

Ethical challenges at the science-policy interface: an ethical risk assessment and proposition of an ethical infrastructure

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Abstract Developing an interface between knowledge holders, stakeholders and decision makers on biodiversity issues, just as any science-policy interface, will face many challenges. In the crucial endeavour to tackle all those challenges, determining an ethical course of actions will be essential to the prestige and credibility of such an interface. The paper identifies and assesses potential ethical risks that may arise in interactions between science, society and policy and uses the Network of Knowledge (NoK) process as an example to show how an ethical infrastructure could be developed for minimizing the ethical risks and their potential consequences. Indeed, when various actors from different spheres (politics, academia, lobbyism, media, etc.) are called upon to interact within one process as complex as the NoK, the integrity and credibility of the latter are at high risk of being compromised if the ethical risks are not adequately addressed. In order to limit those risks, which science-policy interfaces such as IPCC and IPBES have already encountered, we propose to set up an ethical governance infrastructure that will guide (and regulate) interactions among internal actors of the NoK (knowledge coordination body, secretariat, expert working groups, etc.) as well as with external actors (requesters, stakeholders, etc.).

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A thorough evaluation of the interaction between the actors for every step of the process is carried out and potential ethical risks are identified. Suggestions as to how the risks can be handled and prevented are presented and integrated as part of an ethical infrastructure. The main objective of the paper is to address how a science-policy interface and the scientific community as a whole would benefit from implementing ethical measures and instruments to help prevent sensitive issues and undesired consequences undermining credibility and legitimacy.

Keywords Credibility · Ethical infrastructure · Ethical risk assessment · Legitimacy · Science-policy interface

Introduction

The Network of Knowledge (NoK) developed by the KNEU project¹ is an innovative design whose ambition is to better bridge biodiversity knowledge and decision-making in Europe (Nesshöver et al. 2016; KNEU team 2014). The project presents a concrete proposal of how the biodiversity knowledge community could organize itself to improve the capacity to respond to knowledge requests from decision makers.

Developing a Network of Knowledge at the interface between knowledge holders and decision makers on biodiversity issues faces many challenges, just as any science-policy interface does. Science-policy interfaces rely to a large extent on the perceived legitimacy and credibility of their process (Heink et al. 2015; Van den Hove 2007). However, when actors from different spheres (policy, academia, business, lobbying, media etc.) are called to interact within a process as complex as a science-policy interface—implying that their different sets of values, needs, objectives, vested interests and understandings will be confronted—the integrity and credibility of such an interface is at high risk of being challenged and the reputation of the interface affected. In such an endeavour, determining an ethical course of action is essential to prevent damages to the legitimacy and credibility of such an interface. Just as any other organization, it will take effort and time to build the NoK's reputation, but only one scandal to damage or destroy it as illustrated by the debates on the credibility of the Intergovernmental Panel on Climate Change (IPCC) (Beck et al. 2014; Hajer et al. 2012). Indeed, a lack of transparency and proper ethical standards from the IPCC, has been used in a very short period of time to feed public concerns regarding global warming as a whole. More than feeding climate change denial, those debates on IPCC also contributed to tarnish the trust in science. These discussions have further enhanced an already existing mistrust (e.g. Weible 2007) in scientific results and led to extensive review of IPCC's procedures. For this purpose an alliance of national scientific academies—the InterAcademy Council (IAC)—was set up. While its final report rejected the accusation of deliberate manipulation and concluded that the key statements contained in the IPCC reports were correct it also devised a set of recommendations aimed at strengthening the IPCC's processes and procedures so as to be better able to respond to future challenges and ensure the quality of its reports. The IPCC's website now has a dedicated page² summarizing the reforms made in response to the IAC's recommendations (Beck 2012).

¹ www.biodiversityknowledge.eu.

² http://ipcc.ch/organization/organization_review.shtml#UIE_UsWkqTV,%20see%20also%20www.ipcc.ch/apps/future, last accessed April 13th 2016.

The context in which the NoK is being implemented will therefore ask for extra measures to face huge persisting scepticisms. This can also be exemplified by the discussion around the implementation of the Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES), which faced even before their first assessment on pollination came out some debate regarding their transparency for selecting experts and for conflict of interest policy (Foucart 2014; Larigauderie 2015). Therefore the NoK will have to be vigilant and take the necessary precautions right at its start to prevent such damages.

Against this background, the assessment of ethical risks is crucial for an organisation that wishes to prosper while protecting its reputation, credibility and assets. An ethical risk can be defined as the potential undesirable consequences (for an organisation) of an unethical action carried out by a member of an organisation or the organisation itself. The Network of Knowledge will surely not be exempt of ethical risks, to the very contrary. Due to its specific dynamic structure and the sensitive nature of its activities and outputs (Nesshöver et al. 2016), the NoK needs to address and take actions against potential ethical risks that could otherwise greatly impair its credibility and reputation. Unattended ethical risks of the NoK could further result in, for example, unjustified expenses, unpopularity among knowledge holders, policy and/or society, undue influence by external parties, biased or ignored results and ultimately, ethical scandals. In fact, every responsible newborn organisation should attend to this exercise as it adds not only to its credibility and the credibility of its contributors, but can help guiding the management in its decision making and when defining objectives or recruitment of staff.

According to Bertok and Beth (2005), developing an ethical framework that builds on basic guiding values is one key to preventing and managing ethical risks and their potential damages. An ethical infrastructure needs to consist in various instruments and measures that work complementarily, as relying simple on guiding values is not sufficient for ensure a proper management of ethics (see e.g. Paine 1994; Maesschalck 2004). Consequently, this paper discusses the assessment of ethical risks and elaborates on the development of an ethical infrastructure, defined as “the institutions, systems and mechanisms” (Bertok and Beth 2005, 20) seeking to deter unethical behaviour and encourage high standards of behavior from the organisation and its members (OECD 2000), that is adapted to the NoK’s specific dynamic and context. More precisely, the paper aims to (1) introduce the NoK’s innovative approach regarding ethical issues as integral part of its design process, (2) open the debate on the need to integrate ethical issues upstream, to limit their occurrence and (3) inspire similar structures to address ethical issues within other processes at the science-policy interface. Rather than trying to identify specific ethical risks with regard to biodiversity we focus here on ethical challenges that any SPI is likely to encounter. The first section of the paper presents the method used to identify and analyse the ethical risks of the NoK. The second section details the results of the ethical risk assessment and the third section suggests ideas for the implementation of an ethical infrastructure that is adapted to the specificities of the NoK. We discuss these ideas in the fourth section and finalize by drawing some conclusions.

Methods and approach used

In the scope of this paper and as approached by the NoK, organisational ethics—or the ethics of an organisation—is understood as the behavior of the organization that is in agreement with the moral values, standards, norms and rules, accepted by the

organization's members and its stakeholders (Kolthoff 2007). From an individual point of view, an ethical behaviour—or acting with integrity—goes in accordance with the rules, norms and shared values of an organisation (Huberts 2014). Inversely, an unethical behaviour is defined as a behaviour that is either illegal or considered unacceptable and undesirable by the given organisation and society. Other than unethical behaviours, specific situations in or vulnerable activities of an organisation can also be sources of ethical risk. A lack of transparency and of regulations, high discretionary power, regular complaints, conflict of interest or misconduct at work can all pose ethical risks. Ultimately, such risks can lead to problems within the organisation or even scandals and loss of credibility and trust if not adequately addressed and resolved.

As mentioned above, an ethical risk can be triggered by either unethical actions of the organisation's individual members—including managers—or by vulnerable activities, mechanisms or procedures in the organisation's structure and/or activities, which allow for corruption to occur or to be perceived as possibly occurring. This also applies to misbehaviours of the organisation itself through, for example, weak governance structures, the treatment of its members or its decision-making processes. The level of vulnerability is mainly linked to the nature of the work in a given activity, which directly challenges the self-regulation of the organisation's members as well as management, and the type, nature and number of regulations in operation. Behavioural risks are generally regulated through rules, norms, and tools such as codes of ethics or incentives and deterred through sanctions. Structural risks, for their part, ask for regulations in the form of monitoring, verifications or audits such as a due diligence, for example. Both behavioural and structural ethical risks constitute internal risks. External ethical risks rather relate to the way the organisation treats its stakeholders and community, and how it delivers to its requesters and users. Ethical risks generally originate from either one of the main five areas of operation: financial, competition, management of personnel, environmental or societal (Loosdregt 2004, 102).

Assessing ethical risks

The assessment of ethical risks as practiced in this precise case consists of six main steps: (1) first, identify the vulnerable activities, (2) second, identify vulnerable situations and behaviors, (3) third, target the ethical risks, (4) fourth, identify the factors that amplify the risks, (5) evaluate both the probability and potential frequency of occurrence of these specific risks and, (6) identify appropriate measures to reduce the risks. In parallel, potential individual unethical behaviors such as falsifying documents and withholding information should also be identified and addressed in appropriate measures. It is important to note that the steps used for the assessment of ethical risks should be adapted to each organization and its particular set-up.

Once all of the above steps have been completed, the organisation can move forward with a plan of action for the operationalization of the measures selected for managing the identified ethical risks. The plan should take into consideration and integrate already existing measures, programs, directives and tools and take into account the available resources for its implementation. Generally, the measures for the management of ethical risks are integrated in the ethical infrastructure of the organisation.

How were the ethical risks assessed for the NoK?

As the NoK is only now being established, the assessment relies on the design proposal as developed in the KNEU project (KNEU 2014). The perception and interpretation of potential ethical risks is thus based on the authors' interpretation of what its structure and operations would entail. Furthermore, the potential ethical risks and potential measures, for the purpose of this analysis, were identified through a literature review, brainstorming and with the help of an external consulting expert. The assessment is therefore provisional and will be revised and amended during the NoK first year of activity.

The NoK has been originally designed with four functions (see Nesshöver et al. 2016). The ability to connect knowledge holders to each other and to contribute to answering requests is addressed by the Network function of the Network of Knowledge. The actual process of answering the request is addressed by Knowledge Synthesis function of the Network of Knowledge. For the purpose of this paper, we concentrated on the potential governance structure of the NoK (as described in Görg et al. 2016) and on the main two functions, which are the Network function and the Knowledge Synthesis function i.e., we analysed the potential risks linked to the potential governance structure and to the process of those two functions (See Tables 1, 2). Each function has been divided in different tasks that need to be tackled to fulfil the function. For the knowledge synthesis function, the tasks correspond to the consecutive steps described in Livoreil et al. 2016.

Different actors are involved in those two functions and in the governance of the NoK. The Knowledge Synthesis function recognises four different roles for actors involved in the process: the requesters, the knowledge coordination body members, the working group members and the evaluators (see Livoreil et al. 2016). The Network function adds another actor group, i.e. Network of networks and other stakeholders. Finally the governance part brings in the picture the Secretariat of the NoK, the formative Evaluation Body as well as the Advisory Board (see Görg et al. 2016). The involvement and interactions between those diverse actors will be influencing the risks and the way those risks will be managed.

The ethical risk assessment for the NoK was achieved by going through its process step by step. First, the main functions of the NoK as well as the coordination of the NoK process were broken into sub-tasks such as developing effective overall communication channels, setting up and management of web platform and overseeing capacities building activities for the NET function alone. Second, the NoK actors acting in each subtask were identified and listed. Third, for each subtask, actors and interaction between actors, the potential vulnerable actions or situations were identified. Potential consequences of these actions or situations were then listed. Finally, various measures to manage the identified risks were put forward. As this is an ex-ante assessment and many risks depend on the specific measures of putting a step into action, it is important to note that the lists of ethical risks, potential consequences and measures presented in this paper are not exhaustive, as more risks and consequences will certainly manifest through time and experience. This assessment is mainly intended to illustrate the possibilities of taking appropriate measures to manage potential ethical risks and that might encourage similar organisations to do the same.

Table 1 Ethical risks assessment for the Network of Knowledge on Biodiversity and Ecosystem services (NoK)

Main activities/tasks of the NoK	Short description of subtasks	NoK Actors involved	Potential ethical risks		Potential impacts on the NoK	Potential measures
			Action/situation			
Building and maintaining a network of networks (NET Function ^a)	Developing effective overall communication channels	KCB, Strategic Advisory Board, Secretariat, Network of networks and other stakeholders	Conflicts of interests	Damage to reputation, relevance, credibility and legitimacy	Broad dissemination (responsibility of stakeholders to inform their groups); feedback process; PR team	
	Setting up and management of web platform	Secretariat, Network of networks and other stakeholders	Conflicts of interests	Damage to reputation and relevance	Open call and transparent selection for IT support; public feedback process	
	Overseeing capacities building activities	Secretariat, Network of networks and other stakeholders	Bribes, conflicts of interests, favouritism, discrimination	Damage to reputation and credibility	Open catalogue of capacity building activities; broad dissemination (responsibility of stakeholders to inform their groups)	
Knowledge Synthesis Function ^a	Request selection	Requesters (e.g. EU Commission; NGOs; Countries; Citizens), Secretariat	Bribes, favouritism	Damage to reputation (appeal for rejected requests) and credibility	Double selection procedure; periodic check of the selection; record/log-book of all requests; appeal process for rejected requests	
	Dialogue to refine request	Requesters, KCB, Secretariat	Bribes, favouritism, conflict of interests	Damage to reputation and credibility	External facilitator	
	Final request	KCB, Secretariat	N/A	N/A	Mandatory double-checks of all accepted requests	
	Scoping	KCB, Scoping group, Network of networks and other stakeholders	Conflict of interests, favouritism	Damage to reputation and relevance	Public open forms for applying as experts (avoid forgetting experts)	

Table 1 continued

Main activities/tasks of the NoK	Short description of subtasks	NoK Actors involved	Potential ethical risks		Potential measures
			Action/situation	Potential impacts on the NoK	
Knowledge Synthesis Function ^a	Draft protocol	Working group, KCB, Network of networks and other stakeholders	Influence peddling of participants, conflict of interests	Damage to relevance	Public consultation; facilitation (mediation); broad dissemination (responsibility of stakeholders to inform their groups)
	Final protocol	Secretariat	N/A	Damage to reputation and credibility	Amendments; crisis management unit; broad dissemination (responsibility of stakeholders to inform their groups)
	Processing knowledge	Working group, Secretariat, KCB	Conflict of interests, misuse or manipulation of evidence or information, falsification of facts/documents	Damage to reputation and credibility	Hotline ; facilitator; formative evaluation to double check; mid-term evaluation, rules to identify and resolve conflicts of interest
	Results	Secretariat	N/A	N/A	N/A
	Review process	Reviewers, KCB, Network of networks and other stakeholders	Influence peddling	Damage to reputation, independence and credibility	Selection of reviewers; broad dissemination; mechanism for defence; logbook; PR person; strong back-up of experts
	Final report	Network of networks and other stakeholders	N/A	N/A	N/A
	Closing and Follow-up	Secretariat, Network of networks and other stakeholders	Influence peddling	Damage to reputation, independence, and credibility	Follow-up to check how the report is used

^a see KNEU 2014; Livoreil et al. (2016) and Nesshöver et al. (2016)

Table 2 Ethical risks assessment for the governance of the Network of Knowledge

Main activities/tasks of the NoK	Short description of sub-tasks	NoK Actors involved	Potential ethical risk	Potential impacts on the NoK	Potential measures
			Action/situation		
Governance of the NoK (See Görg et al. 2016)	Managing an open governance structure	KCB, Secretariat, Strategic Advisory Board	Bribes, conflicts of interests, influence peddling	Damage to reputation, credibility and legitimacy	Transparent selection of members of NoK bodies; clear rules and procedures for selection
	Accounting and Human resources management	Secretariat	Bribes, conflicts of interests, discrimination, favouritism, professional mistake or negligence	Damage to reputation, credibility and legitimacy. High employee turnover	Clear and transparent rules and procedures for job announcement and recruitment; code of ethics or conduct
	Overseeing finance (incl. seeking and managing funding bodies)	Secretariat, KCB	Bribes, conflicts of interests, discrimination, favouritism	Damage to reputation of the NoK and credibility	Complete reporting on mandated financial accounting reports; audits
	Overseeing tendering process	KCB, Secretariat, Network of networks and other stakeholders	Bribes, discrimination, favouritism, influence peddling		Broad dissemination (responsibility of stakeholders to inform their groups); public open forms to apply; log-book of all decisions; appeal process for rejected proposals
	Evaluation of the work of the NoK	Independent evaluators or formative evaluation (see Görg et al. 2016)	Conflicts of interests, influence peddling		Set up of the formative evaluation body, Standard evaluation protocols, Selection procedure for evaluators; guidelines, rules and procedures
	Adapt NoK's activities to evaluation	KCB, Strategic Advisory Board, Secretariat	Conflicts of interests, influence peddling		Disclosure of evaluation process and results; complaints and feedback process

Results

Tables 1 and 2 summarize the assessment of the NoK's ethical risks and suggest potential measures the NoK could take to prevent those risks from occurring. In the case of the analysis presented in this paper, the focus was rather put on risks that arise through the interaction of the different actors involved in the NoK process. The risks are listed according to the main tasks and subtasks they relate to.

The first column lists the three studied fields of activity within the NoK, in which we assessed the potential risks, namely (1) the NET function (i.e. building a network of networks and providing the NoK with a platform for exchange and mutual learning), (2) the knowledge synthesis function (i.e. management of the process for request-driven advice) and (3) the proposed governance of the NoK (i.e. coordination of the NoK process). The second column enumerates the related subtasks to each field of activity. In order to tailor potential measures (column 6) to ethical risks we distinguished specific subtasks for each of the NoK functions, such as “developing effective overall communication channels” or “Setting up and managing a web platform”.

In each of these subtasks, certain set of actors of the NoK (column three) as identified in Livoreil et al. (2016) will be involved. From analysing each specific activity, and which actors will be involved in each, we were able to derive specific potential ethical risks the NoK could be facing (columns 4 and 5). Potential ethical risks are divided in two columns, listing the “actions” representing problematic behaviors and the undesired “consequences” potentially resulting from these actions. Column 6 lists then different potential measures that should be implemented to manage the related ethical risks. The one in bold are considered essential (see Table 4) and the rest of the measures would be depending on the available resources.

The ethical risks encountered in our analysis (column 4) are described below.

Potential ethical risks defined

A conflict of interest occurs when an individual or an organisation is in a position to take advantage of his or its status for private or organisational gain. The individual is then confronted between two interests, most often personal versus organisational interests. A conflict of interest can either be potential, apparent or actual. Conflicts of interest can lead to various undesirable outcomes such as a KCB member or any of the experts involved working in a pharmaceutical company diverting focus of the knowledge assessment from the impact of certain chemicals. This will of course lead to biased outcomes, making results less useful or even incorrect as well as negatively affecting the reputation of the NoK.

A bribe is the undue advantage (often pecuniary) attributed to a corrupted actor in exchange for the alteration of its behavior to the benefit of the corrupting actor. Favouritism refers to the fact of favouring a person over other candidates for employment or contracts because of extraneous professional or personal ties. In the case of the NoK, conflicts of interest, bribery and favouritism can occur in the majority of subtasks mainly because the process involves different actors from various fields who might have divergent interests and because no one is entirely immune to conflict of interest.

Influence peddling refers to the use of one's influence in an organisation or connections to authority to obtain an undue benefit, while discrimination implies treating different types of people unjustly or prejudicially based on specific criteria. Finally, professional mistakes or negligence and the misuse or manipulation of evidence or information are two actions

that appear in only one function. Professional mistakes or negligence may lead to, for example, an infringement to confidentiality. The manipulation of evidence or information is the fact of intentionally creating false results or information, or altering or hiding/destroying evidence or facts to obtain a specific outcome in one's personal interest.

Actions causing potential ethical risks

The following table (Table 3) summarizes the actions causing ethical risks—as they were assessed in the studied functions of the NoK.

Conflicts of interest, bribes and favouritism are the three ethical risks that appear in all three activity domains. Influence peddling and discrimination are found in two of the three studied activity domains.

We are aware that many other actions can constitute potential ethical risks for the NoK, but because of their omnipresent nature, we did not include them in Table 3. Indeed, ethical risks resulting from individual misconduct are inherent to an organisation's activities regardless of its structure. Such ethical risks are addressed in the code of ethics, rules and directives made public by the organisation. Ethical risks resulting from an organisation's management, such as complaints, high staff turnover, disrespect of environmental and societal rules can also occur in any organisation regardless of its activities, size or structure. These risks are generally managed through specific measures such as audits, standardized procedures, sanctions or formative evaluation.

It is important to note that, although some actions have been identified in only one or two of the studied NoK's activities, they all constitute potential ethical risks that can be detrimental to the organisation well-being. Therefore, all ethical risk should need to be addressed, with no exception.

Potential impacts on the NoK and measures to counteract them

Most potential risks presented in Tables 1 and 2 can have significant detrimental effects on the NoK, mostly affecting its reputation, credibility, legitimacy and sometimes its relevance and independence.

Table 3 Summary of ethical risks that may be impeding the Network of Knowledge process

NET Function: building and maintaining a network of networks	Conflicts of interests Bribes Favouritism Discrimination
Knowledge synthesis function: Management of the process for request-driven advice	Conflicts of interests Bribes Favouritism Influence peddling Misuse or manipulation of evidence or information
Governance of the NoK: Coordination of the NoK process	Conflicts of interests Bribes Favouritism Influence peddling Discrimination Professional mistake or negligence

Various instruments and methods have been suggested to manage the ethical risks and thus prevent their potential consequences (last column of Tables 1, 2). All suggested measures should be relatively easy to implement, the main factors hindering factors being the time and resources available for their implementation. The most significant instruments and methods will be discussed in the following section.

Discussion

The ethical risk assessment presented in this paper is a first step toward the development of an ethical infrastructure that is adapted to the structure and context of the NoK. This infrastructure can serve as inspiration for any other science-policy interface. When defining specific procedures, both can also learn from the functioning of other science-policy interfaces, such as the guidelines developed by IPCC for selection procedures.

An ethical infrastructure should rest on three main building blocks, namely guidance, management and control. The guidance block provides strong leadership, statement of values such as code of ethics and professional socialisation activities such as education and training (Bertok and Beth 2005). The management block includes policies and practices that create conditions “that ensure fair and impartial selection, promotion and remuneration, as well as contribute to social respect” (Bertok and Beth 2005). Finally, the control block regroups elements such as “a legal framework; effective accountability and control mechanisms; transparency, public involvement and scrutiny” (Bertok and Beth 2005).

Each building block is composed of elements serving a specific function (Bertok and Beth 2005). These elements should be complementary, mutually reinforcing and should interact to achieve a synergy for a coherent and integrated structure. Ultimately, they should induce good behavior and manage efficiently ethical risks. A fundamental ethical infrastructure should include the following basic elements: (1) clear guiding values, (2) a code of ethics and/or conduct, (3) training programs, (4) a hotline, (5) a complaint mechanism, (6) sanctions for reprehensible acts, (7) a proper legal framework including rules and directives, and (8) a body responsible for the management of the ethical infrastructure (Bertok and Beth 2005). These basic elements are distributed into each building block as shown in Table 4.

The NoK’s ethical infrastructure will need to include all of the elements outlined above. In terms of guidance, the NoK has defined basic guiding values which are integrity, transparency, excellence, cooperation, communication and reflexivity. These values are at the core of the NoK’s code of ethics and underlie all decision making and objectives. In

Table 4 Basic elements of an ethical infrastructure

Guidance	Management	Control
Clear guiding values	Hotline	Sanctions for reprehensible acts
Code of ethics	Complaint mechanism, including investigation and follow-up	Legal framework including rules and directives
Trainings	Body for the management of the infrastructure	

turn, the code of ethics addresses these values and applies them to specific contexts and situation in order to offer guidance for decision-making. The Code also covers basic definitions, tips for the detection of conflicts of interest, a range of unethical behaviors to avoid, examples of problematic situations, as well as a guide for ethical decision making. Every new staff of the NoK will be given a printed copy of the Code on their first day and will be requested to sign a document attesting that he or she has read and acknowledged its content. Furthermore, the new staff will be trained on the practical applications of ethics, ethical decision making and the detection of conflict of interest. The staff will also be informed about the organisation's policies and measures regarding unethical behavior, sanctions as well as the ethics support network (or mentors) available for help whenever in doubt.

In terms of management, the NoK will put in place a mechanism to enable the reporting of reprehensible actions via an anonymous hotline. The hotline is available to both the public and the NoK's members. A team of permanent NoK staff will have been specifically designated and trained to manage the reports, judge if they are well-founded and consequently, decide whether an investigation process should be initiated or not. This team will be previously selected based on a fair and ethical process, and the NoK will ensure a regular turnover of its members as with other teams in the NoK. When investigations are necessary, the NoK calls upon external professionals (third party) to carry out the process. For financial reasons, the NoK is not in a position, at least for its first years of activities, to consider a full permanent external team for the management of the reports of reprehensible acts. This will be re-evaluated in the 2–3 years following the NoK first activities. Complaints, for their part, will be managed through a separate mechanism and team. The complaints can be filled by email to a specific address or by mail. The NoK's complaint team is responsible for following-up on the complaints as well as reports of reprehensible acts that did not lead to an investigation.

Finally, the infrastructure should be periodically checked evaluated and adapted to the NoK's evolving context. This implies evaluations of, for example, its performance, the ethical climate and ethical culture. Considering the dynamic nature of the NoK's structure, with different actors involved in each request, the ethical infrastructure will at least initially need to be evaluated every year and adapted when needed.

Complementary to its code of ethics, which serves mainly as guidance, the NoK will be adopting a proper set of rules and directives framing its activities and the behavior of its members. Coherently, the NoK should define appropriate sanctions for unethical behavior or reprehensible acts such as reprimand, suspension or termination of the contract or employment. The application of such sanctions when unethical behavior occurs is crucial for the organisation's coherence and credibility when it comes to ethics. The members will feel the organisation is serious and sticks to its word. This will positively influence the level of ethical behavior (Treviño and Weaver 2003) and the perception of the NoK as dealing with ethical issues adequately. In addition to sanctioning the person in charge of an error, any necessary corrections of outputs will have to be made and communicated adequately to ensure credibility is maintained.

The elements presented above represent the instruments and methods included in a basic ethical infrastructure. On top of these core elements, our analysis identified the need for additional instruments that are adapted to the NoK's processes and structure (last column of Tables 1, 2). Just as the basic elements, the additional instruments also fall into the three main building blocks (Table 5).

Table 5 Additional elements identified for the Network of Knowledge

Guidance	Management	Control
Open catalogue of capacity building activities	Ethical leadership	Mid-term evaluation
Declaration of conflict of interest (charter)	Transparent selection procedure for staff, requests, experts, reviewers and evaluators (incl. double-checks)	Audits
	Special forms for the application of experts	Public relations team (incl. crisis management unit)
	Appeal process for rejection	Broad dissemination
	Open call for recruitment	Feedback processes incl. public consultation
	Logbook of requests	Mandatory double-check of all accepted requests
	External facilitator	Follow-up of how report is used
		Transparency of all NoK's outputs (e.g. evaluation process, reports)
		Standard evaluation protocols

Elements in bold are relevant for any science-policy interface

The implementation of the ethical infrastructure

Depending on the available budget and resources, the infrastructure can be improved through the addition of further instruments and methods. This proposed framework should be assessed and evaluated throughout the implementation of the NoK and adapted based on lessons learned and resources available. There is a limit to what can be assessed at this stage of the development of the organisation.

For example, an important point, which was not addressed in our analysis due to the fact that the NoK is not yet in activity are 'legitimate or illegitimate complaints from uninvolved external public actors'. Such complaints could cause damage to the NoK's reputation and credibility if the crisis created by these complaints is not well managed. Indeed, external public actors such as politicians, citizens, lobbies or companies can complain about—or oppose to—potential consequences of a process' results or its resulting policies based on personal interests. These complaints can attract attention, bad press and constitute important risks for the NoK. Although the complaints might not necessarily address "ethical" violations, the NoK could decide to prevent such a risk by including in its infrastructure a crisis management mechanism in order to cope with such undesirable and potentially damageable events. As the risks linked to complaints might not always be related to the NoK's process and might not always be of an ethical nature, 'complaints' was not included in the table presenting the potential ethical risks.

As general recommendations and in addition to the basic elements, we identified a set of instruments and methods that any science-policy interface should adopt to support their processes. We would indeed highly recommend that any science-policy interface, no matter if it is developing or already in activity, should at least start by organizing a

declaration of conflict of interest (charter) for all their actors, set up transparent selection procedures for their members as well as procedures to ensure the transparency of all their reports. Following this first step and depending on resource availability, other basic elements of the proposed ethical infrastructure could be adapted to the specificities of any science-policy interface structure or process. One last important instrument that all science-policy interfaces should implement when they reach a certain degree of formalisation is a public relations (PR) team in charge of managing criticism, reputational crises and complaints, and of setting up feedback processes such as public consultations. The PR team could thereby contribute to improve the outputs of science-policy interfaces as well as their ownership.

Conclusions

Understandably, it is quite improbable that all potential ethical risks of an organisation can be fully tackled, mostly because of a lack of resources, whether financial or human. Therefore, a responsible organisation should prioritize the ethical risks it wants to act on by evaluating the potential gravity and probable occurrence of each risk. The organisation should also make sure it is aware of the level of risk it is ready to tolerate and the amount of resources it is ready to allocate. The ethical infrastructure we propose for the NoK builds on an analysis of the specificities of the procedures involved. Fortunately, many of the potential risks identified can be considerably reduced through ensuring full transparency. Prioritizing transparency could thus be seen as an entry point to manage important specific risks in a cost-effective way. Furthermore, the risk assessment and the development of an adapted ethical infrastructure is an exercise that all similar science-policy interfaces should undertake, as early as possible in their development. Not only will it help preventing potential undesirable damages, it will also help to gain trust from policy, stakeholders and the public. As the IPCC example illustrates damages and reactive behaviour towards them can be quite substantial and not easy to remediate (Beck 2012). Especially for new institutions that do not have a positive reputation yet, anticipatory and proactive approaches thus seem a much more effective strategy.

Although the presented ethical infrastructure still holds several challenges, it offers a step forward in the development and reflections on the integration of ethics in science-policy interfaces and will actually be further developed and eventually implemented by the new EU project EKLIPSE,³ which aims to set up a Network of Knowledge on Biodiversity and Ecosystem Services by 2020.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

³ For further information: see <http://www.eclipse-mechanism.eu>.

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