Feedback on: Research, innovation, education & young people – a new global approach

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1 Summarized lessons learnt and recommendations from the EU Science Diplomacy Cluster

On March 19, 2021, the three Horizon-2020 funded projects on science diplomacy came together at the occasion of the final networking meeting of S4D4C (see here for the event and here for the specific session). They launched the **EU Science Diplomacy Alliance** and summarised lessons learnt and recommendations from the respective projects which could be considered for the global approach:

Lessons learnt from the EL-CSID project

- SD needs to better position itself in the dichotomy between cooperative and competitive science
- SD needs to find a balance between being state-sponsered and having scientist-ownership
- SD should be more used as a strategic concept than as a communication label

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 770342.

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Recommendations from the EL-CSID project to the scientific community

Science needs to incorporate diplomacy in its own praxis for several reasons:

1) combatting anti-scientism

2) repairing fragmentation

3) raising impact on societal debates

4) professionalize dialogue with policy-makers

Therefore we need to add Diplomacy in Science to the definition advanced by AAAS

InsSciDE
Inventing a shared Science Diplomacy for Europe

Lessons learnt from the InsSciDE project

- In the longer term, the convergence of technical, economic and scientific challenges requires a continuum leading to the definition of a global Innovation Diplomacy for the European Union
- Europe must set priorities and targets for its SD. They must be defined on the basis of a consensus that will allow consistent action in the long term.

Potential recommendations from the InsSciDE project

SD must take into account the classical issues of Diplomacy and integrate the challenges related to power relations

This will have to be based on a reinforced External Action Service working in close collaboration with the DGs concerned by the targeted issues. This common understanding is a key point for future success.

The SD strategy defined by the EU must be linked to highly coherent actions within the Union itself. Any contradiction between internal policies and SD initiatives can only weaken both.

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Lessons learnt from the S4D4C project

The ambivalence of the concept of science diplomacy (which includes a national interests' approach as well as an approach that strengthens global common goods) often remains in the dark.

"Science diplomacy for addressing global challenges" is an argument (on the balance between openness and protection of the EU's strategic autonomy) to cooperate, to encourage and increase openness.

Implicitness plays an important role in science diplomacy. Effective SD is not always explicitly named.

SD contexts are complex and variable requiring flexibility and guidance.

A smart approach to science diplomacy—to global resilience through knowledge-based cooperation—does not prescribe the content, but rather focuses on the general enabling conditions and processes of science-based international exchange (instead of prescribing and codifying specific actors, activities, mechanisms, norms and values).

We are now better able to define what "a science diplomat" is but concrete professional profiles for them are still rare.

Capacity-building and trainings are in very high demand. Especially from the academic sector. From all around the world.

Recommendations from S4D4C

The interaction spaces and boundary organisations need to be further developed, e.g. to form structured interfaces for projects to explore foreign policy impacts of their work.

We call for more capacity building on the topic. Including research-based training. And co-creation.

Science Diplomacy activities need to be carefully evaluated to discern "talk" from "action".

We recommend to strengthen the EU Science Diplomacy Alliance and the Science Diplomacy Booster.

Further recommendations are available in our policy papers which are compiled in the next section.

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2 S4D4C Policy Briefs

Policy brief "Global resilience through knowledge-based cooperation: A New Protocol for Science Diplomacy":

Science Diplomacy has the potential to play a considerable role in future international collaborations intent on tackling societal challenges. This ambition cannot be achieved by positioning science diplomacy as a soft power to be utilized by single countries to further their interests. Tackling societal challenges is a cosmopolitan ambition and common, shared interest that requires collective action. The actions required need to be organized by the domain of science, technology and innovation in close collaboration with foreign policymakers. For these cross-boundary efforts an interaction space has to be created that adheres to certain ground rules. The New Protocol for Science Diplomacy provides a set of 12 principles geared towards creating this interaction space.

Policy brief "Calling for a Systemic Change. Towards a European Union Science Diplomacy for Addressing Global Challenges"

Science diplomacy can only thrive to its maximum if accompanied by a farsighted systemic change fostering higher and better interaction between stakeholders and their practice of exchanging knowledge. The brief is based on a more exhaustive policy report which outlines I) Where do we want to be? The EU science diplomacy vision, mission and principles, which emanate from the Madrid Declaration on Science Diplomacy (S4D4C 2019), for addressing global challenges: II) Where are we? Main stoppers, warnings and drivers for addressing global challenges within each of the systems of science, diplomacy, and science diplomacy are identified and summarised. III) How will we get there? The call for systemic change towards EU science diplomacy for addressing global challenges proposes that three transversal processes are required to happen in five key specific spheres (knowledge, governance with no silos, alliances, institutions and people) to foster this systemic change:1. a reinforced EU learning system, 2. integrative leadership and 3. a change of culture, fostering agile, adaptive, effective and permeable environments for professionals of all kinds to collaborate to address global challenges. Based on this 15 recommendations are developed.

Policy brief: Why science diplomacy needs evaluative backing

The public discourse of science diplomacy has been nurtured for two decades, as actors repeatedly stressed the relevance of the concept by campaigning, showcasing and defining activities as science diplomacy. But while the effectiveness of science diplomacy remains unclear, not least as discourse on it gets hardly discerned from concrete actions, this policy brief aims proposes that diplomacy actions should be concretely evaluated. To do so, this policy brief introduces a first set of guiding ideas that policy actors may consider using when developing an evaluative framework.

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Policy brief: Building Better Science Diplomacy for Global Challenges: insights from the COVID-19 crisis

The COVID-19 pandemic has exposed many weaknesses in the interface between scientific research and international relations. The pandemic, like other global challenges, is both knowledge-intensive, in that it requires engagement with scientific knowledge for effective policymaking, and cross-border, in that it is not solvable by a single country acting alone. Based on a broad range of case study research, the S4D4C project has identified a number of key aspects that matter for science diplomacy. In this policy brief, we address four of those (narratives, interests, values, and interdisciplinarity) and discuss their relevance in the COVID-19 crisis. Drawing on these insights, we offer five policy recommendations for expanding and improving future science diplomacy efforts: (1) Create interactive spaces, (2) Promote bi-directional science and diplomacy fluency, (3) Engage the full spectrum of science, (4) Ensure open and interpretable science for diplomacy, and (5) Exert bold values-based leadership. In combi-nation, these will create a strong foundation for addressing not only the ongoing issues in this crisis but also other global challenges, both known and unexpected.

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POLICY BRIEF
FEBRUARY 2021

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USING SCIENCE FOR/IN DIPLOMACY
FOR ADDRESSING GLOBAL CHALLENGES

Global resilience through knowledge-based cooperation: A New Protocol for Science Diplomacy

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The S4D4C project is coordinated by the Centre for Social Innovation (ZSI).
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Abstract

The world is currently dealing with one of the most severe health, economic and social crises in recent memory. Scholars are converging on the perspective that traditional means of addressing these crises have served their time. On the additional backdrop of a global political landscape in transition, realising a post-COVID-19 pandemic recovery will require new modes of international collaboration with scientific knowledge and expertise figuring more prominently. A smart approach to science diplomacy—to global resilience through knowledge-based cooperation—does not prescribe the content, but rather focuses on the process of science-based international exchange. The new Protocol for Science Diplomacy presented in this policy brief inspires the alignment of shared, cosmopolitan interests and their application to cross-border societal challenges. It comprises a set of twelve procedural and infrastructural principles with which actors can create a space for constructive and productive science diplomacy interactions. These principles are: Sensitivity; Inclusiveness; Transparency; Deliberation; Reciprocity; Complementarity & Manoeuvrability; Legitimacy; Alignment; Evaluation; Capacities; Capabilities; Trust. Our Protocol for Science Diplomacy sets new ground rules for international scientific and policy collaboration that enable us, inter alia, to make meaningful steps towards tackling the UN Sustainable Development Goals (SDGs) by their 2030 deadline. As such, it offers a roadmap for science diplomacy in the next decade and beyond.

Why a 'Protocol'?

The term 'protocol' is widely used in international policymaking and diplomatic circles. The Montreal Protocol on Substances that Deplete the Ozone Layer and the Kyoto Protocol to the United Nations Framework Convention on Climate Change, among others, testify to its use in international policymaking. In this domain, protocols often describe additions to existing treaties or agreements. In diplomatic circles, protocol denotes the "body of customs governing the procedure and choreography of diplomatic intercourse" (Jönsson 2016, 83). In its ambition, our Science Diplomacy Protocol is inspired by both strands.

Networks and dialogue

Knowledge resources and dialogue

Governance framework

Trainings for science diplomats

Science Diplomacy for societal challenges

As 2021 gets underway, large parts of the world are grappling with one of the most severe health, economic and social crises of our lifetimes. COVID-19 is laying bare the interdependence, complexity and fragility of our societies (Young 2020). As the President of the European Commission has argued, the crisis also reminds us that "never before has [the] enduring promise of protection, stability and opportunity been more important than it is today" (von der Leyen 2020). SARS-CoV-2 is a novel virus, but it has thrown into sharp relief a series of longstanding global challenges, well articulated by the UN's 2030 Sustainable Development Goals, that are increasingly difficult to address by traditional means in today's world (Beck 2009; Haas 2016; Kuhlmann and Rip 2018). Vaccine nationalism; recent assaults on democracy in Washington DC; the departure of the UK from the European Union; geopolitical and security tensions with Russia and China; policy failures over climate change—all of these challenges reflect a fragmentation of national interests instead of a cooperative pooling of expertise and capacity. Faced with competing claims to knowledge and truth, realising the European Union's ambitious post-pandemic recovery plan—NextGenerationEU—will require new modes and methods of (funding) international collaboration, in which the role of scientific knowledge and expertise in tackling these challenges is more prominent (European Commission 2020).

Selected outcomes of S4D4C's empirical research programme

Aukes, E., Ordóñez-Matamoros, G., & Kuhlmann, S. (2019). Meta-Governance for Science Diplomacy – towards a European framework. *STePS Working Paper Series*, 2019, 1-16. doi: https://doi.org/10.3990/4.2589-2169.2019.01

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Rungius, C., Flink, T., & Degelsegger-Márquez, A. (2018). *State-of-the-art report: summarizing literature on science diplomacy cases and concepts.* Vienna: S4D4C. Available at: https://www.s4d4c.eu/s4d4cs-state-of-the-art-report-on-science-diplomacy/

Young, M., Flink, T., & Dall, E. (Eds.). (2020). *Science Diplomacy in the Making: Case-based insights from the S4D4C project.* Vienna: S4D4C. https://www.s4d4c.eu/wp-content/uploads/2020/03/S4D4C_REPORT_Science-Diplomacy-in-the-Making.pdf

Young, M., Rungius, C., Aukes, E., Melchor, L., Dall, E., Černovská, E., Tomolová, E., Plumhans, L.A., Ravinet, P., Flink, T., Elorza Moreno A. (2020). *The 'Matters' of Science Diplomacy: Transversal Analysis of the S4D4C Case Studies.* Vienna: S4D4C. https://www.s4d4c.eu/wp-content/uploads/2020/09/S4D4C_REPORTS_The-Matters-of-Science-Diplomacy_Sept2020.pdf

A smart approach to science diplomacy – to global resilience through knowledge-based cooperation – does not prescribe the content of science-based international exchanges and related processes, e.g. funding instruments. Rather, it outlines the characteristics of the process by which science diplomacy actors decide on what mechanism is best applied in their specific situation.

As we have explored elsewhere (Aukes et al. 2020):

a. Grand societal challenges require diplomatic efforts and science-based knowledge,
b. Science-based knowledge production is diverse and evolving,
c. Diplomacy means reconciling a variety of interests, and
d. Science diplomacy requires both science literacy and diplomacy literacy.

Building on these points, the Madrid Declaration on Science Diplomacy, the policy report Calling for a Systemic Change, and a forthcoming S4D4C policy brief advocating more intensive evaluation of science diplomacy activities (S4D4C 2019; Melchor et al. 2020; Flink 2021; see text box for further S4D4C sources), we now present a new Protocol for Science Diplomacy, designed to inform a new procedural turn in scientific-diplomatic interactions. The Protocol envisages science diplomacy as less about soft power being deployed in pursuit of national interests, and more about shared, cosmopolitan interests being aligned and applied to cross-border societal challenges (Beck 2009). The Protocol should be deployed as a set of practical guidelines, primarily aimed at science diplomatic exchanges in which the European Union (including Member States and strategic partners), intergovernmental organizations, science and knowledge institutions, and civil society and philanthropic organizations partake.

Principles of a new Science Diplomacy Protocol

Science diplomacy occurs at the intersection of foreign policy, problem articulation (e.g. the UN SDGs), scientific knowledge, technology and innovation, and is characterised by fluidity. Its definition, stakeholders and job descriptions are not fixed. This new Protocol for Science Diplomacy should be applied in collaborative situations based on shared interests. This will help to create a constructive and productive interaction space. The protocol proposes principles of agency and governance that are applicable to various configurations of stakeholders and topics pertaining to the challenges societies face today.

The new Protocol for Science Diplomacy outlines a set of twelve procedural and infrastructural principles that need to be considered in the design and delivery of transformative science diplomacy interactions. Not all are applicable to every situation, but it will be useful to consider several of the principles in most situations. Depending on the specific situation, it is possible that several of the principles need to be balanced against each other and some trade-offs between them are inevitable. The choice of which principles to combine in tackling a specific societal challenge highlights the importance of ensuring such interactions remain flexible and contextually sensitive.

Note: each principle is explained by means of a definition and key questions, as well as illustrated with a fictive case. Each fictive case is an excerpt of a full example on the S4D4C website (https://www.s4d4c.eu/). Each principle presented here is provided with a link that directs you to the full principle description.

Procedural principles

SENSITIVITY

Science diplomatic activities should respect the specific political, socio-economic and environmental context they are designed for and be able to adapt to changes in them.

Key questions:

- Who are the main stakeholders?
- What is the specific (geo-)political, scientific and natural-environmental context?

Fictive case:

A rather elaborate science diplomacy scheme has been running successfully over many years in a stable albeit complex context as the political realities in participating countries are rather diverse.

Science diplomacy schemes encouraging scientific activities in other countries can be at risk of becoming politically instrumentalized. However, they also represent an additional channel into countries with whom relations are not perfect. This can be solved by implementing additional measures that prevent the inappropriate, unintended use of science diplomacy schemes. How to deal with such risks is a matter of situational evaluation based on cultural, political and economic aspects. Click here to find more about this principle.

INCLUSIVENESS

Science diplomatic activities should be aware of different degrees of inclusiveness vs. exclusiveness as well as that inclusion is a political, strategic choice and a component of the diplomatic game, too. Where useful, one should involve a broadly representative portion of the relevant scientific, political and diplomatic communities.

Key questions:

- Who and what needs to be in/out of the envisioned activity?
- How should inclusion and exclusion be balanced to ensure effectiveness of the activity?

Fictive case:

The reviewer committee of an international joint research laboratory discusses the statistics of accepted proposals in their yearly meeting. Reviewer A points to the low acceptance rate of proposals submitted from his fellow countrymen. He claims this could be interpreted as a sign of discrimination.

Awarding research proposals at a joint research laboratory that aims at bringing together researchers from countries with different educational standards and academic opportunities and to foster mutual learning can be a challenge. Taking into account the aims of such research infrastructures, its rules for distributing research funding need to be judged for their justness and adjusted for potential disadvantages of some partner countries. Click here to find more about this principle.

TRANSPARENCY

Science diplomatic activities should be appropriately visible to enable monitoring and accountability activities by observing communities, thereby increasing the legitimacy of the activity.

Key question:

- Which aspects of the activity should be openly accessible? To whom?

Fictive case:
Especially in international relations that are asymmetrical in terms of socio-economic and governance performance, it takes great scientific-diplomatic efforts to construct a stable, accountable quality management system for jointly setting up, evaluating and managing international research projects.

Transparency is key in international joint programming, especially if the socio-economic and political situations of the participating countries are diverse. Each step of a programme including its documentation should be as openly available as possible, so that stakeholders can easily verify them. Click here to find more about this principle.

DELIBERATION

Science diplomatic activities should encourage mutual understanding of actors' perspectives, needs and objectives, as well as of problem definitions and associated solutions, the disciplinary and interdisciplinary knowledge required (incl. probing for other relevant scientific disciplines) and common narratives for the support of science diplomacy processes.

Key questions:

- Which different perspectives exist concerning the planned activity?
- How can consensus be achieved about the problem definition, scope and acceptability of solutions?

Fictive case:
During a sequence of international negotiations, several representatives of international institutions (policymakers, NGOs, experts, etc.) discuss how to tackle water-related challenges on the global level. The negotiations are initially fruitless because most participants' perspectives of what the water problem at hand is differ.

Deliberation about what societal challenges-related problems exist in specific situations often reveals different, sometimes opposing perspectives. Without knowing and revealing what problem definitions actors hold or what they see as acceptable solutions, discussions about potential science diplomacy schemes may grasp at nothing, because proposed solutions are seen as inappropriate. Click here to find more about this principle.

RECIPROCITY

Science diplomatic activities should foster an attitude of understanding and cooperativeness leading stakeholders to trust that each actor participating in the activity contributes to addressing grand challenges in roughly equivalent ways according to their relative abilities, be it through knowledge or other resources.

Key questions:

- What are you willing to contribute and what do you expect your peers to contribute to the activity?
- How do you achieve equivalent contributions?

Fictive case:

In an inter-ministerial government meeting on research cooperation a foreign ministry representative asks, "what, really, do we get in return for all the funding we put into research cooperation with this country? It seems to me that this is basically just foreign aid money, after all, we're not seeing major scientific breakthroughs coming out of it."

Research cooperation with other countries is much more than two (or more) countries investing funds. It provides communication channels and exchange mechanisms that go beyond only promoting scientific breakthroughs. Rather, it presents an opportunity for a sustainable long-term relationship as well as improving the capacity building and the conditions for enhanced scientific reciprocity between countries. Click here to find more about this principle.

COMPLEMENTARITY & MANOEUVRABILITY

Science diplomatic activities should build on stakeholders' strengths to balance out others' weaknesses and embed them in governance arrangements that leave enough room to manoeuvre for these strengths to flourish.

Key questions:

- Who are the relevant stakeholders for the planned activity?
- What are they good at and which weaknesses can be complemented?

Fictive case:

In an international joint programming initiative to be developed, an asymmetrical setting is envisioned concerning the question how many and which resources each country should contribute. While Country A has more financial resources and more advanced management systems to provide, Country B also contributes its considerable regional expertise. Although their levels of scientific quality are similar, the areas of expertise of the participating countries are by design supposed to differ and complement each other – and so do the interests of involved actors as to the purpose of the joint undertaking.

Science diplomacy activities can be designed such that they emphasise the strengths of countries and their representatives in the research and innovation domain. The rules set for science diplomacy activities should be transparent, clear and flexible, while allowing countries' representatives to use room to manoeuvre wherever possible. Click here to find more about this principle.

LEGITIMACY

Science diplomatic activities should strive for the mutual acceptance of shared "rules of the game" in the interaction space, respecting the expertise and framings of participating stakeholders. Science diplomacy activities should enable 'democratic quality' of proposed and implemented mechanisms, processes and solutions.

Key questions:

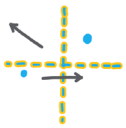
- How does the planned activity contribute to or threaten stakeholders' core values?
- Through which processes can the planned activity increase its legitimacy?

Fictive case:

To put the fight against a virus on the international agenda, country A's national academy of sciences suggests to endorse 'Global Health' for the agenda of the upcoming G20 summit to secure support for substantial supply of funds and research frameworks on multinational level from important partner countries.

Tackling societal challenges at the international policy level cannot do without being supported by sufficient countries and actors. Topics such as "Global Health" may need to be discussed in settings broader than dedicated health or science committees, making meetings such as those under the auspices of the G20 all the more important. Click here to find more about this principle.

ALIGNMENT



Science diplomatic activities should address problems on the lowest, i.e. most local and concrete, appropriate policy/instrumental level while coordinating all involved scales (temporal, spatial and administrative), governance dimensions (horizontal and vertical) and communities.

Key questions:

- On which level is the activity best suited to be implemented?
- How can all influential stakeholders be aligned to maximize the activity's impact?

Fictive case:

The environmental adaptation policy department of country A's central funding agency has now been allocated more budget to finance adaptation research on sea-level rise. It intends to start negotiating a joint funding scheme with country B, which faces similar challenges regarding sea-level rise and has expertise in adaptation techniques.

Cross-boundary science diplomacy schemes often require very diverse political and research systems in the participating countries to be attuned to each other. Alignment of these systems for a successful science diplomacy interaction relies on knowledge about them as well as continuous communication with all domains involved. Click here to find more about this principle.

EVALUATION

Science diplomatic activities should be reflective and facilitate learning throughout the process. As common practice in policymaking at large, evaluating the activities undertaken also needs to become an everyday matter in science diplomacy. This process should include, among others, not only reflecting on the frames, ambitions, interests, outcomes of the involved countries and other actors, but also comparing various similar science diplomacy activities to gauge the efficacy of the one in question.

Key questions:

- What does the performance of the activity teach us?
- Are we satisfied with the activity's performance?

Fictive case:
Focused treatment tests for a vaccine or medicine against the Zika virus were first performed directly by prominent scientists of a leading research institution. Soon after a comprehensive evaluation they realized that these processes were more efficient if performed by a broader international collaboration program that also involved scientists located in the global south.

Comprehensive evaluation and constant monitoring of specific problem contexts can reveal crucial weaknesses in national, regional, and international research programmes. In case of societal challenges it can be important not only to diversify the disciplinary knowledge, but also to bring in researchers from other parts of the world with different perspectives on the matter at hand. Click here to find more about this principle.

Infrastructural principles

CAPACITIES

Science diplomatic activities should create, reinforce and/or draw on suitable and sufficient institutional, organizational, and management resources (e.g. budgets, staff etc.), political will, reliable and inclusive knowledge resources, and gatekeeping proficiency.

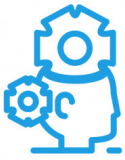
Key questions:

- Which institutional, organizational and other conditions does the activity require that are already in place?
- Which conditions still need to be realized?

Fictive case:
To promote cross-border collaboration and network-building, the board of a joint scientific infrastructure launches new interaction mechanisms such as international teams, deliberation and dialogue structures based on sharing distinct perspectives of relevant actors.

Besides for scientific knowledge production, countries often establish joint scientific infrastructures to intensify and improve their relations. Although scientific collaboration through such infrastructures cannot be expected to develop overnight, the right interaction mechanisms can lead to constructive and communicative relationships. This may, in turn, rub off on the involved countries. Click here to find more about this principle.

CAPABILITIES



Science diplomatic activities should empower individuals to become trained 'translators', 'multilingual' in the sense of speaking the language of science and diplomacy and enable them to opportunistically or incidentally interact with communities beyond their daily circles both in the domain of science and/or diplomacy.

Key question:

- Is the existing human capital, including skills and knowledge, appropriate for the planned activity?

Fictive case:
In the context of a nuclear accident in country A, The chief scientific adviser from country B is required to engage with her peers in country A and, at the same time, explain the scientific evidence to diplomats and policy makers in layman's terms while being aware of both countries' cultural differences.

The individual capabilities of a chief scientific advisor are critical during crisis events. Their skills in communicating scientific evidence to diplomats and policymakers across borders are an asset in complex, cross-cultural communication. Click here to find more about this principle.

TRUST

Science diplomatic activities should produce mutual recognition and credibility on an individual level as well as clear 'rules of the game' on the process level, thereby stabilizing the process and contributing to the legitimacy of the process and involved individuals alike.

Key questions:

- How well developed are trust relationships between potential stakeholders of the envisioned activity?
- What needs to be done to improve these relationships?

Fictive case:
A science attaché from country A deployed to her embassy in country B, and a science attaché from country B deployed to her embassy in country A, interact for the first time during a coffee break of a scientific conference in country B. Because of their good mutual feeling and also the good diplomatic relationships between both countries, they decide to keep in touch to discuss ideas for an annual collaboration.

As in other interpersonal relationships, science diplomacy activities are often founded on trust developing between individual diplomats from different countries. What begins as an innocent, informal talk over a cup of coffee during an official government event may result in an extended annual collaboration to showcase and explore contemporary scientific interests. Click here to find more about this principle.

2030, SDGs and a new wave in Science Diplomacy

As the COVID-19 crisis has revealed, international efforts to produce and disseminate scientific knowledge can achieve exceptional results at remarkable speed. The development of various functional vaccines against the Sars-Cov-2 virus in less than a year, the open availability of around 200,000 scientific publications investigating the virus and its effects, and the pivotal involvement of scientific advisors in the management of the crisis prove the possibility of fruitful collaboration between scientists and policymakers in both national and international realms.

Yet there are many other ongoing societal challenges which have lingered, and not been tackled with anything like the urgency of this crisis mode. Here, the ground rules of international scientific and policy collaboration need to change if we are to make meaningful steps towards tackling the UN SDGs by their 2030 deadline. The complexities that come with knowledge-based cooperation can be daunting, but they also offer opportunities –particularly for a European Union looking to renew and reassert its progressive, values-based role in the world.

Reflecting on the lessons of the past year in her December 2020 State of the Union Address, EU President von der Leyen said, "When we felt fragility around us, we seized the moment to breathe new vitality into our Union. When we had a choice to go it alone like we have done in the past, we used the combined strength of the 27 to give all 27 a chance for the future. We showed that we are in this together and we will get out of this together" (von der Leyen 2020).

Getting out of COVID-19 together has depended upon – and will continue to demand –knowledge-based cooperation between science, innovation, policy and diplomacy at multiple levels of national, regional and global governance. As vaccination programmes accelerate worldwide, we need to look beyond the present crisis towards the multiple, interdependent challenges of the SDGs, and the wider imperatives of resilience and preparedness that this past year has reminded us of. As a contribution to this task, the new Protocol offers a roadmap for science diplomacy in the next decade and beyond.

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S4D4C

USING SCIENCE FOR/IN DIPLOMACY FOR ADDRESSING GLOBAL CHALLENGES

PROJECT PARTNERS

Centre for Social Innovation – ZSI (Coordinator)

Charles University Prague – CU

German Aerospace Centre,
Project Management Agency – DLR

German Centre for Science Studies
and Higher Education Research – DZHW

The Spanish Foundation
for Science and Technology – FECYT

The World Academy of Sciences – TWAS

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WE EXPLORE AND INFORM EU SCIENCE DIPLOMACY

Networks and dialogue

Governance framework

Knowledge resources

Trainings for science diplomats

S4D4C

USING SCIENCE FOR/IN DIPLOMACY
FOR ADDRESSING GLOBAL CHALLENGES

Calling for a Systemic Change

Towards a European Union Science Diplomacy for Addressing Global Challenges

The S4D4C proposal v 2.0. February 2021

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Spanish Foundation for Science and Technology (FECYT), Spain
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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 770342.

Context

As we publish this report, the COVID-19 pandemic is bringing to the limit health, social, economic, and labour systems all over the world, causing turbulences in regional, international and multilateral relations. At the same time, science and its ability to inform policies for better response has become a crucial dimension of the answer to the crisis. COVID-19 is testing the ability of countries and regions to collaborate and fight in a united way.

Now, more than ever, we believe that **science diplomacy**, understood as a series of structured practices at the intersection of science, technology and foreign policy, **can become a fundamental dimension to the European Union and its Member States for addressing global challenges**.

This infographics presents our proposal for a EU science diplomacy addressing global challenges and it is an extreme condensed version of the full report.

All this report is a summary of a series of co-creation networking meetings of the European and global science diplomacy communities, of other key outputs from the S4D4C projects and other researchers and key opinion leaders in the field, and of our own practice in science diplomacy over the last years.

How to cite this infographics

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METHODOLOGY

The conceptualisation and identification of stoppers, warnings, and drivers in the three systems of science, diplomacy, and science diplomacy, followed a qualitative approach based on multiple sources of information.

The two S4D4C networking meetings in Madrid (2018) and Berlin (2019) served to foster discussion around science diplomacy in both the global and European contexts. We collected personal notes of the main messages and recommendations outspoken by invited speakers and participants.

We related these main messages to the overall S4D4C theoretical and empirical framework by conducting content analysis of key outputs from S4D4C such as academic publications and policy briefs/reports.

We tried to align and merge the identified items to academic contributions, policy reports, and personal communications from key opinion leaders in the field.

Our own practice in science diplomacy over the last years also helped during the identification and selection process.

Lastly, a set of S4D4C partners and external experts (acknowledged here as contributors) reviewed the report completing our conceptual analysis with their insights and assessing its overall quality.

Where do
we want to be?

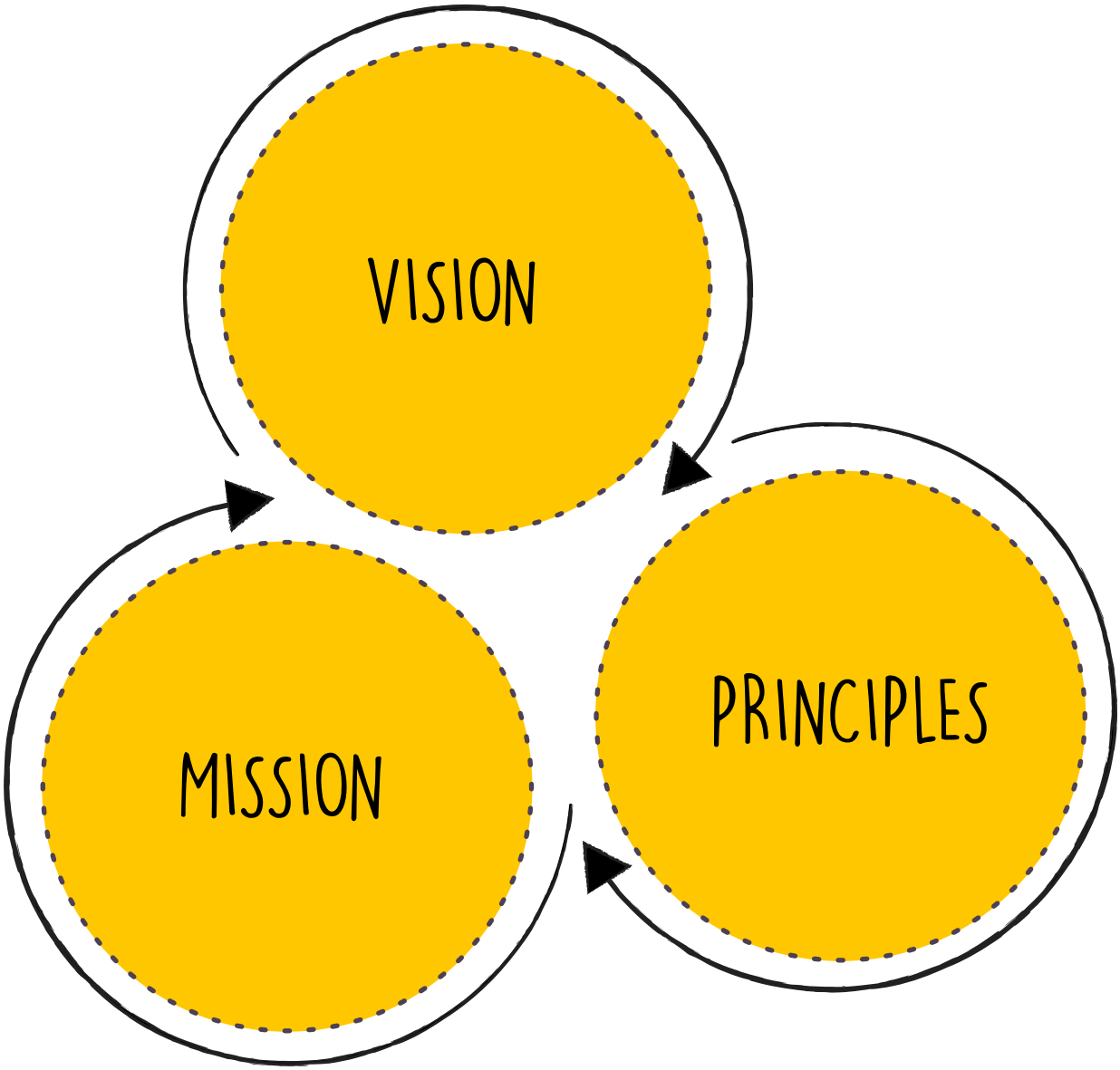
Where
are we?

How will
we get there?

Where Do We Want to Be?

The European Union Science Diplomacy Vision, Mission and Principles for Addressing Global Challenges

The European Union science diplomacy needs to contribute to address global challenges in a just and socially fair manner. Hereby, we propose a vision, a mission, and a set of principles for such a EU Science Diplomacy.



Where Do We Want to Be?

The European Union Science Diplomacy Vision, Mission and Values for Addressing Global Challenges

A vision for the EU

• The EU is a global leader in addressing global challenges with a holistic approach that cherishes democratic values and scientific evidence-centred approach in a balanced way.

• The EU places global challenges at the core of its policy objectives and puts in place the necessary transformative changes to tackle them.

• The EU acknowledges science as an important dimension of its foreign policy because of its capacity to:

- address and solve global challenges,
- provide space for EU and MS to align foreign policy strategies towards common goals,
- bring closer non-EU countries that decide to become associated members to EU science, technology and innovation framework programmes,
- contribute to build the European identity, and
- carry the banner for European values worldwide

A Vision for the EU Science Diplomacy

In order to achieve the proposed EU vision, we have to nurture the following vision of EU science diplomacy:

- EU science and EU diplomacy join forces in order to address global challenges and apply the necessary systemic changes for success
- EU science diplomacy aims to help develop integrated and mission-oriented policies to better tackle global challenges
- EU science diplomacy is rooted in scientific culture, diplomatic culture, and political culture, to contribute to the geopolitical dimension of the European Research Area, to become a driver of EU foreign policy, and to help implement the European Commission‘s priorities.

A Mission of the EU Science Diplomacy

EU science diplomacy for addressing global challenges incorporates:

- Informing foreign policies using scientific evidence and knowledge to help address global challenges.
- Strengthening links with countries all over the world in order to address global challenges together.
- Contributing to position the EU as a global leader in addressing common challenges and reinforcing cooperation in the European Neighbourhood.
- Raising awareness of large scale EU initiatives and their geopolitical impact.
- Becoming a key process to bring together all kinds of stakeholders for the co-design of mission-oriented EU science and innovation so that its outcomes better address global challenges.
- Being a driver of wider EU foreign policy goals.
- Contributing to the coordination and alignment of EU and MS foreign policies.
- Working for the convergence of interests from individuals, stakeholders, regions, nations, and international and supranational organisations towards addressing global challenges.

Where Do We Want to Be?

The European Union Science Diplomacy Vision, Mission and Values for Addressing Global Challenges

Principles of the EU Science Diplomacy

The EU science diplomacy acknowledges the principles presented in the Madrid Declaration on Science Diplomacy and applies them to the EU context:

• **Value for citizens:** EU science diplomacy works to address global challenges particularly relevant to European citizens.

• **Methodological diversity:** it encompasses explicit and implicit science diplomacy forms. EU science diplomacy may be implicit sometimes due to strategic choices.

• **Demonstrable impact:** it works on the design of a methodology to measure its potential positive and, also, unintended or even negative effects.

• **Evidence-informed:** it builds on the integration of evidence, either content-related, context-related, or process-related.

• **Collaboration and inclusion:** it acknowledges its multi-actor effort. In particular, it acknowledges the wealth that the European Union diversity brings into addressing global challenges, whereas at the same time demanding new governance mechanisms.

• **Capacity building:** it builds on the benefit that exchange and capacity building activities will have on all stakeholders involved in science diplomacy.

• **Independence of science:** it acknowledges science as an extremely useful tool for addressing global challenges and for improving international relationships as long as it is not distorted by ideological goals.

Where Are We?

EU Science Diplomacy Stoppers, Warnings, and Drivers for Addressing Global Challenges

We have identified a set of stoppers, warnings and drivers for a EU science diplomacy focused on addressing global challenges, which are specific to the science, diplomacy or the overarching science diplomacy system

STOPPERS, WARNINGS AND DRIVERS FOR ADDRESSING GLOBAL CHALLENGES

SCIENCE	DIPLOMACY	SCIENCE DIPLOMACY
• Scientific and research misconduct • Insufficient European research workforce • Lack of structured policy engagement in scientific institutions • The Ivory Tower culture	• Nationalisms, protectionisms and populisms • Socio-political fractures in the EU • Political decisions outweigh scientific evidence • The tragedy of the commons	• Growing mistrust in democracy, institutions and experts • Discoordination between government departments • Limited or no funding schemes • Need for strengthening institutions
• Specialised, fragmented and continuously evolving scientific knowledge • Bureaucracy and resistance to recognise interface professionals • Science advice mechanisms are complex • Lack of diplomatic training in the research community	• Globalisation, new actors and cooperation goals • Adaptation to digitalisation and information technologies • Common Foreign and Security Policy, a work in progress • Lack of scientific training in the diplomatic community	• Different understandings about science diplomacy • Different mind sets, cultures, and rules to bridge • Competitive versus collaborative approach • Weak political leadership for science diplomacy
• Science and collaboration as core European values • Good examples of science advice mechanisms • The public value of science • Wider policy impact of research and innovation	• The EU: global leader in multilateralism and science • Good examples of development cooperation frameworks • Knowledge-based economic diplomacy • Science as a driver for diplomacy	• The EU shows leadership in SDGs and climate emergency • Global and regional charters for win-win actions • Demand for training from both communities • Trust, empathy, political will, and timeframes

Where Are We?

Addressing Global Challenges Using Science

STOPPERS FOR ADDRESSING GLOBAL CHALLENGES USING SCIENCE

Scientific and research misconduct

The lack of research integrity can affect people trust in science, reduce the impact of research investment and also harm people and the environment.

Insufficient European research workforce

An innovative EU able to take the global lead in addressing global challenges would require a bigger research workforce.

Lack of structured policy engagement in scientific institutions

The concept of science diplomacy for addressing global challenges needs to get more traction within the scientific community.

The Ivory Tower culture

The academic community still struggles to better train researchers with transferable skills and staff their centres with diverse professionals.

WARNINGS FOR ADDRESSING GLOBAL CHALLENGES USING SCIENCE

Specialised, fragmented and continuously evolving scientific knowledge

Science and technology have had vast specialisation and the knowledge is continuously evolving, which all may hamper the impact of science in addressing global challenges.

Bureaucracy and resistance to recognise interface professionals

Public administration (including scientific) tends to be a rigid environment where adaptive changes take time to be implemented.

Science advice mechanisms are complex

The use of science advice mechanisms need to become much institutionalized and formalized.

Lack of diplomatic training in the research community

Science-policy-diplomacy interfaces require a set of skills in international affairs and negotiation often not developed by scientists.

DRIVERS FOR ADDRESSING GLOBAL CHALLENGES USING SCIENCE

Science and collaboration as core European values

EU science contributes to EU values, so taking the lead in addressing global challenges is a natural move.

Good examples of science advice mechanisms

Evidence and science-informed decision making and public policy development are one of the hallmarks of good governance and responsible public administration.

The public value of science

Scientific values provide a common place for understanding and collaboration to find technical solutions to global challenges.

Wider policy impact of research and innovation

Responsible Research and Innovation, Citizen Science, Open Science, or Science Diplomacy contributes to research and innovation having a wider policy impact.

Where Are We?

Addressing Global Challenges Using Diplomacy

STOPPERS FOR ADDRESSING GLOBAL CHALLENGES USING DIPLOMACY

Nationalisms, protectionisms and populisms

Brexit, COVID-19 pandemics and other crises have altogether altered the EU integration process.

Socio-political fractures in the EU

Trust and optimism in the EU project is unequal when comparing different Member States and may underline fractures between North-South and East-West.

Political decisions outweigh scientific evidence

During policy-making, science and scientific evidence is just a credible source of information but it is not the only one as policy makers have to weigh other interests in.

The tragedy of the commons

Individual users act independently following their own self-interest overexploiting or depleting the shared resources without considering the common good.

WARNINGS FOR ADDRESSING GLOBAL CHALLENGES USING DIPLOMACY

Globalisation, new actors and cooperation goals

In science diplomacy, the scientific public administration, scientific organisations, research centres, universities, learned societies, and individual scientists all play a role.

Adaptation to digitalisation and information technologies

The global proliferation of Information and Communication Technologies, the mass adoption of social media, and the use of big data have an impact on diplomacy practices.

Common Foreign Security and Policy, a work in progress

Better coordination is in progress and the European External Action Service still needs to become an even more leading player in EU science diplomacy.

Lack of scientific training in the diplomatic community

Diplomats have been rarely exposed to the science and technology systems and practices, hampering how they understand and engage with the research community.

DRIVERS FOR ADDRESSING GLOBAL CHALLENGES USING DIPLOMACY

The EU: global leader in multilateralism and science

The EU is a global leader in multilateralism and global governance, as well as a global example of scientific research collaboration.

Good examples of development cooperation frameworks

Through the Sustainable Development Goals, the international community has an acknowledged frame of reference for global objectives.

Knowledge-based economic diplomacy

The role of knowledge as a factor in economic prosperity of countries is taking a predominant role in the relations between nations.

Science as a driver for diplomacy

Science is a universal language and can link communities where political ties are weaker.

Where Are We?

Addressing Global Challenges Using Science Diplomacy

STOPPERS FOR ADDRESSING GLOBAL CHALLENGES USING SCIENCE DIPLOMACY

Growing mistrust in democracy, institutions and experts

The economic crisis in 2008 have put at risk citizen trust towards EU institutions, democracy and political representativeness. Trust in science is not an exemption.

Discoordination between government departments

Addressing global challenges requires close coordination between different governmental departments and close communication with other stakeholders involved.

Limited or no funding streams

There is lack or intermittent existence of public funding streams for the research and/or development of science diplomacy actions tackling global challenges.

Need for strengthening institutions

There is a need to strengthen institutions with administrative and managing staff with networks and expertise for science in policy and diplomacy.

WARNINGS FOR ADDRESSING GLOBAL CHALLENGES USING SCIENCE DIPLOMACY

Different understandings about science diplomacy

Different professionals and countries have different conceptions and understandings about science diplomacy.

Different mindsets, cultures, and rules to bridge

Scientists and diplomats belong to two different systems or cultures and they have to engage with counterparts whose values may differ too.

Competitive vs collaborative approach

Strategies for cooperation and competition are based on completely different approaches.

Weak political leadership for science diplomacy

Government science diplomacy requires political support in the higher government ranks to ensure its importance in the policy agenda.

DRIVERS FOR ADDRESSING GLOBAL CHALLENGES USING SCIENCE DIPLOMACY

The EU shows leadership in SDGs and climate emergency

The EU is committed with addressing SDGs and to make Europe become the world's first climate-neutral continent by 2050.

Global and regional charters for win-win actions

Our complex international system provides excellent frameworks for global and regional collaboration, where science diplomacy practice is directly implicit.

Demand for training from both communities

Science diplomacy requires science and diplomacy literacy and a unique set of skills. Both scientists and diplomats are demanding better training.

Trust, empathy, political will and timeframes

Science advice and diplomacy require long-lasting relationships to ensure mutual understanding, common trust, empathy, and influence to foster collaborative scenarios.

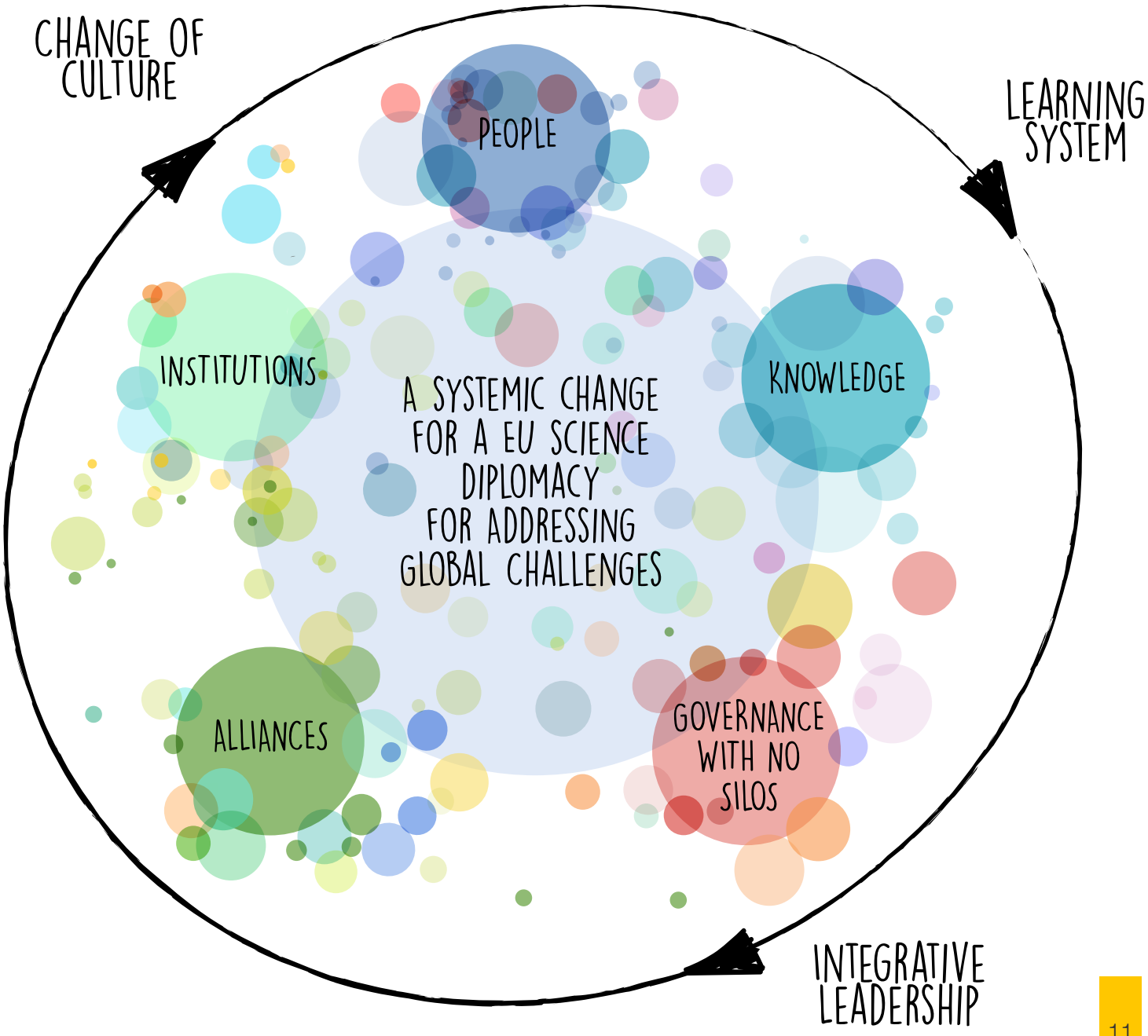
How will we get there?

The Systemic Change to a EU Science Diplomacy to Address Global Challenges

The **EU is in a unique position to lead a science diplomacy approach to address global challenge**s. However, the complexity of the issues that need to be tackled, the many different stakeholders in place, governance levels and the slow pace at which institutions and people are adapting to the new paradigm, all may be hampering a timely, holistic response to these challenges.

We call at **triggering a systemic change in the EU governance of science, diplomacy, and science diplomacy** that aligns and maximizes impact of everyone's efforts towards addressing global challenges.

For a systemic change to happen, **this report proposes a set of policy recommendations focused on an integrative transformation** that takes into account three transversal processes (learning system, integrative leadership, and change of culture) in five specific key spheres (knowledge, governance with no silos, alliances, institutions, and people).



How will we get there?

Transversal Processes for a Systemic Change for Addressing Global Challenges

Three transversal processes are required to happen in five key specific spheres (knowledge, governance with no silos, alliances, institutions and people) to foster this systemic change:

1. a reinforced EU **learning system**, in place through a wide array of science advice mechanisms and their input into the evidence-informed foreign policy making process. This learning system needs to be embedded into and supported by all the spheres of the systemic change. It will require permanent and specially dynamic science advice mechanisms for knowledge to feed the policy-making process, a governance system able to ask for, absorb and react to this knowledge, alliances in place to integrate different stakeholders into the learning system, institutions acknowledging their role in the creation of the system and dedicated and trained people in every single sphere to make the learning system happen;

2. an **integrative leadership**: being able to foster the required changes in every single sphere of this holistic approach. This leadership will need to find ways to better generate and integrate knowledge so that it is fully exploited for addressing global challenges and to find ways to break the existing governance silos currently hampering transversal approaches to global challenges. Moreover, it will need to foster creative ways of establishing alliances, lead deep institutional cultural changes and even creating hybrid or boundary institutions more flexible and adaptive to sudden changes. Finally, an integrative leadership will be needed to inspire professionals addressing global challenges and to support the development of the necessary skills, competences and career options.

3. a **change of culture**, fostering agile, adaptive, effective and permeable environments for professionals of all kinds to collaborate to address global challenges.

Scientific and foreign affairs institutions as well as government departments need better interactive spaces. New alliances require including all relevant stakeholders in the process and building new networks that do not rely on the existing bureaucratic structures. These networks link people of similar roles across existing organisational lines. For that to happen, institutions should promote awareness and a new culture for collaboration between scientists, diplomats, policy-makers, and other professionals. Lastly, new professionals in the science-policy-diplomacy interface must be trained to bring all worlds together and catalyse more interactions.

How will we get there?

Policy Recommendations to the EU and MS for Addressing Global Challenges via the Science Diplomacy Systemic Change

The recommendations below are part of an integrative transformation that calls for action to all stakeholders with a say in EU Science Diplomacy and to all policy levels in the EU.

Knowledge for Addressing Global Challenges

The scientific and technical knowledge has a role in addressing global challenges through the use of scientific evidence in policy making by governments and diplomats.

Recommendation 1: Foster more interdisciplinary research around SDGs through specific calls and mission-oriented funding, ensuring a Social Sciences and Humanities (SSH) perspective is also included, and consider including science diplomacy as a research topic or impact assessment in research funding programmes.

Recommendation 2: Reinforce Responsible Research and Innovation, Citizen Science, Open Science and Science Advice as European science core assets that need to be promoted in the EU global strategy and MS foreign policies.

Recommendation 3: Share best practices for knowledge exchange in science diplomacy and policy for early-career and established researchers and diplomats.

How will we get there?

Policy Recommendations to the EU and MS for Addressing Global Challenges via the Science Diplomacy Systemic Change

Governance with No Silos for Addressing Global Challenges

Global challenges are wicked problems, complex and dynamic; a new way of collaboration is thus needed in order to solve the pressing problems we face globally. There is a need for better policy-alignments to tackle the challenges we face as a society in a coordinated effort.

Recommendation 4: Create and strengthen hybrid institutions bridging the scientific and the diplomatic communities.

Recommendation 5: Improve EU integration and cooperation between MS around topics of scientific priority and geopolitical interests.

Recommendation 6: Improve coordination between EC and EEAS on global and multilateral challenges.

Alliances for Addressing Global Challenges

A new way of collaboration is required where all international, national, regional, R&I systems, diplomatic corps and policymakers are mobilised to use knowledge, fostering transnational and transregional cooperation through networks and alliances for addressing global challenges.

Building networks that study, pilot, and support the new vision of the system is essential for establishing a lasting systemic change. These networks typically do not rely on the existing bureaucratic structure. They link people of similar roles across existing organisational lines reinforcing a change of culture in the community.

Recommendation 7: Foster alliances through the allocation and reallocation of research funds for global and regional priority areas.

Recommendation 8: Involve researchers' networks.

Recommendation 9: Involve citizens.

How will we get there?

Policy Recommendations to the EU and MS for Addressing Global Challenges via the Science Diplomacy Systemic Change

Institutions for Addressing Global Challenges

The design and implementation of a new model must be done in close interaction with all the relevant stakeholders in both the scientific and the diplomatic community. The barriers we are addressing have deep roots which can only be overcome through institutional changes. We advocate for an institutional cultural change leading to more agile, flexible, permeable, and adaptive institutions—in particular, research organisations, universities, and foreign affairs institutions—to better address global challenges.

Recommendation 10: Raise awareness of using science for global challenges and public policy in early-career and established researchers and diplomats.

Recommendation 11: Build knowledge-exchange interfaces.

Recommendation 12: Foster strategic partnerships for capacity building and SD training with other institutions.

People for Addressing Global Challenges

Global challenges require a paradigmatic cultural shift in the way many professions are framed and evolved. In the 21st century, scientists and diplomats need to be prepared to work in a more collaborative and interdisciplinary way. Both communities, scientists and diplomats, should be trained for a cultural change to better address global challenges, in particular SDGs.

Recommendation 13: Empower and train researchers and diplomats to work together to address SDGs.

Recommendation 14: Diversify career paths for scientists and diplomats to include professionals in knowledge brokerage.

Recommendation 15: Launch of a fellowship scheme for scientists to work in EC, EEAS or MS government institutions.

USING SCIENCE FOR/IN DIPLOMACY
FOR ADDRESSING GLOBAL CHALLENGES

February 2021

POLICY BRIEF
FEBRUARY 2021

S4D4C

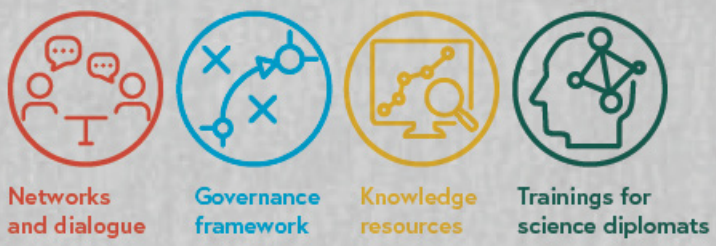
USING SCIENCE FOR/IN DIPLOMACY
FOR ADDRESSING GLOBAL CHALLENGES

Why science diplomacy needs evaluative backing

Tim Flink

Executive Summary

The public discourse of science diplomacy has been nurtured for two decades, as actors repeatedly stressed the relevance of the concept by campaigning, showcasing and defining activities as science diplomacy. But while the effectiveness of science diplomacy remains unclear, not least as discourse on it gets hardly discerned from concrete actions, this policy brief aims proposes that diplomacy actions should be concretely evaluated. To do so, this policy brief introduces a first set of guiding ideas that policy actors may consider using when developing an evaluative framework.



The S4D4C project is coordinated by the Centre for Social Innovation (ZSI).
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 770342.

Introduction

The public discourse on science diplomacy has, by now for about 20 years, proliferated at the intersecting spheres of science, technology, innovation (STI), higher education (HE) and international relations. In this discourse, actors promised that science diplomacy would deliver solutions to exigent global challenges of our times: that dedicated international scientific collaborations will help nurture the international relations of political actors and even alleviate their tensions, and that joint solutions are developed to surmount contemporary societal challenges of cross-border reach. Moreover, science diplomacy has promised to reform traditional diplomacy by encouraging official diplomatic actors to adapt to a similar style of international scientific interaction, to integrate academic researchers as part of diplomatic missions and to win foreign societal favor by calling upon common scientific values and promoting common interests.

However, recent studies have argued that the concept of science diplomacy is in danger of losing conceptual distinctiveness (Flink 2020), as too many overdrawn promises have been made that accompany its solutionist hype (Rungius and Flink 2020) and that can hardly ever be fulfilled. In addition, attempts to define the concept do not sufficiently clarify what science diplomacy is supposed to be. On the contrary, attempts by policy practitioners (Royal Society 2010; Gluckman et al. 2017) to define the concept reify both a calling and a hubris: that ever more aspects of STI, HE and foreign affairs as well as ever more types of actors (Melchor 2020) would and should fit under its umbrella. Nowadays, these extended aspirations can only hardly be separated from facts, and neither can talk be distinguished from actual science diplomacy actions – in fact well-known standard activities in STI and HE.

This policy brief argues that the combination of discursive expansion, definitional reification and empirical lacuna of scientific reflection on science diplomacy is problematic and should be purified by evaluations of real actions. To do so, it introduces a first set of guiding ideas that policy actors may consider using when developing an evaluative framework.

The limits of expanding science diplomacy

Over the last 20 years, the public discourse[1] on science diplomacy has developed various striking features. First, because science diplomacy has not stopped proliferating ever since its initial public relations activities during the first millennial years (Fedoroff 2009; Flink and Schreiterer 2010; Flink and Rüffin 2019), which is astonishing in light of the fact that concepts often lose traction after being introduced for agenda-setting purposes (Birkland 1998; Pump 2011). But this is not the case for science diplomacy, which has enjoyed increasing attention and support of governments worldwide, and it clearly stirred their departments into various kinds of actions.

With this in mind, the second feature of science diplomacy is its integrative force of attraction. Next to expectable entities, i.e. ministries of foreign affairs (MFA) and ministries of STI, many actors without direct governmental responsibilities have been encouraged to seek for and advertise common spaces of interactions: students, researchers and experts with academic backgrounds stemming from universities, public non-university research institutes, academies and national as well as international research funding agencies, but also private consulting firms are nowadays proclaiming they would either concretely engage in science diplomacy or at least endorse it (Degelsegger-Marquez et al. 2019; Flink 2020; Young et al. 2020).

Third, science diplomacy discursively interrelates with other equally affirmative concepts, in particular grand societal challenges (Flink and Kaldewey 2018), and therefore it can be regarded a discursive merger of conceptual thinking in STI and foreign policymaking.[2]

Essentially, science diplomacy expresses a search for stability and meaningful actions in a world increasingly defined by unpredictability (Beck 1992), anthropogenic and natural hazards up to a global scale, and a sense of acceleration affecting societies (Rosa 2013), the more so as it gets undergirded by a general consciousness of global-local interrelatedness (Robinson 2009). What comes along with this conceptual expression is a massive appearance of new actors and a reconfiguration of actors' arrangements, which has led actors to believe that an agencification[3] and hybridisation of organisations was necessary as well as a new mixture of governance modes (Aukes et al. 2019). In this respect, the aspirations expressed by science diplomacy are perfectly understandable, as the concept helps actors manage their uncertainties and find new professional roles and organizational functions within a dynamically changing sectional plane of international STI and foreign policy.

1 Discourse is comprehended as "an institutionally consolidated concept of speech in as much as it determines and consolidates action and thus already exercises power" (Jäger 2001, 35).

2 Recent attempts of the British Council (Knight 2019) to introduce the term "knowledge diplomacy" do not seem to have fallen on much fertile grounds in public policy. Because arguing that science, as in science diplomacy, was confined to the natural or hard sciences and should thus be enlarged to all knowledge-producing subjects, is a marginal and outdated perspective. That international student and researchers exchanges and transnational relations of higher education institutions should play a more pivotal role in diplomacy, is what the discourse on science diplomacy stipulated anyway.

3 Agencification denotes a development in policymaking, in which (often semi-autonomous) organizations have been created to outsource and support hitherto governmental management responsibilities, mostly at arms' length to ministries.

Reification by definitions and case studies

The first hype of science diplomacy was accompanied by attempts of policy entrepreneurs to define the concept and, therewith, set the playing field of its public discourse (thoroughly discussed by Ruffini 2020). Most notably, the Royal Society (2010), synthetizing impressions from a gathering of foreign and STI policymakers and individual cultural entrepreneurs in 2009, concluded that science diplomacy can be subdivided into three dimensions: (i) science in diplomacy (i.e. expertise and advice), (ii) diplomacy for science, i.e. international political activities that help science and science policy communicate across borders, and (iii) science for diplomacy, in other words track-2 and soft power activities to keep up communication via science in tensioned political relations or winning the favor of others by the positive image and reputation of science. While this report summarised positions mostly from the Anglo-American context, it is believed to have a major impact on the public discourse (Ruffini 2020). The second heuristic was borne by empirical research on states' approaches in science diplomacy, concluding that governmental and public actors (i.e. research funding and performing entities) at the intersection of foreign and international STI policymaking are mainly following three strategic approaches: to gain access to other resources abroad (knowledge, finances, talent), to engage in promotion activities (i.e. branding one's own performance and institutions of STI and HE) and to exert influence on other actors by use of STI and HE (Flink and Schreiterer 2010). These actors' strategies do not correspond with all dimensions laid out by the Royal Society. In fact, a great deal of efforts – one might even call it the mainstream of science diplomacy – is following the rationale of diplomacy for science: governmental actors mostly take to access and promotion, but not too often to the strategy of decidedly influencing others, as most activities are supposed to hedge competitive advantages in the international footrace on STI (ibid; Flink and Rüffin 2019; Szkarłat 2020; Sabzalieva et al. 2021). Altogether, these definitions and heuristics of science diplomacy did not primarily served policy actors to distinguish what science diplomacy is – and what it is not. Rather, they served to declare that almost any STI- and HE-related activity can fit under the umbrella of science diplomacy. As a consequence, defining science diplomacy reified the concept for the discourses of STI and foreign politics, while at the same time opening its frame almost to the point that it has become a mellow anything-goes formula.

Moreover and in tacit accordance with these and other definitional attempts, numerous showcases have repeatedly highlighted the importance of science diplomacy: for the sake of evidence-based foreign affairs, the promotion of international STI, HE and for advancing an ersatz diplomacy by academic channels across regional and especially national borders (Yakushiji 2009; Royal Society 2010; Davis and Patnam 2015; Young, Flink, et al. 2020).

"Often it is unclear whether scientific studies follow an analytical purpose or one that is supposed to stabilize the political discourse of science diplomacy."

However, it is unclear whether these studies follow an analytical purpose or one that is supposed to stabilize the political discourse. For many authors investigating into and showcasing science diplomacy do not actually ask if science diplomacy

features any distinction at all, or what it means that the concept has been politically used for varying purposes. Rather, plenty of studies verify the (almost miraculous) functioning and good nature of science diplomacy and its attendant actors (Brumfiel 2004; Davis and Patnam 2015). Only in some cases are actors' constellations, concrete actions and situations, objects and needs for action as well as governance modes reconstructed (Aukes et al. 2019; Young, Rungius, et al. 2020) without actually following the normative cause, and these do offer first ideas on how to compare structural components of individual case studies. But still, most studies neglect to ask whether and how science diplomacy has imposed structural changes upon those actors' groups that either employ the term or enjoy getting associated with it. Surprisingly, the main actors of science diplomacy, i.e. ministries and science attaché networks, hardly appear in any recent study despite their prominent role (but see Flink and Schreiterer 2010; Ruffini 2017; Flink and Rüffin 2019). The same holds true for diplomatic instruments, such as international treaties and agreements, that have not been comparatively investigated (see a first exploration Rüffin and Schreiterer 2017). The effectiveness of strategic STI (funding) programs has not been analysed: neither for political purposes, where one could distinguish between foreign and STI policy, nor for scientific purposes of different layers (individual, organizational, inter-/disciplinary etc.). And if scientists are really doing a good job as quasi-diplomats and should "maybe even take the lead" in diplomacy (as purported by Lord and Turekian 2007), remains empirically unclear and cannot really be answered by speculations, reports on self-experience, or single case studies, regardless of their quantity or historical rigor. Needless to say, the scholarly debates on science diplomacy has almost totally neglected that a vibrant debate on challenges and reforms of diplomacy in general has been going on in studies and practices of international relations for decades (Constantinou et al. 2016; Lequesne 2020). The most problematic aspect, however, is that there are no fresh comparative studies in the sense that governmental coordination, dedicated instruments, such as science advice-mechanisms, agreements and funding, or the rhetorical use of concepts themselves, are accurately investigated. It is almost ironic that while proponents of science diplomacy stress their scientific grounding, they are the least scientific to themselves in their undertaking.

With this critique in mind, there should be enough room and opportunity for actors to take stock and inspect ongoing policy performance and newly proposed policies, following feedback from practitioners who want to clarify how to carry on working with the concept of science diplomacy.

Recommendations for assessing science diplomacy

While policy actions make demands on actors, their time, financial resources, cognitive capacities, and their reputation, it is understandable that actors want to know whether the specific selection of policy actions and efforts are worthwhile. In particular, this is the case in settings where

a. organizational legitimacy depends on public scrutiny and valuations within an institutional field whose actions and reactions get defined by actors thoroughly observing each other (Powell and DiMaggio 1991; Perkmann and Spicer 2007), and

b. where policy actions are defined by situations of high risk, also in terms of potentially irreversible consequences (Funtowicz and Ravetz 1993).

Policies that directly finance or regulate science, technology and innovation (STI) or that are strongly related to STI often confront actors with challenges of both types a) and b). First, because scientific research and technological development are not only cutting across almost all aspects of society but also a bet into an unknown and often non-projectable future. And second, because policymaking still is about promising certainties and societal improvement, at least if actors want to hold on to the agency that is being granted to them via electorate or bureaucratic appointment. Adding to these challenges, the structural properties of international relations provide even less certainties for actors to plan policies, despite the existence of facilitating institutions, such as treaties, international organisations, and diplomacy as well as lowering barriers for cross-border communication flows of all kinds since the 1990s.

Evaluations can help actors reduce such uncertainties. In an ideal setting, we can think of evaluations that can ultimately help actors assess their own or other actors' positions and outputs by addressing previous and current performance and output/outcomes with regard to specific issues (Sanderson 2002; Power 2008). Actors can decide whether evaluations are employed to distribute new or redistribute existing resources (Whitley 2003; Orr et al. 2007; Biester and Flink 2015), realign programs, rearrange staff or rather contribute to organizational learning (Mytelka and Smith 2002; Simon and Knie 2013). With respect to evaluating science diplomacy actions, the following four guiding ideas are worth considering when setting up an evaluative framework.

"Evaluations of science diplomacy can help actors reduce uncertainties. They should always scrutinize whether interactions are based on principles of fair distribution offering benefits to all participants."

1 The need for comparative momentum

Rather than dwelling on single showcases, actors are advised to set up evaluations with comparative elements, i.e. targeting at conclusive points of interest, no matter if effective resource investment and use are under scrutiny or desired outcomes. For example, actors might be interested if they are currently deploying sufficient amount of (and sufficiently competent) staff to fulfil strategic goals they seek to achieve in science diplomacy actions. These considerations in designing an evaluation, however, entail complex questions: What does a sufficient amount of staff members mean in order to reach a goal? Has an actual increase in staff led to the fulfilment of a goal, or other factors? (Why) do other organizations operate similarly or differently in light of the same goal? These and many similar questions concerning resource investments and use of instruments vis-à-vis strategic goals can only be adequately addressed by introducing benchmarks and time markers to compare sequences before and after the introduction of a science diplomacy activity. In addition, they can lead to cross-sectional assessments with comparable others on a national and international level. And most notably, they cannot be reduced to quantitative metrics, as all of the afore-raised aspects depend on the interpretation of qualitative though comparable properties.

2 Aiming for fair distribution of resources and responsibilities in bi- and multilateral settings

In general, diplomacy helps actors mediate interests across borders. As science diplomacy has been promising to nurture cooperation among actors from different states by resorting to scientific actors and their value systems, or to support actors from the science system in cross-border undertakings by offering diplomatic political support, an evaluation of science diplomacy should always scrutinize whether these interactions are based on principles of fair distribution offering benefits to all participants. Or at least, so it can be argued, on a minimum level no involved party should experience disadvantages resulting from science diplomacy activities. One level above, at least one involved party can profit from a science diplomacy activity (while others do not face any disadvantages), and on a third level all involved parties would truly benefit from such an activity. By the term party/actor, one can understand policy actors from at least two states (or international organisations) as well as from at least two different systems, i.e. science and politics. In addition, the likely consequences of actions, positive and negative ones, can be estimated as immediate output (e.g. reputation gains, establishment of multilateral funding programs, or concrete scientific evidence/technology applied to tackling international challenges) and further outcome/impact (future gains from cross-border funding programs, implications of scientifically informed decisions etc.). The most important aspect is that actions would never directly thrust any involved actor into an unfavorable position, in particular not, when interactions are founded on an asymmetrical basis of resources. This could be the case, when actors collaborate from developed and developing countries, or when actors from the civil society are addressed by joint science diplomacy activities[4].

4 Unfortunately, science diplomacy is not free of bad examples, such as allowing parachute science to happen where resources abroad were exploited and human dignity was violated. This does not mean, however, that international scientific competition as such is disreputable or always detrimental to third parties.

3 Science diplomacy on a continuum of collaboration and competition

Evaluations of science diplomacy cannot ignore the competitive (and sometimes even conflicting) sides of international relations that structure the world of STI just as any other societal realm. In this regard, actors can decide whether they want to assess (their own and others') actions in order to gain competitive advantages, to foster collaborations, yield both at the same, or if either can serve as a means to the other's end. It is essential for actors to acknowledge that competition and collaboration often structure policy and scientific actions simultaneously (e.g. aiming at collaborations with partners abroad whilst being in competitive rivalry with others who aim to get the same). In addition, while policymakers can opt for a competitive mode, funded academics might not buy into this strategic goal but reinterpret it as a way of collaborating with others. And even the contrary is possible, i.e. policy actions can be designed to strengthen international scientific collaborations, while they get reinterpreted by academics to serve their competitive ends. In this respect, assessing science diplomacy actions should not encourage actors to cherish false illusions, e.g. believing in altruistic solutionist collaborations, when there is de facto competition at hand.

4 Relating science diplomacy to other concepts

As a concept, science diplomacy finds itself next to many other programmatic descriptions in the vector of science, technology, innovation, higher education and foreign policies. Actors assessing current or future policy actions in this zone are well advised to think whether it is worth labelling and framing actions as concrete acts of science diplomacy, if they would rather choose different concepts (e.g. those that are less restricted to the sphere of diplomacy), or if they would employ several concepts at once and in specific moments of time. It is worth noting that the strategic use of STI concepts by policymakers has – often over longer periods of time – percolated into the identity work of academic researchers, who really believe in these concepts and act according to their underlying expectations. In this regard, using science diplomacy – just as well as other popular concepts in STI and foreign policymaking – should always meet concerns that concepts can unfold structuring and sometimes unintended effects on individual and collective behaviour. Finally, one should not forget that concepts with their promises can turn out to be lemons, or that due to their potential of supporting front-stage talk they can get hijacked by dubious actors, e.g. from authoritarian governments, in order to serve different purposes.

Conclusion

Since actors put considerable effort into policy actions, they regularly want to make sure that these investments are gainful to a maximum or at least satisfactory degree. With the concept of science diplomacy we can associate such concrete actions at the intersection of STI, HE and foreign policy. Yet, despite the massive discursive proliferation of science diplomacy, it remains unclear what actors concretely gain for their commitment. This lack of clarity, as was argued in this policy brief, stems from the fact that the success of discourse has turned science diplomacy almost into an all-inclusive concept operating at the loss of distinctiveness. Against this backdrop, policy actors are advised to bestow great care on using science diplomacy, and in this regard it is recommendable to engage in evaluations of actions adopted under the heading of the concept. More specifically, evaluations of science diplomacy actions should follow a comparative design (regarding time phases and/or comparable actors) with clear benchmarks.

Furthermore, since science diplomacy brings together actors from different states and systems, evaluations should ask if actions are, on a minimum level, not disadvantageous for any actor and, on a maximum level, beneficial for all. In this context, the competitive sides of science diplomacy must be taken into consideration, without disapproving them a priori. Lastly, evaluations might not only relate actions as being part of science diplomacy only, as they can also contribute to adjacent concepts and discourses. The most important aspect is that evaluations can help actors to reflect what promises can be made in the name of science diplomacy (internally within organizations, within institutional fields but also vis-à-vis a wider public) without overstretching expectations.

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USING SCIENCE FOR/IN DIPLOMACY FOR ADDRESSING GLOBAL CHALLENGES

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USING SCIENCE FOR/IN DIPLOMACY
FOR ADDRESSING GLOBAL CHALLENGES

POLICY BRIEF
JUNE 2020

Building Better Science Diplomacy for Global Challenges: insights from the COVID-19 crisis

Executive Summary

The COVID-19 pandemic has exposed many weaknesses in the interface between scientific research and international relations. The pandemic, like other global challenges, is both knowledge-intensive, in that it requires engagement with scientific knowledge for effective policymaking, and cross-border, in that it is not solvable by a single country acting alone. It is an example of what the S4D4C project is tasked with helping Europe to understand and address through science diplomacy. Based on a broad range of case study research, the S4D4C project has identified a number of key aspects that matter for science diplomacy. In this policy brief, we address four of those (narratives, interests, values, and interdisciplinarity) and discuss their relevance in the COVID-19 crisis. Drawing on these insights, we offer five policy recommendations for expanding and improving future science diplomacy efforts: (1) Create interactive spaces, (2) Promote bi-directional science and diplomacy fluency, (3) Engage the full spectrum of science, (4) Ensure open and interpretable science for diplomacy, and (5) Exert bold values-based leadership. In combination, these will create a strong foundation for addressing not only the ongoing issues in this crisis but also other global challenges, both known and unexpected.

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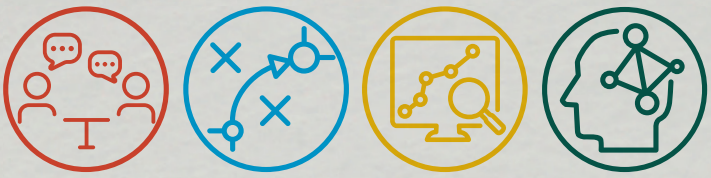

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Building Better Science Diplomacy for Global Challenges: insights from the COVID-19 crisis

Introduction

The COVID-19 pandemic has exposed many weaknesses in the interface between scientific research and international relations. This point of intersection is the focus of science diplomacy, a field that deals with issues that are knowledge-intensive and transnational in that they require science input and are not resolvable by a single country acting alone. Although past global health scares have spurred the strategic institutionalisation of multilateral mechanisms and increased the capabilities of international organisations,[1] it is now apparent that those advances were insufficient. Further, while we are witnessing in this crisis what is arguably the most remarkable scientific mobilisation in history (at the time of writing, there had been nearly 30,000 scientific publications on COVID-19 since the start of 2020),[2] for the most part, the overall global response has emerged in an ad-hoc manner rather than by design. The shortcomings in both preparedness and design exposed by the COVID-19 crisis, demonstrate the need for expanding and improving science diplomacy practices, interfaces, and instruments, as that will be crucial to meeting the next global challenge more effectively.

The S4D4C project – "Using science for/in diplomacy for addressing grand societal challenges"

"In the current political and societal landscape, the needs, stakes and opportunities pertaining to science diplomacy have increased. However, communication between the scientific and diplomatic communities is not straightforward. There is potential for better harnessing European science and science cooperation for European science diplomacy and foreign policy goals, both at EU and EU Member State-level. Not only can new approaches to scientific advice in EU foreign policy benefit from advances in research, but science diplomats can also harness new ways of carrying out research that offer opportunities for foreign policy impact. The overall objective of S4D4C is to support current and future European science diplomacy for the benefit of European capacities, EU foreign policy goals and especially the development of solutions for grand societal challenges. S4D4C has shaped its partnership so that it can effectively address this objective from an academic as well as a practitioners' perspective." (www.s4d4c.eu)

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The COVID-19 pandemic is an example of the type of global challenge which the S4D4C project is tasked with helping Europe to understand and address. In the Madrid Declaration on Science Diplomacy,[3] more than 150 signatories affirmed that: a) science diplomacy is often not fully exploited at all levels of governance, and b) more explicit science diplomacy strategies would allow for more effective alignment of interests and more efficient coordination of resources. This policy brief, therefore, highlights areas that can be more effectively exploited to tackle the pandemic and introduces ideas about what should be included in science diplomacy strategies and coordination efforts for future crises. In this respect, the bilateral and multilateral interactions, both explicit and implicit, that bring knowledge into the policymaking arena and policy alignment across nations at sub-national, national, sub-global, and global levels are critical. These can happen between scientists, science managers, science policymakers, diplomats, officials in foreign, health, science and other ministries, and international organisations.

We focus below on procedural, not substantive issues, not only because we are not medical experts, but more importantly because clear and robust rules and procedures for knowledge exchange, deliberation and decision making are crucial for fighting not only COVID-19 but also other future global hazards.

"The COVID-19 pandemic is an example of the type of global challenge which the S4D4C project is tasked with helping Europe to understand and address"

Insights from the S4D4C cases for COVID-19

The transversal analysis of the S4D4C project's case studies (forthcoming in summer 2020) orients itself on the question, 'What matters for science diplomacy?' and examines a number of key aspects that affect science diplomacy efforts. Here we select four that are of particular relevance to the COVID-19 crisis.

Narratives matter

Creating common narratives facilitates the advancement of collective action, and for knowledge-intensive issues, science has an important role in both shaping the policy narrative and supporting it diplomatically. Common global narratives are relatively rare: in the S4D4C cases,[4] we often found significant variance between national narratives, for example on Zika and cybersecurity, as well as variance between the narratives promoted by policy actors in different national ministries or EU directorate generals. However, with COVID-19, we have witnessed the emergence of a remarkably uniform narrative. The policy solution narrative for the COVID-19 crisis has for now coalesced around a 'containment model', that is, a solution based on scientific modelling in which societies act to control and slow the spread of the virus by 'flattening the curve', something done through 'social distancing' and quarantine. This narrative is especially challenging as it inherently requires coordination and cooperation between countries; it only works if essentially all countries buy into it, and indeed while there are national variations in the implementation of policy reflecting the narrative, there are only a handful of countries (e.g., Sweden) that have not embraced the narrative itself. There is no reason to have expected that a common narrative was inevitable, and we should not underestimate the accomplishment of establishing one.

Science diplomacy played a role in developing the common narrative in a number of ways: first, through international organisations that are diplomatic in nature, e.g., the WHO; and second, through scientists themselves, who have promoted it (in ways often classified as 'science for diplomacy') by urging their peers in other countries to put pressure on their governments to enact social distancing measures.[5] Scientists have also led an effort in policy learning and narrative reframing to promote the use of non-respirator-type face masks by the general public. Building on scientific evidence, they reversed the logic behind why masks should be worn: rather than wearing a mask to protect oneself, one should wear a mask to protect others.[6] The narrative "I protect you, you protect me" was promoted in a short video that went viral on social media and was picked up and promoted by politicians in cross-border dialogues. The European Centre for Disease Prevention and Control (ECDC) has since institutionalized this position in guidelines for the community use of masks.[7]

Science has played a central role in establishing and shaping the policy narratives around COVID-19, but its success has sometimes come in non-traditional policy spaces reliant on social media and the internet. We don't know how many other such efforts simply did not get the time or attention they might have deserved, had more purposefully designed fora been available.

" Science has an important role in shaping the policy narrative "

Interests matter

Global challenges are not the context, nor crises the time, for political conflicts to be played out. While national political interests cannot be ignored or avoided in science diplomacy, they are just one of a number of interests that must be considered and made visible for achieving policymaking results. The S4D4C cases reveal that a unified or unitary interest seldom exists on any level; rather, we find that there is a complex array of competing and cooperating interests of different types (political, scientific, economic, and personal) that operate on different levels and scales. Many of these interests are invisible in policy debates, and a challenge for science diplomacy is to expose them in order to find an optimal balance between cooperation and competition.

Here, we look more specifically at scientific interests and the role they play in addressing the COVID-19 crisis. At a global level, it is essential that scientists have accurate, trustworthy, and common data to work with. In this respect, we have witnessed cooperation in response to COVID-19, beginning with the sharing of the genetic sequence by China,[8] and continuing with data on cases and deaths, some clinical data, and open access publication. The institutionalisation of centralised data collection and information sharing,[9] as described in the S4D4C Zika case, occurred as a response to past epidemics, particularly Zika, Ebola and MERS. Timing matters in a crisis and the shift to open access would likely have been slower and fraught had a pre-existing agreement not been in place. There was also a distinct spill-over effect, leading publishers who had not signed the original agreement to follow suit nevertheless. We take two things from this, one, that effective science diplomacy is needed to set guidelines in advance; once a crisis hits, speed is essential, and there is no time for drawn-out negotiations. Two, that agreements need not be signed onto by all stakeholders, but rather a critical mass should be sought, one that is large enough to create a tipping point that will draw others in as a situation unfolds.

Some of the quintessential examples of science diplomacy are about scientific cooperation between countries otherwise at conflict, such as the USA and USSR during the Cold War. From this perspective, we find many examples within the current COVID-19 crisis of cooperation, even between historical enemies; however, there are still political conflicts that are interfering with global cooperation and knowledge sharing. Taiwan appears to have been one of the most successful examples of preparedness for COVID-19, but China has blocked its inclusion in the WHO, which limits the ability of other countries to learn from its positive example.

The S4D4C case research

The project studied nine cases, categorised by their primary driving force.

Diplomacy challenges – Foreign policy driven cases:
- Science diplomacy and infectious diseases: Between national and European narratives
- Water diplomacy and its future in the national, regional and European environments
- Cyber security: Mapping the role of science diplomacy in the cyber field

Science opportunities – Science driven cases:
- The science and diplomacy of global challenges: Food security in EU-Africa relations
- International dimensions of the EU's FET Flagships: Large scale strategic research investments as a site of de-facto science diplomacy
- Open Science Diplomacy

Coordination options – European instrument driven cases:
- SESAME – An international research infrastructure in the Middle East
- Joint international research programming as a case of science diplomacy
- Science advice in the European Union: Crafting collective understanding of transnational issues

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Science itself is deeply competitive and driven by a race to discover new knowledge, create a breakthrough, or disprove a past theory. The *interest in sharing* discussed above is complemented by an *interest in withholding* for reasons of personal reputation, data ownership, protection of privacy, and the potential for future exploitation as intellectual property. In the quest for medical resolutions, both cures and vaccines, we have seen cooperation and competition working complementarily. Much of the medical research being conducted is transnational, made up of teams of scientists cooperating among themselves and competing with other teams. At the time of writing, the WHO listed 125 candidates for vaccines.[10] Attacking the problem on multiple fronts simultaneously increases the likelihood of finding a solution, but in the past, this has often been characterized by policymakers as wasteful; moving forward, this approach should be re-evaluated and taken into account for future science funding policy. The race for a vaccine also highlights the different interests embedded in the various type of actors that compete in science. There are both corporate and academic research groups involved in this effort, and depending on which type succeeds, there will be different consequences for whether the vaccine is treated as a public good or a private one, and for how it is produced, sold and distributed. This is a critical next phase issue for science diplomacy.

Values matter

At the intersection of science and foreign policy, we find two sets of values that require resolution in policymaking. Politically, values go deeper than narratives or interests and form constitutive elements of policy choices, and scientifically, they are central to ensuring the trustworthiness of scientific results. Science diplomacy's challenge is to avoid being drawn into false trade-offs, but rather seeking solutions that bring both scientific and societal values together. In S4D4C research, we distinguished between scientific values and European values. Scientific values, building on Robert Merton's classic work,[11] include: communalism, universalism, disinterestedness, organised scepticism, and we also add: precaution, openness, and responsibility; European values come from the academic discourse on Normative Power Europe:[12] peace, liberty, democracy, human rights, the rule of law, social solidarity, anti-discrimination, sustainable development, and good governance. Both scientific and European values have been relevant in the policy approach to COVID-19.

When considering the containment narrative of COVID-19, there is evidence of the embeddedness of European values, in particular human rights, solidarity, and the intrinsic value of human life, which were given priority over economic interests. On the other hand, implementing the containment narrative can suggest a trade-off between these values and norms that are authoritarian and threaten the values of liberty, democracy, the rule of law, human rights, and privacy. On a general political level, the emergency powers taken by European governments did not represent a break from the democratic and the rule of law values (with one exception).[13] More concerning were the tools for implementing a containment strategy that requires surveillance measures (tracking and tracing individuals) that potentially threaten privacy. Since passing its GDPR legislation, the EU has been a global champion for the protection of individual privacy, and we commend the way the EU has continued in this crisis to promote win-win solutions that allow for tracing without sacrificing privacy, both directly in software development and by issuing guidelines for data protection in apps that track the virus.[14] On the other hand, the values of liberty and free speech are both political and also essential to the scientific values of openness, disinterestedness (i.e., not having a political stake), and universalism. Here we find examples where the values have not been defended as rigorously: for example, China's silencing of the first doctors to report the outbreak and vetting of publications by Chinese researchers prior to publication,[15] censoring of statements mentioning the virus' origin in China,[16] and along with Russia, using social media to create misleading narratives.[17]

The values of science and society are also challenged by the need to find a long-term medical solution as quickly as possible. In this instance, the values of good governance and scepticism, precaution, and responsibility go together. These values are highly salient in clinical trials and the approval of medicines and vaccines, but they are also relevant in many other areas of science diplomacy. We wrote above about the value of a common global narrative; here, we emphasise scepticism, i.e., that any such narrative should be constantly tested and challenged by science. This is particularly true in our current situation since we know remarkably little about COVID-19. While there has been a great amount of expert opinion, which has undoubtedly provided sound guidance, much of that has been based on assumptions and hypotheses, rather than the sort of empirical evidence that is at the heart of good governance and evidence-based policymaking. Things as basic as the case fatality rate or percentage of the population that has been exposed to the virus are still highly contested. There are questions about the accuracy of data, the standards for compiling certain metrics, i.e., how COVID-19 deaths are counted, as well as issues of randomness and representativeness in sampling. Retractions[18] resulting from rushed and poor techniques in both production and review, as well as scientific malpractice, most visible in the double scandal around hydroxychloroquine, highlight the difficulty of reconciling scientific values and logics with those of business, politics, and the inherent pressures of the crisis itself. While there is a political and public imperative to provide information quickly, great care must be taken to maintain the critical and deliberate processes of science that serve to ensure quality and accuracy.

Multi-disciplinarity matters

The COVID-19 crisis has exposed the interconnectedness of all branches of science when dealing with global challenges. There is no one-dimensional solution to complex problems on a global level, but a multi-disciplinary and interdisciplinary approach increases the likelihood of finding solutions. In our S4D4C research on food security, the need for both social and technical solutions was readily apparent, for example, as farmers in Africa need not only the technical know-how and technology but also the confidence and social conditions to support changing their practices. This points to the need for a systems-based approach which includes not only natural science, life sciences, and engineering, but also the social sciences and humanities.

The section of the S4D4C transversal analysis on disciplinarity looks more narrowly at the importance of the social sciences and humanities (SSH).Our casework found that, in general, the fields of SSH are often pushed to the fringes for the purposes of science diplomacy. Despite their relevance, for example, in water security and infectious diseases, these disciplines are often treated as complementary and are relegated to areas of soft skills rather than being viewed as contributors of critical knowledge. In addressing COVID-19, there are numerous examples of how SSH fields have been and can be engaged in the crisis.[19] The WHO includes the social sciences and ethics as two of the nine priority areas for research in its "Coordinated global research roadmap".[20] However, in terms of an actual role in science diplomacy, the evidence is still limited as to what extent input from all of these disciplines has been sought and used by governments in their international relations activities.

"While there is a political and public imperative to provide information quickly, great care must be taken to maintain the critical and deliberate processes of science that serve to ensure quality and accuracy"

Policy Recommendations

Building on the insights above, we provide five policy recommendations for engaging science diplomacy more effectively in global challenges.

1. Create interactive spaces

"Interactive spaces" for science diplomacy are needed. In S4D4C Policy Brief of January 2020,[21] we argued that, due to the complexity of global challenges, the internal diversity of science, and the reconciliatory logics of diplomacy, effective science diplomacy practices will rely on actors who are literate in both domains. What is needed is to create and foster appropriate fora in which they can engage each other. These "interactive spaces" will enable actors: (a) to discuss, learn and reflect jointly on the stakes in their respective domains, (b) to access relevant science-based knowledge infrastructures and experts, and (c) to suggest forms of organising the intended science diplomacy activity. Science diplomacy efforts should aim to create and institutionalise these spaces at all levels of government and make them accessible to a broad range of stakeholders.

2. Promote bi-directional science and diplomacy fluency

There is a need for people who are fluent in the languages of both science and diplomacy. Making the most of interactive spaces calls for an enhanced ability to communicate between science and diplomacy. There is a need to invest resources in training scientists on how to communicate with policymakers, and vice versa, in training policymakers how to better interact with scientists to ensure that expertise and scientific evidence are smoothly and effectively brought into all levels of international diplomacy. Both types of actor need to recognise the complex nature of the other's field and not mistakenly depict it as uniform or unified: scientists need to understand the multiplicity of viable political solutions, and politicians, the contestation and divergency of scientific views. Further, we reiterate here the suggestion in our recent policy report, "Calling for a Systemic Change: Towards a European Union Science Diplomacy for Addressing Global Challenges",[22] that a career path for a unique type of professional be established, that of the professional knowledge broker, whose role would be to facilitate translation across boundaries between both fields and nations.

3. Engage the full spectrum of science

When facing global challenges, the full range of science is needed. COVID-19 has shown us the importance of non-pharmaceutical interventions and provided the social sciences with an opportunity to show their value. In general, global challenges have social, not only technical aspects, and these are critical for understanding the complex nature of the problems and their solutions. For this reason, it is essential that the social sciences and humanities be fully and systematically incorporated into both the 'interactive spaces' mentioned above as well as institutionalized in funding programmes, knowledge hubs, policy advice systems, and other types of consultations, policymaking activities, and instruments of science diplomacy.

4. Ensure open and interpretable science for diplomacy

A broad and diverse range of stakeholders needs access to quality knowledge that they can interpret effectively. COVID-19 has shown us the value of open science but also the challenges of establishing useful interfaces by which to make that knowledge available. The EU is already a leader in the area of open science, but it should use the COVID-19 pandemic to work towards further institutionalisation of open science as a global default. Ensuring that open knowledge is taken up and put to use requires better interfaces. Global dashboards and knowledge hubs could be much richer in both the breadth and depth of the data they share. Further, new types of

interfaces designed to facilitate cross-governmental and cross-disciplinary understanding are needed. The amount of scientific information on COVID-19 makes it impracticable for an individual, much less every policymaker, medical professional, or scientist who requires information, to engage with all but a small portion of the knowledge base. What is needed are tools that go beyond search and allow for a meta-level of evaluation, translation, and sensemaking for the wide range of actors that demand knowledge-based action and decision-making.

5. Exert bold values-based leadership

Leadership in promoting the values of a liberal world order and the values of science is needed. The EU and its member states should cleave to their values through the crisis. Globally, the EU has influence as a norm setter. The promotion of a Normative Power Europe expresses the idea that Europe is a global champion of a set of values that are at the heart of the post-World War II liberal world order that has brought peace and prosperity both to Europe and the world. Europe has an opportunity in this regard, both to show that the crisis can be managed without resorting to authoritarian measures or abandoning privacy or responsible research practices. The crisis can be a springboard for improving multilateral action, social solidarity, and an invigorated focus on global challenges.

"The crisis can be a springboard for improving multilateral action, social solidarity and an invigorated focus on global challenges"

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