USING SCIENCE DIPLOMACY FOR ADDRESSING GLOBAL CHALLENGES

Deliverable

D2.3 What it takes to do science diplomacy.

Practices, identities, needs and challenges of science diplomacy practitioners. Baseline analysis and needs assessment

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ABSTRACT

In this deliverable, we present the results of a baseline analysis of the needs of the professionals working at the interface of science and foreign policy. We combine qualitative and quantitative data from desk research, interviews, participant observation and, most importantly, an open, anonymous online survey. The 130 answers to the survey constitute a novel source of primary data in the science diplomacy research arena. The results help us better understand the population of science diplomacy practitioners, their goals, practices, challenges and needs as well as their views on the label 'science diplomacy'. The analysis will inform S4D4C's work on training and knowledge resources. In allowing for more targeted governance, the results are also relevant for science diplomacy-related policy-making in the EU and beyond.

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1 Introduction

One of the principal objectives of the S4D4C project is to increase the capacities of EU and EU Member State science diplomats and to offer relevant knowledge resources and training opportunities that support their work. This requires understanding the actual skills and related needs of our beneficiaries. This report presents our findings in this regards.

Science diplomacy takes place in a variety of contexts. The formalised science diplomacy positions at embassy-level (e.g. by attachés and counsellors) usually have a well-defined profile. However, there is considerable variation between countries and their institutions in how individuals get recruited to become science diplomats, how their career paths are and can be shaped and what political relevance is attributed to their specific subject area etc. In addition, the EU level has seen new actors and developments that all other actors in the field must take into account. Hence, the institutional context is complex, highly diversified and increasingly interwoven.

There are several relevant developments that we propose to take into account:

- International cooperation in research is increasing, both in a bottom-up (researcher-driven) as well as a top-down (policy and funding-driven) fashion (Royal Society/AAAS 2010). As a consequence, the number of professionals at the interface of science and foreign policy is increasing. Most importantly in our context, this includes representatives of research funding and public research organisations in charge of supporting international cooperation.
- Foreign policy and science policy become increasingly mutually pervasive, as more scientific expertise needs to be acknowledged and used in foreign policymaking just as well as more scientific issues cannot be attended without aspects of foreign policymaking being in operation, though they often go unnoticed.
- Diplomatic agency itself is changing, for example with respect to digitalisation, the multiplication of actors and non-state diplomacy being on the rise (e.g. Adler-Nissen 2016).

In short, **the stakes for science diplomacy increase as do the potential resources and channels**. That makes not only coordination become a challenge but also identification and professionalization.

In the specific context of the EU, the potential for agency in foreign policy has increased with the establishment of the European External Action Service (EEAS). At the same time, the shared-competence agenda of research, it seems, continues to grow in relevance (with increasing Framework Programme budgets, European Research Area coordination, etc.). The interfaces between the two spheres are under continuous development.

In light of these global and European developments we consider it worthwhile to invest in assessing the challenges and needs of those who stand and work at the interface of science and foreign policy. We contend that such an assessment cannot be limited to the professionals in, one may say, official science diplomacy positions (science attachés and counsellors as well as science advisors to foreign policy). As regards the above indicated developments we rather remain open and

critically reflect our preconceptions of who science diplomats are and, more importantly, what they do.
This report is structured in the following way: We first discuss the state-of-the-art in literature focusing on the skills and resources needed by those working at the science-foreign policy interface. Needless to say, a systemic assessment of these professionals' practices, challenges and needs is novel territory and will, therefore, be discussed with respect to conceptual issues. After outlining the methodology of our needs assessment exercise, we continue with the presentation and discussion of the most important outcomes.

2 Needs of science diplomats – the state-of-the-art

As we have shown in the S4D4C State-of-the-Art Report (Rungius et al. 2018), science diplomacy is a contested term with some influential framing efforts (e.g. Royal Society/AAAS 2010, Gluckman et al. 2017) but without closure as regards to its definition. Science diplomacy is described with reference to supposed purposes, not specific practices; it includes activities of promoting international cooperation in science and beyond as well as science advice to foreign policy. There is also no consolidated body of literature on the practices currently subsumed under the label 'science diplomacy' when it comes to the skillsets and resource needs of those involved.

Hardly any studies (at least not public) investigate into and evaluate the lifeworld experience, resources (financial, human and infrastructural)[1], and especially professional needs of science attachés, while these issues would be highly relevant for the formation of science diplomacy. Further enquiries should be guided by the following questions:

- How does the everyday work of a science diplomat look like? How many different forms can it assume?
- How do we imagine the plurality of duties and positions and how do we imagine their commonalities as one singular field of action?
- What kinds of specific challenges do these positions and tasks pose for the individual professional and to organisations? What kind of skills does this field of action require?
- Are science diplomacy positions only effective if backed by substantial amount of financial resources (e.g. to fund international cooperation activities)?
- How to ensure the integration of the science diplomat into the diplomatic corps at the embassy or other liaison premises abroad?
- How can it be ensured that the science diplomat has access to relevant stakeholders and resources?
- What kind of knowledge resources would the science diplomat benefit from?
- What skills and contents does the science diplomat want to get out of training on science diplomacy?

Our study is an attempt towards answering these questions beyond the scope of a specific country or a single organisation.

[1] We acknowledge that the lifeworld experience and resources (qualitatively measured) of official and mainstream science diplomats is broached by Flink and Schreiterer (2010) as well by Ruffini (2017) in their cross-country comparisons of science diplomacy approaches.

With regard to the skills of professionals at the intersection of science and foreign policy, three bodies of literature exist fairly separately from each other: literature on science attachés, literature on diplomacy skills in general, and literature on science advice.

2.1 Skills of science counsellors and attachés

The literature on the history and profile of science attachés goes back to the 1950s (Loftness 1955; Forbes 1957). Robert L. Loftness (1955), for instance, a former US science attaché in Sweden, justified the role of science attachés by pointing to the service they provide especially to scientists that yet have less international exposure than their most famous peers. Among others, science attachés help establish contacts, organise visits, and report on scientific proceedings in the host country. They are a contact point and a catalyst. In terms of their service to government, they liaise and advise.
An initially confidential CIA report (Lexow 1966) documented staffing problems in the US science attaché programmes. Science attachés, in the way the US had framed their role, need to have scientific legitimacy. However, few renowned scientists can and want to spare time to serve as science attachés, especially if this implies working with the intelligence community or if it requires foreign language skills. As more recent discussions suggest, while management and policy skills complementing the specialist scientific training can be made available via specific programmes (Linkov et al. 2016), the verbal and written communication skills of diplomats and their political knowledge also do not come easily to every scientist (Kaplan 2011). Thus, there is a tension in the relevant skillsets for science counsellors and attachés. As Orio Ciferri (1987), a microbiologist and former science attaché to the Italian embassy in Ottawa, put it: "*The capacity to collect lots of information is a talent well-suited to a scientist. The need to evaluate it accurately and quickly is a skill essential to a diplomat*".

2.2 Diplomacy skills

The literature on diplomacy and the skills involved is certainly much broader than the work on science diplomats. The former has focused, for instance, on the role of communication in international affairs. Among others, it asks how linguistic plurality, body language as well as carefully crafted ambiguity can be productive in this realm (Jönsson 2016). Neumann (2005) argued that diplomats have to consolidate three scripts in their behaviour: a bureaucratic script telling them to follow established routines; a heroic script telling them to make a difference in the world; and a mediator script telling them to smoothen and consolidate the inside of political processes and entities with the outside environment. "*These scripts cannot be reconciled, only juggled*" (ibid., 72). Cornut (2015) brings the discussions of a diplomat's skills closer to the realm of science and science advice. In his view, diplomacy involves the simultaneous management of three roles: of a government representative, a bureaucrat and a knowledge producer. Each of these roles requires a different set of skills.

When it comes to diplomatic knowledge production, both social skills and analytical competences are necessary, they require and support each other (ibid.). This suggests that, in terms of skills involved, the knowledge production and synthesis work of science counsellors/attachés and diplomats in general might not be so different from the work of government science advisors.

2.3 Science advice skills

The literature on science advice to government goes back to C.P. Snow's (1961) work on science and government, which circles around two eminent scientists advising the British government in the Second World War, both mobilising data to back their positions. The role of science advice in a rationalised policy-making process has also been critically discussed (e.g. Jasanoff 1994, Weingart 1999). In the Anglo-Saxon tradition, science advice to government is very often (also) delivered through individual science advisors (and not only through institutionalised or ad-hoc committees). Correspondingly, there is more discussion on the specific skillset required for government science advisors.[2]

Science advisors are supposed to bridge the realms of science and policy. In doing so, they have to recognise the limits of science, accept that they inform and not make policy themselves (Gluckman 2014). Science advisors have to adopt and feel comfortable with the role of a broker (cf. Pielke 2007), not of an advocate, i.e. they have to lay out options instead of following their own agenda. They also have to be able to sustain the trust of the public, the media, policy-makers, politicians and scientists, engaging all these communities. Hilgartner (2000) describes expert advisors as engaging in impression management, strategically engaging with different audiences, revealing and hiding information in order to create and contest authority. In his presentation of expert advice as a publicly staged drama, stagecraft, self-presentation and information management appear as advisors' key skills (whether or not they are explicit about this, is another question). Parr (2015) adds that transparency and independence from financial interests are also required for participation in this drama.

This short overview of relevant lines of research reveals a lack of systematic, cross-country studies of the practices, challenges and needs of professionals at the interface of science and foreign policy. Existing scientific literature focuses on cross-country comparisons of the institutional setup of science diplomacy (Flink & Schreiterer 2010; Ruffini 2017) but has not focused on the level of individual practitioners. Other policy-oriented work has only framed some of the current and future systemic challenges of EU science diplomacy (e.g. Trobbiani & Hatenboer 2018; Van Langenhove 2017) without substantial empirical evidence. While it will be important to continue discussions on a systemic level as regards needs (e.g. of EU institutions etc.), S4D4C is committed to investigate into the individual-level approach, i.e. to the question of the practices, challenges and needs of professionals at the intersection of science and foreign policy. This is crucial, not only from a research point of view but also from a policy perspective: to better be able to define suitable institutional setups, career paths and terms of reference for science diplomacy positions as well as to exploit the opportunities in ongoing changes in the realms of science and diplomacy.

[2] In other cases, the discussion revolves more about the institutional challenges, e.g. regarding the selection of independent experts with the suitable expertise (OECD 2015) or institutional setups at the science-policy interface (van den Hove 2007; Koetz et al. 2008; Wesselink et al. 2013; Broström/McKelvey 2018). In the EU context, both discussions are relevant, as there is institutional science advice as well as *ad personam* advice currently through the group of Chief Science Advisors (cf. Wilsdon et al. 2015). As we are interested in the individual-level skills and needs, we will focus on this part of the literature.

3 Approach and methodology

3.1 Specifying the object of investigation

We expect that science diplomacy as a range of professional configurations at the interface between science and diplomacy comes along with specific conditions, challenges and skills that we aim to better understand with our assessment. By 'needs', we refer to the requirements on all different levels that the respective professionals and organisations face in these specific settings. Therefore, our understanding of needs in our investigations applies both to the individual professional as well as to the systemic level. In the following, we distinguish between these systemic and individual-level needs.

By systemic needs, we mean the needs of organisations (including intra-organisational units) within an institutional environment and governance modes with regard to the design and implementation of specific policies, e.g. in EU science diplomacy. Here, legal frameworks and proclaimed policy objectives are relevant for defining (and understanding) systemic needs. For instance, we can analyse the European Commission's Strategy for International Cooperation or Commissioner Moedas' guidance to derive systemic needs for EU science diplomacy.

Individual needs, by comparison, are the needs of people working in a specific setting, in our case the interface of science and foreign policy that might follow their idiosyncratic logics.

Of course, the systemic needs regularly translate into individual-level needs: e.g. of those tasked with implementing a specific policy. Still, the individual-level offers a different perspective or entry point to understanding professional practices. We might expect, for instance, that individuals involved in designing EU science diplomacy face certain challenges and have certain needs (e.g. regarding skills) over longer periods of time that go beyond the lifecycle of individual policies, legislative periods, etc. Looking at this level of practices and needs also makes us less dependent on trending topics and labels.

Individuals' needs also depend on staff positions and contexts. The fact that there is no final definition of science diplomacy and that there are diverse intersections between science, foreign policy and even other fields (e.g. economic policies, climate and energy, health policies etc.) entails variations in professionals' needs (of an advisor to a foreign ministry, a foreign representative of a research organisation or an attaché at an embassy).

In this report, we deliberately try to be as broad as possible in order to encompass a variety of individual positions at the interface of science and foreign policy, such as:

- Institutionalised positions: science attachés; science advisors; agency and public research organisation representatives in positions abroad,
- Non-institutionalised positions: scientists; managers and administrators of agencies or research organisations with no formal science diplomacy mandate; civil society representatives (facilitators of science diplomacy, etc.).

Since we are interested in a broad range of positions and affiliations, we cannot expect to find a fixed list of needs that similarly apply to every position and that would be affirmed and reinforced by every stakeholder that we ask. The results

are manifold, idiosyncratic and complex, but we learn about concrete practices and tasks and thereafter about the associated challenges and needs of those working at the intersection of science and foreign policy.

3.2 Methodological considerations

The question of what poses a problem and therefore causes certain needs (and what does not) is also a matter of individual perception. Therefore, asking stakeholders directly about their problems and needs might not be sufficient to yield reliable results. However, since our object of study is a product of the social realm and therefore a result of meaning being socially constructed, negotiated and fluid, we contest that objectivity is a quality criterion that could be reasonably achieved in this field of study. That said and in line with a broad consensus in contemporary social sciences, we do not claim objectivity for our results in the sense of classical scientific theory. Generally speaking, our scientific output can 'only' consist of the collection, systematization and interpretation of interpretations. Still, there are of course approaches that are more expedient and do a better job in this endeavour and those that do not.

Specifically, there are some methodological complications to be taken into consideration when aiming at identifying needs. Investigating professional needs can be achieved either through interpreting related data that are already public and have been produced independently from our research, or through initiating communication that then can be analysed and interpreted. Apart from our preliminary desk research, we have mainly applied methods that relied on initiating communication on science diplomats' needs, namely and most importantly an online survey and expert interviews.

This comes along with the following intricacies: First, asking individuals about what they need triggers an act of rationalisation. While the individual might have a clear feeling for her experiences with the challenges and the tasks in her job, she might not yet have articulated and organized these experiences in a coherent logic or sentence. In other words, the process of articulation requires a translation of experiential qualities into intelligible language. This is a first act of rationalisation. The second and maybe even more crucial act of rationalisation is the attempt to make sense of these experiences in line with one's own professional identity and understanding of one's tasks.

Thirdly, this articulation takes place in a specific setting of communication with a counterpart or inquirer whose perceived identity will have an impact on how the respondent frames his or her experiences up to strategic responses. Hence, our survey participants or interviewees will rationalize their response in accordance with their idea of our professional identity, task and mandate. This implies that our participants will give us the kind of messages that they want us to hear bearing in mind our affiliation and research intention that we have displayed in the course of opening up the communication and inviting to participate. When asking about difficulties and needs as researchers who will report later on these needs, we are likely to be perceived as potential multipliers for a specific audience that might be of interest for our dialogue partners. This is common and rational behaviour that needs to be taken into account.

Furthermore and fourthly, while individual actors can reflect upon and explicitly or even strategically refer to certain difficulties or resistances, they can also deal with them without accounting for them at a discursive level. When asking for needs, there is no guarantee that we will receive all aspects that are of

relevance. Whether or not the task is achieved depends on many factors, not only on those being reported as relevant in a given moment. The same problem exists when discussing challenges, to which the needs are linked.

We have tried to do justice to these methodological challenges of assessing an individual's and organisational needs with our survey design. One of our main strategies was to get an understanding of the tasks and concrete practices in the daily work before delving into associated needs. We came to the conclusion that one important analytical category to look at needs is to learn about specific tasks of an actor and the amount of work that goes into them (within the constraints of an individual's professional environment). This is what we call empirical task orientation. Looking at someone's practices or accounts thereof might tell us a great deal about what is relevant for someone, maybe just as much as directly asking what is relevant for him/her. With that, we combined both direct and explicit modes with indirect forms of inquiry.

3.3 Mixed methods design and scope of analysis

This report is borne by a mixed methods design consisting of desk research, participant observation, exploratory expert interviews and an anonymous online survey. The survey is our main source of data for the individual needs of professionals working at the science and foreign policy interface. The desk research, observation and interview data provides evidence on both systemic/organisational and individual needs. In an ideal world, we would combine the survey with a set of in-depth biographical interviews. However, the scope of this task does not allow for this. In order to ensure an appropriate return rate to the survey, we have tried to combine openness (through optional open questions) with structured questions.

The fact that the survey explicitly targeted a broad and global audience allows for comparing the situation within and outside of the EU. The distinction between answers from EU and non-EU respondents renders interesting pieces of evidence for further discussion. Wherever possible and relevant, we have also employed statistical tests to assess inter-group differences and correlations between variables. A separate section gives a detailed account of the statistics used.

In terms of the analysis of survey data, it suffices to take to descriptive statistics. The number of respondents (n=130) is too small to do statistically representative analyses per distinct respondent group. We have many categories that can be combined (non-EU, deployed staff self-describing as science diplomats vs home-based staff, etc.), but here the number of cases would get too low for statistical purposes. Moreover, the N of the population is unknown. There are studies estimating the number of formal science diplomacy positions in embassies but scholars acknowledge that these numbers change often (see, for instance Ruffini 2017; Flink & Schreiterer 2010) and we explicitly aimed to go beyond this group of respondents.

3.4 Respondent group and communication strategy

This study is the first of its kind to venture into the broader group of professionals working at the interface of science and foreign policy and whose members understand themselves as science diplomats.

This also implies, however, that there is no distinct basic population that could be readily addressed. Since there is no final definition of science diplomacy and

since there are diverse intersections between science, foreign policy and even other fields, our survey was aiming at different professional positions and institutional affiliations that together do not constitute a clearly demarcated audience. Regarding the survey dissemination, we circulated the survey through our contacts from the institutions that are affiliated with the consortium (TWAS, DA Vienna etc.) and addressed contacts from further specific institutions and stakeholders that we considered crucial to include (e.g. EEAS, DFG etc.). We also invited participants to forward the survey link to their colleagues (s. survey) and made it public in different settings (talks, receptions, presentations etc.). Employing such a rather uncontrolled snowball effect mechanisms is consistent with the fact that we wanted to address a broad group of professionals (see p.8-9), which is unknown to us as an empirical basic population.

As to the individual level observations, in contrast to earlier efforts that looked exclusively at science advice or the role of science attachés, we have consciously phrased the invitation to the survey in a way that addresses experts working at the interface of science and foreign policy in the broadest possible way, without gearing the focus towards the term science diplomacy from the very beginning. This does also justice to the observed multiplicity of diplomatic actors who may carry several professional identities. Moreover, it allows us to undertake a separate assessment of practices and discursive affinities.

We set up the survey in a way to separate social practices that can *ex post* be put under the term science diplomacy (the onomasiological level) from associations and expectations that are unleashed by introducing the term science diplomacy (the semasiological level)[3]. In terms of the survey design, this meant that we started with learning about the day-to-day tasks of the respondents. Only at the very end did we ask about the respondent's views and associations as well as the expectations that are expressed when the actual term 'science diplomacy' is discussed.

We still have to expect a skew in the respondent population drawn to answer the survey: Professionals aware of and interested in science diplomacy discussions are more likely to answer a survey invitation coming from a project in that area. Ethics standards as well as funding rules, of course, required us to disclose our research project's main subject area. We also asked for objectives and goals, aware that these again trigger rationalisations that might play no role in the individual's lifeworld.

With these 'limitations' in mind, in view of the scope of the present study, our best guess is a combination of an individual's own accounts of challenges and needs, combined with information about their regular practices.

[3] For example, one comes across the rhetorical strategy of practitioners that tell you science diplomacy was very old and has always been there, just without being called as such.

4 Results

We have introduced the distinction between systemic and individual needs. The former are derived from codified policies (like science diplomacy programmes or international cooperation strategies), the latter from individual-level practices and challenges. Both levels interact and individual-level needs partially derive from systemic needs. In the later chapters of the deliverable, we will focus on the assessment of individual needs, but we start with a brief overview on our understanding of the systemic needs in the institutional landscape of European foreign and research policies.

4.1 A preliminary note on systemic needs

The most important systemic needs for our work in S4D4C are those expressed at the level of the European Union. Our predecessor project, EL-CSID, has started investigating the prospects and focus of EU-level science diplomacy. Van Langenhove (2017), for instance, reviews national-level science diplomacy tools. In his mapping, he introduces a classification of science diplomacy tools in strategic, operational and support tools. He also derives recommendations of the currently used tools for EU Member States and EU science diplomacy. At the level of the EU, for instance, he recommends the creation of a culture of science diplomacy within the European External Action Service (EEAS), to better link R&I and the Foreign and Security Policy, to improve inter-institutional dialogue and to develop a strategic plan for EU science diplomacy. Building on van Langenhove's ideas (2017), Trobbiani and Hatenboer (2018) add that at the operational level EU foreign policy goals should be better incorporated in funding programmes. These recommendations can be read as proposed responses to detected needs at the EU level. Through our own desk research, interview work and participant observations, we can put some empirical flesh to the bone of these discussions.

European Commission DG Research and Innovation

DG Research and Innovation is not only the driving force behind and the 'owner' of the EU's Research & Innovation Framework Programmes but also directly deals with key elements of EU science diplomacy:

- DG Research and Innovation has formulated its own international cooperation strategy (COM(2012) 497) and decides on thematic and geographic priorities through close exchange between its international cooperation directorate, the thematic directorates and the various non-European counterparts.
- DG Research and Innovation is also the designer and custodian of a number of bi-regional S&T agreements.
- If foreign policy goals were to be more intensely considered in the Framework Programmes, it would be necessary for the thematic departments as well as to the DG's hierarchy to support this (e.g. through adapting work programmes and calls, modifications to the evaluation procedure or grant management). This would also require support from the Council (i.e. the Member States) and Parliament to follow up on the commitment.
- The participation rules in the Framework Programme are a key to the EU's international relations in research and innovation. A series of related mechanisms for supporting and shaping international cooperation have been introduced, including for example specific flagship projects, coordinated calls, activities implemented by the International Service

Facility, support provided to non-EU National Contact Points or the non-EU members of the Euraxess network.
- The EU Research & Innovation Counsellors deployed in EU Delegations around the world report to DG Research and Innovation.

The systemic needs at the level of DG Research and Innovation are closely related to the current negotiations of the Horizon Europe Framework Programme where the Council and the Parliament of course play a major role).

Staff in the DG is well aware that they already have programmes running that can be attributed to the general understanding of science diplomacy. These programmes and the organisational units responsible for them, however, would need strengthening via greater resources and dedicated instruments (both explicit and implicit), and they must ideally be accompanied by monitoring instruments that would look at the *de facto* science diplomacy activities going on without the explicit label but also could be altered according to the explicit goals of a science diplomacy strategy.

The EU's External Action Service

The European External Action Service is a fairly new actor in the institutional landscape of European diplomacy. With the new Treaty of the Functioning of the European Union (TFEU), especially Art. 180b, the external engagement of the EU in science and technology was widened, while the EU's External Action Service has seized a clearer mandate to bring together international affairs and S&T-activities. However, clearer does not necessarily mean clear enough, hence it has not been before the 2016 that EU's global strategy has explicitly embraced scientific research as part of the EU's foreign policy (EEAS 2016: 44; see also Prange-Gstöhl 2018: 155). Correspondingly, the EEAS with its staff abroad has only slowly taken to explicit science diplomacy (Flink & Schreiterer 2010: 665). Van Langenhove (2017) suggests the creation of a culture of science diplomacy within the European External Action Service. We observe that such a culture is already in place in parts of the institution, which does not use the label as such.

What we learned from expert interviews and via formal and informal interactions with EEAS is that the practices (and related) needs in terms of science diplomacy differ between the various Directorates or Divisions of the Service. Most of EEAS' work is structured geographically while there is one Directorate with a thematic mandate. Knowledge of EU research and innovation issues as well as the frequency of interactions with stakeholders such as DG Research and Innovation varies between these Directorates.

While desk officers working on and with regions might benefit from some indication of how to include science diplomacy in their toolset, people in other Directorates might already be practicing science diplomacy with or without calling it such. They partly rely on input from EU research, e.g. on the outputs of EU arctic research for arctic governance or on Joint Research Centre (JRC) data for peacebuilding (see the Global Crises Atlas[4]). In these cases, the question is whether the existing institutional setup and forms of interactions with EU research and research policy are satisfactory.

Other entities

This is also a relevant question for other institutional entities involved in EU science diplomacy: Is the current science advice system, with the JRC, the

[4] https://ec.europa.eu/jrc/en/scientific-tool/global-crisis-atlas

Science Advice Mechanism (SAM) and the Science Advice for Policy by European Academies (SAPEA) as main actors, suitable for advising EU foreign policy? Are there any institutionalized relations with the EU R&I counsellors and what role do the latter play in this regard anyway? How can research supported via the Framework Programmes best be brought into the picture?

4.2 Individual needs

As introduced above, we have attempted to get an overview of individual needs of professionals working at the interface of science and foreign policy with an open, anonymous online survey, run over the summer months of 2018. We received 130 full answers that are the basis for our assessment of individual needs in science diplomacy.

A note on presentation: The following sections will contain a number of similarly styled charts showing selected results from the survey. Given the multitude of possible combinations in the data (focusing on respondents e.g. from a specific institutional environment, country, country and environment), we only present the most relevant data according to our research interest.

4.2.1 Survey results: Demographics

Of the 130 respondents, 75 are male, 54 female. The average age of the 130 respondents is 45 years (male: 46y, female: 43y). On average, respondents have 10.5 years of academic experience (median: 8 years), 5.8 years of diplomatic experience (median: 3.5), 8.5 years of management experience (median: 5) and 6.4 years of policy experience (median: 5).

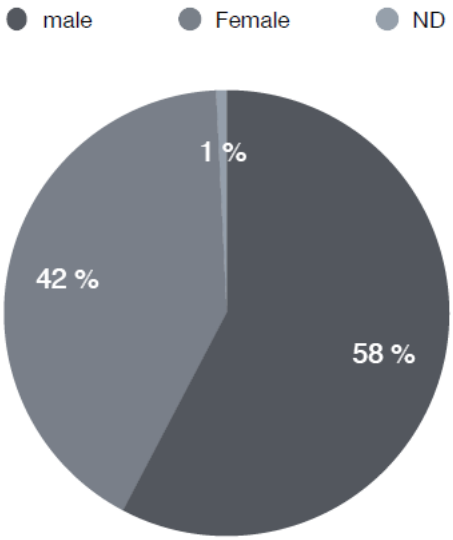

Figure 1: Gender

In terms of their qualification, 55% or 72 of the respondents hold a PhD degree or similar, 54 respondents an MA or similar. The following chart shows the disciplinary distribution in the respondent population with a dominance of natural and social sciences.

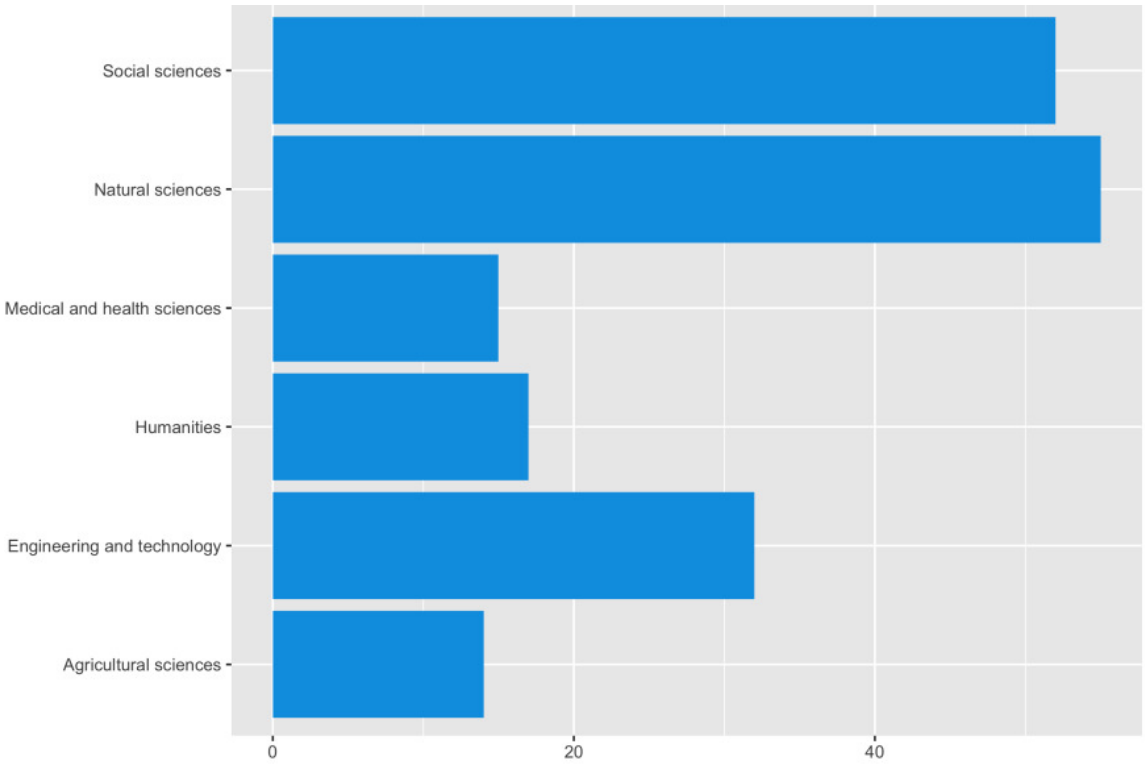

Figure 2: Disciplines

As regards the institutional background, most of the respondents work in the national public/government sector (including national public research organisations), while we also covered societal/non-governmental organisations to some degree (including universities or consultancies). There are relatively few respondents from EU, UN or other intergovernmental organisations.

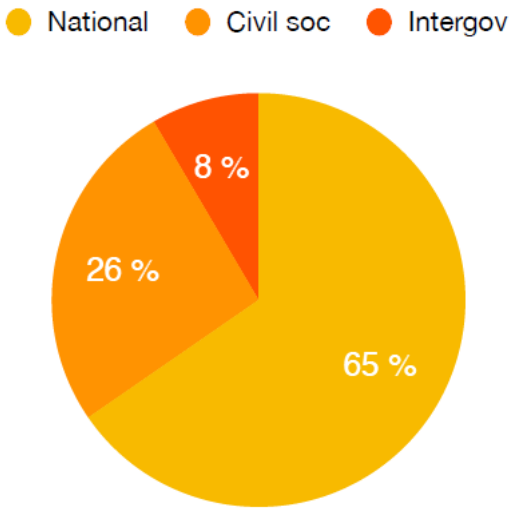

Figure 3: Institutional background

26% of the respondents (34 of the 130) are deployed to a country that is different from their institution's home-base. This would be the typical profile of 'formal' science diplomats in embassies. 21 of these are deployed to an EU Delegation or a national embassy (16% of the 130 respondents). The other 13 deployed individuals might be affiliated to foreign offices of national research or research funding institutions, etc.

As mentioned, the survey addressed a global audience. Among the 130 respondents, 64 have an EU home country (including the countries associated to Horizon 2020), 66 reported that they come from a non-EU country.

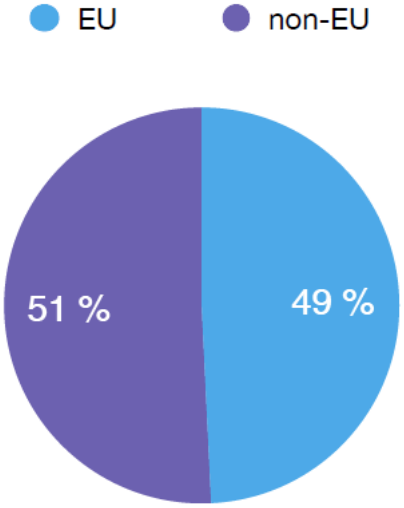

Figure 4: Home country

In terms of respondents' countries, we obtained a very good coverage from some of the major EU countries (only responses from the UK are missing), as well as from some of the smaller EU countries. From non-EU countries, the USA was represented with 6 respondents, Bangladesh, Peru and South Africa with 3.

Home country	Frequencies
Spain	12
Germany	11
Czech Republic	10
France	9
USA	6
Austria	3
Bangladesh	3
Peru	3
South Africa	3
Sweden	3
Switzerland	3
OTHERS	<= 2

Table 1: Home countries, frequencies

A number of cross tabulations provide more details on the group of respondents. For instance, we see that a larger share of EU respondents work at national public institutions compared to the non-EU respondents. Conversely, the

background of civil society institutions plays a relatively large role among non-EU respondents.

	civil soc	intergov	national	sum
EU	13	5	46	**64**
non-EU	21	6	39	**66**
sum	**34**	**11**	**85**	**130**

Table 2: Home country and institutional background

We asked our respondents for a self-assessment of their professional responsibility: Do they think they are diplomats, scientists, managers/administrators or something else?

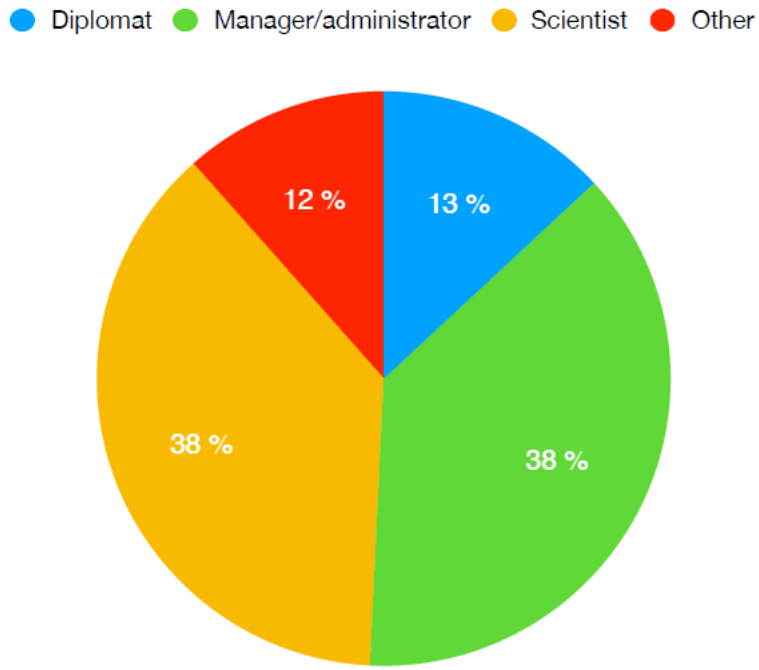

Figure 5: Identities

There are two major identifications: with 38% in each category, the majority of respondents are scientists or managers/administrators. Only 17 out of the 130 conceive themselves as diplomats. This fact can be interpreted in different ways: Either it is a question of professional identity (e.g. scientists joining the diplomatic service might still feel as scientists), of recruitment processes and the job profile of science diplomats (e.g. if scientists are recruited and temporarily deployed to embassies) or it relates to the situation that most of our respondents are not in formal science diplomacy positions. The following cross table sheds some light on this. Indeed, 12 of the 17 professionals stating that they are diplomats are deployed, i.e. they work away from their institution's home base. All 12 of them work at embassies, whereas half of the deployed scientists, for instance, do not work at embassies. This suggests that the respondent group 'scientists deployed' represents a mix of science attachés who identify

themselves with the science system and scientists that work at e.g. public research organisations or funding organisations abroad.

Deployed?	Diplomat	Manager/ administrator	Scientist	Other	Sum
No	5	41	38	11	**95**
Yes	12	8	11	4	**35**
Sum	**17**	**49**	**49**	**15**	**130**

Table 3: Identities and deployment status

In another cross table, we have compared the self-described identity and the institutional background. It shows a clear correlation of the self-description as a diplomat and the professional position at a public organisation.

	Diplomat	Manager/ administrator	Scientist	Other	Sum
EU, UN or other inter-governmental organisation	1	4	2	4	**11**
National/state government (or related agency)	16	33	32	4	**85**
Societal/non-governmental organisation (national and international)	0	12	15	7	**34**
Sum	**17**	**49**	**49**	**15**	**130**

Table 4: Identities and institutional background

The following, final cross tabulation shows that most of the EU respondents describe themselves either as manager/administrators or diplomats, while the majority of non-EU respondents states 'scientist' as their professional identity.

	Diplomat	Manager/ administrator	Scientist	Other	Sum
EU	13	37	10	4	**64**
non-EU	4	12	39	11	**66**
Sum	**17**	**49**	**49**	**15**	**130**

Table 5: Identities and home country

Summing up, the 130 respondents feature a slight majority of men, and roughly half of the respondents have an EU home country. Institution-wise, the majority works for government or other national public institutions. Respondents describe

their professional identity either as managerial/administrative or scientific, with diplomats in a minority. Among those respondents that are deployed in a country different from their institution's home base, diplomats are in the majority. Most non-EU respondents state they define themselves as scientists with respect to their professional identity. Among the EU respondents, the manager/ administrator dominates as defining the respondents' identity, followed by the diplomat.

Following the information about the respondents' backgrounds, we will discuss key findings for each set of questions, first by presenting overall results and then specifying results for subgroups wherever they are relevant and to some degree statistically representative.

4.2.2 Survey results: Practices

In order to learn about the 'needs' of professionals at the intersection of science and foreign policy, we first aim to understand their everyday practices. More specifically, we investigated their goals, objectives, tasks and challenges. For those respondents who stated that they rely on scientific evidence for their work, we additionally asked what sources they use to consult and collect evidence.

In order to reduce the time required to fill in the survey (a longer survey would have reduced the number of respondents), we offered itemised lists of answer options drawn from the literature and the authors' prior work on international cooperation and science diplomacy. Respondents were also able to provide additional answers to the survey, which we report whenever applicable and worth discussing.

Overarching goals

The first question in this section asked about the overarching goals of the respondents. We employed a Likert-style five-point scale from 'not at all' to 'to a large extent' with the option of a neutral answer. Figure 6 shows the responses using a combination of a heatmap and a bar chart.

The results reveal that a majority of respondents consider the improvement of international collaboration for scientific purposes as an overarching goal that guides their activities: 83% of respondents state that this item is highly or rather important to them. A majority of respondents also consider the following goals as rather important: helping extend the frontiers of knowledge, developing partnerships for addressing global challenges, strengthening the international competitiveness of their country/the EU, improving diplomatic relationships via means of science, and strengthening intercultural dialogue by means of science. Some 'other' mentions also point to the strengthening of the respondent's country as an overarching goal, goals related to the promotion of innovation, scientific communication and the development of diplomatic skills.

If we limit our analysis to the respondents from EU countries, the aspect of strengthening competitiveness becomes more important (with 75% stating that it plays a role to some or to a large extent, vs average of 68% as depicted in Figure 6), while the aspect of extending the frontiers of knowledge is slightly less important (61% vs 69%, as depicted in Figure 6). The latter difference is statistically significant, but the former is not (see section 4.2.5 for details). Another statistically significant difference between EU and non-EU respondents concerns the goal of enhancing R&I capacities of developing and emerging countries: This is significantly less important for EU respondents as well as for

respondents that are deployed in a country different from their institution's home country. The two goals of enhancing R&I capacities and strengthening intercultural dialogue are more important for respondents from civil society institutions (especially compared to their colleagues in national/government institutions).

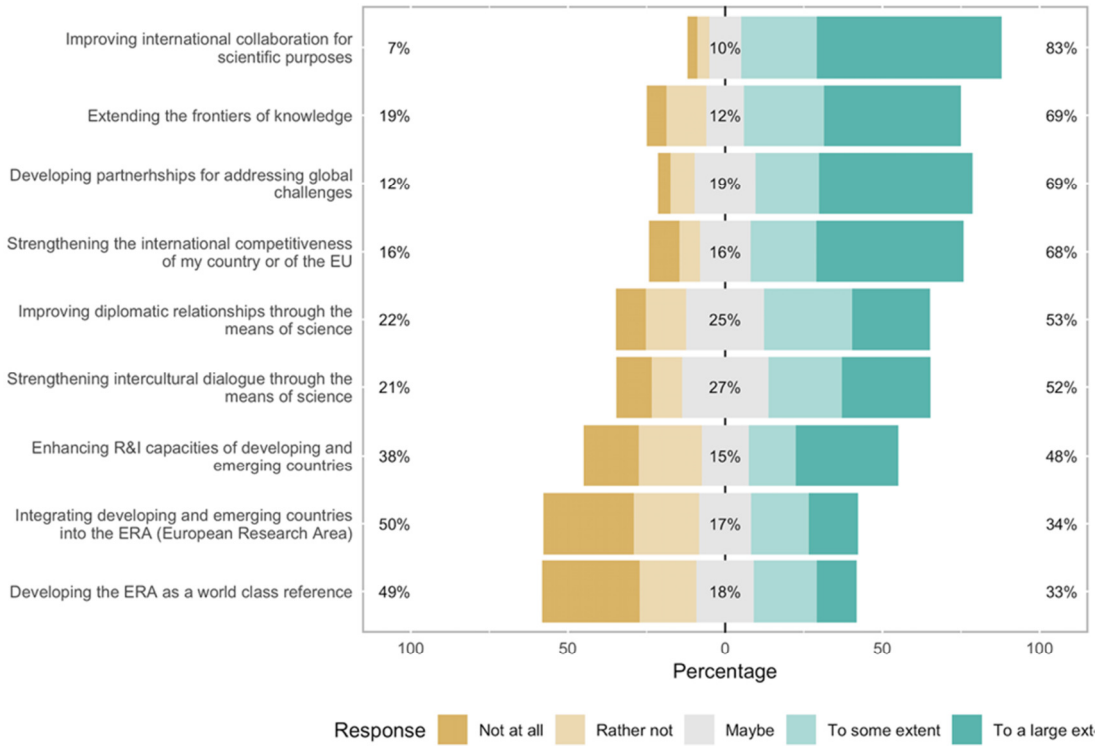

Figure 6: To what extent do the following overarching goals guide your activities?

Specific objectives

In another itemised list of questions, we invited respondents to assess the relevance of more specific objectives of their work. Some items (in particular those ones with 35 or less answers as presented in Figure 7) were only displayed to those respondents who are deployed in a country different from their institution's home base, as portrayed in Table 3. Figure 7 combines the bar chart heat map display of the Likert scale with a histogram indicating the overall number of respondents.

Among the most important objectives are:

- Supporting international scientific cooperation
- Supporting international scientific networks
- Promoting S&T from my home country in my host country
- Supporting academics in my home country
- Observing scientific activities/actors in my host country
- Promoting academics of my home country in my host country
- Supporting science policy in my home country
- Observing political activities/actors in my host country
- Observing the technology market in my host country
- Supporting scientific advice mechanisms in my home country
- Supporting researcher's mobility.

Consistent with the question on overarching goals, we can see that supporting collaboration plays a major role in the respondents' work. For nationally detached

respondents, promotion activities as well as observation and reporting on a variety of developments are other major objectives.

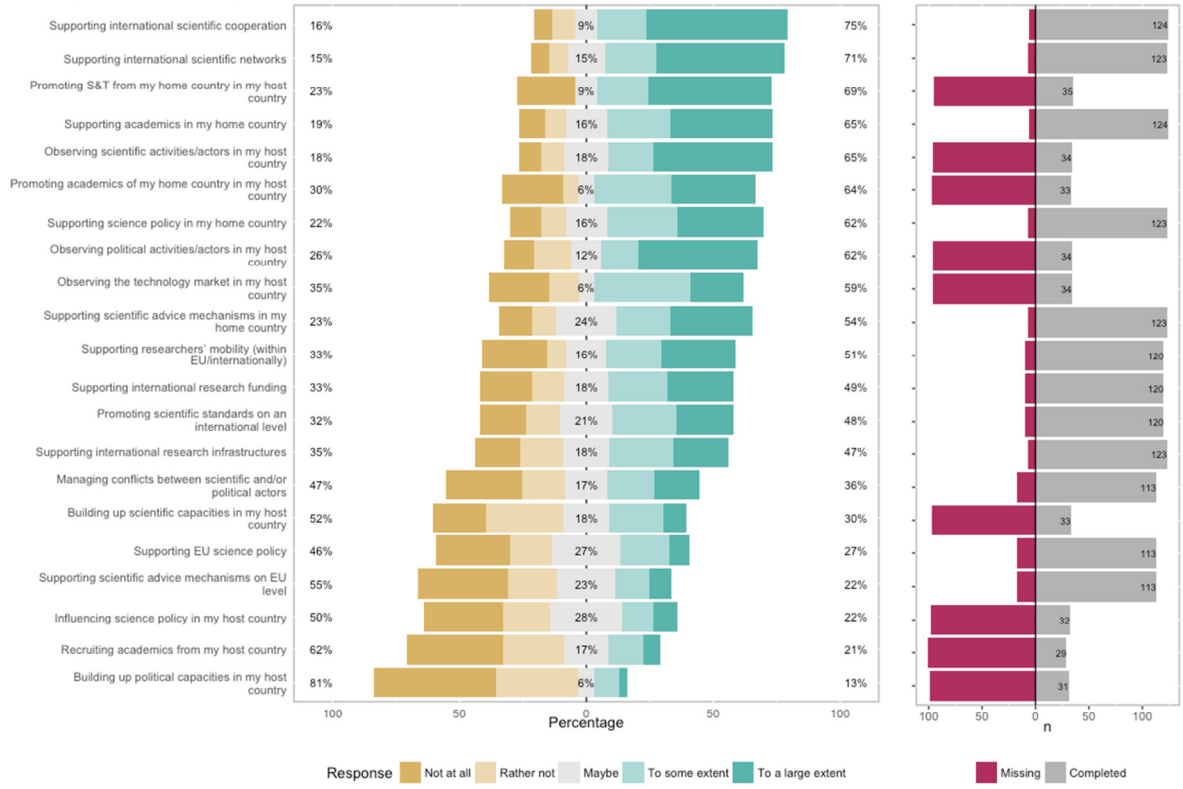

Figure 7: To what extent do the following specific objectives guide your activities?

Moreover, observing a host country's political activities or technology market plays a stronger role for EU respondents than it does for non-EU respondents. This might relate to the fact that the mandate to report developments in host countries back home is most prominent for professionals working in national public institutions. From the demographics analysis we know that the share of non-EU respondents working in civil society institutions is higher than among EU respondents.

Other objectives that respondents mentioned include:

- Promoting scientific standards
- S&T education/teaching activities
- Promoting technology cooperation among private sector stakeholders
- Start-up support.

With this collection of reported overarching goals and specific objectives, we have some validated evidence on the directions of our respondents' practices. This leads us to investigating their day-to-day tasks.

Tasks

We again worked with itemised lists and Likert scales (together with an 'other' option) to find out more about the tasks in which respondents usually and regularly engage. The first two items referring to the experience in host countries, were only shown to respondents who had stated earlier that they are deployed in a country different from their institution's home base.

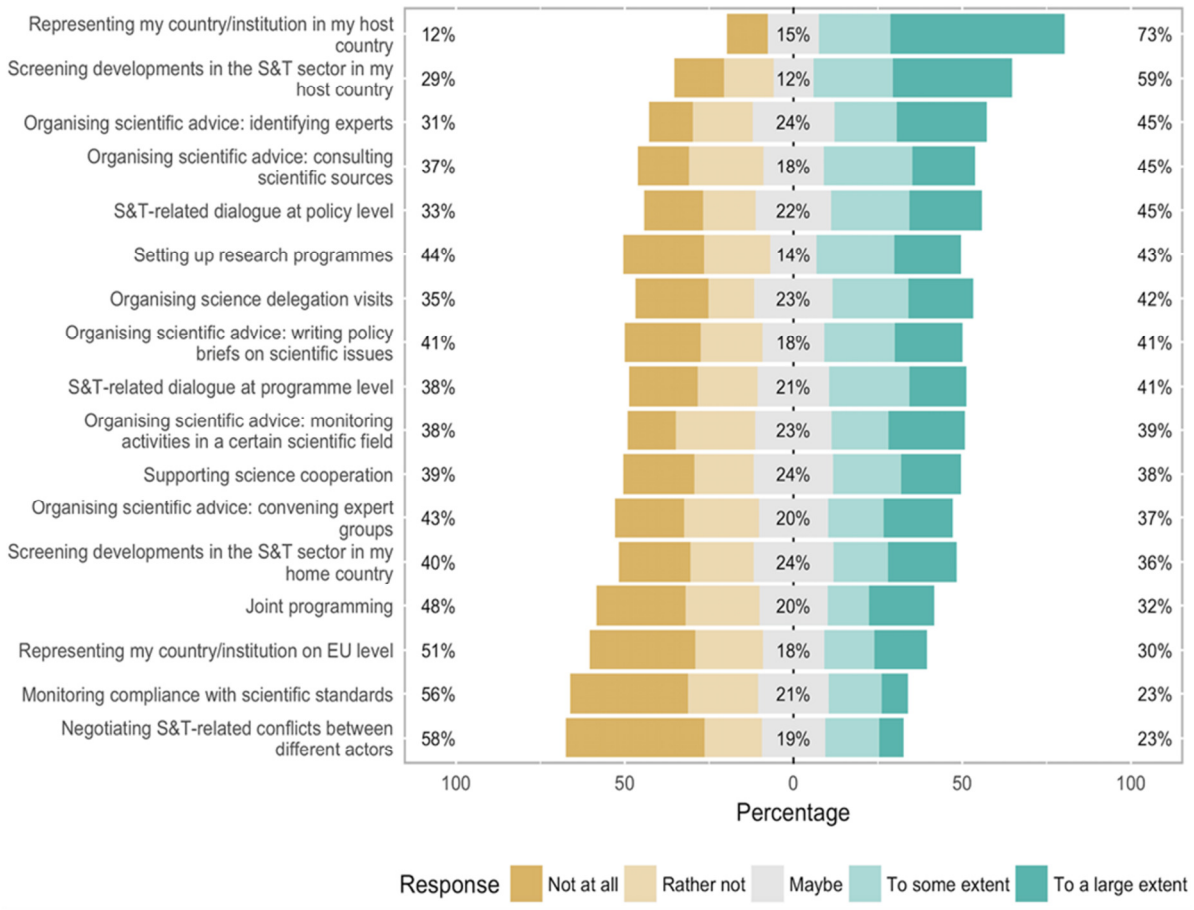

Figure 8: To what extent do the following tasks form part of your daily work?

It is conspicuous that the respondents follow a greater variety of tasks than they stated with respect to goals and objectives. The two questions tailored (and shown) exclusively to the specific group of science diplomats deployed outside their home country seem to be most important to this group - 'representing my country/institution in my host country' and 'screening developments in the S&T sector in my host country' are important to more than 50% of the respondents of the group.

Drawing conclusions about the whole group of science diplomats, 'organising science advice' processes and 'being involved in S&T-related dialogues' is of some or large relevance for 45% of respondents. The setting up of research programmes plays a role in the work of 43% of respondents; on contrary it does not in the case of another 44%.

In the light of these diverse impressions, we wanted to learn more about the respondents' tasks by breaking them down into pre-defined groups, as we expect variance due to their professional backgrounds (and their identification). Indeed, certain aspects of science advice play a stronger role among respondents that self-identify as scientists: Members of this group consult scientific sources more often than the general average (58% state that it is an important task to some extent or to a large extent vis-à-vis only 45% among all respondents). However, they do not engage more often in the identification of other experts that are needed for respective activities (also 45%).

Those who self-identify as diplomats (17 persons) confirm that it is important to represent their country abroad (83% consider it an important task to some or to a large extent). A majority of them also engages in screening developments in

the host country as well as in the home country. In addition, organising visits of scientific delegations is important to 44%. And some of them have a pronounced role in S&T related dialogue or in EU-level representation.

This largely corresponds with the pattern among those respondents that state that they are deployed abroad (35 persons), as depicted in the Figure 9, especially in terms of representing and screening developments in the host country. It is remarkable that 48% of the deployed respondents think supporting science cooperation is rather or greatly important, while this applies only for 31% of the diplomats. Between the two groups of deployed and non-deployed respondents, there is, however, no statistically significant correlation or difference in their task assessments.

We also singled out the responses from EU countries (see Figure 10) and can conclude that the pattern is similar to the general population. The only major differences appear when representation tasks are concerned, which matter more to EU-borne respondents, while responsibilities in science advice are, to the contrary, less important among EU respondents: For instance, only 35% of EU respondents stated that the task of consulting scientific sources is important to some degree or to a large extent (compared to 45% of the general respondents' population). Writing policy briefs is less important to EU respondents (29%) in comparison to all respondents (41%) with both differences revealing a statistically significant central tendency.

There is a statistically significant correlation between the task of 'S&T-related dialogue at policy-level' and the respective institutional backgrounds (national, intergovernmental, civil society) or the identity (scientist, manager/administrator, and diplomat): The policy dialogue is more important for respondents from an intergovernmental background as well as for those identifying as managers. As can be expected, there is also a correlation between the institutional background and the relevance of the task of representation in the host country. This is comparatively less important for respondents working in civil society/non-governmental institutions. These respondents also hardly ever negotiate S&T-related conflicts between different actors.

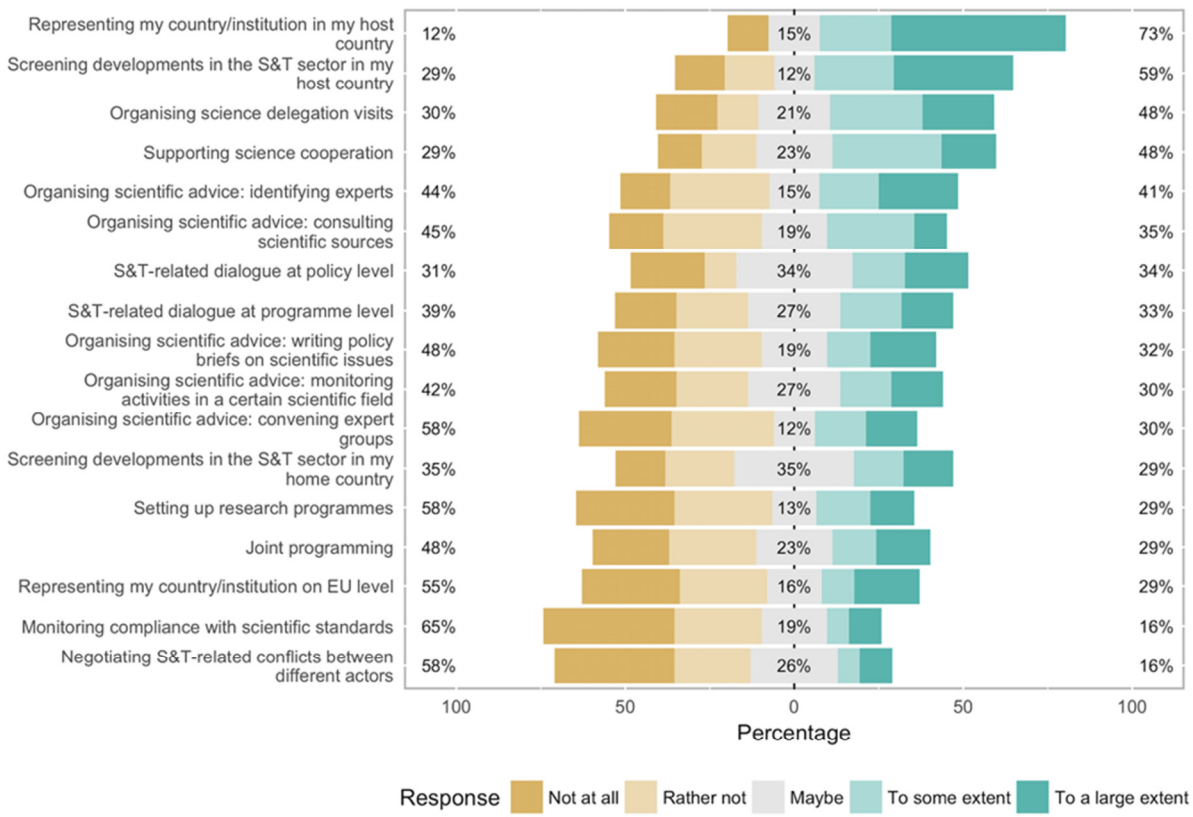

Figure 9: To what extent do the following tasks form part of your daily work? Deployed only

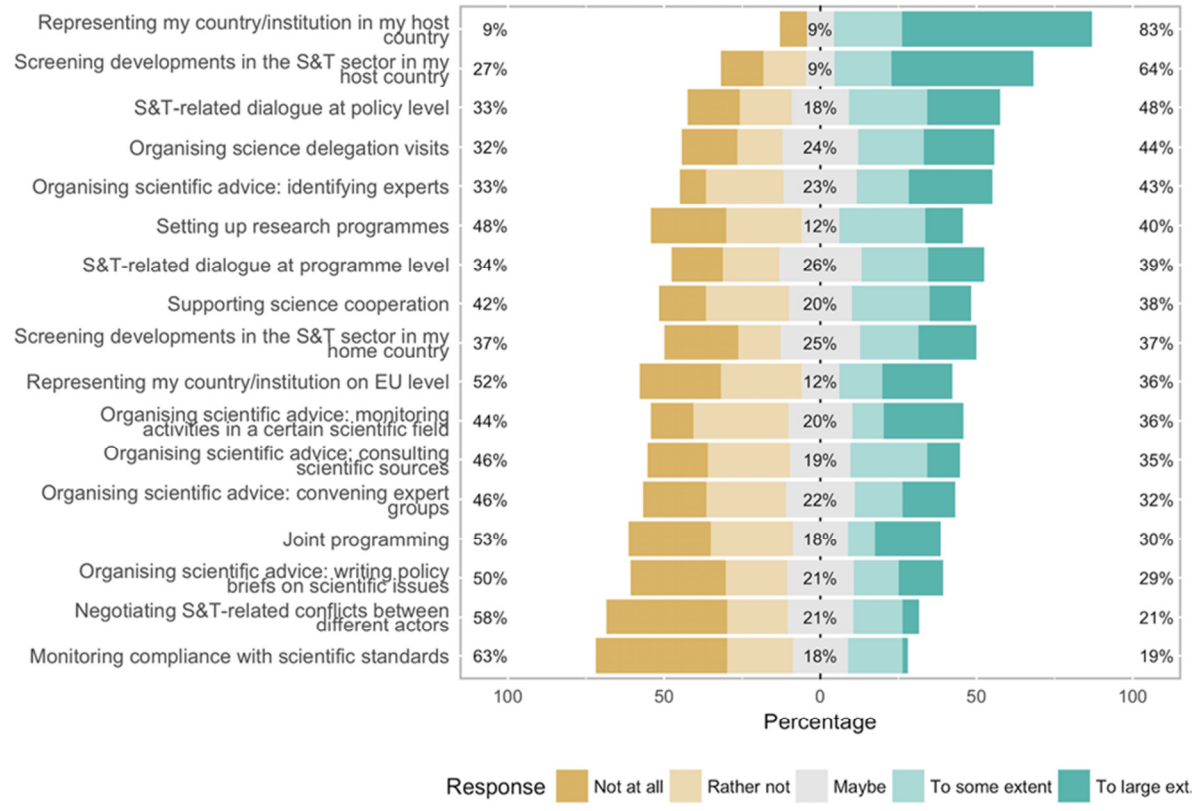

Figure 10: To what extent do the following tasks form part of your daily work? EU only

Challenges

After reporting on their goals, objectives and tasks, we asked the respondents to assess their daily work challenges. This battery of items is essential to learn about the needs of the respondents. The question was filtered according to a number of categories. Some items were not displayed to all respondents, which is why we again include a histogram showing overall responses (see Figure 11 below).

Compared to earlier questions, the answers are more diverse. While this might have to do to some degree with the different answer scale (from not challenging to very challenging without a neutral option), the diversity of answers is still intriguing. There are four challenges that a majority of respondents considers either challenging or very challenging:

- Creating opportunities to get one's message across
- Understanding different S&T-related perspectives in host country (for deployed)
- Raising awareness for the relevance of S&T policies
- Keeping track of recent S&T developments.

As to the second option, which was only presented to respondents that stated that they are deployed outside their institution's home country, there were also 45% who found the issue not or hardly challenging – a polarising question. Other items, such as 'getting access to stakeholders' or 'finding the right persons to contact' also show similar shares of respondents considering the issue not/hardly challenging and challenging or very challenging. Identifying relevant scientific information also seems to be a challenge for a majority of respondents.

If we disaggregate the data, it is interesting to see that those respondents that self-identify as scientists are more likely to consider the identification of scientific information a challenge. This fact might have to do with the increased relevance of this type of work for those respondents who consider themselves scientists. Disaggregated information from the question on tasks shows that consulting scientific sources is something that scientist respondents are more likely to be engaged in. At the same time, we shall see that when it comes to the self-reported needs of the respondents (see chapter on needs below), the science is not the problem.

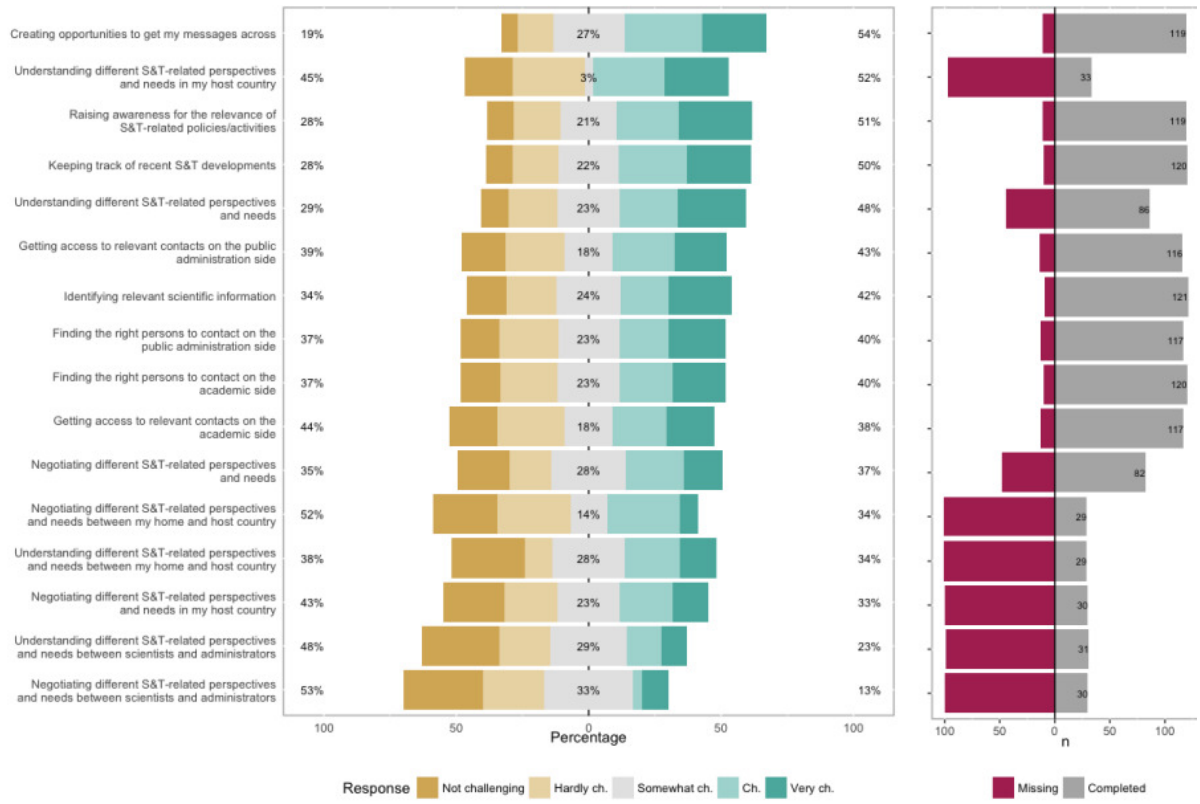

Figure 11: What would you describe as major challenges in your work?

Other findings worth mentioning from a more detailed analysis of the question on challenges include:

- Raising awareness for the relevance of S&T-related policies is a major problem for non-EU respondents, less so for EU respondents and those deployed.
- Non-EU respondents also consider getting their message across and keeping track of recent S&T developments a more important challenge compared to EU respondents.
- Finding the right contacts in the public administration as well as getting access to them is a challenge that is of significantly different relevance for the various respondent groups. Finding the right persons is a challenge that diplomat respondents report as more important than scientists and, especially, respondents that identify as managers.
- When it comes to getting access to the identified public administration stakeholders several groups find it a more important challenge than others: scientist respondents (as compared to managers), those respondents that are deployed, those that work in intergovernmental organisations and non-EU respondents (compared to EU respondents).

The following table summarises this discussion of the disaggregated data analysis. We have highlighted the median values for those items and respondent groups where there is either a statistically significant difference in central tendency (means or medians) or a correlation between the two variables. For the statistical details and additional data, please refer to the statistics section below.

Challenge | median	All	EU	Non-EU	Deployed	Scientists	Managers	Diplomats
Raising awareness for the relevance of ST-related policies/activities	4	**3**	**4**	**3**	4	3	4
Creating opportunities to get my messages across	4	**3**	**4**	3	4	3	4
Keeping track of recent ST developments	3.5	**3**	**4**	3	4	3	4
Finding the right persons to contact on the public administration side	3	3	3	3.5	**3**	**2**	**4**
Getting access to relevant contacts on the public administration side	3	**2.5**	**4**	**4**	**4**	**2**	**3**
Identifying relevant scientific information	3	**3**	**4**	3.5	**3.5**	**3**	**3**

Table 6: Challenges - significant differences in central tendency

In the question battery on challenges, some respondents also made use of the open question to specify additional challenges. The mentions there make clear that some respondents, especially those outside of the EU, have challenges to mobilise sufficient funds for S&T in their country in general or for international cooperation in particular. As one respondent put it, there are "*far too little human resources for the potential of our work*". Some respondents pointed to the uniqueness of their position in bridging science and policy, or basic research and innovation. The fact that formal science diplomacy positions are sometimes linked to more than one ministry adds complexity and leads to challenges in decision-making.

We have seen that the identification of relevant scientific information can be a challenge in the work of our respondents. We wanted to know more in detail about the relevance of scientific evidence to the work of those at the science and foreign policy interface.

Sources for scientific evidence

Many professionals at the science and foreign policy interface deal with scientific knowledge in their everyday practices. Two-thirds of our respondents state that they rely on scientific evidence for their work. We wanted to know where they

get this evidence from. This can inform our research work and the design of our knowledge resources. Please note that some items in this question were filtered and only displayed for respondents who identify as diplomats (see histogram).

The results show that respondents agree to a large extent about the continued relevance of personal contacts, of conferences and other events. Respondents also agree on the relevance of scientific journals (including popular journals), reports and policy briefs and science databases as well as contacts with official science advisors. Blogs, twitter or other social media play a comparatively small role.

The relevance of offline contacts (recommendations, conferences and event visits) is also visible in a related question: We asked those respondents who stated that they consult scientists in their work, how they identify these scientists. Again, personal contacts through conferences, recommendations, affiliated experts or informal networks are mentioned by a majority of respondents. In contrast, social media play a comparatively small role. In the 'other' category, six respondents explicitly pointed to LinkedIn as a source. Academic literature also plays a major role. This result reminds us of the earlier finding that identifying relevant scientific information is challenging for a majority of respondents (more so for scientist respondents and non-EU respondents). We shall see in the next section that this does not translate into respondents voicing a need for technical training (on scientific contents). Instead, it is the soft and diplomatic skills that are more in demand.

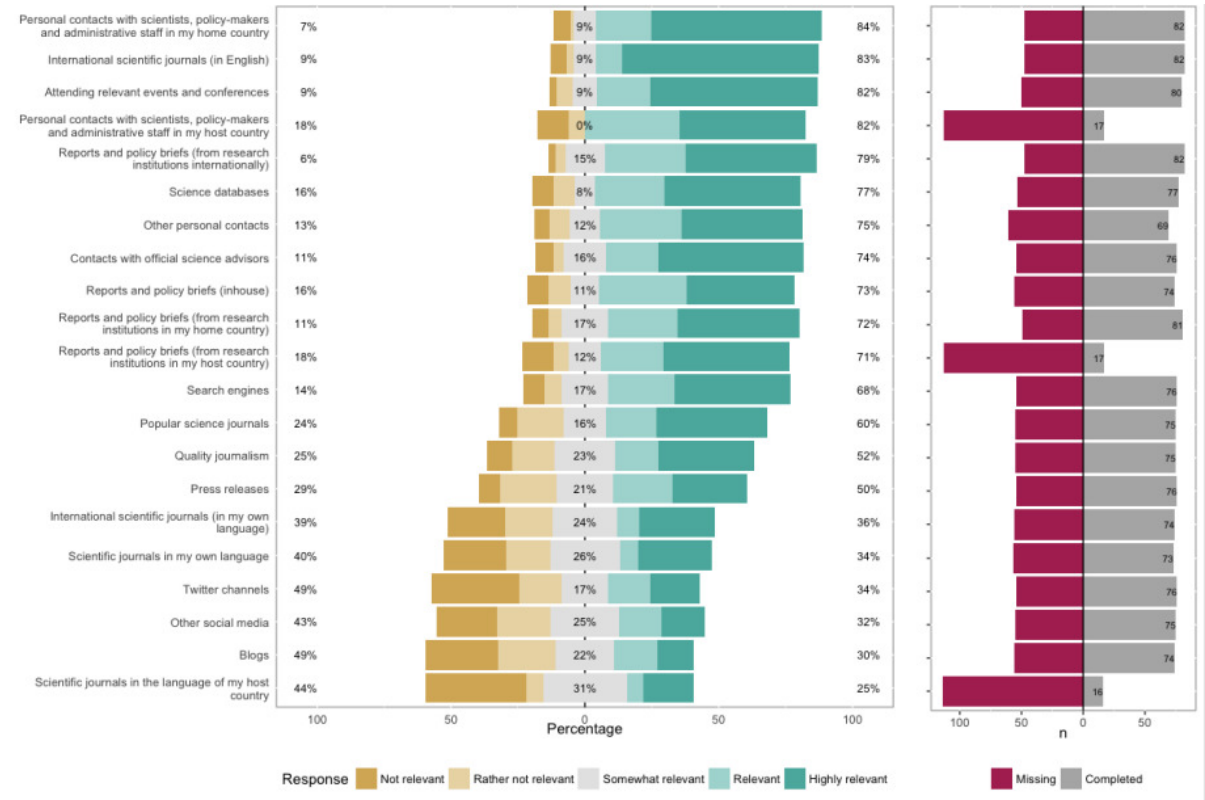

Figure 12: How relevant are the following sources of scientific evidence for your work?

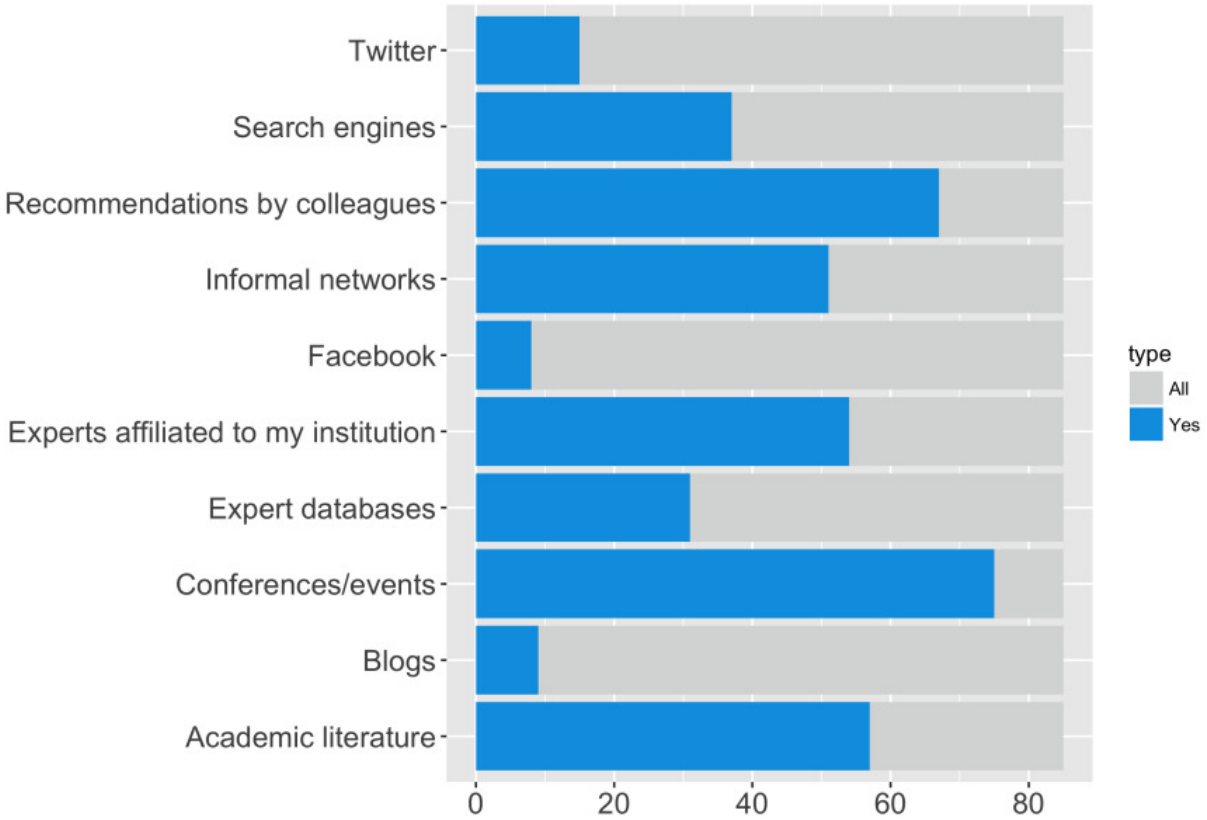

Figure 13: Channels through which relevant scientists are identified

4.2.3 Survey results: Needs

The survey results so far already tell us a lot about the needs of those working at the science and foreign policy interface. For instance, we have learned about the challenge of resources, of getting one's message across, of raising the profile of S&T policy in general, of getting access to stakeholders, etc. We have also asked the question of the needs explicitly, with another set of itemised questions offering pre-identified answers as well as the option to respond freely.

A majority of respondents consider that they would benefit from science diplomacy trainings and more human resources. Apart from this, better access to specific stakeholders, more allowance to travel, better connections to networks and a better understanding of diplomacy are mentioned.

Interestingly, more technical knowledge or 'a better understanding of the world of science' are not demanded. This seems to contradict earlier findings on the challenge of identifying relevant scientific information. The challenges in identifying information do not necessarily mean that these respondents (n.b. this challenge was especially voiced by scientists) need to be trained on the science. Science is not the issue, information retrieval is.

If we disaggregate these answers on the needs by respondent group, we see that EU respondents voice a lower level of 'needs' in general. The share of respondents considering the items relevant for their work is lower across all items. The only item where EU respondents show a higher level of need than others is the question of human resources. Almost two thirds of EU respondents consider they would benefit from additional human resources. Non-EU respondents voice a higher level of need across all items, with a specific focus on

science diplomacy training. This might have been partly the reason why they were attracted to respond to the survey. If we look at scientist respondents, they also voice the need for training as well as more allowance to travel and better connections to professional networks. Diplomat respondents' needs are pronounced in the question of human resources and science diplomacy training.

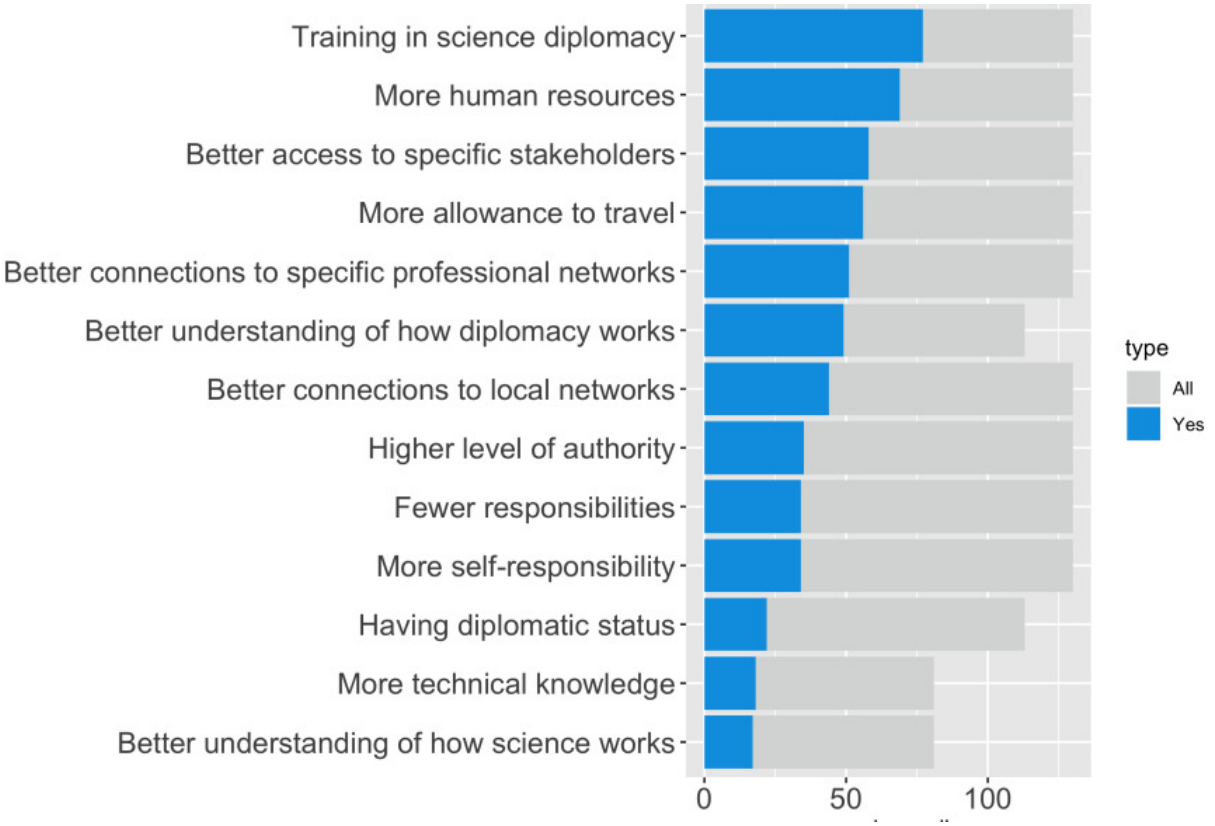

Figure 14: Would any of the following help you to better fulfil your professional responsibilities?

The open question option does not yield additional findings: Respondents reiterate issues such as a lack of funding, recognition or administrative support.

In addition to asking about needs in general, we consulted respondents on their specific needs with regard to knowledge resources and skills used in their work. These results are displayed for EU respondents only, because their needs as beneficiaries to this study were of main interest, while the number of cases is too low for a comparative statistical analysis anyhow.

Knowledge resources needs

We asked EU respondents to specifically state the kinds of knowledge resources they would consider useful for their work. What they mostly appreciate is information about the stakeholder landscape, about formal STI agreements as well as about local STI activities. Around one third of these respondents require information about activities of the non-EU countries they are deployed to in other EU countries. Information about scientific findings and/or results does not seem to be a major issue.

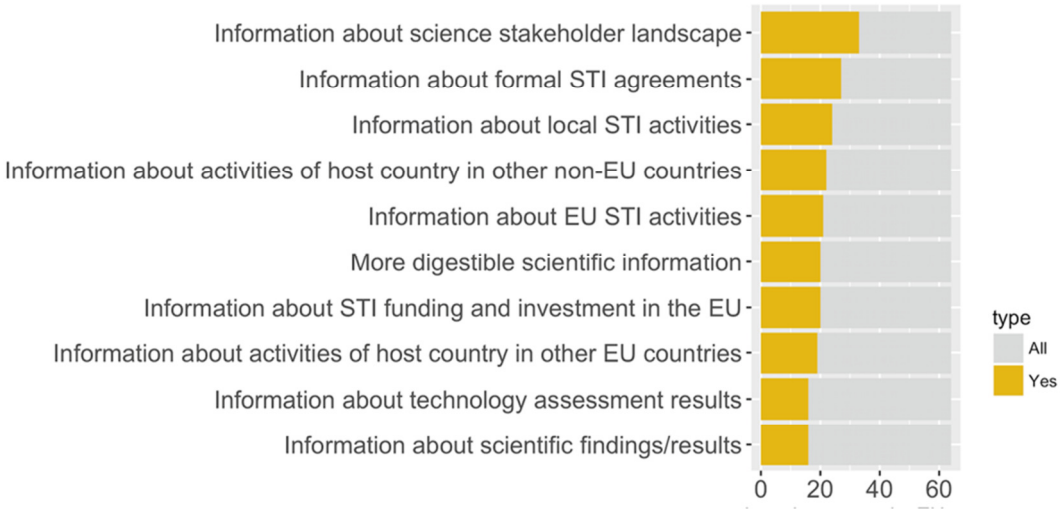

Figure 15: Knowledge resources-related needs, EU respondents only

Skills needs

Finally, we asked EU respondents to assess the skills-related needs that they consider relevant. As the bar chart indicates, soft-skills, such as negotiation, communication and networking, are most in demand. Likewise, respondents are interested in improving their knowledge about how international relations and science are linked with each other as well as about the concept of science diplomacy itself.

21 respondents would also like to know more about international institutions in the area of S&T. Evaluating scientific truth claims, as well as skills related to S&T in the EU and beyond are only requested by a small number of respondents.

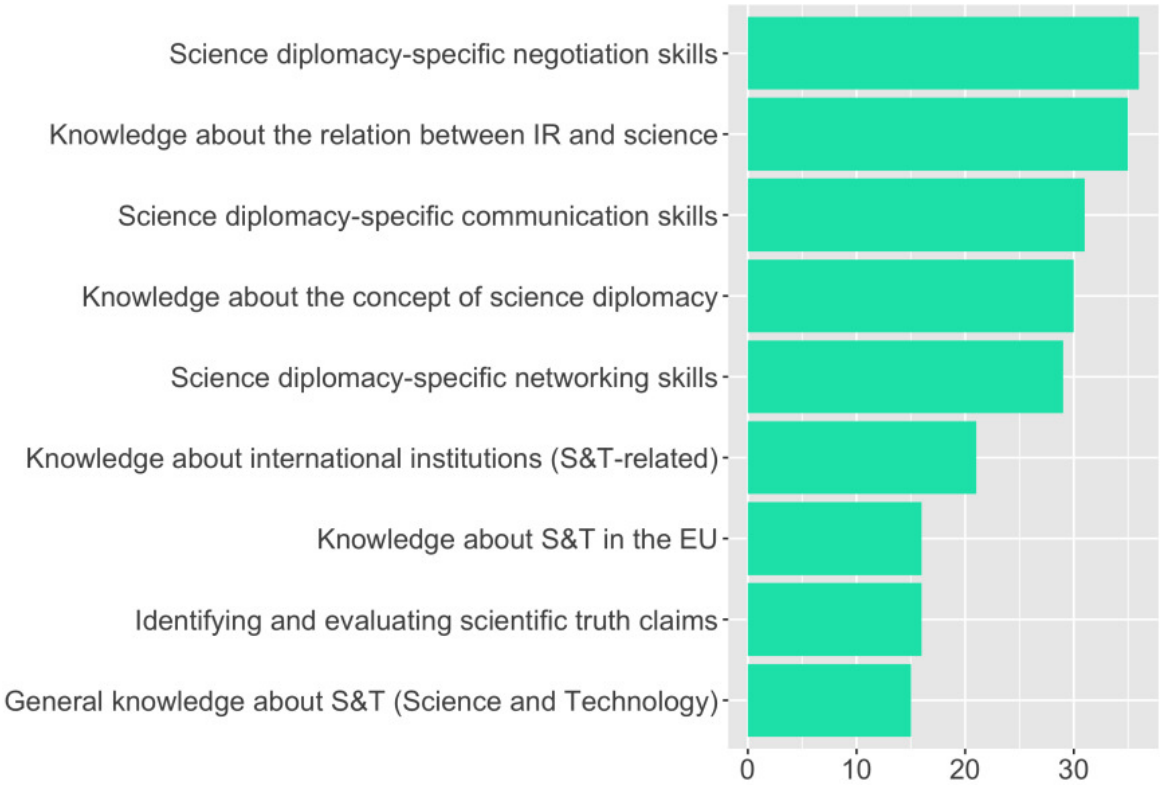

Figure 16: Skills needs, EU respondents only

Training formats

In view of delivering suitable training formats, we have consulted EU respondents concerning their preferred training formats to address the skills needs. A large majority of respondents indicate short, i.e. one to two-day workshops as the preferred format (42 votes). Internships, fellowships, community-building exercises and workshop series are also held useful by over 20 respondents (out of the 64 EU respondents). Between 10 and 20 respondents indicate that pairing schemes, lectures, online courses or rotation schemes would be useful. Eight respondents consider simulations useful. In the 'other' category, two respondents propose study visits, and another one points out that online courses should have an adequate level of depth (not be too simple).

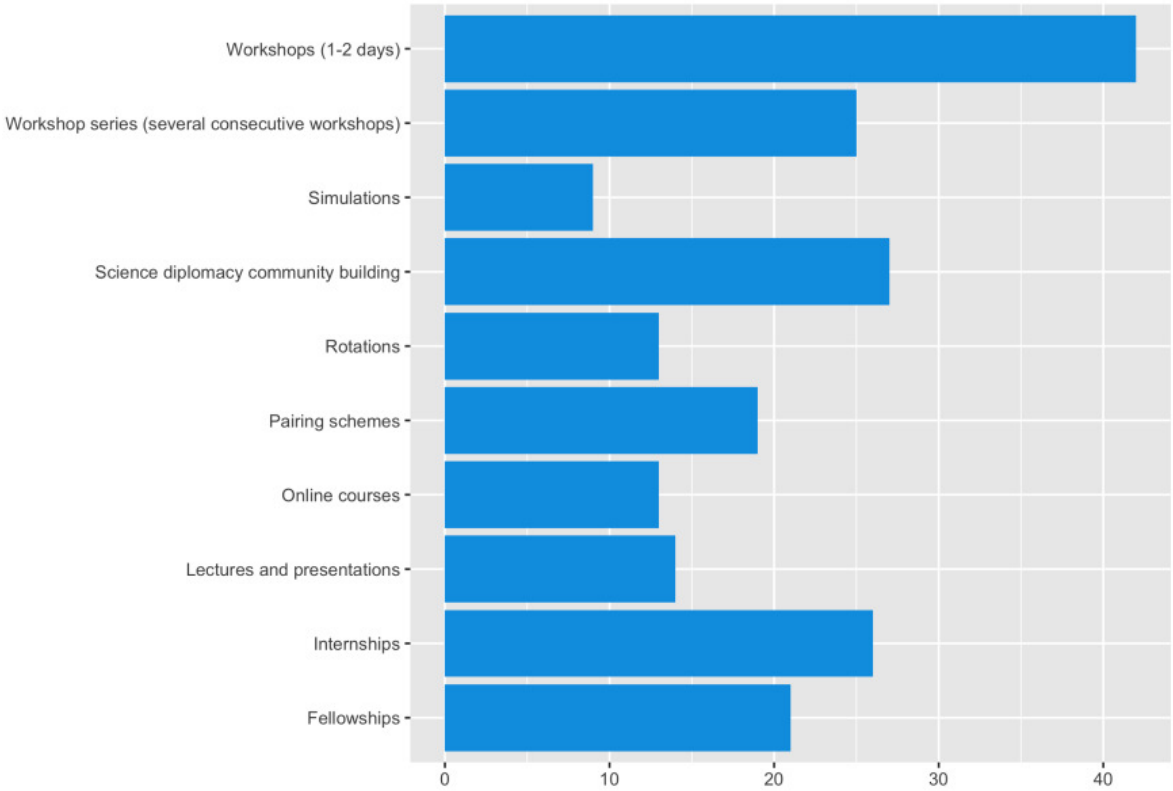

Figure 17: Best training formats, EU respondents only

4.2.4 Survey results: Relevance of the label 'science diplomacy'

As indicated in the introduction, we consciously avoided a focus on the science diplomacy label too early in the survey to reduce respondents' blind reliance on the label. Instead and toward the end of the survey, we asked them whether and how the concept (and label) 'science diplomacy' was interesting for them, and to what extent it was relevant for their work and their professional identity.

The following table shows the median values of the various respondent groups. Answers to these questions were mandatory (thus filled in by all 130 respondents). Differences are not statistically significant.

Median values			Institutional background		
	All respondents	EU only	National	Intergov.	Civil soc.
I have a clear understanding of SD (1-not at all to 5-yes, definitely)	4	4	4	4	4
In my professional environment, I am considered a science diplomat (1-not at all to 5-yes, definitely)	3	3	3	2.5	3
I consider myself a science diplomat (1-not at all to 5-yes, definitely)	3	3	3.5	2.5	3
I use the term science diplomacy in my daily work (1-not at all to 5-regularly)	2.5	2	3	2	2
I think the term science diplomacy is helpful (1-not at all to 5-yes, definitely)	4	4	4	4	5

Table 7: Views on the label 'science diplomacy'

The results show that respondents state a fine grasp of science diplomacy. They also think the term is useful, however, they rarely use the term in their work and only consider themselves science diplomats to some degree. There are no relevant differences between their assessment of their identity as science diplomats and their being perceived as such.

These results raise questions about the pervasiveness of 'science diplomacy' as a discursive. While it is clearly on everyone's lips and while all respondents seem to know what science diplomacy means, there is less professional identification with it. This seemingly weak personal identification is striking in light of the afore-self-described activities of the respondents, as most these activities get usually subsumed under the umbrella of science diplomacy.

4.2.5 Statistical analysis

The major results of the analyses have already been fed into the discussions above. However, we would like to summarise the various steps taken in terms of statistical analysis.

- Descriptive statistics: For the demographics, this included frequency counts, means and cross-tabulation. For the survey questions, most of which are categorical (some are nominal, some dichotomous, most are ordinal Likert-scale questions), it included frequency counts as well as, as the measure of central tendency, the medians.
- Correlations: In order to detect correlations between some of the demographics data (EU or non-EU citizen, home based or deployed, professional identity) and the survey responses, we used Chi-square tests (Spearman's Rho was not possible as one possible is nominal).

- Difference of 'means': In order to compare the central tendency measures of subsets of our data, we used the Wilcoxon signed-rank test. T-tests are not possible because of the scale of our variables.

A principal component analysis-based (variant: multidimensional categorical variables) hierarchical clustering (HCPC; see Husson et al. 2010) did not yield relevant clusters. The explanatory power of underlying factors that were extracted was too limited. In general, the number of respondents is too low for this type of analysis.

The descriptive and further analyses were performed in R.

Scripts as well as an anonymised version of the survey responses are available as open data.

Below we provide a tabular representation of the results of the statistical tests for correlations and differences in central tendency. We have run these tests for:

- the question batteries on goals, challenges, and tasks of science diplomats,
- taking into account the following demographics variables: deployed yes/no, EU/non-EU citizen, professional identity (scientist, diplomat, administrator/manager), institutional background (national, intergovernmental, civil society). For the latter two categories, we only ran correlation tests. Comparison of central tendency would mean running three tests per group (a with b, b with c, a with c), which would result in low numbers of cases.

Displayed are the p-values. Values below or equal to 0.05 indicate statistical significant result (at a 95% confidence level). For instance, a significant result for the challenge 'getting access to relevant contacts on the public administration side' in the columns 'EU vs non-EU' means:

- In the correlation test: There is a statistically significant correlation between respondents' citizenship (EU/non-EU) and their responses to the mentioned challenge.
- In the test for difference in central tendency (Wilcoxon): There is a difference in central tendency ('means', although technically the relevant concept for ordinally scaled variables is the median) between EU respondents' and non-EU respondents' answers to the question about this challenge.

Please note that:

- We have not run these analyses for the question batteries on needs, because of the low overall number of respondents. In accordance with the main analytical focus of the project, we have instead simply zoomed in to EU responses.
- There are cases where there is a statistically significant correlation, but no difference in central tendency. This can be the case as correlation at the level of individual answers is not necessarily related to differences in the tendency of the overall distribution.
- Difference in central tendency does not say anything about the direction of the difference (e.g. is the challenge more or less important for EU/non-EU respondents). This result is discussed in detail above (taking into account the test results documented here).

- NA indicates either that: a) there were insufficient cases to run the test; or b) that the item was not asked to a subset of respondents (e.g. those deployed).

Goals	**Deployed: yes/no** p-values		**EU vs non-EU** p-values	
	Correlation (chisquare)	Diff. in central tendency (Wilcoxon)	Correlation (chisquare)	Diff. in central tendency (Wilcoxon)
Strengthening competitiveness of my country	0,510	0,566	0,200	0,062
Developing partnerships for global challenges	0,647	0,712	0,212	0,387
Enhancing R&I capacities of developing and emerging countries	**0,044***	**0,005***	**0,018***	**0,003***
Strengthening intercultural dialogue	0,770	0,516	0,118	0,357
Improving diplomatic relationships	0,151	0,226	0,462	0,129
Improving international science collaboration	0,904	0,760	0,159	0,829
Integrating developing and emerging countries into the ERA	0,251	**0,037***	0,389	0,710
Developing the ERA	0,760	0,328	0,530	0,384
Extending the frontiers of knowledge	**0,003***	**0,004***	0,155	**0,013***

Table 8: Goals - statistical tests I

Goals	**Scientist, diplomat or administrator/manager** p-values	**National, inter-governmental or civil society institution** p-values
	Correlation (chisquare)	Correlation (chisquare)
Strengthening competitiveness of my country	0,408	0,065
Developing partnerships for global challenges	0,495	0,160
Enhancing R&I capacities of developing and emerging countries	0,760	**0,036***
Strengthening intercultural dialogue	0,568	**0,016***

Improving diplomatic relationships	0,334	0,091
Improving international science collaboration	0,301	0,251
Integrating developing and emerging countries into the ERA	0,236	0,408
Developing the ERA	0,513	0,426
Extending the frontiers of knowledge	**0,004***	0,084

Table 9: Goals - statistical tests II

Challenges	**Deployed: yes/no** p-values		**EU vs non-EU** p-values	
	Correlation (chisquare)	Diff. in central tendency (Wilcoxon)	Correlation (chisquare)	Diff. in central tendency (Wilcoxon)
Understanding different ST-related perspectives and needs	NA	NA	0,353	0,100
Negotiating different ST-related perspectives and needs	NA	NA	0,228	0,385
Understanding different ST-related perspectives and needs in my country	NA	NA	0,763	0,908
Negotiating different ST-related perspectives and needs in my country	NA	NA	0,749	0,982
Understanding different ST-related perspectives and needs between my host and home country	NA	NA	0,422	0,199
Negotiating different ST-related perspectives and needs between my host and home country	NA	NA	0,861	0,846
Understanding different ST-related perspectives and needs between scientists and administrators	NA	NA	0,890	0,433
Negotiating different ST-related perspectives and needs between scientists and administrators	NA	NA	0,096	1
Finding the right persons to contact on the academic side	0,994	0,893	0,983	0,689
Finding the right persons to contact on the public administration side	0,822	0,490	0,414	0,166

Getting access to relevant contacts on the academic side	0,544	0,542	0,302	0,060
Getting access to relevant contacts on the public administration side	**0,006***	0,560	**0,050***	**0,009***
Raising awareness for the relevance of ST-related policies/activities	**0,022***	0,620	**0,030***	**0,050***
Keeping track of recent ST developments	0,350	0,824	0,216	**0,046***
Identifying relevant scientific information	0,279	0,995	0,068	**0,004***
Creating opportunities to get my messages across	0,228	0,423	**0,022***	**0,001***

Table 10: Challenges - statistical tests I

Challenges	**Scientist, diplomat or administrator/manager** p-values	**National, inter-governmental or civil society institution** p-values
	Correlation (chisquare)	Correlation (chisquare)
Understanding different ST-related perspectives and needs	0,548	0,781
Negotiating different ST-related perspectives and needs	0,388	0,407
Understanding different ST-related perspectives and needs in my host country	0,906	0,618
Negotiating different ST-related perspectives and needs in my host country	0,571	0,340
Understanding different ST-related perspectives and needs between my host and home country	0,786	0,526
Negotiating different ST-related perspectives and needs between my host and home country	0,562	0,710
Understanding different ST-related perspectives and needs between scientists and administrators	0,530	0,366
Negotiating different ST-related perspectives and needs between scientists and administrators	0,411	0,517

Finding the right persons to contact on the academic side	0,176	0,106
Finding the right persons to contact on the public administration side	**0,026***	0,777
Getting access to relevant contacts on the academic side	0,208	0,636
Getting access to relevant contacts on the public administration side	**0,012***	0,137
Raising awareness for the relevance of ST-related policies/activities	0,578	0,088
Keeping track of recent ST developments	0,851	0,450
Identifying relevant scientific information	**0,043***	0,427
Creating opportunities to get my messages across	0,252	**0,029***

Table 11: Challenges - statistical tests II

Tasks	**Deployed: yes/no** p-values		**EU vs non-EU** p-values	
	Correlation (chisquare)	Diff. in central tendency (Wilcoxon)	Correlation (chisquare)	Diff. in central tendency (Wilcoxon)
Organising science delegation visits	0,916	0,411	0,769	0,356
S&T-related dialogue at programme level	0,756	0,661	0,577	0,582
S&T-related dialogue at policy level	0,225	0,438	0,859	0,615
Screening developments in the S&T sector in my host country	NA	NA	0,548	0,241
Screening developments in the S&T sector in my home country	0,338	0,969	0,595	0,969
Representing my country/institution in my host country	NA	NA	0,249	0,071
Representing my country/institution on EU level	0,734	0,959	0,059	0,207
Organising scientific advice: identifying experts	0,227	0,262	0,232	0,929

Organising scientific advice: convening expert groups	0,331	0,106	0,830	0,419
Organising scientific advice: monitoring activities in a certain scientific field	0,512	0,177	0,184	0,559
Organising scientific advice: consulting scientific sources	0,587	0,184	0,181	**0,018***
Organising scientific advice: writing policy briefs on scientific issues	0,633	0,466	0,116	**0,013***
Joint programming	0,928	0,995	0,606	0,728
Setting up research programmes	0,377	0,087	0,216	0,255
Negotiating S&T-related conflicts between different actors	0,276	0,876	0,835	0,956
Supporting science cooperation	0,346	0,205	**0,027***	0,952
Monitoring compliance with scientific standards	0,523	0,346	0,094	0,054

Table 12: Tasks - statistical tests I

Tasks	**Scientist, diplomat or administrator/manager** p-values	**National, inter-governmental or civil society institution** p-values
	Correlation (chisquare)	Correlation (chisquare)
Organising science delegation visits	0,110	0,150
S&T-related dialogue at programme level	0,372	0,236
S&T-related dialogue at policy level	**0,032***	**0,016***
Screening developments in the S&T sector in my host country	0,263	0,232
Screening developments in the S&T sector in my home country	0,236	0,533
Representing my country/institution in my host country	0,290	**0,027***
Representing my country/institution on EU level	0,128	0,488
Organising scientific advice: identifying experts	0,587	0,480

Organising scientific advice: convening expert groups	0,751	0,527
Organising scientific advice: monitoring activities in a certain scientific field	0,170	0,328
Organising scientific advice: consulting scientific sources	0,310	0,455
Organising scientific advice: writing policy briefs on scientific issues	0,611	0,234
Joint programming	**0,022***	0,260
Setting up research programmes	0,215	0,222
Negotiating S&T-related conflicts between different actors	0,918	**0,008***
Supporting science cooperation	0,228	0,592
Monitoring compliance with scientific standards	0,338	0,606

Table 13: Tasks - statistical tests II

5 Conclusions and project strategy

As we outlined, the main instrument of our science diplomacy needs assessment was an online survey that was supplemented by desk research and expert interviews. The survey allowed us to collect valuable self-assessments of 130 individuals working at the intersection of science and foreign policy. Some of the respondents are deployed and work in countries different from their institution's home base, a part of them in formal diplomatic positions (attachés, counsellors) in embassies. Almost two-thirds of the respondents work in national public institutions, another quarter in civil society institutions. Roughly half of the respondents are EU citizens (or from countries associated to Horizon 2020). Among the EU respondents, the group of those working at national public institutions makes up an even higher share than in the overall population (72%).

In terms of professional (self-) identities, most respondents consider themselves either scientists (38%) or managers/administrators (also 38%). Only 13% consider themselves diplomats. Most of those considering themselves diplomats are deployed to another country.

Among the EU respondents, more than half consider themselves managers/administrators (only 18% of non-EU respondents do so). Among the non-EU respondents, more than half consider themselves scientists.

We structured the survey in three parts: first, respondents gave an assessment of the underlying goals and objectives of their work, their tasks and the challenges they encounter. Then we asked about their needs in general and more specifically with regard to knowledge resources and skills. Finally, we asked respondents about their views on the label of science diplomacy.

Among the overarching goals of the work of the respondents, improving international collaboration for scientific purposes is the most prominent. This reminds us of traditional 'diplomacy for science' work. However, we also see that other, broader rationales play a major role in the respondents' work. A majority of them also considers developing partnerships to address global challenges as well as the aspect of strengthening competitiveness major goals in their work. 'Science for diplomacy' objectives, such as improving diplomatic relationships through the means of science, are slightly less important but still relevant for a majority of respondents.

Although it is less obvious in the responses on goals and objectives, the tasks of the respondents also reveal that they regularly engage in forms of science advice, such as the identification of experts, the consultation of scientific sources or the writing of policy briefs (non-EU respondents more often than their EU peers). More qualitative research would be required to investigate whether this is mostly a sort of inner-institutional reporting (an attaché informing headquarters) or whether this is also used for other forms of science advice (to government in the wider sense). It would be interesting to follow up on these research questions in order to assess whether we deal with a separate set of practices (of diplomacy for science and science advice) or whether there are linkages that can be exploited to increase the potential of science diplomacy.

The data on the tasks also indicate that most of the deployed respondents are regularly involved in representation tasks (of their country or institution). They also screen developments in their host country, which might be related to both the goals of supporting collaboration as well as increasing competitiveness.

According to our results, our respondents encounter diverse challenges in their daily work. In general, there is a widely held agreement among the respondents about the actual challenges at work, while four challenges matter in particular: it is hard (i) to create opportunities to get one's message across, (ii) to understand different S&T-related perspectives in the host country (for those deployed), (iii) to raise awareness for the relevance of S&T policies and (iv) to keep track of S&T developments.

The aspects (i) and (iii), i.e. to get one's message across and to raise awareness for the relevance of S&T policies and of creating opportunities, are not as problematic for EU respondents as for their non-EU peers. Getting access to public administration stakeholders is also much less of a problem for EU respondents. These differences might also be influenced by different institutional backgrounds (more EU respondents are working in public sector institutions), but the statistical evidence is inconclusive here. However, we saw that some of the issues are more problematic for respondents identifying as scientists compared to those that identify themselves as managers/administrators. Interestingly, diplomats report levels of challenges that are more similar to scientists than to managers/administrators.

We asked respondents who use scientific evidence in their work (two thirds of our respondents) how they get this evidence. The results point to a continued relevance of personal contacts, conferences and other events. Respondents also agree on the relevance of scientific journals (including popular journals), reports and policy briefs, and science databases as well as contacts with official science advisors. Blogs, twitter or other social media play a comparatively small role. Similar dynamics are visible in the channels used for identifying expert scientists.

These findings on the practices and challenges of the people working at the intersection of science and foreign policy allow us to deduce some individual-level needs, for instance the sustained importance of offline contacts. When it comes to the needs as explicitly reported by the respondents, we see a strong demand for training in science diplomacy and related skills, especially concerning negotiations, communication and networking as well as regarding the understanding of the various intersections of science and foreign affairs. As a matter of course, resources (staff, travel funds) are highly demanded, as are better access to stakeholders and networking. In terms of knowledge resources, the need for information about the stakeholder landscape, STI agreements and activities of different actors has been prioritized.

The survey on science diplomacy in the EU serves as a guide for our S4D4C activities. The collection of systemic needs from key organisations at the EU-level (see chapter 4.1 A preliminary note on systemic needs) is a relevant topic for the online and offline trainings. A special module of the training curriculum is dedicated on the structures as well as the definition and implementation of science diplomacy in these relevant organisations. Therefore, the analyses of the European Commission DG Research and Innovation as well as the EU's External Action Service will be taken into consideration for completing the picture on EU science diplomacy.

Furthermore, the S4D4C project can and will address a few of the identified needs:

- A majority of respondents report that they would benefit from more science diplomacy trainings – a need which we will cover with the planned S4D4C online and offline trainings.

- The results of the questionnaire related to 'skills' are taken into account for the preparation of the S4D4C training curriculum.
- We could open up the S4D4C trainings activities for non-EU participants based on the higher need for SD training in non-EU countries.
- The S4D4C knowledge platform will inform the target group about scientific collaboration and it will report on a variety of developments related to science diplomacy.

Moreover, we will continue to offer opportunities for offline networking of science diplomacy stakeholders. In this regard, we will also intervene in the use and assessment of the label of science diplomacy – hopefully for the benefit of the European Union's science and the global responses to societal challenges.

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Annex I – Questionnaire

S4D4C Science Diplomacy Needs Assessment

An open online survey to learn about practices and needs of science diplomacy practitioners.

Welcome to S4D4C's Science Diplomacy Needs Assessment Survey!

The S4D4C project aims at **strengthening science diplomacy in the European Union** by contributing to better science-policy interfaces and supporting the work of science diplomats. With this aim in mind, we want to better understand how EU science diplomacy currently takes place. In particular, we want to learn about the challenges and needs related to science diplomacy that you encounter in your daily practice.

This anonymous survey consists of **5 groups of questions** and should take **no more than 20 minutes** to complete. Questions marked with a **red asterisk** are obligatory, unmarked questions are optional.

A note on **research ethics**: All answers you provide will be kept in strict confidentiality. Results will be published only as aggregate and anonymus data. More information about the project is available on our website. By taking this survey you agree to our informed consent and data protection guidelines.

Thank you for contributing your expertise and sharing your experiences!

There are 53 questions in this survey

Demographics

In this first part, we would appreciate to get a bit of background information on you personally.

1. Please specify your gender.
Choose one of the following answers

Please choose **only one** of the following:

- ○ Female
- ○ Male
- ○ Nonbinary

2. Your age *
Only numbers may be entered in this field.

Please write your answer here:

3. Your highest academic degree *
Choose one of the following answers

Please choose **only one** of the following:

- ○ Secondary school only
- ○ BA, BSc or similar
- ○ MA, MSc or similar
- ○ PhD, MD or similar
- ○ Other _____

4. Your academic discipline(s) *
Check all that apply

Please choose **all** that apply:

- ☐ Natural sciences
- ☐ Engineering and technology
- ☐ Medical and Health sciences
- ☐ Agricultural sciences
- ☐ Social sciences
- ☐ Humanities

The list is based on the Revised Field of Science and Technology (FOS) classification of the OECD's 2007 FRASCATI manual.

5. I am currently based in the following type of institution. *
Choose one of the following answers

Please choose **only one** of the following:

- ○ National/state government (or related agency)
- ○ EU, UN or other inter-governmental organisation
- ○ Societal/non-governmental organisation (national and international)

6. Please specify *

Only answer this question if the following conditions are met:
Answer was 'National/state government (or related agency)' at question '5' (I am currently based in the following type of institution.)

Choose one of the following answers

Please choose **only one** of the following:

- ○ National ministry in charge of foreign policy
- ○ National ministry in charge of science, technology and/or innovation policy
- ○ National research funding organisation (ANR, RCUKs, DFG, NSF, etc)
- ○ National public research performing organisation (CNRS, Fraunhofer, etc)
- ○ National public agency related to STI, science mobility, academic exchange, and international cooperation (British Council, FECYT, DAAD, etc)
- ○ Other _____

7. Please specify *

Only answer this question if the following conditions are met:
Answer was 'EU, UN or other inter-governmental organisation' at question '5' (I am currently based in the following type of institution.)

Choose one of the following answers

Please choose **only one** of the following:

- ○ European Commission DG RTD
- ○ European Commission DG DEVCO
- ○ European Commission REA
- ○ European External Action Service
- ○ EU science advice agencies (JRC, SAM)
- ○ European Commission, other DG and services
- ○ EU-level independent science advice (EASAC, ALLEA, etc)
- ○ UN bodies (UNESCO, WHO, WMO, etc)
- ○ Other inter-governmental organisations (OECD etc)
- ○ Other _____

8. Please specify *

Only answer this question if the following conditions are met:
Answer was 'Societal/non-governmental organisation (national and international)' at question '5' (I am currently based in the following type of institution.)

Choose one of the following answers

Please choose **only one** of the following:

- ○ University
- ○ Public/state-sponsored research institute or think tank
- ○ Political party research institution or think tank
- ○ Independent, non-governmental research-based organisation or think tank (not-for-profit)
- ○ Advisory Council
- ○ Consultancy or think tank (for-profit)
- ○ Corporate/business affiliated organisation or think tank
- ○ Private-public partnership type organisation
- ○ Private enterprise
- ○ Private research funding organisation
- ○ Other _____

9. The official name of my organisation (and unit) is

Please write your answer here:

_____

10. My home country is

Choose one of the following answers

Please choose **only one** of the following:

- ○ Afghanistan
- ○ Albania
- ○ Algeria
- ○ Andorra
- ○ Angola
- ○ Antigua and Barbuda
- ○ Argentina
- ○ Armenia
- ○ Australia
- ○ Austria
- ○ Azerbaijan
- ○ Bahamas
- ○ Bahrain
- ○ Bangladesh
- ○ Barbados
- ○ Belarus
- ○ Belgium
- ○ Greece
- ○ Grenada
- ○ Guatemala
- ○ Guinea
- ○ Guinea-Bissau
- ○ Guyana
- ○ Haiti
- ○ Honduras
- ○ Hungary
- ○ Iceland
- ○ India
- ○ Indonesia
- ○ Iran (Islamic Republic of)
- ○ Iraq
- ○ Ireland
- ○ Israel
- ○ Italy
- ○ Peru
- ○ Philippines
- ○ Poland
- ○ Portugal
- ○ Puerto Rico
- ○ Qatar
- ○ Republic of Korea
- ○ Republic of Moldova
- ○ Romania
- ○ Russian Federation
- ○ Rwanda
- ○ Saint Kitts and Nevis
- ○ Saint Lucia
- ○ Saint Vincent and the Grenadines
- ○ Samoa
- ○ San Marino

- ○ Belize
- ○ Benin
- ○ Bhutan
- ○ Bolivia (Plurinational State of)
- ○ Bosnia and Herzegovina
- ○ Botswana
- ○ Brazil
- ○ Brunei Darussalam
- ○ Bulgaria
- ○ Burkina Faso
- ○ Burundi
- ○ Cabo Verde
- ○ Cambodia
- ○ Cameroon
- ○ Canada
- ○ Central African Republic
- ○ Chad
- ○ Chile
- ○ China
- ○ Colombia
- ○ Comoros
- ○ Congo
- ○ Cook Islands
- ○ Costa Rica
- ○ Côte d'Ivoire
- ○ Croatia
- ○ Cuba
- ○ Cyprus
- ○ Czech Republic
- ○ Democratic People's Republic of Korea
- ○ Congo
- ○ Denmark
- ○ Djibouti
- ○ Dominica
- ○ Dominican Republic
- ○ Ecuador
- ○ Egypt
- ○ El Salvador
- ○ Equatorial Guinea
- ○ Eritrea
- ○ Estonia
- ○ Ethiopia
- ○ Fiji
- ○ Finland
- ○ France
- ○ Gabon
- ○ Gambia
- ○ Georgia
- ○ Germany
- ○ Ghana
- ○ Jamaica
- ○ Japan
- ○ Jordan
- ○ Kazakhstan
- ○ Kenya
- ○ Kiribati
- ○ Kuwait
- ○ Kyrgyzstan
- ○ Lao People's Democratic Republic
- ○ Latvia
- ○ Lebanon
- ○ Lesotho
- ○ Liberia
- ○ Libya
- ○ Lithuania
- ○ Luxembourg
- ○ Madagascar
- ○ Malawi
- ○ Malaysia
- ○ Maldives
- ○ Mali
- ○ Malta
- ○ Marshall Islands
- ○ Mauritania
- ○ Mauritius
- ○ Mexico
- ○ Micronesia (Federated States of)
- ○ Monaco
- ○ Mongolia
- ○ Montenegro
- ○ Morocco
- ○ Mozambique
- ○ Myanmar
- ○ Namibia
- ○ Nauru
- ○ Nepal
- ○ Netherlands
- ○ New Zealand
- ○ Nicaragua
- ○ Niger
- ○ Nigeria
- ○ Niue
- ○ Norway
- ○ Oman
- ○ Pakistan
- ○ Palau
- ○ Panama
- ○ Papua New Guinea
- ○ Paraguay
- ○ Sao Tome and Principe
- ○ Saudi Arabia
- ○ Senegal
- ○ Serbia
- ○ Seychelles
- ○ Sierra Leone
- ○ Singapore
- ○ Slovakia
- ○ Slovenia
- ○ Solomon Islands
- ○ Somalia
- ○ South Africa
- ○ South Sudan
- ○ Spain
- ○ Sri Lanka
- ○ Sudan
- ○ Suriname
- ○ Swaziland
- ○ Sweden
- ○ Switzerland
- ○ Syrian Arab Republic
- ○ Tajikistan
- ○ Thailand
- ○ The former Yugoslav Republic of Macedonia
- ○ Timor-Leste
- ○ Togo
- ○ Tokelau
- ○ Tonga
- ○ Trinidad and Tobago
- ○ Tunisia
- ○ Turkey
- ○ Turkmenistan
- ○ Tuvalu
- ○ Uganda
- ○ Ukraine
- ○ United Arab Emirates
- ○ the United Kingdom of Great Britain and Northern Ireland
- ○ United Republic of Tanzania
- ○ United States of America
- ○ Uruguay
- ○ Uzbekistan
- ○ Vanuatu
- ○ Venezuela (Bolivarian Republic of)
- ○ Viet Nam
- ○ Yemen
- ○ Zambia
- ○ Zimbabwe

11. I am deployed to a country different from my institution’s home base. *

Please choose **only one** of the following:

- ○ Yes
- ○ No

12. My host country is

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '11' (I am deployed to a country different from my institution’s home base.)

Choose one of the following answers

Please choose **only one** of the following: (Answers see question 10)

13. I am working in an embassy or I am a member of an EU delegation. *

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '11' (I am deployed to a country different from my institution’s home base.)

Please choose **only one** of the following:

- ○ Yes
- ○ No

14. The official title of my current position is

Please write your answer here:

15. My main professional responsbility is *

Choose one of the following answers

Please choose **only one** of the following:

- ○ scientist
- ○ diplomat
- ○ manager or administrator
- ○ Other

16. I am a... *

Only answer this question if the following conditions are met:
Answer was 'scientist' at question '15' (My main professional responsibility is)

Choose one of the following answers

Please choose **only one** of the following:

- ○ scientist with an explicit diplomatic role
- ○ scientist with some diplomatic responsibilities (in managing science relations, etc.)
- ○ scientist with no diplomatic role
- ○ science advisor
- ○ Other _____

17. I am a... *

Only answer this question if the following conditions are met:
Answer was 'diplomat' at question '15' (My main professional responsibility is)

Choose one of the following answers

Please choose **only one** of the following:

- ○ diplomat with mainly science-related responsibilities
- ○ diplomat with partially science-related responsibilities
- ○ diplomat with no science-related responsibilities
- ○ Other _____

18. I am a... *

Only answer this question if the following conditions are met:
Answer was 'manager or administrator' at question '15' (My main professional responsibility is)

Choose one of the following answers

Please choose **only one** of the following:

- ○ manager or administrator with explicit responsibilities in science cooperation
- ○ manager or administrator with explicit responsibilities in science policy
- ○ manager or administrator with no explicit science-related responsibilities
- ○ Other _____

19. My main responsibilites can be ascribed clearly to one of the professional categories (scientist, diplomat, administrator) provided above.

1 - I strongly disagree, 5 - I agree

Please choose **only one** of the following:

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

20. I have

Please write your answer(s) here:

years of academic work experience:

years of diplomatic work experience:

years of work experience in science management:

years of work experience in science policy:

Current practices

In order to understand how we can best address your needs, we first need to understand the way you work. This is the focus of the following questions.

21. Please indicate to which extent the following overarching goals guide your activities:

1 - not at all, 5 - to a large extent

Please select at least one answer

Please choose the appropriate response for each item:

	1	2	3	4	5
Strengthening the international competitiveness of my country or of the EU	○	○	○	○	○
Developing partnerships for addressing global challenges	○	○	○	○	○
Enhancing R&I capacities of developing and emerging countries	○	○	○	○	○
Strengthening intercultural dialogue through the means of science	○	○	○	○	○
Improving diplomatic relationships through the means of science	○	○	○	○	○
Improving international collaboration for scientific purposes	○	○	○	○	○
Integrating developing and emerging countries into the ERA (European Research Area)	○	○	○	○	○
Developing the ERA as a world class reference	○	○	○	○	○
Extending the frontiers of knowledge	○	○	○	○	○

1 - not at all, 5 - to a large extent

22. Any other important overarching goals that are not listed?

Please write your answer here:

23. Please indicate to which extent the following specific objectives form part of your responsibilities:

1 - not at all, 5 - to a large extent

Please select at least one answer

Please choose the appropriate response for each item:

	1	2	3	4	5
Supporting international scientific cooperation	○	○	○	○	○
Supporting international research infrastructures	○	○	○	○	○
Supporting international scientific networks	○	○	○	○	○
Supporting international research funding	○	○	○	○	○
Supporting researchers' mobility (within EU/internationally)	○	○	○	○	○
Supporting scientific advice mechanisms on EU level	○	○	○	○	○
Supporting scientific advice mechanisms in my home country	○	○	○	○	○
Supporting EU science policy	○	○	○	○	○
Supporting science policy in my home country	○	○	○	○	○
Supporting academics in my home country	○	○	○	○	○
Observing scientific activities/actors in my host country	○	○	○	○	○
Observing political activities/actors in my host country	○	○	○	○	○
Managing conflicts between scientific and/or political actors	○	○	○	○	○
Building up scientific capacities in my host country	○	○	○	○	○
Building up political capacities in my host country	○	○	○	○	○
Promoting scientific standards on an international level	○	○	○	○	○
Influencing science policy in my host country	○	○	○	○	○
Observing the technology market in my host country	○	○	○	○	○
Promoting S&T from my home country in my host country	○	○	○	○	○
Promoting academics of my home country in my host country	○	○	○	○	○
Recruiting academics from my host country	○	○	○	○	○

1 - not at all, 5 - to a large extent

24. Any other objectives that are not listed?

Please write your answer here:

25. Please indicate to which extent the following tasks form part of your daily work:

1 - not at all, 5 - to a large extent

Please select at least one answer

Please choose the appropriate response for each item:

	1	2	3	4	5
Organising science delegation visits	○	○	○	○	○
S&T(Science and Technology)-related dialogue at programme level (between funding agencies)	○	○	○	○	○
S&T-related dialogue at policy level	○	○	○	○	○
Screening developments in the S&T sector in my host country	○	○	○	○	○
Screening developments in the S&T sector in my home country	○	○	○	○	○
Representing my country/institution in my host country	○	○	○	○	○
Representing my country/institution on EU level	○	○	○	○	○
Organising scientific advice: identifying experts	○	○	○	○	○
Organising scientific advice: convening expert groups	○	○	○	○	○
Organising scientific advice: monitoring activities in a certain scientific field	○	○	○	○	○
Organising scientific advice: consulting scientific sources	○	○	○	○	○
Organising scientific advice: writing policy briefs on scientific issues	○	○	○	○	○
Joint programming	○	○	○	○	○
Setting up research programmes	○	○	○	○	○
Negotiating S&T-related conflicts between different actors	○	○	○	○	○
Supporting science cooperation (advice on partners, conflict resolution, regulations and standards, etc)	○	○	○	○	○
Monitoring compliance with scientific standards	○	○	○	○	○

1 - not at all, 5 - to a large extent

26. Any other important tasks that are not listed?

Please write your answer here:

27. What would you describe as major challenges in your daily work?

1 - not challenging, 5 - very challenging

Please select at least one answer

Please choose the appropriate response for each item:

	1	2	3	4	5
Understanding different S&T-related perspectives and needs	○	○	○	○	○
Negotiating different S&T-related perspectives and needs	○	○	○	○	○
Understanding different S&T-related perspectives and needs in my host country	○	○	○	○	○
Negotiating different S&T-related perspectives and needs in my host country	○	○	○	○	○
Understanding different S&T-related perspectives and needs between my host and home country	○	○	○	○	○
Negotiating different S&T-related perspectives and needs between my host and home country	○	○	○	○	○
Understanding different S&T-related perspectives and needsbetween scientists and administrators	○	○	○	○	○
Negotiating different S&T-related perspectives and needs between scientists and administrators	○	○	○	○	○
Finding the right persons to contact on the academic side	○	○	○	○	○
Finding the right persons to contact on the public administration side	○	○	○	○	○
Getting access to relevant contacts on the academic side	○	○	○	○	○
Getting access to relevant contacts on the public administration side	○	○	○	○	○
Raising awareness for the relevance of S&T-related policies/activities	○	○	○	○	○
Keeping track of recent S&T developments	○	○	○	○	○
Identifying relevant scientific information	○	○	○	○	○
Creating opportunities to get my messages across	○	○	○	○	○

1 - not challenging, 5 - very challenging

28. Are there any other challenges?

Please write your answer here:

29. Is there anything that makes your position unique, particularly with regard to working at the intersection of science and policy? If yes, could you please specify?

Please write your answer here:

30. Do you need scientific evidence for your work? *

Please choose **only one** of the following:

- ○ Yes
- ○ No

31. How relevant are the following sources of scientific evidence for your work?

1 - not relevant, 5 - highly relevant

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '30' (Do you need scientific evidence for your work?)
Please select at least one answer

Please choose the appropriate response for each item:

	1	2	3	4	5
International scientific journals (in English)	○	○	○	○	○
International scientific journals (in my own language)	○	○	○	○	○
Scientific journals in my own language	○	○	○	○	○
Scientific journals in the language of my host country	○	○	○	○	○
Popular science journals	○	○	○	○	○
Quality journalism	○	○	○	○	○
Reports and policy briefs (from research institutions in my home country)	○	○	○	○	○
Reports and policy briefs (from research institutions in my host country)	○	○	○	○	○
Reports and policy briefs (from research institutions internationally)	○	○	○	○	○
Reports and policy briefs (inhouse)	○	○	○	○	○
Press releases	○	○	○	○	○
Attending relevant events and conferences	○	○	○	○	○
Twitter channels	○	○	○	○	○
Blogs	○	○	○	○	○
Other social media	○	○	○	○	○
Science databases	○	○	○	○	○
Search engines	○	○	○	○	○
Personal contacts with scientists, policy-makers and administrative staff in my host country	○	○	○	○	○
Personal contacts with scientists, policy-makers and administrative staff in my home country	○	○	○	○	○
Contacts with official science advisors	○	○	○	○	○
Other personal contacts	○	○	○	○	○

1 - not relevant, 5 - highly relevant

32. If you directly consult scientists for your work, how have you found them? *

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '30' (Do you need scientific evidence for your work?)

Check all that apply

Please choose **all** that apply:

- ☐ Conferences/events
- ☐ Recommendations by colleagues
- ☐ Informal networks
- ☐ Experts affiliated to my institution
- ☐ Expert databases
- ☐ Search engines
- ☐ Academic literature
- ☐ Blogs
- ☐ Twitter
- ☐ Facebook
- ☐ Other:

33. What professional networks are you part of (scientific or professional associations, diplomatic networks, etc)?

Please write your answer here:

Needs

We can now focus on tools or inputs that you consider useful to your current and future work.

34. Would any of the following help you to better fulfill your professional responsibilities?
Check all that apply

Please choose **all** that apply:

- ☐ More self-responsibility
- ☐ More human resources
- ☐ More allowance to travel
- ☐ Better access to specific stakeholders
- ☐ Better connections to local networks
- ☐ Better connections to specific professional networks (academic, administrative etc.)
- ☐ Training in science diplomacy
- ☐ Better understanding of how science works
- ☐ Better understanding of how diplomacy works
- ☐ More technical knowledge
- ☐ Higher level of authority
- ☐ Fewer responsibilities (e.g. in order to be able to focus more)
- ☐ Having diplomatic status
- ☐ Other:

35. Which of the following would you consider helpful and much-needed for improving interfaces between science and foreign policy in general?

Check all that apply

Please choose **all** that apply:

- ☐ More science management positions
- ☐ More science diplomacy positions
- ☐ More science councelor/science attaché positions
- ☐ More active recruiting of science diplomats
- ☐ Strengthening national science advice mechanisms
- ☐ Strengthening international science advice mechanisms
- ☐ Regular training opportunities in science diplomacy
- ☐ Other:

36. In addition to what is already available to you, what kind of knowledge resources would you benefit from?

Check all that apply

Please choose **all** that apply:

- ☐ Information about formal STI (Science, Technology and Innovation) agreements
- ☐ Information about STI cooperation between the EU and my host country
- ☐ Information about local STI activities
- ☐ Information about EU STI activities
- ☐ Information about private sector research activities in my host country
- ☐ Information about STI funding and investment in my host country
- ☐ Information about STI funding and investment in the EU
- ☐ Information about the activities of other countries (EU member states) in my host country
- ☐ Information about the activities of other countries (non-EU) in my host country
- ☐ Information about the activities of my host country in other countries (of the EU)
- ☐ Information about the activities of my host country in other countries (outside the EU)
- ☐ Information about the science stakeholder landscape (who does research where etc)
- ☐ Information about scientific findings/results
- ☐ Information about technology assessment findings/results
- ☐ More digestible scientific information
- ☐ Other:

37. Would having better access to specific stakeholders (in Brussels, EU member states, global stakeholders, etc) improve your ability to carry out your work? *

Please choose **only one** of the following:

- ○ Yes
- ○ No

38. Could you specify which stakeholders? *

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '37' (Would having better access to specific stakeholders (in Brussels, EU member states, global stakeholders, etc) improve your ability to carry out your work?)

Please write your answer here:

39. What do you feel would be the best way to get access to these stakeholders (meetings/visits, joint events, conferences, etc)? *

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '37' (Would having better access to specific stakeholders (in Brussels, EU member states, global stakeholders, etc) improve your ability to carry out your work?)

Please write your answer here:

40. Please describe a specific instance where it would have been useful to involve a specific stakeholder differently, at a different time, etc.

Please write your answer here:

Training

41. Have you ever participated in a science diplomacy training activity?

Please choose **only one** of the following:

- ○ Yes
- ○ No

42. What was most valuable for you in the training/s?

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '41' (Have you ever participated in a science diplomacy training activity?)

Please write your answer here:

43. What was missing in the training/s that should have been covered?

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '41' (Have you ever participated in a science diplomacy training activity?)

Please write your answer here:

44. What skills and information would you hope to get out of (further) science diplomacy training?

Check all that apply

Please select at least one answer

Please choose **all** that apply:

- ☐ Science diplomacy-specific negotiation skills
- ☐ Science diplomacy-specific networking skills
- ☐ Science diplomacy-specific communication skills
- ☐ Identifying and evaluating scientific truth claims
- ☐ Knowledge about the concept of science diplomacy
- ☐ General knowledge about S&T (Science and Technology)
- ☐ Knowledge about S&T in the EU
- ☐ Knowledge about international institutions (S&T-related)
- ☐ Knowledge about the relation between international relations and science
- ☐ Other:

45. What are, in your opinion, the best teaching formats and techniques for science diplomacy trainings?

Check all that apply

Please choose **all** that apply:

- ☐ Lectures and presentations
- ☐ Workshops (1-2 days)
- ☐ Workshop series (several consecutive workshops)
- ☐ Online courses
- ☐ Pairing schemes
- ☐ Rotations
- ☐ Fellowships
- ☐ Internships
- ☐ Simulations
- ☐ Science diplomacy community building
- ☐ Other:

Concluding questions

We would like to conclude this survey with a few questions regarding your overall views on science diplomacy.

46. I have a clear understanding of science diplomacy. *
1 - not at all, 5 - yes, definitely

Please choose **only one** of the following:

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

47. In my professional environment, I am considered a science diplomat. *
1 - not at all, 5 - yes, definitely

Please choose **only one** of the following:

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

48. I consider myself a science diplomat. *
1 - not at all, 5 - yes, definitely

Please choose **only one** of the following:

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

49. I use the term science diplomacy in my daily work. *
1 - not at all, 5 - regularly

Please choose **only one** of the following:

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

50. I think the term science diplomacy is helpful. *
1 - not at all, 5 - yes, definitely

Please choose **only one** of the following:

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

51. Could you please shortly explain why you consider the term helpful or not helpful?

Please write your answer here:

52. Are there ongoing changes in the field of science diplomacy that you consider significant? Please describe them.

Please write your answer here:

53. What are the upcoming issues for science diplomacy?

Please write your answer here:

Thank you for participating in this S4D4C survey!

Please help us to distribute this survey further by **forwarding the invitation email/link to your colleagues**! Thank you!

Results of our research will be made available on the project website www.s4d4c.eu. The results will be published as aggregate and anonymous data only.

We also invite you to follow us on twitter @S4D4C and to join the LinkedIn group of European science diplomacy practitioners.

Thank you for completing this survey.