship imposed by the Counter-Reformation (Young, 2018 ; Keller & Penman, 2015; Yamamoto, 2012; Gascoigne, 1999; Cepik, 2003; MacLeod, 2010).

While Hartlib would be responsible for consolidating and censoring scientific information within the Commonwealth, the Duke of Holstein would have access to information from continental Europe via Clodius. Additionally, Dury would facilitate the transmission of general information to the authorities of Protestant churches. It is not implausible to suggest that this agreement, rather than facilitating the dissemination of knowledge, resulted in its concentration into a single network, which subsequently assumed the role of the Royal Society itself, eight years later. From the modern concept of state intelligence, the pact is notable for its emphasis on confidentiality and the handling of information deemed to be of national security or strategic importance. Which particular tenets of the emerging philosophical movement did they deem to be of national security importance?

It is clear that the signatories recognised the technological superiority of navigation, geography and mining in Catholic realms as a threat. However, they also considered Protestant realms to be the repository of new philosophical ideas with aggregating potential, especially in the areas of alchemy/chemistry and moral sciences. Protestant philosophers were not entirely rationalists. As previously stated, although the philosophers of the Royal Society espoused the new empiricist and rationalist philosophy of Bacon and Boyle, as well as the logic of Descartes, a considerable number remained committed to a hermetic and mystical interpretation of nature, continuing their work as alchemists, e,g,. Newton, Boyle and Hooke. This epistemological syncretism has been overlooked in the official history of science for various reasons (Gortari, 1952). While it currently does not have practical value in understanding the history of discoveries, it is of great value in understanding who these figures were and what their motivations and spiritual and political ideals were. As alchemy underwent further refinement, philosophers and governors sought to establish the primacy of material

and spiritual reason in the universe and to derive a secular logic of power. This was to be a logic that did not derive from divinity but from man in harmony with divinity. This was an interpretation that was entirely consistent with Lutheranism (Gortari, 1957).

This interpretation has been advanced by some historians, as the notion of class within Protestant scientists is analogous to the material liberties already conquered in the bosom of the Reformation and Calvinism by merchants. In Protestantism, wealth and reason are secularised by merchants and scientists, respectively. From the perspective of the polis of science, Hartlib, Clodius, and Dury promote a notion of a political constitution of "truth". Which truth? That of the Protestant utopia, in which the government is expected to adhere not to the catholic dogma but to the reason that guides the Protestant Interest (Keller and Penman, 2015).

The influence of the utopian Christian Society Pact on the development of Anglo-Saxon scientific diplomacy has rarely been the subject of detailed analysis. The Royal Society, however, identifies Henry Oldenburg as the immediate predecessor and the underlying rationale of the English scientific internationalisation policy. This can be seen to make a veiled reference to the spirit of scientific diplomacy and evidence-based policy in the early years of the Christian Society pact and the Royal Society (New frontiers in science diplomacy, 2010).

### *The "Reason of State"*

It is noteworthy that Charles II of England did not espouse the tenets of utopianism to the same extent as his counterpart from the County of Gottorf. Conversely, it seems likely that Charles II perceived the opportunity to differentiate himself from Cromwell's radical concepts by endorsing philosophers and facilitating their autonomy of thought, as opposed to providing a platform for the dissemination of Protestant ideology towards continental Europe (Greaves, 1971; Shapin, 1994). England distanced itself from the Thirty Years' War conflict, prioritising internal stability and the weakening of France, while maintaining neutrality towards Spain. Consequently, it engaged in diplomatic negotiations with representatives of both the Catholic and Protestant factions (Marks, 2012; Asch, 1997).

However, returning to the utopian thinking behind the deployment of international relations, intelligence, and power networks from science, it is evident that the Christian Society Pact represents an example of scientific diplomacy, or more precisely, geopolitical intelligence derived from science. In his 1653 ratification, Dury elucidates that the primary objective of this pact and the network of philosophers serving the Protestant interest is to collectively conceptualise a theory regarding the "Reason of State." In other words, the intention was to propose a political manifesto that would justify the existence of secular Protestant states in opposition to Catholic religious states. Dury posits that power in Catholic states is derived from multiple sources beyond divinity granted to the Pope and succession in the kingdoms under the Catholic Church. He claims that Catholic political thought draws upon Greek traditions and is informed by the ideas of Machiavelli. In this view, power is exercised through the use of violence and fear as a means of domination, and the secular power

of the Catholics can be characterised as Machiavellian. Consequently, it was deemed necessary for Protestants to have their own theoretical framework for understanding and exercising power, namely that of the utopic Reason of State (Keller and Penman 2015; Wolffe, 1991; Tadie, 2017).

## From War to Peace: Origins of Modern Diplomacy

The "Hartlib Papers", the London-Gottorf correspondence, and even the Invisible College can be situated within the context of a period characterised by conflict and tension between Protestants and Catholics, which ultimately led to the Thirty Years' War (1618-1648). It is intriguing to observe that some of the most significant scientific advancements have occurred during periods of significant geopolitical tension. Some historians have theorised that in the absence of institutionalised science, patronage towards the sciences increased in order to gain geopolitical power and prestige. Similarly, utopian thought found alternative spaces amidst the confusion and cessation of censorship from both Catholics and Protestants. It can be observed that periods of social turbulence have often been accompanied by significant shifts in philosophical thought. The Thirty Years' War, which had a devastating impact on Europe, began with the Defenestration of Prague in 1618. It subsequently escalated into a peasant war that jeopardised the unity of the Holy Roman Empire due to a series of crises, including displacements, famines and massacres. It can be considered one of the first large-scale wars of the Early Modern Period, with historical precedents in the Hundred Years' War. It is estimated that the conflict resulted in the deaths of at least 8 million people in Europe (Asch, 1997)

In 1646, Emperor Ferdinand III of Austria (also Charles V of Spain and Austria) entrusted Count Maximilian von Trauttmansdorff with the responsibility of organising peace at the Congresses of Münster and Osnabrück. In a novel approach, an emperor delegated extraordinary and plenipotentiary powers to an ambassador with a single objective: to negotiate peace. The Congresses of Münster and Osnabrück saw the advent of a novel approach to conflict resolution, namely the multilateral approach. These novel forms of representing international power had never been practised before. Rather than addressing the underlying causes of conflict, they sought to resolve it based on the idea of shared interests. As the scholar of diplomatic history Juan José Bremer observed, the Peace of Westphalia marked the birth of modern diplomacy. Its objective was to guarantee peace through treaties, prioritising conciliation and avoiding the imposition of paradigms or discussion of the difficult causes of conflict, such as religious disputes. In practice, peace is not a product of raison d'état but rather a result of consensus and recognition among sovereign states (Bremer, 2017; Méndez-Silva, 2018; Klimburg-Witjes and Trauttmansdorff, 2023).

## Conclusion

The Christian Society Pact and the utopian ideals espoused by Hartlib and the Duke of Gottorf (as evidenced by their proposed utopia Antalia), demonstrate a clear intention to combine utopian and secular thought within the Protestant interest. It would be beneficial to ascertain whether the philosophers of the Christian Society Pact perceived the emerging philosophical and scientific movements as a secular religion, which would be a crucial element of utopia in alignment with the ideas of

Thomas More. It seems likely that this is the case, and so we can conclude that this is the first occasion on which the idea emerges that government decisions can be legitimised not only in theocratic absolutism, but in the pragmatism and empiricism of an enlightened monarch, or even of an enlightened republic?

In contrast to the Protestant interest that motivated the Christian Society Pact to assert philosophical superiority over Catholic states, the diplomats of the Peace of Westphalia opted for mediation on negotiable points (trade, circulation, process of elector princes, among others), avoiding the religious, theological, and philosophical issues. Essentially, diplomacy does not resolve the underlying causes of conflict. Rather, it serves to end the conflict and to maintain peace based on the idea of shared interests. Consequently, diplomacy cannot be considered scientific. Instead, diplomacy focuses on facilitating the coexistence of different visions for peace, rather than implementing a new paradigm.

The concept of scientific diplomacy in the Anglo-Saxon cultural space has a complex and multifaceted trajectory, which can be traced from its origins in the 17th century to its contemporary application. Throughout this trajectory, various geopolitical interests, philosophical utopias, and power dynamics have played a significant role. Thus, the "Christian Society Pact" represents a pivotal moment in which scientists and rulers demonstrated an interest in utilising scientific networks as a tool of state intelligence for political and religious purposes. The Royal Society of London played a pivotal role in the institutionalisation of science as a component of state policy, while simultaneously affording scientists a class status within secular Protestant society. This highlights the interconnection between science, religion, and power. In contrast to diplomacy, which seeks to resolve conflicts through mediation for peace, the intelligence of the 17th century was aimed at consolidating Protestant interests and its cultural hegemony. This dichotomy between the pursuit of knowledge and its application for political purposes remains pertinent in the analysis of contemporary scenarios involving science, diplomacy, and intelligence.

It is noteworthy that the Royal Society document makes reference to itself in its search for historical sources rather than, for example, to the post-war science movement for peace. This is an intriguing and provocative approach. As in the past, science continues to exert an international influence and intersect with diplomatic activities. When these actions are oriented towards Peace, they can be described as diplomacy and never to be confused with technical science advisory.

In the light of historical precedent, the aspirations of diplomacy and policy to take on a scientific character and of science to embody diplomatic principles, like the idea of raison d'État, have utopian roots that have endured from 1652 to the present day.

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# Role of Media in Science Diplomacy

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## Introduction

The 21st century is increasingly driven by the technological and innovation prowess of a nation which contributes significantly to shaping the market dynamics and access, economic & social growth, self-reliance & security quotient of a nation. More importantly, it directly influences the stature of a country in the high table of nations.

For India, Science, Technology & Innovation (STI) is now recognised as the driving engine of growth across sectors covering agriculture, communication, education, clean energy, climate resilience, defence, health, water, transport, manufacturing, disaster management, etc. The role of S&T will be both profound and prolific, as India transits to become one of the top global economies.

The span of science and technology policy interventions, both in its breadth and depth, has become increasingly important in order to address national needs and aspirations by being inclusive and, at the same time, also meet the international obligations as a responsible State actor in the comity of nations.

India has internationally showcased that a public infrastructure for digital services can promote welfare objectives from financial inclusion to vaccine delivery. It has been well demonstrated and recognised how science and technology-led innovation played a seminal role in fighting COVID and meeting the multifaceted challenges posed by the pandemic. Inherent capabilities of the scientific

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and technological prowess of India were amply demonstrated by Vaccine Maitree which scripted a new paradigm on health diplomacy across 77 odd countries on the world map.

India today has a thriving and vibrant innovative eco-system with the third largest Start-up enterprise in the world, with perceptible growth of science-led deep-tech start-ups. The emerging areas of cyber-physical systems like AI, ML, Analytics, IOT, Deep learning, quantum, cybernetics, semiconductor research, 5G/6G communication, defence tech, clean energy, aerospace and outer space technology, deep ocean mission along with new frontiers of bio-engineering and bio-manufacturing has provided strong enabling platforms to leverage upon in developing new patents, products, processes and services that have the market potential not only domestically but also at a global level.

Therefore, using Science & Technology as a potential tool for diplomacy in high-priority and high-opportunity areas is getting even more imbibed now than before in our foreign policy dispensation. Addressing the 2022 Global Technology Summit, EAM Dr S Jaishankar remarked that the rise of India is deeply linked with the rise of Indian technology. He alluded to the central role that technology will play in paving the way for future bilateral engagements. He categorically stated that India's engagements with nations will be increasing charted based on the technology prowess, governed by the principles of technology access and market reach.

As science, technology and innovation increasingly becomes an intrinsic diplomatic tool in foreign policy enunciation of India, it is obvious that it would require proactive engagement of non-government actors like private-sector, academia and research community, Indian diaspora, and most importantly the large Indian media house. Towards effectively building the narrative of international alliances based on emerging technologies in shaping the future geopolitical conundrum, the role of India has to be effectively conveyed by the media as a part of our global order commentary.

Internationally, Indian media has to portray the contemporary image of India as an emerging scientific and technological powerhouse that is effectively leveraging its technology led innovation skills and trained manpower to provide solutions to various real-world challenges in an affordable, accessible and available manner. Inaugurating the Indian Newspaper Society premises in Mumbai in July 2024, the Prime Minister urged Indian media to enhance their global footprint and portray not only the emerging capabilities of the country but also bring about change and create new discourse. He commended the role of Indian media in effectively promoting the technological strength of the Digital India program at an international level.

As countries compete to build capabilities and skills for harnessing scientific knowledge in order to make its use to develop new technologies, today's media also needs to highlight the associated risk and challenges posed by such emerging technologies in a rationale and balanced manner. It is seen that Developed countries often hype the negative aspects of new and emerging technologies and dissuade other countries from pursuing the development and adoption of such front-end technological tools. Indian media needs to play a

proactive and vigilant role in safeguarding and creating discourses that rightly protect our strategic and non-strategic interests gained through scientific and technological pursuits in frontier areas.

Technology denial or prohibitive cost of technology, especially under climate change and clean energy negotiations, and the prevailing WTO patent regime are some of the practical challenges which hold back equitable and inclusive technology facilitation mechanism. The role of pro-active media to effectively highlight and defend the country's position and interest is invaluable in this regard. This will also pave way for India to take a leadership role in south-south cooperation and achieving the SDG and climate adaptation goals.

Structured communication by media is all about developing and delivering strategic national aims by understanding and influencing world opinion. Too often, the Indian media commentary on scientific and technological advancements is tactical, responsive and fragmented. Managing risk and reputation through a cogent media narrative is vital when we talk about S&T and diplomacy.

This can be best achieved by building a constructive and organic relationship between national media and the STI community across government, academia, R&D labs, industry and the startup enterprises. The need to train and incentivise science reporters is not only critical to raise the awareness of our people and polity of the importance and relevance of STI but also objectively project India's role, capability and commitment to a just world order by leveraging the fruits of STI.

The collective role of government agencies like the Ministry of External Affairs, along with R&D agencies both in the public and private sector, in tandem with all arms of social, print and electronic media will be critical for achieving this. We have to diligently develop an effective and seamless outreach platform as a part of our world-order engagement both in strategic and non-strategic sectors that are driven by the prowess of science, technology and innovation.

REPORT

# Geneva Science Diplomacy Week 2024: A Review

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## Introduction

Started in 2022, the Geneva Science Diplomacy Week is an initiative coordinated by GESDA (Geneva Science and Diplomacy Anticipator Foundation), an independent non-profit organisation founded in 2019 as a result of collaboration between Swiss and Geneva authorities.

Selection in the Geneva Science Diplomacy Week 2024 was through a competitive and internationally selective process. It brought together a diverse group of 30 participants from 25 nations, each with different professional backgrounds ranging from officials and government representatives to scientists.

## The Geneva Science Diplomacy Week 2024

The immersive programme for the Week 2024 aimed to leverage Geneva's multilateral ecosystem and foster collaborative learning and networking among the participants from the various institutions.

The Programme started at the International Red Cross and Red Crescent Museum, where the evolution of science diplomacy was highlighted starting from 2010.

As the first step, the need for an anticipatory approach in science diplomacy was emphasised, balancing the rapid

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pace of scientific advancements with the urgency of addressing global challenges and navigating geopolitics.

The participant engaged in discussions on diverse topics derived from the 2023 GESDA Science Breakthrough Radar®, which is an instrument set up by GESDA to provide insights into future science and technology trends. The instrument aims to enrich Geneva's multilateral ecosystem and the global system by fostering learning, networking, and critical questioning on science diplomacy.

During this first phase of the Programme, participate were provided with insights into multilateral diplomacy processes and the potential role of 'boundary-spanners' between the scientific and diplomatic realms.

This phase also included a UN-guided tour and a reception with Enrico Letta, President of the Jacques Delors Institute, emphasising the importance of global training frameworks in tackling challenges accelerated by science and technology.

The second phase of the Programme, highlighted the value of diverse perspectives in scientific anticipation and foresight, emphasising the importance of collaboration and trust-building in science diplomacy.

Moreover, participant were engaged in a "Climate Diplomacy Simulation" at the University of Geneva, organised by the Centre for System Solutions and GESDA.

The scenario presented to us involved a global crisis of trust following revelations of dubious geoengineering experiments in the Pangean Union. The role-playing exercise required participant to take on various stakeholder roles with competing interests at a solar radiation management conference organised by the United Nations.

Representing diverse backgrounds and nationalities, participant were tasked with debating a proposed moratorium on solar geoengineering technology and uses. The simulation intended to highlight the complexities of global governance in climate technology, where the line between scientific research and application is blurred and where the importance of anticipation, involving diplomacy, industry, and society in decision-making from the start, was emphasised.

The exercise also underscored the challenges of reaching consensus in multi-stakeholder approaches and the need for thoughtful consideration of trade-offs and potential profits.

Moreover, in a lesson on computational diplomacy, UNIGE professors discussed the project of analysing data on UN Security Council resolutions using computational science.

This project aims to enhance science diplomacy by quantitatively analysing critical mechanisms underpinning foreign policy and international relations. The data revealed the growing importance of security threats such as pandemics, non-state armed groups, and cyber-attacks, prompting discussions on necessary reforms within the UN Security Council.

This second phase of the Programme concluded with an interactive session on science diplomacy and emerging technologies at Impact Hub Geneva,

hosted by the Swiss Young Academy and foraus. The above-mentioned discussions and role-playing activities provided insights into the complexities of global governance, the importance of multi-stakeholder collaboration, and the role of anticipation in addressing emerging challenges in science and diplomacy.

The third phase of the Programme featured thought-provoking discussions, and interactive sessions focused on the governance of lethal autonomous weapons systems, negotiation, and the intersection of science, peace - technology, and diplomacy.

At the Geneva Centre for Security Policy, participant engaged in a simulation where real-life policymakers role-played as scientists and vice versa to discuss the ethical implications of lethal autonomous weapons.

Key considerations that emerged included transparency, accountability, collateral damage, and the need for regulations to govern the development and use of such weapons. The debate underscored the challenges of regulating emerging technologies and the importance of addressing ethical dilemmas in science diplomacy.

GESDA SD week also provided an opportunity to engage in private discussions with Ambassador Thomas Greminger, Director of the Geneva Centre for Security Policy, and former Swiss President Micheline Calmy-Rey, who shared insights on multilateralism and negotiation engineering.

The latter, developed by the Science in Diplomacy Lab at the University of Geneva and the Swiss Federal Institute of Technology, aims to apply scientific methods to depoliticise negotiations and solve complex problems in diplomacy.

Discussions also touched on the complexity of achieving peace, the need for scientific evidence in diplomatic decision-making, and the collaborative efforts of organisations like GESDA to develop a shared sense of purpose.

Overall, it provided insights into the ethical, political, and scientific dimensions of global challenges, emphasising the importance of interdisciplinary collaboration, forward-thinking approaches, and evidence-based decision-making in science diplomacy.

The fourth phase of the Programme included a visit to the European Organisation for Nuclear Research (CERN), where scientists and officials, including German physicist Rolf-Dieter Heuer, offered their views on science diplomacy and debated whether science is neutral. It was underlined how political decisions are best based on science.

The participants were also given an overview of the treaty-based intergovernmental organisation's scientific cooperation in Europe, which began in 1954.

As one of the world's largest and most respected centres for scientific research, CERN was, indeed, a forerunner of modern science diplomacy, serving as a haven for British and German scientists to collaborate for the first time in the wake of World War II.

It was also underlined how CERN works to advance the UN's 17 Sustainable Development Goals for 2030 and has

identified seven – five SDGs dealing with health, education, gender, energy, and innovation, and two dealing with international cooperation – where it can be particularly active, and tries to tailor its programs to support the advancement of those seven SDGs.

Moreover, the Deputy Director for Research and Computing detailed CERN's governance, which emphasises open science and collaborations among member and non-member nations, together with the need for leaders to promote policies for peace and development based on scientific evidence and facts, rather than populism and emotion.

Activities also included an interactive role-playing game on quantum diplomacy. The scenario was set in 2032, when large-scale quantum computing has been achieved and could help curb global greenhouse emissions – but one country has a monopoly on the technology and imposes export controls on quantum-related goods and services. The crisis goes to the UN.

The game served as an introduction to GESDA's most advanced initiative, the Open Quantum Institute (OQI), launched at CERN in March 2024.

Further activities were marked by insightful discussions on the human right to science, global cooperation, and the role of science in addressing global challenges. The participant were engaged in a simulation game aimed to test the ability to balance individual, group, national, and global interests in achieving the UN's Sustainable Development Goals for 2030.

These activities were preceded by a lecture on the human right to science, highlighting its importance in addressing global challenges such as pandemics, climate change, and disinformation. It also explored the legal basis of the right to science under the Universal Declaration of Human Rights and the International Covenant on Economic, Social and Cultural Rights, where the necessity of science and creativity in advancing human rights and global progress was emphasised.

GESDA SD week also provided valuable lessons about the complexities of decision-making and the need to consider the broader impact of choices on various stakeholders.

The week culminated in a closing keynote by the World Health Organisation's chief scientist, who emphasised the importance of building trust and fostering scientific literacy in policymaking.

Overall, the Geneva Science Diplomacy Week 2024 equipped us with new perspectives, skills, and, in particular, new connections and new international networks to possibly jointly drive positive change in the intersection of science, diplomacy, and global cooperation.

## Conclusions and Recommendations

The Geneva Science Diplomacy Week 2024 served as a platform for engaging discussions, interactive sessions, and simulations on various aspects of science diplomacy. From the importance of anticipation in addressing global challenges to the ethical implications of emerging technologies, we gained valuable insights into the complexities

of global governance and the role of interdisciplinary collaboration in shaping the future of diplomacy.

Based on the discussions and activities during the event, the following conclusions and recommendations can be drawn:

**Anticipation and Collaboration:** The need for an anticipatory approach in science diplomacy was a recurring theme throughout the week. It is crucial for stakeholders to anticipate future challenges and opportunities in order to effectively navigate the rapidly evolving landscape of science and diplomacy. Collaborative efforts among diverse stakeholders from government, scientific, and diplomatic realms emerged to be essential in addressing complex global issues.

**Ethical Considerations:** The discussions on lethal autonomous weapons systems and quantum diplomacy underscored the importance of ethical considerations in decision-making processes. It is imperative for policymakers and scientists to prioritise transparency, accountability, and the ethical implications of emerging technologies, ensuring that the benefits of science and technology are balanced with ethical standards.

**Multilateral Cooperation:** The week highlighted the value of multilateral cooperation in addressing global challenges. Stronger multilateral partnerships and collaborations among nations emerged to be essential for achieving sustainable and inclusive global development.

**Capacity Building and Education:** The emphasis on scientific literacy, trust-building, and global training frameworks underscored the importance of capacity building in science diplomacy. Investing in education and training programs that equip individuals with the necessary skills and knowledge to engage in diplomacy and scientific cooperation emerged to be crucial for advancing global cooperation and peace.

REPORT

# 2024 AAAS-TWAS Course on Science Diplomacy: Reflections & Insights

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## Introduction

The practice of science diplomacy is not new, however, its conceptual and theoretical understanding is usually traced back to the seminal report 'New Frontiers in Science Diplomacy' jointly published fifteen years back by the American Association for the Advancement of Science (AAAS) and the Royal Society. The capacity building and training programmes in science diplomacy have largely remained fragmented and restricted to extra-curricular courses and workshops, and a few are conducted by international science organisations (Mauduit & Soler, 2020). The AAAS and The World Academy of Sciences (TWAS) science diplomacy course can be viewed as one of the earliest courses in science diplomacy, which has been continuing for over a decade now. AAAS-TWAS week-long course is designed for scientists, policy- and decision-makers, as well as other relevant stakeholders and institutions.

The course is held each year at the Abdus Salam International Centre for Theoretical Physics in Trieste, Italy with exceptions during 2020-2023 when the courses were held online. The course explores the concepts of science diplomacy, and how it could be leveraged to tackle contemporary international policy issues and challenges pertaining to science, technology, environment, health, sustainable development, etc. Apart from the AAAS-TWAS course, other science diplomacy courses include those offered by Using Science For/In Diplomacy for Addressing Global Challenges (S4D4C), Inventing a Shared Science Diplomacy for Europe (InnSciDE), DiploFoundation, Geneva Science and Diplomacy

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Anticipator (GESDA), United Nations Institute for Training and Research (UNITAR), the São Paulo Innovation and Science Diplomacy School (InnSciDSP), and Research and Information System for Developing Countries (RIS) to name a few. A few courses are also offered by some universities' centres/departments.

## AAAS - TWAS Course 2024

Having held about 10 editions of the course and having trained several emerging leaders across the world, AAAS-TWAS continues to be one of the significant courses in science diplomacy. This year, the course was held from 17-21 June 2024 with about 20 participants from across 11 countries (including Argentina, Cameroon, Guatemala, India, Kazakhstan, Germany, Madagascar, Nepal, Pakistan, Sudan, Uganda). The course saw a fair gender representation among participants and speakers. The selection of participants reflects the program's outreach and commitment towards providing opportunities for capacity building in emerging economies and the Global South. Thus, representing socio-economic diversity and geographical inclusion. Although the course prioritised participation from developing and S&T lagging countries, limited participation from developed countries like Germany underlined the significant move towards bridging the gap and establishing and strengthening the connection between the Global North and the Global South. This is extremely essential to create a diverse and inclusive science diplomacy network for an agile, pragmatic and inclusive understanding and practice of science diplomacy, which at present largely remains centred around the Global-North. Recognising the need for a stronger science-policy nexus for science diplomacy, the AAAS-TWAS course has for the past four years mandated applications by participant pairs of both scientists and policy makers living in the same country and having common interests in issues related to science, technology and innovation. Such an effort aims to strengthen the connection between scientists and governmental officials, decision makers and diplomats, which is integral to tackling common challenges. The group of speakers and experts was a blend of policymakers, academics and practitioners across Africa, Asia, Europe and Americas with diverse knowledge in geophysics, food security, climate change, biodiversity and ranging from multilateral, regional and city-led approaches in science diplomacy.

The course consisted of the keynote address, panel discussions on preconceptions and concepts of science diplomacy and its career trajectories, as well as group activities and role-playing exercises. The inaugural session emphasised on the increasing role of science diplomacy and the need for a global network of science diplomats, which can be seen as one of the key achievements of the AAAS-TWAS course. The course held in the 'city of science' emphasises on science and diplomacy for fostering global cooperation and solving complex global challenges through dialogue, informed-decision making, knowledge sharing and technology transfers. The inaugural session also underlined the need for 'collaboration over competition' towards a 'collective response' in solving common challenges. The keynote address was presented by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which aims to protect species by regulating

international trade in plants and animals. The role of the private sector, youth, and local communities, and especially the significance of the Global South was underlined. Therefore, finding synergies for addressing the triple planetary crisis across geopolitical landscapes and forging inclusive pathways towards conservation of biodiversity and achieving SDGs is necessary. The role of local communities in tackling biodiversity loss is of utmost significance. Some efforts undertaken by CITES and issues/challenges faced in such efforts and engagements with local communities were discussed.

The following session provided a brief overview of the workshop and an introduction to science diplomacy, which also gave a historical perspective of the practice of science diplomacy and a peak into the 'three-dimensional' AAAS-Royal Society Framework for Science Diplomacy. As science diplomacy and international science cooperation are sometimes wrongly used interchangeably, the session highlighted that their motivations were distinct. AAAS efforts to build relations with China and Cuba were discussed in some detail, followed by enumerating the opportunities and challenges for science diplomacy with growing complex geopolitics, asymmetries in scientific capabilities and limited resources for S&T.

The first discussion during the following session focused on environmental science diplomacy enabled by scientific engagement with the Democratic People's Republic of Korea in Mount Paektu, an active volcano at the border between North Korea and China. Such a project signified that science cooperation is often an early area for engagement as countries build relationships. The second revolved around the unique science-policy interface, which helped in co-designing through scientific assessments leading to the publication of the reports of the Intergovernmental Panel on Climate Change (IPCC) and the UN Framework Convention on Climate Change (UNFCCC), which provide a science-based assessment of climate change and provide recommendations which are instrumental for informed decision making. While most of the focus of science diplomacy remains global and region-centric, the third discussion revolved around the Barcelona city-led S&T Diplomacy, which led to the creation of SciTech Diplomacy Hub to position Barcelona as a global lab in science diplomacy to elevate the role of S&T and cities in foreign policy. The role of non-state actors, sub-national governments and non-government organisations in science diplomacy was highlighted.

The course themes resonated with the three dimensions of science diplomacy as defined in the AAAS-TWAS 2010 Report. The module on 'Science for Diplomacy' illustrated cases of science collaboration in times of diplomatic tensions through case studies in UK science diplomacy, environmental science as a safe space of science engagement with North Korea and efforts of the AAAS to establish collaboration with Cuba. However, all speakers highlighted the issues of blanket sanctions, travel and visa restrictions, political conflicts, etc., in realising and strengthening such science-based collaboration in politically strained situations. The next module centred around 'Science in Diplomacy' which assessed the role of scientists in progress towards the Sustainable Development Goals. The case studies revolved around the need for trans-boundary cooperation over water resources which may help in

addressing issues of SDG6 vis-a-vis safe drinking water and sanitation for all. This required coordinated actions and information exchanges together with accelerated development and uptake of innovative technologies between countries. The Guarani Transboundary Aquifer was discussed as a successful example of hydro-diplomacy. Further, the need for strengthening the science policy nexus in agriculture, which greater dialogue between scientists, policymakers and other stakeholders to ensure food security and tackle hunger and undernourishment was emphasised. Therefore, knowledge co-creation and integration for sustainable and equitable food systems is essential. Lastly, 'Diplomacy for Science' was reflected by shedding light on international efforts to build large scale infrastructure projects like.

Synchrotron-light for Experimental Science and Applications in the Middle East (SESAME), International Centre for Theoretical Physics (ICTP), African Light-source, Square Kilometre Array, etc. Alongside the achievements of these large science projects, the issues and challenges of establishing, sustaining, and continuing them were also discussed in great detail.

One of the biggest challenges of the emerging and growing fields like science diplomacy is the availability of career opportunities in science diplomacy. To address this, the course has a dedicated session on careers in science diplomacy. Another key feature of the course was the group activities which focused on building networks between participants as well as also ensuring greater engagement with the experts and speakers. The first of such breakout groups discussed 'What is (and what is not) Science Diplomacy? and before the closure of each day participants were given space to reflect on their learnings of the day. The course included role playing exercises which were helpful in absorbing the duties and responsibilities of the given roles, and also enabled participants to understand what goes into multi-stakeholder and plurilateral negotiations on common and global issues. The role playing games continue to be a medium of conversation and dialogue between the alumni even after the course. The course gave ample scope for networking through welcome and gala dinner receptions, which is extremely crucial to develop a significant science diplomacy alumni network which sustains beyond the course.

## Conclusion

Although there are several science diplomacy courses that have come up now, the AAAS-TWAS course certainly continues to be one of the well-known and important courses. Some efforts to also bring participant pairs from the developed countries (like one done this year) is a very welcome step in bringing the Global North and the Global South together and forging global science diplomacy networks. These are important as most of the challenges that we face today are trans-national and global in nature, and therefore, will require coordinated global responses which are rooted in science, and help in effective and informed decision making. Additionally, as AAAS-RS are making efforts to re-look and expand the contours of science diplomacy, the course could reflect these newer horizons moving beyond the three-dimensional perspective on science diplomacy. Greater discussions

on issues of techno-nationalism, techno-sovereignty, geopolitical tensions affecting S&T cooperation and growing facets of 'collaboration vs competition' will be crucial. AAAS and TWAS have ensured continued engagement by adding their participants to an alumni network, and can regularly share relevant events and publications for longer engagement.

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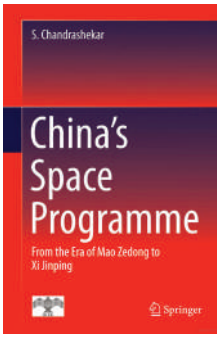
# China's Rise in Space: Implications for Geopolitics and Space Diplomacy

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The rise of China to become a major space power has been one of the most significant developments shaping geopolitical dynamics in the 21st Century. The role of China's space programme in facilitating the country's emergence as an influential player in international affairs has also been a subject of great interest to both policymakers and academics alike in recent times. The evolution of the programme from the basics to even reach the most elite fields of spacefaring, such as deep space exploration and human spaceflight, is a true testament to how any country can leverage advanced technologies to tangibly demonstrate its prowess to the world, while positioning it favourably to set global agenda. The book *China's Space Programme: From the Era of Mao Zedong to Xi Jinping* offers a comprehensive assessment of the same through binding political, military, economic and technology aspects into a coherent narrative. The book is divided into two parts with the first part delving into the history of the programme and various internal and external factors that shaped it. The second part delves into each of the functional areas of China's space programme in depth across ten chapters, looking at recoverable satellites, communications satellites, weather satellites, China's remote sensing satellites, navigation

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satellite constellation, human spaceflight, space science, space infrastructure and launch vehicles. The author also elaborates upon various military satellites and trends driving China's approach to international cooperation and diplomacy.

The author segregates the evolution of China's space programme into three phases: Origins (1956-1976), Economic Reform and the Deng Era (1977-1990), The Post-Cold War Era (1991-2000) and the ongoing Growth Phase (2001-2020). Aspects that went on to mould the programme during each of these phases, including domestic and external pressures, role of scientists and interventions from leadership, have been elaborated upon in each of these sections.

China's space programme, originated in the context of the Mao Zedong-led Cultural Revolution, which has been termed "the most turbulent period in China's history" (p.15). During the initial phase Qian Xuesen, known as the Father of China's Space Programme, played the role of a liaison between the political, military and scientific communities to get the programme moving. Qian, who was studying in the United States of America at the time under American aerospace pioneer Theodore van Karman, was deported to China after being accused of being a spy. Following the launch of Sputnik in 1957, Qian, along with four other scientists, Zhao Jiuzhang, Qian Sanqiang, Chen Fangyun and Cai Xiang, put in a proposal to launch a space programme. Mao Zedong himself wanted the programme to go ahead as part of China's Great Leap Forward effort. The author herein highlights Mao's leadership and vision for the Chinese nation as driving its efforts in space. He effectively saw the achievements in space as a means to demonstrate China's power to the world. To initiate the programme, the Chinese Academy of Sciences set up Group 581 in 1958, which was tasked with three objectives: the development of a sounding rocket, the launch of a 200 kg satellite and the launch of a heavier satellite weighing up to 1000 kg. Consequently, China became the fifth country to launch a satellite in 1970 and would go on to launch a total of 11 satellites by 1976.

The book delves into the developments and priorities guiding China's activities in outer space during the second phase, the Deng Era. Under Deng Xiaoping's leadership, the programme focused on orienting science and technology development towards realising economic and societal needs. This caused the programme to be seen through an economic lens. More importantly, Deng did not see China as partaking in a space race. This phase saw China solidify its space launch infrastructure. Launches undertaken during this time further marked a shift toward leveraging space-based applications, including communications, remote sensing and weather. China further started to look to capitalise on launch commerce, with several commercial contracts signed during this period.

Priorities were redefined in an international environment defined by the disintegration of the Soviet Union in the post-Cold War era, which fundamentally altered the global power structure. In tracing these shifts, the author also brings into context the ripple effects from US sanctions imposed on the country in the aftermath of the 1989 Tiananmen Square incident. This period witnessed China engage in a reorganisation of institutions. The human spaceflight programme also

received a renewed focus during this time (p.36), with importance also being accorded to establishing China's own space station. While the space station is not exactly a priority from a development perspective, the author notes that its pursuit was seemingly driven by "near unanimity in China's political circles to establish its credentials as an emerging global power" (p.44).

Pointing to how China's space assets "cover an entire gamut of satellite products from human spaceflight to small satellites", the author surmises the programme to be in its growth phase during 2001-2020 (p.55). Assessing the in-depth evolution of China's space programme across six decades, the author notes China to have evolved as a major player comparable to leading spacefaring nations, the USA and Russia, from around 2010. Herein the author discusses the turn that the programme took towards security, particularly as Chinese military planners started thinking about the means that could be employed "to prevent or deter the USA from intervening in a future Taiwan conflict" (p.47). In referring to this phase of China's space programme, the author notes the advent of Xi Jinping to leadership in 2010 to have resulted "in a major increase in the scope and scale of China's space activities" (p.73). In this regard, China started to seriously look at enhancing the space component of Command Control Communications Computers Intelligence Information Surveillance Reconnaissance (C4I2SR). It further went on to establish the Peoples Liberation Army (PLA) Strategic Support Force in 2015, which was tasked with space, cyber and electronic warfare. The author notes China's successes with respect to the Chang'e lunar missions to have brought a lot of prestige (p.51).

Discussions outlined in the book further make important references to the core priorities shaping China's approach to space diplomacy across the four phases. Initial efforts involved a major cooperative programme with the Soviet Union, which helped China by supplying them with missiles, consultancy, and training of Chinese engineers in the Soviet Union (pp-3-4). The key modalities and achievements of the China-Brazil Earth Resource Observation (CBERS), which has generally been regarded worldwide as one of the most successful space diplomacy projects, have also been detailed in the book. China has also actively cooperated with French and German commercial players for procuring critical technologies to enhance capabilities, particularly for communications satellites. Cooperative ventures have also been initiated with the UK on the small satellite front.

There has also been an evolving trend signifying space science as a major focus of China's space diplomacy. It also engaged with the European Space Agency during 2004-2007 to launch and analyse data from the Double Star Cluster Programme which seeks to gain a deeper understanding of how the sun influences the earth's environment. The author details China's efforts to lead advanced space science projects, including the Quantum communication satellite, Micius, launched in 2016, which became the first in the world to demonstrate space-based quantum key distribution. The author terms these as indications of China's desire to "catch up and even outperform the most advanced space powers" (p.70).

The evolving discourse on China's rise regards the country's growth trajectory to become a major player in the global

space order, significantly bolstering its credentials to match up to the USA in its mastery of the domain. The book alludes to various variables, political, technological and strategic, that have shaped China's space programme to meet its national goal to catch up to the USA and attain the status of a superpower (McCartney, 2024; Brown 2022). In this regard, the author notes how China's plans in space could shape the contours of geopolitics in the coming decades. He writes that the US-China dynamic will continue to drive the global space ecosystem, with increased hostility between the two negatively impacting the space industry. although the European Union and Russia may be more interested in cooperating with China. In this background, "emerging powers India, which have a border problem with China, are also likely to become a more active partner in a US-led anti-China alliance" (p.75). Moreover, the author notes the emergence of two distinct political blocs in space, one led by China and the other led by the USA, respectively. The implications of such a dynamic, especially as China is utilising outer space to channel its responses to a perceived US dominance on world affairs, shall determine the future trajectory of space cooperation and collaboration in the coming decades.

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2. In-text referencing should be embedded in the anthropological style, for example '(Hirschman 1961)' or '(Lakshman 1989:125)' (Note: Page numbers in the text are necessary only if the cited portion is a direct quote). Footnotes are required, as per the discussions in the paper/paper.

3. Use's' in '-ise' '-isation' words; e.g., 'civilise', 'organisation'. Use British spellings rather than American spellings. Thus, 'labour' not 'labor'. Use figures (rather than word) for quantities and exact measurements including per centages (2 per cent, 3 km, 36 years old, etc.). In general descriptions, numbers below 10 should be spelt out in words. Use fuller forms for numbers and dates— for example 1980-88, pp. 200-202 and pp. 178-84. Specific dates should be cited in the form June 2, 2004. Decades and centuries may be spelt out, for example 'the eighties', 'the twentieth century', etc.

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