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Crossing Borders

How public should science be?

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Crossing Borders

How public should science be?

Especially in crisis situations (such as the current COVID-19 pandemic) and for important proposed reforms, there is a growing public demand for scientific advice. This is often associated with expectations that researchers cannot always meet. Conversely, the conditions for science communication and scientific policy advice have changed considerably in recent decades. For example, both the new opportunities and the risks of digital media are becoming clear. This publication discusses how the relationship between science, politics and the public can be re-explored.

Since the outbreak of the COVID-19 pandemic, the question of what role science should play in political discourse has moved into the focus of public interest with unprecedented vehemence. In addition to governments directly consulting individual virologists or (epidemiological) research institutes, major scientific institutions such as the German National Academy of Sciences Leopoldina[1] and the presidents of four non-university research organisations[2] have actively participated in the discussion by providing recommendations.[3] More than ever before, scientific problem descriptions, data and evaluations are influencing political measures. It seems as if the relationship between science, politics and the public is currently being reassessed.

The current crisis situation has not created a new phenomenon but has only reinforced the trend of mutual reliance between science, politics and the public, which has been observed for some time. Decision-makers in the political arena and in business were already looking for ways to better substantiate and legitimise their decisions through external scientific expertise when faced with major societal challenges, for example when trying to deal with increasing immigration, climate protection and when preparing for far-reaching reforms (e.g. of the labour market or the pension system) or in economic crises. Research is also held in high esteem within society. The special edition of the 'Science Barometer' was able to demonstrate in the surveys an increased trust in science in the case of the current COVID-19 pandemic.[4] Conversely, scientists have always been and continue to be active in the public sphere. For some time now, research experts have frequently been guests on talk shows. Authors from the field of science often write opinion pieces and guest contributions in daily newspapers and magazines.

However, this role of research is by no means uncontroversial. If scientists are prominently represented in the media, this always arouses criticism of their supposed 'opinion influencer' status. Scientific advisory activities, especially where they are not transparent, raise the question of the permissibility of such influence in democratic decision-making processes and the limits and modes of scientific policy advice. Particularly in politically sensitive situations, it is evident that scientists in the political arena operate in an environment with unwritten rules they are not familiar with. Sometimes they find themselves caught between two fronts: Either their advice is used by the parties to legitimise their own position or, conversely, is dismissed as partisan or unsubstantiated and, in the worst case, damages their academic reputation. Attacks on unpopular scientific results or the scientific institutions that support the researchers are increasing in almost all countries. Populist and conspiracy theory movements sometimes display an open and even proud aversion to science. Internationally recognised scientists who try to give expert advice in a crisis complain about a growing aggressiveness of attacks directed towards them, which do not even stop at personal insults.[5] It seems that these scientists are paying a price for being increasingly close to the political arena.

A Current Discussion - Even Before COVID-19

A readjustment of the relationship between science, politics and society was on the agenda long before the COVID-19 pandemic began. Experts from poli-

tics, science, media and civil society discussed this topic under the title 'Crossing Borders: How public should science be?' at two events organised in September 2019 and January 2020 by the German National Academy of Sciences Leopoldina, the Institute for Advanced Sustainability Studies and the European research network Population Europe.[6] Close to the same time, leading representatives from research and science policy in Berlin debated the public role of science in a series of opinion pieces in *Tagesspiegel.*[7] The topic also received a high level of attention in the political sphere at the federal level, with the focus on the full range of science communication. This can be seen, for example, in a policy paper issued by the German Federal Ministry for Education and Research in November 2019,[8] in which the heads of the ministry set a clear focus, as well as in a motion submitted by the coalition parties in December 2019.[9] This was followed by a motion by the Free Democratic Party (FDP) in March 2020[10] and a motion by the Greens (Bündnis 90/Die Grünen) in June 2020.[11] The public expert discussion on 'Science Communication' held on 27 May 2020 in connection with the deliberations of the Bundestag Committee on Education, Research and Technology Assessment has further deepened other aspects of this topic.[12]

These documents reflect a high expectation of the problem-solving capacity and innovative power of research. At the same time, however, they are also based on the assessment that the relationship between science and society urgently needs to be further developed. Moreover, the COVID-19 pandemic has fuelled media coverage and scientific work on the topic.[13]

With the Voice of Science

In essence, this is about a well-known topic. Already in 1999, the Stifterverband's memorandum on the 'Public Understanding of Sciences and Humanities', together with the major science organisations, had provided significant impetus.[14] Individual academic disciplines, such as political theory, philosophy of science, sociology of science, history of science or communication sciences, have already dealt in the past intensively with the relationship between science, politics and the public. Some science institutions have adopted guidelines on science communication and policy advice after thorough discussions in research groups or specifically established commissions. In addition to funding top-level research, the 'universities of excellence' in Berlin, Bonn, Karlsruhe, Constance and Munich explicitly mention dialogue with society as an important goal of their excellence projects. In the new version of the 'Pact for Research and Innovation' of the Federal Government and the German states, which enters into force in 2021, the transfer from science to industry and society is one of the central objectives. Does this mean that the relationship between science, politics and the public really needs to be reassessed?

Indeed, the area in which science, the public and politics interact is not uncharted territory that needs to be explored. 'Public science' and 'Open Science' have long since become standing terms in the science policy debate. The requirement to make the results of publicly funded research available to all interested parties as early and freely as possible is increasingly becoming a natural part of both public and private research funding ('Open Access').

In addition, university and research institutions have greatly expanded public relations work in recent decades. With associations and networks, events and postgraduate courses, a highly professional infrastructure in the field of science communication now exists. Today, almost all science institutions use a wide repertoire of innovative formats which are constantly being adapted to new viewing and learning habits of a wide range of target groups.

Pluralisation of Knowledge

However, especially since the triumph of social media more than ten years ago, a new quality of media work has emerged. Alongside professional journalistic research, a plurality of perspectives has emerged on the internet. This represents an increase in possible perspectives and is, in this respect, an enrichment. However, this diversity can often hardly be filtered by users according to its truthfulness and the author's motives that are outside of scientific interest. Whereas in the past an editorial office with its good name stood for the reliability of content, today read-

ers are often left alone to judge whether a source on the internet is trustworthy. Where information is primarily sorted according to visibility rather than content, and the number of 'likes' and 'clicks' can be more decisive than the frequency of being cited in assessing the relevance of an article, this trend is intensifying. The phenomena of closed echo chambers and the systematic fading out of other points of view are now well described. In addition, classical science journalism has come under economic pressure due to the internet-based dissemination of information and is thus increasingly restricted in its ability to work and its reach.

The scientific world is also not free from such mechanisms. Disagreements among scientists have been public from the beginning, and in this environment, attention has always been attracted to alarming news, exaggerated formulations, sweeping judgements and 'science scandals'. In today's media world, however, such points of view can be communicated to an international readership in real time without prior quality control and with a reach – depending on the topic – that can far exceed the circulation levels of a newspaper or a scientific publication. Institutional science communication is also characterised by the mechanisms outlined above: Today it must act quicker, more directly and more concise. In recent years, this topic has been addressed by various statements, for example by the working groups 'Science, Public and the Media' (WÖM) of the German National Academies of Sciences Leopoldina[15] or the Siggen Circle.[16]

In Dialogue with Politicians

Engagement in political consulting and policy dialogue is another demand that is increasingly being made of researchers, and this is also not a new development. Many scientists are active in relevant advisory boards, commissions, working committees, expert discussions and hearings or take part in panel discussions together with representatives from politics, business and society. The statutes of many academies and science organisations stipulate political consulting as a core institutional task.

But here too, expectations of science have recently increased considerably. It is no longer just a matter for individual representatives of research to actively participate in the policy arena on their own free will. Rather, scientists and scholars are now almost expected to explain, for example, the social and political relevance and 'impact' of their research when applying for funding. This can sometimes go so far that the criterion for successful outreach of a scientific project is expected to be proof of the research results' direct impact of on politics, the economy and society.

In addition: Not just since 'Fridays for Future' have there been calls for experts from the field of science to take a clearer stand on the major issues facing our society in the future and to participate in corresponding political statements of intent. This also has a long tradition, for example in the active participation of prominent scientists in the environmental, peace and anti-nuclear movements of recent decades. It is not uncommon for the public perception to blur the boundaries between the statements of scientists as individuals and as representatives of their academic institution, their subject or even 'science' itself.

Between Detection and Application

Particularly in application-oriented research areas, the exchange with societal actors in both directions is actually fundamental because it allows research to be geared towards needs and both the social and technological innovations can be developed and tested in joint dialogue and experimental spaces ('real-world laboratories'). The concept of Responsible Research and Innovation (RRI) also claims to subject research to social evaluation not only in its tasks and results but also to reflect the effects of research on society from the outset in the research process, for example in procedures, models and quality controls. The spectrum of new approaches here ranges from the trans-disciplinary involvement of stakeholders at the design stage of research projects to the attempt to have scientific research also evaluated by non-experts ('extended peer review'). The idea of 'Citizen Science' is also currently discussed a great deal, which tries to involve non-scientists in the research process in various disciplines, for example in the collection of data. Such new approaches have inherent

limitations and, in particular, do not or only to a limited extent affect classical basic research in many disciplines. In contrast, interdisciplinary sustainability research is an example of how research simultaneously takes up many such approaches in order to specifically support the transformation of society towards sustainability ('transformative research'). In such research approaches or in such an understanding of science, science communication also plays a completely different role than that which has been widespread up to now, because it is more strongly oriented towards mutual exchange.

The Pressure on Researchers is Growing

As seen above, there is a great opportunity on the expectation horizon. Scientists can make an important contribution to solving major societal challenges and exert their technical and methodological competence in shaping our future. This contributes to the social significance of 'science as a profession' and ultimately also to the willingness of the public sector to adequately fund research budgets even in times of dwindling public resources. While this does not make science a 'fifth estate' in democracy (and should not become one for lack of democratic legitimacy), it can certainly play the role of a critical voice in political decision-making alongside journalism (as it already did in the climate debate and during the COVID-19 pandemic).

However, the new public role of science also poses problems. On the one hand, new job profiles must be presented to scientists in a balanced manner in order to not overburden them. Already today, the workload resulting from growing obligations to teach, supervise young researchers and tasks related to academic administration, fundraising and preparing for evaluations is increasingly affecting the research process. So how can one create more time to engage with the public, improve communication skills and establish a culture of appreciation for science communication? Finally, can the media presence of researchers outside of science also increase their visibility within their own discipline? This idea is still relatively uncommon in Germany compared to the U.S.

On the other hand, there are also 'systemic' reasons for scientists being more resilient in the face of public demands. The cardinal virtues of a researcher are the inclusion of as much information as possible relevant to his or her research question, the discussion of the state of the field, the thorough weighing of contradictory findings, the questioning of supposed certainties, the formulation of hypotheses and their critical examination in exchange with experts at international conferences, in peer reviews of publications or assessments. The requirements in science communication, however, are different: they are determined by shorter publication rhythms, a larger proportion of visual and graphic information, and the need for texts that are as short and simply formulated as possible.

Policy advice is also not science in itself. Its conditions, rules and risks are of a very specific nature. Varying individual interests and abilities do not speak in favour of demanding a public or political role from every scientist with no exception. Moreover: What is the relationship between individual opinions expressed by scientists and the positions of institutions and organisations? This problem area also became evident during the COVID-19 pandemic.

In the end, it must always be taken into account that even renowned researchers are subject to misjudgements or may deliver incomplete or incorrect results. This is especially true when they have to make decisions about highly complex social problems based on a disparate state of the field and uncertainty or when they have to make a judgement based on a selective disciplinary perspective. The 'self-regulatory mechanisms' of the science system can also reach their limits, as was made clear, for example, in connection with the so-called 'reproduction crisis', when peer review procedures are overloaded or, in the worst case, the publication of a study's results that do not fit into the prevailing picture is prevented.

Recommendations

Further professionalisation of science communication

The efforts to professionalise science communication,

which have been pursued for many years, should be further expanded.[17] Professionally trained science communicators and suitably equipped institutions can organise the necessary processes in a time and cost-efficient manner and thus relieve researchers and teachers of demands on their time and advise them in their appearances.

However, science communication must not be overburdened. It can only perform a mediating function, especially where the knowledge base is already secure. For complex and particularly controversial research questions, it needs the overview and detailed knowledge of the scientists. For this reason, researchers should continue to be empowered and encouraged to have an impact on society. Targeted support includes students from all subjects participating in relevant seminars; later in their academic career, within the context of graduate schools and thereafter, students should have the opportunity to gain practical experience in presenting their own research to society and to participate in media training. Universities and research institutions could enable researchers to spend a practical sabbatical year in business, politics or at cultural or civil society organisations, and vice versa. Above all, the involvement of researchers in science communication should be more widely recognised in the evaluation mechanisms of science (e.g. in appointment procedures).

Policy information instead of policy making

Scientific consulting services can and must contribute to providing decision-makers in politics, business and society with a balanced picture of the facts and forecast further developments to the extent that this is possible based on current knowledge and methods. Using this knowledge, scientists can also assess with a certain degree of probability what consequences individual interventions by politicians could have. On this basis, policy recommendations can also be made – especially since researchers do not expect that a recommendation has to be followed. The idea that scientists should help shape political decisions would neither do justice to the self-image of research nor would there be sufficient legitimacy within democratic theory for this.

One should not, however, be naïve in understanding the influence of science either because even an advisory activity limited to the provision of scientific evidence usually means at least an implicit recommendation for action. The political preferences and individual experiences of the scientists involved are also reflected in the advising. Even with the best intentions, the boundaries between scientific advice and problematic influence on decisions can become blurred, whether intentionally or not. Scientists must always be aware of these boundaries. As the critical comments on scientific advice during the COVID-19 pandemic have shown, they will have to clarify their value assumptions and their non-scientific preferences in public debates. Societal actors are also increasingly demanding transparency – and rightly so – from researchers as to how they arrived at a certain recommendation.

Dialogue formats can be an important instrument already during the scientific development process for taking into account the multi-dimensionality of political decision-making and scientific knowledge processes, for revealing one's own foundations and for achieving an exchange of knowledge in which both sides can benefit from each other – the 'practice' with the goal of 'evidence-informed policy making'; science with a view to aspects not yet sufficiently considered in the research design to date or to new research questions to be posed. In this sense, scientific policy advice should not be misunderstood as a 'one-way street' for communication in which there is only a transfer of knowledge from research to practice, but as a process of mutual learning.

In any case, in light of the growing demands on research, a discussion on the permissible scope of scientific policy advice is needed. The already existing guidelines of individual organisations and the scientific literature on this subject area provide important impulses in this respect. It is important to further advance and deepen the debate on these aspects that has been conducted since the beginning of the year and during the COVID-19 pandemic, and to further expand international comparative research on scientific policy advice in Germany.

Quality offensive instead of banalisation of knowledge

How are scientific enlightenment and evidence-informed policy advice possible under the conditions

of growing differentiation and multiplication of communicative acts as we experience them in the digitalised world? How can consumers 'separate the wheat from the chaff' among the multitude of information available on the Internet today, which are recognised as serious and methodologically sound scientific offerings?

A gatekeeping institution controlling the 'Experts' label makes little sense, because such a claim to exclusivity is foreign to science. Even outstanding experts of a subject have to prove themselves again and again in their own field. In view of today's inflationary use of the 'Expert' attribution, it should be a minimum requirement that those who self-proclaim scientific expertise are sufficiently qualified for their work. Therefore, research institutions should be more assertive in pointing out how to become qualified as a professional scientist, which in some cases involves training that can span over a decade and then undergoing constant internal quality control in peer-reviewed publications and presentations. This is not about opinion control, but about making it clear to the consumer whether an offer referred to as 'research' or 'research institute' really involves qualified scientists. In this way, internet users cannot only be better protected against fraudulent labelling, but it can also put a stop to those who pursue a populist agenda and embellish it as 'research'.

Furthermore, it is also a matter of imparting scientific media competence more strongly in schools and training institutions and making material available for this purpose from the science community (e.g. catalogues of criteria for evaluating 'scientific contributions'). More investment should be made in the establishment of facilities that help to sort, evaluate and prepare scientific offerings, for example in systematic reviews, as is customary in medicine, or in regularly published overviews of topics, provided that the authors have a complete overview of the state of the field on their topic. The work of the international research network Cochrane or the Science Media Center is a successful example in this respect.

Popularisation of knowledge through education

In addition, more interfaces between the general education of adults and science should be developed in order to transfer the dynamics of research from higher education to curricula and institutions of lifelong learning. This will require more professional providers and educators with a scientific background. We should have a broad understanding of professorships to incorporate those who want to acquire the teaching competence for lifelong learning and no longer want to only be active in research. Efforts should also be stepped up to permanently enrich the didactics of higher education teaching and the institutions of lifelong learning with offers available online and thus connect them with each other. This would create the opportunity to prepare these offers for target groups other than course participants. Further examples are cooperations between universities and adult education centres (for example in Hanover and Vienna). The field of 'Citizen Science' also offers very good starting points for transfer and dialogue.

A further professionalization of science communication and competence development in society at large and over the entire life span could go hand in hand. A general education enriched in this way ultimately strengthens the culture of discourse in a democracy – which in turn limits the ability of those who abuse the possibilities of the modern media for their propaganda.

Setting boundaries, overcoming boundaries

Science institutions should invest in professional science communication, policy consulting and policy information and provide appropriate internal training and advice. Scientists need support and recognition of their commitment at the intersection of politics and society.

At the same time, however, it is also necessary to defend the freedom necessary for research again and again. The importance of such free spaces as places where new research approaches are conceived and tested, far removed from public considerations and the rationality of the market, cannot be overemphasised for the innovative capacity of Germany as a research location.

The critical function of science requires researchers to keep a certain distance from society, while also directly engaging with it in order to constantly develop the sense of a future that is to be shaped to-

gether. The discussion about where exactly the fine line runs between the urgently needed social commitment of scientists and the freedom necessary for good research should be reopened against the background of growing public demands. ■

Footnotes

1. Ad hoc opinions on the coronavirus pandemic (21 March 2020, 3 April 2020, 13 April 2020, 27 May 2020, 5 August 2020).

2. Strategies to contain the COVID-19 pandemic. A statement by the presidents of the non-university research organisations based on mathematical analyses of the data situation (28.4.2020).

3. Recommendations from the perspective of educational science and educational practice were published by the Friedrich Ebert Foundation at the end of May 2020: School in times of pandemic - Recommendations for the design of the school year 2020/21 (28.5.2020).

4. Science Barometer Corona Special. Science in dialogue: Berlin (April and May 2020).

5. At the peak of the Corona crisis, the virologist Christian Drosten reported receiving death threats (Guardian, 26.4.2020). In the USA, the virologist Anthony S. Fauci received personal protection (Washington Post, 2.4.2020).

6. The materials for the series of events can be downloaded from https://population-europe.eu/policy-insights/workshop-discussion-how-should-scientific-community-behave-controversial-political or https://www.leopoldina.org/veranstaltungen/veranstaltung/event/2772/.

7. The individual contributions by Christian Thomsen (10.10.2019), Jürgen Renn (16.10.2019), Barbara Stollberg-Rilinger (3.11.2019), Peter-André Alt (13.11.2019), Ernst Dieter Rossmann (15.11.2019), Jürgen Kocka (2.10.2019), Jutta Allmendinger / Harald Wilkoszewski (2.10.2019) and Jürgen Zöllner (2.1.2020). See also Reinhard Hüttl, Wissenschaft muss sich erklären", duz (7/2020) as well as events on this complex of topics, such as the ZEIT Forum Wissenschaft "Vom Lob und Fluch des Zweifel - Wann wissen wir, was wahr ist? (5 November 2019), the conference "Wissenschaft in Verantwortung" (Science in Responsibility) of the Friedrich Ebert Foundation (21 November 2019, conference proceedings to be published in autumn 2020) or the event "Cha(lle)nging Perspectives" of the Young Academy (19 August 2020).

8. Policy paper of the Federal Ministry of Education and Research on science communication. Berlin/Bonn: Federal Ministry of Education and Research, November 2019.

9. Motion by the CDU/CSU and SPD parliamentary groups "Strengthening science communication - securing structures, creating new opportunities", 17 December 2019, German Bundestag, Printed Paper 19/16044.

10. Motion by the FDP parliamentary group "Real science communication - credible and participatory", 3.3.2020, German Bundestag, Printed Paper 19/17517.

11. Motion by the Bündnis 90/Die Grünen parliamentary group "Science in dialogue with society - comprehensively strengthening science communication and science journalism", 16.6.2020, German Bundestag, Printed Paper 19/20041.

12. The statements of the experts Peter-André Alt (German Rectors' Conference), Antje Boetius (Alfred Wegener Institute / Science in Dialogue), Stefan Brandt (Futurium), Nicola Kuhrt (Science Press Conference), Beatrice Lugger (National Institute for Science Communication), Steffi Ober (NABU - Nature and Biodiversity Conservation Union Germany), Volker Stollorz (Science Media Center) and Jan-Martin Wiarda (journalist): German Bundestag, Committee Printed Paper 19(18)192.

13. Molthagen-Schnöring, Stefanie. "Science Communication - Impulses in Times of the Corona Crisis", in: E-Paper of the Friedrich-Ebert-Stiftung, March 2020. Also published by the FES E-Paper by Ernst Dieter Rossmann ("Science communication after the crisis - a political assessment") and Jan-Martin Wiarda ("Corona: Opportunity window for science journalism?").

14. Stifterverbandes. *Dialog Wissenschaft und Gesellschaft.* https://www.stifterverband.org/ueber-uns/geschichte-des-stifterverbandes/push-memorandum

15. Deutsche Akademie der Naturforscher Leopoldina e. V. *Zum Verhältnis zwischen Wissenschaft, Öffentlichkeit und Medien*. https://www.leopoldina.org/politikberatung/arbeitsgruppen/abgeschlossene-arbeitsgruppen/wissenschaft-oeffentlichkeit-medien/fentlichkeit-medien/

16. The Siggener Kreis is a think tank on the future of science communication https://www.wissenschaft-im-dialog.de/projekte/siggener-kreis/.

17. See Matthias Mayer / Friederike Schneider, Bedingt dialogbereit, FAZ v. 2.9.2020.

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