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Romancing science for global solutions: on narratives and interpretative schemas of science diplomacy

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In recent years, the concept of science diplomacy has gained remarkable ground in public policy. Calling for closer cooperation between actors from science and foreign policy, it is often being promulgated as a hitherto neglected catalyst for international understanding and global change. On what grounds science diplomacy entertains these high hopes, however, has remained unclear, and—as a blind spot—unaddressed in a discourse mostly shaped by policy practitioners. Recognizing that the discourse on science diplomacy is still unspecific about how its means and ends should fit together and be comprehended, we reconstruct the concept and its discourse as a materialization of actors' interpretative schemas and shared assumptions about the social world they constantly need to make sense of. Science diplomacy is presented as a panacea against looming threats and grand challenges in a world facing deterioration. The prerequisite for such a solutionistic narrative is a simplified portrait of diplomacy in need of help from science that—romanticized in this discourse—bears but positive properties and exerts rationalizing, collaborative and even pacifying effects on a generic international community in its collective efforts to tackle global challenges. We conclude that these interpretative schemas that idealize and mythify science as overall collaborative, rationalizing and complexity-reducing are problematic. First, because the discourse misconceives ideals and norms for real and will therefore disappoint social expectations, and second, because science is likely to be instrumentalised for political purposes.

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Introduction

The last fifteen years have seen an upswing of *science diplomacy* in public discourse, a concept and driver that is supposed to bridge actions of science and foreign policy. That science diplomacy entered the scene of public policy discourse and has succeeded in entertaining more and more actors far beyond the realms of foreign policymaking for such a long time is rather phenomenal. First, because the functional necessity of the concept is unclear, particularly in light of the fact that institutions and their activities at the intersection of science and foreign policymaking have existed for decades. Second, because science diplomacy shows longer trajectories than concepts usually do, when they are created for agenda-setting purposes in policymaking. And third, because the concept even affects actors we do not associate with diplomacy in the narrow sense: Nowadays, universities and individual academics want to engage in science diplomacy, and some even offer courses and master's degree programs to study how to become a science diplomat. What accounts for the wide reception of science diplomacy, and why does the concept stick and keep encouraging practitioners to engage and affirm it? While only few scholars have reflected upon the emergence of the concept and its related policy practices (Walker, 2015; Penca, 2018; Ruffin, 2018), this article discusses science diplomacy as a discursive phenomenon. We look at science diplomacy as an expression of cultivating social order, meaning, legitimacy and identity in a globally changing world perceived as challenging. By reconstructing understandings of science diplomacy and identifying its functional roles, we can also learn how the interrelation of the social realms of science, science policy and foreign policy gets co-produced via rhetorical language politics.

Borne by constructivist approaches that highlight the functionality and structuring effects of language in communication processes, we follow the main threads of science diplomacy to discuss its underlying narratives, its taken-for-grantedness and actors' isomorphic alignment to its myths of rationality (Drori et al., 2003). It is important to ask what has made the emergence and structuration of science diplomacy necessary: in light of the historical fact that internationality was recognized as a key condition to science policy and the evolution of science as such (Schott, 1991; Crawford et al., 1993; Stichweh, 1996; Flink and Ruffin, 2019), and functionally (Luhmann, 1995, p. 106) whether it allows to condition communication processes in a specific (and no other) way.

To do so, the article briefly introduces methodological approaches to language concepts and their social functions, followed by briefly revisiting the emergence of science diplomacy as a concept in public discourse. In the main part we reconstruct the essential currents and interpretative schemas behind the discourse on science diplomacy combining it with a discussion of rhetorical strategies that actors employ. We find that actors unanimously call upon the dramatic narrative of imminent global challenges and threats for justifying their engagement they frame by this concept. Science diplomacy is presented as the key device and solution to turn this desperate state of affairs into a situation of opportunity—even one that will yield return—invoking an almost heroic empowerment of kindred spirits all over the world. As part of that, science is portrayed to spread and propagate collaborative virtues, i.e., rationalize and pacify self-interested politics. This narrative ties in with a logic of collective action that takes a reference point in nation states. Science is believed to work as a cross-boundaring and unifying force due to its supposedly collaborative nature. Finding that science diplomacy largely rests on romanticized ideals and misconceptions urges, at the minimum, a more prudential utilization of the term in public policy.

On language concepts

With the constructivist and linguistic turns in the social sciences, scholars have gained an interest in studying language concepts as regards their structuring function in society. The common ontology is that these concepts do not merely represent but immediately shape meaning in the course of their expression during social interactions (e.g., Lakoff and Johnson, 1980; Luhmann, 1995). In political science and organization studies, concepts are held essential for actors to seize institutional legitimacy, as their activities can be framed and primed as part of narratives (Fischer and Forester, 1993; Rein and Schön, 1993; Czarniaswska, 1998). With regard to foreign policy, concepts have been acknowledged to play a vital role. In fact, a highly codified and formal system of symbolic actions, such as the 'protocol' in diplomacy, can be regarded as communication between state actors (and increasingly non-state actors) (Watson, 1982; Chilton and Lakoff, 1995; Jönsson and Hall, 2005). But even more so, the structural relation between science and politics is constituted by language concepts. While these keep actors at distance, e.g., ascribing to them specific responsibilities and competences, they also offer 'meeting points' through generalized symbols that are communicable across distinct spheres (Flink and Kaldewey, 2018).

Studying concepts in context furthermore affords us to inquire how actors (human beings and organizations) act upon them. Concepts can help actors in their strategic bounding and tailoring work vis-à-vis each other (Calvert, 2006), but they also mould into the fabric of their identity (Somers, 1994). This does not presuppose that concepts express a blurring of systemic boundaries, i.e., policymakers do not just become scientists or vice-versa. But as Jacob (2005, p. 198) has put it, they "can build consensus in that they allow sufficient interpretative flexibility for those involved to agree on a particular problem definition *without* agreeing on its implications or solution".

When a new concept seizes prominence in social communication, questions of emergence arise, such as why this and not another concept has been selected, what specific meanings a concept is charged with (Luhmann, 1995, p. 148), and to which contexts and problems it responds to. Moreover, it is interesting to see how some concepts in science policy develop popularity or prominence. Some concepts become catchy and travel across time and spatial contexts (Flink and Peter, 2018), especially if they have undergone processes of mythification, glorification and conventionalization in popular daily life (Ceccarelli, 2013).

In light of these methodological considerations, the term science diplomacy is analyzed as a symbolic concept that has opened up and structures a specific area of communication. By interpreting how actors¹ introduced science diplomacy or have positioned themselves to this concept, we can flesh out various interpretative schemas (Sewell, 1992) that operate in moments of interpretative challenges to concrete situations that evoke action. Because novel concepts can reveal how actors either develop new interpretative schemas to situations that institutionalized practices cannot cope with, or that they self-legitimize their schematic actions, prevalent understandings and convictions about the world by applying new language fixtures.² And particularly the concurrence of old and new concepts reflects the changing of actors' interpretations within and across functional systems. This approach requires interpreting concepts as elements embedded in narratives and their very social contexts.

Science diplomacy: the emergence of a concept

Whereas international affairs and science, technology and higher education have a longstanding relation, the explicit and copious

employment of the term science diplomacy does not show up before the first years after the year 2000. Hardly any reference can be found to science diplomacy before the millennium. A search in the Web of Science, in Scopus, Google Ngram Viewer and the full text accessible online archives of the scientific journals *Nature* and *Science* (that have always featured discussions on policy issues in their editorials, letters to the editors and other formats, such as news and comments) reveal but two entries from 1945–2000. Among others, the search included the terms “science diplomacy”, “scientific diplomacy”, as well as “science [AND] diplomacy”, while related concepts (e.g., international science policymaking) were carefully taken into account, i.e., contributions read in search for discussions pertaining to foreign affairs and diplomatic issues. For example, the News and Comments section of the journal *Science* discussed the unfitting position of science and technology in the US State Department despite its announced creation of a Bureau of Oceans and International Environmental and Scientific Affairs (Walsh, 1974). In another instance, the AAAS celebrated its Washington Fellowships program that, since 1973, had placed scientists in Congress, in the US Department of State’s International Development Agency or in executive branches related to arms control and national security issues, based on their scientific and technical expertise as well as on respective governmental needs (Science, 1990).

The most prominent use of science diplomacy during the first years of its promotion can be attributed to a group of policy entrepreneurs in and around Washington’s science and foreign policy organizations, most notably the American Association for the Advancement of Science (AAAS), whose members aimed for institutional change in US foreign politics (Turekian and Lord, 2007; Dreifus, 2008). In preparation of a presidential change, marketing science diplomacy promised to encourage reforms within the Department of State and to resurrect the US’ image abroad, which had been compromised by the Bush administration’s hardline realist approach to foreign politics, especially its interventions in Iraq and Afghanistan. By the time that the new administration under President Barack Obama took office in early 2009, science diplomacy was to be placed high on the pedestal in US foreign policy. Indeed, the new president positively alluded to science and higher education as an international bridge-builder in a speech at the University of Cairo,³ and US-engagement was backed by fellowship programs from the Department of State teaming up for marketing campaigns together with the newly founded AAAS Center for Science Diplomacy and other agencies, most notably the US Agency for International Development (USAID) and the National Academies for Science, Engineering and Medicine (NASEM).

In other states, science diplomacy initiatives were newly advertised, and existing ones got into their stride as being part of this new discourse. In light of a transnationally interactive and mutually observing network of staff from ministries, from research (funding) organizations, academies and their many liaisons abroad (e.g., Schütte, 2008; Yakushiji, 2009; Berg, 2010) that has got stirred into action, it is hard to assess whether the US were in the vanguard of this new movement. For example, in the early years of millennium the British government began to enforce, revamp and merge its international science policy activities and parts of its foreign services under the heading of the Science and Innovation Network (SIN), then to be coordinated inter-departmentally by the “Global Science and Innovation Forum” (GSIF) and enjoying strategic funding in alignment of the Millennium Goals and UK’s business interests, such as the British Low Carbon High Growth Initiative.⁴ As another example, in 2009 Germany’s Federal Foreign Office celebrated the so-called “Initiative on Foreign Science Policy” (“Außenwissenschaftspolitik”) with a huge conference that brought together over 300 elites from all over the world. Linking with the

Hightech Strategy (2006) and Internationalization Strategy (2007) of the Federal Ministry of Education and Research, this initiative was flanked by a series of funding programs: the founding of bi-national universities, several one-stop-shop houses abroad (“German Science and Innovation Houses”) that should market the different research (and funding) organizations under one roof on several innovation hotspots abroad, and the bilateral Centers of Excellence managed by the German Academic Exchange Service (DAAD) twinning German university research and postgraduate training with those of developing and threshold countries. A similar initiative was taken by Switzerland that invested into promotion activities under the label of “Swissnex”, also including the Swiss science and innovation houses. One could add many more examples of countries’ explicit agendas that have been newly set under the label science diplomacy. After, as it were, a formative phase of a new discourse on science diplomacy the concept has for more than ten years flanked numerous national and transnational policy initiatives (these and further initiatives of France and Japan were analyzed by Flink and Schreiterer, 2010).

Following the European Council’s decision of 26 July 2010, also the EU started to strategically interlink its newly set up European External Action Service (EEAS) with science, technology and innovation policy goals set by its respective Directorate General. In 2012, the European Commission explicitly introduces the term science diplomacy,⁵ before the EEAS adopted it in 2016 mainly acknowledging it as a soft power tool: “Science cooperation is a fantastic way to developing links of all kinds (human, political, business oriented...), and maintaining them when other kinds of direct relations are difficult (cf. Iran).”⁶ Next to seconding attachés and counselors to external representations of strategic regional and thematic interests (ibid.; Rüffin, 2020) for observation activities and Framework Programme marketing, the European Commission’s Directorate General for Research is increasingly consolidating the EU’s geopolitical goals and strategic research and development goals, when it comes to negotiations with regions, such as the Middle East or new global superpowers like China and Russia. To fathom the potentials of science diplomacy while marketing the EU’s new interests and seeking for training possibilities, Directorate General for Research has recently funded three collaborative research and development projects.⁷

Interpretative schemas and narratives of science diplomacy Science diplomacy and global challenges.

It is almost common sense that human beings try to understand individual situations and actions by placing them into a coherent narrative, an explanatory framework that helps them to make sense of the complex social world they are situated in. Narratives can operate with spatial-temporal markers allowing for meaningful chronologies and directionalities. They also operate with conditional and causal explanations of actions that will or have happened, and often they contain categories of collective identities—we as opposed to them—to name some aspects (Lakoff and Johnson, 1980). When narratives of modernity contain an element of significant problems or crises, their story-telling is likely to imply clues of how to solve or overcome them.

The concept of science diplomacy is embedded in the narrative of a crisis, in fact a looming scenario in which the world is facing pressing and *existential* problems that do not only affect a single nation state anymore but the entire mankind. In adjacent discourses, this dramaturgy is known as ‘global challenges’ or ‘grand/societal challenges’ (Stone, 2020; Keenan et al., 2012; Flink and Kaldewey, 2018). The narrative of challenges builds on the idea that problems are never too big to fail but rather present a “challenge” that, once taken, one could even grow stronger with.

However, these challenges require collective collaborative efforts if they want to be mastered. And here comes science diplomacy, a cherished solution to these challenges, promising to foster international understanding and a greater sense of collaboration between actors from different functional systems and states (Moedas, 2016; Müller and Bona, 2018; Turekian et al., 2015; Royal Society, 2010).

The fact that the concept of science diplomacy is born out of this projection has at least two defining implications. First, it evokes a sense of immediacy and urgency to act by pointing to world-spanning threats to human life and wellbeing (Royal Society, 2010; Müller and Bona, 2018) exemplified here by the Royal Society⁸ report:

“Science diplomacy is not new, but it has never been more important. Many of the defining challenges of the 21st century—from climate change and food security, to poverty reduction and nuclear disarmament—have scientific dimensions”. (Royal Society, 2010, first page of main text body)

The suggestion here is to conceive of this situation as ultimately hopeful and manageable with the unexpected virtue of what is called science diplomacy. Science diplomacy is presented as a response to these exact same challenges, if not a panacea. The second defining characteristic, therefore, is conveying a sense of competence and accomplishment in light of these urgent scenarios. In the face of a threatening future, science diplomacy appears as a sensationally empowering vision. In summary, the narrative of global challenges builds the very foundation for science diplomacy to appear as an indispensable remedy and a spark of hope. It prepares the ground for a dramaturgy of ability, reassurance, and (almost heroic) empowerment in the wake of seemingly intractable challenges. The current understanding of science diplomacy largely rests on a specific blending of visions, hopes and beliefs that respond to a shared description of challenges and threats.

Global challenges as collective action failure. That science diplomacy is narrated as a remedy to global challenges hinges on their specific framing and the properties ascribed to these challenges. Vaulting national borders, these problems are presented as elusive to traditional governmental control and regulation, and in that they particularly pose a problem to national accountability. Moreover, global problems are cross-cutting topic areas, e.g., climate change relates to questions of energy supply, poverty, migration etc. “This also means that impacts and responsibilities are not anymore to be found on a national scale. Rather, their transnational nature requires constructive engagement of stakeholders across borders and between policy levels”. (Aukes, 2020, p. 6) We can say that the different forms and expressions of global challenges (e.g., climate change; but also resource degradation, violation of human rights etc.) in the context of science diplomacy are presented in the logic of *global negative externalities*.⁹ Externalities are the unintended effects of self-interested individual activities on someone else or on global commons. They can be positive (beneficial) or negative (detrimental). The main feature of global commons is at the same time their main problem in terms of providing fair allocation and accountability.¹⁰ They are non-excludable (which makes it difficult to govern them; also referring to interconnectedness and transnationality) though rivalrous (which makes it necessary to govern them). This results in a collective action problem, which refers to the inability to yield compliance between self-interested actors in the absence of a world government ruling upon nation states.

In this respect, the narrative of science diplomacy relates to the problem of *collective action failure* (Olson, 1965; Hardin, 1968). While globalization opens up highly interconnected, transnational action contexts, national governmental actions bound to their own territory are rendered ineffective. Spill-over effects (negative externalities) would increase and could not be controlled (rewarded, restricted etc.) by single regulative systems (cf. Turekian et al., 2015, pp. 1–2; Royal Society, 2010). As Diane Stone (2020, p. 1) puts it upfront in her new book:

“Global policy problems are [...] very difficult, sometimes impossible, to solve for many reasons: first, incomplete or contradictory knowledge creating uncertainty; second, the number of countries, communities and other interests involved with quite disparate values; third, the multiple arenas for deliberation; and fourth, the interconnected nature of many global issues with other problems (Geuijen et al., 2016; Head, 2013). International policy coordination to deliver collective action and implement a set of genuine global responses is often slow and incomplete, while effectiveness is often driven by non-compliance”.

While collective action problems are common sense in the debate on global governance and many other scholarly and practitioners’ fields, science diplomacy promises to provide an unexpected and innovative solution: *by calling in science*. Science—more precisely, a specific view on science that advocates of science diplomacy hold—seems to perfectly address the two main conditions required by the specific problem-framing: complete information and trust. Science diplomacy not only constitutes a promise that scientific expertise and advice should serve foreign policy whenever complex international issues are to be dealt with (information requirement), such as climate change, pandemics, issues of non-proliferation etc. Also, science is regarded in all confidence as naturally adding to the level of trust—a logic of action that seemingly promotes disinterested and collaborative virtues in self-interested actors who would better cooperate on an international level. Accordingly, the ‘language of science’ is presented as a means to achieve higher-level policy goals, as it would foster collective action in the international arena, particularly on cross-border issues, and substitute classical means and styles of communication in foreign policy (Berkman, 2019; Copeland, 2016; S4D4C, 2018).

Collaborative science? The narrative that science diplomacy would be capable of solving global challenges—all of them collective action problems—nurtures from the idea that science was a conscientiously collaborative endeavor. There are explicit statements that praise science diplomacy for “using science to rise above military conflict and political and cultural differences”. (Royal Society, 2010, p. 1; quoting Lorna Casselton). Overall, the discourse constantly repeats that science would foster trust, understanding and collaboration across borders. Thereby, it would help identify common goals, transcend national identities and provide arenas of exchange. The following quote exemplifies the role of science to identify common interests. It goes so far as to attest science with a “unifying power” in the wake of post-WWII era:

“In 1954, CERN, the European Organization for Nuclear Research was formed by twelve European countries, including Germany and Italy. These twelve nations signed on to promote the unifying power of science, both ideologically and pragmatically—bringing scientists together from countries that had been at war less than a decade previously, while sharing the increasing costs at the frontiers of nuclear physics research. Thus, modern science

diplomacy among European nations was born out of both shared aspirations and a practical necessity". (Moedas, 2016, p. 2)

Statements like these from the former EU Research Commissioner are cautious with contending overly explicit correlations between science and peace, but at the same time they are ambitiously suggestive. "The unifying power of science" is described to originate in a rather unavoidable side effect of a mundane requirement. It is claimed that science can even offset ideological chasms from the most atrocious wars ever fought: by raising pragmatic necessities. From this point of view, science diplomacy seems to bear an almost magic touch: Enmity, usually negotiated as a tragic and irrational trait of the human race, gets defeated (virtually on the side) by accommodating a pragmatic necessity to collaborate, which would be inherent to scientific research. In that, formerly overshadowed common interests are remembered, shared aspirations are identified, and even pragmatism and ideology unite in the frame of science diplomacy. Yet, common goals represented by science appear to be quite compelling rather than incidental: "When traditional forms of diplomacy have been exhausted and conflicting sides have not reached a common understanding, science diplomacy may offer a breakthrough, bonding them through a shared goal" (European Commission, 2019, p. 75). Scientists should thus exert a "bonding" or cohesive force that seems even strong enough to serve as a back-up in situations where actors differ substantially on a political level.

The second theme (transcending national identities) rests on the vague and simplistic idea¹¹ that scientists would have a dual, i.e., a national and scientific identity. Their scientific identity would allegedly set aside prejudices and affords collaborating with colleagues regardless of their provenance and worldviews. This theme has become almost emblematic for science diplomacy:

"During the Cold War, the development of organizations such as the International Institute for Applied Systems Analysis and scientific exchanges between American and Soviet scientists provided a critical connection between adversaries". (Turekian and Lord, 2007, p. 769)

"Throughout history, science has been an effective means of bringing together political opponents that need to address a pressing common threat. For instance, cooperation between western and former Soviet scientists helped in mapping and assessing Soviet weaponry shortly after the fall of the Soviet Union, preventing a nuclear disaster. Thus, science can be used to move beyond ideological cleavages, gathering together people with very different worldviews". (European Commission, 2019, p. 71)

Quite strikingly, this reputed capacity to move beyond political cleavages can only seize significance in this narrative, as long as scientists are still construed as different. Thus, we are dealing with a political construction that scientists actually have or maintain distinct national and/or cultural identities that seem conflictive from outside. Or put in other words, the purported non-ideological, a-political and therefore collaborative virtues of science assume significance only in a profoundly political setting.

This brings up a principal flaw in the science diplomacy concept, hitherto woefully ignored in the discourse. The narrative offers the outlook that political conflicts can be overruled by genuinely 'scientific' (e.g., disinterested and rational) attitudes. Being educated and socialized as a scientist, individuals would have seized collaborative virtues and shaken off all appraisal of values related to national, local, cultural, racial and religious provenance. Science serves as an allegory for the universal human

motivation and pursuit of reason. Scientific disinterestedness is expected to act as a unifying point of orientation deliberately opposing competing national interests. Science is used emblematically for communism, universalism, and disinterestedness, but in a deeply political context: to counter what are considered the deficiencies of politics; divisiveness, opposition, and self-interestedness. In that, the discourse principally turns "retro" by alluding to *The Normative Structure of Science* (Merton, 1973).¹² It is necessary to recall that Robert Merton's original cause was to inquire—and later attest—that science could only thrive in democratic societies due to corresponding but not interfering social principles. And still, as Merton himself was fully aware of, norms should not be taken for reality, and hardly can they function as an empirical foundation that science was in fact a genuinely collaborative endeavor undertaken by socially caring altruists, as is portrayed in the discourse of science diplomacy. Therefore, what the narrative actually bears on in the first place is a permutation of a normative ideal surging on historical examples that are being taken out of context with real circumstances.

Apart from misinterpreting scientific norms as a practical reality and incorrectly taking them at face value, a second fallacy regards neglecting the fact that these norms were primarily meant to apply to a methodological context, i.e., they are confined to the process of generating and validating knowledge. In the context of science diplomacy, however, these methodological principles are exploited to call for transformative effects in politics. While there is no doubt about the fact that some forms of scientific cooperation among conflicting nations can allow new perspectives on each other and open up channels for communication, it is an erroneous conclusion to ascribe these effects to a somewhat compelling cooperative attitude of science. Fierce competition, hierarchy, patronage, reputation games (Latour and Woolgar, 1986), chauvinism and elitism (Musselin, 2013), scientific misconduct, arbitrariness in peer judgements (Lamont et al., 2006), a "global war on talents" (Michaels et al., 2001) and national ranking games (Lynch, 2015), as well as a huge gap between the Global North and South as to possibilities of taking part in the world science system (Bradley, 2008; Wagner, 2009), to name but some other social aspects of science that de facto exist, all seem to be far away from what the discourse on science diplomacy envisages as science. Science diplomacy is rooted in the idea of science to be non-ideological and due to that able to pacify and advance the course of action in politics (Royal Society, 2010; Colglazier, 2017). This does not only stretch the original idea of scientific principles on the one hand, but also reveals a highly simplistic idea of the nature of political conflict on the other.

The myth of rationalizing politics. Whereas the discourse on science diplomacy narrates the story of science being a-political, it is twisting science to unfold political authority. Scientific collaboration should become a standard for political behavior in international arenas, even to the point that political conflicts could be settled on the grounds of scientific values and principles (European Commission, 2019, p. 71). In that, science diplomacy vaguely alludes to longtime debates about the standing of science vis-à-vis society. Without any explications or cautious scrutiny, hopes rest on the presumption that science could permeate politics and override futile partisan politics.

"Like some proponents of science diplomacy, I am rather an optimist, perhaps too much so. My optimism is based on science playing an influential and positive role in human affairs, including in diplomacy and foreign policy. It often translates into a worldview, rooted in the Enlightenment,

that human history is predominantly a story of continual upward progress that benefits all. [...] Nevertheless, science diplomats are realists and recognize that politics is a more powerful force than science, at least in the short run". (Colglazier, 2017, p. 1)

Despite all ascribed modesty or realism to science diplomats, the discursively expressed expectations on the role of science in society are obviously high. Science is meant to play an "influential role" in politics and might eventually overrule and supersede politics:

"It is time for the scientific community to increase its role in diplomacy—and maybe even take the lead. Nongovernmental scientific organizations are more credible, more nimble, and—as honest brokers—in many cases more respected than the U.S. government overseas". (Turekian and Lord, 2007, p. 770).

It is this pervasive confidence in the powers of science to accommodate political conflict that composes the optimistic tapestry of sound of science diplomacy. This optimism seems to be particularly based on a specific understanding of how science relates to society and politics. While advocates of science diplomacy remain almost entirely silent about the fact that scientific research depends on political regulation and distributions of public funds, they lean on the notion that science informs policymaking, as was e.g., captured by the metaphorical figure of the 'honest broker' (Pielke, 2007). Accordingly, scientists or scientific organizations are meant to act as unselfish and therefore credible facilitators in politics. At the same time, however, they are not supposed to touch upon grand policy goals. Science as an honest broker does not advocate for or against a policy alternative. As congenial as this may sound, however, the discourse takes a role model for reality, and no matter what status, it would still remain highly presuppositional and conceptually problematic. If we follow Roger Pielke, the positive sides of *policy*, "a commitment to a particular course of action", should be distinguished from the negative sides of *politics*, i.e., "the process of bargaining, negotiation, and compromise that determines who gets what, when, and how" (ibid., 2007, p. 31). The latter would also stand for the abysses of the everyday political struggles that threaten to obstruct and "overshadow policy" (ibid., 34). On the grounds of this distinction rests the illusion that the political realm (e.g., diplomacy) can be rationalized and enhanced via science, while landmark decisions remain in the peoples' power. In this, the idea of the honest broker is to draft a middle ground for the role of science in politics between the two theoretical extremes, technocracy and decisionism. However, the extremes are in fact not truly mediated, but only split up and projected onto the previously differentiated realms of policy and politics: Scientification and technocratization are strongly cherished on the operational administrative level, while decisionism is preserved on the higher-order policy level.¹³

Science diplomacy assumes that politics and policy could be differentiated to eliminate political conflict on the operational level by scientific reason. The discourse actively promotes a favor for scientists to serve in and replace genuinely political positions—or what is called "science diplomats". One of the first publications spreading the term science diplomacy was dubbed with "Scientists are among America's most effective diplomats" (Turekian and Lord, 2007). However, apart from the fact that this distinction between politics and policy is merely a conceptual one, the idea that science can rationalize the level of politics is similarly hypothetical. As the Social Studies of Science have empirically shown many times, even if all involved actors are

strongly committed to rationalizing decision-making processes by providing scientific evidence, dissent and conflicts tend to shift to the level of how to include what kind of knowledge etc. (e.g., Jasanoff, 1990; Sarewitz, 2000; Weingart, 1999). But Social Studies of Science do not give evidence that including scientists or scientific expertise would systematically shorten, simplify or ameliorate decision-making processes. Quite to the contrary, scientific knowledge increases uncertainty by raising awareness of the actual status quo and the very limits of knowledge, of increased complexity inherent to facts under investigation and of increased options for decision-making that entail unforeseeable consequences (Beck, 1992; Böhme, 1997). This is not to say that science should keep its hands off politics. But science cannot relieve from the burden of insecurity and complexity—conditions appertaining to any major political decision-making process. Science can inform political disputes, but it cannot settle them.

The invisible hand of science. That messy politics could be rationalized by science to develop better policies, is one myth within the narrative of science diplomacy. The second myth expresses the hope that stakeholders' interests will somewhat magically converge—and conflicts around the globe dissolve—, if only science was more dominant and influential in international affairs. These virtuous effects of science in society remind of the idea of Adam Smith's (1776) "invisible hand" that benefits will be most far-ranging to society, if institutions like Adam Smith's economic market—or in our case science—would unfold self-regulatory forces among their self-interested participants. Science, as in science diplomacy, is held to provide a similarly tacit and built-in vigor that promotes the common good out of its own and regardless of actors' individual motivations. Certainly, science diplomacy does not advocate against political intervention and regulation, but it ranks the merits of scientific reason as a social force of its own. Right from the beginning of the public discourse on science diplomacy, its advocates and endorsers claimed that the concept would comprise the entire spectrum of different motivations: narrow strategic state interests, as well as the unselfish pursuit of the global greater good seem to harmonize effortlessly as one (Turekian and Lord, 2007; Turekian et al., 2015; Gluckman et al., 2017). Science diplomacy ranges from "protecting and advancing state interests", particularly the improvement of a state's image in the sense of 'soft power', to working "on global problems such as energy, clean water, and health" (Turekian and Lord, 2007; S4D4C, 2018; López de San Román and Schunz, 2018). Conflating different categories of motives is not a trivial side effect but has developed into a flagship feature of science diplomacy understandings. Things would fall into place, if only science took a more pervasive and predominant stance in global affairs and on all political levels.

In fact, it is one of the major promises of science diplomacy that self-interested and altruistic ambitions (redefined as "direct" and "indirect national interests"; Gluckman et al., 2017) would not contradict but even reinforce each other for the benefits of humankind. Many speech acts are eager to point out that science diplomacy includes as well narrow, strategic ends, e.g., securing economic and innovative competitiveness (Copeland, 2011, Royal Society, 2010). Hedging talents from abroad and running in the global footrace on innovation leadership, it is argued, would contribute to progress in the long run—almost a classic from National Innovation System's research (e.g., Nelson, 1993; Sharif, 2006) that gets raked up by advocates of science diplomacy. This notion is echoed by another prominent reference published by a small group of chief science advisors to prime ministers and foreign ministers,¹⁴ who came up with their own "utilitarian framing" of science diplomacy, in comparison to the "traditional

taxonomy” of the Royal Society and AAAS. This publication can be regarded as a reaction to the critique that the discourse on science diplomacy would have ignored the competitive elements of science, technology and innovation policies, and so their simple twist is to frame all self-interested competitive aspects of science, technology and innovation as being beneficial to society, as long as this happens through the means of science.

The soft power paradox. The term science diplomacy used by administrations is mostly employed in the sense of a ‘soft power’ (Nye, 1990, 2008) tool that belies its very promises with regards to strengthening collective action around the globe. In this context, science diplomacy is linked to the rather traditional intention of expanding the realm of influence and securing national and regional advantages. For example, the last European Research Commissioner Carlos Moedas, repeatedly praised science diplomacy for contributing to the EU’s effort “to carve out a more political role” and its “global ambitions” (Moedas, 2016), which effectively translates into “a more influential and powerful role” (cf. European External Action Service, 2016; “principled pragmatism”). The Global Strategy of the EEAS from 2016 can be considered the first EU document that explicitly adopts science diplomacy as a foreign policy tool, gushing out statements of a critical security situation: “We live in times of existential crisis. [...] Our Union is under threat” (European External Action Service, 2016, p. 7). The predominant concern in this context is “to make Europe stronger: an even more united and influential actor on the world stage that keeps citizens safe, preserves our interests, and upholds our values”. (European External Action Service, 2018, p. 1). Against this background, it does not come as a surprise that science diplomacy is resized and ranged in as one tool of many to serve overriding EU power and security concerns. This dominant logic of action even stretches into other areas of competence. With explicit reference to science diplomacy, Moedas noted:

“At a time of great political uncertainty—exacerbated by the sovereign debt crisis and the sensitive political and humanitarian consequences of nearby conflicts in Ukraine and Syria—the commission must demonstrate clear political leadership in the interests of Europe” (Moedas, 2016).

As part of a soft power tool, science diplomacy is also charged with promoting values that are not as universal as they are claimed to be. In some cases, the speech acts promote liberal values and democratization in a rather unreflected, almost neo-imperialistic manner. At least in the US context, the use of the term science diplomacy reflects rather direct intentions to influence and shape other parts of the world (“create citizens”, nota bene non-US citizens!) in order to serve US interests.

“If we understand public diplomacy in these terms, the role of S&T is pivotal. Scientific education creates citizens with the critical thinking skills necessary for successful participatory governance and competition in the global economy”. (Turekian and Lord, 2007)

Here, it is worth turning to Joseph Nye’s (2017) self-critical revision of his almost inflationarily used concept of ‘soft power’—in a double sense. First, the trajectories of ‘soft power’ illustrate how an analytical term, introduced by Nye (1990) in his book *Bound to Lead: The Changing Nature of American Power*, can turn into a political concept hallowing no matter who’s intention “to affect others by attraction and persuasion rather than just coercion and payment”. Second, ‘soft power’ just, as well as ‘smart power’—another of Nye’s often-used terms (2008) illustrating the

combination of coercion and payment with charm offensives—gets twisted by policy practitioners into something normative, whereas Nye never claimed that these terms would describe actions to be borne by higher grounds. They are simply observable means in politics, especially foreign affairs, to win a “contest of competitive credibility” vis-à-vis others (Nye, 2008, p. 100). In this respect, the promising vistas of science diplomacy, i.e., getting academics to engage in unselfish international collaborations, is no more than a subordinate to national interests in a global footrace on geopolitical advantages.

Conceptual reflections on science diplomacy

The different threads, means and purposes of science diplomacy, discussed and marketed in public policy during the first ten years of the millennium, got deftly engraved by policy practitioners with reputational organizational backing to form some sort of a standard definition (Royal Society, 2010) containing three dimensions: (i) diplomacy for science, (ii) science for diplomacy, and (iii) science in diplomacy and diplomacy for science. Quite strikingly, the three dimensions comprise but every form of interaction between science and international policy possibly imaginable and considered to yield positive results. Whereas definitions are required to be distinctive, essentially excluding, non-circular and non-obscuring, we are in fact dealing with a catch-all-phrase that enables actors to do the exact opposite. They can either argue that science diplomacy was all-inclusive and rectify that any action related to international science and foreign politics was of—or should occupy—moral high grounds. Or they can emphasize that specific actions have been—in retrospect—or are currently being part of such august calling. This conceptualization serves more as a rhetorical game: Instead of defining what science diplomacy is in an analytically unambiguous way, it is rather an invitation to interrelate two spheres in an unsystematic and inconclusive way (not included are ‘diplomacy against science’, ‘diplomacy in science’) without further defining the spheres themselves (Rungius et al., 2018). This implies the framing of activities under the guise and allusion of being scientific, such as by conferences with panels, poster sessions and awards, a strong emphasis of academic titles to signal actors’ merits, their belonging to science, no matter if their expertise is up-to-date, and not least by use of scientific media, such as journals¹⁵ and publishing styles respectively.

The concept builds an image of scientificity by showing systematic efforts of defining how science diplomacy should be comprehended, yet is barely helpful in analytical terms and “far from being stable and clearly defined” (Trobbiani and Hatenoer, 2018, p. 3). Both key elements of the concept, i.e., ‘science’ and ‘diplomacy’, are employed associatively but without further elucidation. Nowhere can we find clarifications within discourse what is actually meant by diplomacy: Is it an action, an art, profession or occupation, does it have to take place somewhere specific, such as in foreign ministries, embassies or permanent representations, does it entail the so called ‘protocol’, symbolizing a convention of nation states (and other international organizations) to reciprocally acknowledge sovereignty in an “organized conduct of relations” (Adler-Nissen, 2015, p. 92; compare Bjola and Kornprobst, 2013)? Does diplomacy refer to specific forms of communication, e.g., a noncommittal consenting language, or a “choreography of diplomatic intercourse” (Jönsson, 2016, p. 84) or simply a style of non-committal communication? These questions are left unanswered or answers are variable at will. The same holds for science: in light of about 50 years of Science And Technology Studies, presenting science as a singular and essentialist given is pointless and old-fashioned. But even if we acknowledge that proponents of science diplomacy employ the

term ‘science’ in an ordinary way, the most simple questions would still remain unanswered: Does it denote a specific logic of action, a set of standards, a profession or rather a community of actors? Is science, if in theory or practice, the same everywhere around the world? Are social sciences and humanities to be included? Would proponents of science diplomacy call any communication between academic researchers from different countries an act of science diplomacy?

Another recurring theme in the literature to define and illustrate science diplomacy is reinterpreting historic cases of science collaboration (Moedas, 2016; Royal Society, 2010; Berkman et al., 2011, Berkman, 2019; Neureiter, 2011). International science collaborations are retrospectively presented, relabeled, and retold as examples for the alleged legacy and future prospects of science diplomacy. This discursive strategy reaches back to the past five to seven decades, usually relating to the early post-WWII era. In some cases it goes as far as to reinterpret “the enlightenment” “as an admirable time for European science diplomacy” (Müller and Bona, 2018, pp. 1–2). Within the European context we regularly find references to CERN, the European Organization for Nuclear Research (Moedas, 2016, p. 2). In the global context another historic case often cited as a prime example is the 1959 Antarctic Treaty. It was concluded by the Soviet Union and the United States during the heights of the Cold War (Berkman, 2019; Royal Society, 2010). The following sequence is only one example that shows how past events are reframed as beacons of a history of science diplomacy.

“Why did the 1959 Antarctic Treaty become the first nuclear arms agreement? What enabled the US and the Soviet Union to establish the region south of 60° south latitude for peaceful purposes only? Answers to these questions underlie the origin of science diplomacy, with its deep roots through history, especially after World War II. The global precedent of the Antarctic Treaty embodied six ‘matters of common interest’ with science as the keystone, establishing a ‘firm foundation for the continuation and development of such cooperation on the basis of freedom of scientific investigation in Antarctica as applied during the International Geophysical Year’”. (Berkman, 2019, p. 64)

Without providing any further definition, the term science diplomacy is presented as something that has a long history and deep roots. Science diplomacy is pictured as if pervading the history of international conflict. Examples from the past on what can nowadays be associated with science diplomacy thus serve on purpose as a naturalistic fallacy to confirm its relevance. They presage that science diplomacy carries a claim that is bigger than merely the relevance of science and diplomacy interfaces. Such historicization conveys an almost dramatic promise that rests on the projection of particular interpretations of past events into the future.

The term science diplomacy is often employed as some kind of an incantation, a mantra that undergird protest against menaces to collaborative science and against reason that seem to correlate with the new rise of populism and nationalistic voting public, as well as with national-egoistic geopolitics. In response, science diplomacy is used to indicate righteous attitudes, i.e., social openness, integration, right-minded communication and scientific reason wherever possible. During conferences and in social media communication, one often notices statements pertaining to a wide variety of generally science-related topics that endorse the relevance of science diplomacy. One cannot but conclude that the concept has been inflated toward becoming a “catch-all phrase” (Trobiani and Hatenboer, 2018, p. 3) of public engagement in and for science.

Conclusion

While science diplomacy has been thrust into public policy discourse about fifteen years ago, the concept promises to have legs given its proliferation and dispersion across countries and various kinds of organizations. Acknowledging the concept’s sudden appearance and uncontested fittingness to science, higher education and foreign policy that we found astonishing, our aim was to reconstruct the main undergirding interpretative schemas of science diplomacy and its narrative. After its emergence in the first years of the millennium, as part of marketing campaigns of foreign, science and higher education policies, science diplomacy has become part of a narrative of global threats and challenges that call for collective measures of various actors across national borders. To tackle these challenges and avert such threats, diplomacy is held necessary, but traditional forms are being depreciated as defective. This is where science is called upon: to take on the role of an undecieved and considerate, rationally superior and diligent actor countering all sorts of deficiencies that national politics would be carrying along: divisiveness, opposition, and self-interestedness. The proposed solution, an impregnation of diplomacy by science, rests on an idealized, modernistic understanding of science as an uncorrupted and august pace-maker of change and progress toward the positive, not least promising the tacit, almost miraculous percolating of cooperative scientific values into politics. Different worldviews, norms and “ideological cleavages” seem to be trumped by the allegedly practical orientation, objectivity and other collaborative virtues of science, an idea we termed “the invisible hand of science”. As part of a myth of rationalizing politics, science is even twisted into becoming a political authority of its own, while science diplomacy would offer an adequate opportunity.

Whilst remaining silent about the mechanisms how the concept would produce its alleged effects, the discourse on science diplomacy seems to have stabilized via associative rhetorical strategies. Definitions are used that are, in fact, circular and non-negotiable, in combination with exemplifications that hardly exceed the anecdotal level, no matter if heroic historical or current cases are employed. The discourse has idealistically transfigured an image of science, in particular regarding its social dimensions, that has never or only partly existed. In contrast, advocates and endorsers do not use the discourse on science diplomacy to reflect on the profound societal interventions they wish to see, in particular with respect to the expected impregnating role onto science, nor on the paradoxes regarding the implementation of science diplomacy as a soft power tool. In the paragraph we called the ‘soft power paradox’, a strong inconsistency became manifest: While science is cherished for being non-political, this property was to be instrumentalized as a form of *ersatz* diplomacy, i.e., it is being used for political purposes that essentially revolve around interests and power.

In general, neither real circumstances in, but idealistic norms of, science and politics are used in cross reference to stabilize the concept of science diplomacy. The question is—what’s happening next to science diplomacy? First, it is likely that advocates of science diplomacy continue to showcase ample positive examples from the past and the present, which will enlarge the concept’s application and, by inflationary use, the likeliness of its decline. Before that, however, its proponents might need to cope with the fact that more and more non-democratic governments can take to science diplomacy too for window-dressing their activities in the name of science. As the European Union is currently acclaiming its own values in a geopolitically tensioned situation, the idealistic norms of science and politics that the discourse on science diplomacy is bearing on can be easily disavowed as either inconsistent or chauvinistic and condescending.

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Notes

- 1 These actors reach from state leaders to former and current high-ranking officials of governments or quasi-governmental institutions (e.g., Turekian and Lord, 2007; Schütte, 2008; Obama, 2009; Fedoroff, 2009; Berg, 2010; Neureiter, 2011; Hormats, 2012; Moedas, 2016) or hybrid professionals that are hard to be distinctly attributed to science or politics (Turekian et al., 2015; Gluckman et al., 2017; Berkman, 2019). On the institutional level, the public discourse of science diplomacy has been borne by organizations, such as academies (see e.g., Royal Society, 2010) or funding institutions that can be best described as intermediary organizations (Braun and Guston, 2003) between the two systems, and not least collaborative projects, such as three EU-funded projects EL-CSID, S4D4C and InsSciDe that contain great deals of promoting science diplomacy.
- 2 Our data basis was designed to cover the main formative speech acts on science diplomacy. In that our choice of data reflects the specific actors' landscape within the Western hemisphere: The first share of analyzed texts regards the (largely US-centric; see next section) formation history of the term until today (Turekian and Lord, 2007; Obama, 2009; Fedoroff, 2009; Royal Society, 2010; Neureiter, 2011; Colglazier, 2017; Turekian et al., 2015; Gluckman et al., 2017; Berkman, 2019) including Canada (Copeland 2011, 2016); the second share includes the ensuing discourse within the EU, both on the level of supranational policies (Moedas, 2016, European Commission, 2014, 2019; European Union External Action Service, 2016, 2018) and EU-funded research pertaining to science diplomacy (Van Langenhove, 2016; S4D4C, 2018; Müller and Bona, 2018; Stone, 2020; Aukes, 2020). In that, the data basis is confined to a "Western" discourse, omitting countries, such as India and Brazil, in which the concept seems to gain traction as well. Furthermore and as a result of our research interest in the formation of the concept, we included texts that refer to science diplomacy almost only in an affirmative way, i.e., presenting the concept as a given and positive. We are aware that there are critical conceptual reflections of the term among the studied actor groups (mainly: Penca, 2018; Trobbiani and Hatenoer, 2018; Ruffin, 2018), though their share is vanishingly small. The formats of communication that we have assessed are mainly grey literature (e.g., Royal Society, 2010), speeches (e.g., Neureiter, 2011) and publications in semi-academic formats (e.g., Science and Diplomacy). All data analyzed during this study are included in the list of references of this published article.
- 3 In his speech, "A New Beginning", held at Cairo University on 4 June 2009, President Barack Obama encouraged the audience to open a new chapter in ties between the U. S. and the Muslim world. Among other references to science and technology, the President announced to "launch a new fund to support technological development in Muslim-majority countries, and to help transfer ideas to the marketplace so they can create jobs" (Obama, 2009).
- 4 See the government's Science and Innovation Investment Framework: Next Steps 2004–2014; stored at http://news.bbc.co.uk/1/hi/shared/bsp/hi/pdfs/science_innovation_120704.pdf (last accessed 21 Jan 2019).
- 5 COM(2012) 497.
- 6 https://eeas.europa.eu/topics/science-diplomacy/410/science-diplomacy_en.
- 7 The first project "European Leadership in Cultural, Science and Innovation Diplomacy" (www.el-csid.eu) was followed by two projects: "InsSciDe—Inventing a shared Science Diplomacy for Europe" (www.insscide.eu) and "S4D4C—Using Science for/in Diplomacy for Addressing Global Challenges" (www.s4d4c.eu).
- 8 Published in cooperation with the AAAS.
- 9 cf. two of the three "immediate areas of opportunity for science diplomacy": Confidence building and nuclear disarmament and Governance of international spaces (Royal Society, 2010, p. 7).
- 10 Including preservation.
- 11 How the individual self is a product of complex multiple identity formation processes, has been subject to hundreds of years of scholarly research (for an overview Stets and Burke, 2000).
- 12 Communism (science as a collective endeavor, tools and insights are considered collective goods), universalism (science as an impersonal endeavor; independent of the researchers' personal attributes), disinterestedness (science as primarily motivated by the quest for knowledge and principally unaffected by other concerns), and organized skepticism (science as an undecieved endeavor, basically critical towards all assumptions and findings).
- 13 This has to do with the fact that the modern understanding of science comes with a positivistic knowledge claim and therefore has to somehow accommodate for the idea of science's epistemic superiority. Basically, this leaves only two categories of roles for science in political decision-making processes, either acknowledging science's epistemic superiority (technocracy) or rejecting science's epistemic superiority (decisionism).

14 http://www.sciencediplomacy.org/files/pragmatic_perspective_science_advice_dec2017_1.pdf.15 See <http://www.sciencediplomacy.org/>.

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Competing interests

The authors declare no competing interests.

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