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# Technology hype: Dealing with bold expectations and overpromising

Jascha Bareis, Maximilian Roßmann, Frédérique Bordignon

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## **Technology hype**

Dealing with  
**bold expectations**  
and overpromising

**Special topic** Technology hype: Dealing with bold expectations and overpromising

**Research** Chatbots als pädagogische Herausforderung für Schule und Unterricht

**Interview** with D. Shanley: Can the history of Responsible Innovation help us live better with hype?

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# Editorial



**KAREN KASTENHOFER**

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Technikfolgenabschätzung (TA) widmet sich der Analyse möglicher Folgen neuer Technologien und neuer soziotechnischer Infrastrukturen. Sie versucht Entwickler:innen, Anwender:innen, Politiker:innen und Bürger:innen möglichst früh relevantes Wissen bereitzustellen, um eine informierte Meinung bilden und kluge Handlungen setzen zu können. So weit, so gut. Die damit einhergehende starke Zukunftsorientierung wirft allerdings auch lange Schatten, insbesondere wenn sie auf strategisch überzogene Versprechungen und Befürchtungen trifft. Leicht kann TA hier unkritisch befeuern, was der nüchternen Betrachtung bedürfte; leicht kann sie den Fokus auf kaum relevante Nebenschauplätze lenken, wenn die Bearbeitung drängender gesellschaftlicher Problemlagen eventuell ganz anderer Ansätze bedürfte. Dementsprechend werden schon länger Rufe nach kritischer Distanz und stärkerem Gegenwartsbezug durch ‚hermeneutische TA‘, ‚Technologien der Bescheidenheit‘, ‚nüchterne TA‘ oder eine ‚Soziologie der Hoffnungen und Erwartungen‘ in TA und Wissenschafts- und Technikforschung laut.


Die Realisierung solcher Programme erweist sich allerdings als voraussetzungsreich. Längst sind in westlichen Innovationssystemen – in akademischen Karrieren, kompetitiver Forschungsförderung und medialer Darstellung von Technowissenschaft – überzogene (Selbst-)Darstellungen und Versprechungen die Norm geworden. Und nicht nur das: Sie sind diesen geradezu funktional eingeschrieben.

Bescheidenheit mutet hier nicht nur seltsam an, sie gerät schlichtweg zum Störfaktor. Längst sind wir alle ‚exzellente‘ geworden und längst trägt jede technowissenschaftliche Neuerung gleichsam im Alleingang zur Rettung der Welt (oder auch ihrem Untergang) bei. Solch überzogene Darstellungen sind einerseits funktional notwendig (zunehmend gilt nur exzellente und ‚High-Impact‘-Forschung als förderwürdig), sie sind andererseits aber natürlich auch wirklichkeitsverzerrend und dysfunktional. Nicht zuletzt können sie das Interesse der Öffentlichkeit nur kurzfristig anfeuern und gefährden langfristig das Vertrauen in Innovationseliten, ihre Vertreter:innen, Institutionen und Interventionen.

Welche Möglichkeiten gibt es nun für TA, solch überzogenen Ansprüchen dort entgegenzuhalten, wo sie offensichtlich dysfunktional werden? Wie funktionieren ‚Hypes‘ und welche Wirkung entfalten sie im Detail? In dieser Ausgabe von TATuP finden sich aktuelle Antworten auf diese Fragen, mit denen wir uns bestimmt noch länger auseinandersetzen werden.

Ich wünsche viel Spaß bei der Lektüre!

*Karen Kastenhofer*

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## Technology hypes, expectations and overpromising

*The term 'hype' can be understood as both descriptive and action-guiding. This TATuP Special topic contributes to a better understanding of the temporal and institutional dynamics that create, fuel and maintain hypes in order to better anticipate, deconstruct and criticize them.*

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# TA Focus 32/3 (2023)

## News for the TA community/ Meldungen für die TA-Community

Jonas Moosmüller<sup>1</sup>, Maximilian Roßmann<sup>2</sup>, Steffen Albrecht<sup>3</sup>, Reinhard Grünwald<sup>3</sup>

### EUROPA

#### Vorschläge zu künftiger Politikberatung

Die Rolle der Wissenschaft bei der Vorbereitung politischer Entscheidungen war selten so prominent – und zuweilen auch umstritten – wie während der COVID-19-Pandemie. Vor diesem Hintergrund hat die Generaldirektion ‚Research and Innovation‘ der Europäischen Kommission untersuchen lassen, wie das wissenschaftliche Beratungssystem verbessert werden kann. Der im Oktober 2023 erschienene Bericht befasst sich mit aktuellen Trends wie dem wachsenden Einfluss von KI-gestützten Vorhersagen auf politische Entscheidungen, der Konzentration auf auftragsorientierte Forschung oder der zunehmenden Beteiligung von Bürgerinnen und Bürgern an der Wissenschaft. Der Bericht weist auch auf die Notwendigkeit hin, wissenschaftliche Meinungsverschiedenheiten und die Ungewissheit, die mit großen gesellschaftlichen Herausforderungen verbunden ist, besser zu berücksichtigen. Es sei wichtig anzuerkennen, dass sowohl die Wissenschaft als auch die Politik wertebasiert und Wertedebatten ein wichtiger Bestandteil von Beratungsmechanismen sind.

[op.europa.eu/en/home](http://op.europa.eu/en/home)

<sup>1</sup> Institute for Technology Assessment and Systems Analysis (ITAS), Karlsruhe Institute of Technology (KIT), Karlsruhe, DE

<sup>2</sup> Faculty of Arts and Social Sciences, Maastricht University, Maastricht, NL

<sup>3</sup> Office of Technology Assessment at the German Bundestag (TAB)

### POLITIKBERATUNG

#### TA für den Deutschen Bundestag

Auch in den kommenden fünf Jahren wird das Institut für Technikfolgenabschätzung und Systemanalyse (ITAS) die parlamentarische Arbeit des Bundestags mit unabhängiger wissenschaftlicher Expertise unterstützen. Am Büro für Technikfolgen-Abschätzung (TAB) beobachten Forschende des ITAS bereits seit 1990 wissenschaftlich-technische Trends, erstellen Analysen zu aktuellen forschungs- und technologiepolitischen Fragen und identifizieren Innovations-

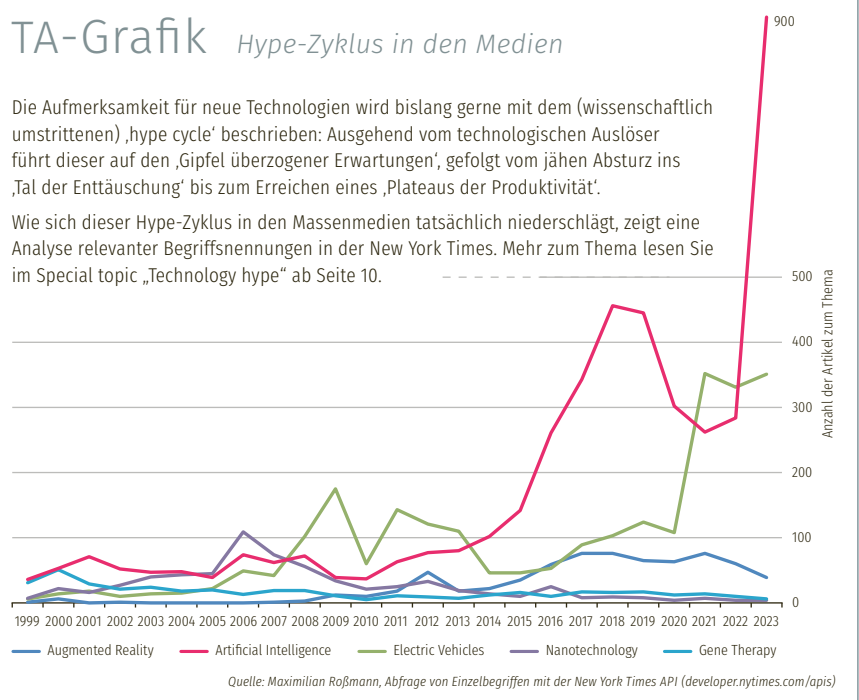
potenziale. Partner für den Zeitraum bis 2028 sind wie zuvor das IZT – Institut für Zukunftsstudien und Technologiebewertung und der VDI/VDE Innovation und Technik. Um Handlungsoptionen für das Parlament künftig noch präziser zu identifizieren, erweitert das TAB sein Methodenspektrum, etwa mit digitalen Datenanalysen und partizipativen Szenariomethoden. Zugleich sollen die Foresight-Aktivitäten den Fokus noch stärker auf Innovation und transformative Resilienz legen. Darüber hinaus hat sich das TAB vorgenommen, die Sichtbarkeit seiner Ergebnisse auch außerhalb des Bundestages zu erhöhen.

[www.tab-beim-bundestag.de](http://www.tab-beim-bundestag.de)

### TA-Grafik *Hype-Zyklus in den Medien*

Die Aufmerksamkeit für neue Technologien wird bislang gerne mit dem (wissenschaftlich umstrittenen) ‚hype cycle‘ beschrieben: Ausgehend vom technologischen Auslöser führt dieser auf den ‚Gipfel überzogener Erwartungen‘, gefolgt vom jähen Absturz ins ‚Tal der Enttäuschung‘ bis zum Erreichen eines ‚Plateaus der Produktivität‘.

Wie sich dieser Hype-Zyklus in den Massenmedien tatsächlich niederschlägt, zeigt eine Analyse relevanter Begriffsnennungen in der New York Times. Mehr zum Thema lesen Sie im Special topic ‚Technology hype‘ ab Seite 10.



## STADTFORSCHUNG

## 50 Jahre Difu

Welche Spielräume haben Kommunen, bezahlbaren Wohnraum zu schaffen? Wie kann eine ökologisch und sozial verträgliche Mobilität in der Stadt gewährleistet werden? Und wie können Städte die Vorteile von Digitalisierung und KI nutzen? Seit dem Jahr 1973 beschäftigt sich das Deutsche Institut für Urbanistik (Difu) mit den täglichen Herausforderungen von Stadtverwaltungen und Kommunalpolitik. Gegründet wurde das gemeinnützige Institut auf Initiative des Deutschen Städtetags unter dem Motto ‚Rettet unsere Städte jetzt!‘. Heute beschäftigt es knapp 200 Mitarbeitende am Hauptsitz in Berlin und einer Außenstelle in Köln. Das langjährige Mitglied im Netzwerk Technikfolgenabschätzung (NTA) ist damit das größte Stadtforschungsinstitut im deutschsprachigen Raum. Seinen 50. Geburtstag feiert das seit 2018 von Carsten Kühl geführte Institut mit einer Fachveranstaltung zu aktuellen Herausforderungen wie Klimawandel und Wohnen, unter anderem mit Bundesbauministerin Klara Geywitz.

[difu.de/50-jahre-difu](http://difu.de/50-jahre-difu)

## BETEILIGUNG

## Bürgerdialog bereichert Forschungsagenda

Einen ganzen Nachmittag Zeit nahmen sich am 14. Oktober 2023 in Karlsruhe über 30 Menschen unterschiedlicher Altersgruppen, um zu diskutieren, wie sich Klimaschutz für Bürgerinnen und Bürger lohnen könnte. Organisiert wurde die Dialogveranstaltung vom Institut für Technikfolgenabschätzung und Systemanalyse (ITAS) im Rahmen der zweiten Science Week des Karlsruher Instituts für Technologie. Das Besondere an dem Format: „Die Bürgerinnen und Bürger hatten bei uns nicht nur die Möglichkeit, eigene Ideen zu entwickeln. Vielmehr sollen ihre Vorschläge auch tatsächlich in der Forschungsagenda des KIT be-



Bildquelle: Sabine Arndt

## 5 Fragen an Herbert Paschen

*Im Jahr 1995 Gründungsdirektor des Instituts für Technikfolgeabschätzung und Systemanalyse (ITAS) und im Jahr 1990 des Büros für Technikfolgen-Abschätzung beim Deutschen Bundestag (TAB)*

### **Sie gelten als Wegbereiter der TA in Deutschland. Woher rührt Ihr Interesse für das Forschungsgebiet?**

Bereits in den 1960er-Jahren hat eine öffentliche Debatte über ökologische Auswirkungen des Einsatzes neuer Techniken eingesetzt. Damit einher ging die Forderung, die Informationsgrundlagen für politische Entscheidungen zu verbessern. Das hatte großen Einfluss auf meine Arbeit in der Heidelberger Studiengruppe für Systemforschung und später für die TA in Karlsruhe. Vorbild war das Office of Technology Assessment beim US-Kongress, zu dem ich auch persönliche Kontakte hatte.

### **Was ist für Sie Kern der politikberatenden Technikfolgenabschätzung?**

Den sehe ich in ihrem unmittelbaren Handlungs- und Entscheidungsbezug. Fester Bestandteil aller TA-Analysen ist die Entwicklung von Handlungsoptionen, z. B. gesetzliche Maßnahmen zur Verhinderung oder zur Förderung bestimmter Anwendungen einer neuen Technologie.

### **Mit dem TAB haben Sie den Grundstein für die parlamentarische TA gelegt. Was überwog bei den Abgeordneten, Begeisterung oder Skepsis?**

Begeisterung war wenig zu spüren. Der Vorschlag der Enquete-Kommission sah einen

dreijährigen Modellversuch vor und wurde überwiegend skeptisch beurteilt. Qualität und Nutzen der in dieser ‚Probezeit‘ durchgeführten Projekte waren entscheidend für den Beschluss, die TA langfristig beim Deutschen Bundestag zu institutionalisieren.

### **KI-Technologien sind derzeit in aller Munde. Gibt es Zukunftstechnologien, die daneben zu wenig Beachtung finden?**

Die digitale Transformation wird zweifellos tiefgreifende Auswirkungen in allen Bereichen der Gesellschaft haben. Die TA wird signifikante Beiträge zur Bewältigung dieser Herausforderungen zu leisten haben. Dies gilt auch für andere gesellschaftliche Zukunftsaufgaben, die ohne neue Technologien nicht zu lösen sind, z. B. ein klimaverträgliches Verkehrssystem.

### **Hand aufs Herz: Haben Sie bei der Einschätzung von Technikfolgen in Ihrer langen Karriere auch schon einmal danebengelegen?**

Ich glaube, dass meinen früheren Mitarbeiterinnen und Mitarbeitern und mir das erspart geblieben ist. Generell kann es aber leicht zu Fehlrteilen kommen, wenn es um Techniken mit potenziell weitreichenden, anfangs jedoch kaum abschätzbaren Folgen geht.

DETAILED VIDEO INTERVIEWS AVAILABLE AT [www.tatup.de/youtube](http://www.tatup.de/youtube)



## Aus dem openTA-Kalender

### 31. 01.–01. 02. 2024, PADERBORN

4. Fachtagung Integrierte Forschung: Mensch-Technik-Verhältnisse transdisziplinär reflektieren und gestalten  
*integrierte-forschung.net/cluster/fachtagungen*

### 14.–16. 02. 2024, GRAZ

18. Symposium Energieinnovation: Europas Energiezukunft – Sicher, leistbar, sauber!?!  
*www.tugraz.at/events/eninnov2024*

### 11.–12. 04. 2024, DRESDEN

Konferenz ‚Reallabore – ExperimentierRäume für den Weg in eine nachhaltige Gesellschaft‘  
*www.ioer.de/veranstaltungen/rlnk2024*

### 06.–08. 05. 2024, GRAZ

The 22<sup>nd</sup> annual STS conference Graz 2024 ‚critical issues in science, technology and society studies‘  
*www.stsconf.tugraz.at/*

### 09.–10. 05. 2024, KARLSRUHE

17<sup>th</sup> society and materials conference (SAM17)  
*www.itas.kit.edu/english/events\_2023\_sam17*

### 23.–24. 05. 2024, BERLIN

Tagung ‚Expertise in digitaler Transformation‘  
*soziologie.de/aktuell/news/expertise-in-digitaler-transformation-mai-2024*

### 04.–07. 06. 2024, ENSCHEDE

EU-SPRI Annual Conference 2024: Governing technology, research, and innovation for better worlds  
*www.utwente.nl/en/euspri2024/*

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rücksichtigt werden“, so Marius Albiez, der am ITAS die Veranstaltung mitkooptiert hat. „Beeindruckt von der Vielfalt der Ideen“ zeigte sich dementsprechend auch die neue Vizepräsidentin für Digitalisierung und Nachhaltigkeit des KIT, Professorin Kora Kristof, die bereits vor Ort mögliche Anknüpfungspunkte für die Forschung identifizierte und die Ergebnisse entgegennahm.

[www.itas.kit.edu/buergerdialog](http://www.itas.kit.edu/buergerdialog)

## REALLABORE

### Stellungnahme zu Reallabor-Gesetz

Das Bundesministerium für Wirtschaft und Klimaschutz (BMWK) will für die Interaktion von Wissenschaft und Gesellschaft in Reallaboren einen gesetzlichen Rahmen schaffen. Im Zusammenhang des Konsultationsprozesses zu der Gesetzesinitiative hat das Netzwerk ‚Reallabore der Nachhaltigkeit‘ eine Stellungnahme veröffentlicht. „Die Reallabore-Gesetz-Initiative ist grundsätzlich begrüßenswert, letztlich aber kommt es auf deren konkrete Umsetzung an“, sagt

Oliver Parodi, der Sprecher des Netzwerks. „Wichtig sind hierbei“, so Parodi, „eine konsequente Nachhaltigkeitsorientierung, weitreichende Partizipation und ergebnisoffenes Experimentieren sowie das Grundverständnis, dass Reallabore dem gesellschaftlichen und wissenschaftlichen Lernen dienen.“ Das 2019 gegründete ‚Netzwerk Reallabore der Nachhaltigkeit‘ versteht sich als Anlaufstelle und Plattform für Reallabore im deutschsprachigen Raum sowie für alle an nachhaltiger Entwicklung Interessierte. Es umfasst 50 Organisationen sowie über 80 aktive und abgeschlossene Reallabore.

[www.reallabor-netzwerk.de](http://www.reallabor-netzwerk.de)

## PARLAMENTARISCHE TA

### EPTA-Konferenz in Barcelona

Generative künstliche Intelligenz war das Thema der diesjährigen EPTA-Konferenz. Die jährlich stattfindende Tagung der europäischen Vereinigung von Institutionen für parlamentarische TA fand am 9. Oktober 2023 in Barcelona statt. Vier Mitglieder des Deutschen Bundes-

tages waren angereist, um sich im katalanischen Parlament mit Forschenden und zahlreichen Abgeordneten anderer Parlamente über die neuesten Entwicklungen auf dem Gebiet der generativen KI und die Rolle der TA auszutauschen. Der New Yorker Psychologe und Neurowissenschaftler Gary Marcus zeigte in seiner Keynote bestehende Unzulänglichkeiten der Text- und Bildgeneratoren auf und mahnte eine verantwortungsvolle Weiterentwicklung an. Er plädierte zudem für eine verpflichtende Überprüfung von KI-Systemen durch unabhängige wissenschaftliche Institutionen. In drei Sessions wurden die Chancen, Risiken und Herausforderungen der Anwendungen in Bezug auf die Politikbereiche Gesundheit, Bildung und Arbeit diskutiert. Im Fokus stand zudem die Frage, wie die dynamische Entwicklung besser an demokratischen Werten ausgerichtet werden kann. Der auf der Konferenz vorgestellte EPTA-Bericht präsentiert die aktuellen Debatten über generative KI in den verschiedenen Ländern und die damit verbundenen Anforderungen an die Technikfolgenabschätzung.

[www.parliament.cat](http://www.parliament.cat) (EPTA-Bericht und Videoaufzeichnung der Tagung)

## EUROPA

## Foresight für EU-Parlament

Der Wissenschaftliche Dienst des Europäischen Parlaments (EPRS) hat die Aufgabe, Abgeordnete mit wissenschaftlich fundierten Studien und Recherchen zu unterstützen. Um das Parlament künftig auch in den Themenfeldern ‚Strategic Foresight‘ und ‚Technikfolgenabschätzung‘ zu beraten, hat der EPRS im Juli 2023 einen Rahmenvertrag mit dem DLR Projektträger geschlossen. Dieser ist beim Deutschen Zentrum für Luft- und Raumfahrt angesiedelt und arbeitet wiederum mit Unterauftragnehmern aus mehreren EU-Mitgliedsstaaten zusammen, etwa dem Institut für qualifizierende Innovationsforschung und -beratung (IQIB), dem Danish Board of Technology, der Spanish Foundation for Science and Technology (FECYT) und der Stiftung für Technologiefolgen-Abschätzung TA-Swiss. Das Portfolio an möglichen Aufträgen umfasst neben Studien zu Foresight und TA auch Briefings für Mitglieder des Europäischen Parlaments. Außerdem soll der DLR Projektträger Veranstaltungen für Abgeord-

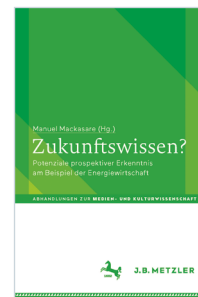
nete oder Fachleute organisieren sowie Kommunikationsmaterialien erstellen. [projektraeger.dlr.de](mailto:projektraeger.dlr.de)

## PUBLIKATION

Blick in die Energie-  
Glaskugel

Der Sammelband ‚Zukunftswissen?‘ fragt am Beispiel der Energiewirtschaft nach den Potenzialen prospektiver Erkenntnis. Die Beiträge des auf einer Tagung der Ruhr-Universität Bochum basierenden Bands kommen aus vielfältigen Fachrichtungen, von der Technikfolgenabschätzung über die Technikphilosophie und Ökonomik bis hin zur Literaturwissenschaft. Aus TA-Perspektive interessieren insbesondere die Beiträge von Armin Grunwald und Gesine Lenore Schiewer. Für ersteren ist die Validität von Energieszenarien vor allem eine Frage nach ihrem Zustandekommen und damit nach den ihnen zugrundeliegenden normativen Annahmen, Visionen und Utopien. Armin Grunwald setzt sich zudem kritisch mit der Annahme auseinander, es gäbe eine

datenbasierte ‚beste Lösung‘, die von politischen Entscheiderinnen und Entschcheidern nur noch verwirklicht werden müsse. Gesine Lenore Schiewer, Lehrstuhlinhaberin für Interkulturelle Germanistik an der Universität Bayreuth, nimmt in ihrem Beitrag ‚Emotionen als Komponente der Zukunftsforschung‘ in den Blick. Sie weist unter anderem darauf hin, dass bestimmte Emotionen wie ‚Angst‘ im Kontext der Zukunftsforschung häufiger aufgegriffen werden als positive Gefühlsregungen.



Mackasare, Manuel (Hg.)

**Zukunftswissen?** Potenziale prospektiver Erkenntnis am Beispiel der Energiewirtschaft. Berlin: J. B. Metzler, 2023, 370 S., 74,99 €, ISBN 9783662667552

## Personalia

Bildquelle: M. Pollert/Wuppertal Institut



**MELANIE SPECK**, Professorin an der Hochschule Osnabrück und Senior Researcherin im Forschungsbereich Produkt- und Konsumsysteme am Wuppertal Institut, unterstützt künftig den ersten Bürgerrat des Deutschen Bundestags. Der Bürgerrat beschäftigt sich in den kommenden Monaten mit dem Thema ‚Ernährung im Wandel – Zwischen Privatangelegenheit und staatlichen Aufgaben‘. Zusammen mit zehn weiteren Forschenden wurde Melanie Speck von den Fraktionen benannt, um die Arbeit der per Los ermittelten Bürgerinnen und Bürger zu begleiten. Speck forscht unter anderem zur Nachhaltigkeitsbewertung und zur gesellschaftlichen Transformation in Ernährungssystemen.

Bildquelle: OTH Regensburg/Michael Hitz



**KARSTEN WEBER** ist in den wissenschaftlichen Beirat für den Forschungsbereich ‚Information‘ am Karlsruher Institut für Technologie (KIT) berufen worden. Das Gremium steht dem KIT-Vorstand beratend zur Seite, begleitet die laufende Forschung und hat „einen starken Einfluss auf strategische Entscheidungen zur Forschungsausrichtung im Bereich Information“. Karsten Weber, der selbst in Karlsruhe promoviert hat, lehrt und forscht seit 2013 an der OTH Regensburg und ist dort Co-Leiter des Instituts für Sozialforschung und Technikfolgenabschätzung (IST). Im Oktober 2022 hat Weber die Forschungsprofessur ‚Technikfolgenabschätzung für KI-gestützte Mobilität‘ an der OTH Regensburg übernommen.



**ARMIN GRUNWALD** hat den Bad Herrenalber Akademiepreis für das von ihm geleitete Institut für Technikfolgenabschätzung und Systemanalyse (ITAS) entgegengenommen. Die Auszeichnung würdigt die Verdienste der TA in Karlsruhe um den Dialog zwischen Wissenschaft, Gesellschaft und Theologie. Gernot Meier, der kommissarische Direktor der Akademie, hob die bedeutende Rolle hervor, die das ITAS bei der Beratung von Politik und Öffentlichkeit erlangt habe. Eine Rolle, mit der das Institut und sein Leiter aber bescheiden umgehen würden: „Statt technokratisch [...] Lösungen mit der Autorität der Wissenschaft zu empfehlen, wird stets die Notwendigkeit alternativer Optionen und Meinungen [...] betont“, so Meier.

SPECIAL TOPIC

# *Technology hype: Dealing with bold expectations and overpromising*

*Technologie-Hype:*

*Der Umgang mit überzogenen Erwartungen und Versprechungen*

Edited by J. Bareis, M. Roßmann, and F. Bordignon



## INTRODUCTION

# Technology hypes: Practices, approaches and assessments

Jascha Bareis<sup>\*1,2</sup> , Maximilian Roßmann<sup>3</sup> , Frédérique Bordignon<sup>4,5</sup> 

**Abstract** • To date, the study of hype has become a productive but also eclectic field of research. This introduction provides an overview of the core characteristics of technology hype and distinguishes it from other future-oriented concepts. Further, the authors present promising approaches from various disciplines for studying, critiquing, and dealing with hype. The special issue assembles case studies, methodological and theoretical contributions that analyze tech hypes' temporality, agency, and institutional dynamics. It provides insights into how hypes are triggered and fostered, but also how they can be deconstructed and anticipated.

**Technologie-Hypes: Praktiken, Ansätze und Abschätzungen**

**Zusammenfassung** • Mit der Erforschung von Hypes ist ein produktives, aber auch vielschichtiges Forschungsfeld entstanden. Ziel dieser Einführung ist es, einen Überblick über die zentralen Merkmale von Technologie-Hypes zu geben und diese von anderen zukunftsorientierten Konzepten abzugrenzen. Darüber hinaus stellen die Autor\*innen vielversprechende Ansätze aus verschiedenen Disziplinen zur Untersuchung, Antizipation und zum Umgang mit Hype vor. Das Sonderheft versammelt Fallstudien, methodische und theoretische Beiträge, die die Zeitlichkeit, das Handeln und die institutionelle Dynamik von Tech-Hypes analysieren. Es bietet Einblicke, wie Hypes ausgelöst und gefördert werden, aber auch wie sie dekonstruiert und antizipiert werden können.

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**Keywords** • *hype, overpromising, expectations, emerging technology*

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"Hyper! Hyper!  
We need the bass drum!  
Come on!"<sup>1</sup>

## Introduction

Technology assessment (TA) has been highly productive in discussing the power and problems of technology expectations, futuristic communication, and their overpromising. Situating TA in societal context, ranging from political debates to the attention economy in social media, sheds light not only on the analysis of hype but also on the 'modulation' of visions to reach wider audiences. This may include unheard or neglected voices and arguments in technology development and its critiques, e.g., to reach sustainable development goals (Dierkes et al. 1996; Grunwald 2015; Rip 2006; Schneider et al. 2023).

In contrast to 'vision' or 'expectation', calling technology 'hype' is both descriptive and action-guiding. It suggests a temporal dynamic of attention and confidence in projected technological change – an increase followed by a decrease – and points to the question of inappropriate attitude and reaction, given the context of a debate. At stake are taking poor public policy decisions, misdirecting financial resources, the lack of studying more pressing societal consequences, and, more generally, jeopardizing trust in science (Intemann 2020; Löfstedt 2003).

However, TA has never been alone in developing methods to study and find a response to technology hype. This Special topic in the *Journal for Technology Assessment in Theory and Practice* seeks to highlight the variety of approaches from dif-

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<sup>1</sup> "Hyper Hyper" is a song by German band Scooter, released in May 1994 from their debut album, "... and the Beat Goes On!" (1995).

ferent disciplines and the internationality of cases. Herewith the issue contributes to a better understanding of temporalities, agency, and institutional dynamics that provoke, fuel and maintain hypes, and provides knowledge to better anticipate, deconstruct and criticize them.

## Joint efforts to narrow down the phenomenon: dimensions and characteristics of technology hypes

### Rhetorics and the emotional appeal of overpromising language

By means of bold statements, superlatives and exaggerated claims, hypes appeal to emotions to seek attention. Historical analogies to break-throughs or reference to fictional literature serve tech-evangelists to claim proficiency and reliable guidance in uncertain times. Cherishing narratives of approaching disruptions suggest societal roles and call for requirements to be met, so a specific goal can be achieved (Mische 2014; Van Lente and Rip 1998). People often share technology narratives for the sake of excitement, however, often ignoring how they assemble and change the meaning of arguments, facts, and data, e.g. at a scenario workshop (Roßmann 2021).

Ideally, “imagination under constraints” of beliefs and scientific knowledge allow for societal learning (Kind 2016, p. 3). The simulated experience of technological consequences (by means of illustrative imagery, or stories in place of an argumentation) reaches wider audiences and can help to bridge boundaries between disciplines, publics and institutions (Dierkes et al. 1996; Lösch 2006). However, by means of emotional appeal and dramatization, narrative communication can also bypass the rational assessment of statements (Green and Brock 2000). This

potentially conflicting communication aims. It urges us to carefully consider the context, speech positions and audience, when technological novelties are announced.

### Temporality and the play with attention spans

The three ‘musketeers’ of rhetoric – *ethos*, *pathos* and *logos* – are occasionally supplemented by *kairos*, which is the opportune moment for action. Hypes gain their real performative momentum by pointing to vast opportunities that lie ahead, which ask for the right timing if great potentials shall not be lost. Hence, temporality is a crucial dimension for understanding and negotiating technology expectations.

Popular technology narratives structure salient societal discourses on technology and usually refer to bigger time-spans. The studies of socio-technical imaginaries (Jasanoff and Kim 2009), for example, reveal differences in common understandings of technology projects in society, informing about hopes and concerns in project proposals or policy papers that consider large future trajectories (e.g. see Bareis and Katzenbach 2022 for staging Artificial Intelligence; or Mosco 2005 for the study of the cyberspace metaphor).

Technology hypes, however, radically focus on temporal prominence. Stressing the opportunity costs is a distinctive feature of hypes, who urge followers to act instantly, take risks and think boldly. Thereby hype narrows down remembrances of the past and, likewise, future trajectories to come. While narratives, visions and imaginaries rather mark the cultural background that persists over a longer period of time, technology hypes foreground peak and outlier achievements of tech development. Hereby, they give relevance to certain claims for only a limited period of time. Hypes are the opportunists among future tellers, who ride on the wave of attention and are less interested in the long-term societal consequences of what happens

## *Hypes appeal to emotions to seek attention.*

emotional celebration of statements is characteristic of hype – and risks turning an informative and appealing story into a sensationalist one.

Social media has further increased this phenomenon. Big tech platforms reinforce outreach and attention to a topic by a system of likes, shares, hails and reposts. Here, research has shown that communication and algorithmic content moderation on platforms supports sensationalism and click-baiting. It is emotional and controversial posts, and especially visual material over factual and descriptive content, that become featured in timelines by users (Gillespie 2018; Gorwa et al. 2020). Such attention-seeking logic on platforms certainly contributes to an environment that nourishes hyping as it elicits emotional appeal and impulsive action over critical reflection.

Given this large influence of language, deliberate and responsible communication about technology requires reflection about

when the wave collapses. Comparing hype cycles therefore studies the attention and popularity of technologies and their claims by means of time-row analysis of publication counts in newspapers or social media, citation counts, or patent applications (Dedehayir and Steinert 2016). One can also draw on discourse analysis or stakeholder interviews, for instance to assess confidence in stock market trends. The representation of a hype cycle according to Gartner Consulting, which follows the evolution of hype from an attention trigger, over a peak of inflated expectations, to a trough of disillusionment – until state of affairs stabilize in a plateau of productivity, is particularly popular (Linden and Fenn 2003). Though, due to its missing empirical validation, weak theoretical grounding, and instrumental use for claiming future developments with the authority of a seemingly scientific representation, Rip (2006) calls the model a “folk theory” (p. 362).

Time is a crucial factor in the phenomenon of hype – both as a constitutive feature (hypes need the future trajectory in order to gain momentum), and also as an analytical dimension (e.g., when studying the attention span in the building up and waning of a hype).

### Impression management and the creation of followership and collaboration

The possibility to learn from imagining futures and to influence how others imagine them with pretense practices, invites various stakeholders for strategic actions and engage in the “politics of expectations” (Beckert 2016, p. 79). Recalling *kairos* above: Observing a trend as hype points to a short window of

spectives and indicating how one would act if a certain scenario unfolds, generates a common ground for individuals or organizations to understand each other and plan with mutual assurances. Two extreme poles can be distinguished that both allow for coordination: either a situation of mutual trust, where stakeholders understand and rely on each other, or the situation of mistrust, when all statements about the future are perceived as strategic performances resulting from profit or power striving. The study of hypes and overpromising provides insights into popular expectations and their reactions. Mische (2014) suggests developing digital methods to study ‘projective grammars’ that can further indicate e.g., the perceived openness and attitude of different actors to shape or collaborate in the future.

*Hypes gain their real performative momentum by pointing to vast opportunities that lie ahead, which ask for the right timing if great potentials shall not be lost.*

opportunity to instrumentally exploit the attention for one’s own purpose. Especially on social media, the strategic use of certain buzzwords, hashtags and prefixes, like *AI*, *nano-*, *smart-*, or *green-*, helps actors to reach a wider audience, even though actors know that there is little or no shared understanding of the term (Bensaude Vincent 2014). The relationship between leaders and their followers is shaped sustainably by ‘impression management’ that instills attention and authority in promises about products, applications, or tech-companies. It becomes visible when one follows actors and objects across different sites, revealing differences between ‘front region’ performances and statements and actions ‘backstage’ in team meetings or the laboratory (Goffman 1990, p. 69). Technology presentations, such as the release of a new iPhone (Sharma and Grant 2011) or the advertisement of air-taxis (Woznica 2022) strategically highlight and disguise expectations. As ‘narrative accelerators’ they fuel public discourse and can further bloat an emerging bubble (Goldfarb and Kirsch 2019). In interaction with their own communities of practice, scientists tend to easily reject certain visions but still strategically use these narratives to gain funding or legitimacy from politicians (Selin 2007). Birch (2017), therefore, understands not the expectations of successful technological applications but the expectation to increase the value of research assets, such as networks, laboratory equipment, or topical knowledge, as a major driving force in techno-scientific capitalism. The economic, social, and cultural capital required for (strategic) ‘future making’ also sheds light on unequal speaker positions to advocate for neglected concerns or more ‘profane’ and less technocentric visions, such as job opportunities (Sand 2019).

Finally, imagined futures serve as a projective space to coordinate actions (Van Lente and Rip 1998). Sharing problem per-

Although our call for papers drew attention to the fact that digitization of mass media also necessitates a revision of methods for studying imagined futures and that we are particularly interested in computational methods, we received hardly any submissions from this field. In our opinion, TA is a welcoming interdisciplinary niche for experimenting with new methodological approaches. We would therefore call our colleagues to follow up, e.g., with the study of hype language in scientific publications by word lists (Bordignon et al. 2021; Millar et al. 2019; Vinkers et al. 2015), or with the use of metrics of significance (like citation surge or betweenness centrality) to identify emerging trends and potential hypes (Chen 2006; Chen et al. 2012).

### Dealing with hype: How and when to intervene?

Actors can be stuck in ‘lock-ins’ when promises call for action and stakeholders are on the spot to deliver on their bold claims. Such lock-ins hinder organizations to acknowledge ‘uncomfortable knowledge’ or to share relevant information, which can spur worrisome trajectories based on misguided beliefs (Rayner 2012). Exchanging expectations about potential but unproven harms or benefits of technology is indispensable for reflecting about societal change, though. It is the realm of shared imagined futures that allows for debates, self-reflection and strategic planning about the use and misuse of technology and their societal consequences.

How, though, can we assess when a red line is crossed regarding economic market power and an overheated discursive situation? When do some players gain too much attention and lock society in unwanted path-dependencies? Assessing the dis-

course on Nanoethics, Nordmann (2007) prominently warned of the looming danger of futuristic ‘tunnel visions’ that draw all attention and ‘ethical resources’ away from other, more pressing issues. Also, Vinsel (2021) understands the criti-hype as an academic business model. Others argue that it may only be right that TA not only analyzes but speaks out for the instrumental use of visions, e.g., to foster democratic values and sustainable development goals (Dierkes et al. 1996; Schneider et al. 2023). Grunwald (2010) argued that enabling public debates about technology in society makes imaginaries available for technology development and can, thus, justify or outweigh the danger of tunnel visions. However, the question remains when and why such an instrumental use of imagined futures becomes inappropriate. Auch (2013) suggests that there is no checklist answer but we

presented in national strategies. Their analysis considers how this policy discourse is collaboratively shaped by scientists, politicians, and industry. They challenge current models of hype in science and innovation, mainly the Gartner hype cycle, and propose the ‘hype helix’, a model that captures the cyclical and iterative nature of hype in research.

Arora and Sarkar endeavor to go beyond hype as a discursive process by redescribing it also as a mnemonic device. They show how tech hype, when applied to emerging technologies like blockchain, can influence the way complex societal problems, such as land rights in India, are (mis-)remembered. Their study highlights the danger of oversimplification and selective presentation of benefits – mainly a solution to corruption and an improvement of land titles management – which overlooks the

## *Actors can be stuck in 'lock-ins' when promises call for action and stakeholders are on the spot to deliver on their bold claims.*

can only train our ‘virtue of proportionality’. As Dani Shanley illustrates in her TATuP interview (this issue), the history of TA and Responsible Research and Innovation (RRI) also provides some learnings on this.

An even more hands-on treatment of technology hypes would be the building of scenario pathways. Here, policy makers can discuss potential future trajectories and ground lofty discourses with plausibility. This helps them to assess the complexity and ambiguity of future developments and structure messy and contradictory future discussions. The benefits are manifold. Policy makers can escape dominant thought patterns and dive into different epistemic and power positions of actors in society, giving space to silenced and neglected discourses. The biggest benefit of scenarios in the context of hype, though, is to strengthen one’s own strategic orientation in the midst of societal crisis, or technology glorification by some attention-seeking actor. The knowledge about different scenarios allows policy makers a strategic-resilient treatment of exuberant promises, encouraging them not to jump on every bandwagon a tech-hype proclaims.

### Presentation of the volume

The contributors to this TATuP Special topic have used different methods to respond to our call to deconstruct technological hypes: Some have developed an original analytical framework, others have used interviews and field observations, some have proposed case studies, and finally a few others have also supplemented their study with a quantitative approach.

Roberson et al. examine the dynamics of hype in the field of quantum technology by deconstructing core arguments pre-

complexities and nuances of India’s land tenure system and the potential negative consequences for marginalized groups.

In his study of exaggerations in debates surrounding social experiments, Neuwinger also finds a tendency among both advocates and critics to overstate benefits and understate risks. This stems from a reductive, tool-based mindset that glosses over complexity by equating social experiments with drug trials, and solely defining impact in causal terms.

Züger et al. demonstrate how the performative nature of expectations has significant implications for actors within the public interest AI field. Their research, employing case studies and interviews, unveils the paradoxical position of actors in public interest initiatives. While they gain support and benefit from the community-building which fosters AI hype, they also maintain a critical stance, acknowledging the risks of unreliable funding and emphasizing the priority of addressing societal needs.

Kari et al. leverage the sociology of expectations perspective to offer valuable insights into the intricate interplay of hype and promises within the domain of nuclear technologies, particularly small modular reactors (SMRs). With the analysis of publication counts and ‘hype language’ in a Finnish newspaper, they highlight the crucial role of techno-scientific promising in shaping innovation trajectories. They show how the media serves as a key arena where proponents and critics battle over SMRs promises (e.g., cutting carbon emissions and enhancing energy security) leading to SMR topicality, hyping, and eventual deconstruction.

Meunier and Herzog clarify the relationship between a long-term socio-technical imaginary, such as precision medicine, and shorter-term technological hypes, including advancements in omics and AI technologies. They consider that an improvement in the assessment of precision medicine requires a cautious and

realistic approach that considers the long-term developments, including previous disappointments, as well as limitations that have hindered the realization of promises being made.

Both Frisch and Gaillard et al. unpack the concept of overpromising and provide new definitions. Frisch sees overpromising as a distinct feature of companies' imagined business futures in response to decarbonization pressure. He suggests that overpromises emerge from contradictions between a company's inevitable profit orientation, the exaggeration and misrepresentation of an organization's estimated potential to restructure itself, and the systemic pressure and bandwagon of performative commitments. Eventually, promoting optimistic narratives about achieving a decarbonized economy can paradoxically hinder climate action by creating a false sense of achievement and delaying necessary measures.

Gaillard et al. explore overpromising as a common feature of scientific discourse, particularly in fields such as nanoscience. In their multidisciplinary approach, combining signaling theory, philosophy of promising, and science studies research on scientific communication, they put forth a conceptualization that facilitates the identification and assessment of overpromises. They emphasize the importance of considering the context of knowledge available when assessing promises and delineating the crucial factors for assessing the plausibility of claims being made.

Some of the case studies that the authors have chosen to present raise issues that ethicists should help to address. But according to Pichl, ethicists can also contribute to hype as she shows in an investigation within the field of stem cells, where therapeutic promises are often used as moral arguments for funding and research-friendly regulation. Pichl's research article clearly demonstrates how this contributes to the hype surrounding stem cell research and its potential applications. To avoid contributing to hype, the article argues, ethicists must critically examine future visions and promises, be aware of their own performative role, and cooperate more closely with disciplines like STS and TA to contextualize analyses within socio-technical dimensions.

We conclude by expressing our gratitude to all the reviewers who contributed to improving the quality of the manuscripts with their constructive comments, and by wishing (with no overpromising) that the readers of this TATuP Special topic will find both inspiration and answers for future work.

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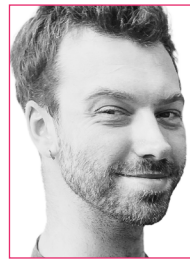
**Competing interests** • The authors declare no competing interests.

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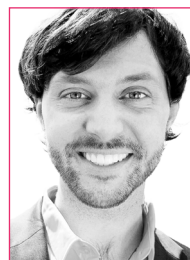


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RESEARCH ARTICLE

# Assessing the journey of technology hype in the field of quantum technology

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**Abstract** • The ‘second quantum revolution’ promises new technologies enabled by quantum physics and has been the subject of substantial hype. We show that while creating expectations has helped secure support for quantum research, their iterative effects can come to affect the field in concrete ways. These iterative impacts for quantum include emerging discussions about ethics and the delivery of promised outcomes. Such contestations could open up alternative quantum futures, but this will depend on how the ‘hype helix’ of iterative expectations unfolds.

## *Bewertung der Entwicklung des Technologie-Hypes im Bereich der Quantentechnologie*

**Zusammenfassung** • Die ‚zweite Quantenrevolution‘ verspricht neue, durch Quantenphysik ermöglichte Technologien und hat einen großen Hype ausgelöst. Die durch diesen Hype geweckten Erwartungen haben zu erheblichen Spekulationen und Investitionen von Nationalstaaten und Unternehmen geführt. Wir zeigen, dass das Schüren von Erwartungen zwar die Forschung im Bereich der Quantenphysik vorangebracht hat, ihre iterativen Auswirkungen jedoch auf unerwartete Weise nachwirken können. Es tauchen auch umfassendere Fragen zu Quanten auf, die sich mit Ethik, Energie-Fußabdrücken und unmöglichen Versprechen befassen. Diese Auseinandersetzungen könnten im Prinzip alternative Quantenzukünfte eröffnen, dies wird allerdings davon abhängen, wie sich die ‚Hype-Helix‘ der iterativen Erwartungen entfaltet.

**Keywords** • *hype, iterative expectations, quantum technology*

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## Introduction

Hype – or the use of exaggerated, sensational language to create narratives about the future impact of science and technology – has been central to building social and material support for the field of quantum technology. Quantum technologies draw on quantum science to build a range of applications around the world (Gibney 2019). The technologies – including quantum computers, quantum sensors, and quantum key distribution – are the subject of much hype (Roberson 2021). Similar to artificial intelligence, quantum technology is considered a critical technology by several nations due to the potential technical capability – a ‘step change’ – and the potential for vast economic gain.

We draw on published empirical research to examine how quantum hype is shaped by the interaction between scientific promises and national-strategic visions. We contribute to the wider field of enquiry around hype in proposing that the process of hype in research is not so much one-way as it cyclical – providing feedback to the actors who spark these conversations in new and sometimes unanticipated ways. This new model is described as a ‘hype helix’. We use this model as we consider how the language used by physicists to describe the ‘second quantum revolution’ is shifting through the introduction of uncertainty (pessimism) and incorporation of new concerns and issues. Furthermore, we review how quantum hype discourse prompts iterative effects, including international conversations on the societal impacts of quantum technologies led by forums that include the World Economic Forum. Our research points to the fact that, while hype is an effective mechanism for scientists to achieve support for their research, hyped promises can be adopted by government and returned to scientists in the form of expectations that scientists must attempt to fulfil.

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## The management of expectations and hype

Hype consists of promises of new benefits or outcomes from science and innovation, which are articulated in present-day research agendas (Birch et al. 2012; McCray 2013). This language and the resulting work that researchers do to manage stakeholder expectations is integral to the creation and evolution of science and technology fields. Schyfter and Calvert (2015) explore the interplay of hype and inflated expectations in their work on synthetic biology – a field shaped by promised-laden rhetoric on the delivery of biotechnology and the creation of a new industry. These promises towards synthetic biology, in turn, influenced stakeholder expectations and forcefully directed research into narrow, now pre-determined, focus areas.

Use of hype is complicated by side-effects that scientists cannot control, e.g. how the expectations they create will be received by other audiences. Public communication on benefits or results of scientific research and/or technological developments invite response from stakeholders in the field and wider audiences (Etenhuber 2008). These responses to hype are influenced by societal contexts people exist within; a critical concern in a digitally-connected world (Davis and Jurgenson 2014; Marwick and Boyd 2011). This necessitates careful management and moderation of hype. Examples of expectations management relevant to this area include the method of ‘recalibration’ in biomedical innovation (Gardner et al. 2015), which seeks to contain the hope and despair experienced by patients seeking cures (Petersen et al. 2017), and the deliberate use of pessimism by biotech firms looking to counterbalance optimism (Tutton 2011). The case of quantum technologies in this paper is another example of how over-promising is moderated and managed by multiple stakeholders.

## Tracking the modulation of the quantum hype

Current models for hype in science and innovation describe the journey of hype in relation to science popularisation models by charting how a topic moves from specialised to non-specialised audiences. These models – including the industry-focused ‘gartner hype cycle’, which depicts how exaggerate expectations and claims surrounding emerging technology rise and fall – assume that the cycle or wave of hype occurs once (n.a. 2015). They do not explicitly account for the iterative effect of expectations or the way an audience might respond to exaggeration. Nor do they generally incorporate a mechanism for the recalibration or moderation of expectations. Konrad and Alviai Palavicino (2017) do, however, implicitly allude to the need to modulate expectations while charting the evolution of hype for graphene. To build on and improve these models, we propose the hype helix (figure 1).

In the hype helix, expectations rise (‘high expectations’) and fall (‘low expectations’) as they travel through time, and be-

tween creator and audience. Incorporating the fluctuations proposed by other literature on hype, the spiral of the helix depicts highs and lows of attention and exaggerated expectations, and then reflects on how expectations return to their creators. The helix also depicts how expectations shift in form and function as they progress between different actors and audiences within various contexts.

In figure 1 (below), we exemplify how this model might work in various cases of science and innovation by labelling the stages of high and low expectations which transpired within our research. In this edition of the hype helix, we focus on the quantum hype. We represent two stages of hype through time for quantum technology. The first loop begins with the coining of the ‘second quantum revolution’ and reflects on how promises for quantum technologies rose in the early 2000s. The second loop begins with the experimental breakthrough in 2014, which created a launchpad for new, heightened expectations for the field. This process of contestation and expectation management for quantum by scientists, government, and industry is explored in this paper, after the methods section.

## Method

As advocates for a new technological field, quantum scientists and engineers have rhetorically managed the uncertainty related to timelines and outcomes by using statements focused on significant benefits for audiences in science policy, politics, and industry. We consider the dynamics of hype surrounding quantum and the technologies the field aims to produce (‘quantum technologies’), using on rhetorical analysis to deconstruct the core arguments presented in national strategies for quantum science. This allows us to explore the way this policy discourse was co-created by scientists, politicians, and industry (Ploeger 2009).

We draw on empirical data from a study we published in 2021 (Roberson et al. 2021) and data collected during the first author’s doctoral research (Roberson 2020). The data included public documents published during the formation and finalisation of three national strategies for quantum science in the UK, USA, and Canada along with interviews with four physicists who were involved in the creation of one or more national strategies. These interviews provided additional depth to the situated rhetorical analysis of the strategy documents, including specific insight into the development of the strategies and the role hype played.

## Following the Helix model: creation and moderation of expectations by physicists

Close reading of the quantum national strategy documents revealed that the rhetoric of economic gain and competition was routinely emphasised. This is in line with broader trends in re-

search policy (Felt 2014) and previous work on high-energy physics (Ploeger 2009). This style of rhetoric matters because it influences the development of the research field and the evolution of distinct future trajectories. Competition-focused rhetoric frames science as a game or race between groups and drives preoccupation with whether a researcher/research team is winning or losing (Roberson 2020). Media coverage focused on the development of useful quantum computing provides an example of this rhetoric. Meanwhile, economic-focused rhetoric argues that a core value of basic research is its capacity to enable economic growth, leading to a focus on market benefits and risks. Through this rhetoric, a technoscientific future marked by geopolitical rivalry and market-based economics comes to be produced and reinforced, at least so long as it goes unchallenged.

Documents produced during the development of national strategies for quantum show how expectations for quantum technologies originated within research and industry communities before they were adopted by governments. For example, a key meeting at Chicheley Hall in the United Kingdom led by the UK Defence Science and Technology Laboratory produced a researcher-led report (Pritchard and Till 2014) and subsequent government-issued policy documents on the value of quantum technology for the nation.

However, as these expectations circulated through different social groups worldwide, quantum hype met opposition with the views of the quantum physics research community (Das Sarma 2022). This echoes the findings of Schyfter and Calvert (2015) in terms of the iterative relationship between hype created by researchers and subsequent expectations of key stakeholders, in this case government and industry. Around 2014, initial hype fostered an atmosphere of urgency around quantum technologies. This provoked interest amongst policymakers and parliamentarians and prompted national investment and coordination efforts. In recent years (2019 onwards), however, expectations have returned to researchers in the form of questions around the dangers posed by the ‘quantum arms race’ and a need for more detail around the implications of using quantum technologies in society (Inglesant et al. 2021).

Interviews with physicists involved in the creation of national strategies for quantum science provide some additional context on the iterative evolution of quantum hype and expectations. The nationalist focus found in the documents analysed was largely absent in the responses of interviewees, although one (senior quantum physicist) said “the element of competition was a strong focus for the United States and United Kingdom” (Roberson 2020, p. 110). Physicists preferred discussion

on the need to grow a critical mass with regards to enabling the presence of skilled workers and production of research, which would help produce crucial early-stage prototypes and, eventually, commercially viable machines while nurturing the emerging sector.

Reflecting on the hype which accompanied greater investment and interest in quantum commercial outcomes, scientists tended to highlight the uncertainty of future predictions for quantum technology. While some academic questions for quantum science may have been achieved, the physicists were quick to highlight the potential obstacles on the road ahead. They highlighted “continuing high levels of uncertainty around the eventual applications of quantum physics” (Roberson 2020, p. 110).

Alternately fearful and hopeful expectations generated around quantum technologies are likely to play some part in how public narratives evolved (Borup et al. 2006; Schyfter and Calvert 2015). The statements provided by physicists through research interviews in 2018–2019 may be part of conscious attempts to intervene in relation to extreme expectations with the intention of preventing potential disappointment (Eames et al. 2006). In this research article, we develop upon this perspective by presenting a new model of how hype occurs in communication on science and technology.

Expectations crafted by quantum scientists iteratively returned to impact on the field. The original audiences of the expectations – including, government, private companies, and other professional bodies – are taking seriously the chance that quantum computing – and quantum technology more broadly – may negatively impact society. An example of this altered state is visible in World Economic Forum discussions and a subsequent report on the quantum computing ethics (WEF 2021). This is despite some physicists’ fears that it is too early yet to

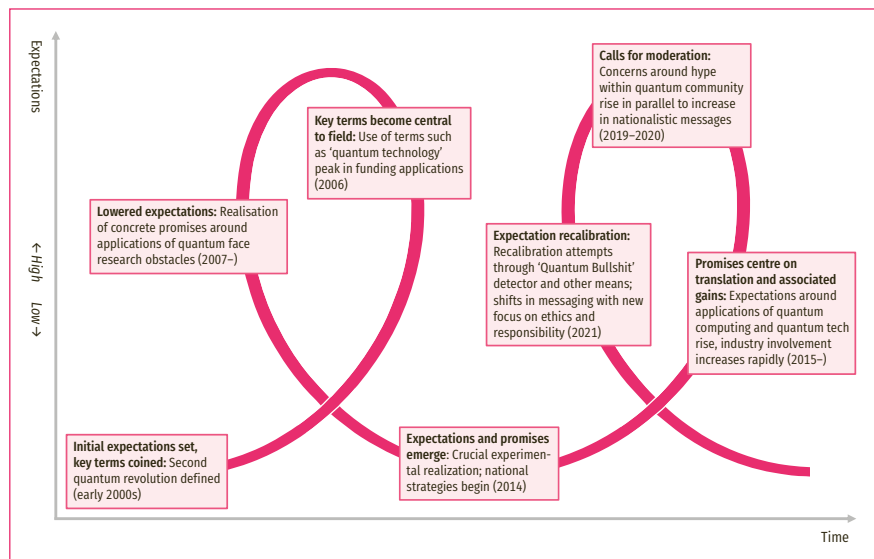


Fig. 1: Hype helix with stages mapped to public communication of quantum technologies.

Source: authors' own compilation

seriously review the societal impacts of quantum technology. The influence of geopolitical tension is also visible in government policies focused, perhaps pre-emptively, on export control of quantum technologies and enforcement of sovereignty (Williams 2021).

Concerns over the impact of hype on academia and quantum start-ups has also been rising and physicists have responded with attempts to moderate language used in the field. In 2019, an article in *Nature* tracked the scale of private investment in quantum technology start-up companies (Gibney 2019). They found that in 2017 and 2018 alone companies received at least 450 million US dollars in private funding, mostly from venture capitalists. Looking forward a few years and in 2021 quantum computing company PsiQuantum raised another million US dollars again, a sum of money which brings its total valuation up to 3.15 billion US dollars. Researchers interviewed for the *Nature* article worried about the hype, saying “there’s a lot of hype in the field, a lot of promises that on the face of it look a little ridiculous, and some of that gets funded” (Gibney 2019, p. 24). In response to similar concerns over hype, some researchers began an anonymous Twitter account called the ‘Quantum Bullshit Detector’, which aims to dispel high expectations by retweeting hyped claims and marking them ‘bullshit’ (Chen 2019).

## Conclusion

As new developments have emerged in the field of quantum technology, the journey of hype for the field has included framing, and then re-framing of developments and promised outcomes within stories of potential success (Borup et al. 2006). The hype helix we present in this article builds upon key literature, including Schyfter and Calvert’s (2015) observation that promises for science and technology futures build iteratively, affecting first the organisations lobbied by researchers and then the researchers themselves in turn. By proposing the hype helix, we suggest a different way of conceptualising and modelling the role of hype in technoscientific work. Further investigation and testing of the model are needed to review how well it charts technoscientific hype in other fields.

This research article portrayed the process how expectations of quantum are taken up by nations. These expectations in turn have generated discomfort amongst researchers and tensions between national visions and academic research. We have charted how high and low expectations emerged in different stages of public communication about the quantum field. As represented in the hype helix, expectations rose upwards initially in the early- to mid-2000s. This hype has informed a long-running narrative designed to deliver increased support for quantum.

We note that efforts and intervention to modulate initial promises are undertaken by scientists, and, as a consequence, lowered expectations are introduced into the discursive field of quantum. Meanwhile, an atmosphere of competition may have had broader implications than just affecting the ability of quan-

tum scientists to collaborate. Pressure to be first to market and media might also conflict with calls for public dialogue and discussion on the societal aspects and impacts of emerging quantum technologies.

Undeniably, the hyped-up narrative for quantum has produced a desirable result for quantum scientists in the form of national coordination and funding in multiple countries, so ensuring the continuing momentum of the field. However, the risk remains that by using hype physicists might jeopardize stakeholders’ trust in quantum science and technology by creating unrealistic expectations. So, the importance of moderating and managing hype remains.

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RESEARCH ARTICLE

# Are social experiments being hyped (too much)?

Malte Neuwinger\*,<sup>1</sup> 

22

**Abstract** • Social experiments, also known as randomized controlled trials, are the subject of contentious discussions, giving rise to buzzwords such as ‘credibility revolution,’ ‘experimenting society,’ ‘global lab,’ or ‘empire of truth.’ While using exaggeration to illustrate opportunities and risks may well be justified, this research article analyzes to what extent the present debate is characterized by excessive hype. It finds that the transformative potential of social experiments is greatly overestimated, a judgment that applies to the reasoning of both proponents and critics.

*‘It became a thing – in academia and outside organizations. And then it became controversial, which, in a sense, is even better.’*

Nobel laureate Esther Duflo  
about the rise of social experiments  
(quoted in Parker 2010)

## Werden Sozialexperimente (zu sehr) gehypt?

**Zusammenfassung** • Sozialexperimente, auch bekannt als randomisierte kontrollierte Studien, werden kontrovers diskutiert, etwa unter den Schlagworten ‚Revolution der Glaubwürdigkeit‘, ‚Experimentiergesellschaft‘, ‚globales Labor‘ oder ‚Imperium der Wahrheit‘. Obwohl Übertreibung zur Verdeutlichung von Chancen und Risiken durchaus gerechtfertigt sein kann, untersucht dieser Forschungsartikel inwiefern die aktuelle Diskussion durch einen übermäßigen Hype geprägt ist. Im Ergebnis wird festgestellt, dass das transformative Potenzial von Sozialexperimenten weit überschätzt wird. Diese Diagnose gilt gleichermaßen für die Argumente von Unterstützern und Kritikern.

**Keywords** • hype, social experiment, RCT, instrument constituencies, tools-to-theories heuristic

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## The debate

There is little doubt that modern societies should use their best knowledge to improve people’s lives. Yet what exactly constitutes our best knowledge and how exactly it should be used are controversial questions. Over the past twenty years, a wave of ‘evidence-based policy making’ has provided one answer: Public policy should be tested through social experiments. Much like in clinical trials, such experiments randomly assign people to ‘treatment’ and ‘control’ groups: In the simplest case, one receives the new program, the other does not, and if the former program leads to better effects than the latter we may conclude that our program ‘works’. And much like in clinical trials, such an approach is seen as applying the organized skepticism of science to policy making: If we are uncomfortable with taking untested drugs, why would we be comfortable with subjecting ourselves to untested public policies?

This reasoning has given rise to a wave of excitement. As the titles of several recent books and articles inform us, ‘randomized controlled trials’ (RCTs), as social experiments have been labelled to fit the medical model, constitute a ‘credibility revolution’ in social scientific research (Angrist and Pischke 2010), the beginning of a ‘twenty-first century experimenting society’ (White 2019) in which ‘radical researchers are changing our world’ (Leigh 2018). Long-time commitment to the claim that RCTs will ‘revolutionize social policy’, as they revolutionized medicine (Duflo and Kremer 2005, p. 228), has earned three economists the 2019 Nobel Prize. (As explained below, the strong connection between medicine and social science seems overdrawn. Because it was the standard terminology before the current hype, I therefore speak of social experiments instead of

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RCTs (Greenberg et al. 1999).) Among other things, social experiments have been used to check whether microcredits can help people rise out of poverty, whether disbursing money for relocation improves people's health and income, and whether a universal basic income has positive economic and psychological effects. While most prominent in Anglophone countries, social experiments are increasingly spreading around the world. Even countries lagging behind the trend, like Germany, have now begun to express interest (Faust 2020).

For some time now, the amount of attention social experiments receive has raised suspicions of hype. Critics have worried that many claims about experiments' superiority are epistemically unjustified, politically tendentious, and ethically questionable, because they involve unwarranted generalizations beyond the particular experimental context, promote small problem fixes at the expense of larger socio-economic effects, and are cavalier about people's rights (Kvangraven 2019; Picciotto 2012; Ravallion 2009). Pushing these critiques further, some speak of the emergence of a new 'empire of truth' that crowds out democratic deliberation through technocratic governance (Kelly and McGoey 2018) or an elitist 'global lab' that reduces people to the equivalent of test animals (Fejerskov 2022). According to critics, by combining scientific credibility, a strong media profile, and the support of philanthropic foundations supporters have turned social experimentation into a profitable 'scientific business model' (Bédécarrats et al. 2019, p. 750).

What should one make of this debate, whose strong rhetoric and self-perceived societal relevance is likely to baffle the uninitiated? I argue that proponents and critics have usefully raised awareness about the potentials and risks of social experiments, but by now the most radical factions of the debate are in danger of losing touch with reality. Drawing on open-ended interviews with twenty influential advocates, implementers, and funders, the main section of this article shows that practitioners are much more pragmatic about social experiments than academic discussions would make one believe. These interviews were conducted in 2022 and 2023, mostly via video call, targeting key social experiment supporters such as the International Initiative for Impact Evaluation (3ie) and the Abdul Latif Jameel Poverty Action Lab (J-PAL). In addition, conceptualizing the phenomenon of 'hype', the remainder of the article argues that social experiments should be seen as a tool that actively shapes the thinking of those involved in the debate. In particular, this tool promotes the misleading assumption that social experiments can easily be compared with drug trials and narrows down attention to a policy's 'impact' in the sense of causality.

## Hype and criti-hype

Debates about new scientific and technological developments often make it hard to tell which side is right. One reason for this is that both the relevant facts and the relevant criteria of 'right' and 'wrong' are part of the discussion. Another is that situations in

which things are still unfolding make it harder to identify vested interests and analytical blind spots. To mitigate this problem, technology assessment (TA) and especially science and technology studies (STS) recommend the principles of 'symmetry' and 'reflexivity'. Symmetry prompts researchers to 'maintain a posture of balanced skepticism' toward both sides of the debate. And reflexivity, as Stephen Hilgartner, Sheila Jasanoff and Hilton Simmet note in a 'living document' that circulates within the STS community, appeals to researchers' capability to 'become aware of the assumptions underlying their knowledge claims and, where necessary, to address specific blind spots and sources of bias or error'. Because things in the making involve what STS scholars call 'interpretive flexibility', one should rather be careful with strong epistemic or normative judgments.

My brief survey of the social experiment debate suggests that it is pretty much the opposite of symmetric or reflexive. Rather, 'credibility revolutions', 'experimenting societies', 'global labs', and 'empires of truth' are examples of hype in the technical sense of the term. While all science needs to go slightly beyond existing evidence to make useful inferences, 'inappropriate exaggeration' willingly sacrifices reasonable prediction in favor of generating excitement and enthusiasm. Indeed, though 'enthusiasm' may seem like an odd description of worries about technocracy and unethical human experimentation, the concept of hype applies equally to optimistic and pessimistic exaggeration. After all, both have the effect of impeding a clear assessment of the issue at hand (Intemann 2022, pp. 180–182). If not in 'content', radical critiques of social experiments therefore seem closely connected to their intellectual counterparts in 'form': While the normative evaluation flips from celebratory to alarmist, both sides agree that the implications for policy making will be radical.

Social experiments are not alone in being hyped both ways. Indeed, fighting positive overclaiming through negative overclaiming seems to be part of a general phenomenon, one that has been termed 'criti-hype' (Vinsel 2021). Many scholars have worried that widely hailed technologies like genetic engineering, nanotechnology, or social media will bring about a social dystopia. While such worries are quite reasonable in principle, the problem with criti-hypes is that they seem less interested in getting a handle on the problems identified than in imagining grim 'technoscientific futures' (Vinsel 2021). Ironically, then, the asymmetrical, unreflexive social experiment debate may feed not one but two 'scientific business models': one that acquires money and publicity through experimentation, and the other that does the same by criticizing that experimentation – and both do this though it is quite unclear whether social experiments will have the predicted effects one way or another.

## Will social experiments transform policy making?

Obviously, not all discussion of social experiments constitutes hype. But what does? As Intemann (2022) stresses, particularly



STS scholars have been rather vague about the criteria by which they identify hype. As indicated, her solution is to focus on claims that are both exaggerated and inappropriate. In other words, identifying hype involves *empirical assessments* as well as reasoned and explicit *value judgments*. What does this imply for the social experiment debate?

Let's begin with value judgments. Intemann suggests that relevant judgments may be divided into two parts, namely (1) the most important goals of communication and (2) the acceptable risk of getting things wrong: What should advocates and critics try to communicate and how bad would it be if their claims turned out to be false? In my judgment, the social experiment debate's goal should be to accurately communicate the potentials and risks of social experiments as tools of political decision making. If one gives at least some credence and weight to the worries of both sides of the debate – as I think one should – the risk of getting things wrong suggests a tension. Overstating the benefits and understating the risks might lead to increased global injustices caused by social experimentation, while the converse error might perpetuate badly informed and at worst harmful government policies at the expense of better ones.

Based on these value judgments (which may be disputed, but to me seem quite modest), one might already conclude that many commentators have indeed exaggerated inappropriately. Clearly, they have not even tried to give a balanced account of benefits and risks. On the other hand, one might argue that some exaggerations may nevertheless be useful because they clarify that diverging value judgments are premised on very different normative concerns: harm through experimentation vs. harm through business as usual (Parkhurst 2017, pp. 7–8). Here the second part of identifying inappropriate exaggeration comes in: empirical assessments. As I will show, both sides of the social experiment debate often exaggerate inappropriately because they invite unwarranted inferences about social experiments *given the evidence we have available* – namely that they predict transformative change on the basis of very limited facts. This becomes clear when considering that most practitioners appear to have adopted a 'new middle ground' between the 'well-rehearsed and polarized positions' of hyperts and criti-hyperts (Giselquist and Niño-Zarazúa 2015, p. 2).

One claim that pervades recent discussions is that evidence from social experiments is the 'gold standard' of evidence while anything else supposedly 'has no legitimacy and basis in reality' (Fejerskov 2022, p. 172; Gerber et al. 2014). Surprisingly, among people whose job consists in implementing and funding social experiments, very few seem to share this view. Instead, one employee of the Abdul Latif Jameel Poverty Action Lab (J-PAL), a major social experiment advocate, describes them as 'a tool in

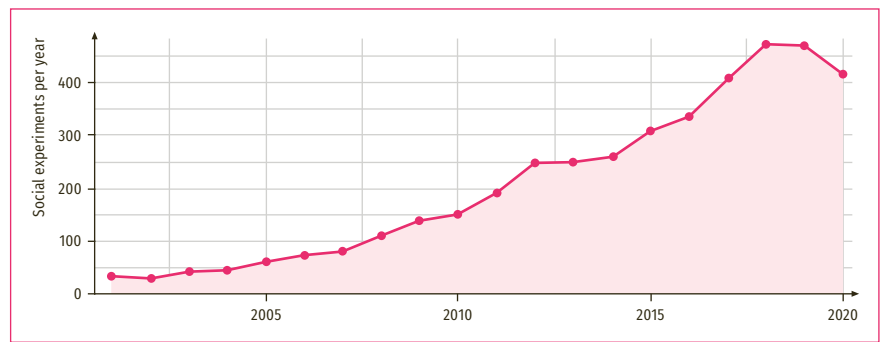


Fig. 1: Annual number of social experiments in international development, conducted between 2000–2020.

Source: Jie (2023)

the toolbox rather than the answer to all questions' (interview J-PAL 3). Another predicts that social experiments 'will become less [...] glorified. And they will become just a tool in the arsenal of governments' (interview J-PAL 2). An analyst at Arnold Ventures, a major philanthropic funder, worries about a 'point, and maybe we're here now, where there's just a lot of frustration with how often unsatisfying the answers to these questions are', sometimes because experiments produce no measurable effects, sometimes because interventions are badly implemented – and often because trying to tell these options apart is like 'banging your head against the wall' (interview Arnold Ventures).<sup>1</sup> Senior officials at the Behavioral Economics Team of the Australian Government similarly oscillate between confidence in the benefits of experiments and disillusionment (Ball and Head 2021, pp. 113–115). And so do researchers at the Behavioural Insights Team (BIT) in the UK, stressing that 'RCTs are not the answer to everything – you need to combine them with all kinds of other approaches' (interview BIT).

An accurate assessment of social experiments' transformative potential also needs a good grasp of how large the 'business' actually is and how much potential it has for growth. This is surprisingly difficult. For international development, one of the largest and best-documented fields, a few hundred social experiments are conducted every year, with a clear upward trend over time – compare Figure 1 to the current annual number of medical trials, which is around 60,000 (WHO 2023). In Northern countries, experiments in education are certainly on the rise, while other fields are smaller and precise numbers are harder to come by. (Much depends on the exact definition of a 'social experiment': How many people should it involve? How much does the 'treatment' need to differ from the status quo?) But even given clearer definitions and better data, the question is: Would, say, several thousand social experiments a year be enough to transform policy making?

<sup>1</sup> In the natural sciences, a similar problem is known as the 'experimenter's regress': Well-conducted experiments discover new facts, but these 'facts' only are facts if we know that the experiment was 'well-conducted', which we only 'know' because of the new 'facts' (Godin and Gingras 2002).

Part of the answer depends on whether governments are interested enough in the results to use them in their daily decision making. This issue has given practitioners some headaches – even strong evidence loses out to political strategy – but there are certainly ongoing efforts to establish collaborations with governments (Taddese 2021). Another part of the answer depends on whether the current business model is as profitable and sustainable as hypers and criti-hypers seem to believe. For international development, the assumption is that social experimentation will keep flourishing because ‘demand is twin-engined, driven by both the donor community and the academic world’ while ‘supply is largely shaped by a brand of scientific businesses and entrepreneurs’ (Bédécarrats et al. 2019, p. 750).

tend to be people-centered: ‘Hype cycle’ models suggest that people pass through different stages of excitement and frustration before an innovation finally brings productive development (Dedehayir and Steinert 2016). The reverse model is tool-centered: Rather than a passive thing people are more or less excited about, innovations can develop ‘a life of their own’ in the sense that (1) new tools prompt people to popularize them because their users come to materially depend on them, and (2) acquaintance with new tools shapes people’s thinking. While not explicitly framed as a theory of hype, the active role of innovative tools has been proposed as an important factor for developments in both science and politics. The ‘tools-to-theories heuristic’ suggests that the rising familiarity with statistical concepts

## *Isn’t talk of ‘impacts’, ‘outcomes’, and ‘results’ simply a symptom of rampant managerialism in public policy?*

As far as I can tell, however, this analysis overlooks a host of misaligned incentives among the actors being involved.

One primary misalignment is that most academics are interested in policy evaluation only if they can publish their results in academic journals. Almost all practitioners interviewed report a fundamental tension between academically interesting and practically relevant experimental work. The compromise is often to test small ‘nudges’ that are easy to implement and quick to evaluate (White 2014, pp. 21–22). Unfortunately, academically clever but tiny interventions are rarely useful for government policy – with the possible exception of behavioral science applications in governance, where the incentives of academics and public partners roughly converge on light touch interventions (Fels 2022). As one researcher at the German Institute for Development Evaluation (DEval) remarks, ‘even in the English-speaking world, it’s individual cases where it has really been win-win for both sides, where there’s been an academic publication and it also helped on the practical side’ (interview DEval). Practitioners also worry that funding may die down because experiments are too expensive, or that governments may lose interest because results take too long to become available. Overall, while social experiments are a significant phenomenon with benefits and risks, their transformative potential seems limited given the available evidence and the incentives of relevant actors.

### **Thinking through tools: how social experiments shape hypers’ and criti-hypers’ reasoning**

Having discussed whether social experiments will have a transformative effect on policy making (probably not), it is interesting to turn around and ask whether experiments may have an effect on hypers and criti-hypers themselves. Descriptions of hype

influenced theories of psychology (Gigerenzer 1991), while the concept of ‘instrument constituencies’ suggests that acquaintance with the notion of citizen panels affected prevailing thinking about political representation (Simons and Voß 2018). Social experiments seem to influence the thinking of both hypers and criti-hypers in a similar way, leading them to equate social experiments with drug trials and think of ‘impact’ in the narrow sense of causality.

While they fundamentally disagree about the implications, hypers and criti-hypers are united in comparing social experiments to clinical trials. To one side, the success of evidence-based medicine renders social experiments the obvious solution to social problems (Leigh 2018, chapter 2). To the other side, the fact that drug trials are increasingly outsourced to the Global South serves as an effective warning against the social inequalities scientific and technological innovations can produce (Fejerskov 2022, chapter 5). Such dissensus in consensus resembles the nineteenth century practice of ‘bundling’ loosely associated issues into large-scale, urgent, and contentious questions (the Eastern Question, the Jewish Question, etc.): Both sides of the debate merge social and medical experiments into a single Experimental Question, seeking to ‘raise the profile of their questions in order to draw attention to preferred solutions’ (Case 2018, p. 4). By thinking ‘through’ the tool, all experiments become the same – and depending on one’s inclinations more of them signify either a move toward ‘science’ or ‘technocracy’. Perhaps subconsciously, bundling medical and social experiments wins everyone involved argumentative mileage.

The odd feature of this apparent agreement is not only that hypers and criti-hypers rarely investigate the comparability of social and medical experiments explicitly, but that neither side seems to notice that a huge part of high-tech, high-stakes medicine is rarely subject to experimental evaluation, including surgery (Bothwell and Jones 2021). And this is despite the fact that

surgery is in many ways the better comparison. For instance, in both social and surgical interventions placebos and double blinding are much harder to implement than for drugs (for practical and ethical reasons) and their success crucially depends on the skills and motivations of those who implement them (respectively, surgical teams and public administrators).

The second way in which the tool of social experiments influences the thinking of hypers and criti-hypers alike is that it focuses their attention on the notion of ‘impact’ (Breslau 1997). Indeed, social experiments zoom in on a very particular interpretation of impact in the sense of the *precise estimation of causal effects, everything else being equal*. The logic of experiments – the point of which is to create a counterfactual ‘ceteris paribus world’ through randomization – provides the discussion with a definition of what impact *is*. Hypers and criti-hypers naturally disagree whether social experiments are the adequate tool to assess impact-as-causality (Bédécarrats et al. 2019; Gerber et al. 2014), but they rarely recognize that their understanding is in direct competition with the very different conception of impact as the *overall effect a policy has, considering the complexity of the real world*. The latter has long been the official definition of the OECD Development Assistance Committee (2021), which has never settled on experimental methods (Faust 2020, pp. 74–75). Evidently, thinking ‘through’ the tool of social experiments discourages advocates and critics from engaging other conceptions of impact.

It is possible to disregard such confusions as another oddity. Isn’t talk of ‘impacts’, ‘outcomes’, and ‘results’ simply a symptom of rampant managerialism in public policy? Yes, but not ‘simply’. After all, regardless of preferred vernacular it is difficult to deny that both the question (1) whether an observed improvement can be causally attributed to a newly implemented policy and (2) whether that policy really creates improvements in the grand scheme of things are highly important. Clear thinking about both (and their interconnection) is central to any policy debate and disregarding them as ‘neoliberal’ is just as unhelpful as trading off one against the other. In sum, while the social experiment debate has clarified the potential risks and benefits of social experimentation itself, narrow tool-based thinking seems to prevent greater clarity about what it means to ‘have a positive impact’ on people’s lives.

## Conclusion

Hypes put an interesting twist on the truism that ‘extraordinary claims require extraordinary evidence’. As extraordinary claims about the transformative potential of social experiments become the norm, the more cautious view that such claims are inappropriate exaggerations is put in the position to provide extraordinary evidence. Thus, people who have built a reputation around praising or criticizing social experiments will predictably not be convinced of my argument. And they should not be, because the evidence I have presented is indeed partial. It is possible that I

have misjudged the facts, that my interviewees have deceived me, or that my analysis is faulty in some other way. Still, I hope my argument can shift the burden of proof at least a little.

Critics might also ask whether less hype would actually lead to better decisions. Isn’t my argument based on a ‘technocratic fallacy’ (as one reviewer of this article opines): that ‘facts [...] are only an input [to policy making, my addition] that can (and should!) be ignored in the name of ideology’? It is certainly true that democratic politics cannot do without value judgments (just like the identification of hype) and that the selection of relevant facts requires deliberation. The process is complicated. Still, I agree with Parkhurst (2017) that good policy requires both values *and* facts. Just like insisting on the importance of impact is not *per se* neoliberal, insisting on the importance of facts is not *per se* technocratic.

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Interviewees consented that the information they provided can be used in publications, but without transcripts being open to the public. The Special topic editors have had access to the transcripts quoted in the article.

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RESEARCH ARTICLE

# Tech hype as a mnemonic process: Misremembering the land problem in India

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**Abstract** • This research article considers tech hype as a mnemonic process that makes us remember or forget the world, technology, and the myriad ways we can relate to it. The argument is based on an auto-ethnographic vignette and a close reading of two key texts in the discourse on using technology for land management in India. The article shows how technology, the social, and the practice of knowledge-production can be rethought in this mock battle between hype and criticism of hype.

*Tech-Hype als Erinnerungsprozess: Falsche Erinnerung an das Landproblem in Indien*

**Zusammenfassung** • Der Forschungsartikel betrachtet den Tech-Hype als Prozess, der uns an die Welt, die Technologie und die unzähligen Möglichkeiten, wie wir damit umgehen können, erinnert oder sie uns vergessen lässt. Die Argumentation basiert auf einer autoethnografischen Vignette und einer genauen Lektüre zweier Schlüsseltexte im Diskurs über den Einsatz von Technologie für die Landwirtschaft in Indien. Der Beitrag zeigt auf, wie Technologie, das Soziale und die Praxis der Wissensproduktion in diesem Scheingefecht zwischen Hype und Kritik am Hype neu gedacht werden können.

**Keywords** • tech hype, mnemonic, blockchain, land rights, India

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## Introduction

The research article moves into the foreground what ‘hype’ and ‘criti-hype’ do in the context of emerging technologies, and how they serve as a mnemonic process which has influence on how a problem is remembered. The paper contends that both ‘hype’ and ‘criti-hype’ are produced within a certain discursive milieu of ‘tech-solutionism’ as well as the ‘counter-(tech) solutionism’. The paper contends that the faux combat between hype and criti-hype not only sidesteps ordinary problems of technology (Vinsel 2021) but also takes attention away from ordinary problems and diverse political imaginaries that have been long in the making.

The paper enacts a critique through a juxtaposition (Pál 2013) of two reports – Blockchain for Property: A roll out road map for India (BFP) (Chandra and Rangaraju 2017) and Recasting land tenure rights in the data epoch (Gurumurthy et al. 2022) (RLT) published by two leading, independent, nonprofit, policy institutes in India – India Institute and IT for Change, respectively. While BFP advocates the use of blockchain and big data for managing property rights in India, RLT critiques such initiatives. The two reports reflect the overall positions of their respective organizations. India Institute defines itself as an evidence-based, free-market policy institute. On the contrary, IT for Change distinguishes itself from both techno-utopic as well as market-fundamentalist approaches to technology.

It should be noted at the outset that these two texts are not unique but symptomatic of the larger discourse on emerging technologies. A critical discussion of these two texts is complemented by the first author’s autoethnographic account of working at a privately funded tech policy organization in India from 2021–2022.

The rest of the article is divided into three sections. The section that follows defines hype and foregrounds its mnemonic characteristics. The third section presents the two texts to note how hype and criti-hype are entangled to produce the mnemonic effect. The fourth and concluding section presents an autoethnographic account to situate the ways in which the technology, the social and the knowledge-making practice are reworked in this faux combat between hype and criti-hype.

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## Situating hype

„It's good you are working on these other aspects of blockchain. I am tired of these crypto people and the hype that they have generated.“

(Quote from the project manager where the first author worked on a project to map the implications of recording land rights on the blockchain in India)

It is commonly agreed upon that Bitcoin emerged in the moment of a ‘catastrophic failure’ (Bijker and Law 1994, p. 2) – the 2008 financial crisis – as one of the several alternatives to the production, circulation and use of money (Kostakis and Giotitsas 2014).

*Hype makes us remember and forget the world, the technology, and the myriad ways in which we can relate to it.*

The future of bitcoin, and with it of decentralized crypto coins remains uncertain given the state’s monopoly on the production and circulation of money. However, blockchain, the technology underpinning bitcoin, is a strong contender in the redesigning of governance processes (Jun 2018).

The first epigraph is uttered within this milieu – indicating the promise of erasing the catastrophic failure while stabilizing the technology as a non-financial, distributed ledger that can keep tamper-resistant and transparent records. The fascination with cryptocurrencies is identified by the speaker of the first epigraph as *mere* hype and paying scholarly attention to its non-financial use cases is presumed to be more mature and reasonable.

To note the discursive limits inherent in the first epigraph, we can diffract it through Fisher’s (2009) description of capitalist realism. That is, to the often-quoted statement that Fisher appropriates, “It is easier to imagine an end to the world than an end to capitalism” (2009, p. 7), one can also add state’s monopoly over monetary value to the list. Considering this, according to the first epigraph, studying the non-financial use cases of blockchain is strategic, more practical, mature and grounded because it is *presumably* immature to question the state’s monopoly over value.

### Hype as a mnemonic process

Scholarly attention to memory has focussed on two things: its relationship to the history of subjectivity and to the technologies of representation (Radstone and Hodgkin 2003). The first deals with the question: what we remember (which makes ‘us’) while the latter is invested in asking how we remember (the way we are).

To consider hype as a mnemonic process is to foreground how hype constitutes not only the technology or its use but also the socio-political that it intervenes in. Hype makes us remem-

ber and forget the world, the technology, and the myriad ways in which we can relate to it. To pay attention to hype as a mnemonic process requires paying keen attention to the way the technology and its place in the world is narrated and “the constitutive role of memory in this process of self-image making or identity formation” (Assmann 2006, p. 67).

Hype as a discursive process and hype a mnemonic process are closely related. While redescribing hype as a discursive device allows us to encapsulate its knowledge claims within the discursive limits, redescribing hype as a mnemonic process foregrounds the narrative structure and its affective reworking of the collective memory across different scales. As a mnemonic process, it co-produces scales from the individual to the various col-

lective and trans-scalar processes. Memory after all is a multi and trans-scalar process which re/descales the social (Erl 2011). Hype and criti-hype – that is, critics who “retain the picture of extraordinary change but focus instead on negative problems and risks” (Vinsel 2021) – can then be situated on the same spectrum of affective reworking of memory – of what *ought* to be remembered and forgotten, and how. This characteristic of hype as a mnemonic process complements recent approaches to hype as a rhetorical device that is not “an inaccurate forecast but rather an expectant kind of language, rhetoric, or discourse” (Smith 2020, p. 502). This allows one to ask not only how hype is produced but also what it is made to do.

### Land on blockchain: What is being envisioned?

A growing discourse around land and property rights has argued for a formalisation of land records through digitisation to reduce poverty (Sjaastad and Cousins 2009). It is purported to “facilitate the functioning of land markets in developing countries as well as diminish the threat of losing land rights for vulnerable communities” (Daniel and Ifejika Speranza 2020).

This discourse assumes that formalization of land rights and entitlements can lead to better economic growth and development. It argues that people do not lack assets but lack formal recognition of their assets which affects their access to their rights. This claim has been noted to be lacking and a growing body of literature sheds light on its deficiencies (Benjaminsen et al. 2009; Bromley 2009; Meinzen-Dick and Mwangi 2009; Toulmin 2009).

It is amidst this backdrop that formalisation and digitalisation of land and property records have started shifting towards discussions and experiments of land records management on the

blockchain across various states (Daniel and Ifejika Speranza 2020; Konashevych 2020; Shang and Price 2019; Thamrin et al. 2021; Yapicioglu and Leshinsky 2020).

In India, despite policy-hesitancy concerning cryptocurrency, experiments in blockchain are already underway (MF 2019; MEITG India 2021, MEITG India n.d.; NITI Aayog 2020). These efforts have triggered the interests of both the private and the state actors.

To foreground the misremembering being enacted by the two reports, it would be worthwhile to give a quick note on India's land regime. India's land rights regime and tenure forms are remarkably heterogenous, reflecting the country's diverse cultural, historical, and socio-economic contexts which is "nor-

approaches towards big data processing, increased community involvement and improved land digitization. Blockchain is presented as both a "a new trust regime" which would bring "trust, transparency and efficiency in property transactions" (Chandra and Rangaraju 2017, p. 25) and a "disruptive technology, taking the world by storm in a plethora of areas where there was a centralized entity hitherto" (Chandra and Rangaraju 2017, p. 22).

BFP envisions a decentralized governance mechanism that can revamp property governance. It promises to remove corruption by reducing the human point of contact and avoid fraudulent overlapping transfers towards tamper-proof, immutable land records that can directly benefit the state. BFP promises to improve the "security and checks in transactions involving high-

### *This discourse assumes that formalization of land rights and entitlements can lead to better economic growth and development.*

mally viewed as a planning and administrative nightmare" (Benjamin 2004, p. 177). The tenure form can rest on several sources such as historical, indigenous conventions, particular sections from the Revenue Act, specific title granting announcements on national days, housing schemes, titles issued by village bodies, city corporation and state level organizations and titles handed down by local royalty (Benjamin 2004, p. 180).

This loose regulatory environment that is premised upon mixed land use is considered to be "the single most important factor that facilitates poor groups access to productive land" (Benjamin, 2004, p. 179). However, the loose regulatory regime is not perceived as conducive for market-led development. In 2008, India's policy on land reforms shifted the "presumptive nature of land records and ownership to that of guaranteed title to land or conclusive land title regime" (Nayak 2021, p. xiv) wherein ownership is guaranteed by the state as opposed to presumptive titling where ownership is assumed unless refuted. This shift is pursued by 'cloaking change in the guise of continuity' by finding innovative ways "via complementary technological and regulatory frameworks" (Nayak 2021, p. 11). This policy shift from presumptive to conclusive titling, adopting an apolitical route, becomes a fertile ground for technological solutions such as digitization, GIS mapping and blockchain to flourish.

### **Situating the two reports: misremembering the land problem**

#### **From land rights to blockchain for property rights**

BFP was published in 2017 by the India Institute with contributions from authors affiliated with both academia and industry such as the National Law School of India University, Carnegie India, ChromWay Sweden etc. It identified the need for transformations in the legal regime vis-à-vis land ownership, ethical

value assets such as real estate and property" (Chandra and Rangaraju 2017, p. 6), "centralization of land and property records within the state machinery (which are often in the form of physical ledgers and maps)" (Chandra and Rangaraju 2017, p. 6), improve decision-making, land market price and financialization, and access to clear titles in the case of reparation. Representing state, academic and business interests, it weaves a strong link between introducing blockchain for land management and conclusive titles for ownership.

BFP doesn't invest in *merely* overselling the advantages of blockchain. It is divided into five chapters, a foreword and two case studies. Through this structure, it traverses the risk of tech hype in two ways. First, by downplaying blockchain's challenge to fiat money while upholding its use case for "trade finance and property governance" (Chandra and Rangaraju 2017, p. 25). Second, by foregrounding it as a socio-technical system that will require an entire ecosystem, policy reforms and involvement of host of actors for its success. Its use depends on a robust titling law for conclusive titles, rigorous digitization of existing land records, and an active involvement of local actors such as activists and civil society-based organizations that can translate the vision on-ground. At the same time, the five chapters together work towards redescribing the land problem where access to property is directly linked to improving access to financialization (a claim commonly disputed in the literature) while land disputes are re-framed as a symptom of corruption. This misremembering or re-description of the land problem essentially works towards legitimizing the use of blockchain for property rights.

#### **From land rights to data rights: Whither land problem?**

One can grasp the faux combat between hype and criti-hype by juxtaposing BFP with RLT. RLT was published in 2022 by IT for Change as a critique of India's Digital India Land

Records Modernisation Programme (DILRMP), the national programme to digitize and modernize land records. The report was a case study conducted in collaboration with FIAN (For the Right to Food & Nutrition) International, a Germany-based human rights organization. RLT notes that DILRMP “continues on the slippery slope of de-recognition of traditional claims of marginal farmers in common property resources noted in the early phases. Most notably, the customary tenure rights of marginal farmers, tribal groups, and indigenous peoples do not find a place in the Program” (Gurumurthy et al. 2022, p. 5).

To present the critique of the programme, RLT poses a series of mnemonic questions: “Digitalization for whom? Towards what? And in whose interests?” (Gurumurthy et al. 2022, p. 12). These questions remain rhetorical in their plea to the policy makers to remember the claims of the marginalized in order to “reclaim the transformative potential of the digital paradigm for tenure rights and farmer empowerment” (Gurumurthy et al. 2022, p. 4). These questions clear the space to demand a “new policy vision for digitalization in agriculture [...] in consultation with farmer constituencies [...] rather than those of the capitalist market” (Gurumurthy et al. 2022, p. 14).

While we understand the need for a critical appraisal of proposed digitalization policies to make them more robust, we are interested in interrogating the narrative structure via which the critical appraisal is enacted. The “critical judgement” enacted by RLT operates in the mode of “fault-finding” (Williams 2014, p. 84) that relies on exposing a prevailing constellation of power of marginalized farmers and extractive capitalism which has to be tamed through a robust social welfare state. The prevailing logic of “techno-political authority of database welfare regimes” (Gurumurthy et al. 2022, p. 2) is not interrupted or destabilised via this critical judgement. Instead, it enacts a kind of an “inverted contrary affirmation” (Foucault 1996) of the digitalization programme provided that the recommendations made by RLT are taken into account. Against criti-hype we understand critique as that which underscores the contradictions of the discourse, and “brings into relief the very framework of evaluation itself” (Butler 2001). Thus, one can identify in RLT a “bid to change or revitalize politics by bringing the citizen closer to the state or the state closer to the citizen [which] offer the simplest alternative to politics: the simple police” (Rancière 1999, p. 31) i.e., risk-management, regulation and governance.

By enacting a critical appraisal of the DILRMP, RLT forecloses a potential critical relation that can “order the entire field of moral and political judgement” (Butler 2001). Instead, it relies on available configurations where the harms ensuing from data, datafication and use of technology can be mitigated through civil society consultations and a promise of a functional social welfare state, an elusive postcolonial dream (Arora 2020) that can domesticate the market while offering, presumably, a democratic alternative to the technocracy of big tech. It remains unclear how this conclusion is any different from the ‘efficiency discourse’ of tech-solutionism that is critiqued at the beginning

of RLT. The way forward presented by RLT fails to present any challenge to the BFP’s ‘roll-out plan’ that already anticipates RLT’s critique and advocates the use of blockchain by weaving a complex web of datafication, blockchain, local actors and CBOs.

RLT’s critical appraisal can be described as enacting a governance ecosystem which *merely* envisions a greater role for civil rights-based organizations (CBOs), where CBOs appear as social experts (albeit unelected) speaking on behalf of the most vulnerable. Here, the socio-political problem, the question of democracy and the political is redescribed and misremembered merely as facilitation of politics by the experts. From another perspective, this position can be considered guilty of foreclosing the political.

## Epilogue

### How not to engage in hype or criti-hype: an autoethnographic account of a failed project

A proposal to study land management on blockchain was submitted by the two authors of this paper to the Nudge Foundation, a non-profit organization based in India that funds solutions to social issues via global philanthropic investment firms and foundations. The proposal was rejected by the jury. At the same time, the first author of this paper was working as a researcher at another tech-policy institute in India. The previously rejected proposal was submitted to the institute by the first author for internal funding and was accepted in July 2022.

The project was not assigned any fixed budget and I [first author] was merely expected to do a critique of existing policy briefs bringing in critical perspectives on the technology and its proposed use for land management. The fieldwork-based method that was proposed in the initial proposal was ignored as ‘there was no budget for it’.

I worked on the project for three months and conducted a critical discourse analysis of the white papers which were advocating the use of blockchain for property management. I was asked to write a paper which was to be presented at the donor’s property consortium meetings in January 2023 and was informed by the manager that “[the donor] is very excited to know the results and they are looking forward to the paper” (personal communication with the first author).

Due to both personal and professional reasons, however, I resigned in December 2022 without submitting the final report on the project. While other factors had facilitated the decision to resign, I would say, in hindsight, that the inhibition to share the report with the team and the donor emerged from the realisation that the discourse analysis had not revealed anything original and that the paper, if at all, would be merely repeating ‘critical perspectives’ that, as mentioned previously in the case of RLT, are meant to operate as ‘inverted contrary affirmation’ (Foucault 1996) of the programmes and technologies being critiqued.



The auto-ethnographic account above, when refracted through Lee Vinsel's (2021) argument does not only foreground how "innovation speak distracts us from ordinary problems of technology and infrastructure, including maintenance, repair, and mundane labour." The account also distracts scientists from studying ordinary problems, using ordinary tools, and from using research methods that may not always result in operationalizable results or might reconfigure a research problem into a problem that is not in need of the next big tech or a more robust political intervention.

For instance, Benjamin's extended fieldwork-based study of a settlement in South Bangalore presented a "nuanced dynamics of contestations around land" (Benjamin and Raman 2011, p. 26) that allowed him to glimpse local government as a 'porous bureaucracy' (Benjamin 2004), a dynamic which is washed out in straightforward debates over corruption that is "actively promoted by organizations like the World Bank, to limit the influence of local agents" (Benjamin and Raman 2011, p. 26). RLT uses Benjamin (Benjamin et al. 2007) as a citational resource to critique the efficiency paradigm of "techno-development" (Gurumurthy et al. 2022, p. 3). However, RLT's policy recommendations merely complement the efficiency paradigm of BFP as they envision a "a farmer-centric vision of data infrastructure" (Gurumurthy et al. 2022, p. 12). The overall logic of the policy brief forecloses the ordinariness of porous bureaucracy, the 'greyness that surrounds' (Benjamin et al. 2007) claims, local conflicts and contested social relations in favour of an operationalizable tech policy recommendations.

Vinsel (2021) continues to work with a notion of hype as unrealistic claims which are further boosted by the "academic humanities and social science researchers who played along with hype to score cash money and prestige". While we distance ourselves from this meaning of hype that relies on the false dichotomy between projected vs realistic promise, we find the concept useful to note certain trends. A critical reading of BFP and RLT, and the methodological limits narrated via the auto-ethnographic account allowed us to locate both hype and criti-hype on the same spectrum of tech-solutionism. We showed how, as a 'mnemonic process', hype and criti-hype and the faux combat between them rework myriad ordinary social and political problems into tech and regulatory problems. They not only reify the technology but also the socio-political surrounding it while silencing the most affected. Both impinge upon our understanding of the world and how we remember it foreclosing the myriad ways in which we can relate to it. Contrary to this faux combat, it is worthwhile to remember, à la Rancière (1999), policy as policing and to not forget the value of critical work as fantastical, ordinary, unrealistic, immature and without operationalizable implications.

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RESEARCH ARTICLE

# Handling the hype: Implications of AI hype for public interest tech projects

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**Abstract** • Based on theories of expectations of technology and empirical data from expert interviews and case studies, this research article explores how actors in the field of public interest technologies relate to and within the dynamics of AI hype. On an affirmative note, practitioners and experts see the potential that AI hype can serve their own purposes, e.g., through improved funding and support structures. At the same time, public interest tech actors distance themselves from the dynamics of AI hype and criticize it explicitly. Finally, the article discusses how engagement with AI hype and its impact affects society as a whole and, more specifically, society's ability to develop and use technologies in response to societal problems.

**Umgang mit dem Hype:** Auswirkungen des KI-Hypes auf gemeinwohlorientierte KI-Projekte

**Zusammenfassung** • Auf der Grundlage von Theorien über Erwartungen an Technologien und anhand empirischer Daten aus Expert\*innen-interviews und Fallstudien untersucht dieser Forschungsartikel, wie sich Akteur\*innen im Bereich der Public-Interest-Technologien im und zum KI-Hype verhalten. Praktiker\*innen und Expert\*innen sehen einerseits, dass der KI-Hype ihren eigenen Interessen dienen kann, z. B. durch verbesserte Finanzierungs- und Förderstrukturen. Gleichzeitig distanzieren sich Public-Interest-Tech-Akteur\*innen von der Dynamik des KI-Hypes und kritisieren ihn ausdrücklich. Abschließend wird im Artikel diskutiert, wie sich die Auseinandersetzung mit dem KI-Hype und dessen Wirkung auf die Gesellschaft insgesamt auswirkt und speziell auf die Fähigkeit der Gesellschaft, Technologien zur Lösung gesellschaftlicher Probleme zu entwickeln und einzusetzen.

**Keywords** • public interest tech, AI, hype, sociotechnical change

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## Introduction

The strong presence of artificial intelligence (AI) technologies is driven by substantial advancements in the performance of machine and deep learning, currently the main technique behind what is called artificial intelligence (Toosi et al. 2021), as well as by the public availability of more tools based on these techniques. However, the discussion of AI is also driven by imaginaries and narratives of AI, and AI hype dynamics, involving a multitude of actors.

Public interest tech as a field of technology production has emerged in the past decades and includes state, civic, non-commercial as well as actors in the field of social entrepreneurship aiming to produce technology serving a societal benefit (Abbas et al. 2021). Despite extensive research on theories and case studies on hype dynamics, the field is lacking insights on actors' perception of their involvement with those dynamics, specifically with regards to non-industry actors.

The first part of this research article provides a theoretical background on the hype around AI based on theories of hype and technology expectations (Van Lente et al. 2013; Dedehayir and Steinert 2016), which sets the stage for the second empirical part. Drawing on case studies and qualitative interviews with practitioners and experts in the public interest technology sector, we focus on two research questions: Firstly, we want to answer how actors in the field of public interest tech relate themselves to and within AI hype dynamics. Secondly, we ask what societal implications build on the involvement of public interest tech actors in AI hype dynamics. We discuss how performing hype and at the same time relating to this hype affects the capability to put societal problems at the center of technology development.

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## Theoretical background: the sociology of expectations and the temporality of hype

Hype is a term used to describe high expectations towards technology that manifest on different levels and follow specific dynamics over time. To theoretically frame our understanding of hype, we turn to the sociology of expectations, a theoretical strand within Science and Technology Studies that describes sociotechnical change (Borup et al. 2006; Sovacool and Hess 2017). Akin to theories of discourse and sociotechnical imaginaries, the sociology of expectations focuses on the systems of meaning that surround new technologies (Sovacool and Hess 2017). The sociology of expectations focuses on the involved actors and knowledge communities (Borup et al. 2006) as well as on different levels of expectations (research groups or firms, technological field, technology in society, Van Lente et al. 2013).

Two elements of the sociology of expectations are important to our study: the temporality of expectations and their performative character. The first element, the ‘temporal patterning’ (Borup et al. 2006) of expectations, describes how expectations towards the value of one technology evolve over time. Looking at such a timeline, expectations towards technology often pass a promise-disappointment cycle. For example, in the archetypical form of the Gartner hype cycle, a peak of inflated expectations is followed by a trough of disillusionment, after which a slope of enlightenment leads to a plateau of productivity (Fenn and Raschko 2008; Dedehayir and Steinert 2016). Even though empirical findings on hypes have shown variations in hype cycles and rather complex patterns (Dedehayir and Steinert 2016), the idea of a succession of phases after the emergence of a new technology is helpful to our understanding of the AI hype.

The second central element for our research is the performative character of these expectations. Performativity implies that expectations do not stay on a rhetorical level but result in material consequences and that the phenomenon of hype is construed by its performance. As Borup et al. (2006, p. 292) put it: “[...] In what way do they [narratives and views] become ‘inscribed’ in texts, actions, bodies, materials, objects and machines [...]?” This performative character of high rising expectations depends on how visions of the future shape the present: “[T]he promises of the future that make up a hype, have a performative capacity in the present as they attract resources, coordinate activities, and spur competition” (Van Lente et al. 2013, p. 12).

## Seasons come and go: laying out the case for the AI hype

Regarding AI technology, these high expectations manifest in narratives that focus on the effects of AI that give agency to technology (Vicsek 2021), framing it as a key technology of our time in an ‘age of AI’ or even speaking of an ‘AI revolution’ (Köstler

and Ossewaarde 2022). On the other hand, many narratives are marked by anxieties and dystopian visions, for example in the debate on the future of work (Vicsek 2021), without even mentioning ideological debates on the dangers of AI (Stieler 2023). This charged discourse on AI overall can be described as a mismatch between the expectations and the realities of AI systems, which we want to explain in further detail.

### AI hype and mismatched expectations

In comparison to other hyped technologies, AI can be seen as a ‘long fuse technology’ (Dedehayir and Steinert, 2016), which progresses slowly through a series of highs and lows. AI raises expectations on a societal macro level, addressing technology in society (Van Lente et al. 2013), and triggers ubiquitous promises and rather generic expectations. The potential and power attributed to AI as a technology with general capabilities, whether advancing or detrimental, appear as recurring themes in the discourse on AI. In parallel to these polarized positions regarding AI effects, AI systems in practice have recently sparked a more empirically driven critical debate around AI, pointing to problems of discrimination, security issues as well as false promises and promises of AI solutions (Buolamwini and Gebru 2018; Kaltheuner and Amironesei 2021; Bender et al. 2021). The discourse of these past months demonstrates an entanglement of different stages of AI hype: AI polarization and overpromising as a sign of hype flourishing and the critical discourse on present AI practices as a sign of disillusionment.

The adaptiveness and general capabilities that are inherent in the imaginaries of AI discourse are at a mismatch to the concrete applications scenarios of AI. One could even regard the term ‘artificial intelligence’ as a symptom of this mismatch as it is being used unspecifically for many different applications and methods. This generalism guides the attention to assumed capabilities and an often-personified idea of AI, and away from a specific use case with clear technical properties and limitations, thus creating a tension between broad rhetorical visions and attempts to discuss application specifics (Sovacool and Hess 2017).

### AI hype and multi-actor assemblage

The many actors involved in the AI hype include the AI industry, governments, research institutions, media and diverse AI funders as well as civil society actors. In the past decade, investment in AI increased 18 times (Maslej et al. 2023). Governments and policy makers take up the narrative of AI being a groundbreaking technology in their national AI strategies (Bareis and Katzenbach 2022) but also contribute to shaping the future by implementing funding for AI. This also becomes visible on the European level, where the integration of AI systems is in many funding initiatives a necessary condition to be eligible for funding (European Commission 2020). This corroborates the finding that “once a technology begins to hype, decision makers in organizations may follow the trend rather than carefully as-

sessing the technology's potential themselves" (Dedehayir and Steinert 2016, p. 29).

In this multi-layered scenario of actors contributing to the AI hype, hype dynamics can start in different public realms or specific communities at different times and follow different patterns. Different stages of AI hype cycles are happening all at once and as argued, they may collide or overlap in public discourse.

In the layered network of actors, the state is often expected to promote a responsible use of AI. Ulmiche et al. (2021, p. 171) diagnose a current "governance frame [that] assigns more active and collaborative roles to the state and society", which is also a way of trying to counterbalance the oligopoly of few companies and increasingly acknowledged risks and ambiguities of AI systems.

### AI hype and public interest tech

The current hype around artificial intelligence amplifies prevalent questions of responsibility and accountability in the development of AI applications. "Hype pushes the discourse of ML/AI towards unrealistic questions, and popular representations in the media might relocate responsibility to those with less control of the outcomes" (Slota et al. 2020, p. 7). The hype goes along with a high policy priority in which political actors at least discursively try to counterbalance the power of big tech: Ethical debates are ever-present, and high expectations are allocated to public engagement. Designing artificial intelligence in the public interest, despite most often very limited resources, therefore comes with an extended set of ambiguous but high expectations.

In contrast to the rather few commercial drivers of the AI industry that heavily dominate the public discourse as well as the economic landscape around artificial intelligence, public interest technology projects do not fit into a logic of maximiz-

## Methods

The underlying study employed a mixed-methods approach, consisting of ten case studies, based on document analysis and semi-structured interviews, and 17 additional semi-structured expert interviews to investigate public interest tech projects developing AI applications. The interviews gathered data on the experts' understanding of public interest AI, the potentials, risks and challenges these actors identify as well as their views on support and funding that is needed. For the case studies, a purposive sampling technique was employed to select public interest tech actors that represented a diverse range of initiatives in the fields of sustainability, consumer protection, social issues such as equity and gender equality, labor issues and work-related applications. Conditions for this sampling were the advanced stage of the project, and the feasibility of analysis of the case in the timeframe of the study. For the expert interviews, again a purposive sampling method was utilized to identify 17 experts with significant experience and expertise in the public interest tech field, particularly in Germany.

Overall, 20 semi-structured interviews were conducted with a selection of the case studies and the selected 17 experts. Interviews were conducted following a responsive interviewing approach (Rubin and Rubin 2012), the interview guide was developed following Helfferich (2019) and consisted of narrative prompts for each section as well as optional follow-up questions.

For the purpose of this research article, the collected data, including interview transcripts and documents, were re-analyzed and subjected to qualitative content analysis. The analysis process followed an extractive and structured approach (Gläser and Laudel 2010; Kuckartz 2018). AI hype emerged as a theme from our data: Although the phenomenon of AI hype was not the original focus of our interview question, many interview partners proactively started to use the term 'hype' and directly or in-

*One could even regard the term 'artificial intelligence' as a symptom of the mismatch as it is being used unspecifically for many different applications and methods.*

ing profits. Public interest technology in general can be defined as "the application of design, data, and delivery to advance the public interest and promote the public good in the digital age" (McGuinness and Schank 2021, p. ix). Actors from the public interest tech sector implementing AI systems often share the goal to not only use AI systems for a societal benefit, but also procedurally reflect the public interest in the development technology. This can be done for instance by following data ethics, having a higher level of transparency and entry points for deliberation, or inclusive problem-solving and openness (Züger et al. 2022).

directly explained in their statements how they relate to it. The codes were organized based on this emerging theme and categories were developed that capture different themes of relation to AI hype of public interest tech projects according to our focus of research. This analysis method allowed a systematic examination of the data. By employing this mixed-methods approach, combining case studies and expert interviews, the study aimed to provide a comprehensive understanding of how actors in the field of public interest tech relate themselves to AI hype dynamics and how performing hype and at the same time engaging with this hype affects society overall.

## Empirical findings

Looking at the empirical data from the interviews and case studies, we used the aforementioned theoretical background and research on AI hype as a lens to describe the occurrence of hype in our data and how actors perform or describe their relation to the phenomenon. The descriptions of their positions towards the hype and how their perception influences their decisions, is what we see as the mentioned performative nature of the AI hype. We will introduce this in examples in the following sections and draw attention to a specific act of hype performativity, namely the claim of resisting the hype, which was evident in our findings.

### Performativity of AI hype

Firstly, AI hype contributes to certain beneficial conditions for public interest tech projects. In our case studies and interviews, two concrete beneficial aspects resulting from hype were mentioned several times: the emergence of support structures and community-building.

The support structures described by the experts included funding possibilities as well as immaterial competence training, coaching or networking events. One common aspect that can be found in our data is that public interest tech initiatives are aware of AI-focussed funding possibilities, one expert describing that “here is of course a very classic promotion of hype”, allocating “several hundred million for AI” (Expert Interview (in the following EI) 15). The study participants acknowledge that implementing AI technologies in public interest tech projects is helpful for them to access funding. The founders of a tool aiming to automate gender sensitive writing in documents described AI as a “hot topic” that helped gain support for their idea. Another project which dealt with estimating the irrigation needs of trees was actively looking for calls with a focus on urban development, climate and AI. The increasingly critical public discussion on risks of AI technologies led to an increased willingness of public or philanthropic funders to support projects that aim to compensate for flaws of AI, which is the case for one of our case studies, in which the project team aimed to build a non-discriminatory dataset.

A second aspect beneficial to public interest tech organizations is community building through visibility of public interest tech. Publicly visible public interest AI projects have a signaling-effect for other projects and potentially lead to stronger networks of public interest tech, increasing the chances to “have a community of people who can also support each other” (EI06).

Because of more public interest oriented initiatives working on AI and sharing their work there is a higher availability of open source and free AI-related resources such as training data or software building blocks. Many projects build on open-source resources, like one of our cases that built on and extended open streetmap data (EI19). According to the founders of an AI system for more accessibility of mobile devices, their project could

never have come this far “if there hadn’t been so many other free projects that we could have used in our systems” (EI20).

The participation of volunteers, that a number of public interest tech projects deeply rely on, is increased by the current hype on AI. This can be illustrated by a project that relies on voice data donations, which currently many volunteers contribute to: “Most communities are very excited about the idea of key technology products being offered in their language for the first time” (EI18).

### Positioning within the hype

Aside from these descriptions of hype benefits, the main mention of the AI hype was from a critical perspective. For example, one expert describes the use of the AI terminology in the public funding context as being

*“[...] mainly used on the political level, [as] totally blurred, where everyone is allowed to interpret what they think they mean. And these are more projection surfaces than concrete terms, and that also makes the discussion very difficult, because [...] everyone means something completely different.”* (EI05)

This broad use of the term ‘AI’ was identified as a major problem by many of the experts, who perceive it as a “massive buzzword” (EI06) and report that the innovative aura of the technology has also reached the public interest tech scene admitting that “actually it’s always totally unclear what we’re talking about” (EI06).

Aside from this general critique towards an unspecified use of the term, our findings showed in many statements a clear critique of AI hype. Interestingly, this critique has the effect of the speaker distancing themselves from the hype, implying that the speaker is rather an observer confronted with a hype they need to deal with, rather than an active part in the hype dynamic. One key point of the critique is that the aforementioned benefits (and funding opportunities) were dependent on the use of AI techniques, e.g. machine learning, thus limited to a specific technology, which the participants of our study saw as problematic, since it limited their ability to adjust and choose technologies for their projects freely. The experts described this system as being exploitable too, mentioning that they used the term AI to apply for funding, even if their project does not or only partly use AI technologies. “Of course, we sometimes write AI on our applications, [...] even though we know that it is actually data, that we simply visualize data, make explorative analyses, reports, and so on.” (EI06)

This dynamic, that the term AI can be (mis-)used to gain funding, was discussed with different sentiments: While some openly admitted using the term strategically, others described this practice critically. Their criticism was focused on the funding system itself, embedding and enforcing an exclusive focus on AI technology. More specifically, study participants criticized that this deterministic focus on AI in funding calls shifted

the focus of interest away from actual problems and towards the technology, explaining that data driven projects should only be adopted if the technology supports their goals: “And if we realize, our impact logic has nothing to do with AI, then we don’t need it. [...] We always need to see how it actually helps us to improve our work.” (E106)

From the interviews we understand that actors try to actively distance themselves from being a part of the hype, and describe their intent to resist it because the values driving their projects are partly in conflict with the temporality and side effects of

*addressing them or reforming the current economic systems which might be the root cause of some of [the] concerns about AI development and use” (Ulinicane et al. 2021, p. 171).*

An additional reason for why the choice to focus solely on AI as a technology is problematic, can be explained by a concept that Slota et al. (2020, p. 7) call a “well-socialized technology”, which is based on a good understanding of who is responsible for what in regards to the technological use in society:

## *AI hype contributes to certain beneficial conditions for public interest tech projects.*

hype. From these actors’ point of view, hype provides opportunities but also results in a dependency on changing and unreliable funding tides. Most public interest tech actors are committed to social and ecological sustainability, which implies a somewhat hype-adverse disposition in their work, as their work is built on long-term use and re-use. One conclusion an expert drew was that “the question how I can use AI for social good is the wrong question, because it is techno-centric. We need to learn to think [...] starting with the problem” (E117).

### Discussion: public interest tech within the AI hype

Our findings show that public interest tech actors find themselves in a paradoxical relation to AI hype: They benefit from hype, but also have contrary values and needs. Limiting funding to AI technology neglects the less visible tasks and parts of a project that are often underfunded already: maintenance, capacity building, or foundational data structures. The public tech sector exemplifies how “hypes can [...] be considered as a resource as well as a pitfall” (Van Lente et al. 2013, p. 1626).

Especially in the context of public interest technology, hype dynamics are seen as problematic, because the needs and problems of society don’t follow hype cycles. The focus of funding on one technology encourages non-profit actors to focus on it, rather than on the societal problems they address – with whichever means best suited. Moreover, hype dynamics stand in contrast with sustainable funding, which is a huge problem for public interest tech projects to find. With a focus on AI, the needed infrastructure and resources are immense and hard to sustain. Addressing this issue of a focus on technology, Ulinicane et al. argue that this framing in a debate is a choice and not a necessity. They argue that

*“alternative frames are possible, for example, prioritizing tackling societal problems where AI is one of [the] means*

*“A well-socialized technology is one [...] where sufficient implicit knowledge exists that misrepresentation is relatively visible, and misunderstandings can be more readily corrected. More specifically, the socialization of technology speaks to its visibility and in shared understandings of its role” (Slota et al. 2020, p. 7).*

The authors claim that this is lacking for AI and see “a problem of the socialization of AI” (Slota et al. 2020, p. 7). Building on this idea, the expectations towards AI mismatching actual AI systems’ performance can be seen as a symptom of a badly-socialized technology. A better socialization of AI in Slota’s understanding would contribute to more nuanced expectations and could position AI amongst other technologies in a complex socio-technical scenario with societal issues at center.

Finally, our findings highlight the power imbalance that is inherent in the AI sector. Several actors profit from the hype around AI. Through its funding programs, the European Commission invests one billion euros per year in AI and additionally mobilizes investments from the private sector and its Member States to reach an annual investment of 20 billion euros over the course of this decade (EAIF 2021). However, the major part of these investments goes to for-profit companies, which creates a massive imbalance in the field of actors developing AI, since it is for-profit actors who hold the most data, infrastructure and financial resources.

### Conclusion

Regarding our research question how actors in the field of public interest tech relate themselves to AI hype, our findings show that these actors are in a paradoxical position. On a smaller scale than commercial actors, those using AI in the public interest can benefit from the general AI hype but remarkably exhibit their critique and intent to resist the hype as well.

On a societal level, our results on public interest tech point to the need for a clearer societal understanding of the socio-technical systems of AI technologies as well as the responsibilities of involved actors. Public interest technology development is a resource beyond the technologies themselves: The sector is a political sphere, which involves civil society in the development of technology. Public interest technology includes an awareness of the sociotechnical conditions and contexts. Crucially, it aims to put societal needs at the core and gives citizens a stake in the discourse and the governance of technology. This approach involves a pluralistic and participatory governance of data and models as digital commons, it aims to challenge prevalent structures of power by being inclusive of volunteers and citizens and giving affected communities a say over their data. The hype around AI is a highly political issue, since not only is AI playing an increasingly important role in all aspects of life, but also the hype itself is impacting our societies extensively. The existence of public interest tech projects developing and implementing AI and their critical assessment of the AI hype is a reminder of how things could be otherwise. On a final note, as researchers writing about AI hype, and thereby identifying as the observers of the phenomenon, we, similar to our interview partners, are, by participating in this discourse, at the same time part of this puzzling hype phenomenon.

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RESEARCH ARTICLE

# Technology hype, promises, and expectations: The discussion on small modular reactors in the Finnish newspaper 'Helsingin Sanomat' in 2000–2022

Mika Kari<sup>\*1</sup> , Markku Lehtonen<sup>2</sup> , Tapio Litmanen<sup>1</sup> , Matti Kojo<sup>3,4</sup> 

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**Abstract** • While the construction of collective promises is vital to the success of any techno-scientific innovation, it also entails the risk of overpromising and cycles of hype and disappointment. This article explores the discursive construction of the nuclear sector's latest promise concerning small modular reactors (SMRs), using Finland as an example. It provides a brief overview of the Finnish context of SMR development and analyzes its coverage in the leading Finnish daily newspaper Helsingin Sanomat 2000–2022. Efforts at promise construction have so far been aimed at building legitimacy for SMRs, while strengthening credibility – another key element of successful promise construction – has only just begun. The increasing number of SMR-related articles indicates a growing hype, but the absence of a corresponding 'hype language' suggests that the considerable media attention does not automatically translate into emphatic media coverage and discursive hyping.

## Technologie-Hype, Versprechen und Erwartungen:

Diskussion über kleine modulare Reaktoren in der finnischen Tageszeitung Helsingin Sanomat im Zeitraum 2000–2022

**Zusammenfassung** • Die Konstruktion kollektiver Versprechen ist zwar für den Erfolg jeder technologisch-wissenschaftlichen Innovation von entscheidender Bedeutung, birgt jedoch auch das Risiko allzu gro-

ßer Versprechungen und Hype-Zyklen sowie Enttäuschung. Dieser Forschungsartikel untersucht die diskursive Konstruktion neuester Versprechen im Nuklearsektor am Beispiel kleiner modularer Reaktoren (SMRs) in Finnland. Er gibt einen kurzen Überblick über die SMR-Entwicklung in Finnland und analysiert die Berichterstattung in der führenden finnischen Tageszeitung Helsingin Sanomat zwischen 2000 und 2022. Bisher zielten die Bemühungen darauf ab, die Legitimität von SMRs zu stärken, während die Verbesserung der Glaubwürdigkeit – eine weitere wichtige Voraussetzung für die erfolgreiche Konstruktion von Versprechen – gerade erst begonnen hat. Die wachsende Zahl von SMR-bezogenen Artikeln deutet auf einen zunehmenden Hype hin, aber das Fehlen einer entsprechenden ‚Hype-Sprache‘ legt nahe, dass die beträchtliche Medienaufmerksamkeit nicht automatisch zu einer verstärkten Medienberichterstattung und einem diskursiven Hype führt.

**Keywords** • techno-scientific promises, media analysis, hype cycle, nuclear energy, small modular reactors

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## Introduction

There is a need to better understand how technological future scripts and technological hype cycles are constructed and how they evolve. Science and Technology Studies (STS) have shown that techno-scientific promises and expectations have significant performative power to shape the trajectories of modern societies (Konrad et al. 2016).

This research article applies the perspective of sociology of expectations to explore the intertwining of the hype and con-

struction of the techno-scientific promises concerning nuclear technologies. To illustrate these processes, we examine the promise construction concerning the so-called small modular reactors (SMRs) in Finland. As the latest in the series of nuclear sector promises, SMRs are generally defined as reactors with a capacity of 10–300 megawatt, built in a modular, assembly-line fashion. The SMRs constitute a heterogeneous group of dozens of designs, some based on the currently operating light-water reactor technologies and others applying more innovative approaches. A number of prototypes are expected to be in operation by 2030 (NEA 2023), including the LDR-50 small-reactor designed by the Technical Research Centre of Finland (VTT) mainly for district heating. Overall, the SMRs are still very much a future promise rather than current-day reality, with implementation and the risk of disillusionment predicted by the hype cycle still some way off.

The current enthusiasm, perhaps hype, around SMRs has its background in the increasingly pressing needs to cut carbon emissions, the heightened concerns for energy security especially after the Russian invasion in Ukraine, in February 2022, and the nuclear industry's attempts to survive in a stiffening competition with ever-cheaper renewable energy technologies.

Throughout its history, the nuclear sector has experienced cycles of ups and downs, periods of enthusiasm and hope concerning specific technologies (e.g. fast breeders, successive reactor 'generations', fusion, geological disposal of waste) followed by disillusionment, polemic and again revival of reformulated promises (Kaijser et al. 2021). The 'nuclear renaissance' (Nuttall 2022) announced by the industry at the turn of the millennium was cut short, partly because of the 2011 Fukushima accident, as were the previous attempts to bring SMR technologies to the market in the US in the early 2000s (Thomas and Ramana 2022). Importantly, the ongoing latest wave of enthusiasm for SMRs is spurred by the formidable difficulties that the construction of large nuclear power plant projects has in recent

articles relating to SMRs published over the period, 2) the trends and the match with the hype cycle model, 3) the main themes and specific SMR promises and expectations, and 4) the type of 'hype language' employed. We observe that the bulk of the promise construction efforts has focused on building legitimacy for SMRs, while the strengthening of credibility – another key ingredient of successful promise construction – is only at an early phase. As for the discursive 'hying', we note that hype, as measured by the amount of media attention, is not always accompanied by semantic hype, that is, overly optimistic and exaggerated language. We furthermore stress that trends of possible media hype are embedded in their societal context.

## Theorizing technological hype, promises and expectations

Our analysis draws on concepts from the sociology of expectations, which has highlighted the crucial role of techno-scientific promising in shaping innovation and deployment of new technologies. Regardless of whether they are fulfilled or not, promises make things happen, by aligning actors, institutions, and capital; guiding activities; providing structure and legitimacy; reducing uncertainty; as well as fostering and steering investment (Borup et al. 2006; Van Lente 2012; July 2010).

A techno-scientific promise can be understood as a specific form of anticipation and expectation, which encompasses both the relatively vague visions and more specific statements about the future of a given technology (Parks 2020). For instance, the 'umbrella' SMR promise consists of a large variety of specific reactor designs under development. These designs – which vary widely in terms of their energy output, size, fuel type, enrichment level, fueling frequency, site location, and spent fuel characteristics – each constitute a specific promise of its own. The viability of a promise – whether general or specific – is not an

*As for the discursive 'hying', we note that hype as measured by the amount of media attention is not always accompanied by semantic hype, that is, overly optimistic and exaggerated language.*

years faced in the West (Lehtonen 2021). Compared with these megaprojects, the SMRs promise to be cheaper, safer, quicker to deploy, and more compatible with the decentralized and renewables-dominated energy systems of the future (NEA 2023).

In the following, we will explore the discursive dimension of the construction of the SMR promise in Finland. We first briefly review the key policy initiatives and processes in support of the SMRs, and then analyze SMR reporting in the leading Finnish daily newspaper Helsingin Sanomat (HS) in 2000–2022. The media analysis explores 1) the distribution of the ar-

inherent attribute of the technology in question but instead an outcome of processes whereby its legitimacy and credibility are collectively constructed, through the interaction between promissory discourses, their counter-narratives, institutions, and material realities. To be legitimate, a promise needs to address a societal problem widely recognized as important and urgent, whereas credibility hinges on the perceived ability of the technology to address that challenge. Credibility typically builds upon past experience and/or the perceived competence and trustworthiness of the proponents of the technology. Legitimacy and credibility

are built through ‘trials of strength’ (Joly 2010; Chateauraynaud 2011) – whereby the promise is confronted with counter-narratives, detractors, and unanticipated situations.

When a techno-scientific promise fails to materialize, it engenders disappointment and disillusionment, corresponding to the disappointment phase of the Gartner consultancy hype cycle (figure 1).

The hype cycle model assumes this to occur when the technology enters into the implementation phase (Joly 2010; Konrad et al. 2012). The hype cycle, with its pre-defined five phases of innovation (innovation trigger, peak of inflated expectations, trough of disillusionment, slope of enlightenment, and plateau of productivity) is obviously simplistic and deterministic (Borup et al. 2006), and has been criticized on many accounts (Dedehayir and Steinert 2016; Steinert and Leifer 2010).

Yet, the construction of promises often indeed results in hypes. Moreover, regardless of its ability to accurately describe the evolution of a technology, the hype cycle is performative: Whether realistic or ‘excessive’, hype cycles shape the very development of technologies that they seek to describe, for instance when innovation actors anticipate hype and adjust their behaviors accordingly (Konrad 2006; Joly 2010; Alvial-Palavicino 2015). Unlike the hype cycle assumes, promise construction entails gradual modification of the initial promise, not merely hype and disappointment relating to an immutable initial promise (Joly and Le Renard 2021; Lehtonen 2023).

While the hype cycle denotes the amount of attention that the media gives to a techno-scientific innovation, the nature of that attention is likewise crucial. Therefore, we also examine the ‘hype language’ in the articles, i.e., how enthusiastically the SMR promise is presented as a solution to the given problems.

The media is a key public arena in which discursive battles between proponents and detractors of techno-scientific promises are fought, dramatized, and performed (Kojo et al. 2023). These discursive battles contribute to the construction and deconstruction of the promise, generating hype and fueling disappointment, and triggering changes in institutional and material realities. These changes feed back on the discursive battles, shaping the promise discourses and expectations. It is this discursive creation of expectations, as one of the resources and strategies mobilized by actors to steer promise construction, that the media analysis in this research article focuses on. It does so by analyzing the promises and expectations, and identifying indications of hype relating to the SMRs in the leading Finnish daily newspaper.

To place this analysis within a broader context, the following section briefly describes the societal context for the SMR promise construction in Finland.

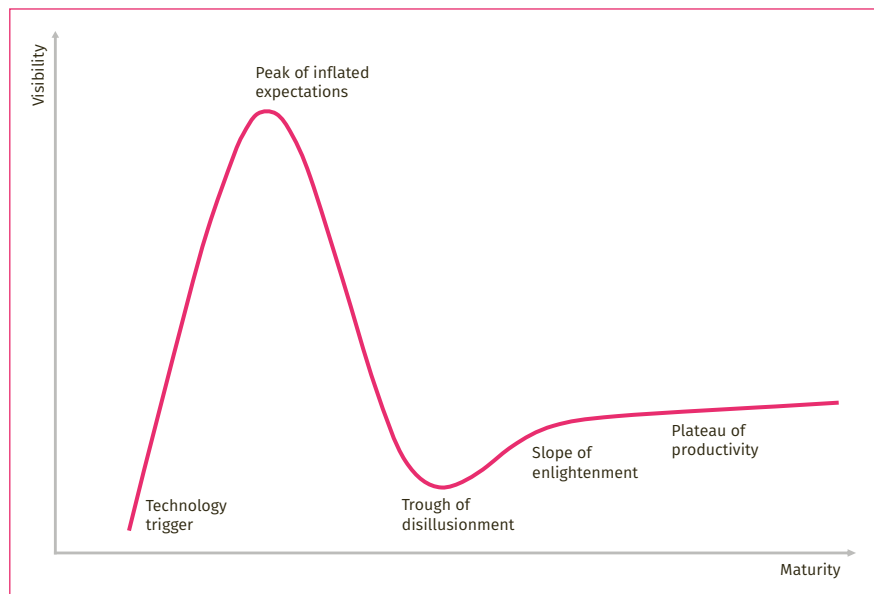


Fig. 1: The Gartner Consultancy hype cycle.

Source: Borup et al. 2006, p. 291

## The Finnish context for SMR promise construction

Nuclear power accounts for about 35 % of electricity production in Finland. It has been an important part of the country’s energy policy since the late 1970s, and has since then enjoyed widespread support across the political spectrum. In 2002, Finland became the first Western country to approve the construction of a new nuclear power plant (NPP, OL3 UNIT) since the Chernobyl accident in 1986. In 2010, the government approved the construction of further two large NPP units – OL4 and Hanhikivi 1.

As elsewhere, also in Finland the problems with the large NPP projects have driven interest for SMR technology. OL3 entered commercial operation in 2023, 14 years behind the original schedule, and at an estimated cost almost four times higher than the original EUR 3.2 billion (Proctor 2023). Two other NPP projects have been cancelled. OL4 was suspended in 2015 because of the delays with OL3 (TVO 2015), and Hanhikivi 1 was terminated in 2022, after the Russian invasion in Ukraine, given that the Russian Rosatom was both the main shareholder and technology supplier for Fennovoima (Husu and Kojo 2022).

While Finland’s currently operating NPPs produce only electricity, SMRs are suggested mainly as a means of decarbonizing district heating (Tulkki et al. 2022). Early studies on nuclear district heating in Finland were carried out in the 70s (Leppänen 2019, pp. 6–10). In the early 2010s, the power company Fortum explored the use of nuclear energy for district heating, and pondered on the possibility of switching to smaller power plants, to reduce financial cost and risk (Lähteenmaa 2013). Fortum (2010) flagged for nuclear energy as ‘the most cost-effective’ and environmentally friendly district heating option for the Helsinki metropolitan area in 2020–2080. More recently, local

politicians in the metropolitan area have shown growing interest in SMRs as a means of reaching the ambitious carbon-neutrality targets by 2030 (Tulkki et al. 2022).

In addition to the state-owned research institute (VTT) small reactor mentioned earlier, also the technical LUT University has embarked on the development of its own LUTHER experimental SMR design, based on light water low-temperature, low-pressure reactor (Truong et al. 2021).

As part of the effort to establish a national ‘SMR ecosystem’, initiated in 2020 (Häkkinen et al. 2023), the adaptation of the regulatory framework for the needs of possible future SMRs is underway, as part of the overall reform of the Nuclear Energy Act. The work enjoys both political and industry support, and seeks to remove “regulatory and licensing barriers” that would hinder the “introduction of series-produced SMRs” and the associated climate benefits (Kojó et al. 2023, p. 5).

## The media analysis: data and methods

To explore the discursive dimension of promise construction, we analyzed the SMR debates in the leading Finnish newspaper Helsingin Sanomat in 2000–2022. HS dominates the Finnish media landscape as the only major national daily newspaper, and is among the country’s three most trusted news media outlets (Media-alan tutkimussäätiö 2023).

Articles were searched on the newspaper’s own online database, combining as search terms the derivative of either ‘mini’, ‘small’, ‘modular’, or ‘heating and SMR’ with the derivative of one of the terms ‘reactor’, ‘nuclear reactor’ and ‘nuclear power’, in Finnish, or using a compound word formed by applying the same principle. Once duplicates had been removed, the screening for relevance of the remaining 892 newspaper articles and the elimination of articles concerning SMRs for naval, test and research purposes, and for spacecrafts and missiles resulted in a final text corpus of 104 texts.

support the interpretations and back up the arguments. The following software was used for the analysis: NVivo 1.7.1 and Microsoft Excel (multiple versions).

## Promises, expectations and hype surrounding small nuclear reactors in Helsingin Sanomat

The distribution of the articles from 2000 to 2022 (figure 2) follows three distinctive phases. At the first phase (2000–2017), small nuclear reactors are mentioned occasionally, in up to three articles per year (altogether 17 articles). The interest picks up at the second phase (2018–2020), with 6–7 articles per year (altogether 19 articles). The final phase (2021–2022) indicates possibly mounting hype and rapidly growing media attention, with 28 articles in 2021 and 40 articles in 2022.

At phase one, the mentions of SMRs were too few to allow a meaningful analysis of the most prominent themes. However, at phase two, climate change and district heating were the themes that started to bring visibility to SMRs. These were central also at the beginning of phase three: In 2021, the most prominent themes were 1) combating climate change, reducing emissions and pursuing carbon neutrality; 2) use of SMRs for district heating to reduce emissions; and 3) a new age of, or future prospects of, nuclear energy and the role of SMRs in such a future. Year 2022 brought to the fore 1) the energy crisis, and the concerns over energy security and self-sufficiency; 2) reports concerning the reform of the Nuclear Energy Act and SMR regulation, while the topic 3) from the previous period (a new age of nuclear and the role of SMRs in it) still remained prominent.

The style of the analysed articles in HS was rather restrained. Explicit promises were rare, except in opinion pieces (HS 01.07.2021; 16. 12. 2021; 03. 01. 2022; 02. 12. 2022). Instead, the articles typically featured somewhat cautiously phrased expectations or aspirations. Examples included: “[... ]It is hoped that se-

*The viability of a promise – whether general or specific – is not an inherent attribute of the technology in question but instead an outcome of processes.*

The analysis focused on four topics in SMR reporting: 1) The distribution of the articles; 2) the trends and match with the hype cycle model; 3) the most frequent themes and the associated promises and expectations; and 4) the types of ‘hype language’. The qualitative textual analysis combined close reading and a hermeneutic approach. The texts were subjected to several iterative reading rounds whereby the material considered important for interpretation was highlighted and then re-examined. References and quotations are in the following section used to

ries-produced small reactors will reduce the cost of building nuclear power and bring nuclear energy into new uses” (HS 29.01.2022); SMRs “[...] are supposed to be sort of off-the-shelf purchasable power plants, which could in principle be produced in series” (HS 17. 10. 2022); “In small nuclear power plants, so-called passive safety systems are also being pursued” (HS 20. 10. 2022); and, “Small nuclear power plants may be able to solve the problem of the high cost and slowness of nuclear power” (HS 18. 06. 2022). Summing up, alongside improved safety, the ex-

pected main benefits of SMRs were their “small size, versatility, speed of construction and lower costs” (HS 09. 11. 2021).

The understated style of HS clearly extends also to its use of ‘hype language’. The articles seldom applied straightforward hyping up, i.e. portraying small nuclear reactors in an excessively positive light. In 2021, the closest to hyping were mentions of small nuclear reactors as “seemingly very promising” (HS 01. 6. 2021), a “potential future technology” (HS 12. 04. 2021) and “now emerging as one of the interesting alternatives” (HS 09. 12. 2021). Yet, an editorial ended on a rather bold note stating: “[...] but the future belongs to small power plants” (HS 27. 10. 2021). In 2022, while by no means prevalent, hype was somewhat less restrained, and gaining immediacy, as small nuclear reactors were referred to, for example, as a “hot topic” (HS 01. 07. 2022), “a particularly viable option” (HS 02. 12. 2022), and a “subject of high expectations” (HS 29. 01. 2022). The articles presented such reactors as being capable of transforming energy production, making it more climate-friendly, and even “solving” the energy transition (HS 03. 01. 2022; 30. 05. 2022; 09. 02. 2022; 31. 03. 2022). An editorial from February 2022 rehearsed the declaration from a few months earlier: “The future belongs to small modular nuclear power plants, not to old-fashioned giants” (HS 14. 02. 2022).

## Conclusions

This research article explored SMR hype and promise construction in Finland. The analysis illustrated the embeddedness of promise discourses within the evolving societal context.

The analysis of Helsingin Sanomat’s SMR reporting identified three phases, with only sporadic references to such reactors during the first 17 years, an awakening interest since 2018, and a rapidly growing media attention since 2021. The rapid increase in the visibility of SMRs in the third phase indicates signs of hype, in quantitative terms. During this phase, the articles focused on legitimizing the SMR promise, that is, on demonstrating the urgency and societal relevance of the problems that SMRs are expected to solve. The articles highlighted the potential of SMRs in combating climate change, in decarbonizing district heating, and in inaugurating a new era for nuclear energy. In 2022, with the aggravation of the energy crisis as a result of the Russian invasion in Ukraine, these themes were complemented by concerns over energy security. In 2022, HS also showed increasing interest in the plans to reform the Nuclear Energy Act, in particular to facilitate the possible deployment of SMRs.

Despite the increasing number of articles mentioning SMRs – suggesting a possible mounting of hype – from early on the HS

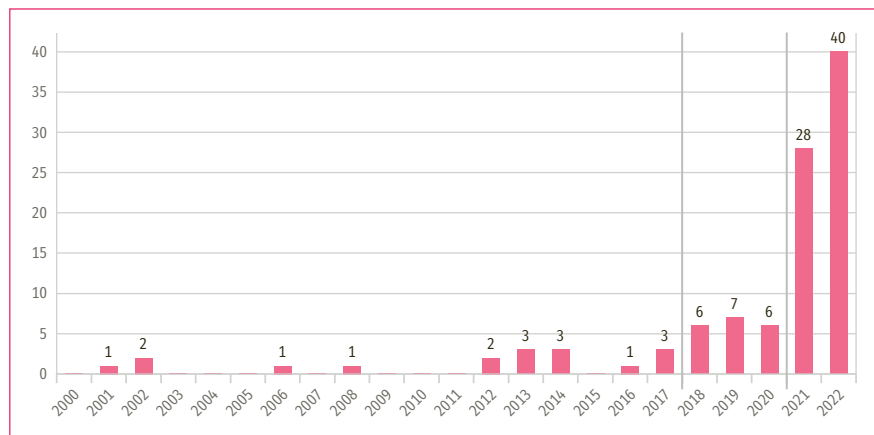


Fig. 2: The number of HS articles relating to small nuclear reactors, per year, in the final text corpus.

Source: authors' own compilation

articles generally kept to a cautious language, without making explicit promises concerning the potential of SMRs. Hype defined as the amount of media attention was therefore not accompanied by a corresponding semantic hype. In 2022, however, the HS language began to show signs of hype. In its editorials, HS took quite a clear stance, both in 2021 and 2022, rather confidently declaring that the future belongs to small nuclear plants.

The careful and restrained but gradually changing language of the leading Finnish newspaper shows signs of emerging discursive construction of credibility. The SMR promise construction has thus far mainly focused on legitimization, with climate change, energy security, energy independence, and the past problems with the construction of large reactors as key arguments. HS has hardly sought to establish credibility for the promise – for instance, it rarely refers to authoritative experts or past experience of nuclear technology development to back up the claim that SMRs are viable. More generally, the construction of credibility via efforts to bring about institutional and material change are also at an early stage in Finland. However, some measures have been initiated such as state-financed R & D, feasibility studies by major utilities, development of domestic SMR designs by a technical university and VTT, and a reform of the regulatory framework.

Certain caution is in order when interpreting the degree of ‘hyping’ and the Finnish SMR promise. Firstly, an analysis of a wider range of publications, notably technical and economic journals and magazines, might reveal a different picture of hyping. Second, given that the very function of hyping and promise construction is to facilitate and enable the deployment of a technology, determining whether hype is ‘excessive’ becomes a moving target, and can be done only after the event. What seems excessive today may in hindsight turn out to be realistic, precisely thanks to successful promise construction, including ‘hyping’. The future will tell whether the incipient ‘hyping’ over the SMRs, as revealed in the media debate, will successfully combine with the institutional and material dimensions of promise construc-

tion, or whether the hype will soon turn into disappointment once implementation gets underway, as predicted by the hype cycle model. The absence from HS reporting of clear counter-narratives that could help balance the expectations suggests that the risk of a hype disappointment sequence could indeed be real.

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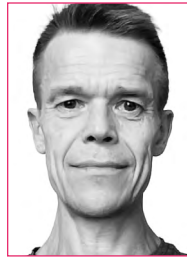
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RESEARCH ARTICLE

# Omics and AI in precision medicine: Maintaining socio-technical imaginaries by transforming technological assemblages

Robert Meunier<sup>\*1</sup> , Christian Herzog<sup>2</sup> 

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**Abstract** • We understand precision medicine as a socio-technical imaginary according to Jasanoff. After briefly outlining how the imaginary of precision medicine emerged from the Human Genome Project and spread across national contexts, we raise the question of why the imaginary and the expectations and promises associated with it persist despite regular disappointment among practitioners about the failure of personalized healthcare. We argue that short-term technological hypes enable stakeholders to renew and maintain the promises of precision medicine. In our view, these hypes are around transformations of a technological assemblage. We discuss this in detail for omics and AI technologies and evaluate the recent transformations in light of the long-term imaginary of precision medicine.

**Omics und KI in der Präzisionsmedizin:** Die Aufrechterhaltung soziotechnologischer Imaginarien durch die Transformation technologischer Assemblagen

**Zusammenfassung** • Wir verstehen Präzisionsmedizin als soziotechnologisches Imaginarium nach Jasanoff. Nach einer kurzen Darstellung, wie die Imagination der Präzisionsmedizin im Zuge des Humangenomprojekts entstanden ist und sich über nationale Kontexte hinweg verbreitet hat, werfen wir die Frage auf, warum die Imagination und die damit verbundenen Erwartungen und Versprechen trotz regelmäßiger Enttäuschung über das Scheitern der personalisierten Gesundheitsversorgung in der Praxis fortbestehen. Wir argumentieren, dass kurzfristige technologische Hypes es den Interessenvertretern ermöglichen, die

*Versprechen der Präzisionsmedizin immer wieder zu erneuern und damit die Imagination aufrechtzuerhalten. Bei diesen Hypes geht es nach unserer Auffassung um Transformationen einer technologischen Assemblage. Wir erörtern dies ausführlich für Omics- und KI-Technologien und bewerten die jüngsten Transformationen im Lichte der langfristigen Imagination der Präzisionsmedizin.*

**Keywords** • precision medicine, big data, artificial intelligence, imaginary, assemblage

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## Introduction

The term ‘precision medicine’ appeared around 2010 and gained prominence since 2015, when the Obama administration launched the Precision Medicine Initiative (Blasimme and Vayena 2016). Here is the PMI’s mission statement:

“The future of precision medicine will enable health care providers to tailor treatment and prevention strategies to people’s unique characteristics, including their genome sequence, microbiome composition, health history, lifestyle, and diet. To get there, we need to incorporate many different types of data, from metabolomics [...], the microbiome [...], and data about the patient collected by health care providers and the patients themselves.” (White House, quoted from Etchings 2017, p. 17)

As the quote indicates, the goals of personalized treatment and prevention are to be achieved by collecting and integrating large amounts of heterogeneous data. Such data and the means for acquisition, management, and analysis are often referred to as ‘-omics’ in reference to the term ‘genomics’, used for the information technology-aided study of DNA sequence developed in the course of the Human Genome Project (HGP). The

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HGP resulted in much of the theoretical, regulatory, and material frameworks on which today's biomedical big data research is built (Hilgartner 2017). Currently, not only molecular, but also data on environmental exposure, lifestyle, or individual medical history is seen as part of the omics endeavor, despite being more heterogeneous than, e.g., genomic or proteomic data. Information infrastructures, from databases to clouds, are necessary for data-intensive approaches, but in particular data science methods from statistical algorithms to artificial intelligence (AI) applications, esp. machine learning (ML), are seen as crucial in generating knowledge from data of such diverse origins (Etchings 2017; Heil et al. 2021; MacEachern and Forkert 2021).

Precision medicine can be regarded as part of a continued effort by various stakeholders from science, industry, healthcare, and politics to maintain a vision of data-intensive, molecular biology-centered biomedicine that emerged in the wake of the HGP. The more commonly used term for this vision is 'personalized medicine'. An early opinion piece on this new 'post-genomic' vision from 2001 stated:

"The post-genome era has begun, and with it the promise of tailoring the practice of medicine to the individual. This emerging field of personalized medicine encompasses the use of risk algorithms, molecular diagnostics, targeted therapies and pharmacogenomics to improve health care. Personalized medicine will provide the link between an individual's molecular and clinical profiles, allowing physicians to make the right patient-care decisions and allowing patients the opportunity to make informed and directed lifestyle decisions for their future well-being. Molecular diagnostics, the use of DNA-, protein- or mRNA-based biological markers to predict the risk of developing disease or the molecular phenotype of an existing one, will change the way we currently define disease" (Ginsburg and McCarthy 2001, p. 491).

*How is the post-genomic biomedical vision –  
that we will analyze as a socio-technical imaginary – maintained,  
even though its promises remained unfulfilled?*

From the metaphor of 'tailoring' to the notion of individual characteristics, the emphasis on both prevention and treatment, and the idea that data from various molecular levels will be integrated with clinical records, there is much continuity between this quotation and the above statement on precision medicine. Indeed, the US National Research Council report (NRC 2011) that introduced 'precision medicine' as a science policy category, suggested it as a replacement for 'personalized medicine' and many treat the terms as synonymous. We will use 'PM' to refer to both.

The question is: How is this post-genomic biomedical vision – that we will analyze as a socio-technical imaginary – maintained,

even though its promises remained unfulfilled (Section 1)? Our answer is that this is achieved by stakeholders through connecting the imaginary to ever-new technologies – a process we address as transforming a technological assemblage – and by depicting these transformations as revolutionary, i.e., through technological hype (Section 2). By reviewing the biomedical literature and drawing on relevant STS work, we show how short-term hypes (applying to transformed assemblages) enable a renewal of a long-term promise (pertaining to an imaginary). For the case at hand, this means that the current omics and AI technologies need to be assessed as elements of an assemblage and in the context of the assemblage's role in the long-term imaginary (Conclusion).

### Maintaining the post-genomic biomedical imaginary

While practitioners often speak of a paradigm (shift), commentators have characterized PM as a scientific/intellectual social movement (Juengst et al. 2016; Au 2021), umbrella term (Pokorska-Bocci et al. 2014), or socio-technical imaginary (Erikainen and Chan 2019; Strand 2022), among others. All these denominations bear value, depending on the question asked. We adopt the notion of a socio-technical imaginary. This is appropriate, because of the longitudinal outlook, where imaginaries are described as relatively stable or durable, albeit not as static, but as undergoing dynamic changes. This serves our interest in long-term trends. Even though PM has itself been described as a hype (Maughan 2017), we reserve 'hype' for the more short-term dynamics pertaining to technological novelty.

Socio-technical imaginaries are defined as "collectively held, institutionally stabilized, and publicly performed visions of de-

sirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology" (Jasanoff 2015, p. 4). The concept thus usefully ties together politics, meaning, morality, and technology in the context of promises and expectations that envision socio-technical futures, but are shaped by current interests and in turn have effects in current socio-economic systems.

Regarding politics, socio-technical imaginaries "are not the same as policy agendas" and yet they involve "active exercises of state power, such as the selection of development priorities, the allocation of funds, the investment in material infrastructures, and the acceptance or suppression of political dissent" (Jasanoff

and Kim 2009, p. 123). We cannot discuss this in detail but refer to Blasimme and Vayena (2016) for the case of the U.S. Importantly, while imaginaries were originally seen as playing out on the national level, Jasanoff's 2015 account suggests that imaginaries can be effective across nations when propagated by economic or professional networks.

Indeed, the HGP as well as the development of the imaginary of PM are strongly connected to U.S. science and healthcare policies. However, PM has been adopted by research institutions and policies in developed countries, e.g., in Europe and Japan (Bando 2017). While facing similar challenges for healthcare systems, such as an aging society and the rise of chronic diseases, each of these contexts is characterized by specific political and regulatory environments, as well as varying healthcare systems. Also developing countries such as Brazil and China joined the 'bandwagon' (Au and Da Silva 2021).

Analyzing PM as scientific/intellectual movement (SIM) through collaborations as documented in articles published between the 1990s and 2019, Larry Au generates network graphs, which are centered on the U.S. and U.S. institutions, but indicate a global distribution: "These network diagrams can be interpreted as the uptake of a SIM's language by researchers across countries or institutions, and crucially, a working agreement as to what the SIM is – at least enough to facilitate collaboration." (Au 2021, p. 6) The propagation of the imaginary through these networks is then accompanied by continued negotiation of the meanings of the respective labels (e.g., 'personalized' vs. 'precision'), the locus of the novelty compared to previous medical practice or health care models, and normative consequences (e.g., regarding the position of the patient) (Juengst et al. 2016; Erikainen and Chan (2019). We focus here on the technological dynamics accompanying the development of the imaginary.

Before we address the hype around omics and AI (Section 2), we need to highlight a historical conundrum to which it speaks. So far, we have made clear how the socio-technical imaginary of PM emerged from the HGP in the late 1990s and was estab-

lished first in the U.S., then in the EU and in many other places. This, however, does not explain why the imaginary has persisted for such a long time. One might think that this is because it brought about or at least partly realized the desired social progress it envisions. And indeed, proponents constantly repeat success stories. However, these success stories are few compared to the candidate targeted drugs and molecular markers pursued in research. Proponents, as well as critical commentators, have thus repeatedly observed that PM "falls a long way short of the predictive and preventative healthcare paradigm it once promised", as an editorial in *Nature Biotechnology* put it about ten years after the conclusion of the HGP (Anonymous 2012). Tim Maughan, a research active physician, after discussing some of the success stories for cancer treatment, cites a study reporting "that the mean improvement in overall survival from 71 targeted cancer therapies approved by the FDA between 2002 and 2014 was only 2.1 months" (Maughan 2017, p. 14). He then diagnoses that the "main scientific reason that has emerged for this relative failure of targeted therapies for cancer is the presence of profound tumour heterogeneity and clonal evolution that can be identified in most cancers" (Maughan 2017, p. 14). Twenty years after the HGP, researchers still observe that "[d]espite personalized medicine [...] being featured prominently in industry and academia, its promise has largely not been realized" (Lamb et al. 2021, p. 20). However, referring to the blood serum proteome as a source for biomarkers, they maintain that "[t]echnological advances for high-throughput measurement of proteins in biological samples have facilitated this work" (Lamb et al. 2021, p. 21). This is a common pattern. Most practitioners see no obstacle to PM's success, in principle. They point out the failure, only to suggest a technological feat that has been missing to reach the goals. Hence, technology plays a crucial role in maintaining the imaginary despite disappointments. We substantiate this view with respect to omics and AI in the context of PM.

### Transforming the assemblage: the omics and AI hype

It is a truism for technology assessment as well as for social studies of technology that technologies are not isolated. To understand how omics technologies and AI are subject to hype and to contextualize this hype in the long-term development of the post-genomic biomedical imaginary discussed above, we need to think of them as integrated in an interdependent manner into a socio-technological nexus, which we conceptualize as an assemblage.

## *Technology plays a crucial role in maintaining the precision medicine imaginary despite disappointments.*

lished first in the U.S., then in the EU and in many other places. This, however, does not explain why the imaginary has persisted for such a long time. One might think that this is because it brought about or at least partly realized the desired social progress it envisions. And indeed, proponents constantly repeat success stories. However, these success stories are few compared to the candidate targeted drugs and molecular markers pursued in research. Proponents, as well as critical commentators, have thus repeatedly observed that PM "falls a long way short of the predictive and preventative healthcare paradigm it once promised", as an editorial in *Nature Biotechnology* put it about ten

The word *assemblage* is an unfortunate translation of the French term *agencement*, originally used by Deleuze and Guattari (1980). Rather than referring to something larger that is assembled to produce a new and emerging unit, an assemblage is to be conceived of as an "arrangement or layout of heterogeneous elements" (Nail 2017, p. 22). Assemblages are not systems in the narrow sense of constellations whose characteristics emerge from the properties of their components. The description as an assemblage serves to maintain diversity – instead of essence – and emphasizes relations and events between its constituents. Hence, an assemblage allows for the recombination

or removal of its “self-subsisting fragments” (Nail 2017, p. 23) without its (immediate or even eventual) dissolution. Hence the notion is inherently about dynamics and contingencies, rather than stability and unification.

Assemblages, like imaginaries, are dynamic but persistent. There is no cause-and-effect relation between the two. The imaginary involves broader socio-political processes which support the formation of a scientific-technological assemblage that is seen to enable an envisioned social order. But the assemblage and its anticipated capabilities in turn shape this vision. In line with the notion of an imaginary, “desire” gives things the properties they have in an assemblage (Buchanan 2020, p. 56). But this also connects it to short-term technological hypes as organizing collective expectations, which can be understood as “real

(transcriptomics) or the human microbiome (metagenomics). At the same time, various technologies to study proteins and metabolites were further developed for high-throughput data generation (proteomics, metabolomics). ‘Systems medicine’ was suggested as way to deliver PM by providing a framework for integrating molecular omics data. It promised to be more holistic and dynamic than the gene-centered reductionism and determinism of the HGP. The new data generation technologies and computational tools expanded the assemblage and, again, this was described as an ‘omics revolution’ (MacEachern and Forkert 2021).

The shift to the ‘precision medicine’ label is sometimes associated with the inclusion of yet more data sources made available through digital devices (e.g., wearable sensors) and dig-

*The big data approach fostered by extended omics and AI technologies is seen to overcome the limitations of an earlier genome-centric personalized medicine.*

time representations of future technological situations and capabilities” (Borup et al. 2006, p. 286). We locate hype in the events of transformation of an assemblage that are perceived or presented as disruptive. Unlike systems-of-things, assemblages are not defined by their components, but rather by their products (Buchanan 2020, p. 47). Even with material elements removed, an assemblage can still result in *actual* effects, e.g., in the form of stories, expectations and hopes that matter to people. Transformations of assemblages through removal or addition of elements, can, hence, perpetuate the promises of an imaginary, even if the specific promises associated with specific technologies fail to be actualized.

The PM imaginary supports an assemblage that involves heterogeneous sets of apparatuses, infrastructure, institutions, and social actors associated with academic, clinical, and industry research. This assemblage underwent several transformations. Many can be described as alterations of existing technologies, integration of technologies from different fields, or the introduction of novel technologies. Some of these events are described by stakeholders as revolutionary.

‘Omics’ already refers to a very heterogeneous set of technologies. In the course of the HGP, DNA sequencing technology evolved quickly and with it bioinformatics tools and infrastructures. These formed the core assemblage of the PM imaginary, which was initially conceived primarily as ‘genomic medicine’. Around 2005, next-generation sequencing technologies (NGS) became integrated into the assemblage. This was seen as revolutionary in many fields, as it made access to sequence faster and cheaper (Bösl and Samida 2021). It not only made it possible to collect more genomic data across populations or for individual tumors, but also to study more extensively RNA transcripts

italization of many processes, including patient records and insurance claims (Etchings 2017; Fröhlich et al. 2018). This ‘extended omics’, includes new data types, e.g., on exposure, lifestyle, or medical history. Extended omics come with a ‘data deluge’ that is seen as threatening the success of these technologies, similar to the earlier ‘bioinformatics bottleneck’ diagnosed in the context of NGS. In this situation, AI technologies such as ML are suggested as solutions as they are expected to meaningfully integrate these heterogeneous data sets (Fröhlich et al. 2018; Heil et al. 2021; MacEachern and Forkert 2021). This merging of omics and AI represents a recent transformative event. Indeed, hype has been diagnosed for biomedical big data and AI (Fröhlich et al. 2018). At the same time, this event aligns the PM imaginary with other big data imaginaries. In fact, none of these technologies are exclusive to biomedicine. They are used in other fields in biomedicine, biology, and elsewhere. But each lead to new infrastructures, institutions, social roles, and research designs in the context of the PM imaginary.

The term ‘artificial intelligence’ does not reference any single or specific mathematical method, computer hardware, or way of deployment. Rather, AI in itself constitutes an assemblage of all elements able to achieve an output behavior reminiscent of intelligent human behavior (cf. Wang 2019). AI technologies have even broader applications than omics and are currently discussed in terms of hype with respect to many fields. Both research and popular literature are rife with statements signaling “overpromised and underdelivered” results of AI in health care (Strickland 2019, p. 24) and remaining “major technical and ethical questions” (Rajpurkar et al. 2022, p. 36). Yet the belief in the potential of AI remains firm, even while proponents openly call for “a need for bold imagination” (Rajpurkar et al., 2022,

p. 36). As Schneider and Lösch (2019, p. 205) put it with reference to assemblages, such imagination “would not be conceived as something of the isolated mind or person but an emergent effect of the relations and co-operations of elements”.

To be sure, in its current shape, the assemblage associated with the PM imaginary involves more than extended omics and AI. Older technological elements are still included. Omics still includes sequencing and AI technologies are built on long-term bioinformatic infrastructures. Furthermore, there are other elements, some constituting recent novelties, that we do not discuss here, such as advanced imaging, organoids, or single-cell omics, each perceived as disruptive in an ever-accelerating cycle of technological transformations. The key insight is that hyping new technologies and, hence, transforming an assemblage is related to the technologies’ ability to speak to and re-new the promises that have been put forward with respect to earlier configurations of the assemblage in the context of an imaginary. Paradoxically, the fact that previous technologies integrated into the evolving assemblage did not deliver what was expected does not create distrust in the new ones but makes them stronger, as they can be presented as overcoming the shortcomings of the older ones. The big data approach fostered by extended omics and AI technologies is seen to overcome the limitations of an earlier genome-centric PM.

## Conclusion

This research article clarified the relation between long-term socio-technical imaginaries, entailing promises and expectations, and short-term technological hypes, which we have described as applying to technologies as integrated into and transforming an assemblage associated with an imaginary. The PM imaginary emerged in the wake of the HGP and has persisted for a quarter of a century, carrying forward the same set of promises of improving healthcare based on individual characteristics of patients and healthy citizens. Despite some success stories, the promises have not been fulfilled to an extent that would justify the amount of support mobilized by the imaginary. What maintained the imaginary was the continued transformation of the assemblage of research technologies. Most recently, the perceived revolutionary event of introducing and merging extended omics and AI technologies enabled stakeholders to maintain the PM imaginary.

How then should we assess these technologies, resisting the hype? It is certainly not warranted to infer inductively that because previously hyped technologies did not deliver on the promises of PM, extended omics combined with AI will not deliver either. However, the long-term developments suggest a more cautious approach regarding the expectations. This is relevant regarding the normative aspects of the PM imaginary. The emphasis of omics and AI approaches on the use of more data on more levels of a citizen’s life, from life-style information gathered by mobile devices to medical records, for research and

clinical practice, brings with it a number of ethically relevant issues: increased medicalization of healthy individuals (Erikainen and Chan 2019), the moral duty of data donation (Lee 2021), or concerns about data security or discrimination resulting from undetected biases (Geneviève et al. 2020). These issues can be represented as ‘costs’ on the side of health care receivers and need to be related to expected benefits. Hence it is important to reflect on how realistic these expectations are.

Nonetheless, previous hypes maintaining the imaginary also teach us that transformations of the assemblage had many effects on how research is done, even if those were not always the expected ones. Likewise, the current big data regime will certainly result in innovations in research and industry, new infrastructures, institutions, and actors (Heil et al. 2021). Big data approaches might even eventually lead to personalized treatment and prevention. But then, one can also assess the PM imaginary as a whole and the social order it envisions. Many have criticized the way it unevenly supports economic aims and diminishes efforts to improve public health measures (most recently, Tabery 2023).

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RESEARCH ARTICLE

# Don't believe the hype?: Imagined business futures and overpromising for a decarbonized economy

Thomas Frisch\*<sup>1</sup> 

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**Abstract** • International climate governance is increasingly focusing on the role of the private sector. This article explores how companies translate the narrative of deep decarbonization into their entrepreneurial visions of the future. Based on a qualitative multiple case study, it shows that overpromising is an essential feature of imagined business futures, and identifies three forms of overpromising: contradiction, exaggeration, and commitment. The research article contributes to the emerging field of hype and overpromising by proposing a contextual and nuanced understanding of overpromising. The results illustrate the power of desirable transformation narratives, but also their limitations and side effects.

*Don't believe the hype?: Unternehmerische Zukunftsvisionen und Overpromising für eine dekarbonisierte Wirtschaft*

**Zusammenfassung** • Die internationale Klimapolitik nimmt zunehmend die Rolle des Privatsektors in den Blick. Der Beitrag untersucht, wie Unternehmen das Narrativ einer tiefgreifenden Dekarbonisierung in unternehmensspezifische Zukunftsvisionen übersetzen. Auf der Grundlage einer qualitativen vergleichenden Fallstudie wird gezeigt, dass Overpromising ein wesentliches Merkmal solcher Zukunftsvisionen ist. Es werden drei Formen von Overpromising herausgearbeitet: Widerspruch, Übertreibung und Selbstverpflichtung. Der Artikel leistet einen Beitrag zum noch jungen Forschungsfeld von Hype und Overpromising, indem er ein differenziertes und kontextabhängiges Verständnis von Overpromising vorschlägt. Die Ergebnisse zeigen die Macht wünschenswerter Transformationsnarrative, aber auch ihre Grenzen und Nebeneffekte.

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## Introduction

Companies tend to perceive climate change as a risk. However, a counternarrative has been gathering pace since the Paris Agreement in 2015. This metanarrative (over)emphasizes the opportunities of a decarbonized economy and can be connected to an "incantatory climate governance" model in international climate policy (Aykut et al. 2021, p. 519). A telling example of such an opportunity narrative are companies' claims that they will become climate-neutral, net-zero, or even climate-negative. Critical studies have shown that most of these claims lack a clear understanding of what net-zero means (Fankhauser et al. 2022) and do not hold up to scrutiny, since they exclude certain business activities, lack concrete action plans, or overestimate the maturity and scalability of new technologies, such as carbon removal (Net Zero Tracker 2023). Meanwhile, global greenhouse gas (GHG) emissions continue to rise, not least because of insufficient corporate responses to climate change (Engels et al. 2023). Set in this context, companies' climate commitments may not be taken seriously or could even lead to further 'climate delay' (Lamb et al. 2020) and 'time-buying' for a fossil-fuel-based economy (Boettcher et al. 2021). This article explores how companies construct imagined business futures in response to decarbonization pressure and argues that overpromising is a distinct feature of these imagined business futures. Based on a case study of 20 international companies from various industries, it identifies three forms of overpromising: contradiction, exaggeration, and commitment.

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## Theoretical framework

Deep decarbonization means drastically reducing the amount of CO<sub>2</sub> and other GHG emissions in the atmosphere and is imperative for reaching the goals of the Paris Agreement (Geels et al. 2017). The energy transition away from fossil fuels is crucial, yet deep decarbonization requires a radical change in how the economy as a whole is organized (Sovacool et al. 2023) – and it is arguably the most important political project in global climate governance. Since multiple narratives about deep decarbonization compete for hegemony in public discourse, it would be naïve to assume the dominance of a single one or to claim that there exist clear distinctions between opposing narratives. Instead, narratives co-exist, overlap, emerge in different variations, change over time, and they require translations in different contexts (Beck et al. 2021). In the wake of the “incantatory climate governance” model (Aykut et al. 2021, p. 519), companies are increasingly under pressure to clarify their roles within a deep decarbonization scenario. In response, they construct imagined business futures, or – in other words – visions of how they imagine doing business in a deeply decarbonized economy.

### Constructing imagined business futures for deep decarbonization

Beckert’s (2016, 2021) concept of imagined futures demonstrates how fictional expectations and narratives are an inherent feature of capitalism and an important source for economic actors’ long-term decision-making, especially in times of uncertainty. Imagined futures are projections of how the future could unfold, a complex *mélange* of known facts, informed assumptions, and judgments about probable developments, enriched with emotional components (Beckert 2021). Credible imagined futures become performative and are powerful resources for guiding organizational strategies and decisions. In our case, companies need to translate the vague imaginability of deep decarbonization into concrete, company-specific, and, most importantly, desirable scenarios, which presents a complex challenge for companies, particularly those in carbon-intensive sectors (Engels et al. 2020).

Companies construct imagined futures to influence and align with the expectations of their institutional environments, of their business partners, and their stakeholders (Beckert 2021). These futures are communicated via narratives and legitimized by “instruments of imagination” (Beckert 2021, p. 1), for example, cognitive devices, such as different methods of planning, forecasting, or scenario-design. Narratives include rhetorical means, such as metaphors or personification, and make use of numbers, images, and graphs (Beckert 2021). Examples in the context of deep decarbonization include the metaphor of green growth, environmental key performance indicators, colorful charts of emission reduction pathways, glossy images of pilot projects, and portraits of people who drive change in the company.

### Overpromising and the creation of unrealistic expectations

The disconnection between what companies promise to do and what they actually do has been studied by institutional theory on organizational decoupling (Powell and DiMaggio 1991; Meyer and Rowan 1977), particularly related to Corporate Social Responsibility (Velte 2023). It is well understood how decoupling is rooted in an organization’s search for legitimacy gains vis-à-vis external stakeholders, juxtaposed with structural constraints or certain inter-organizational logics (Suchman 1995; Powell and DiMaggio 1991). Similarly, future-making practices are full of implicit values and presuppositions. Thus, they act as frames of potentiality that require constant re-interpretation and adaptation rather than unambiguous scripts for action. However, there is a difference between necessary flexibility, considering the uncertainty of the future, and generating unrealistic expectations.

The Sociology of Expectations (SoE) is insightful for understanding how unrealistic expectations build a fruitful ground for hype and overpromising. SoE is concerned with the performativity of desirable expectations and is typically applied to innovation processes or early stages of technology development (Borup et al. 2006). It has shown how expectations are key to understanding social and technological change by mobilizing resources and aligning actors toward a desired future. One line of research focuses on the notion of hype, i.e. “a peak of positive expectations, without claiming that these expectations are necessarily and intrinsically inflated” (Bakker and Budde 2012, p. 553). Research has investigated the formation and development of hype, its potential for generating action, and its temporal dimension, particularly the so-called ‘hype cycle’ (Bakker and Budde 2012; Van Lente et al. 2013). Recent studies have suggested a more gradual and context-dependent understanding of hype as a particular form of exaggeration (Intemann 2022) shifting the question toward when or to what extent overpromising is appropriate or not. Others pointed to the fact that desirable and undesirable futures follow distinct but similar logics (Kester et al. 2020). Some authors have started to investigate the mechanisms behind hype creation, including the linguistic features of hype (Millar et al. 2022) and the practices that fuel and prevent hype or those that are suitable for its deconstruction.

This article investigates deep decarbonization as a site of ‘hyperprojectivity’ (Mische 2014), where companies engage in ‘anticipatory practices’ (Alvial-Palavicino and Konrad 2019), such as developing imagined business futures for a decarbonized economy. It argues for a context-specific and nuanced understanding of overpromising and identifies three forms of overpromising in companies’ imagined futures: contradiction, exaggeration, and commitment. While overpromising is essential (and inevitable) for the construction of imagined business futures, each type is characterized by different underlying dynamics and not all types of overpromising are problematic, *per se*.



## Research design

The article follows an explorative, qualitative research design. It is based on a multiple case study realized within a longitudinal research project covering three years of interaction with 20 panel companies from Brazil, Germany, Hongkong, Japan, and the United States. The methods feeding into the analysis are: three rounds of semi-structured group interviews with sustainability managers; a review of publicly available documents; and interaction with company representatives as part of an ongoing research cooperation. Interview transcripts and company reports serve as primary material for the analysis, supplemented by field notes.

Interviews took place annually between 2020 and 2023. They covered four recurring topics:

1. climate goals and strategy;
2. climate management activities, achievements, and barriers;
3. organizational implementation;
4. external influences and stakeholder interaction.

The Hamburg-based project team organized and carried out the interviews. Academic partners supported arranging and holding the interviews in Hongkong and Japan. The author was involved as an interviewer with Brazilian, German, and US companies.

The author analyzed the transcripts and reports following a Grounded Theory approach with coding until theoretical saturation along three steps of open, axial, and selective coding

(Strübing 2021). The topic of overpromising emerged through constantly engaging with the material, and it became more prominent with the increase of corporate net-zero commitments and parallel reports about the low robustness of these commitments. As there were no direct questions about hype and overpromising, the findings are the result of a thorough reading of transcripts and reports that has necessarily been filtered through the interpretive lens of the author. Due to the short format of the paper, the focus lies on the most prominent themes identified in the material.

The sampling aimed for variety to avoid industry- or country-specific biases. The following criteria were applied for inclusion in the sample: a minimum of three companies per country, from different sectors, with high direct or indirect emissions and capital market orientation. Several companies qualified for inclusion and were approached via networks and local academic partners. Twenty-two companies agreed to participate in a long-term study with annual interviews and regular exchanges (Fig. 1), but two were excluded from the analysis: one ceased to participate after the first year and the other was an insurance company without high emissions. Thus, the final sample comprises 20 companies covering different industries and occupying diverse positions along the value chain. Some are at the core of the energy transition or heavily dependent on fossil fuels, while others are closer to end consumers. All companies operate internationally and are at least indirectly influenced by different regulations due to their supply chains or main customers. They

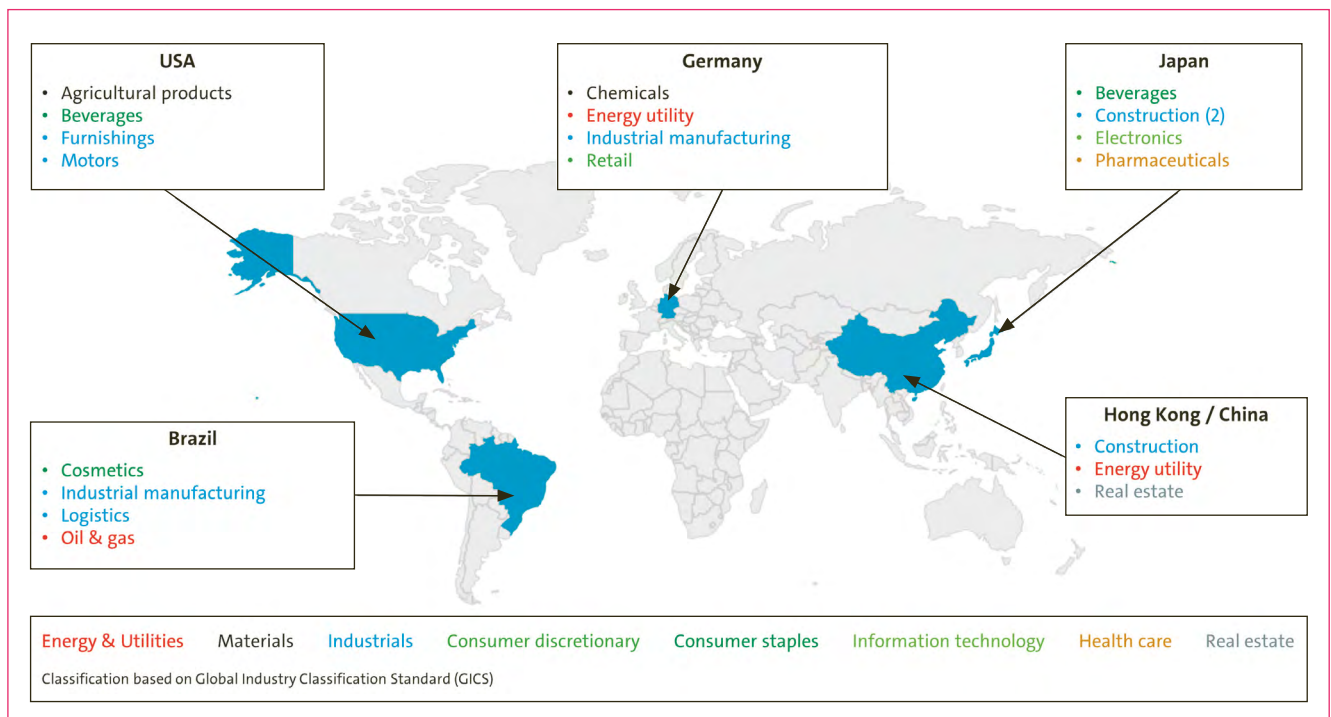


Fig. 1: Sample overview by D°Grees project (Decarbonization: Global Research on Effects in Enterprises and Societies) at University of Hamburg.

Source: author's own compilation

differ in size, revenue, business model, and product portfolio, as well as in the scale, feasibility, and achieved level of transformation.

The combination of a qualitative approach and a huge variety in the cases allows for an in-depth study of company-specific factors and a more comprehensive perspective. However, there is no intention for a comparison based on country, sector, or size, and given the small number of cases, nor is there any legitimacy for this comparison. Instead, the analysis aims to find similarities in the ways companies speak and write about their imagined business futures. This requires reducing the complexity of each case and disregarding influential factors, such as sector-specific challenges or regulatory differences. Yet, the goal of this research is to open up the field of corporate future-making practices for the study of overpromising and to provide resources for follow-up research.

## Analysis

### Overpromising as contradiction

Overpromising as contradiction is characterized by ignoring, repressing, or downplaying apparent tensions between the necessity for decarbonization and other strategic company goals. Two examples were particularly prominent in the empirical material: business growth versus emission reduction and cooperation versus competition. Many companies claim to have sustainability at the center of their strategies or speak of sustainable growth as a new strategic direction. However, the conflict between growth and absolute emission reduction necessary for deep decarbonization is rarely made explicit or framed as a challenge to overcome: *“You can grow economically, but you have to find ways to decouple emissions from that and bring them down. And I think that is the huge challenge that not only we are facing, but somehow all the players in the field.”* (German company, March 2023) Companies are aware of the difficulty but do not question growth as a goal, which strengthens the overall narrative that capitalism can become ‘green’ or ‘sustainable’. However, a recent study calculated that the decoupling rates between emission reductions and economic growth of high-income countries would need to increase by a factor of ten by 2025 to meet these countries’ fair-share contributions to the 1.5°C target, i.e. considering a country’s historical emissions and its capability to reduce them (Vogel and Hickel 2023). Such an increase in decoupling would require either a radically different type of economic activity – i.e. a departure from the growth imperative – or a quantum leap in technological development, both of which seem very unlikely.

A second area of conflict exists between cooperation and competition: *“There is a sense of teamwork that we have to be part of this trend in Japan, but at the same time, it has become an area of competition, and we are competing to be the first to introduce this area of expertise to the world and increase its value.”* (Japanese company, May 2022) Climate action is a

complex problem and requires concerted action that goes beyond common levels of cooperation in the economy. Companies have expanded collaborative activities with a wide range of stakeholders, particularly with regard to the supply chain, customers, and, to some extent, competitors. However, cooperation predominantly centers on data collection in a supplier-customer relationship, or knowledge exchange and advocacy in initiatives in industry associations or between climate leaders across sectors. While this provides resources and incentives for emission reduction activities, much more cooperation is required to realize a deep decarbonization of emission-intensive industries, particularly in terms of technology and infrastructure development.

As these two examples illustrate, overpromising as contradiction is rooted in some of the defining logics of capitalism and represents a major obstacle to reaching deep decarbonization. Companies as profit-oriented, competitive organizations will not be able to overcome this type of overpromising without systemic changes. However, there is a strong interest within the global economy and its existing power structures to maintain the illusion of a possible decarbonized business future with “continued growth in demand and profit, [but] without substantial contestation and trade-offs” (Tilsted et al. 2023, p. 6).

### Overpromising as exaggeration

Critical studies have shown that companies exaggerate in various ways when speaking about their decarbonization plans: by excluding certain business areas or emission categories from their climate targets, by employing strategic or selective disclosures about emissions, and by overestimating the (future) demand for low-carbon products or the scalability of emergent technologies (Net Zero Tracker 2023; Velte 2023). In contrast to contradiction, exaggeration is not a systemic *failure* of the current global economy, but a response to external expectations that a transition towards a decarbonized economy is possible. The past years have seen a tremendous increase in this type of endorsing response, primarily driven by the financial industry.

This increase has produced an avalanche of net-zero targets, fostered the development of new disclosure standards, and given birth to a whole industry that provides tools to track GHG emissions or evaluate companies’ transition plans and climate performance. In this context, how companies imagine a decarbonized business future becomes a matter of reputation and stakeholder management. Even companies that were initially hesitant to announce climate neutrality targets in the first year – *“We wouldn’t promise anything to the outside world where we don’t say we have a very high probability of achieving that, right?”* (German company, November 2020) – did so within this paper’s research timeframe and became guilty of overpromising.

A recurring challenge for companies has been collecting emission data from their own operations and suppliers, which are far from the “real” data: *“So, then we realized: ‘Come on, why [is] your emission so much higher than we were expecting?’ Then we realized that [...] [t]hey are reporting other business units that they have under their companies that are not in our*

value chain, but of course, it affects their total numbers.” (Brazilian company, January 2022) Nevertheless, companies publish numeric data in reports, which are considered when evaluating targets or calculating remaining carbon budgets, suggesting objectivity and a realistic assessment of companies’ emissions.

This clearly illustrates that data-driven climate governance is full of implicit exaggeration, which is known and accepted by their addressees in for example the financial industries. Overpromising as exaggeration is similar to what Intemann (2022) has described in science journalism: it is explicit as well as implicit, gradual, and closely related to value judgments about what is (in)appropriate in specific contexts. Unlike contradiction, there are possible ways of dealing with this type of over-

change and create large-scale support for decarbonization within companies, as well as through the diffusion of norms, such as target setting, across the economy.

## Conclusion

This research article investigated how companies translate the narrative of a transition towards deep decarbonization into company-specific imagined business futures. It argued that overpromising represents an essential and inevitable feature of imagined business futures and identified three forms of overpromising: contradiction, exaggeration, and commitment. Each

## *Dystopian imaginarieness may inhibit climate action because of feelings of fear and apathy.*

promising within the current economic system, for example, by combining the pressure for transparency with clear methods of accountability. These initiatives are typically market-based and can more successfully become part of a dominant narrative, such as the popularization of the Science Based Targets initiative or the development of mandatory sustainability standards.

### Overpromising as commitment

The final type of overpromising highlights the generative character of high expectations and thus adds a more positive take on overpromising, which can be understood as a form of commitment. An illustrative example is a public announcement of ambitious climate targets without a concrete plan, something frequently mentioned within the research sample: *“If we waited until we had everything figured out, we would never announce. And I think that’s what happens with a lot of companies. [...] If you wait for the perfection, you will never make the plans.”* (Company from the United States, February 2022) While this could be perceived as an exaggeration of a company’s capability of achieving its targets, company representatives stressed the importance of making a public commitment to creating a governance structure within the organization, allocating monetary and human resources or speeding up processes.

This becomes particularly evident in companies that have only recently begun to think about their roles within a decarbonized economy. A company representative from Brazil explained how sustainability moved from the company’s margins to being one pillar of its strategic planning resulting in increased responsibilities and recognition within the organization: *“We coordinate now more or less sixty people [...] Of course, we are not the number one [priority] because all the areas, all the departments have their own responsibility. But now the doors are open for us, totally.”* (Brazilian company, March 2022) Overpromising as commitment in this sense could even initiate organizational

of them lacks credibility, but in different ways: Downplaying value conflicts between decarbonization and other company goals is rooted in some of the defining logics of capitalism, growth and competition, and the implausible vision of green capitalism. Decoupling external disclosure from internal processes is related to expectations of stakeholders that companies support the transition towards deep decarbonization. However, a public commitment to decarbonizing, even if implausible, also stimulates change and creates large-scale support within organizations and across the economy. The results illustrate the power of desirable narratives, but also their limits and side effects. Dystopian imaginarieness may inhibit climate action because of feelings of fear and apathy. Mainstreaming an opportunity narrative around a decarbonized economy comes with the cost of accepting overpromising and unrealistic imagined business futures. This may be important when initiating organizational change but just defers uncomfortable yet necessary decisions in the long term. In order to prevent further climate delay (Lamb et al. 2020), it is important to have shared, desirable, just, and realistic futures, and to engage in honest and constructive conversation about the degree to which overpromising is productive and appropriate for dealing with the complex challenges of decarbonization.

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RESEARCH ARTICLE

# Overpromising in science and technology: An evaluative conceptualization

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**Abstract** • This research article examines overpromising in scientific discourse that may raise unrealistic expectations in order to gain trust and funding. Drawing on signaling theory, philosophy of promising, and science communication research, a conceptualization of overpromising is presented. This conceptualization facilitates the evaluation of promises in science and technology and highlights the importance of the knowledge context. Further research is needed to explore the broader dimensions and motivations for overpromising.

*Overpromising in Wissenschaft und Technik: Eine evaluative Konzeptualisierung*

**Zusammenfassung** • In diesem Forschungsartikel werden übertriebene Versprechungen im wissenschaftlichen Diskurs untersucht, die überzogene Erwartungen wecken können, um Vertrauen und finanzielle Unterstützung zu erhalten. Basierend auf der Signaling-Theorie, der Philosophie des Versprechens und der Forschung zur Wissenschaftskommunikation wird eine Konzeptualisierung des Overpromising vorgestellt. Diese Konzeptualisierung erleichtert die Bewertung von Versprechen in Wissenschaft und Technik und hebt die Bedeutung des Wissenskontexts hervor. Weitere Forschung ist erforderlich, um die breiteren Dimensionen und Motivationen für übertriebene Versprechungen zu untersuchen.

**Keywords** • conceptualization, evaluation, overpromising, promises, signaling

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## Introduction

Overpromising of potential breakthroughs or social benefits is a regular feature of scientific discourse (Rip 2006): In order to attract research funding, promote research projects, or attract public attention, researchers make inflated or even untenable claims (Eisler 2012). Particularly in disciplines like nanoscience, dependent on their supposed future potential for funding and appeal, such promises are prevalent (Mody 2006).

Promises are assurances which may lead to expectations and agreements, and can therefore be used as signals to solicit trust or other resources. Promises can take little time and effort for the promiser, but if there is information asymmetry, assessing the promise will take more time and effort for the promisee. Together, these three characteristics can incentivize overpromising in science and technology; scientists who overpromise can gain short-term benefits with easily expressed promises, while it is difficult for promisees to assess promises at the frontier of knowledge. At the same time, promisees such as colleagues, funders, and policymakers, would benefit from improved overpromise detection. This article offers a conceptualization to as-

## *A broken promise is not a necessary condition for overpromising.*

sist in a more time-efficient, critical investigation and interrogation of overpromises, specifically for future-oriented promises (under conditions of information asymmetry) assuring breakthroughs or social benefits. Although knowing the characteristics of the promisers would further facilitate this investigation and interrogation, this is left for future study.

Our investigation draws on signaling theory (Gambetta 2011), philosophy of promising (Sheinman 2011 a), and science studies research on scientific communication. To clarify overpromising and its proposed assessment, we include examples from nanobiology, taken from grant applications, reports, popular science books, and patents. We conduct a conceptual analysis of over-

promising to distinguish overpromises from other types of promises and subsequently outline the context involved in assessing the plausibility of scientific promises.

## Promising in science and technology

When a person, such as a scientist, makes a promise about the future, they either 1) assure (Parkhill 2008; Scanlon 1990) that they (will) do something, or 2) assure that a specific outcome will occur. Unlike philosophers such as Thomas Scanlon (1990), we do not consider it necessary for the assurance to be made purposefully for it to be a promise. This assurance distinguishes promises from other predictions like forecasts, which only describe potential actions or outcomes.

For 1), the promiser self-imposes an obligation to keep their promise (Driver 2011; Rand 1984, p. 136). For 2), the promiser stakes their reputation on the actual occurrence of the events they have promised. They therefore have a responsibility to refrain from irrational promises which 1) they cannot fulfil, thus failing their obligation, or 2) will not come true, thus breaking the confidence of their promisee (Parkhill 2008; Rand 1984, p. 136). As such promises can harm their scientific endeavors in the long run, scientists have an occupational responsibility to refrain from such promises – just like they have an epistemic responsibility to know and check their sources or methodology. Like research integrity issues, where some cases may be clearly fraudulent and others debatable, some promises may be evidently irresponsible, while others merely questionable.

We can distinguish between “individual acts of promising, practices of promising, and the relation between them” (Sheinman 2011 b, p. 3). Promises do not occur in isolation, but rather are part of and influenced by, for example, cultural traditions, ongoing debates, and professional norms. Depending on the practice of promising they are part of, individual acts of promising can lead to different expectations or agreements and, by extension, obligations.

### Practices of promising

Scientists engage in various promising practices, including those customary to their medium of communication. Promises made in books will differ from promises made in articles and, similarly, promises made in popular science books will differ from promises made in textbooks. Promisers, in their writing, must attend “to the stylistic conventions and preferences of the editor and audience”, as Charles Bazerman (1988, p. 202) already established for how authors express themselves in experimental articles. Prior research documents how scientists adapt accounts of their actions and beliefs for different social situations (Gilbert and Mulkay 1984). These varying accounts are influenced by the intended audience: “[W]hen scientists write experimental papers, they make their results meaningful by linking them to accounts of social action and collective belief” (Gilbert and Mulkay 1981, p. 270).

These conventions shape the perception and consequences of promises. For example, scientific and technological promises made in popular science books engender beliefs on the part of their audience: When a scientist states that “[n]anoshells can be configured to scatter light as well as absorb it. This scattering can be used to create an image of where the nanoshells congregate. A possible future treatment could have the cancer patient visit the doctor periodically to be injected with special nanoshells coated with antibodies that would search for various types of cancer. Then electronic scanning would find the nanoshell congregations and allow pinpoint targeting of the laser – which would then cook the tumors – all in one afternoon” and subsequently assures that “[h]uman trials for this technique will begin within the next few years” (Foster 2006, p. 267), this may lead cancer patients to believe that human trials will commence during their lifetime.

### Promises and agreements

Promises occurring between a promiser and a promisee lead to implicit or explicit agreements; through the act of promising, “the promiser commits to the promisee to do what’s promised” (Sheinman 2011 b, p. 3). The promiser and the promisee come to an agreement, often with the promiser committing to a course of action.

When a group of researchers promises to a funder that they will “share entire datasets using the open microscopy environment” (Bordignon et al. 2023), and the funder consequently provides funding, the two come to an agreement. These types of agreement are often explicated in legal documents. For example, in Horizon Europe grants, beneficiaries and the funding agency sign a contract outlining the general terms and conditions, as well as the rights and obligations of both parties (Danish Ministry of Higher Education and Science 2023).

One could argue that in grant applications, all parties understand that not all promises will be fulfilled due to the inherent uncertainty of scientific research and technological development, and thus that the implicit agreement differs from what they would expect if they took the promise literally (White 2017). Indeed, for many grants, funders only check whether promises mentioned in tandem with deliverables and milestones are fulfilled. As one grant applicant put it:

*“When writing a grant it is important to find a good balance between what you promise to do in the general parts of the grant and what you truly deliver [...]. In general, when it comes to scientific work we don’t tend to overpromise much and activities are usually directly translated into deliverables. When it comes to stakeholder engagement, dissemination, communication and exploitation of results however this translation is often less direct and therefore less balanced; in general we tend to overpromise in impact sections and purposefully set out to not capture all those promises in concrete deliverables to allow as much room to deviate throughout the project”* (Gaillard’s personal correspondence by e-mail, 03. 04. 2023, anonymized).

### Rules of the game

Even without leading to (formal) agreements, promises in grant applications can create expectations, for example among inexperienced researchers unfamiliar with the rules of the game. The lack of codified conventions, coupled with the promisee's ignorance of these conventions, hinders proper understanding of the signaled intentions. Similarly, statements which are not expressed as promises might still be interpreted as promises due to the context in which they are made. Scientists may hedge their statements about the future or their future actions by presenting them as mere predictions, but do so in contexts where the audience might interpret them as promises, leading them to either expect the scientists to conduct certain research and deliver particular outcomes or expect certain developments to occur. Promisers therefore need to carefully take into consideration their (potential) audiences.

Which expectations, beliefs or agreements follow from the cultural, societal or occupational context influences what the promise exactly entails, and thus whether the promise is an overpromise or not. If the adequate interpretation of promises is practice-specific, misinterpretation across practices may be looming. For all these reasons, we can question the rules of the game that give rise to overpromising.

### Overpromising in science and technology

Overpromising in science and technology refers to scientists promising more than is rational within their context of knowledge – which means, the total sum of their knowledge. Given our current state of knowledge, some promises can be known to be impossible, for example, promises which violate the law of identity. In other cases, there might be an ongoing debate about the current state of knowledge, leading to conflicting views on whether a promise is questionable or not. This happened when futurist and engineer Eric Drexler and chemist Richard Smalley debated Drexler's promises concerning molecular assemblers. In the 1980s, Drexler made promises regarding scientific and technological developments such as “molecular assemblers will bring a revolution without parallel since the development of ribosomes, the primitive assemblers in the cell” (Drexler 1986, p. 21). According to Smalley, fundamental, unavoidable and thus insurmountable problems would arise when trying to build these molecular assemblers (Smalley 2001), meaning Drexler's promises would be overpromises. As a final category, there are promises that do not contradict established knowledge, yet are inherently uncertain due to the exploratory nature of scientific research. However, even under uncertainty, we can distinguish promises from overpromises by whether they consider the current context of knowledge. It is precisely in these cases where the determination of whether they are overpromises becomes most challenging and where conceptual clarification is most essential.

### Overpromising and broken promises

Because overpromising entails making promises without taking into consideration the context of knowledge, overpromises are often broken. However, it does not follow that broken promises are necessarily due to overpromising or that a fulfilled promise was not an overpromise when it was made. Although one might intuitively look to broken promises for indications of overpromising, this strategy would limit the investigation of overpromises to retroactive analysis and runs the risk of unjustly equating overpromises with broken promises. Consider the following two cases. First, scientists who had made promises to their funders about conducting research in exchange for funding in the period just prior to the COVID-19 pandemic. During the pandemic, it became clear that they would not be able to sufficiently access their laboratories, making their promised deadlines impossible (Stoye 2020). Yet their original promises were not overpromises: Their promises were possible at the time they were made – they could not have foreseen that a pandemic would subvert their deadlines.

Second, the American privately held corporation Theranos. The company's owner and its president assured potential investors that Theranos would develop devices using finger-prick blood samples for a wide range of laboratory tests (Levine 2018). Early on, these promises closely resembled academic overpromises – the owner told investors that the company would do the research needed to meet the promised benchmarks for scaled-up production and improved reliability and sensitivity, similarly to the promises made in grant applications. However, the founder of Theranos made these assurances even though there was no indication the company was able to develop these devices. She maintained this unfulfilled promise for fifteen years, until the company was legally dissolved for having lied to investors.

### Context of knowledge

These cases illustrate that whether a promise was fulfilled or not is not the determinant of whether a promise is an overpromise, but rather whether the promisers take into consideration the context of knowledge when making a promise. In both cases, the promise was broken, but in the first case the promisers took into account all the knowledge available to them; in the second, they did not. When they made their promise, the scientists in the first case could not have expected that the COVID-19 pandemic would occur and disrupt their ability to meet deadlines (Stoye 2020). Therefore, when they made their promise, it was rational: Under normal circumstances they would have had lab access, and subsequently would have been able to meet deadlines and fulfill their promises. In the second case, the Theranos company owner and company president actively evaded considering the knowledge available to them.

A broken promise is therefore not a necessary condition for overpromising. The fulfillment of a promise cannot be the sole measure to classify a promise as an overpromise, much like a car crash does not automatically indicate reckless driving. Both cases could be influenced by many (unforeseen) factors. But

just as a car crash can lead to inquiries about reckless driving, an unfulfilled promise can instigate investigation into potential overpromising.

### Overpromises and deceptive promises

Theranos not only overpromised, it also made deceptive promises: It deliberately exaggerated assurances and misled funders in order to bring in investments. The promise was made both without taking into account the knowledge context, i.e., an overpromise, and without the aim of fulfilling it, i.e., a deceptive promise (Markovits 2011, p. 298). Although actors make promises with a specific aim, overpromises can arise for a number of reasons, such as sloppiness, routines learned from others and repeated uncritically, or overenthusiasm. When an overpromise is made with the aim to fulfill it, the promiser may fail to take the knowledge context into account, neglecting their epistemic and moral responsibility, but they are not purposefully deceiving the promisee (Markovits 2011, p. 298).

Scientific promises which are both deceptive and overpromising are sometimes thought of as ‘strategic promises’, made with the purpose of obtaining funding or creating support. In Theranos’ situation, promises were strategically made to secure funding. Whether impossible promises made in grant applications without the aim of fulfilling them also fit this category depends on whether all the involved parties understand that the promises made are empty promises or not – i.e., it depends on the rules of the game and how they are understood by the audience.

## Evaluating promises

Investigating whether a promise can be fulfilled involves an evaluation of the plausibility of underlying inferences about the future, a common practice for assessing a variety of claims about the future (Fischer and Dannenberg 2021) and for distinguishing predictions worthy of consideration from those that are not. This is relatively straightforward for promises which the evaluator knows to be impossible based on their current knowledge. However, for promises made under conditions of information asymmetry, a systematic evaluation of future claims is required. This evaluation begins by determining which aspect(s) of an inference need to be clarified for the evaluator to enable a judgement (Fischer and Dannenberg 2021, pp. 8–9). To this end, several analytic tools are already available from argument analysis (Epstein 2013) and ethics of emerging technologies (Lucivero et al. 2011), but these are not specifically tailored to show how to question future-oriented scientific promises *based on the context of knowledge*.

Therefore, we propose here to question future-oriented promises in science and technology by identifying and evaluating dimensions of the context of knowledge, building on some of the cognitive dimensions identified by sociologist Ann Mische. Although Mische (2009) uses these dimensions descriptively, to analyze without judgement how futures are conceptualized, her

theory serves as a useful basis for the assessment of promises. We look at four dimensions of the context of knowledge, namely clarity, level of certainty, degree of control, and connectivity. Although we focus on promises in this article and not promisers, it is important to note that for many dimensions, knowing who makes the promise is often useful for determining the plausibility of the promise in that regard, because different actors have, for example, differing degrees of control or track records.

### Clarity

Scientific promises are conveyed with differing clarity. Some are highly specific with regards to when the promise will be fulfilled, such as the promise that “[n]umerous newly designed, advanced materials and manufacturing processes will be built by 2015 using control at the nanoscale level” (Foster 2006, p. 229). Other promises are vaguer with regards to when the promise will be fulfilled: “In the business and investing world, the changes nanotechnology will bring in the next few decades will change the way people consume things” (Booker and Boysen 2011, p. 2). Many scientific promises lack even this general timeline of when the promise will be fulfilled, like the following example: “With the study of nano-size particles, devices, and composites, we will find ways to make stronger materials, detect diseases in the bloodstream, build extremely tiny machines, generate light and energy, and purify water” (Booker and Boysen 2011, p. 2). Note that the promise itself does not provide much clarity either. For example, it is unclear which type of strength is meant (tensile, compressive or shear), or which diseases will be detected.

### Decisiveness

Future-oriented promises are conveyed as assurances. Scientists promise that something *will* happen or that they *will* do something. If they do not want to convey such decisiveness, they can make other types of predictions instead, such as expectations or forecasts (De Wilde 2000, pp. 15–17). Previous work on scientific communication has documented the tendency of scientists in multiple fields to make more decisive statements inversely correlated with how scientific the outlet is (Bucchi 1998); the less scientific the outlet, the more decisive the statements.

Besides intended audience, various other genre features will influence the decisiveness of scientific promises, such as word limits. If a grant applicant has to specify how 100,000 dollars will be spent, a 1,000-word limit will allow for less nuanced promises than a 10,000-word one.<sup>1</sup>

Promises may also lose nuance over time, or statements about the future might start out as other types of predictions, but evolve to become promises, due to an increase in the conveyed decisiveness. In the 2007 popular science book *Nanotechnology 101*, repeated reference is made to a prediction by the National Science Foundation. The first reference explicitly states it as a prediction: “The National Science Foundation predicts that the global marketplace for goods and services using nanotechnol-

<sup>1</sup> We thank Diego Gambetta for this example.



ogies will be worth a trillion dollars by 2015” (Mongillo 2007, p. xvii). The second reference no longer states it as a prediction, but still does not convey an assurance, instead using the hedge word *could*: “By 2015, nanotechnology could be a \$ 1 trillion industry” (Mongillo 2007, p. 3). However, almost immediately afterwards, this statement transforms into a promise, assuring the layman reader that “[a]s was stated earlier, the global marketplace for goods and services using nanotechnologies *will* grow to \$ 1 trillion by 2015” (Mongillo 2007, p. 4, own emphasis).

### Degree of control

Promisers may also fail to account for factors that affect the degree to which promises are achievable, overestimating their own limited capacity to control future events. If scientists overstate their degree of control, promisees and other interested parties such as funders might further inquire into how the promiser assumes to have control and how they would act if it appears they do not.

In one grant application, researchers stated: “Through continual conversation with nanobiologists we will convince the community that what we have to offer is not just helpful, but necessary for the field to advance” (Bordignon et al. 2023). The promisers did not consider the degree to which others will comply; they made a promise that depends on the actions and beliefs of nanobiologists, over which they have limited control. They cannot guarantee the funders that nanobiologists will become convinced; that decision ultimately is up to the nanobiologists themselves. Additionally, the promisers cannot accurately predict how persuasive they will be in convincing enough individuals within the community to support their proposal.

Relatedly, the fulfillment of scientific promises about potential benefits is often conditional upon enthusiasm about the technology or intervention needed to bring about these supposed advantages. Many promises related to the possible benefits of these technologies or interventions can only be realized if the technology or intervention is embraced and implemented, over which the promiser has little to no control. Whether fulfillment of the promise is considered plausible then hinges on whether the assessor considers it plausible that the circumstances (will) favor implementation.

### Connectivity

Promise fulfilment is conditional on whether specific events occur. The following promise assumes economically and societally viable development of entirely new pharmaceutical systems: “In medical applications, nanomaterials will make self-regulating pharmaceutical dispensers compatible with biosystems so that they will not be rejected by the human body and will last many times longer in the corrosive and mechanically harsh environment of the human body” (Foster 2006, p. 229). The promise is implicitly connected to multiple inferences about the future, including a technological overhaul of drug delivery.

In other cases, promises explicitly depend on the fulfilment of other promises, or the occurrence of specific events. The

promise “Once the bacteria (or other mutated organisms) learn to live with nanotubes (carbon or non-carbon) they will start using these nano-tubes to beneficial purposes for themselves, perhaps to fight with other bacteria in the hunt for food or for play” (Khadkikar and Irani 2006), found in a patent, is dependent on the bacteria indeed learning to live with nanotubes, a scenario the authors try to make plausible in the preceding paragraph. The promise’s plausibility relies on the plausibility of the preceding scenario.

## Conclusion

Promises are signals that can be used to establish trust and acquire valuable resources. However, ignoring the context of knowledge in promise-making can result in overpromising. To facilitate the evaluation of promises, we have presented a conceptualization of overpromises, highlighting their relation to other forms of promises. In addition, we have shown how promisees can question scientific promises by evaluating the knowledge context.

While we have focused on the conceptualization of overpromises, fully examining overpromising requires considering the promiser’s identity, normative dimensions of the promise, and its specific context. Historical research on habitual overpromisers, as well as conducting interviews with promisers, could offer further insights.

Furthermore, understanding why overpromising persists in certain contexts requires further research, especially when both the promiser and the promisee seem aware of it. An investigation into such occurrences, such as within grant application procedures accepting inflated societal impact claims, would shed light on the underlying motivations and systemic factors perpetuating overpromising.

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RESEARCH ARTICLE

# Efforts against stem cell hype stuck in the logic of overpromising?: An essay on hype-conducive ways of doing ethics

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Anja Pichl\*,<sup>1</sup> 

**Abstract** • Studies on hype have had a strong focus on the role of science, media and markets in overstating potential benefits or risks of emerging science and technologies. Less attention has been paid to the role of ethics in creating or sustaining hype or alarmism. This research article focuses on how bioethical approaches as well as bioethicists' relationship towards science contribute to stem cell and organoid hype. How (if at all) may ways of doing ethics fuel exaggerated expectations and could ethics be done differently? Understanding hype-conducive ways of how ethicists engage with science and technology is of relevance not only for the broader ethical community but also for technology assessment and science and technology studies where an increasing interest in normative dimensions of their object of study has been observed.

**Stecken Bemühungen gegen Stammzell-Hype in der Logik überhöhter Versprechen fest?: Ein Essay über hype-fördernde bioethische Zugangsweisen**

**Zusammenfassung** • Studien zum Thema Hype haben sich stark auf die Rolle von Wissenschaft, Medien und Märkten bei der Übertreibung potenzieller Nutzen oder Risiken wissenschaftlicher und technologischer Entwicklungen konzentriert. Weniger Aufmerksamkeit wurde der Rolle der Ethik bei der Entstehung von Hype oder Alarmismus zuteil. Dieser Forschungsartikel befasst sich mit der Frage, wie bioethische

Zugangsweisen sowie das Verhältnis von Bioethiker\*innen zur Wissenschaft zum Hype um Stammzellen und Organoide beitragen. Wie (wenn überhaupt) können bioethische Ansätze überzogene Erwartungen schüren, und könnte Ethik anders praktiziert werden? Ein besseres Verständnis, wie Formen der ethischen Auseinandersetzung mit Wissenschafts- und Technologieentwicklung zu Hype führen können, ist nicht nur für die Bioethik von Bedeutung, sondern auch für Technikfolgenabschätzung und STS, die ein wachsendes Interesse an normativen Dimensionen ihrer Forschungsobjekte zeigen.

**Keywords** • hype, stem cell research, organoids, bioethics, vision assessment

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## Introduction

Is there a way to analyze and communicate current technoscientific developments, their potential trajectories and normative implications without fueling hype? The ubiquity of promissory language and high expectations both within academic and public debate of recent scientific developments and technological innovations does not exactly raise hope that there is an easy path to find. This observation applies to research on science and technology from different fields such as science and technology studies (STS), technology assessment (TA) or bioethics, even though the ways in which they contribute to hype and the challenges of how to avoid it differ. This research article critically analyzes the role of bioethics (broadly conceived) in raising exaggerated expectations with regard to stem cell (SC) research

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and organoid technology. In contrast to the role of science and media, ethicists' contribution to science and technology hype has been rather neglected so far (apart from notable exceptions such as Hedgcock 2010; Nordmann 2007). Ethicists have often been regarded as fueling what Kristen Intemann (2022) called hype's counterpart, alarmism. Critics also pointed to the role of self-interest in funding and legitimization of ethicists' own relevance, when they overstate potential harms of emerging technologies (Vinsel 2021), which Timothy Caulfield (2016) dubbed 'ethics hype'. Albeit related conditions and incentive structures profoundly shape bioethics, this research article can't do justice to them. It focuses more narrowly on how ethical approaches themselves might contribute to exaggerated expectations and whether ethics could be done differently. Can features of bioethical approaches as well as bioethicists' relationship to science lead ethicists to succumb to a logic of overpromising – ultimately compromising their own aims?

SC research is a suitable case study because of the prominent role of therapeutic promises and efforts to work against hype both from within the scientific community as well as by ethicists and policy makers. I will sketch some key aspects of SC hype, clarify the concept of hype based on Intemann (2022) and show that, notwithstanding prominent measures against and an increased awareness of the problem of hype, it recurs in the recent organoid ethics debate. This indicates that hype cannot be avoided by means of more cautious communication alone. Instead, the relationship of ethics and science, the performative role of expectations, visions and imaginaries, (often implicit) assumptions about science and society and the sociopolitical role of bioethics itself (Lettow 2011) need to be critically analyzed and partly reconfigured in order for ethicists to avoid contributing to hype as far as possible. Ethicists' reluctance to engage in these efforts and to develop a (self-)critical attitude can be interpreted as a sign of crisis of the profession. While ethics plays a minor role in hype dynamics, its understanding is relevant not only to the broader ethical community but also to TA and STS. Here, an ever-increasing interest in normative dimensions of science and technology development has been observed (Dusseldorp 2014; Kollek 2019; Nierling et al. 2021). The closer engagement with ethical issues rightly called for in these fields could benefit from avoiding pitfalls ethicists encountered and improve bioethics by illuminating its blind spots.

## Stem cell hype and countermeasures

Hype is usually broadly understood as raising unduly high expectations or exaggerating the relevance, usefulness, reliability, safety, prospects etc. of scientific findings or technologies (Caulfield et al. 2016). Therefore, it is often regarded as either a problem of science communication (Intemann 2022), be it with the general public, science funding institutions, investors or other audiences, or as a problem of how societal and institutional conditions shape science. The latter includes factors

such as pressures to publish and to develop clinical or commercial applications, media and marketing practices, public expectations and scientific bandwagon (Caulfield and Condit 2012, p. 210). Important sources of hype and misrepresentation of SC research have been attributed to the commercial sector with its direct-to-consumer advertising strategies (Petersen et al. 2017) and its “techniques of promissory marketing that offer a vision of the future that may never be realized” (Rajan 2006, p. 13) as well as to overly optimistic media portrayals of stem cells' therapeutic potential and clinical translation timelines (Kamenova and Caulfield 2015; Mason and Manzotti 2009) where regenerative therapies seemed “just around the corner” (Lysaght and Campbell 2013, p. 256).

The metaphor of scientific breakthroughs is a reliable indicator of hype (Brown and Michael 2003) and has accompanied SC research at least since the first cultivation of human embryonic stem cells (hESCs) in 1998. It still features prominently in recent scientific and media portrayals of organoid research. In his analysis of SC promises and related metaphor use, Lawrence Burns coined the term “stem cell superhero” which expresses the widespread belief that stem cells have a “seemingly ‘magical’ capacity to heal virtually any disease” (Burns 2009, p. 429). It also emphasizes that “to summon them we must make difficult moral choices” and exerts pressure not to hinder researchers from learning to understand and control stem cells (Burns 2009, p. 427). This exemplifies the performative character of such metaphors and related visions that also feature prominently in ethical discourse. Also visions of immortality and reversing ageing were associated with SC research and “used to invent a mandate for action” in speculative ethics (Nordmann 2007, p. 33). Stem cell promises derive part of their appeal and strength from widely shared ideas about nature and the need to gain control over biological processes in order to use the body's self-healing capacities conveyed in the “powerful image of regeneration under technological control, yet which is still being directed by nature's ‘own dictates’” (Franklin 2004, p. 60). Ethicists often uncritically reproduced such images and metaphors, notwithstanding social science critique, e.g. of the metaphor of ‘clinical translation’, which suggests a one-directional transition from basic science to clinical application (Martin et al. 2008). ‘Clinical translation’ has also been identified as “one of the policy buzzwords of our era [...] drawing massive public and private investment into areas like stem cell research” (Lysaght and Campbell 2013, p. 255). Whether this concentration of funding was justified in view of other health needs and research interests or not, it enabled the rapid development of SC research. This provides an example of the positive effects hype can have. Apart from financial support, hype can also raise public awareness and literacy of science (Intemann 2022) and be used to involve broader audiences in ethical debate.

However, SC research doesn't seem to be one of the a-political sciences that permit “honest hype to make science public” (Nerlich 2013, p. 43). Stem cell promises fall on the fertile ground of unmet medical needs by desperate patients and relatives as well

as business actors who are keen to exploit societal expectations and hopes for cures. SC hype fosters a business model of private SC clinics offering unproven therapies for a broad range of conditions across the globe, putting patients' health and science's reputation at risk (Turner 2021). The "race to be the first nation/university/lab/scientist to unlock the (hyped up) promise of X, Y, or Z" (Nerlich 2013, p. 47) partly explains the many prominent instances of fraud as well as premature clinical translation in SC research (Daley 2012). Accordingly, more cautious communication strategies (Caulfield et al. 2016) and better public understanding of SC research (Mason and Manzotti 2009) have been called for and were introduced as a requirement of scientific integrity by the International Society of Stem Cell Research (ISSCR) in the 2016 report and retained in the 2021 update of their Guidelines (ISSCR 2021). Important efforts to improve SC science literacy and communication followed, but certain exaggerated assumptions about the state of research and the therapeutic applicability of stem cells and their derivatives seem to have become entrenched within the public imagination. This is at least indicated by the constantly high demand for unproven SC therapies and the massive increase in the number of clinics offering them in recent years in the USA (Turner 2021).

### The role of ethics in stem cell and organoid hype

But how did ethical discourse contribute to SC hype, if at all? In the early 2000s, therapeutic promises of SC research were often cited as a moral argument for funding, research-friendly regulation and for overcoming ethical quandaries in the ethical literature. In addition, the presumed therapeutic potential of adult stem cells or, after 2007, induced pluripotent stem cells (iPSCs) was often contrasted with that of hESCs in order to present the SC type that was considered ethically less or not problematic by the respective parties as scientifically more promising and ethi-

cally preferable (Lysaght and Campbell 2013). In this way, bioethics contributed directly to stem cell hype by means of ethical argumentation. These factors and the dependence of hype on value judgements, instances of hype cannot be identified by empirical methods alone but require a normative concept of hype as elaborated by Intemann (Intemann 2022) in relation to science communication. She defines hype as an "*inappropriate* exaggeration [...] that depends on two sorts of value judgements: (1) judgements about the proper goals of science communication in specific contexts, and (2) judgements about what constitutes an 'exaggeration' in that context" (Intemann 2022, p. 280, emphasis in original). Hype is "likely to invoke or encourage false inferences or unreliable predictions" (Intemann 2022, p. 290) and obscures risks, whether intentional or not.

Applying this concept to bioethics (whose definition, aims and methods are admittedly contested), two goals appear most relevant for public bioethics following Adam Hedgecoe (2010, p. 165): (1) 'horizon scanning', i.e. to identify, analyze and address potential ethical issues and (2) non-legal regulation, e.g. by establishing norms of scientific conduct and processes of research oversight. Obviously, horizon scanning requires anticipation and going beyond current evidence, thus it inevitably contains a speculative element. This is problematic only if it hinders the goals of ethics according to the above. Horizon scanning must be distinguished from 'speculative ethics' that Alfred Nordmann (2007, p. 34) characterized as a "strategy which construes possibly emerging issues as if they were presenting themselves already" (Nordmann 2007, p. 34). Such an "if-and-then syndrome" (Nordmann 2007, p. 34) is also common in organoid ethics. A whole strand of debate focuses on ethical issues concerning the potential generation of consciousness in brain organoids (either in the petri dish or after transplantation into animal models). Thereby, like in the case of enhancement discussed by Nordmann, "considerations of the present are overwhelmed by the supposed imminence of a highly speculative future" (Nordmann 2007, p. 39) populated by conscious brain organoids. This constitutes a form of hype because, notwithstanding cautionary remarks regarding the speculative character of the brain organoid

### *Bioethics contributed directly to stem cell hype by means of ethical argumentation.*

debate, its mere existence and dominance in the organoid discourse convey the impression that the fervently debated future scenarios will (sooner or later) become reality and other ethical issues receive less attention. Resuming Intemann's (2022) normative account of hype, it seems obvious that relevant goals of ethics – horizon-scanning and regulation – are hindered thereby.

In contrast to such forms of indirect hype, explicit hype is sought to be avoided in the recent organoid ethics debate. Ethicists explicitly reflect their responsibility for not fueling hype and call for a cautious use of metaphors and choice of terminology as well as a restrained portrayal of potential applications of

cally preferable (Lysaght and Campbell 2013). In this way, bioethics contributed directly to stem cell hype by means of ethical argumentation.

Ethicists, who are usually perceived as disinterested and credible, thus provided resonance and legitimacy to therapeutic promises of SC researchers, science journalists and biotech investors. It is, however, not enough to look for explicit overstating of therapeutic potential and time frames. Hype – as a state of exaggerated expectations rather than the act of exaggerating – can also be caused by agenda setting, emphasis, omissions, lack of contextualization etc. (Intemann 2022). Due to

organoid technology. Megan Munsie and colleagues for example state that “researchers need to avoid the hyperbole that are too often a hallmark of stem cell research and candidly discuss advances and limitations with the public” (Munsie et al. 2017, p. 944). Accordingly, they address technological limitations and challenges of current organoid research and criticize media reports for speaking of a ‘miniature human kidney’ “which linguistically obscures differences between organoids and organs” (Munsie et al. 2017, 942). Also, Bredenoord et al. (2017, p. 1) explicitly discuss the responsibility “to avoid inaccurate or incomplete representations and excessive expectations” in public communication and call for an “accurate, balanced, and respon-

havior of public and policy makers towards science, they are also deeply engrained and play a performative role in science itself as the sociology of expectations and other work in STS made clear (McNeil et al. 2017; Konrad et al. 2017). They shape the trajectories of science and technology development via agenda setting, coordination of activities, attraction and legitimization of funding and research interests etc. (Brown and Michael 2003). Though a critical assessment of the role of visions, imaginaries and promises is a desideratum and may reorient bioethics towards the present and actual problems (Nordmann 2007) and counteract hype, it is only rarely part of ethical analysis. A notable exception in the organoid ethics debate is a methodolog-

### *Significant obstacles for a broader uptake of vision assessment in bioethics seem to arise from characteristics of bioethical approaches and from the relationship of ethics to science.*

sive public representation of regenerative medicine and stem cell research” (Bredenoord et al. 2017, p. 6) in line with the ISSCR Guidelines (2021). Nevertheless, in the same paper they state that “cultured organoids hold great potential for replacing damaged tissue or even complete organs, a potential that has already been demonstrated in animal models” (Bredenoord et al. 2017, p. 5). In general, therapeutic promises still play a significant role in the organoid ethics debate, e.g. as an argument to continue contested research on cerebral organoids and embryo models. Are they instances of hype and insufficiently responsive towards a public that to a considerable extent already bought into inflated promises of SC cures? Due to the openness of the research process, it is difficult to draw a clear line between hype and realistic expectations of future developments. Also, different standards of caution may apply to public communication in contrast to scientific papers, because the professional community is supposed to be able to handle promissory language better than lay audiences. However, it seems inconsistent to argue that the commitment to careful communication counts only for publications addressing the broader public, because the ethical debate doesn’t take place in a vacuum and affects science and its social perception and conditions (Hauskeller et al. 2019), especially as ethicists are often perceived as neutral, knowledgeable and following high standards. Furthermore, ethicists themselves can also be misled about the likely benefits of a technology or the significance of a new research area which may distort their judgements.

#### **Vision assessment as a remedy?**

Vision assessment (Lösch et al. 2021) has been proposed as a means against speculative ethics (Nordmann 2007). Visions, imaginaries and promises not only influence the attitude and be-

havior of public and policy makers towards science, they are also deeply engrained and play a performative role in science itself as the sociology of expectations and other work in STS made clear (McNeil et al. 2017; Konrad et al. 2017). They shape the trajectories of science and technology development via agenda setting, coordination of activities, attraction and legitimization of funding and research interests etc. (Brown and Michael 2003). Though a critical assessment of the role of visions, imaginaries and promises is a desideratum and may reorient bioethics towards the present and actual problems (Nordmann 2007) and counteract hype, it is only rarely part of ethical analysis. A notable exception in the organoid ethics debate is a methodolog-

ical report on vision assessment concerning the use of organoids and organ-on-a-chip models in personalized medicine (Vogt et al. 2022). Significant obstacles for a broader uptake of vision assessment in bioethics seem to arise from characteristics of bioethical approaches and from the relationship of ethics to science. Critics have long pointed out that and how features of ethical approaches contribute to narrowing the scope of bioethical inquiry and to a focus on potential consequences and downstream effects of scientific development (Hedgecoe 2004; Hilgartner et al. 2017) which often results in hope-, hype- and fear-debates. A narrow focus on biological entities, their (presumed or anticipated) properties and ethical issues often identified by scientists (Hedgecoe 2010) comes at the expense of more fundamental questions concerning processes of valorization and commodification of biological material, possible changes in the understanding of and relationship toward the body, social relations to nature and ways of life as Susanne Lettow (2011) pointed out for bioethical discourse in general. While leaving other sources of scientific understanding made available by historical, social and philosophical studies of science often aside, bioethicists tend to reproduce self-representations by scientists as a matter of fact and neutral basis for ethical examination.

Bioethicists thus often uncritically adopt scientists’ aims and visions which obviously increases the risk of giving in to hype. In the organoid debate, an important goal and quality criterion of bioethical work seems to be to support organoid research: “[P]rocess and progress should not be hampered” (Munsie et al. 2017, p. 945) and ethicists seek to contribute to its social acceptance (Bredenoord et al. 2017). The goal of supporting scientific ‘progress’ and procuring public acceptance is certainly bound to ethical standards of acceptability and notions of responsible science, but most discussants do not make them ex-

plicit. Insoo Hyun (2017), for example, only specifies the goal of promoting ‘scientific progress’ by means of anticipation and avoidance of ‘moral controversy’, but does not further explain his understanding of scientific progress and underlying visions of a desirable future, the role of organoid research in building it and who might share it. Whose needs and future imaginaries are considered and in what way, whose are left out of consideration etc. is hardly ever examined in the organoid ethics debate. Instead, organoid ethicists tend to uncritically accept scientific visions and scenarios, whether they endorse or problematize them, such as the prospect of developing therapies or generating conscious organoids. Organoid ethicists even portrayed themselves as navigators who guide the development of organoid technology carefully into a seemingly separate sphere: society (Bredenoord et al. 2017). This ignores the complex and dynamic reality and intricacies of scientific development as inseparable part of social transformation processes in which ethicists are also actively involved (Lettow 2011) and the need for understanding its dynamics, conditions, framing and underlying visions, let alone for making efforts to shape them. The close and often uncritical relationship to science doesn’t seem to be widely perceived as a problem within bioethics, instead, calls for a closer integration of ethics with science are raised in the organoid debate (Hyun 2017). However, it seems obvious that on this narrow basis, both goals of horizon scanning and regulation cannot be properly achieved.

## Conclusion

Measures against hype such as avoiding promises and exaggerations in the portrayal of science and combining statements of future applications with reservations concerning technical limitations and scientific uncertainty are obviously important. However, they are insufficient for preventing hype as they do not address its roots. In the ethical discourse on organoids, lessons were learned from the SC debate in terms of overt hype, but not in terms of reflecting ethicists’ own attitude towards the life sciences and ways of ethical thematization that lead to ‘inappropriate exaggerations’ (Intemann 2022), missing the goals of bioethics. Better understanding and pulling out root causes of bioethical hype such as narrow views of science that separate it from its societal conditions and political dimensions could contribute to better bioethics. Ethicists have the responsibility to critically assess future imaginaries, visions, promises as well as dynamics and conditions of science and technology development, understand their performative role – and perhaps even use it for promoting ethically desirable developments. Methodologically, this requires critical examination and the opening up of bioethical approaches for closer cooperation with other disciplines, especially STS, TA and other strands of social and political science research and philosophy of science. It would be a practice turn that goes beyond merely integrating ethics with science.

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RESEARCH ARTICLE

# Chatbots als pädagogische Herausforderung für Schule und Unterricht

Johannes Gutbrod\*<sup>1</sup>, Britta Klopsch<sup>1</sup>

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**Zusammenfassung** • Chatbots und künstliche Intelligenz (KI) machen auch vor Schulen nicht halt. Sie gewinnen in pädagogische Settings zu integrieren, ist für Schulen und Lehrkräfte eine noch ungewohnte Situation. Dieser Beitrag setzt grundsätzliche pädagogische Aspekte von Schule in Bezug zur Digitalisierung und zeigt auf, wie die Herausforderung KI mit der pädagogischen Herangehensweise an Bildungs- und Erziehungsprozesse in Einklang gebracht werden kann.

## Chatbots as a pedagogical challenge for schools and teaching

**Abstract** • *Chatbots and artificial intelligence (AI) do not stop at schools. Integrating them beneficially into pedagogical settings is still an unfamiliar situation for schools and teachers. This article relates the fundamental pedagogical aspects of schools to digitalization and shows how the challenge of AI can be reconciled with the pedagogical approach to educational processes.*

**Keywords** • *artificial intelligence, school, education, digitalization, action orientation*

## Einleitung

Künstliche Intelligenz (KI) hält zunehmend unmittelbaren Einzug in das Leben der Menschen. Mit ChatGPT und anderen Bots wurden nun Systeme entwickelt, die durch künstliche neuronale Netzwerke komplexe sprachliche Daten verarbeiten können. Sie sind dazu fähig, unmittelbar auf Anfragen „eloquent erscheinende Antworten zu den unterschiedlichsten Themen“ (Albrecht 2023, S. 9) in vielfältiger Ausdrucksform zu verfassen. Von Computerprogrammen bis hin zu Gedichten kann KI unterschiedliche Textgattungen schreiben und ist dabei so gut, dass die KI-basierte Herkunft Lehrkräften wie Lernenden auf den ersten Blick nicht auffällt.

Diese Bandbreite an bearbeitbaren Themenfeldern führt zu großen Unsicherheiten im Bildungssystem (Belousova 2022). Chatbots scheinen für Lehrende wie Lernende fast universell nutzbar, das führt dazu, dass traditionelle Formen des (Auswendig-)Lernens und Prüfens, bspw. durch eine Hausarbeit, aktuell zunehmend in Frage gestellt werden.

Die Unwägbarkeiten, die sich damit verbinden, bedürfen einer pädagogischen Antwort. Wie soll die Institution Schule künftig in Anbetracht einer sich ständig weitentwickelnden digitalisierten, technisierten und virtualisierten Welt die Kinder und Jugendlichen unterstützen mit KI im allgemeinen und Chatbots im Besonderen umzugehen?

Dieser Frage soll im Folgenden aus pädagogischer Perspektive nachgegangen werden. Zunächst wird die ureigene pädagogische Aufgabe, das Erziehen und Bilden, erläutert. In einem zweiten Schritt wird die Technikfolgenabschätzung in eine pädagogische Perspektive gerückt, bevor eine pädagogische Handlungsorientierung für den Umgang mit KI den Beitrag beschließt.

## Die pädagogische Aufgabe von Schule

Unterricht ist ein Prozess, „in dessen Verlauf von Seiten des Unterrichtenden aus der Versuch unternommen wird, eine Erweiterung des gegebenen Wissens-, Kenntnis- und Fähigkeitsstandes auf Seiten des bzw. der Unterrichteten hervorzurufen“ (Terhart 2009, S. 102). Unterricht beschreibt folglich den päd-

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agogischen Modus, in dem Schulen arbeiten sollen. Jener umfasst den Zweiklang des Lehrens beziehungsweise Lernens und des Erziehens.

Als Erziehung lassen sich jene Prozesse beschreiben, „die den Menschen zu Autonomie und Mündigkeit hinleiten und ihm helfen, alle seine Kräfte und Möglichkeiten zu aktuieren und sich als selbstständige Person zu gestalten. Erziehung betrifft den Menschen dabei in seiner individualen [...], sozialen [...] [und] kulturellen [...] Dimension.“ (Böhm und Seichter 2018, S. 146). Der zugrundeliegende Lernprozess zielt auf Haltung. Eine Person wird durch eine andere geführt und dazu aufgefordert, autonom und mündig zu handeln. Sie soll selbstständig urteilen, um herauszufinden, was das Geforderte für das eigene Leben bedeutet und welche Entscheidungen zu treffen sind. Dabei verbindet die Person ihre moralische Haltung mit ihrer persönlichen Einstellung, die gemeinsam zu einer Handlung führen. Letztendlich führt Erziehung so zu einem mündigen Leben in Verantwortung (Benner und Brüggem 2004, S. 687).

Die Bildung einer Person umfasst das Zusammenspiel zwischen Wissen und Haltung, die sich ebenfalls in Handlungen ausdrückt. Sie erweitert das Ziel der Erziehung durch fachspezifische Inhalte und Kompetenzen. Um einerseits die persönlichen Talente, Stärken und Vorlieben erfahrbar werden zu lassen und andererseits auf eine Vielzahl späterer Berufe vorzubereiten, vermittelt die Institution Schule eine breite Allgemeinbildung. Das generelle Ziel der Institution Schule bleibt aus pädagogischer Perspektive somit notwendigerweise für die einzelne Person zunächst unbestimmt.

Im Zusammenspiel zeigt sich Bildung in einem immerwährenden Kreislauf: *Wer gebildet ist, der bildet sich.*

## Technikfolgenabschätzung aus pädagogischer Perspektive

Aus pädagogischer Perspektive sind künstliche Intelligenz und Chatbots kein gravierender *Gamechanger* (Albrecht 2023, S. 71), wie dies die Medien zeitweise suggerieren. Bei künstlicher Intelligenz und Chatbots handelt es sich – pädagogisch betrachtet – um einen weiteren Anlass, anhand dessen sich erziehen, bilden und letztendlich mündiges Handeln erlernen lässt. Die pädagogische Kernfrage lautet folglich: Was macht verantwortliches bzw. mündiges Handeln in Ansehung der Verwendung von künstlicher Intelligenz und Chatbots aus? Wenn Chatbots und künstliche Intelligenz zunehmend natürlicher Teil der Lebenswelt sind, muss die Schule eine Antwort geben wie sie eine Einbettung in diese Kultur der Digitalität (Stalder 2016) auch hinsichtlich einer Qualifizierung der Lernenden für spätere Berufe gewährleistet.

Dazu gehört zunächst die Kenntnis des Gegenstandes, in dessen Ansehung man verantwortungsvolle Entscheidungen treffen soll, also die Kenntnis von Chatbots und ihren Möglichkeiten, verbunden mit dem Wissen darüber, wie man diese in schulische Lehr-Lernsettings gewinnbringend integrieren kann. Neben dieser bildenden Dimension umfasst die pädagogische Perspektive auf Schule auch deren erzieherische Dimension. Dies bedeutet

### *Was macht verantwortliches bzw. mündiges Handeln in Ansehung der Verwendung von künstlicher Intelligenz und Chatbots aus?*

Dies ist gleichsam die größte Herausforderung für die Schule. Sie soll Heranwachsende nicht nur dazu bilden, in einer zukünftigen Gesellschaft leben zu können, sondern auch diese dazu befähigen die Gesellschaft aktiv mit zu gestalten. Da sich die Gesellschaft weiterhin wandeln wird, wird es notwendig werden, sich kontinuierlich auf unbekannte Situationen einzustellen und lebenslang Lernprozesse einzugehen. Der Bildungsbegriff greift dies auf, da er zweierlei Aspekte in sich vereint: Das *Ergebnis* und den *Prozess*. Die Ergebnishaftigkeit der Bildung zeigt sich in den jeweiligen Entscheidungen der Menschen als konkretes Tun. Bildung ist in dieser Perspektive zu einem bestimmten Zeitpunkt sichtbar. Die Prozesshaftigkeit der Bildung zeigt sich in der Planung, Durchführung und Reflexion der konkreten Handlungen. So kann im Nachhinein eine Handlung nicht ungeschehen gemacht werden, wohl aber die Beurteilung dieser, künftig anders zu handeln. Bildung als Prozess ist also stets fortlaufend, d. h. als retro- wie prospektive Beurteilung konkreten Handelns.

nicht nur, dass die Lernenden Verantwortung für ihr Lernen und ihre Handlungen übernehmen. Wahrlich mündig zu handeln bedeutet auch, sich der Konsequenzen des (eigenen) Handelns bewusst zu sein und damit die Folgen dieses Handelns abschätzen zu können. Gerade im Zusammenhang mit dem Einsatz von KI, des eigenen digitalen Fußabdruck, d. h. der passiv und aktiv erzeugten Datenspur im Internet, sowie der Nutzung von Chatbots für das Erledigen von Aufgaben, sind hier Kommunikationsprozesse notwendig, die bislang in Schulen vernachlässigt wurden.

Pädagogisch gesehen müssen Schüler:innen zunächst in die Lage versetzt werden, mit künstlicher Intelligenz und Chatbots umzugehen. Für die Diskussion um Bildung und Erziehung lohnt es sich, unterschiedliche Ebenen näher in den Blick zu nehmen, die die Auseinandersetzung mit digitalen Tools befördern. Die Verschränkung dieser Ebenen trägt in einem zweiten Schritt dazu bei, eine schulische Lernumgebung zu schaffen, die es erleichtert, die Kultur der Digitalität in den Schulalltag

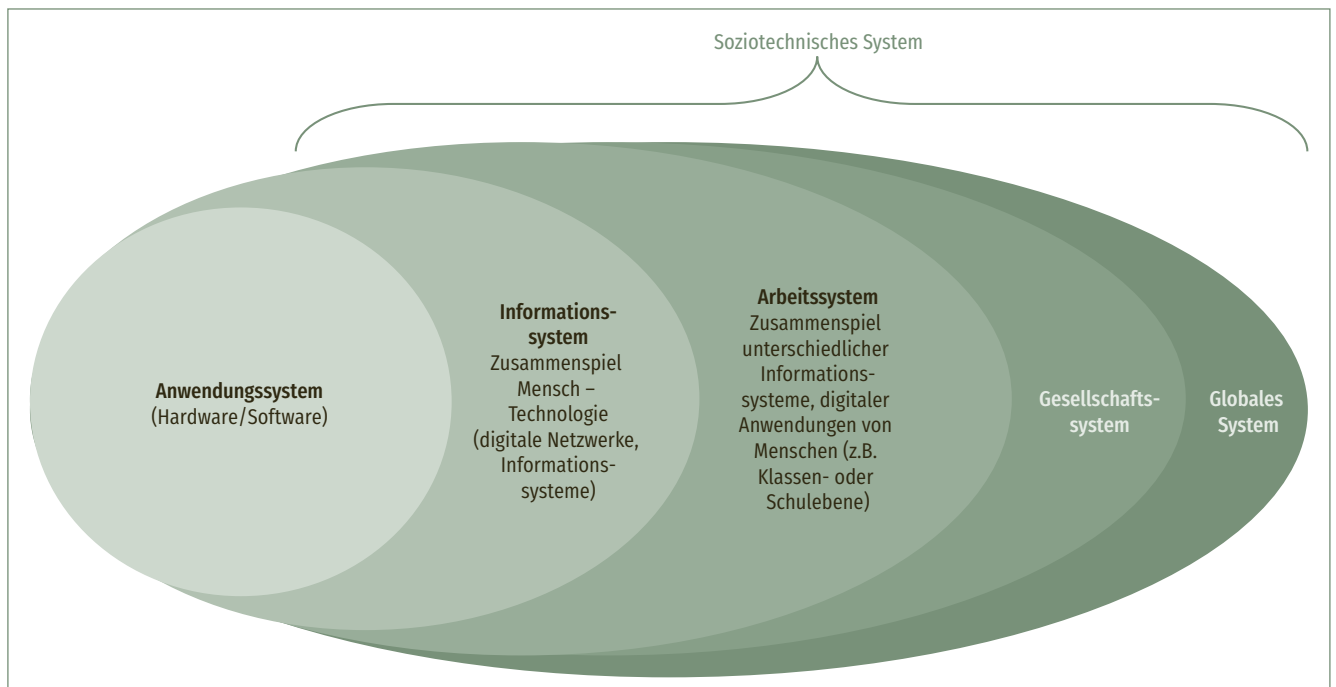


Abb. 1: Systemische Einflüsse auf Nutzung digitaler Tools.

Quelle: Klopsch 2023, S. 95 in Anlehnung an Knackstedt et al. 2022, S. 9

mit einzubeziehen und Chatbots gewinnbringend zu nutzen. Zur Verdeutlichung der Ebenen dient ein systemtheoretisches Schalenmodell (Knackstedt et al. 2002, S. 9; Teubner 1997, S. 26). Es weist unterschiedliche (Sub-)Systeme aus, die miteinander in Einbettungsbeziehungen stehen (siehe Abb. 1).

Wenn alle Lernenden einen Zugang zum Internet in den Schulen erhalten, mit Laptops oder Tablets ausgestattet werden, erhalten sie die Möglichkeit der Anwendung digitaler Tools. Die Erweiterung des Anwendungssystems um den Menschen führt zu soziotechnischen Systemen, in denen Personen mit der Technik zielgerichtet interagieren (Ropohl 2009). Im Informationssystem findet nun eine individuelle Auseinandersetzung mit den Tools statt. Die Lernenden schauen Erklärvideos, bearbeiten Multiple-Choice-Aufgaben und nutzen Chatbots als Werkzeuge, bspw. um ganze (digitale) Texte zu verfassen, zum stilistischen Korrigieren, zum Übersetzen, zur Suche nach Synonymen, zur Strukturierung von Themen oder um Ideen für das eigene Schreiben zu erhalten (Mohr et al. 2023; Marx 2023; Albrecht 2023, S. 72).

Auf der nächsten Ebene arbeiten mehrere Informationssysteme zusammen. Für Lernende kann dies bedeuten, dass sie ihre Lernergebnisse oder (Lern-)Zwischenschritte digital zur Verfügung stellen, wodurch Lehrkräfte oder Peers jederzeit gezieltes Feedback geben können. Sie erhalten die Möglichkeit, zu sehen, wo andere stehen und woran sie gerade arbeiten. Dieser Zusammenschluss unterschiedlicher Informationssysteme bildet das Arbeitssystem, das durch die Umsetzung von miteinander verbundenen und ko-konstruktiven Arbeitsprozessen, auch und gerade in professionellen Lerngemeinschaften, große Bedeu-

tung für die Entwicklung der individuellen Teilnehmenden aber auch der Schule bzw. des Bildungssystems in sich hat (Klopsch 2023).

Das Gesellschaftssystem befasst sich darüber hinausgehend mit „rechtlichen, politischen, ökonomischen, ökologischen und zusätzlichen sozialen Aspekte der Informationssystemnutzung“ (Knackstedt et al. 2022, S. 10), während das globale System sich mit Effekten der Globalisierung auseinandersetzt.

Im „Schonraum Schule“ (Wiater 2002, S. 156) wurde über die letzten Jahrhunderte hinweg vorwiegend lebensweltanalog gearbeitet. Dies bedeutet, dass die Handlungen im Unterricht zwar an der Realität abgebildet wurden, diese aber nicht nachhaltig beeinflussten: Wer bislang im Mathematikunterricht bei einer Textaufgabe einen Fehler beging, konnte die Berechnungen erneut anstellen, um seinen Fehler zu verbessern. Wer sich hingegen in der Arbeitswelt verrechnet, macht einen Fehler von weit größerem Ausmaß. Das Gesellschaftssystem war somit nur mittelbar mit der Schule verbunden.

Lernen im Zeitalter der Digitalität verändert diesen Schonraum Schule. Schulen, die das Lernen und Leben im 21. Jahrhundert ernst nehmen, setzen vermehrt auf interdisziplinäre authentische Aufgabenstellungen, die in die Lebenswelt der Lernenden hineinragen und diese auch beeinflussen (Sliwka und Klopsch 2022). Möglichst viele Ebenen des soziotechnischen Systems werden nun einbezogen. Dies verschiebt die traditionelle Rolle der Lehrkräfte. Waren sie bislang Expert:innen ihres Faches, deren Aufgabe hauptsächlich in der Vermittlung von Wissen bestand, werden jetzt andere Rollenzuschreibungen wichtig. Lehrkräfte unterstützen die Lernenden nun darin, Quel-

len zu nutzen, individuelle Lernwege anzulegen und Lernprozesse zu durchlaufen, die für sie persönlich wichtig sind, um sich selbst in der Welt zurechtzufinden. Darüber hinaus werden sie darin begleitet, mit anderen zusammenzuarbeiten und ihre Rolle in der Welt vorzubereiten. Um verantwortungsvoll zu handeln ist es demzufolge notwendig, bereits auf der Ebene des Informationssystems die Schüler:innen mit KI und Chatbots vertraut zu machen, diese aber nicht nur blind anwenden zu lassen, sondern auch deren Chancen aber auch Risiken zu verdeutlichen.

Gleiches gilt auch für die Lehrkräfte. Auch sie agieren in einem Informationssystem und müssen mögliche Folgen und Konsequenzen der Verwendung von KI und Chatbots für eine verantwortungsvolle Handhabung abzuwägen. Was es bedeutet,

Die pädagogische Herausforderung bleibt also bei allen Innovationen gleich: Ein bestimmtes Tool zu nutzen, darf nicht auf die reine Anwendung reduziert werden, sondern bedarf eines fachlichen Verständnisses auf dessen Grundlage mit dem Tool gehandelt wird.

Überträgt man diese Idee auf KI und Chatbots, dann sollten Schüler:innen durch die Nutzung zum (kritischen) Denken angeregt werden, so wie dies bereits in manchen Schulen praktiziert wird. In einigen Prüfungsformaten dürfen Schüler:innen „KI als Inspiration und Formulierungshilfe benutzen [...] – ganz offiziell“ (Spiewak 2023). Die eigene Denkanstrengung wird ihnen dabei nicht abgenommen, sondern erfolgt auf anderer kognitiver Ebene.

## *Bei künstlicher Intelligenz und Chatbots handelt es sich – pädagogisch betrachtet – um einen weiteren Anlass, anhand dessen sich erziehen, bilden und letztendlich mündiges Handeln erlernen lässt.*

wenn künstliche Intelligenz Big Data nach Mustern durchsucht, um passgenaue Werbung einblenden oder Nachrichtenfeeds auf die Interessen der Person anzupassen, bedarf einer Beurteilung. Das Problem, in einer Filterblase gefangen zu sein, wenn die Interaktion und gemeinsame Einschätzung auf Arbeitssystemebene ausbleiben, liegt auf der Hand. Erzogen wird in der Schule erst dann, wenn die Lehrperson „durch das Aufzeigen von Möglichkeiten, das Problematisieren von Inhalten bzw. Sachverhalten und Fragestellungen sowie das Hinweisen auf Notwendigkeiten und Ansprüche beim Zögling Wahrnehmungs-, Denk-, Handlungs- und Verhaltenspotentiale“ (Zirfas 2018, S. 39) entfaltet.

Nimmt man den Anspruch der erzieherischen Dimension von Schule ernst, so ergeben sich weitreichende Konsequenzen für die verschiedenen Unterrichtsfächer. Auch bei der Nutzung künstlicher Intelligenz und Chatbots darf die Frage nach der Haltung und einer „Veränderung bzw. Erweiterung von kognitiv-theoretischem Wissen, von sozio-moralischen Sollensanforderungen“ (Zirfas 2018, S. 39) und praktischen Handlungsformen nicht zu kurz kommen.

Überlegungen, aktuelle technische Möglichkeiten in den Unterricht zu integrieren sind jedoch nicht neu. Bereits Mitte der 1980er-Jahre entstand eine Diskussion zur Nutzung von Taschenrechnern in der Schule. Zu Beginn ihrer Entwicklung wurden sie als potenzielle Gefährdung mathematischen Denkens wahrgenommen und unterlagen besonderen Einschränkungen zur Nutzung im Unterricht (MKJS-BW 2014). Entscheidend ist aus pädagogischer Sicht, dass der Taschenrechner bestimmte Prozeduren erleichtern kann, das mathematische Denken jedoch nicht ersetzt. Wer nicht versteht, wie Mathematik funktioniert, wird auch den Taschenrechner nicht gewinnbringend einsetzen können.

Dies hat Konsequenzen für schulischen Unterricht. So tritt der Prozess der methodisch begründeten und erkenntniserweiternden Fragenstellung in den Vordergrund. Fragen stellen bedeutet nichts anderes, als über den Unterrichtsgegenstand methodisch nachzudenken. Auch dies ist keine radikal neue Auffassung.

Bereits Immanuel Kant sah es als die wichtigste Aufgabe an, die *richtigen* Fragen stellen zu können. „Es ist schon ein großer und nötiger Beweis der Klugheit oder Einsicht, zu wissen, was man vernünftigerweise fragen solle. Denn, wenn die Frage an sich ungereimt ist, und unnötige Antworten verlangt, so hat sie, außer der Beschämung dessen, der sie aufwirft, bisweilen noch den Nachteil, den unbehutsamen Anhörer derselben zu unge-reimten Antworten zu verleiten“ (Kant 1975, KrV:B83).

Der Pädagoge Alfred Petzelt greift diese Ansicht Kants auf, indem er das Fragen sogar als *motus mentis*, als grundlegende Denkbewegung, nobilitiert (Petzelt 2018). Der pädagogische Vollzug beginne, so Petzelt, mit dem Fragen. Erst wenn etwas frag-würdig erscheint, kann es zum Unterrichtsthema gemacht werden und dies können – besser müssen – eben auch die Folgen der Nutzung von technischen Neuerungen sein. Es scheint bspw. kein gängiges Wissen zu sein, dass die *kostenlosen* Dienste im Internet, mit persönlichen Nutzerdaten bezahlt werden.

Ebenfalls interessant für die Technikfolgenabschätzung ist die Frage nach der Bildungs- bzw. Chancengerechtigkeit (Faller 2019). Diese impliziert, dass alle Lernenden unterstützt werden, ihr individuelles Potenzial voll auszuschöpfen. Für Lehrkräfte bedeutet dies, adaptiv auf Lernbedarfe zu reagieren, „um allen Lernenden unabhängig von ihrer Herkunft und Lernausgangslage das Erreichen eines bestimmten Bildungsniveaus zu ermöglichen“ (Sliwka et al. 2023, S. 183). Der Einsatz von KI zeigt hier besondere Herausforderungen für Unterrichtssettings. Eine gewinnbringende Nutzung erfordert viel Eigenverantwortung.

tung und Selbständigkeit aber auch viel Vorwissen der Lernenden. Aspekte, die leistungsstarke Schüler:innen oft in sich vereinen. Leistungsschwächere Lernende sind dabei schnell überfordert, was dazu führt, dass diese Bildungsanlässe für sie wenig fruchtbar sind (Spiewak 2023).

Zusätzlich problematisch scheint, sofern die Inhalte und Arbeiten von künstlicher Intelligenz gezahlt werden müssen, dass entscheidend ist, wieviel Geld Eltern dafür ausgeben können. Der Bildungserfolg der Kinder hängt dann einmal mehr vom persönlichen sozioökonomischen Status ab – ein Zusammenhang, der im deutschen Bildungssystem seit Jahrzehnten sehr ausgeprägt ist (OECD 2021).

Kritisch zu denken, Fragen zu stellen und Bildungsangebote zu erhalten, die man aufgrund seiner Leistungsfähigkeit produktiv nutzen kann, dies scheint ausschlaggebend, um die Möglichkeiten der KI gewinnbringend einzusetzen. Wie eine anschlussfähige pädagogische Handlungsorientierung aussehen kann, wird im Folgenden aufgezeigt.

## Pädagogische Handlungsorientierung in Ansehung künstlicher Intelligenz

Um Anregung zu finden, inwiefern Bildung in Zeiten tiefgreifender Veränderung durch KI in der Schule gefördert werden kann, lässt sich auf Gedanken zum *Erziehenden Unterricht* von Friedrich Herbart zurückgreifen, die dieser bereits 1806 formuliert hat. Herbart gesteht in diesem Zusammenhang „keinen Begriff zu haben von Erziehung ohne Unterricht; so wie ich rückwärts [...] keinen Unterricht anerkenne, der nicht erzieht“ (Herbart 1982, S. 22). Wissen und Haltung und deren schulische Pendant Bildung und Erziehung stellen für ihn eine unzertrennliche Ein-

Erziehung und Unterricht stehen in einer wechselseitig Verwiesenseitigkeit. Wer erzieht, ohne zu unterrichten, der erklärt Haltung ohne sachlichen Bezug. Es fehlen Wissen und Fähigkeiten, die sittliches Handeln nach sich ziehen könnten. Wer nur sittliches Handeln *predigt*, bemächtigt sich der Person, da kein plausibles und intersubjektiv nachvollziehbares Wissen vermittelt würden, das sittliche Handlungsmuster begründen könnten. Erziehung mündet dann in einer blinden Übernahme der Handlungsmaximen einer anderen Person, versetzt junge Menschen aber nicht in die Lage, begründet entscheiden zu lernen. Um zu erziehen und nicht zu dressieren, gibt es in der Schule verschiedene unterrichtsmethodische Konzeptionen. Eine dem erzieherischen Prozess unabdingbare unterrichtsmethodische Sequenz ist diejenige der Sinnorientierung.

Was damit gemeint ist, kann durch eine simple Frage veranschaulicht werden: *Was bedeutet das Gelernte für mich, meine Mitmenschen und die Gesellschaft, in der ich lebe?* „Wo im Unterricht dieses Prinzip nicht berücksichtigt, dem oder der Lernenden also keine Möglichkeit eingeräumt wird, den Lernprozess selbst zu überschauen und die gewonnenen sachlichen Einsichten im Hinblick auf ihre Haltungs- und Handlungsrelevanz selbst zu beurteilen, bleibt das Lernen defizitär“ (Rekus und Mikhail 2013, S. 337).

Die Frage nach dem Sinn des Gelernten ist keineswegs trivial und ebenso keine, in der KI eine Hilfestellung geben könnte, die über das Aufzählen statistisch relevanter Inhalte hinausgeht. Es handelt sich hierbei vielmehr um eine höchst individuelle Betrachtung, die Urteilskraft erfordert. Zur Beantwortung dieser Frage müssen sich Personen über ihre Motive, Beweggründe und Ansichten klar werden. Sie fällen Urteile und beurteilen Sachverhalte nach individuellen Maßgaben. Zwar könnte eine KI weitere Informationen liefern, neue Aspekte aufzeigen und

*Schulen, die das Lernen und Leben im 21. Jahrhundert ernst nehmen, setzen vermehrt auf interdisziplinäre authentische Aufgabenstellungen, die in die Lebenswelt der Lernenden hineinragen und diese auch beeinflussen.*

heit dar und bedingen sich gegenseitig. So lässt sich die oben bereits erwähnte inhärente Problemstellung von KI und Chatbots erst dann erzieherisch wenden, wenn neben der Einführung, Erläuterung und Anwendung auch das Moment der kritischen Reflexion hinzutritt. Erst wo den Schüler:innen aufgezeigt wird, welche Veränderungen sich in ihrer Lebenswelt durch den ungezügelter Einsatz von künstlicher Intelligenz und Chatbots bspw. in der Bildbearbeitung oder in der Verbreitung von *fake news* ergeben, können sie eigene Handlungsmaxime ausprägen und auch einhalten. Und „gerade dieses für die Erziehung notwendige Moment leistet der Unterricht“ (Mikhail 2016, S. 80).

andere Sichtweisen anbieten. Die Entscheidung, wofür sich jede Person entscheidet, obliegt jedoch immer dem Menschen selbst.

Ein Beispiel, auf diese Weise mit ChatGPT in Kontakt zu treten, könnte darin bestehen, dass Lernende zu zweit über einen Prompt für ChatGPT nachdenken und diesen zunächst inhaltlich diskutieren. Im Anschluss daran recherchieren sie mit dem Bot, diskutieren die Ergebnisse, fügen sie ihrer eigenen Argumentationslinie hinzu oder werfen sie und teilen die Erkenntnisse mit der Klasse (Dillard 2022).

Ein anderes Beispiel besteht darin, dass Lernende mit dem Bot diskutieren, indem sie die Argumentationsseite und

ChatGPT den Gegenpart einnimmt. Auch hierbei lässt sich die eigene Meinung schärfen, Argumente reflektieren und tiefergehend in ein Thema eintauchen.

Kein Mensch kann für einen anderen eine Entscheidung fällen bzw. eine Handlung übernehmen, noch weniger kann es ein digitales Tool. Es ist eine pädagogische Aufgabe, den Prozess der Sinnstiftung bei jungen Personen zu begleiten.

Bedeutend ist die Unabschließbarkeit dieses Prozesses. Werte bzw. Bewertungen sind keine absolute Setzung. Im Unterricht werden von der Lehrperson immer wieder Urteile von Schüler:innen eingefordert, denn „Werturteile werden nicht ohne Grund gefällt. Werte erheben einen Geltungsanspruch und müssen deshalb begründet sein“ (Rekus 1993, S. 221). Erst durch

*Kein Mensch kann für  
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die Begründung kann ein intersubjektives Verständnis entstehen. Ferner darf nicht verkannt werden, dass Lehrpersonen ihre Schüler:innen zur Beurteilung immer wieder auffordern, um im Angesicht ihres Wissens „neu gewonnene Werturteile selbst kritisch zu prüfen und dieses Wissen in sich ändernden Situationen vernunftgemäß einzusetzen“ (Gutbrod 2018, S. 219). Auch hier lassen sich Chatbots als Gegenspieler gut einsetzen – immer vor der Folie, sich gewahr zu sein, dass der Anlass die eigene Entwicklung ist.

Zusammenfassend zeigt sich: In Zeiten zunehmender Verstrickung des weltweiten sozialen Lebens, der Akzeleration der Kommunikation und der Überhandnahme von täglichen Entscheidungen, sollte Urteilsfähigkeit durch Bildung das erklärte Ziel aller unterrichtlichen Bemühungen sein. Wer künstliche Intelligenz für Online-Recherche, Hausarbeiten, Referate oder Ähnliches verwenden möchte, muss zuerst einmal in der Lage sein, die richtigen Fragen zu stellen. Ohne konkrete Fragestellung kann künstliche Intelligenz keine Antworten liefern. Oder anders ausgedrückt: Lediglich eine gebildete Person kann die erkenntniserweiternden Fragen stellen und die Antworten auf den eigenen Horizont und das eigene Handeln beziehen. Dies wiederum erfordert Urteilsfähigkeit und eine Begründung von Entschlüssen, um fremden Antworten und Ansichten nicht ausgeliefert zu sein. Urteilsfähigkeit erreicht man ausschließlich durch Bildung und nicht durch die Chatanfragen an künstliche Intelligenz.

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RESEARCH ARTICLE

# Mirke Neighbourhood Panel: Accompanying research for the Solar Decathlon Europe 21/22

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**Abstract** • The international architecture competition Solar Decathlon Europe was held in Wuppertal in 2022 and focused on sustainable building and living in the city. The student teams participating in the competition developed buildings that would enable climate-friendly living and be tailored to the “Mirke” district in Wuppertal and the individual needs of the residents in this neighborhood. Not only the neighborhood was the focus of the competition, but also the residents of the Mirke district were involved in the project through a neighborhood panel. As part of the Mirke neighborhood panel, three survey waves were conducted between May 2021 and August 2022. The results and insights gained from the neighborhood panel were incorporated into the project and shared with the architectural teams participating in the competition. In addition, the results were shared and discussed with the urban development department of the city of Wuppertal, local initiatives, and other partners in the neighborhood.

## Mirke Quartierspanel:

Begleitforschung zum Solar Decathlon Europe 21/22

**Zusammenfassung** • Der internationale Architekturwettbewerb Solar Decathlon Europe fand 2022 in Wuppertal statt und beschäftigte sich mit nachhaltigem Bauen und Wohnen in der Stadt. Die am Wettbewerb teilnehmenden Studententeams entwickelten Gebäude, die ein klima-

freundliches Wohnen ermöglichen und auf den Wuppertaler Stadtteil „Mirke“ und die individuellen Bedürfnisse der Bewohnerinnen und Bewohner in diesem Quartier zugeschnitten sein sollten. Nicht nur das Quartier stand im Fokus des Wettbewerbs, sondern auch die Bewohnerinnen und Bewohner der Mirke wurden über ein Quartierspanel in das Projekt eingebunden. Im Rahmen des Mirker Quartierspanels wurden zwischen Mai 2021 und August 2022 drei Befragungswellen durchgeführt. Die Ergebnisse und Erkenntnisse aus dem Quartierspanel flossen in das Projekt ein und wurden mit den am Wettbewerb teilnehmenden Architekturteams geteilt. Darüber hinaus wurden die Ergebnisse mit dem Amt für Stadtentwicklung der Stadt Wuppertal, lokalen Initiativen und anderen Partner\*innen im Quartier diskutiert.

**Keywords** • panel survey, neighborhood survey, city development, energy-efficient refurbishment, citizen participation

## Introduction

Climate change is one of the greatest challenges of our time. Cities in particular have a key role to play in climate protection (IPCC 2023). According to the recent IPCC report urban areas are home to 4.2 billion people (IPCC 2023, p. 909), the majority of the world’s population. Cities consume about 75 percent of the world’s global primary energy and emit between 50 and 60 percent of the world’s total greenhouse gases (Khor et al. 2022; Kraas et al. 2016). At the same time, cities are particularly hard hit by the consequences of global warming for example, rising temperatures and heat stress, rising sea levels, storm surges, and extreme weather events (IPCC 2022). Also, the growing population faces a shortage of affordable housing (Kraas et al. 2016). By 2030, it is estimated that 250 million new housing units will be needed in the 12 countries that are home to 61 percent of the world’s total population. This leads to an urgent need for action to optimise existing urban structures and raise awareness of sustainable building and renovation.

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This topic is addressed by the Solar Decathlon Europe (SDE), an international student competition about sustainable building and living in the city. It has taken place every two years since 2010. In 2022, the SDE was held in Germany for the first time. The German SDE edition especially focused on the challenges of sustainable energy transitions in urban contexts, while exploring opportunities for the revitalisation of building stock that work toward reducing the carbon footprint. Reusing, evolving, building up and re-defining existing dwellings were the central architectural tasks, whilst resource efficiency, sufficiency, climate protection and closed-life-cycle construction were central themes. Sixteen student teams constructed demonstration units and competed in the SDE 21/22 exhibition area in Wuppertal, Germany. Wuppertal was not only site of the competition, in particular a district of the city was subject of the designs – the Mirke district. This means, the teams of the competition developed buildings that enable climate-friendly living tailored to the district “Mirke” and the individual needs of the residents in this neighbourhood. With its building- and energy-related challenges and also social problems, this district is a typical representation of many urban districts in Europe (Voss and Simon 2023) and therefore provided the ideal environment for the competition.

As part of the SDE 21/22, a neighbourhood panel was being set up as accompanying research and focused on the following research questions:

1. How do the residents perceive the living conditions in their neighbourhood and the development of the neighbourhood?
2. How does the SDE 21/22 affect the neighbourhood residents?
3. What are the residents' expectations from the SDE 21/22 for their neighbourhood and the exhibition area in the future?

Three survey waves were conducted as part of the Mirke neighbourhood panel between May 2021 and August 2022. The results and insights gained through the neighbourhood panel were shared with the architectural teams of the competition. By participating in the Mirke neighbourhood panel, the citizens provided insights into their routines and attitudes and shared their views on local challenges, transformation processes and important future issues.

## Design and methods

### Panel development and structure

All households (approx. 4,000) in the Mirke neighbourhood received a postal invitation to the neighbourhood panel from the City of Wuppertal in April 2021. A total of 1004 people accepted the invitation and registered for the Mirke neighbourhood panel in the recruitment phase. Just under half (461 people; response rate: 45.9%) took part in the first survey in September 2021. This response rate is slightly higher than average (Wu et al. 2022). In the second survey wave in April 2022, 390 people took part (response rate: 38.8%). In the third survey wave in August



Fig. 1: Meine Mirke Pass.

Source: © SDE 21/22

2022, 376 people took part (response rate: 37.4%). Recruitment, first and second wave were carried out before the SDE 21/22, the third wave was carried out after the event.

The surveys were generally carried out digitally, but could also be completed on paper, if desired. In addition, it was possible to fill out questionnaires at the exhibition area in preparation close to “Nordbahntrasse” and during on-site recruitment activities. This opportunity was offered irregularly on weekday afternoons and at weekends.

**Incentives:** Incentives were a key element of the survey. More than 100 vouchers for local gastronomy, cultural and leisure time offers were raffled among the participants upon successful registration. In addition, after completing the first survey, the so-called “Meine Mirke Pass” was handed out (figure 1), with which the participant could get three free drinks at local cafés and restaurants in the Mirke neighbourhood as well as other benefits in the region. To create renewed incentives, this offer was extended before the second and third wave.

**Communication activities:** To increase visibility of the survey, it was accompanied by video, poster, television and print campaigns. Also, results of the first wave were publicly exhibited at three locations in the Mirke neighbourhood: in “Rathausgalerie” on the subject of living, in “Ein Quadratkilometer Bildung” on the subject of neighbourhood life and in “Café Kinderwagen” on the subject of mobility.

### Contents of survey waves

The *recruitment survey* asked about aspects such as size of apartment/house, number of living spaces and demographic variables such as gender, age and employment situation. In addition, language preferences (possible options were German, English, Turkish) for completing the surveys were recorded. Also, there was the option of naming desired topics for future surveys.

The contents of the *first survey* wave included the place attachment-scale of Raymond et al. (2010), social cohesion-scale

of Tackenberg et al. (2020) environmental awareness-scale of Geiger and Holzhauser (2020) and renovation approval-scale of Schempp (2013). Other aspects asked were: satisfaction with the living conditions in the Mirke neighbourhood, key factors for the choice of the living environment, personal activities in the neighbourhood, means of transport used, housing constellation and housing space, and attitude towards space sufficiency.

The *second survey* focused on the one hand on mobility and parking, including various future scenarios and solutions for mobility. On the other hand, aspects such as gentrification of the neighbourhood (using the scale of Üblacker and Lukas (2019)), renovation measures carried out and civic engagement (using the scale of BMFSFJ (2017)) were assessed.

The *third survey* was conducted after the main event phase of the competition “Solar Decathlon Europe 21/22” in the Mirke neighbourhood and served both to capture panellists’ evaluation of the event and to post-measure indicators such as place attachment, environmental awareness, mobility behaviour, and work and housing preferences.

Overall, civil society actors in the Mirke neighbourhood were involved in the conception of the panel before starting and during its course.

## Results

### Weighting of cases

In order to check the representativeness of the participants for the Mirke neighbourhood, the data was compared with official statistics and then weighted (figure 2). By weighting a sample, the sample profile of the study can be approximated to a desired profile, such as the underlying population (Bethlehem 2008). The poststratification weights in the present sample were created using information on age, gender and migration background. The poststratification weights also adjust for unequal selection probabilities (design weights).

### Descriptive results

#### First survey wave [n = 461]

**Demographics:** The number of male and female participants was almost equally distributed (51.2% male, 47.7% female, 1.0% diverse). 57.9% of the participants were between 16 and 44 years old and 13.3% stated that they were over 65 years old. A majority stated that they were currently unmarried (59.2%). Married or in

a registered partnership are 31.9%. Also, a large majority of participants have either a university education (tertiary level; 48.5%) or a (higher) secondary education (upper secondary level; 40.8%). 62.4% of respondents were employed; a smaller proportion reported being in education or training schemes (17.4%) at the time of the survey. The monthly net household income for the majority of respondents was between 2000€ and 4000€ (37.9%) or between 1000€ and 2000€ (24.0%). 22.7% of the participants had lived in the Mirke neighbourhood for more than 20 years.

**Place attachment and environmental awareness:** Overall, the participants feel quite connected to the neighbourhood (mean = 2.8; 0 = no place attachment at all; 4 = strongly attached to the Mirke neighbourhood). Also, when asked whether they like living in the Mirke neighbourhood, the majority of participants expressed (very) strong agreement (90.5%). The neighbourhood relations were rather good to very good (“I know some of the neighbours more closely and they help each other out sometimes”, “I maintain friendships with some neighbours”; 67.8%). Also, the majority of respondents rated intercultural co-existence in the neighbourhood (rather good/very good: 76.1%) and social cohesion positively (rather good/very good: 57.6%). Environmental awareness was generally high (mean = 3.0; 0 = not at all environmentally aware; 4 = very aware) among respondents in the Mirke neighbourhood.

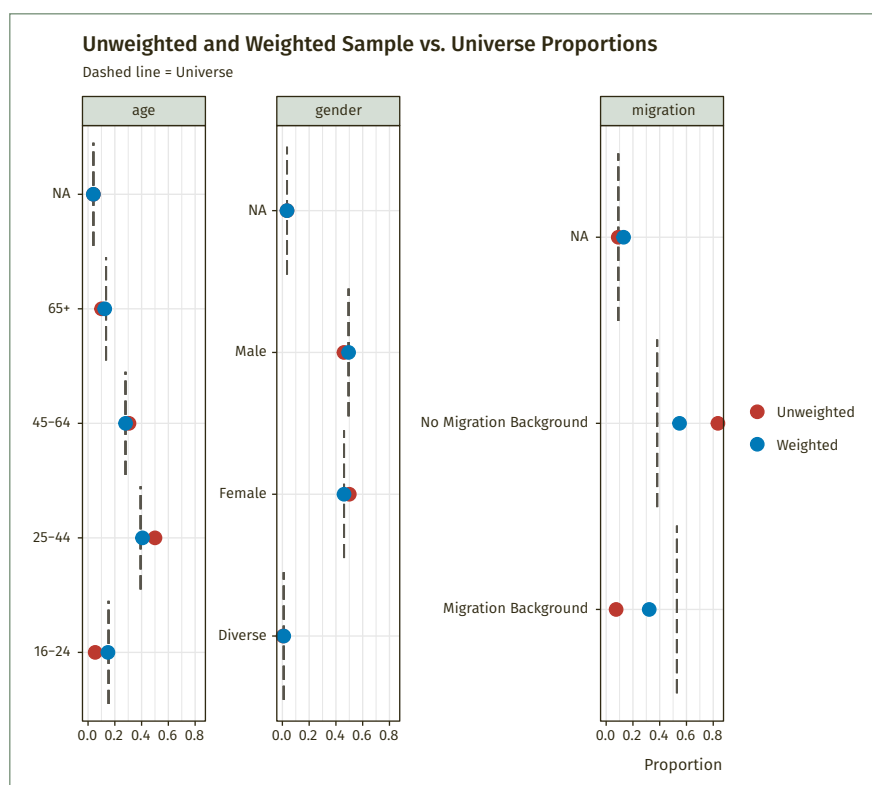


Fig. 2: Weighting of sample after the third wave.

Source: authors' own compilation

**Mobility:** The majority of participants stated that they have a driving licence themselves (74.0%). In addition, 54.0% say they always have permanent access to a car and 72.4% have at least one car in their household. Only a small proportion of respondents (15.0%) are members of a car-sharing provider. In terms of transport use, car use in the Mirke neighbourhood is relatively balanced: While 45.8% of respondents said they used their car daily or several times a week, 54.2% said they rarely or never relied on their car. Car sharing was again not used by the majority (98.0%). Public transport was used frequently (daily or several times a week) by 40.7% of the participants at the time of the survey. Walking, on the other hand, was much more common: Around 83.7% stated in the survey that they covered distances exclusively on foot every day or several times a week.

**Satisfaction with flat size and housing situation:** A majority of respondents stated that they currently live in a rented flat (79.3%) and less frequently in a condominium (14.8%). The average number of rooms is 2.9 rooms and the average living space per person is 45.1 sqm. Most of the participants live with one other household member (38.1%) or alone (32.5%). Also, the majority of respondents are (very) satisfied with their housing situation (79.0%). Only a very small proportion stated that they were (very) dissatisfied with their housing situation (3.7%). The majority of the participants felt that the size of the flat was just right (59.9%) and 27.7% tended to feel that it was rather/much too small.

In the first survey, the possibility was given to name desired topics for future surveys. The most frequent mentions related to mobility and parking, which were then integrated as a main topic in the second survey.

### Second survey wave [n = 390]

**Mobility station, neighbourhood hub and neighbourhood garage:** Mobility stations link different means of transport in one place, enabling passengers to choose flexibly between public transport, sharing and the like. 84.1% of respondents rated the idea of a mobility station as good to very good. Also, 62.6% of the people said they could well/very well imagine using a mobility station. In addition to mobility services, neighbourhood hubs integrate, for example, parcel service functions, local supply facilities or bicycle repair modules. At the same time, it can create a new meeting place for local residents. Most respondents rated the idea of a neighbourhood hub (88.8%) and also the idea of a neighbourhood garage (83.8%), which is located near residential houses and apartments and is intended to provide space for all vehicles belonging to the residents of a neighbourhood, as good to very good. When evaluating different scenarios for solving the parking problems in the neighbourhood, the installation of a mobility station and neighbourhood hub was named as the best solution, the installation of a neighbourhood garage as the second-best solution, and the creation of additional free residents' parking in the neighbourhood as the third-best solution.

**Energy-related building renovation:** The respondents were asked which energetic building refurbishments have been done since 2000. 29.0% declared to have modernised the heating system largely or completely, 24.1% replaced old windows (largely or completely) and insulation was installed by 22.7% (largely or completely). Under 5.0% declared "other" refurbishments, the use of renewable energy for heating or an installation or the renewal of a ventilation system (largely or completely).

**Housing and satisfaction with individual housing factors:** Most participants have not changed their housing situation since the first survey wave (85.8%) and did not plan to do so (62.0%). Satisfaction with individual factors of housing varied widely among the factors surveyed. Most people were particularly satisfied with their apartment size (86.5% (rather/very) satisfied), their house community (74.1% (rather/very) satisfied), floor plan or room layout (84.6% (rather/very) satisfied), number of rooms (84.7% (rather/very) satisfied), and balcony or terrace (70.0% (rather/very) satisfied). Satisfaction with parking spaces for cars and bicycles, shared areas and the energy condition of the building was rather poor.

**Gentrification:** Gentrification was surveyed by a scale of 10 questions. The respondents assessed the gentrification tendencies with a mean of 2.1 on a range from 0–4 (0: no perception of gentrification; 4: strong perception of gentrification). Thus, there is an ambiguous result with a slight tendency towards a perception of gentrification.

**Civic engagement:** 28.9% of the participants stated that they are civically engaged at least once a week. About the same number of participants said they never get involved (31.7%). Most of the participants are active members of a sports club. 30.0% of the participants are passive members of professional associations. 21.0% of the participants specify that they are passive members of a church and other religious communities. In addition, 11.2% of the participants are active in music clubs or theatre groups. Also, 11.2% of the participants are actively involved in an ethnic community.

### Third survey wave [n = 376]

Of the participants in the neighbourhood panel, 71.0% attended the SDE 21/22 event between June 10 and June 26 2022, and most of them enjoyed the exhibition area along the "Nordbahntrasse" (90.6% rather/very much liked it). To assess panellists' point of view they were asked to assess statements such as "I will try to transfer ideas from SDE 21/22 into my own life." From the respondents' point of view, the information about the individual buildings was presented in an understandable way (62.4% (rather) agree). Around 70.0% of the respondents stated that hosting the SDE 21/22 in the city of Wuppertal will have a positive benefit for the Mirke neighbourhood and also that they believed the exhibition and event area will remain exciting in the

future (70.4% rather/fully agree). It was communicated beforehand that some of the buildings will be further used in the follow-up project “Living lab NRW”. 76.8% of respondents agreed that the SDE event would be (rather) good for the Mirke neighbourhood and just under half of the respondents (49.2%) think that the SDE event would (rather) positively change the neighbourhood in the long term.

Complementary, the panellists were asked in open-ended questions what they liked about SDE 21/22, what they did not like about it, and what should change accordingly for a repeat of the event. Respondents indicated that they particularly liked the sustainability and future orientation of the event (13.5%), the innovations brought forth (10.9%), the general collaboration of the international university teams (10.4%), and the building concepts presented (10.1%). Negative aspects of the event mentioned were that the total event duration was too short (11.0%), the traffic concept was not sufficient (8.4%) and the waiting times at the houses were too long (7.9%). Related to this, the most frequently mentioned comments were that a longer exhibition duration should be chosen if the event is repeated (15.3%) and that the guided tours through the houses should be changed (9.6%). For example, it was suggested that more guided tours could be offered, that there should be tours in smaller groups, or that advance reservations could be made.

## Conclusion

In 2022, the SDE was held in Germany for the first time. Adding new storeys, closing gaps between buildings, and horizontal building extensions were three specific tasks in the field “construction” addressed by the SDE 21/22, consistently taking account of the architectural and technical improvement of existing buildings. Wuppertal was not only the venue for the SDE 21/22, but an important source of inspiration for the ideas that were developed during the competition. The urban profile of the competition, in detail described by Voss and Simon (2023), anchored the competition at the neighbourhood level. It enabled the teams to plan their building projects with actual social contexts – provided by the Mirke neighbourhood panel – and building structures given in reality.

Through the accompanying research with the Mirke neighbourhood panel, which took place in this form for the first time in the context of an SDE, the neighbourhood residents were involved in the SDE 21/22 and its topics. They provided insights into their routines and attitudes and shared their views on local challenges, transformation processes and important future issues.

It has also helped to increase the acceptance of and interest in the event and to create impulses for long-term neighbourhood development. The acceptance of the residents for the event was central because the event took place within the neighbourhood. At the beginning, scepticism could be heard in conversations, but the broad information about the event and the possibility to express opinions and preferences via the panel could have set posi-

tive impulses here. In addition, six demonstrators remain on site and thus leave their mark on it, but also continue to provide the opportunity for research on sustainable building and living with the follow-up project “Living Lab NRW”.

The results of the Mirke neighbourhood panel are relevant for various sides: a) on the scientific side with findings on the conception and management of a neighbourhood panel, b) on the SDE side with information for the student competition teams on the composition of the neighbourhood and the preferences of the residents, and c) on the side of the civil society actors in the neighbourhood, with whom the results were discussed and reflected and who were also involved in the conception of the panel.

Regarding the conception and management of the neighbourhood panel it can be noted that incentives and communication played a key role. The number of residents participating in the neighbourhood panel was slightly above average (Wu et al. 2022) after the recruitment phase, which may indicate a positive effect of the incentives used. Also, the response rate did not decrease problematically over the three survey waves, which can be seen as a possible effect of the incentives, too. At the same time, panellists’ wishes about topics for the future survey were also incorporated, and thus the surveys may have had a thematic relevance for the participants.

Furthermore, transparent communication about the procedure, the results and the underlying objectives of the survey was key. Communication measures included postcards and posters in the neighbourhood, tarpaulins along the “Nordbahntrasse”, coverage on social media channels, e.g. videos on YouTube and Instagram. There was also coverage in the local press and local time on television and direct exchange at on-site events and roundtable discussions. The close cooperation with social institutions in the neighbourhood has also made an important contribution to disseminate information about the project and the survey.

Regarding the SDE competition side, the SDE 21/22 competition showed the building potential and technical feasibility of the journey towards a climate-neutral building stock. The urban profile of the competition found detailed reflection in the competition rules and anchored the competition at the neighbourhood level. It enabled the teams to plan precision drafts with actual social contexts and specific building tasks. Because of the focus on further construction onto the existing urban building stock the urban structural context was important for each of the contributions. It showed that it is necessary for the architectural and energy transformation to go hand in hand, as the existing building stock frequently fails to meet people’s needs and personal requirements. The ideas for existing urban building stock in the neighbourhood could be developed and tested on site in demonstrators.

The neighbourhood panel had a high relevance for the Mirke neighbourhood in general and the civil society actors in this quarter in particular. The surveys and their results were discussed and reflected wherever possible, e.g. through specific evaluations and detailed elaboration of relevant aspects of the results, to adjust their further work. In addition, the findings and

insights gained from the neighbourhood panel were shared with the municipal planning department of the City of Wuppertal.

Furthermore, the area on which the competition took place is located next to the very popular “Nordbahntrasse” as well as in direct vicinity of Utopiastadt, a key player in the district, but had not been developed so far. Through SDE 21/22, the area is ready to be opened up as space to develop with and for the neighbourhood. Further projects and ideas are already planned and discussed in the “Stadtentwicklungssalon” under the heading “Future areas (german: Zukunftsflächen) of the district”.

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This TATuP interview with Danielle Shanley, conducted by Maximilian Roßmann, explores the origins of Responsible Innovation (RI) and Technology Assessment (TA) in the 1960s, revealing early visions of collaboration and interdisciplinarity a decade before the Office of Technology Assessment (OTA) was founded in the United States. Shanley highlights the significance of history in understanding hype and identifying with the intellectual movement despite its contested concepts and folk history. She suggests proactive engagement to ensure RI's continuity beyond buzzwords.

**Maximilian Roßmann: How did you get interested in the history of Responsible Innovation and Technology Assessment?**

**Dani Shanley:** My background is mainly in Science and Technology Studies (STS) and the philosophy of technology. I did a research master's at Maastricht University and a PhD was advertised here to conduct a transnational history of RI. It was a very open-ended project, and I spent the first year embedding myself in and amongst the RI community. At the time, there were many events going on, as it was 2017, which was really the boom time of RI. People were trying to negotiate what it was, or what it should be. I conducted interviews with some of the leading voices of the community, and they all had a very clear idea about what kind of history they thought I should be writing. I guess what I was more interested in was trying to see if and how they used history when they were introducing the concept. From there, I traced some of the common stories I was hearing, which I referred to as "folk histories" in my thesis (building on Arie Rip's notion of folk theories) because they were being told over and over again, and over

**Keywords** • *history, responsible innovation, social movements, hype, technology assessment*



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## INTERVIEW

*mit/with Danielle Shanley*

*von/by Maximilian*

*Roßmann*

# *Can the history of Responsible Innovation help us live better with hype?*

*Kann uns die Geschichte*

*der Responsible*

*Innovation helfen, besser*

*mit Hypes umzugehen?*

time people seemed to stop thinking critically about the sorts of origin stories they were telling.

**When does your history begin?**

My history begins in the early to mid-1960s. You know, for example, the Of-

fice of Technology Assessment (OTA) in the United States didn't come out of nowhere. And neither did the professional Society for Science and Technology Studies (4S), which got started around a similar time – the first professional meeting of 4S was in 1975 while OTA first opened its doors in 1974. However, what I really wanted to look at was the pre-history of how we got there. And it was interesting to me to see just how much academic research was going on around the idea of Technology Assessment (TA) a couple of years before the OTA got going. There was a lot of overlap between various academic groups and it was clear that similar concerns and interests drove the people drawn to both TA and STS. From as soon as STS got started, TA was a research subject, you know, it was something that scholars were interested in. And as we now know, the interaction between these two communities has always continued. Crucially, I think that it is this close-knit relationship and sort of feedback loop between them that has brought us to where we are now. What I try and do in my thesis is to show that in the early days of TA there were many competing ideas around what it could or should be and this is why it eventually ended up becoming this slightly hollowed out version of what some people initially wanted it to be.

**What was the historical context for the first ideas of TA and RI to emerge?**

In the US context, government spending on technology was continuously soaring year on year, which was beginning to attract criticism both within Congress and amongst the wider public. At the same time, Congressional decision-making increasingly revolved around new and emerging technologies. Those working within the corridors of power were becoming increasingly aware that they didn't have the expertise or knowledge required in order to make good decisions. So, Emilio Daddario who chaired the subcommittee on Science, Research, and Development started exploring the idea of TA. Interestingly, as a side note, Daddario had been corresponding with Charles Lindbergh who was living as a hermit in

the remote countryside at the time (for a variety of reasons). Daddario, like many others, really saw Lindbergh as this sort of Hero of American Progress and Technology, seeing how he had operated the first non-stop flight across the Atlantic. It was through Daddario's correspondence with Lindbergh that Daddario really started to think seriously about the idea of TA. Lindbergh repeatedly stressed his concerns to Daddario, along the lines of "You know, I think we need to slow things down, I think we need to kind of have a better understanding of the decisions we're making and the impact these technologies are going to have."

**... Impacts the technologies are going to have! Did TA researchers in these early days promise that they can forecast scenarios?**

I think definitely, in the early days of OTA, they were very wary about making predictions. I think they really tried to focus on outlining the different courses of action you could take. I'm trying to think if they explicitly used the word "scenario" – I don't think so, but they definitely talked about creating stories, creating narratives, and thinking about the future. Crucially, no one wanted it to be seen like they were the ones steering or giving clear advice on what decisions should be taken, because they talked a lot about upholding some ideal of neutrality. As a result, they avoided committing to specific predictions. It was more like "these are the options available based on the research we have done". No one involved wanted OTA to have too much responsibility. And that was sort of the fear that politicians had, you know, they didn't want to outsource what they saw as their responsibility. So, it was very much a part of the identity of OTA as well – "We don't have responsibility for the decision-making. We are just providing information." But I think that academics had a different idea of TA (and indeed Daddario did as well, to some extent).

**So, in the OTA, there was a concrete effort to say that this is the politicians' job, and this is now what scientists and ex-**

**perts do, and we create, kind of a boundary field?**

Yes, very much. Still, OTA became something very different from what it was in that pre-period, because in the pre-period

interests of activists, stating that if you're having these kinds of committees, you need to include stakeholders beyond just the techno-scientific elites. And then you see a lot of pushback, like "We don't want

*Over time people seemed to stop thinking critically about the sorts of origin stories they were telling about Responsible Innovation.*

it was much more about how we get scientists and politicians talking to each other and working together. People like Lola Redford and Ralph Nader represented the

to open the doors to that, that's going to be a nightmare." Then, you had the members of the techno-scientific elite, like Jerome Wiesner, who had a very clear idea of what they thought TA should be. For example, Wiesner is attributed with having said that TA needed to be like a traffic light system. The idea being that TA should be able to provide a red light, like a stop sign, that it needed to have this early warning function, to see the potential for where things could go wrong and provide an opportunity to pull the plug. Whereas I think for Daddario, at least in the beginning, when you read the very early documents of his subcommittee and a number of his speeches what he was trying to say was "we are all responsible as citizens to be thinking about these things. And it's not just a case of politicians with the decision-making power and you scientists doing your work, but we need to collaborate." Daddario was somehow quite effective in creating a bridge between these groups. However, what TA later became at the OTA was not his vision for it initially. His vision was a lot closer to something like RI. He really wanted to promote interdisciplinarity, he wanted people to reflect a lot, you know, anticipating and including different stakeholders, these sort of key elements that we associate with responsible innovation today.

**So, the initial idea was to set up interdisciplinary teams to better reflect responsibilities. Looking at it nowadays, who does identify under RI, and who does not?**

How we identify, I think, is an interesting and ongoing question. I think in STS



**Danielle Shanley**

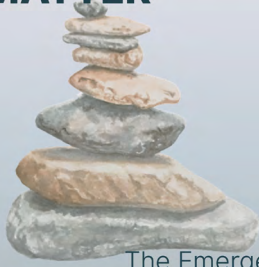
is Assistant Professor at the Faculty of Arts and Social Sciences at Maastricht University in the Netherlands.

She is currently exploring the ethical implications of immersive environments (which combine advanced technologies such as virtual reality and artificial intelligence).

Dani's expertise is mainly within science and technology studies and the philosophy of technology, with a particular focus on reflexive, participatory design methodologies (or, responsible innovation), such as social labs and value sensitive design.



## MAKING RESPONSIBILITY MATTER



The Emergence of Responsible Innovation as an Intellectual Movement

Danielle Shanley

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"We have to take responsibility to keep it going and to make sure that whatever the new buzzword is, we still make clear that these things are very much tied together", Danielle Shanley.

and RI circles it is perhaps asked more than in most other academic communities. And you know, our conferences often have panels like "What is X (STS/RI etc.) ...?" – in the sense of "What are we actually doing?" Something I recently talked about with a friend of mine is asking what qualifies you as an AI ethicist, right? Who are you to do that kind of thing? What would the procedures look like to give some kind of license to people to perform this role? I think this is something that we have in RI as well. What gives us the credibility or power to play this role, right? I think who identifies as RI and who does not is quite an interesting question because the community is often referred to as a sort of bubble. A couple of people I was speaking to in the United Kingdom were previously very closely affiliated with the ELSI/ELSA work (Ethical, Legal, and Social Implications/Aspects). And they said, "You know, yeah, a few years ago, all the grants we were writing, it was all under this banner of ELSI/ELSA. Now it's responsible innovation. But for us, it doesn't really matter. As long as this work continues being funded, it doesn't really matter what we call that kind of thing." I think that's very interesting.

Indeed, this is very interesting, and I can fully relate to these ongoing politics and struggles about identifying with the banner of TA, STS, technology ethics, or RI. Philosophers then claim that STS just describes but avoids the normative debate. And TA people claim that STS and ethicists miss giving stakeholders applicable recommendations, and so on.

I think the reason why people are drawn to them is similar, like wanting to have some kind of impact, even if it's by describing things differently. In the first kind of generation of STS, people often came from technical backgrounds, people like Wiebe Bijker or Arie Rip, for example, that were scientists or engineers. But I think also that it's people that associate themselves with a particular kind of social scientific work in interdisciplinary teams, who are interested in the responsibilities of scientists and technologists. Increasingly, scholars are also trained in STS all the way through, and I think it's interesting to think about what that means and how that changes the ways in which we're able to interact with the different communities, when we don't

sible Research and Innovation (RRI) has been overhyped and expectations have been too bloated for that time?

It is perhaps important to just briefly point out the differences between RRI and RI. Though they are overlapping discourses, we typically think of RRI as related more specifically to the policy related discourse, particularly the Commission's focus on the "keys" of RRI. Meanwhile RI is typically used to refer to a broader academic discourse and the community which that discourse has brought together. Hype is an interesting topic from within both RRI and RI, especially if we think about Artificial Intelligence now and how we can try and move away from hype narratives. But I'm also interested in the hype of RRI/RI itself, because I think ultimately, we need hype, right? I mean, as researchers, when we write research proposals to get grants, you know, we have to hype what we're doing. I think again from the kinds of conversations I have with people in RRI/RI projects, I get the feeling that people do think it overpromised, but I think in a way that it had to. I mean, if

*What Technology Assessment became at the Office for Technology Assessment was not Daddario's vision for it initially. His vision was a lot closer to something like Responsible Innovation.*

have that same technical language or background or expertise. I think that the whole thing with RI is quite a broad banner that brings many different people together. And I think we can say, in that way at least, that it has been quite effective.

**It was quite effective in bringing people together. But then, there was this headline "R.I.P.R.I." as you cite in your paper<sup>1</sup>. Would you say that is true? That Respon-**

you want to be transformative, you kind of have to make big claims, right? It is very difficult to break the need for hype cycles without transforming the whole research system. And so, I think we're complicit, to some extent, in also playing part of the same game that we're criticizing<sup>2</sup>. RRI had a very clear trajectory in terms of, you know, a huge surge of interest, a

<sup>1</sup> See Shanley 2022.

<sup>2</sup> For a further discussion about the discomforts with the bubble, hype and politics of RRI, see Shanley et al. 2022.

sort of peak, and then, you know, now we see it's kind of in this "where is it going next?" phase. Are we completely letting

should be more proactive, and we should take more agency in making sure that this doesn't just fade away. Just because they

ven't been told or the histories that have been overlooked or neglected. And I think that has a very important role when we think about hype and how we treat hype as well. I'm doing a scenario workshop with some people in France in a month and I was talking to someone about it yesterday. And she asked, why don't you do a history exercise with them? They're already so engaged in the hype and as a result, these are the people that don't necessarily think so much about history. I think it's not just recognizing the importance of history for TA, but for the communities that you're working with in terms of thinking about the hype and trying to learn how to live well, or how to live as responsibly as possible, with hype.

*We should be more proactive in making sure that Responsible Innovation doesn't just fade away. Just because they decided to stop funding it under this name doesn't mean we have to give up on it!*

go of the term? Are we still using it? But I guess the question is then, how can we do it as responsibly as possible? Like how can we and how do we make sure that we're not just reinventing the wheel with each new buzzword?

#### Do you have any suggestions for that?

No, unfortunately, I don't have any particular solutions to offer. I just think it's an important conversation that should be taking place rather than waiting for the next buzzword to come along and then all jumping on that bandwagon. We need to be having these conversations within universities, between universities, and across other institutions and domains. It's certainly a common criticism within the RI community that we've failed to properly engage industrial partners sufficiently. I think we

decided to stop funding it under this name doesn't mean we have to just give up on it, right? We have to take responsibility to keep it going and to make sure that whatever the new buzzword is, we still make clear that these things are very much tied together – as I try to show with my extended histories of RI. We don't just abandon one program and move on to the next. I think that is important, like I said, I think what we can do is ensure that we have these kinds of conversations around how we make sure that we don't just start again from scratch each time.

#### From reflecting on RI's and TA's joint history – what would you say is the main takeaway for the TA community?

Huh, that's a big question. I've spent a lot of time thinking about histories that ha-

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# Book review: Tisch, Anita; Wischniewski, Sascha (2022): Sicherheit und Gesundheit in der digitalisierten Arbeitswelt

Eva-Maria Walker<sup>1</sup>, Linda Nierling<sup>\*,2</sup> 

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Eine der zentralen Fragen der aktuellen Arbeitsforschung ist die nach einer am Menschen orientierten Gestaltung der digitalen Transformation. Angesprochen sind damit Fragen, wie sich durch digitale Technologien die Organisation, aber auch die Bedingungen und Anforderungen an menschliche Arbeit verändern. Vor diesem Hintergrund hat die Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA) bereits im Jahr 2018 ein Schwerpunktprogramm zum Thema „Sicherheit und Gesundheit in der digitalen Arbeitswelt“ ins Leben gerufen mit dem Ziel, nicht nur eine empirische Bestandsaufnahme der Arbeitsfolgen digitaler Technologien vorzulegen, sondern auch eine kriterienbasierte Orientierung für die menschengerechte Gestaltung digitalisierter Arbeit zu entwickeln.

Mit vorliegendem Sammelband liegen nun umfangreiche Ergebnisse aus der ersten Phase des Schwerpunktprogramms vor, die auf Basis des sogenannten Tätigkeitsansatzes (Autor et al. 2003) eine an Berufsfeldern orientierte Evaluation der digitalen Transformation vornehmen, um darauf aufbauend Gestaltungsmöglichkeiten mit handlungsorientierender Kraft zu entwickeln.

## Wie lässt sich digitale Arbeit menschengerecht gestalten?

Der Sammelband gliedert sich entlang von fünf Themenblöcken: Da ist erstens die Frage nach den Kriterien menschengerechter Gestaltung von digitaler Arbeit und inwiefern etablierte Gestaltungskriterien weiterhin von Nutzen sind. So besitzen Kriterien wie Ganzheitlichkeit und Anforderungsvielfalt zwar Gültigkeit,

allerdings bedarf es auch der Neuentwicklung, um die spezifischen Herausforderungen der digitalen Transformation greifbar zu machen. Im zweiten thematischen Block wird der methodische Untersuchungsansatz vorgestellt. Zur Begründung des analytischen Rahmens wird zu Recht darauf verwiesen, dass die digitale Transformation nicht ganze Branchen oder Berufe verändert, sondern vielmehr schrittweise auf Tätigkeiten einwirkt. Die Tätigkeiten werden entlang ihres Arbeitsgegenstandes differenziert (Person, Information, Objekt) und zu vier Arbeitstätigkeitstypen gruppiert: personen-, informations- und objektbezogene (operative) Tätigkeiten sowie die (dispositive) Tätigkeit des Führens und Managens. Im dritten thematischen Block werden Risiken und Chancen für die vier Arbeitstätigkeitstypen in einem methodischen Dreischnitt evaluiert: Zunächst werden auf Basis der vom Bundesinstitut für Berufsbildung in Kooperation mit der BAuA durchgeführten Erwerbstätigenbefragung (2018) arbeitsbezogene Belastungen, Beanspruchungen und Arbeitsfolgen untersucht und anschließend mit der Befragung ‚Digitalisierung und Wandel der Beschäftigung‘ (2020) in Verbindung gebracht. Da durch die unterschiedlichen Datensätze keine Aussagen über Kausalitäten zwischen Technologieinsatz und Arbeitsbedingungen getroffen werden können, wird in einem dritten Schritt die Schnittstelle zwischen den Arbeitsbedingungen und der jeweiligen Verbreitung des Technologieinsatzes mit narrativen Zukunftsszenarien und einem systematischen Literaturüberblick komplettiert.

## Tätigkeitsspezifische Entwicklungen der Digitalisierung

Bei an Personen ausgerichteten Tätigkeiten wie ‚Menschen pflegen‘ und ‚Menschen kontrollieren‘ zeigt sich, dass die Arbeitstätigkeiten per se mit hohen Belastungen einhergehen, während verlässliche Daten zum Einsatz und zur Verbreitung von digitalen Technologien fehlen. Hier besteht Forschungsbedarf, um sowohl mit Blick auf ein beteiligungsorientiertes Vorgehen digitale Technologien in Arbeitskontexte einzubetten als auch den an Interaktion orientierten beruflichen Kern der Tätigkeiten zu erfahren. Im Feld der informationsbezogenen Tätigkeiten ist per se ein höherer Digitalisierungsgrad zu beobachten. Ent-

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Tisch, Anita; Wischniewski, Sascha (2022):

### Sicherheit und Gesundheit in der digitalisierten Arbeitswelt.

Kriterien für eine menschengerechte Gestaltung  
Baden-Baden: Nomos.

338 Seiten, 69,00 €,  
ISBN 9783848783519

sprechend werden Entwicklungstrends für den Arbeitsschutz in diesem Feld aufgegriffen, wie digitale Arbeitsmittel, virtuelle Arbeit, Veränderungen durch KI. Das Feld der objektbezogenen Tätigkeiten, wie Herstellen, Transportieren, Reinigen weist hingegen einen geringen Digitalisierungsgrad auf und ist noch immer durch hohe physische Arbeitsanforderungen gekennzeichnet. Der Einsatz digitaler Technologien zielt hier v. a. auf eine Entlastung. Im Tätigkeitsfeld ‚Führen und Managen‘ liegt der Schwerpunkt auf digitales Führen und Managen, das mit einer hohen Komplexität und zeitlichem Aufwand verbunden ist, womit eine höhere Arbeitsintensität einher geht. Als Zukunftsfeld wird der verstärkte KI-Einsatz in diesem Feld beschrieben.

Schlussfolgernd werden im vierten Block die Konsequenzen für die Ausdifferenzierung des Arbeitsschutzes diskutiert, v. a. mit Blick auf räumlich und zeitlich verteilte Arbeit sowie die neuen Anforderungen durch KI. Der letzte, fünfte thematische Block gibt erste empirische Ergebnisse zur Verbreitung von KI-Technologien am Arbeitsplatz wider und thematisiert einen ‚Digital divide‘ zwischen komplexen und einfachen Tätigkeiten, da der Einsatz von KI-Technologien bei komplexen Tätigkeiten den Handlungsspielraum erhöht, während er bei einfachen Tätigkeiten mit einer Verengung einher geht.

### Künftige Anforderungen durch KI

Der Band liefert mit Blick auf die digitale Transformation eine thematische Erweiterung zur bestehenden Debatte. Insbesondere die Erarbeitung von und Orientierung an Kriterien, die an einer normativen Gestaltung, d. h. eine am Wohl des Menschen orientierten digitalen Transformation der Arbeitswelt ausgerichtet sind, überzeugen. Schaut man auf den Diskussionstand der thematisch verwandten arbeitssoziologischen Forschung, so finden sich hier – neben der Frage um die Arbeitsfolgen der Digitalisierung – v. a. Fragen nach den branchen- und qualifikationsspezifischen Anwendungsfeldern digitaler Technologien, den Möglichkeiten der Regulierung und Arbeitsgestaltung sowie Fragen nach gesamtgesellschaftlichen Entwicklungsperspektiven (Buss et al. 2021; Hirsch-Kreinsen et al. 2018; Schrape 2021). Vorliegende Publikation steht sozusagen ‚über den Dingen‘ und wählt ein methodisches Design, das sich auf die Tätigkeitsebene konzentriert.

Die Bezugnahme auf Tätigkeiten ist einerseits methodisch innovativ, da auf diese Weise die konkrete Tätigkeit Gegenstand einer differenzierteren Analyse der digitalen Transformation wird. Andererseits birgt dieser Ansatz die Gefahr, dass mit Blick auf die zu entwickelnde Gestaltung strukturelle Faktoren wie bspw. branchenspezifische, organisationale, qualifikationsorientierte, aber auch arbeitspolitische Bedingungen notwendigerweise außen vor bleiben (Baethge-Kinsky et al. 2018). Mit Blick auf die gesellschaftlichen Herausforderungen der digitalen Transformation, wäre ein stärkerer Einbezug von aktuellen Entwicklungen und Problemlagen, wie prekäre Beschäftigungsverhältnisse, global verteilte Arbeit und Fachkräftemangel in sozialen Berufen, gerade mit Blick auf die normative Orientierung des Ansatzes, wünschenswert gewesen. Dies betrifft auch den

Einbezug von KI. So wird KI als neue Technologie zwar berücksichtigt, allerdings eher ‚traditionell‘ in bestehende Arbeitsstrukturen, v. a. mit Blick auf Entscheidungsunterstützung, integriert. Um auf rasante neue Entwicklungen, die mehr und mehr tätigkeitsübergreifend in Arbeitsprozesse Einzug halten, wie potenziell beispielsweise ‚large language models‘, zu reagieren, ist künftig sicher eine zukunftsorientierte Anpassung des tätigkeitsorientierten Ansatzes notwendig.

Im Band wird der Schluss formuliert, dass künftige Anforderungen an den Arbeitsschutz eine „engere Verknüpfung technischer und organisatorischer Arbeitsschutzstrukturen“ (S. 8) erfordern. Die Rezensierenden teilen diese Einschätzung: Diese Verzahnung ist sowohl auf Ebene des tätigkeitsbasierten Ansatzes und seiner Offenheit für künftige technologische Entwicklungen in ihrem gesellschaftlichen Kontext (s. o.), als auch mit Blick auf eine mögliche Verzahnung der zugrunde gelegten Datensätze ausgesprochen wichtig. Abschließend hätte man sich zudem einen zusammenführenden letzten Teil gewünscht – nicht zuletzt, um künftige digitale Herausforderungen und tätigkeitsübergreifende Erkenntnisse mit Blick auf zukunftsorientierte Gestaltungsnotwendigkeiten der digitalen Transformation für die Lesenden zusammenzufassen. Mit Blick auf diese Weiterführung der menschengerechten Gestaltung des Arbeitsschutzes sind wir nun also gespannt auf die Fortführung der Forschung im aktuellen Schwerpunktprogramm.

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## Meeting report: “Fair and decent work in the global economy?”. International Labour Process Conference, 2023, Glasgow, UK (hybrid)

Felix Gnisa\*<sup>1</sup> 

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The 41<sup>st</sup> International Labour Process Conference (ILPC) was held at the University of Strathclyde in Glasgow from April 12 to 14, 2023, with a focus on ‘Fair and decent work in the Global Economy.’ The conference is the annual gathering of sociologists of labour from the field of Labour Process Studies who investigate how social inequality and domination are reproduced in workplace realities. The ILPC is grouped around the Labour Process Theory (LPT), which emerged within Anglo-American sociology of work in the 1970s. This research program and its discussion at the ILPC offer enriching insights for the community of technology assessment (TA) on the genesis and impact of technology in the world of work.

### Labour Process Theory and technology assessment

Harry Braverman’s 1974 standard work *Labour and Monopoly Capital* established the Labour Process Debate with a study of labour in the US-American steel mills of Bethlehem Steel. In the heyday of industrial mass production, he looked at the standardized and sharply divided work of pig iron shippers and machinists and the hierarchical command relationships between management and workers. Braverman reconstructed the work organization, ostensibly solely oriented toward technical efficiency, as the result of corporate conflicts and social domination. Assembly lines, working rules and machine tools were shaped by a systematic conflict over wages and work performance between management and workers. In the centre of this struggle for each side lay the control over the labour process. For example,

Braverman and other researchers like David Noble showed that the development of numerically controlled (NC) machine tools was used specifically to assert the interests of management over workers. The ability of engineers to program machine movements deprived machinists of control over the quantity and pace of work and adjusted their output to the management’s specifications. At the same time, the introduction of the technology was repeatedly accompanied by sabotage, slowdowns, and work stoppages that reshaped the design of the NC-technology. These conflict-theoretic assumptions about the genesis of technology form the basis of the research agenda that guides the papers presented at ILPC.

For the TA community, LPT research provides some interesting stimuli, since from its onset it has deliberately discussed the genesis and effects of technology embedded in social conflicts. Over the past 40 years, the subject of research has changed from machine tools and assembly lines to computer-aided production planning systems in robotized factory floors, dialer software in call centres, virtual software development environments for IT experts and digital platform technologies that control the work of couriers and cab drivers. However, LPT-oriented research has always asked which latent contradicting interests or open conflicts between management and workers give rise to technology in the world of work and what effects this has on working conditions. In this respect, it offers promising starting points for TA, too, both with its social constructivist-conflict-theoretical understanding of technology and with its view on the effects of technology in the world of work.

### Industrial automation and digital platforms

The 41<sup>st</sup> ILPC placed its thematic focus on work in global value chains and the Global South. One conference stream concentrated on labour issues in agricultural and extractivist industries in the Global South. For example, Rama Salla Dient (University of Edinburgh) spoke about land grabbing in the wake of economic development strategies in Senegal, or Antonio Mitidiero Junior (Federal University of Paraíba) on the impact of flexible crops on land distribution in Brazil. In the stream on migrant mobility regimes, Samia Dinelacker (University of Onabrück) presented findings on the work of Taiwanese manufacturing workers in Indonesia and their resistance practices, some of which are based on solidarity networks in local subcultural heavy metal scenes.

Despite this strong focus on labour relations in the Global South, the conference also dealt in many aspects with technological change in the world of work. The debate about the impact of digital automation technologies on the skills of workers in industry shaped some of the contributions. Paaritosh Nath (Azim Premji University), for example, used quantitative labour market data to criticize the assumption that automation in the Indian automotive industry would lead to a higher demand for qualified workers. Instead, he said, technically skilled workers are facing fewer and fewer demanding jobs. This is because Industry 4.0 technologies would be used primarily to devalue labour.

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A particular focus was on the digital platform industry. In particular, the work of couriers on platforms such as Deliveroo and Lieferando or of cab drivers on Uber have already been intensively researched over the last ten years, guided by the LPT. Ethnographic methods and research more interested in informal conflicts celebrated their renaissance on this subject especially in German-speaking countries. As such platforms make employment very easy this enables low-threshold field access, which is probably a weighty reason for the inflation of research on the topic. This year again numerous contributions in different sessions dealt with the locally and temporally flexible algorithmic

partners in the transfer of research findings. By contrast, Jamie Woodcock (University of Essex), a representative of the younger LPT generation defended a strictly partisan approach to research as a solidarity science for workers and unions. This is because the analytical and methodological foundations of LPT, with its focus on social relations of domination, conflict and resistance, can only be sustained if one takes a critical view of social inequality and dominant labour regimes. Transferring this debate to the TA community could be equally fruitful. Ultimately, TA's pro-democratic impetus indicates that, above all, those who are negatively affected by technological change in a variety of ways

*The world of work is possibly the place where people not only come into contact most intensively with diverse technologies, but also are affected by technological change without any chance of democratic influence.*

management of digital platform work, its insecure employment relationships and informal and collective resistance practices of workers against digital labour regimes. A recurring question here was to what extent the production model on delivery platforms could be described as a digital update of Taylorism. Lorenzo Cini (University College Cork) for example, argued against this assumption in his contribution. Work on platforms, he emphasized, is less characterized by a clear separation of conception and execution, and instead systematically relies on the wayward contributions of couriers. Even the violation of work rules – for example, when ignoring route specifications – ultimately ensures the efficiency of the work processes. All in all, however, it can be said that LPT's research agenda at the time contributes little that is fundamentally new about platform work. After several years of fruitful research, the subject matter seems to have been well illuminated and current findings often only illustrate old findings.

### **On the partisanship of (technology) research**

A discussion of particular interest for the impact interests of the TA community unfolded in the stream 'Braverman and beyond', which shed light on the historical origins of LPT and its potentials for future research on work. One of the sessions focused on the question of how LPT research should relate to economic, political, and civil society actors as addressees and buyers of its findings. Paul Thompson (emeritus, University of Stirling) – a doyen of the research community from the early days of LPT who, by his own account, organized factory intervention to politicize workers in the 1970s in the aftermath of the student movement – argued for a neutral research practice that provides knowledge for multiple actors. In this respect, he saw both unions and management consultancies as potential practice

without being able to make their own decisions should be provided with knowledge and strengthened in their ability to act politically. If this assumption is followed, TA would also have to be moderately partial in its own research and consultancy.

### **Work and technology assessment**

In any case, for TA researchers interested in the social negotiation and consequences of technological change, the 2023 ILPC offered a rich reservoir of debates, illustrative cases and research desiderata. In addition to the focal points mentioned here, results were presented on the robotization of care work, labour in blockchain-based Decentralized Autonomous Organizations, or the digitalization of the construction sector. The world of work is possibly the place where people not only come into contact most intensively with diverse technologies, but also are affected by technological change without any chance of democratic influence. A stronger orientation of the TA community towards the sociology of work would hence be profitable. The next opportunity for doing this, at comparatively close geographic range, will be the 42<sup>nd</sup> ILPC, which will take place from April 03 to 05, 2024 in Göttingen and thus at one of the centres of German sociology of work.

### Further information

<https://www.ilpc.org.uk/>

## Meeting report: „Infrastrukturen der Zukunft: Wie kann TA anstehende Transformationen begleiten?“ Conference, 2023, Vienna, AT

Christoph Kehl\*<sup>1</sup> 

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Nach einer vierjährigen Pause (aus bekannten Gründen) konnte die diesjährige TA23 am 6. Juni 2023 wieder vor Ort in den Räumen der Österreichischen Akademie der Wissenschaften in der Mitte Wiens stattfinden. Das Thema der Konferenz – „Infrastrukturen der Zukunft“ – war angesichts dringend anstehender Transformationen hochaktuell und stieß bei den rund 100 Teilnehmenden auf großes Interesse. Was die Technikfolgenabschätzung (TA) zur zukunftsfähigen Gestaltung kritischer Versorgungssysteme beitragen kann, wurde in zwei Plenarvorträgen und neun Sessions (mit insgesamt 27 Vorträgen) aus unterschiedlichsten Perspektiven diskutiert. In den Vorträgen standen vor allem die durch die Energiewende herausgeforderten Energieinfrastrukturen und immer wieder das Thema Digitalisierung (oft auch in Kombination) im Fokus.

### Macht und Ohnmacht

In der ersten Keynote erörterte Stine Lomborg, Associate Professor im Department of Communication der Universität Kopenhagen, am Beispiel digitaler Plattformen, wie bestimmte Akteure infrastrukturelle Macht erlangen und wirksam werden lassen. Es ist kein Geheimnis, dass digitale Plattformen, die aus unserem Alltag nicht mehr wegzudenken sind, von einer Handvoll amerikanischer Big-Tech-Unternehmen kontrolliert werden. Doch welcher Art ist die Kontrolle, die diese Unternehmen ausüben? Lomborg plädierte in ihrem Vortrag dafür, zur Beantwortung dieser Frage den Blick stärker auf die materielle Backend-Infrastruktur digitaler Kommunikationssysteme zu richten. Wer diese physischen Infrastrukturen kontrolliere, beherrsche auch die digitalen Ökosysteme. Macht werde ausgeübt durch digita-

les Tracking oder indem die in den Stores angebotenen Apps bestimmte technische Anforderungen erfüllen müssen. Das sei besonders vor dem Hintergrund kritisch zu sehen, dass etwa in Dänemark öffentliche Sozial- oder Bildungsleistungen zunehmend über mobile Apps zugänglich gemacht würden, wodurch staatliche Wohlfahrtsleistungen in eine verstärkte Abhängigkeit von großen Digitalunternehmen geraten. Es sei entscheidend, so Lomborg, solche Praktiken der technisch-materiellen Machtausübung und die zugrundeliegenden Optimierungsvisionen empirisch zu beleuchten und kritisch zu reflektieren – und nicht zuletzt, sie Politiker\*innen bewusst zu machen, die in der Mehrheit überzeugt davon seien, dass Partnerschaften mit Privatunternehmen für datengesteuerte Innovationen unerlässlich seien.

Im zweiten, online gehaltenen Eröffnungsvortrag machte Cordula Kropp, Direktorin des Zentrums für Interdisziplinäre Risiko- und Innovationsforschung der Universität Stuttgart (ZIRIUS), die Beharrungskräfte bestehender Infrastrukturen zum Thema. Als Weichensteller prägten sie gesellschaftliche Verhältnisse, und zwar auf eine Art und Weise, die nicht immer dem langfristigen Gemeinwohl diene. Kropp ging in ihrem Vortrag hauptsächlich auf das Beispiel der nach wie vor massiv auf den motorisierten Individualverkehr ausgerichteten Verkehrssysteme ein. Woran liegt es, dass die Verkehrswende bislang nicht in Gang gekommen ist? Auf mangelndes Wissen oder ungelöste technische Fragen sei das nicht zurückzuführen. Vielmehr diagnostizierte Kropp, ähnlich wie Lomborg, in der Infrastrukturpolitik eine technikzentrierte Optimierungslogik, die den Weg zur Klimaneutralität mittels Elektrifizierung und Digitalisierung erreichen möchte – dabei jedoch im Endeffekt einen wachsenden Ressourcenverbrauch verursache und die bestehenden infrastrukturellen Rahmenbedingungen zementiere.

Eine etwas ernüchternde Botschaft des Vortrags lautete, dass sich lokale Gestaltungsansätze erschöpften, solange sie nur auf diskursiver Ebene wirken und keine nachhaltigen Veränderungen auf institutioneller und struktureller Ebene bewirken. Um die Beharrungskraft bestehender Infrastrukturen zu durchbrechen, sei es notwendig, auch an den großen Rädern der Infrastrukturplanung zu drehen und institutionell koordinierte Veränderungen auf allen Ebenen anzustoßen. Hoffnungsvoller stimmte letztlich Cordula Kropps Plädoyer für eine mutige TA, die auf die blinden Flecken einer wachstums- und effizienzorientierten Infrastrukturpolitik hinweist und die sozialökologische Versorgungsgerechtigkeit offensiv zum Thema macht.

### Unsichtbares sichtbar machen

Die in den Keynotes aufgeworfenen Fragen wurden in den nachfolgenden Vorträgen an verschiedenen Stellen und aus unterschiedlichen Perspektiven aufgegriffen. Die infrastrukturelle Macht großer Datenkonzerne war in der Session zu „Digitalen Infrastrukturen“ ein zentraler Bezugspunkt. Der europäischen Versuch, mit Gaia-X ein eigenes Cloud-Ökosystem aufzubauen und sich damit aus der Abhängigkeit von Big-Tech-Plattformen zu lösen, war Thema des Beitrags von Andreas Baur (Internationales Zentrum für Ethik in den Wissenschaften der Universität

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Tübingen). Im Zentrum des Vortrags stand das Dilemma, dass auch Gaia-X mangels Alternativen nicht darum herumkommt, auf die großen Cloudanbieter nichteuropäischer Herkunft zu bauen. Wie lässt sich „mit amerikanischen Clouds nach europäischen Sternen greifen“? Im Falle von Gaia-X werde versucht, die Konformität mit europäischen Werten und Regeln u. a. direkt auf der technischen Prozessebene („Compliance by Design“) zu garantieren und digitale Souveränität so in die Cloud-Infrastruktur zu übertragen. Offensichtlich lässt sich infrastrukturelle Macht auch für europäische Ziele nutzbar machen.

Neben Cloud-Infrastrukturen stehen auch Such-Infrastrukturen bereits seit Längerem im Fokus der EU-Technologiepoli-

Infrastrukturen anders als Einzeltechnologien u. a. konstitutiv durch ihre Verborgenheit im Gebrauch auszeichneten, was den infrastrukturellen Wandel zu einer besonderen Herausforderung für die TA macht. Wie lässt sich etwas gestalten, was weitgehend unsichtbar bleibt? Ihr Vorschlag: Visibilität herstellen, weniger durch Folgenabschätzung, sondern durch Reflexion jener weitgehend unreflektiert bleibenden Gebrauchspraktiken.

Dazwischen diagnostizierte Claus Seibt (Hochschule für Wirtschaft und Umwelt Nürtingen-Geislingen) für die TA eine gewisse Infrastrukturbblindheit, die er auf eine dogmatische Fokussierung auf Innovationsprozesse zurückführte. Dass Innovationen in Infrastrukturen eingebettet und diese dafür ggf. umge-

*Hoffnungsvoll stimmte das Plädoyer für eine mutige TA,  
die auf die blinden Flecken einer wachstums- und effizienzorientierten  
Infrastrukturpolitik hinweist.*

itik, wenn es darum geht, sich aus der Dominanz US-amerikanischer Technologiekonzerne zu lösen. Astrid Mager (ITA Wien) ging auf europäische Bemühungen ein, der Marktmacht Googles eine eigene Suchmaschinenlösung entgegenzustellen. Nachdem die Idee einer eigenen europäischen Großsuchmaschine (mit entsprechender Infrastruktur) als gescheitert gelten kann, stellte sie drei kleinere, alternative Suchmaschinenprojekte (Startpage, Open Web Index, YaCy) und deren Vorstellungen eines spezifisch europäischen Gegenentwurfs zu Google & Co. vor. Ihr Beitrag mündete in der These, dass die technologische Diversität, die diese Bottom-Up-Ansätze verkörpern, besser mit der Idee eines pluralistischen Europas vereinbar sei als ein europäisches Google-Pendant.

In der Session „TA der Infrastrukturen“ wurden allgemeinere Überlegungen zur Rolle der TA vorgetragen, die jedoch gut an die Diagnose von Cordula Kropf zu den großen Beharrungskräften infrastruktureller Systeme anschlossen. Armin Grunwald (ITAS/KIT) machte in seinem Beitrag auf die gespaltene Beschaffenheit moderner Infrastruktursysteme aufmerksam. Bürger\*innen bekämen üblicherweise nur die „Hochglanzseite“ zu sehen, über die infrastrukturelle Dienstleistungen bereitgestellt würden. Verborgen blieben die dahinter liegenden „schmutzigen Hinterhöfe“ – die dunklen Kanalisationssysteme und blutigen Schlachthöfe. Die Hauptaufgabe der TA sieht Grunwald darin, das zunehmend unübersichtliche Hinterland der Infrastrukturen zu erkunden, die dort ablaufenden Prozesse und damit verbundenen Auswirkungen in das gesellschaftliche Bewusstsein zu rücken – eine „TA des Verborgenen“ also. Nur so ließen sich Abhängigkeiten durchbrechen und letztlich auch Transformationsprozesse gestalten. Sehr ähnliche Überlegungen wurden von der Philosophin Martina Philippi (Ruhr-Universität Bochum) im dritten Vortrag der Session präsentiert, wenn auch aus einer erkenntnistheoretischen Perspektive. Sie wies darauf hin, dass sich

baut werden müssen, werde in vielen TA-Studien inzwischen ausgeblendet. Aus eigenen Erfahrungen zur Transformation von Mobilitätssystemen schöpfend, plädierte er für eine „TA der Infrastruktur“, die den erforderlichen infrastrukturellen Umbau wieder stärker zum Thema macht.

#### Ausblick

Die zukunftsfähige Gestaltung der Infrastrukturen steht aktuell vor etlichen spannungsreichen Herausforderungen: Erforderlich ist der klimagerechte Umbau der Versorgungssysteme, wobei Stabilität und Sicherheit gewahrt bleiben müssen. Die fortschreitende Digitalisierung bietet hierbei Chancen, erhöht aber auch den Vernetzungsgrad der Systeme und damit die Ausfallrisiken. Dabei ist die Transformation im laufenden Betrieb vor allem auch ein Governanceproblem, denn Infrastrukturen entziehen sich als weit verzweigte soziotechnische Systeme einer direkten Steuerung – Verantwortlichkeiten und Machtverhältnisse bleiben in der Regel intransparent (wie die Systeme selbst). Der Tag in Wien warf vielfältige Schlaglichter auf die damit verbundenen Probleme und mögliche Lösungsbeiträge der TA: von der Folgenabschätzung über ein Resilienzmonitoring bis hin zu partizipativen Gestaltungsansätzen. Klar wurde aber auch, dass sich die TA noch vielen offenen Fragen gegenübersteht – Stoff für weitere Konferenzen gibt es allemal.

#### Weitere Informationen

<https://www.oeaw.ac.at/ita/veranstaltungen/vergangene-veranstaltungen/konferenzen/ta23-konferenz>



## Meeting report: „Data Sharing – Datenkapitalismus by Default?“. Conference, 2023, Berlin, DE

Murat Karaboga<sup>\*1</sup> , Greta Runge<sup>1</sup> , Frederik Metzger<sup>1</sup> 

Das Teilen von Daten (data sharing) ist notwendiger Bestandteil jeder Gesellschaft. Es ist die Grundlage gemeinsamer Kommunikation und Interaktion. Zwei entscheidende digitalpolitische Fragen unserer Zeit sind, ob und inwiefern das Teilen von Daten freiwillig erfolgen soll und wie die Regulierung dessen aussehen muss, damit das Datenteilen dem Gemeinwohl und nicht wenigen Partikularinteressen – vor allem denen der internationalen Konzerne – dient. Diese und verwandte Fragen standen im Mittelpunkt der diesjährigen Präsenz-Tagung der Plattform Privatheit<sup>1</sup> am 5. und 6. Oktober mit rund 150 Teilnehmenden. Die Moderation durch Barbara Ferrarese und Miriam Janke und die graphische Übersetzung der Tagungsinhalte via ‚graphic recording‘ von Magdalena Vollmer rahmten die Jahreskonferenz im Umweltforum in Berlin.

### Dynamik der Macht

Die Antworten auf die Kernfragen lieferten über die Konferenztage ein gemischtes Bild. Paul Nemitz (EU-Kommission; Generaldirektion Justiz und Verbraucherschutz) etwa, erörterte in seiner Keynote zur ‚praktischen Konkordanz und Kohärenz von Individualrechten und öffentlichem Interesse im EU-Recht der persönlichen Daten‘, wie der Datenkapitalismus die Dynamik von Macht und Profit verstärkt. Die Menschen, deren Daten den großen Plattformbetreibern als Ressource dienen, würden durch die bestehende Ungleichheit zunehmend zu passiven Datenlieferanten, die Plattformen hingegen zunehmend ertrags- und einflussreicher. Die daraus resultierende Machtkon-

zentration sei nicht nur schlecht für die Bürger:innen, sondern auch für den Markt und die Demokratie. Um diesen Tendenzen entgegenzuwirken, bedürfe es mehr europäischen Selbstbewusstseins: Selbstbewusstsein in die europäische Innovationsfähigkeit und in die Fähigkeit, Machtzentren auch wieder aufzulösen. Eben das sei, was die EU-Kommission mit ihren zahlreichen Regulierungsinitiativen bezwecke. Die erste Säule sei die Einhegung bestehender Plattformmacht mittels ‚Digital Markets Act‘ und ‚Digital Services Act‘, während in der zweiten Säule mittels ‚Data Act‘ (DA) und ‚Data Governance Act‘ (DGA) neue Innovationen ermöglicht werden sollen. Im Hinblick auf den Nutzen des DGA und des ebenfalls verhandelten ‚Artificial Intelligence Acts‘ äußerte sich Nemitz überraschend skeptisch: Ersterer sei ein Papiertiger während dem Regulierungsansatz für künstliche Intelligenz aufgrund des Fehlens von Klagerechten ein Durchsetzungsdefizit drohe. Die kritische Publikumsfrage danach, ob denn die EU mit dem ‚Europäischen Raum für Gesundheitsdaten‘ (EHDS, welcher das Teilen von Daten auch ohne vorherige Einwilligung der Betroffenen erlauben möchte) nicht dasselbe anstrebe, was GAFAM (also die größten Technologieunternehmen der Welt) bereits täten, ließ dann auch die Bruchlinien innerhalb der EU-Kommission deutlich werden: Verbraucherschutz- und grundrechtsorientierte Kommissionsteile, denen Paul Nemitz zugehörig ist, können diese nur insoweit vorantreiben wie es die politischen Kräfteverhältnisse vis-à-vis der marktorientierten Teile der Kommission und im EU-Institutionengefüge zwischen Kommission, Parlament, Europäischem- und Ministerrat letztlich zulassen.

### Datenerhebung im Kontext des Gemeinwohlinteresses

Der zweite Keynote-Sprecher, Ulrich Kelber (Bundesbeauftragter für den Datenschutz und die Informationsfreiheit, BfDI), diskutierte in seiner Keynote ‚The winner takes it all? Selbstbestimmung und Fairness beim Teilen von Daten‘ die Grundsatzfrage nach der Vereinbarkeit von Verarbeitungsinteressen mit dem individuellen Grundrecht auf Datenschutz. Seine Antwort auf die Frage nach der angemessenen Balance zeigte, dass offenbar der oberste deutsche Datenschützer in seinem Bemühen, Datenschutz mit Innovationen und Datennutzung zu vereinbaren, durchaus kompromissbereiter ist als frühere BfDIs. Nach der Kritik am unternehmerischen Streben zur Maximierung von Partikularinteressen bezeichnete Kelber Gesundheit und Sicherheit als zwei Bereiche, in denen ein Gemeinwohlinteresse an personenbezogenen Daten vorhanden sei. Prägnant auf den Punkt brachte er es mit dem Ausspruch: „Datenteilen ist dann gut, wenn es Wohlstand für viele bringt.“ Diese Formel zog prompt die Kritik daran an, Wohlstand für viele und nicht für alle Menschen zu fordern. Aus dem Publikum kam außerdem die Frage, weshalb er die im Kontext des EHDS vorgesehene Aushebelung der informationellen Selbstbestimmung nicht kritisieren. Die Frage blieb zwar unbeantwortet, in seiner Rede wurde jedoch klar, dass im Gesundheitsbereich die

<sup>1</sup> Die ‚Plattform Privatheit‘ geht aus dem ‚Forum Privatheit‘ hervor. Sie bildet seit 2023 den vom BMBF geförderten Forschungsverbund für verschiedene interdisziplinäre Vorhaben im Kontext von Privatheit und Selbstbestimmung.

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Priorität offenbar aufgrund des dort attestierten Gemeinwohlinteresses nunmehr auf dem Datenteilen und nicht dem Datenschutz liegt.

### **EU: zwischen Handlungsmacht und Intervention**

Einen innovationsorientierten Ansatz diskutierte auch Astrid Mager (Institut für Technikfolgen-Abschätzung der Österreichischen Akademie der Wissenschaften) in ihrer Keynote ‚Europäische Suche? Vom Datenkapitalismus zur Suchmaschinen-Diversität‘. Denn frühere Bemühungen der EU um technologische Souveränität hätten zwar nicht zu den anvisierten Zielen geführt (etwa dem Aufbau einer europäischen Suchmaschine),

gitalpolitik, die sich von einem nachhaltigen Commitment aller Akteure über faire Datenverteilung bis hin zum Schutz demokratischer Werte und Stärkung der Rechte des Individuums erstrecken. Dass derzeit aufgrund der politischen Unterstützung günstige Bedingungen zur Einrichtung von Datenräumen herrschen, war eine der Erkenntnisse des Vortrags von Abel Reiberg (acatech). In der Diskussion wurden aber auch Machtfragen in der Regulierung von Datenräumen thematisiert. Trotz der bestehenden Steuerungsversuche bezüglich gerechter Datenraumstrukturen, so Reiberg, müsse die Gefahr der Machtkonzentration ernst genommen und besser adressiert werden. Als eine Art Generalresümee der gesamten Veranstaltung diene schließlich

*Es bedarf mehr Selbstbewusstseins in die europäische Innovationsfähigkeit und in die Fähigkeit, Machtzentren auch wieder aufzulösen. (Paul Nemitz)*

jedoch andere Innovationen befördert. Dies verdeutliche, dass Europa selbst auf Technologiegebieten, die als verlorener Posten gelten, noch immer Handlungsmacht habe und diese auch nutzen solle. Dazu bedarf es laut Mager aber Interventionen: Die EU leide – trotz starker Rhetorik – an einer brüchigen, nationalstaatlich fragmentierten Praxis. Mehr Langzeitfinanzierung und ‚slow scaling‘ seien geeignete Mittel, damit sie sich nicht vor raschen Technologieentwicklungen hertreiben lasse. Zudem liege die besondere Stärke im Bereich dezentraler föderaler Strukturen und diese Stärke müsse mehr auf die digitale Welt übertragen werden, indem z. B. offene (Daten-)Strukturen und datentreuhänderische Bemühungen gefördert werden – individualrechtlichen Datenschutz sah Mager als eher wenig hilfreich an.

Die von Nemitz vertretene pessimistische Perspektive auf den DGA spiegelte sich auch in zwei Vorträgen des Panels zu Datentreuhändern wider. Hanna Püschels (TU Dortmund) empirische Umfrage zeigte eine geringe Nutzungsbereitschaft für Datentreuhänder auf Seiten der Bevölkerung. In Paul Johannes' (Uni Kassel) Vortrag wurde die enorme Komplexität der EU-Regulierung zu Datenvermittlungsdiensten und Datengenossenschaften deutlich. Diese Unübersichtlichkeit, resümierte Johannes, drohe das Potential des DGA zu ersticken. Die Gegenperspektive nahm Bernd Rauch (Fraunhofer IESE) ein. Datentreuhänder, so seine Sicht, können durchaus zu einem vertrauenswürdigen Datenaustausch beitragen, sie müssten allerdings auf passende Anwendungsfälle abgestimmt werden; Aufbrechen von Datensilos sowie Daten zur Verfügung stellen allein sei unzureichend.

### **Fairness, Recht und Regulierung**

Im Panel zu Datenräumen definierte Stefanie Fuchsloch (Nationale Forschungsdateninfrastruktur e. V.) aus der Perspektive eines digitalen Infrastrukturbetreibers drei Wünsche an die Di-

der Vortrag von Oliver Vettermann (Karlsruher Institut für Technologie). Er kritisierte Datensouveränität als Leerformel, Forschungsdatenräume als menschenleer und zeigte auf, dass in den letzten Jahren der Mensch zunehmend aus dem Mittelpunkt der digitalpolitischen Debatte gerückt sei und nunmehr ökonomische Interessen im Zentrum stünden, wie in den Debatten um DGA und DA deutlich werde.

Am Ende der Konferenz war einerseits klar, dass Datenteilen dem Gemeinwohl dienen soll und nicht Partikularinteressen. Andererseits zeigten sich die Referent:innen insgesamt doch sehr offen für eine innovationsorientierte Perspektive, die Datenschutz dem Gemeinwohlinteresse zuordnet.

Weitere Informationen

[www.forum-privatheit.de](http://www.forum-privatheit.de)

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## TATuP

33/1 (2024) will be published in March 2024 with the Special topic

### “AI for decision support”

Public discussions about artificial intelligence (AI) often feature extreme scenarios in which AI systems either subjugate humanity or solve all of humanity's pressing problems – from climate change to combating pandemics. On this background the next TATuP Special topic asks: What are possible futures, social impacts, regulatory options, ethical conundrums and agency constellations? How and to what extent might AI systems be used for decision support in the future? Which social impacts will AI decision support systems have? What are the specific challenges related to the regulation of AI for decision making? And what is the relationship between the common good and individual rights?

Special topic editors are Diana Schneider (Fraunhofer Institute for Systems and Innovation Research ISI, Competence Center Emerging Technologies) and Karsten Weber (Institute for Social Research and Technology Assessment, OTH Regensburg).

### THANK YOU TO ALL REVIEWERS

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### CONSTANZE SCHERZ HAS LEFT THE EDITORIAL OFFICE

After 15 years as managing editor and, since 2018, as academic editor, Constanze Scherz has left the editorial office in order to dedicate more time to her tasks as deputy head of ITAS/KIT. She initiated TATuP's relaunch as a peer-reviewed journal in 2017. Thanks for everything, Constanze!

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