Trust in Science? Revisiting Participatory Science and Framing Knowledge as a Gift

Franziska Sörgel[1]

[1]Institute for Technology Assessment and Systems Analysis (ITAS), Karlsruhe Institute of Technology (KIT), Germany

Abstract. This article critically examines the intricate dynamics of trust in (open) science. Drawing from observations in participatory formats, such as citizen dialogues during the Karlsruhe Institute for Technology's Science Week, the article identifies a tendency among scientists to withhold certain forms of knowledge, particularly negative knowledge. Inspired by Marcel Mauss' theory of the gift, it explores how reframing trust as a reciprocal and moral transaction can offer valuable insights into fostering transparent and equitable knowledge exchange practices. Through a nuanced exploration of reciprocity and transparency, the article challenges conventional notions of scientific trust and highlights the ethical dimensions of knowledge sharing. Ultimately, it aims to contribute to a deeper understanding of trust in science and promote more ethical and inclusive knowledge exchange practices in contemporary scientific inquiry.

1. Introduction

In the last couple of years, the German[1] research and innovation landscape has experienced a notable transformation characterised by a pronounced emphasis on participation in civil society and open science. This shift is exemplified by recent initiatives such as the 'Participation Strategy for Research'[2] introduced by the Federal Ministry of Education and Research (BMBF) in Germany in June 2023 while a similar transformation was already indicated around 20 years ago with the 'Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities'[3], which had been signed by nearly 800

---

[1] Author's note: While the focus is on the German research landscape, the author will also draw parallels with similar trends in other Western universities throughout the article as such strategies seem relevant for a broader research landscape.

[2] See: Participation Strategy by the BMBF 2023

[3] See: Open Access Initiative by the Max Planck Society

universities by November 2023. These strategies do not only seek to integrate civil society groups into research processes by involving them in committees and incentivising collaboration between researchers and the public; they are also indicating a general shift towards an open science that ought to be available to 'everyone', meaning those who have the resources and competencies (or, e.g. cultural capital, following Bourdieu (1986)). While these two exemplary initiatives are specific to Germany, similar structures may also be emerging in other countries (e.g. UKRI's strategy for open science[4], 'Ouvrir la science!' in France[5] or Spain's National Open Science Strategy ENCA[6]). At the heart of this shift is recognising the value of diverse perspectives in shaping research agendas and fostering collaboration between researchers and civil society. It reflects a broader societal expectation that science should not remain confined within the ivory tower but should be open and accessible to the public as we know it, for example, from Mode 2 (Gibbons et al., 1994; Nowotny et al., 2013). Several key expectations in science policy are linked with the concept of open science. Nevertheless, we can observe that for considerations of trust in science, perspectives often emerge from the viewpoint of the public, specifically on how to gain the public's trust in science.

Firstly, open science promotes higher transparency and additional quality assurance in the research process, enhancing reproducibility and strengthening trust in scientific endeavours (e.g. Winker et al., 2023). Secondly, it facilitates the faster re-utilisation of research findings, which aims to increase the efficiency and performance of the scientific system (e.g. ZBW, 2023). Thirdly, open science suggests supporting more effective knowledge transfer to the economy and society, stimulating innovations based on scientific findings (e.g. Fell, 2019). Lastly, it encourages non-scientists involvement in the research process, aiming for greater societal relevance and acceptance of research priorities (EU's Open Science Policy 2020-2024[7]). In both scholarly literature and the expectations set forth by political actors, there is a prevailing belief that individuals with a solid grasp of scientific concepts possess a more sophisticated understanding of science (e.g. Hilgartner, 2015). This notion suggests that citizens with extensive scientific knowledge are better equipped to assess the reliability and credibility of scientific institutions. Moreover, research indicates a strong correlation between scientific trust and individuals' evaluations of research institutions' goals and actions, a relationship significantly influenced by their level of scientific knowledge. Scholars argue that scientific knowledge enables individuals to assess scientific trust rationally, with performance-based evaluations as critical criteria (e.g. Böhme & Stehr, 1986; Reichmann, 2011).

---

[4] See: United Kingdom Research and Innovation's (UKRI) Strategy on Open Research

[5] See: Ouvrir la Science in France

[6] See: National Strategy For Open Science (ENCA) in Spain

[7] See: EU's Open Science Strategy 2020-2024

However, the emergence of this imperative, as reflected in political calls for increased openness in science, prompts critical inquiry into the appropriateness of political intrusion into scientific spheres and their advocacy for public engagement and participatory communication formats. While opening science to broader participation is undoubtedly appealing (e.g. Rössig et al., 2023; Hecker et al., 2018; Marres, 2011), it necessitates a critical examination of the implications of such openness (Hosseini, 2024) referring to the question of how open scientific knowledge should be. In this context, several questions arise: What is the role of governmental bodies in mandating openness in scientific research, and what are the implications for the autonomy and self-regulation of the scientific community? The imposition of mandates from governmental bodies raises concerns about the erosion of self-regulatory mechanisms (Maasen & Weingart, 2006) within the scientific community. This prompts me to question the underlying dynamics of trust between politics and science. If the requirement for openness is consistently enforced, can we still consider scientific engagement with the public as voluntary? Moreover, what does the prevailing perspective on trust in science from the public's viewpoint mean? Should we not strive to allow for a general diversity of perspectives here, which also includes questioning the trust of scientists in the public and in their own system.

In light of these considerations, this article critically examines the diverse perspectives on trust, specifically through serendipitous findings from a current research project. It explores how participatory science, knowledge management, and governmental intervention intersect in shaping science strategies. By introducing Marcel Mauss's theory of the Gift (1925), it explores the tensions arising from the imperative for openness while preserving the integrity and autonomy of scientific inquiry. Furthermore, it prompts reflection on the evolving relationship between politics and science, highlighting implications for trust within the scientific community. By embracing diverse perspectives, effectively managing knowledge forms, and leveraging theoretical insights such as Mauss's theory of the Gift, researchers can adeptly navigate the complexities of contemporary research environments and contribute to meaningful societal engagement. Additionally, the article advocates for continuous dialogue and reflection on participatory research's ethical and practical dimensions, thereby advancing towards a more equitable and impactful scientific enterprise.

2. Sharing Knowledge: An Approach

As the introduction indicates, promoting civil participation and open scientific practice has political implications (Koenig et al., 2023; Mayer et al., 2020). Accordingly, participation formats as they take place at universities are a product of these political demands. During the research for a project called 'Participatory Procedures and Processes in Research Organizations' (PaFo) at the Karlsruhe Institute of Technology (KIT)[8], an array of such participatory formats has been observed, particularly emphasising citizen dialogues. These dialogues emerged as pivotal platforms where researchers and citizens collaboratively delve into pressing societal issues and craft research inquiries for one day that potentially influence KIT's research agenda. This participatory approach underscores a steadfast commitment to inclusive research practices, fostering the acknowledgement of diverse perspectives in shaping the research landscape. The primary objective of the project's empirical study has been to measure the impact of citizen dialogues on the university's research agenda, namely the KIT. Specifically, it aims to investigate whether the university's administration effectively communicates the knowledge and contributions of participants to relevant researchers and whether these insights subsequently influence ongoing academic work. Additionally, the study examines the event's effect on the participants themselves, exploring whether engagement with scientific discourse alters, e.g. their ways of thinking and acting. To facilitate this, a matrix has been developed as a multi-methodological framework, outlining the categories and indicators necessary for assessment, which are explored through various instruments such as questionnaires, interviews, and document analysis, to name but a few. I used qualitative and quantitative methods to comprehensively understand actors' expectations as part of a multimethodological approach. I used participant observation and go-alongs to engage directly with attendees in real-time during the event. Additionally, I conducted focus group interviews during coffee breaks to capture collective dynamics and immediate reactions as the event unfolded. I collected quantitative data through questionnaires, which gathered demographic information and details about the general composition of the attendees. Photographs were also taken throughout the event, providing visual material that could later be used to trigger memories and stimulate discussions during post-event interviews. So far, I have conducted 25 qualitative interviews following the event with participants, including citizens, university administrators, and researchers. These interviews were transcribed, analysed, and coded to extract key themes and insights. The photographs taken during the event were revisited during these interviews to help interviewees recall specific moments or experiences. Both the qualitative and quantitative data serve as critical

---

[8] Author's note: The university provides core funding for the project.

sources of information for the matrix, which is continuously shaped and refined based on these inputs and is reviewed and adjusted annually with each citizen dialogue.

However, amidst these participatory endeavours, insightful but serendipitous observations surfaced during interviews with participating scientists and researchers, prompting me to reflect on these findings, which I would like to elaborate upon here. While these qualitative findings are serendipitous and not sufficiently developed to be the focal point of this analysis, the investigation and general observations from the scientific system indicate trends that merit further exploration. The observations now prompt me to use them as the starting point for this paper and to elaborate on trust in science within the context of the openness of our system. The data itself is relatively young and still developing. Yet, it provides a clear basis for further investigation into the issues and questions raised in this paper, mainly as I have been gathering more data, so the thesis is gaining strength.

2.1. Sharing Knowledge: What Knowledge?

Several interviews with citizens and researchers made it apparent that not all knowledge is openly shared within scientific communities. This revelation provoked me to explore the dynamics of knowledge sharing and identify distinct knowledge structures. In the mentioned research, scientists' and researchers' recognition and management of various knowledge forms became central when asked about their way and attitude towards knowledge exchange. Further, researchers often unconsciously refer to knowledge forms that include positive, missing (Seidl, 2010), and negative knowledge (Oser, 2005), each playing a distinct role in shaping research agendas and informing decision-making processes. Hence, I briefly summarise what to understand under these terms: (1) Positive knowledge, in distinction to the following definitions, encompasses the information and insights that are well-established and widely accepted within a given field of study. It represents the body of knowledge that forms the basis for scientific inquiry and serves as a foundation for further research and innovation. (2) Missing knowledge, on the other hand, in philosophical considerations, refers to the gaps and uncertainties in our understanding of a particular phenomenon or issue. These gaps may arise due to limitations in existing research, unanswered questions, or areas where empirical evidence is lacking. Identifying missing knowledge is critical for directing future research efforts and addressing areas of uncertainty within the scientific discourse (e.g. Seidl, 2010). (3) Now, turning to the concept of negative knowledge, as conceptualised by Fritz Oser (2005), it represents a unique and intriguing knowledge dimension often overlooked in traditional research paradigms. Negative knowledge pertains to insights gained from recognising and understanding processes, methodologies, or phenomena by discerning how they do not function or operate as expected. It involves understanding what does not work, which can be just as informative and valuable as understanding what does.

However, negative knowledge poses challenges to transparent knowledge exchange, as it may involve acknowledging failures, limitations, or areas of uncertainty within research endeavours. In principle, Oser's conceptualisation of negative knowledge would highlight the importance of transparency and openness within scientific communities (e.g. Merton 1957). Withholding or neglecting to share negative knowledge can hinder progress and contribute to the perpetuation of misconceptions or flawed assumptions. By acknowledging and sharing negative knowledge, researchers could contribute to a more comprehensive and nuanced understanding of phenomena, facilitating more informed decision-making and advancing scientific knowledge.

Now, as indicated, during conversations with several scientists involved in participatory formats aimed at informing the public, I observed that negative knowledge often remains unshared within scientific communities. This poses a challenge to transparent knowledge exchange and highlights the need for increased openness. Thus, this observation prompts me to question why scientists withhold this form of knowledge and what this reservation reveals about current science communication practices.

Despite the theoretical importance of distributing scientific knowledge, scientists often feel constrained in their knowledge-sharing practices. They perceive pressure to limit their disclosures to performance-based knowledge and positive findings, driven by the desire to enhance their credibility and that of the scientific community. Furthermore, there is a prevalent reluctance among scientists to share their 'research islands', reflecting a persistent perception of isolation and separation between the realms of science and society. This reluctance stems from viewing political calls for increased transparency and public engagement as transient trends rather than enduring commitments to societal integration. It suggests that various factors pressure scientists. As described above, the focus on performance is a significant criticism, as reflected in performance evaluations and impact assessments. An obvious assumption may be the strengthening of these criteria and the current narrow focus on science communication, as proposed, e.g. by the German BMBF, which additionally suggests a proper framework and is surrounded by its #FactoryWisskomm initiative.[9] The efforts are not fundamentally misplaced, but these demands seem to consider scientists insufficiently. Accordingly, an important observation in this context is that scientific projects are now engaging with these 'impact assessments' and positioning themselves to shape legitimacy arguments (Bahr et al., 2022), potentially to anticipate and avoid further criticism. In essence, while scholarly

---

[9] There seem to be plenty of such science communication strategies worldwide: e.g. Engage.EU at WU, Vienna; COALESCE by Science for Change in Barcelona; Research in Conversation at Oxford University; Pursuit-Platform at University of Melbourne

literature and political discourse emphasise the importance of scientific knowledge in fostering trust and collaboration between science and society, empirical observations reveal significant barriers and complexities in achieving this ideal. Recognising and addressing these discrepancies is crucial for bridging the gap between scientific expertise and public understanding, fostering a more robust and inclusive scientific enterprise.

Given this context, it is crucial to clarify the relationship between (non-)knowledge and trust and, moreover, another prerequisite, namely autonomy. Trust occurs when one cannot know or verify. In this sense, trust is a meta-emotion, a feeling underpinned by other feelings (Sörgel, 2024: e.g. 192). Through this, trust can dissolve power dynamics. For instance, Ingold writes: 'To trust someone is to act with that person in mind, in the hope and expectation that she will do likewise – responding in ways favourable to you – so long as you do nothing to curb her autonomy to act otherwise (Ingold, 2000: 69–70).'

In this vein, I would now like to turn to Marcel Mauss's theory of the gift and understand it as an inspiration to reflect on trust and its related implications and to make it fruitful for our understanding of science and sharing knowledge.

3. Marcel Mauss's Theory of the Gift to Reframe our Understanding of Trust

Marcel Mauss, a prominent French sociologist and anthropologist, is renowned for his work in understanding the complex social phenomena of gift-giving across different cultures and societies. His seminal book, *The Gift: Forms and Functions of Exchange in Archaic Societies* (1925), remains foundational in anthropology and sociology. At the heart of Mauss' theory is exploring the multifaceted nature of gift-giving practices within traditional societies. He investigates the intricate dynamics of gift exchange, elucidating how these exchanges serve not merely as economic transactions but as profound social and moral phenomena. Mauss emphasises that gifts are never given or received in isolation; they are imbued with social meanings and expectations, shaping relationships, identities, and social structures within communities. Mauss identifies three essential obligations inherent in gift exchange: the obligation to give, the obligation to receive, and the obligation to reciprocate (Mauss, 2002: 17ff.). These obligations form the basis of a complex system of social ties and obligations, fostering mutual interdependence and solidarity within communities. Moreover, Mauss highlights the symbolic significance of gifts, not to be confused with presents, which transcend their material value to convey social status, power dynamics, and cultural norms (Mauss, 2002).

Thus, it is indeed ownership that one obtains with the gift that one receives. But it is ownership of a certain kind. One could say that it partakes of all kinds of legal principles that we, more modern, have carefully isolated from one another. It is ownership and possession, a pledge and something hired out, a thing sold and bought, and at the same time deposited, mandated, and bequeathed to be passed on to another. For it is only given you on condition that you use it for another or pass it on to a third person, the 'distant partner', the murimuri. Such is the nature of this economic, legal, and moral entity (…) (Mauss, 2002: 30).

Yet, Mauss explores the role of reciprocity in the gift exchange, emphasising its importance in maintaining social cohesion and reinforcing social bonds. According to Mauss, reciprocity is not merely an economic exchange but a moral imperative, reflecting a society's values and norms. Central to his theory is the concept of 'total prestation' (*préstation totale* often translated as 'total service') (Mauss, 2002: e.g. 4), wherein the gift is not simply a one-time transaction but entails a series of reciprocal exchanges, creating an ongoing cycle of obligations and counter-obligations, representing every facet of the society it originates from. The gift encompasses economic, political, kinship, legal, mythological, religious, magical, practical, personal, and social dimensions. When such an item circulates within the social milieu, the giver effectively reconfigures the social fabric, which underpins the gift's inherent power. Thus, the act of giving necessitates a subsequent act of receiving and reciprocating, thereby perpetuating social cohesion and mutual dependence (Mauss, 2002: 62). Mauss' understanding of trust, therefore, results from the mutual obligation of reciprocity and the mutual assurance of acknowledgement and appreciation, while preserving the individual's autonomy.

3.1. Rethinking Trust in Science

Even if we cannot be sure whether the French sociologist Marcel Mauss fully grasped the complexity of the gift in so-called archaic groups, the observations nevertheless provide valuable indications of the gift's social implications. I would like to shed further light on these aspects and make them fruitful for understanding trust in science from two perspectives. So, let me ask how to rethink trust in science as a reciprocal and moral transaction rather than a plain non-word to match socially acceptable expectations. As noted, scientific knowledge and expertise are not merely commodities to be traded but valued resources with social significance and ethical implications. I want to posit a dual perspective on trust, emphasising the interplay between trustworthy exchange and moral obligations in fostering mutual trust between scientists and society.

Trustworthy exchange entails not only the dissemination of scientific knowledge but also the establishment of transparent and ethical practices that uphold the integrity of the scientific endeavour. Simultaneously, moral obligations underscore the ethical responsibilities of scientists to engage with society in a manner that fosters mutual understanding, respect, and accountability. By reframing trust as a gift, I prompt reflection on the norms and conditions necessary for promoting genuine knowledge exchange and

scientific self-regulation. It underscores the importance of recognising scientific knowledge as a social construct shaped by reciprocal interactions and moral imperatives. Moreover, this perspective flips the coin on trust *in* science.

On the one hand, and I assume this is the common perspective for political stakeholders (e.g. Santirocchi et al., 2023; The British Academy, Policy Report 2024), the first perspective revolves around trust in science from the public's standpoint. Hence, the public and policymakers expect research and science to be credible, reliable, and trustworthy. The public and policymakers rely on scientists to deliver neutral and objective information, enabling them to make evidence-based decisions on challenges like climate change or other (related) crises and the implementation of scientific and technological advancements in areas such as the environment, healthcare, and technology (e.g. Grønli Åm, 2011: 18). On the other hand, the second perspective delves into trust in science from the standpoint of scientists towards society, emphasising the reciprocal nature of trust and the handling of 'open knowledge'. We can recognise tendencies in our research results that there is a loss of trust on the part of science in society and that the points mentioned above of not sharing knowledge give the impression that phenomena such as misinformation (e.g. fake news or the manipulation of facts) or the accusation of unscientificness result in reticence and isolation. This withdrawal has the opposite effect to that intended by the political calls. And yet, after all these political interventions, we have to ask ourselves if we regard the dissemination of knowledge as more than a sterile or technical business. In this context, several critical points and gaps arise within this system. The central importance of publications in the scientific community is underscored despite the challenges posed by fake publishers.

Discussions revolve around implementing an Open Access model to facilitate global access to scientific articles and accelerate knowledge exchange. While highlighting the benefits of Open Access, concerns emerge about potential data misuse, science parasites, and worries regarding data tracking and espionage by major publishers (e.g. Charité, Berlin, 2020: 'Wie erkenne ich Raubjournale?' (Engl. How can I detect predatory journals?), ZBW (2023): 'Open Access Mythen. Was ist dran?' (Engl. Open Access Myths: What's the Truth?)). Concurrently, scepticism arises towards digital workflows and platform dependence in the publication process (Franzen, 2016), cautioning against predatory publishers and scientific publishers' monetisation of user data (Koerber et al., 2023). Criticisms are levelled at the inadequate recognition of publishers relative to the efforts of scientists in publications and peer reviews. Overall, there is a discourse on the advantages of Open Access for scientific progress, juxtaposed with the challenges and risks associated with the dominance of major publishers and the trade of scientific data. These discussions converge with the recognition of unequal access to scientific knowledge, where disparities hinder collaboration and competitiveness driven by the pressure to publish in prestigious journals, which may compromise data sharing and

communal benefits. This competitive atmosphere undermines reciprocity and erodes trust within the scientific community. Additionally, the replication crisis underscores the reproducibility challenges in science, questioning the reliability of findings and the integrity of researchers, thus further weakening trust and diminishing the perceived value of shared knowledge.

Let me, therefore, refer to the main points above and transfer them to the current academic system. Relating now to the understanding of trust being founded on the principle of reciprocity. Just as in gift-giving, where giving and receiving create social bonds, trust emerges through mutual actions and fulfilling obligations. Trust is strengthened when both parties honour their promises and attend to each other. Trust is not merely a rational decision but also possesses symbolic value. It represents mutual recognition and respect, akin to the symbolic significance of gifts in traditional societies. This symbolic value contributes to the depth and stability of relationships. When applying this to the scientific system, particularly in the context of the availability and dissemination of knowledge, the sharing and exchanging of knowledge can be viewed as a form of a 'gift' that fosters trust, collaboration, and the advancement of collective understanding. Researchers share their findings, methodologies, and data, which others can build upon, critique, and expand. This exchange is analogous to gift-giving, where sharing knowledge could create social bonds and mutual obligations among scientists. Trust is built when researchers consistently contribute valuable insights and honour the norms of transparency, reproducibility, and acknowledgement of others' work (e.g. Shapin, 2004). The symbolic value of this trust is significant, as it represents mutual recognition and respect within the scientific community, thereby contributing to the depth and stability of professional relationships.

3.2. Reciprocity Through Autonomy

Especially in light of current political events (e.g. this year's protests on the Israel-Palestinian war at universities in the US (Harvard, Columbia, and Brown Universities) and Australia (Sydney, Monash, Queensland Universities) but also various European countries, e.g. UK (Oxford, Exeter, Bristol Universities), France (Sciences Po), Belgium (Ghent University), Germany (Berlin Universities) that questioned free speech and academic freedom, and imposed accusations of antisemitism), it is essential to maintain the autonomy and integrity of the scientific enterprise while ensuring that collaborative efforts are conducted to uphold scientific standards and principles and critically evaluate political actors' expectations and interventions in this context. While calls for increased transparency and public engagement are commendable, they must balance preserving scientific autonomy and preventing undue interference in the research process (e.g. Böschen 2018; Franzen, 2014). A genuine collaboration between science and society can only thrive in an environment that respects each actor's roles and responsibilities

while fostering meaningful dialogue and mutual understanding. Even though it is not conducive to the relationship between science and political actors when the latter seek advice, recommendations for action in critical situations have been formulated by the scientific community on a large scale for years, only to be ignored.

Furthermore, within the discourse surrounding the cultivation of reciprocal knowledge exchange norms, it is imperative to critically engage with the role of governmental entities, exemplified by the Federal Ministry of Education and Research (BMBF) in Germany. While acknowledging the BMBF's laudable initiatives to enhance civil society participation in research endeavours, a nuanced examination is warranted. Despite the apparent enthusiasm for fostering public engagement, a discerning approach is necessary to mitigate potential encroachments upon scientific autonomy and the imposition of authoritarian directives upon research agendas (Kölbel, 2016). It behoves stakeholders to recognise that while promoting greater accessibility of science to society is a commendable aspiration, safeguarding scientific integrity necessitates a reasonable balance. Thus, while extolling the BMBF's endeavours, it is incumbent upon the scholarly community to advocate for a framework wherein scientific inquiry remains driven by intellectual curiosity rather than bureaucratic mandates (Kölbel, 2016).

One of Mauss's criticisms of Western societies in his book's concluding chapter (Mauss, 2002: 83 ff.) is its tendency to reduce social relationships to economic transactions, diminishing the exchange's social and moral dimensions. In capitalist societies, the emphasis on monetary value and profit often supersedes considerations of social cohesion and solidarity, leading to the commodification of goods and services and the alienation of individuals from their labour and communities. Moreover, he argues that capitalist structures disrupt the reciprocity inherent in gift exchange by promoting unequal power dynamics and exploitation. In contrast to the egalitarian ethos of gift economies, where gifts are given and received without expectation of immediate return, capitalist systems often perpetuate inequalities and reinforce hierarchies based on wealth and privilege. Additionally, Mauss critiques capitalism for undermining traditional cultural practices and values associated with gift-giving. As capitalist economies expand and globalise, traditional gift economies and reciprocal social relations are often marginalised or supplanted by market-based exchanges, eroding social cohesion and losing cultural heritage. Mauss's critique underscores the social and moral implications of economic systems based on profit-driven exchange. It highlights the need to reevaluate societal values and prioritise collective well-being over individual gain. His work inspires debates on the relationship between economic structures, social relations, and human flourishing in contemporary societies.

This strongly resonates with the established academic system in Germany, but in general goes for Western countries' universities, revealing profound challenges and shortcomings within higher education (e.g. see the vivid description of for-profit education

and general conditions of the educational system in the US by Clark 2019; Bosanquet et al. 2020). Firstly, the commodification of knowledge within academia is evident in the increasing commercialisation of research outcomes. Universities are pressured to prioritise research projects that promise immediate financial returns or commercial applications (Harvey & Stensaker, 2008), often at the expense of fundamental research that may not yield immediate economic benefits. For instance, disciplines like the humanities and pure sciences, which may not directly translate into marketable products or services, are often undervalued and underfunded compared to fields with more apparent commercial potential, such as engineering or natural sciences. Moreover, the pervasive culture of metrics and performance indicators in academia perpetuates a narrow focus on quantifiable outputs, such as publication counts and citation metrics (Stensaker and Harvey, 2008 & 2010), rather than the quality and impact of research. This emphasis on quantitative measures can stifle innovation and intellectual risk-taking, as scholars may feel pressured to conform to established paradigms or pursue research topics that are more likely to yield high citation rates, regardless of their intrinsic academic value. This trend exemplifies the 'publish or perish' mentality, where scholars prioritise quantity over quality to secure tenure or funding (e.g. Bahr et al., 2022: 61-62).

Furthermore, the rise of precarious employment practices within academia exacerbates inequalities and undermines academic freedom (Shapin, 2004: 57). Adjunct faculty and contract researchers often face unstable employment conditions, low pay, limited access to resources and institutional support. This precariousness undermines the academic staff's well-being and professional development and compromises the quality and continuity of education and research. For instance, researchers on short-term contracts may be hesitant to pursue long-term projects or engage in interdisciplinary collaborations due to the uncertainty of their employment status. In addition, the increasing commercialisation of higher education has led to a proliferation of profit-driven initiatives, such as privatised degree programs and corporate-sponsored research centres, which prioritise financial returns over the public good. This trend not only undermines the autonomy and integrity of academic institutions but also risks compromising the impartiality and objectivity of research outcomes.

4. Conclusion

In conclusion, the transformation in the German research and innovation landscape towards open science and civic participation marks a significant shift towards greater inclusivity and collaboration (even if this seems to be the case for the European and, in general, Western countries' research landscape). Initiatives such as the 'Participation Strategy for Research' and the 'Berlin Declaration for Open Access to Knowledge in the Sciences and Humanities' exemplify this commitment to integrating civil society into research processes and fostering openness in science. However, this shift towards open science raises critical questions about the implications of increased political intervention in scientific spheres and the potential erosion of self-regulatory mechanisms within the scientific community.

The concept of openness in science extends beyond mere accessibility to knowledge; it encompasses transparency, accountability, and ethical conduct. As seen in the discussions surrounding participatory science, knowledge management, and governmental intervention, the imperative for openness necessitates careful consideration of the balance between promoting accessibility and preserving scientific integrity and autonomy. The imposition of mandates from governmental bodies prompts reflections on the dynamics of trust between politics and science and the voluntary nature of scientific engagement with the public.

Furthermore, exploring diverse forms of knowledge, including positive, missing, and negative, underscores the complexity of knowledge exchange within scientific communities. While positive knowledge forms the basis of scientific inquiry, missing and negative knowledge reveals gaps, uncertainties, and failures inherent in the research process. The reluctance to share negative knowledge highlights the challenges in fostering transparent knowledge exchange and calls for increased openness within scientific communication practices.

Therefore, I introduced Marcel Mauss's theory of the gift, in which trust in science is reframed as a reciprocal and moral transaction that relies on transparent knowledge exchange and mutual understanding between scientists and society. By acknowledging scientific knowledge exchange's social and ethical dimensions, researchers can navigate the complexities of contemporary research environments and contribute to meaningful societal engagement. However, challenges persist within the academic system, including the commodification of knowledge, the emphasis on quantifiable outputs, and the rise of precarious employment practices. These challenges underscore the need for a fundamental reevaluation of the role of higher education in society and the values that underpin it. By addressing these challenges and embracing the principles of openness, reciprocity, and ethical conduct, the scientific community can take significant strides in

fostering trust, collaboration, and innovation. However, to genuinely advance towards a more equitable and impactful scientific enterprise, reforming the structural foundations of academic employment is crucial. One area needing attention is the precarious nature of university employment contracts. This mainly affects PhD candidates and post-doctoral researchers, who often find themselves trapped in a cycle of temporary contracts with disproportionate dependency on professors, which in turn can lead to the consolidation of power around individual figures and increase the risk of power abuse.

To address these issues, institutions must introduce new employment models that provide greater stability and long-term opportunities. Political actors must also address the perception that they lack trust in university employees and their work ethic, fostering a healthier relationship between academia and policy. These potential changes call for critical reflection on the meta-emotion of 'trust' within the scientific community. While complete trust in scientists could raise concerns about unchecked authority and the entrenchment of power, it is equally important that scientists remain conscious of the power dynamics between themselves and society, particularly in the context of their public role.

The imposition of externally driven programmes and policies highlights a trend of control mechanisms over which scientists have little influence. It underscores the need for a systemic review of how academia allocates and manages public funds. Ensuring that these investments lead to meaningful and high-quality research outputs rather than being driven solely by quantitative metrics like publication counts is crucial. It is imperative to re-evaluate the criteria used to judge scientific quality.

Additionally, the relationship between universities and political institutions must be scrutinised. Questions regarding how universities should engage with politics, the nature of their dependency on political agendas, and who evaluates the excellence of universities need to be addressed. The current evaluation and selection systems that label institutions as 'excellent' should be revisited to ensure they are fostering academic excellence rather than merely reinforcing existing power structures.

These initial steps would serve as a foundation for creating a more transparent, equitable, and sustainable scientific landscape where trust is earned and nurtured without compromising researchers' autonomy.

Literature

Bahr, A., Eichhorn, K., Kubon, S. (2022). #IchBinHanna. Prekäre Wissenschaft in Deutschland, Suhrkamp, Berlin.

BMBF's Participation Strategy for Research (2023). https://www.bmbf.de/SharedDocs/Downloads/de/2023/partizipationsstrategie.pdf?__blob=publicationFile&v=1. (Last access 18/10/2024).

Böhme, G. & Stehr, N. (1986). The Growing Impact of Scientific Knowledge on Social Relations In: Böhme, G. & Stehr, N.: The Knowledge Society, pp.7-30. Reidel Publishing Company, Dordrecht.

Böschen, S. (2018). Wissenschaft und Autonomie: Wissenschaftliche Identitätspolitik auf dem Prüfstand partizipativer Wissensproduktion. In: Bohmann, U., Börner, S., Lindner, D., Oberthür, J., Stiegler, A. (eds) Praktiken der Selbstbestimmung. Springer VS, Wiesbaden. https://doi.org/10.1007/978-3-658-14987-1_7

Bosanquet, A., Mantai, L., & Fredericks, V. (2020). Deferred time in the neoliberal university: experiences of doctoral candidates and early career academics. Teaching in Higher Education, 25(6), 736–749. https://doi.org/10.1080/13562517.2020.1759528

Bourdieu, P. (1986) The forms of capital. In J. Richardson (Ed.) Handbook of Theory and Research for the Sociology of Education (New York, Greenwood), 241-258.

Charité Berlin (2020): Wie erkenne ich Raubjournale?, retrieved from: https://www.charite.de/fileadmin/user_upload/portal_relaunch/forschung/GutWiss Praxis/2020/Wie_erkenne_ich_Raubjournale.pdf (last accessed 07/06/2024, 18:14)

Clark, N. K. (2019). Shame and Loathing in Academia: For-Profit Education and the Adjunct Crisis. Transformations: The Journal of Inclusive Scholarship and Pedagogy, 29(2), 136–141. https://doi.org/10.5325/trajincschped.29.2.0136

Ensuring open research (2024). https://www.ukri.org/what-we-do/supporting-healthy-research-and-innovation-culture/open-research/#:~:text=UKRI%20aims%20to%20achieve%20open,(the%20FAIR%20Data%20Principles) (last accessed 26/09/2024).

EU's Open Science Strategy 2020-2024 (2020). https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/our-digital-future/open-science_en (last accessed 17/10/2024).

Fell, M. J. (2019). The Economic Impacts of Open Science: A Rapid Evidence Assessment. Publications 2019, 7, 46. https://doi.org/10.3390/publications7030046

Franzen, M. (2014). Grenzen der wissenschaftlichen Autonomie. Zur Eigengesetzlichkeit von Publikationskulturen. In: Franzen, M., Jung, A., Kaldewey, D., Korte, J.: Autonomie revisited – Beiträge zu einem umstrittenen Grundbegriff in Wissenschaft, Kunst und Politik (pp.374-399) Edition: Sonderband 2 der Zeitschrift für Theoretische Soziologie, Beltz Juventa.

Franzen, M. (2016). Open Science als wissenschaftspolitische Problemlösungsformel? In: Simon, D., Knie, A., Hornbostel, S., Zimmermann, K. (eds) Handbuch Wissenschaftspolitik. Springer Reference Sozialwissenschaften. Springer VS, Wiesbaden. https://doi.org/10.1007/978-3-658-05455-7_23

Gibbons, M., Limoges, C., Scott, P., Schwartzman, S., & Nowotny, H. (1994). The new production of knowledge: The dynamics of science and research in contemporary societies. London, Sage.

Harvey, L. and Stensaker, B., 2008, 'Quality culture: understandings, boundaries and linkages', European Journal of Education 43(4), pp. 427–42.

Hecker, S., Haklay, M., Bowser, A., Makuch, Z., Vogel, J., & Bonn, A. (Eds.). (2018). Citizen Science: Innovation in Open Science, Society and Policy. UCL Press. http://www.jstor.org/stable/j.ctv550cf2

Hilgartner, S. (2015). Science and democracy: making knowledge and making power in the biosciences and beyond. Routledge.

Hosseini, M., Hildalgo, E. S., Horbach, S. Guttinger, S. & Penders, B. (2024). Messing with Merton: The intersection between Open Science practices and Mertonian values. Accountability in Research 31 (5): 428-455.

Ingold, T. (2000). The Perception of the Environment: Essays on Livelihood, Dwelling and Skill. Routledge.

Kölbel, M. (2016). Das Bundesministerium für Bildung und Forschung (BMBF) als wissenschaftspolitischer Akteur. In: Simon, D., Knie, A., Hornbostel, S., Zimmermann, K. (eds) Handbuch Wissenschaftspolitik. Springer Reference Sozialwissenschaften. Springer VS, Wiesbaden. https://doi.org/10.1007/978-3-658-05455-7_18

Koenig, T., Vilain, E., LoTempio, J.E. (2023). Open Science? Conceptualizing Openness as an Emerging Moral Economy of Science In: Getzinger, G., Jahrbacher, M. Häller, F.: Conference Proceedings of the STS Conference Graz 2023. https://doi.org/10.3217/978-3-85125-976-6-02

Koerber, A., Starkey, J., Ardon-Dryer, K., Cummins, R. G., Eko, L., Kee, K. (2023). The Predatory Paradox. Ethics, Politics, and Practices in Contemporary Scholarly Publishing, Open Book Publishers. 10.11647/OBP.0364

Limoges, C. (1993). Expert knowledge and decision-making in controversy contexts. Public Understanding of Science 2, 417–426.

Maasen, S., Weingart, P. (2008). Unternehmerische Universität und neue Wissenschaftskultur. In: Matthies, H., Simon, D. (eds) Wissenschaft unter Beobachtung. VS Verlag für Sozialwissenschaften. https://doi.org/10.1007/978-3-531-90863-2_9

Marres, N. (2011). The costs of public involvement: everyday devices of carbon accounting and the materialization of participation In: Economy and society 40 (4), 510-533.

Mauss, M. (2002). The Gift. The Form and Reason for Exchange in Archaic Societies, Routledge.

Max Planck Society's Open Access Initiative (2003): https://openaccess.mpg.de. Last access: 18/10/2024.

Mayer, K. et al. (2020). Empfehlungen für eine nationale Open Science Strategie in Österreich / Recommendations for a National Open Science Strategy in Austria. https://doi.org/10.5281/zenodo.4109242.

Merton, R.K. (1957). Social Theory and Social Structure. Revised Edition, Free Press, New York.

National Open Science Strategy (ENCA) 2023-2027 (03/05/2023): https://www.ciencia.gob.es/en/Estrategias-y-Planes/Estrategias/ENCA.html. Last access: 27/09/2024.

Nowotny H., Scott P.B., Gibbons M.T. (2013). Re-thinking science: Knowledge and the public in an age of uncertainty. John Wiley & Sons.

Oser, F. (2005). Negatives Wissen und Moral In: Benner, Dietrich (Eds.): Erziehung - Bildung - Negativität. Weinheim u.a. : Beltz, S. 171-181. DOI: 10.25656/01:7792

Ouvrir la Science. (2024, June 10). *Home - Ouvrir la Science*. Ouvrir La Science. https://www.ouvrirlascience.fr/home/. Last access: 27/09/2024.

Reichmann, W. (2011), Institutionalizing Scientific Knowledge: The Social and Political Foundation of Empirical Economic Research. Sociology Compass, 5: 564-575. https://doi.org/10.1111/j.1751-9020.2011.00384.x

Research in conversation | University of Oxford. (n.d.). https://www.ox.ac.uk/research/research-in-conversation (last accessed 27/09/2024).

Rössig, W., Dietermann, B., Schultka, Y., Poieam, S. and Moldrzyk, U. (2023). Opening museums' science communication to dialogue and participation: the "Experimental Field for Participation and Open Science" at the Museum für Naturkunde Berlin JCOM 22(04), N01. https://doi.org/10.22323/2.22040801

Santirocchi, A, Spataro, P., Alessi, F., Rossi-Arnaud, C., Cestari, V. (2023): Trust in science and belief in misinformation mediate the effects of political orientation on vaccine hesitancy and intention to be vaccinated. 10.1016/j.actpsy.2023.103945

Science for Change. (2024, September 16). COALESCE project: Science Communication in Europe - Science for Change. https://scienceforchange.eu/en/project/coalesce/ (last accessed 27/09/2024).

Seidl, Horst. (2010). Einführung in die antike Philosophie. Hauptprobleme und Lösungen, Freiburg: Karl Alber.

Shapin, S. (2004). The way we trust now: The authority of science and the character of the scientist. In Trust Me, I'm a Scientist, ed. P. Hoodbhoy, D. Glaser, and S. Shapin, 42-63. London: The British Council.

Social Media Team. (2023, October 27). Communicating Science for Impact: Insights from the ENGAGE.EU Science Communication Workshop at WU - WU Blog. WU Blog. https://blog.wu.ac.at/en/2023/10/communicating-science-for-impact-insights-from-the-engage-eu-science-communication-workshop-at-wu/ (last accessed 27/09/2024).

Stensaker, B., Harvey, L. (2010). Accountability in Higher Education: Global Perspectives on Trust and Power. New York and London: Routledge.

Sörgel, F. (2024). Emotional Drivers of Innovation. Exploring the Moral Economy of Prototypes, Transcript, Bielefeld.

The British Academy (Ed.) (2024). Science for Policymaking: Understanding and enhancing the role of science in public policy debate in the UK. Report to the Prime Minister's Council for Science and Technology from the British Academy. March 2024.

The University of Melbourne. (n.d.). *Pursuit*. https://pursuit.unimelb.edu.au/ (last accessed 27/09/2024)

Winker, M.1 A. et al. (2023). Equity, transparency, and accountability: open science for the 21st century. In: The Lancet, Volume 402, Issue 10409, 1206 - 1209

ZBW (2024): Open Access Mythen. Was ist dran?, retrieved from: https://openeconomics.zbw.eu/wp-content/uploads/2023/09/Open-Access-Mythen.pdf (last accessed 07/06/2024).