Original Article

How does the European Commission use scientific expertise? Results from a survey of scientific members of the Commission's expert committees

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Abstract Given the high levels of uncertainty and complexity of issues considered at the EU level, knowledge from sound and reliable sources of expertise is of a particular importance. To date, literature on the role of scientific knowledge and scientists in EU policy-making is relatively scarce. Furthermore, we know little about the scientists involved in EU policy-making: what attitudes do they hold regarding their contribution to policies shaped and adapted at the EU level? How do scientists perceive their role in EU policy-making? The article relies on new data from a survey of scientific members of the Commission's expert committees to gain insights into the perceptions held by scientists on how their knowledge is used: the literature on knowledge utilisation suggests that an agent can use knowledge as an instrument to increase its problem-solving capacity (instrumental knowledge utilisation), but also for more strategic purposes such as support for predetermined policy preferences (substantiating knowledge utilisation), or as a way of promoting power and influence (legitimising knowledge utilisation). The study finds that strategic uses of knowledge are not highly prominent in the process of proposal drafting. On the contrary, we find that the instrumental mode is perceived as dominant by scientific contributors. Future research need to show whether this mode of scientific knowledge utilisation is also relevant for other stages in the EU policy-making process.
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Introduction

> Scientific expertise is increasingly becoming a critical element in the design, implementation and assessment of public policies. This means that policy-makers must be able to consult the scientific community. Scientists should have an opportunity to share their concerns and knowledge. This will ensure that decisions are objective and based on sound scientific evidence. (European Commission, 2005, p. 1)

In recent decades, attention has been placed not only on the quality of EU legislation, but also on the policy-making process within which legislation is developed (Radaelli, 1999a; Richardson, 2006). The European Commission (hereafter, 'the Commission') argues that policies have become increasingly complex, leading to the EU facing growing uncertainty in fields such as social matters, human and animal health, food safety, Genetically Modified Organisms (GMOs), monetary union, and macroeconomics (European Commission, 2001, p. 19; Tosun, 2013). With the high levels of uncertainty and complexity of issues considered at the EU level, knowledge based on sound and reliable expertise is of a particular importance. Haas notes that '[…] the uncertainties associated with many modern responsibilities of international governance turn to new and different channels of advice, often with the result that international policy coordination is advanced' (1992, p. 12). Given such circumstances, policy-makers are influenced by new information and after consulting scientific communities they are able to determine policy alternatives (Weiss, 1979; Haas, 1992).

Despite the normative explanations emphasising the crucial role of (scientific) expertise in policy-making, we know little about the actual role of science and scientists involved: what attitudes do they hold regarding their contribution to policies shaped and adapted at the EU level? How do scientists perceive their role in EU policy-making? In this contribution, we analyse the perceptions of scientists regarding the extent to which the Commission uses scientific evidence, or more precisely, whether the Commission uses this knowledge in the way it is meant to be used, namely as an instrument to broaden the understanding of existing problems and to shape solutions to them. Or, on the contrary, is expertise used as a tool to advance the Commission's policy preferences or institutional powers and influence.

In this article, we seek to go beyond the existing research by systematically tapping into the use of scientific expertise across specific policy areas and Directorates General (DG) of the Commission. We report the results of a survey of more than a 100 scientists who have assisted the Commission in the preparation of legislative proposals as members of expert committees. The article draws on these new data to gain insights into the perceptions on three conceptual modes of knowledge utilisation: instrumental, substantiating and legitimising.

The recent literature on knowledge utilisation distinguishes several rationales behind EU policy-making and the use of scientific knowledge (Boswell, 2008;

Schrefler, 2010). Knowledge can be used instrumentally, meaning that scientific expertise serves as a way of vocalising the cause-and-effect of complex issues, and providing information that helps to frame a problem, fostering a collective debate and search for scientifically based solutions to existing problems (Haas, 1992, p. 2). Here, policy outcomes, for example policy initiatives, reflect results in which scientific arguments are highly influential to the consideration of policy alternatives. Scientists are consulted because policy-makers seek to advance their understanding, reduce uncertainty and approach existing problems with sound evidence at hand. Scientific expertise also can be used strategically. The strategic use of expertise in the literature is divided in two subcategories: (1) substantiating, that is the agent, in this case the Commission, seeks to promote or/and justify its predetermined policy preferences, and (2) legitimising, that is the motivation behind this mode of knowledge use is related to one's goals to increase political influence and powers as such and/or to strengthen prestige, status or reputation (Schrefler, 2010, p. 315).

The focus of this study is on scientists providing contributions that are taken up by Commission officials. We focus on scientists for two reasons. First, we assume that scientists functioning as external actors providing knowledge to policy-makers are more likely to provide honest information. Haas (1992) notes that the motives and behaviour of scientific communities are different from those who have to function under the bureaucratic constraints, that is Commission officials. Scientific communities share 'cause-and-effect' understanding, principled beliefs and a consensual knowledge base (Haas, 1992, p. 18). In contrast, the Commission official's mandate is to use scientific evidence in an instrumental way, which makes it more likely that strategic uses would be underreported. Second, given the dearth of case-transcending systematic empirical data mapping, scientists' perceptions are an important contribution to advancing the understanding of the role of knowledge in the EU policy-making process (see also the section 'Operationalising modes of knowledge utilisation').

Scientists are considered to be those who have a 'sufficiently strong claim to a body of knowledge that is valued by society' (Haas, 1992, p. 16). They use methods that are conventional to their discipline. Other actors, such as interest groups, can also provide expertise; however, their knowledge is considered to be non-scientific for the sake of this study. More particularly, we focus on so-called in-sourced experts rather than scientists directly employed by the Commission (Van Schendelen, 2003).

As we focus on Commission expert groups, we deal with the early stage of policy-making, where the Commission initiates and formulates policy proposals. This approach sheds light on the interaction patterns between the Commission and scientific communities and makes it possible to capture the underlying knowledge utilisation practices, because at this policy-making stage scientists actively participate in policy formulation and can directly observe the use of their knowledge.

To be sure, Commission proposals need to be accepted by the Council and typically also by the European Parliament and therefore proposals are often modified

in the course of legislative bargaining. At the same time, the Commission has room to manoeuvre in the agenda-setting stage. The Commission is in charge of organising not only the input from expert committees, but also the input from Member States' officials and other stakeholders. The Commission can choose a range of issues it wants to bring onto the EU agenda and how issues are framed. It can offer policy alternatives consistent with particular frames while neglecting others (Radaelli, 1995; see also Majone, 1997; Princen, 2009).

In the remainder of the article we first theorise the use of expertise in policy-making. On the basis of a brief review of the literature on knowledge utilisation in the European Union, we then conceptualise the modes of knowledge utilisation and translate these into statements amenable for large-N research. We then introduce our survey design, followed by the analysis and discussion of the survey results and the conclusion.

Theoretical Framework: Commission Use of Knowledge Neutral or Strategic?

There are a number of reasons why we can expect the Commission to use scientific knowledge as an instrument to tackle policy issues. In rational choice theory, explanations of institutional choices focus on the functions a certain institution has to perform and its influence on policy outcomes (Pollack, 1997). To explain the delegation of tasks to non-majoritarian institutions, a functionalist approach emphasises expertise that is produced by independent bodies that are separated from their creators. This delegation is justified by the need for collective actions and the necessity to resolve commitment problems, as well as the requirement to overcome information asymmetries in order to produce well-informed, long-term oriented policies at the EU level (Thatcher and Stone Sweet, 2002, p. 4). Following the functional theory of delegation, the legislators, that is the Council and the European Parliament, confer tasks to the Commission precisely because it is expected that the Commission acts in a neutral manner, that is, its behaviour is based on sound evidence rather than on competing preferences, ideologies or interests (Majone, 1996; Tallberg, 2002; Thatcher and Stone Sweet, 2002, p. 4). Member States prefer the Commission to have the agenda-setting authority because they expect 'relatively unbiased and well-informed proposals […]' (Pollack, 1997, p. 106). With the delegation of policy-making tasks to the supranational agent, that is the Commission, collective choices are expected to be based on reliable evidence.

The institutional structure of the EU follows this logic. In its role as an agenda-setter, the Commission can rely on more than a thousand expert committees that assist in initiating and formulating new legislation (Gornitzka and Sverdrup, 2011). As the Commission is arguably under-resourced and understaffed for the tasks at hand, the practical work of proposal drafting is in most cases inconceivable without

the external provision of expertise from various types of sources (Van Schendelen, 2003, p. 1; Morten, 2007, p. 150; Princen, 2011, p. 936; Haverland and Liefferink, 2012). Expert committees 'are the largest organized information system in the EU' (Gornitzka and Sverdrup, 2011, p. 50) outnumbering the two other major venues for expert advice, namely the Council Working Groups, the work horse of the Council and the Comitology Committees, where national civil servants scrutinise the Commission when it comes to delegated legislation and the implementation of policies (Eichener, 1997; Joerges and Vos, 1999; Quaglia *et al*, 2008; Gornitzka and Sverdrup, 2011). In short, the use of expertise has become a *sine qua non* for the Commission. Almost all policies that emanate from the EU are based on proposals made by the Commission.

Furthermore, the fact that the European Union and therewith the Commission deals with issues of regulation rather than issues of redistribution contributes to the Commission's autonomy. Regulatory issues are often characterised by high levels of complexity and uncertainty. Given the characteristics of the issues, mass public mobilisation is rather unlikely (Cobb and Elder, 1975: referred to in Cobb *et al*, 1976, p. 130). This opens up the opportunity for developing policy agenda relatively undisturbed inside the political system, rather than as a response to external pressures (Cobb *et al*, 1976; see also Radaelli, 1995, pp. 168–170). This argument is well summarised by Radaelli:

> Knowledge, rather than budget, is the critical resource in [regulatory, EU] policy-making, and the Commission utilizes this resource extensively. Regulatory policies aim at efficiency, rather than redistribution. This makes them suitable for discussion and negotiation in expert circles, whereas redistribution kindles the passions of politicians, political parties and mass opinion because of its impact on the class structure. (1999b, p. 759)

However, theories of delegation also emphasise that the agents who are assigned certain tasks might have different preferences from the principals who have delegated these tasks. The underlying assumption in the P-A models is that agents develop their own interests over time and they are in a position to promote these because they have the resources, that is expertise and, in particular, scientific expertise, which are crucial for modern policy-making (Majone, 1997). Hence, even though the Commission has the task and the means to use scientific evidence in a neutral way, it may actually use the scientific committees it manages and the evidence generated there strategically to advance its policy positions or institutional ambitions (Majone, 1996; Boswell, 2008; Schrefler, 2010).

Although the delegation literature, as well as the general literature on public policy-making, gives rise to the expectation that the Commission uses scientific evidence in a strategic manner, we have no systematic evidence about the extent to which this is actually the case. The need to identify broader patterns is highly advocated in recent work mapping the directions of the future research agenda on

this topic (Tosun, 2013, p. 1522). The literature on the role of expertise in EU policy-making is rich in conceptualisation but empirical research is restricted to either general information about the composition of expert groups or a few in-depth case studies tracing the use of knowledge in specific settings. However, even if scientists are indeed members of expert groups, it is not clear whether and how their input is actually used. Furthermore, even though in-depth case studies are ideally suited to trace processes of knowledge utilisation, they cannot show whether their findings are confined to their cases or hold more generally (see Haverland, 2007).

Research on the Role of Knowledge in (EU) Policy-making

There is a rich literature on the role of (scientific) knowledge in public policy-making in general and there also are studies on EU policy-making in particular (for example, Weiss, 1979, 1986, 1999; Barnes and Edge, 1982; Wittrock, 1991; Radaelli, 1995, 1999b, 2009; Herbst, 2003; Amara *et al*, 2004; Hertin *et al*, 2007; Boswell, 2008, 2009a; Brown, 2009; Haverland, 2009; Schrefler, 2010). This literature has advanced our knowledge in three ways. First, it conceptualises the use of scientific knowledge, moving beyond the simple dichotomy of the use and non-use of knowledge. The main pioneer in this respect was Carol H. Weiss (1979). On the basis of the existing literature on knowledge utilisation, she identified seven meanings ('images'/ 'models') of the use of scientific knowledge. Building on this work other authors have arrived at more parsimonious conceptualisations. Radaelli (2009) and Schrefler (2010) distinguish between an instrumental use, a symbolic use, a strategic political use, a strategic substantiating use and the non-use of scientific knowledge. Boswell (2008) arrives at an even more parsimonious typology distinguishing an instrumental use, a substantiating use and a legitimising one.

The second contribution lies in tracing the use of scientific knowledge in particular settings. Schrefler (2010) illustrates the four modes of scientific knowledge utilisation in a case study of US regulatory agencies. Boswell has analysed the use of expert knowledge by the European Commission generated through the European Migration Network (Boswell, 2008). Haverland has traced how the Dutch government has used (scientific) experts to influence EU chemicals policy (Haverland, 2009). Delfani contributes to the analysis of the role of policy bureaucrats who interact with experts by focusing on policy learning processes in the labour market policies of Denmark, the Netherlands and Sweden (Delfani, 2013).

Other studies focus on the institutional elements of knowledge utilisation. Gornitzka and Sverdrup (2011) have collected and analysed data on the composition of the 1237 Commission expert groups that existed at the beginning of 2007. Egeberg *et al* (2003) have surveyed 218 national officials from 14 Member States attending Commission expert groups and/or Council Working Group and/or Comitology Committees. This research was aimed at arriving at general features of the inner

workings of these committees but has not been particularly tailored towards the use of scientific knowledge.

Our research adds to each of the three advancements. First, we built on existing typologies of the use of scientific knowledge and operationalise these concepts into survey questions, hence making the topic amenable to large-N research. Second, we complement the case studies. Often cases are selected to illustrate how one particular mode of knowledge utilisation prevails against the others. As a result, case studies cannot provide us with a comprehensive picture of the use of knowledge in policy-making. And third, we built on large-N research of general features of the institutional venues for the provision of expertise to shed light on whether the presence of scientists in these committees translates into scientific considerations when discussing policy problems and shaping proposals to solve them.

Operationalising Modes of Knowledge Utilisation

Modes of knowledge utilisation have been conceptualised with case studies in mind. As our article uses a survey, we are confronted with challenge to 'quantify' the use of knowledge. We have taken the existing typologies as a heuristic device to arrive at our survey questions (Weiss, 1979; Radaelli, 1999b, 2009; Boswell, 2008; Schrefler, 2010). We follow the lead of Boswell and differentiate between an instrumental mode, a substantiating mode and a legitimising mode, enriching these on the basis of other literature. We also experimented with the more nuanced typologies of Radaelli (2009) and Schrefler (2010), but we felt that there is a thin line between what they call the 'symbolic mode' and the 'strategic political mode'. This has raised issues regarding conceptual independence and led to difficulties in identifying a clear-cut operationalisation of these concepts.

The instrumental mode

The first mode of knowledge utilisation represents the way scientific knowledge is normatively meant to be used: as an instrument to solve policy problems and/or increase the problem-solving capacity. Boswell (2008) and Schrefler (2010) label this mode 'instrumental' (see also Weiss, 1979; Radaelli, 2009). The motivation for instrumental knowledge utilisation might be found in the responsibilities of an actor to perform their mandate and obligations to convey outputs and specific tasks, which are set up by the political principals (Schrefler, 2010). This reasoning is rooted in the functionalist theories of delegation. Hence, the underlying principle of the instrumental use of knowledge is a type of policy-making in which the 'rational' aspect of the policy process is stressed (Caplan, 1979; Weiss, 1979; Radaelli, 2009).

Weiss elaborates: 'A problem exists and a decision has to be made, information or understanding is lacking either to generate a solution to the problem or to select among alternative solutions, research provides the missing knowledge. With the gap filled, a decision is reached' (1979, p. 427; see also Boswell, 2008, p. 474). In this case, expert knowledge constitutes the main source of arguments used to choose between policy options. Hertin *et al* note that knowledge is used instrumentally '[…] for concrete decisions in the sense of specific information to improve the design of policies and provide rational guidance' (2007, p. 6). The assumption in this reasoning is that if policy issues are identified and clearly defined, policy-makers use the best available information and analysis of what seems to work to come up with decision options and choose the most efficient solution for the problem at stake.

The following statements in the questionnaire of this study have been used to reflect this mode of knowledge utilisation:

- Scientific knowledge was used to broaden the understanding of existing issues.
- Scientific knowledge was transferred into the legislative proposal.
- Scientific knowledge was used to solve existing problems.
- Scientific knowledge was relevant for the formulation of legislative proposal.

Unlike the problem-solving approach, which is based on well-weighted and evidence-based considerations, policy outputs/outcomes reflecting strategic knowledge utilisation are rooted in the self-interests of key actors. The strategic use of expertise in the literature is divided in two subcategories: substantiating and legitimising.

The substantiating mode

Knowledge might be used to substantiate choices, which are predetermined before a consultation with scientific experts (Sabatier and Weible, 2007). Expertise is employed to support policy choices, which have already been taken (Amara *et al*, 2004; see also Haas, 2004, p. 574; Boswell, 2008; Schrefler, 2010). Policy-makers use new research only if it fits this position, or only those parts of research that do. Knowledge that coincides with policy-makers' position and preferences based on political or economic interests is employed to take decisions or to gain superiority over alternative positions (Hertin *et al*, 2007). Sometimes research is taken out of the context to make an impression of approval of the predetermined position (Weiss, 1979) or evidence is even consciously manipulated (Hertin *et al*, 2007, p. 20). According to Boswell (2009a), the substantiating use of knowledge enables the agent to gain support and approval for the choices they make when taking important decisions. In order to tap this mode of knowledge utilisation, the following statements were put to the respondents:

- Scientific knowledge was used to justify the preferred and predetermined policy choices of the DG in charge of the legislative proposal.

- I have noticed that the DG had its own position and searched for the scientific arguments in favour of its position.
- Other experts' advice was prioritised against mine mainly because their position was closer to the DG's position.
- The Commission had a clear vision on what the new policy/legislation should look like and the presence of scientists did not change this vision.

The legitimising mode

Knowledge can also be used to enhance one's position in the policy arena and to gain legitimacy and prestige in respect to other actors or institutions rather than to find a solution to a specific problem. Boswell calls this mode the 'legitimising mode' (Boswell, 2008) and Schrefler refers to the 'political' mode (Schrefler, 2010, p. 315). In this case, the agency just seeks to convince others (for example in our context, other DG of the Commission, the Council or the European Parliament) that it has competence and capacities to make highly specialised decisions (Radaelli, 1999b). It is also used to meet accountability demands in EU policy-making (cf. Majone, 1996; Boswell, 2008). The fact that knowledge is produced and maintained by the agency is more important than the actual use of the knowledge (Weiss, 1979). Scientific research findings and/or databases provide actors with 'epistemic authority' (Herbst, 2003, p. 484; see also Boswell, 2008). The DG might feel the need for such 'epistemic authority', because the Commission is a multi-lateral organisation in which they are involved in inter-departmental battles and tensions (Hix, 2005). Scientific expertise might also be used to cope with external pressure generated by legislative bargaining processes, where the Commission has to manoeuvre between the positions of the Council and the European Parliament. The following survey statements reflected this:

- Scientific knowledge was used to legitimise the decisions by proving the competences of the DG to the other European institutions (other DGs, the Council or the European Parliament).
- Scientific knowledge was used to enhance prestige and reputation of the DG, rather than to create the legislative proposal.
- The presence of scientists and their scientific knowledge was used as a tool to increase DG's powers and influence against other actors (other DGs, the Council or the European Parliament).
- I have noticed that scientific knowledge was used to respond to external pressure rather than to prepare the legislative proposal.

Given that both the substantiating and the legitimising mode constitute strategic uses of knowledge, it is important to emphasise the essential difference in the rationale for these two modes (Boswell, 2009b; Schrefler, 2010). The substantiating mode of knowledge is related to the *content* of policy solution, while the legitimising

mode is de-coupled from the content and merely serves as a tool to enhance an agent's institutional position, for example. its powers, its authority or the status of certain organisational structures. The literature on knowledge utilisation addresses this difference: 'In the case of legitimizing knowledge, an administrative agency is attempting to secure its legitimacy qua organisation. It is keen to demonstrate its capacity to mobilise resources to produce and apply knowledge. In the case of substantiating knowledge, by contrast, the aim is to garner support for a preferred course of action' (Boswell, 2009b, p. 73).

Informed by a threefold typology of modes of scientific knowledge utilisation, we have arrived at 12 statements that can be used in a large-N study.

Research Design and Method of Data Collection

An internet-based questionnaire was used to conduct the survey. We define scientific experts as scientists that work at academic institutions and possess an academic title (starting with PhD candidates onwards). Information about experts was retrieved from the Commission's register of expert groups and similar entities.[1] Note that the database is under reconstruction and therefore does not include all expert groups. The questionnaire was sent to 423 scientists who have provided their scientific knowledge in various policy areas. Data were collected from 15 April 2011 until 7 June 2011. During this period, three e-mails were sent out asking (reminding) the recipients to return the questionnaire. One hundred and twenty responses were received (response rate: 28.4 per cent). The lion's share of the survey is made up of the statements that tap into the three modes of knowledge utilisation discussed in the previous section. Scientists were asked to express their agreement or disagreement with the statements on a seven-point scale.

In order to check for the possibility of a self-selection bias, we compared the characteristics of the entire sample with the characteristics of the received responses to check the extent to which the respondents are representative in terms of gender, academic status (PhD candidates, doctors or scientists with unspecified qualifications[2]), responsible DG and the country in which they are based (see Table 1). The analysis shows that the responses largely reflect the distribution in the total sample. When it comes to the distribution across DGs, there is a slight underrepresentation of DG Research and Innovation.

Survey Results and Discussion

How does the European Commission use scientific knowledge? Is it used as an instrument to solve policy problems? Is it used to gain legitimacy and prestige vis-à-vis other actors or is it used to substantiate pre-determined choices?

Table 1: Distribution of socio-demographic attributes in the sample and responses (per cent)

	Total sample	*Responses*
Location		
Old Member State	70.2	66.7
New Member State	18.4	23.3
Non-EU based	11.3	10.0
Total	100.0	100.0
Academic status		
Doctor	17.0	13.3
PhD	1.7	2.5
Professor	29.3	32.5
Scientists with unspecified qualifications	52.0	51.7
Total	100.0	100.0
Gender		
Male	60.8	62.5
Female	39.2	37.5
Total	100.0	100.0
DGs		
Agriculture and Rural Development	8.5	11.7
Competition	0.7	0.8
Economic and Financial Affairs	3.5	2.5
Education and Culture	5.7	3.3
Employment, Social Affairs and Inclusion	28.8	30.0
Enterprise and Industry	0.9	0.8
Environment	1.4	0.8
Health and Consumers	6.6	8.3
Information Society and Media	0.2	0.8
Internal Market and Services	0.7	0.8
Justice	8.0	10.8
Maritime Affairs and Fisheries	19.4	18.3
Research and Innovation	15.4	10.8
Total	100.0	100.0

The patterns of scientific expertise utilisation

What stands out is that the vast majority of respondents agreed with statements measuring instrumental knowledge utilisation (see Table 2). Virtually all respondents agreed that 'scientific knowledge was used to broaden the understanding of existing issues' (Q1, 97 per cent).[3] Nearly 90 per cent agreed that it was 'used to solve existing problems' (Q8, 87 per cent). When it comes to the question whether knowledge actually feeds into legislative proposals, again nine out of 10 indicated that 'knowledge was relevant for the formulation of the legislative proposal' (Q10, 90 per cent).

Table 2: Agreement on various modes of scientific knowledge utilisation

Statement	*Agree* (%)	*Neither agree/nor disagree* (%)	*Disagree* (%)
Instrumental			
Q1. Scientific knowledge was used to broaden the understanding of existing issues:	97	0	3
Q6. Scientific knowledge was transferred into the legislative proposal:	82	10	8
Q8. Scientific knowledge was used to solve existing problems:	87	7	3
Q10. Scientific knowledge was relevant for the formulation of legislative proposal:	90	7	3
Substantiating			
Q2. Scientific knowledge was used to justify the preferred and predetermined policy choices of the DG in charge of the legislative proposal:	70	14	16
Q4. I have noticed that the DG had its own position and searched for the scientific arguments in favour of its position:	44	27	29
Q7. Other experts' advice was prioritised against mine mainly because their position was closer to the DG's position:	18	27	55
Q11. The Commission had a clear vision on what the new policy/legislation should look like and the presence of scientists did not change this vision:	35	12	54
Legitimising			
Q3. Scientific knowledge was used to legitimise the decisions by proving the competences of the DG to the other European institutions (other DGs, the Council or the European Parliament):	65	19	16
Q5. Scientific knowledge was used to enhance prestige and reputation of the DG, rather than to create the legislative proposal:	18	19	62
Q9. The presence of scientists and their scientific knowledge was used as a tool to increase DG's powers and influence against other actors (other DGs, the Council or the European Parliament):	42	34	24
Q12. I have noticed that scientific knowledge was used to respond to external pressure rather than to prepare the legislative proposal:	17	28	55

More than 80 per cent also agreed with the more far reaching statement that 'scientific knowledge was transferred into the legislative proposal' (Q6, 82 per cent). In sum, at least four out of five scientists agreed with any of the four statements tapping into the instrumental use of knowledge. Disagreement with any of these statements never exceeded 8 per cent. That is to say, scientists perceive themselves as key actors not only in indicating boundaries and delimiting policy options, but also in greatly influencing the actual options of policy-makers. This indicates a high potential for 'rational' EU policy-making at this early drafting stage.

What about the strategic uses of scientific knowledge? We find empirical support for the ideas that scientific knowledge is also used to substantiate predetermined choices. More than two-thirds of respondents agreed with the statement that 'scientific knowledge was used to justify preferred and predetermined choices of the DG in charge of the legislative proposal' (Q2, 70 per cent). However, there was much less agreement with the statements about more specific aspects: Q4, Q7 and Q11. When asked whether scientists have 'noticed that the DG had its own position and searched for the scientific arguments in favour of its position', fewer than half agreed (Q4, 44 per cent). Only a third agreed that 'the Commission had a clear vision on what the new policy should look like and the presence of scientists did not change this vision', and more than half disagreed (Q11, 35 per cent versus 54 per cent). This indicates that under certain circumstances, the role of scientific advice can be crucial even if policy-makers have predetermined policy alternatives in mind before consulting scientists. Under certain circumstances, policy-makers can be open to the best solution, rather than wishing to uphold their own positions. Again, it is important to note that even if experts are invited with a strategic substantiating agenda in mind, they can be successful in imposing new policy alternatives and options, which are different than those initially intended by policy-makers. The survey results clearly illustrate that scientific experts felt they were able to play a key role in transmitting new patterns of reasoning to policy-makers and directing them to new options that had not been envisioned. Also less than a fifth of respondents agreed that 'other experts' advice was prioritised against mine, mainly because their position was closer to the DG's position' (Q7, 18 per cent). Here, we observe that the scientists involved in the policy-making process perceive only minor patterns of selective use or, in other words, manipulation and abuse of scientific expertise.

The same applies to the legitimising mode of knowledge utilisation. Most scientists agreed with the general statement associated with a legitimising mode of knowledge utilisation (Q3, 65 per cent), but only a minority with the more specific statements. However, when asked to weight the relative importance of the legitimising mode vis-à-vis the instrumental mode, a majority of respondents suggested that the instrumental mode was more prominent. When given the following statement, that is Q5, 'Scientific knowledge was used to enhance prestige and reputation of the DG, *rather than* [authors' emphasis] to create the legislative proposal', almost two-thirds disagreed and only 18 per cent agreed. The same tendency can be noted with Q12, which also required the respondent to choose which aspect of scientific knowledge utilisation was more relevant, that is instrumental or strategic.

Overall the results point towards the perceived dominance of the instrumental use of knowledge: the four statements capturing the instrumental use of knowledge consistently show very high levels of agreement and when pressed to choose between statements pointing towards a more strategic use of knowledge and an instrumental use, the latter statement receives much more support. At the same time, most

scientists agreed that there are some strategic features involved as well. The two statements (Q4, Q9) received some support. Hence, for many scientists the instrumental use is dominant but it comes along with some strategic elements.

This should be good news for a functional perspective on delegation that scientific knowledge is indeed used to understand policy problems and that scientific knowledge does translate into legislative proposal. An important rationale for the delegation of tasks to 'agents' is the idea that the actors act neutrally and draw on unbiased policy expertise. This is also the official reason why many of expert committees are created and maintained and why scientific experts are outsourced. Overall, our evidence suggests that this system works as intended.

This dominance of instrumental use is, however, surprising from a principal agent perspective. As noted in the previous sections, the Commission has been granted much room to manoeuvre by its principal, the Council and increasingly the European Parliament. There are no restricting administrative procedures when it comes to the terms by which expertise should be used or to the composition of expert groups. Hence, contrary to what might be expected when a self-interested actor has much leeway, the Commission does not seem to misuse its position.

Having said this, it is import to put the results into the context of the overall process of EU policy-making. We focus on the early stage of policy-making, when topics might not yet be much politicised, in the sense that other political actors such as the Council or the European Parliament are not yet paying much attention. It may well be that at later stages the Commission will use the scientific input it has gained through its expert committee in a more strategic way. When confronted with opposition from the Council and/or the European Parliament, the Commission may tailor knowledge generated during the expert group meetings to substantiate its policy preferences or to claim epistemic authority. Future research needs to clarify whether this is the case, or whether the instrumental use of scientific knowledge remains dominant at all stages of the policy process.

Three modes of knowledge utilisation

We began this section by discussing the results for each statement. This allows for a rich and detailed analysis of our results. As the statements have been derived from the conceptual literature on modes of knowledge utilisation, it is interesting to know whether the statements actually capture the three dimensions of knowledge utilisation developed in the literature.

To test the dimensionality of the empirical data and its structural composition, the Principal Components Analysis (PCA) technique is applied (Tabachnick and Fidell, 2007). The PCA is a tool to identify the underlying patterns of knowledge utilisation in the data and to classify them according to practices existing in empirical settings (ibid, p. 607). As our conceptualisation has arrived at three modes of knowledge

utilisation (instrumental, substantiating, legitimising), we set the fixed number of factors and run statistical software (SPSS) to extract three factors.[4] The three-factor solution was preferred because of its theoretical support.

The initial results show that indeed three groups can be differentiated but that two of the 12 statements load on the 'wrong' dimension. The four statements measuring instrumental knowledge utilisation load as expected on the first component, but the first statement measuring substantiating, and the first statement measuring legitimising knowledge utilisation do as well. Three remaining statements of substantiating knowledge utilisation (Q4, Q7, Q11) load on component 2. Component 3 is loaded with the three remaining statements of legitimising knowledge utilisation (Q5, Q9, Q12). By searching for explanations why two statements did not confirm to our expectations, we conclude that the first three statements of each mode (Q1 – instrumental, Q2 – substantiating, Q3 – legitimising) are formulated in a rather general way. They all received a higher acceptance rate compared with other statements within the group. The words used in these statements have a broad meaning, that is they are not as specific and concrete as the other statements in each group. For example, the phrases 'legitimise the decisions', 'justify predetermined policy choices' and 'broaden the understanding of existing issue' are rather abstract statements and contain theoretical concepts, for example to legitimise, which can be confusing to the respondents. It is this communality between Q1–3 that leads to them loading on the same factor. We conclude that even though these statements are theoretically relevant, the operationalisation is not explicit enough.

In a second step, we dropped the first three statements of each mode. We ran the PCA again with the remaining nine statements, which explain 66 per cent of the variance. The initial eigenvalues show that the first factor explains 33.6 per cent of the variance, the second factor 22.9 per cent and the third 9.3 per cent (see Table A1 in Appendix 1: Statistics). The results show that the theoretically defined concepts can be reduced to three groups. The group labels (instrumental, substantiating and legitimising) proposed in the literature on knowledge utilisation fit the extracted components. That is, three groups of statements loaded on the three different components. Statistical results allow us to conclude that the threefold typology is empirically valid and statements measuring each mode are reliable and have an internal consistency. This is also supported by the Cronbach's α score, that is equal to or higher than 0.70 in each of three groups (see Table A2 in Appendix 1: Statistics).

We should not, however, overlook that the eigenvalues show that the third component has obtained less than 1.00 value (0.84) meaning that it is accounting for less variance than had been contributed by one variable (Tabachnick and Fidell, 2007, pp. 644–646). Components with eigenvalues less than 1.00 are viewed as less significant. Therefore, it is still necessary to test the instrument with new datasets to arrive at more robust conclusions.

Conclusion

This article contributes to the debate on the role of scientific expertise in European Union policy-making, a query that is particularly relevant in the case of the Commission's exclusive responsibility and duty to initiate proposals and put them forward onto the EU agenda. When it comes to the European Union, the existing literature is strong on conceptualisation and there are studies that focus on institutional elements, such as the composition of expert groups. Also a few case studies trace the use of scientific knowledge regarding particular issues in particular settings. We contribute to this literature with a large-N study in which we surveyed more than a 100 scientists who had participated in the Commission expert groups about how their knowledge was used by the Commission. The survey suggests that the instrumental use of knowledge is dominant. Scientific expertise is used to broaden the understanding of existing issues and to solve policy problems. Scientific expertise does translate into Commission's proposals. At the same time, many scientists agreed that there are also other modes of using scientific knowledge. The knowledge is also used to substantiate decisions already taken or to demonstrate competence vis-à-vis other actors. Yet, when asked questions relating to the relative importance of the instrumental use of knowledge and more strategic uses, most respondents felt that the instrumental use was dominant. In the majority of investigated cases, non-scientific uses play a role as well but not as important as scientific ones.

This result is good news for a functional theory of delegation. The Commission predominantly acts in the way it is intended to act when it comes to scientific input. It uses expertise to create sound policies. The dominance of the instrumental use of knowledge is surprising from a principal agent perspective. Given the fact that the Commission has much leeway in the use of scientific knowledge, one might have expected more deviation and a more strategic use of knowledge.

One needs to keep in mind that the research is restricted to the perspective of the scientists and that it focuses on the early stage of the EU policy process. It may well be that the Commission uses knowledge more strategically when the pressure rises in the negotiations with the Council and the European Parliament. Future research will need to show whether the dominance of the instrumental use of knowledge is specific to the first stage of policy-making or holds more generally.

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Notes

1 European Commission, 'Register of Commission expert groups and other similar entities'. *Source*: http://ec.europa.eu/transparency/regexpert/. Note that the Commission's expert group register does not provide contact information. However, full name, surname, field, academic status and so on are indicated in most cases, and further contact information was provided by the scientists on the internet.

2 The data provided by the Commission regarding the academic status of the members of Commission committees are not consistent. In some cases, the academic degree or title (PhD, Dr, Prof) was provided, in other cases it was indicated that experts are 'scientists' without further specification.

3 The seven-point scale: 1 meaning that you *strongly agree*, 2 – *moderately agree*, 3 – *slightly agree*, 4 – *neutral/neither agree nor disagree*, 5 – *slightly disagree*, 6 – *moderately disagree*, 7 – *strongly disagree*. For the presentation purposes the seven-point scale is collapsed into 'agree', 'neither agree/nor disagree', or 'disagree'. By recoding the seven-point scale into the three-point scale, the general trends of the responses become clearer.

4 The protocol adopted here for factor analysis is to use the setting PCA and rotate the matrix of loadings to obtain orthogonal (independent) factors (Varimax rotation) of the 12 seven-point scale statements.

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Appendix

Table A1: Factor loadings and communalities based on a Principal Component Analysis with varimax rotation[a] for nine statements measuring three modes of knowledge utilisation (120)

Component	*1*	*2*	*3*
Q6 Instrumental	**0.83**	0.12	–0.14
Q8 Instrumental	**0.80**	–0.16	–0.01
Q10 Instrumental	**0.80**	–0.06	0.17
Q4 Substantiating	0.02	**0.77**	0.16
Q7 Substantiating	–0.02	**0.77**	0.05
Q11 Substantiating	–0.07	**0.65**	0.24
Q5 Legitimising	–0.10	0.57	**0.57**
Q9 Legitimising	0.22	0.12	**0.86**
Q12 Legitimising	–0.29	0.45	**0.64**
Eigenvalues	3.02	2.06	0.84
Percentage of total variance	33.55	22.87	9.31
Number of test measures	3	3	3

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
[a]Rotation converged in five iterations.

Table A2: Descriptive statistics for the three modes of knowledge utilisation

	No of items	*M (SD)*	*Skewness*	*Kurtosis*	*Cronbach's α*
Instrumental	3	2.40 (1.22)	1.50	1.82	0.75
Substantiating	3	4.37 (1.70)	–0.11	–0.85	0.70
Legitimising	3	4.56 (1.68)	–0.27	–0.54	0.72