

Public Hearing as a Tool for the Co-production of Science and Society

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Mapping concepts, forms and practices of public participation
in science and technology

AMULET – **ADVANCED MULTISCALE MATERIALS FOR KEY ENABLING TECHNOLOGIES**



SUMMARY OF THE LITERATURE REVIEW

About Project

The AMULET project focuses on advanced engineering of multiscale materials from subnanometer design to integration into functional architectures for use in numerous applications in electrical, medical and environmental technologies, including socio-economic impact assessment. These are Key Enabling Technologies (KETs), which are essential for EU competitiveness. Cross-disciplinary excellent research is carried out by a world-class team benefiting from extensive international synergies.

OBJECTIVES OF THE PROJECT

1

To develop new applications in medicine and bio/nanotechnology by studying the interaction of biomolecules with industrially relevant advanced materials

2

Development and implementation of new sensing concepts and platforms using 2D materials

3

Development and implementation of catalytic photo(electro)chemical and chemical heterogeneous processes in gas and liquid phase for the removal of toxic substances and conversion of selected raw materials into value-added products

4

Development and implementation of hierarchical heterostructures and devices for flexible electronics, optoelectronics and mixed concepts for energy conversion and storage.

The summary of the literature review “Public Hearing as a Tool for the Co-production of Science and Society” explores the evolution of ideas, realities and forms of public participation in decision-making about science and new technologies in the European Union (EU) from the late 1990s to the present. The term “co-production of science and society” in the document’s title refers to the notion of co-production (Jasanoff, 2004), which offers a framework for understanding how science and society are inherently entangled and simultaneously (re)constituted.

The first part of the study traces the development of debates on public participation in science and research decision-making in the EU, using examples of debates on genetically modified organisms, nanotechnology, synthetic biology and artificial intelligence. Each section presents

1. a brief context;
2. selected case studies - with background information on the concepts involved in responsible research, social and ethical issues, and specific forms of public engagement; and
3. critical reflection and the formulation of challenges that serve to illustrate the arguments that have driven the notion of public engagement in the EU towards the concept of open science.

The concept of open science in the EU is discussed in detail in the second part of the document. The third part contains selected methods of public hearings that can serve as inspiration for the AMULET project.



Part 1:

The evolution of public engagement in science and technology decision-making in the EU

Chapter 1:

Genetically modified organisms (GMOs)

- (1) Since their introduction to the market in the 1990s, GMOs have been met with public opposition due to concerns about environmental and health risks. Public opposition has also reinforced the so-called **deficit model** of the public. The deficit model has manifested itself as a tendency for governments to react negatively to public discontent primarily by linking it to citizens' ignorance and the need for (re)education.
- (2) However, the social sciences have shown that lay people can meaningfully engage in discussions about science and technology. In this context, a model of **deliberative democracy** has emerged, whereby public involvement in science and technology decision-making involves direct discussion with and involvement of citizens in science and technology decision-making.
- (3) Nevertheless, the deliberative model is often criticised for taking little account of external factors that are at odds with the idealised image of free decision-making on a more equal basis. Moreover, the enthusiastic support for grassroots participation by political elites in some Western European countries has raised the question of whether the initiatives are really intended to promote public participation or whether they are more of a form of political marketing and persuasion. In most countries and ca-

ses, public engagement initiatives on GMOs have remained separate from the formal decision-making process.

Chapter 2:

Nanotechnology (NT)

- (1) In the case of NT, stakeholders such as politicians, businessmen and scientists have tried to prevent a repeat of the same scenario as with GMOs, leading to a rise in negative attitudes towards the emerging technology. The public debate on NT has therefore focused in many countries on raising public awareness of NT, but also on the use of participatory methods of public hearings.
- (2) Researchers concerned with the **ethical, legal and social issues** (ELSI) associated with emerging technologies believe that it is important to consider these issues throughout the research and development cycle, even at the earliest stages of basic research.
- (3) However, the ELSI concept has been criticised, for example, because projects incorporating the framework place a strong emphasis on the speculative promises associated with sociotechnical innovations rather than their use in practice (Balmer et al., 2016). Another issue is that the ELSI framing considers social and ethical implications as secondary and separate from scientific research itself, which may reinforce the view that science itself can be separated from its social and ethical dimensions (Calvert, 2023).

Chapter 3:

Synthetic Biology (SB)

- (1) The discussion on SB took into account many lessons from the debate on GMOs and NT. The public debate has therefore inclu-

ded a wide range of approaches, from interdisciplinary dialogue, to discussion of biosafety, social and ethical implications or the need for effective communication and regulation, as well as public engagement, including participatory actions.

- (2) Around 2012, the concept of **Responsible Research and Innovation** (RRI), which has also been applied in the field of SB, started to come to the fore in science policy. RRI includes the involvement of all actors (from individual researchers and innovators to institutions and governments) through inclusive, participatory methods at all stages of the processes and at all levels of research and innovation governance (from agenda setting to design, implementation and evaluation). This was another attempt to tackle the framing of the deficit model.
- (3) Although many experiments with participatory activities have been launched in the EU over the last 20 years, all too often, these processes have remained disconnected from the actual work and decision-making processes in the research, development and innovation system. Moreover, social scientists, along with scientists and engineers who use RRI, are at risk of being drawn into an instrumental 'service' role to produce outputs according to externally imposed agendas, often with the assumption that they will facilitate public acceptance of the technology and help bring it to market (Calvert, 2023).

Chapter 4:

Artificial Intelligence (AI)

- (1) Since 2009, there has been a sharp increase in public discussions about AI, and hopes for AI in healthcare and education have risen, but on the other hand, concerns about the loss of control over AI and the negative impact of AI on the labour market, as well as ethical concerns, have grown (Lobera et al., 2020;

Roberge et al., 2020). As there is a widespread perception that AI will have a significant impact on society, its development has been accompanied by the promotion of various concepts of responsible research and development (Yigitcanlar et al., 2022). Part of this drive for responsible development is the exploration of the attitudes of stakeholders, as they may have different attitudes towards AI applications, which may limit their adoption if these attitudes are not taken into account by AI developers (Lai et al., 2020).

- (2) One of the methodologies aimed at responsible research and development is **value sensitive design** (VSD). VSD comprises four downstream phases: 1) analysis (analysis of risks and values of different actors, etc.), 2) design, 3) implementation, and 4) maintenance and use, which are cyclical, as the functioning and consequences of technologies need to be monitored continuously.
- (3) According to a content analysis of 16 European national strategies for AI decision-making (Wilson, 2022), although public involvement in AI governance is mentioned in most of these strategies, the public is primarily and almost exclusively acting as service users in the strategies. With regard to criticisms of VSD (see, e.g. Jacobs and Huldgren, 2021), these relate, for example, to the fact that researchers, by referring to VSD and only loosely applied stakeholder engagement methods, subsequently claim more authority and impartiality than is actually warranted given the stakeholder engagement method used, and de facto only legitimise newly repainted established practices in this way.

Part 2: Open Science (OS)

(1) In addition to improving the efficiency of science, the European Commission presents OS as a means of changing the interaction between science and society for the benefit of wider societal impact (Schöpfel et al., 2016). In particular, UNESCO's 2021 Recommendation on Open Science has become a foundational document for implementation, an international framework for OS policy, practice, principles and values. According to this recommendation, OS should respect the diversity of knowledge systems and promote open dialogue with different communities and societal actors. To this end, it is proposed that new forms of collaboration, such as citizen science, be used to exchange and co-create knowledge between scientists and society.



- (2) In a review study on the relationship between science and the public in the OS concept, Lakomý et al. (2019) distinguish three primary forms of public engagement: (1) informal discussions with scientists (science festivals and science cafés); (2) decision-making on research funding and priorities (political negotiations, participatory budgets, citizen crowdfunding); and (3) participation in citizen science activities (e.g. collaboration on data generation and processing; participation in decision-making on the research process; activities in citizen science labs, which can take the form of a platform for research investigations defined and carried out together with citizens or affected communities.
- (3) Public engagement in science remains marginal in the usual OS practice (see, e.g. Lakomý et al., 2019), and the main challenges for OS in communicating science include addressing the different preferences of different target groups, including those not interested in science.



Part 3:

Methods of public hearings

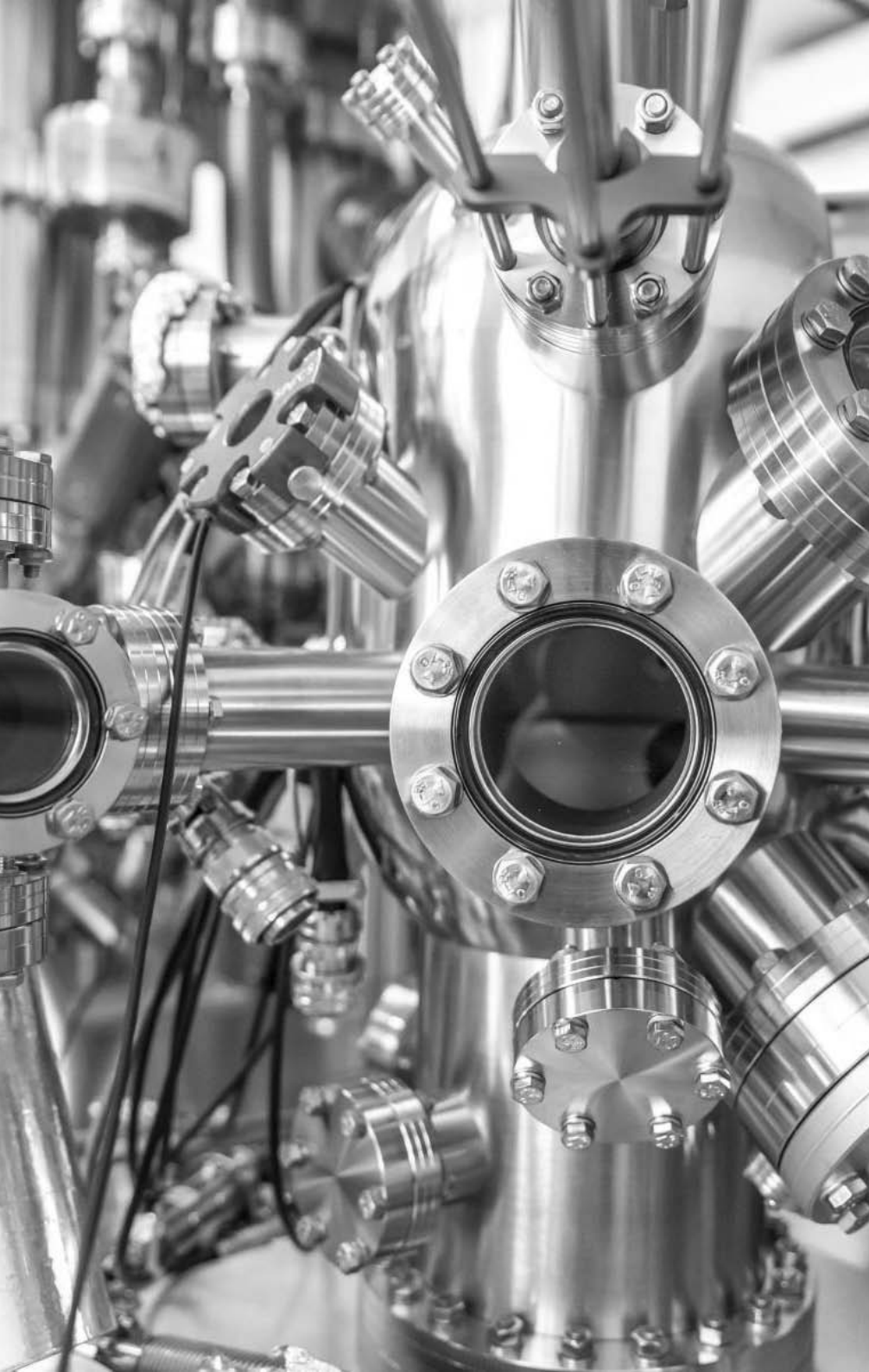
[The Action catalogue](#) online tool allows researchers, policymakers and others interested in inclusive research to find the method that best suits the needs of their particular project (57 methods in total). We have selected and summarised several methods from this inventory that might be suitable for implementing the four public hearings in the AMULET project.

- **Citizen Hearing.** The purpose of the Citizen Hearing is to inform citizens and generate discussion among citizens. The method is convenient when it is appropriate to gauge public opinion on a given topic. Through dialogue, and without the intervention of experts, citizens formulate their own challenges, suggestions and ideas, e.g. how a selected problem could be addressed.
- **Science Café.** An event held in an informal setting as a place for dialogue with participants from all areas of life and academia. Appropriate topics include those that elicit audience responses - scientific research that has a profound impact on people's lives or creates ethical dilemmas. An expert briefly introduces the topic, and then the floor is open for discussion.
- **Open Space Technology.** This involves organizing and leading a one-day meeting (or multi-day conference) where participants are asked to focus on a specific important task, topic or goal. Participants should be selected in accordance with the objectives of the event so that all stakeholders are adequately represented.

- **Deliberative online forum and e-conferences.** Deliberative online forum is an online discussion in online forums between informed individuals on issues that concern them. They also usually lead to some form of consensus and collective decision.

We have also supplemented these methods with two examples of public hearings practised in the Czech Republic:

- **Public hearings of Institut úzkosti (the Anxiety Institute).** The Anxiety Institute is a collaborative research platform for people in the fields of art, theory, science and activism. Since 2018, the institute has been initiating interdisciplinary, intergenerational and international dialogue in the territory of the City of Prague and has been researching the newly pressing phenomenon of anxiety for a long time. The public hearing has gradually evolved into a three-hour format, which allows for a concentrated focus on the topic under investigation through the contributions of about 40 guests from various fields.
- **Public hearings of the Senate of the Czech Republic.** Public hearings cover a variety of topics. Experts from the relevant field are usually invited to speak, with the participation of members of selected committees of the Chamber of Deputies and the Senate and other senators, as well as representatives of state bodies and other institutions, representatives of non-governmental organisations, and representatives of the professional public (depending on the subject of the hearing). In addition to the speakers, debates and questions from the floor are organised (e.g. within thematic blocks). Speaking time for the interventions submitted is between 5 and 15 minutes, depending on the agenda of the public hearing; the speaking time for the debate is no longer than 3 minutes. The whole public hearing shall be closed with a final summary.



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