CULTIVATED MEAT: A HYPED TECHNOLOGY NEGLECTED BY (GLOBAL) TA?

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1st global TA conference (ETAC6)

Session 5.1 Hype Assessment I

PRISM•LT

Radboud Universiteit

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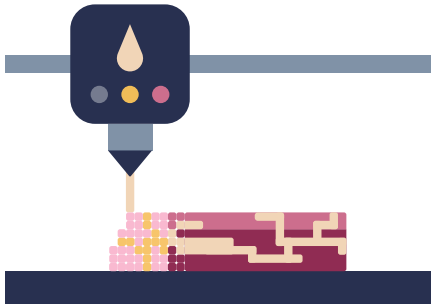
European Innovation Council

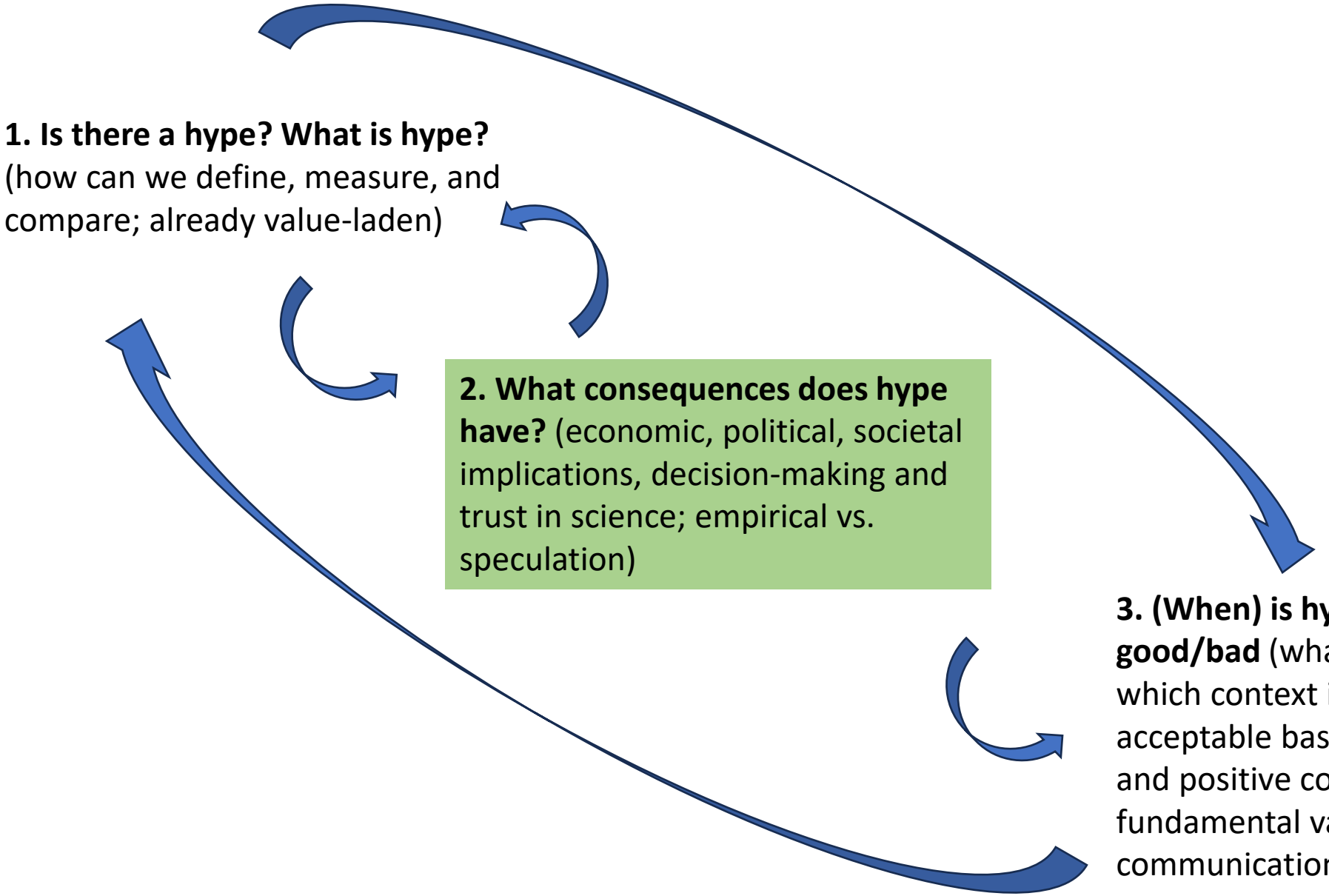
Cultivated meat (CM)/Agenda

- Lab-grown, in vitro, cultured, clean, …
- animal cells grown in bioreactors, resembling minced meat
- proof of concept, but scaling-up and affordable prices challenging
- potentially more sustainable in several dimensions



Complex tissue manufacturing using engineered living materials – PRISM-LT

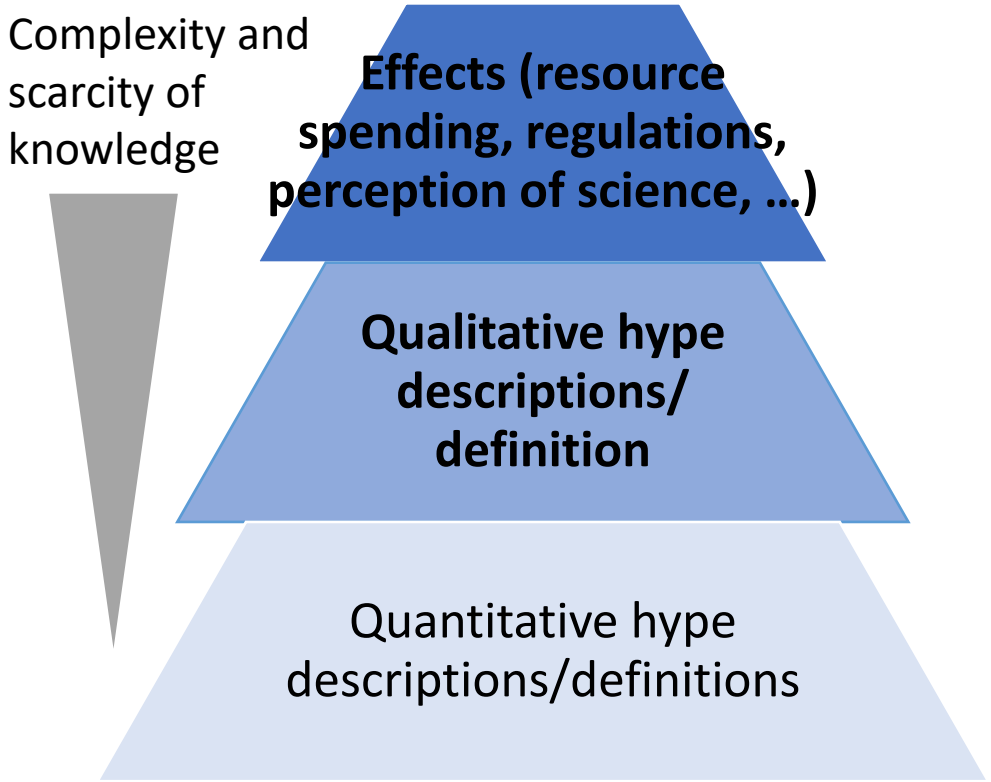
- **Investigation of consequences of hype**
- **Media analysis of news articles and online comments (GER/NL, 2020-2023/2025)**
- **(Global) TA and cultivated meat (hype)**

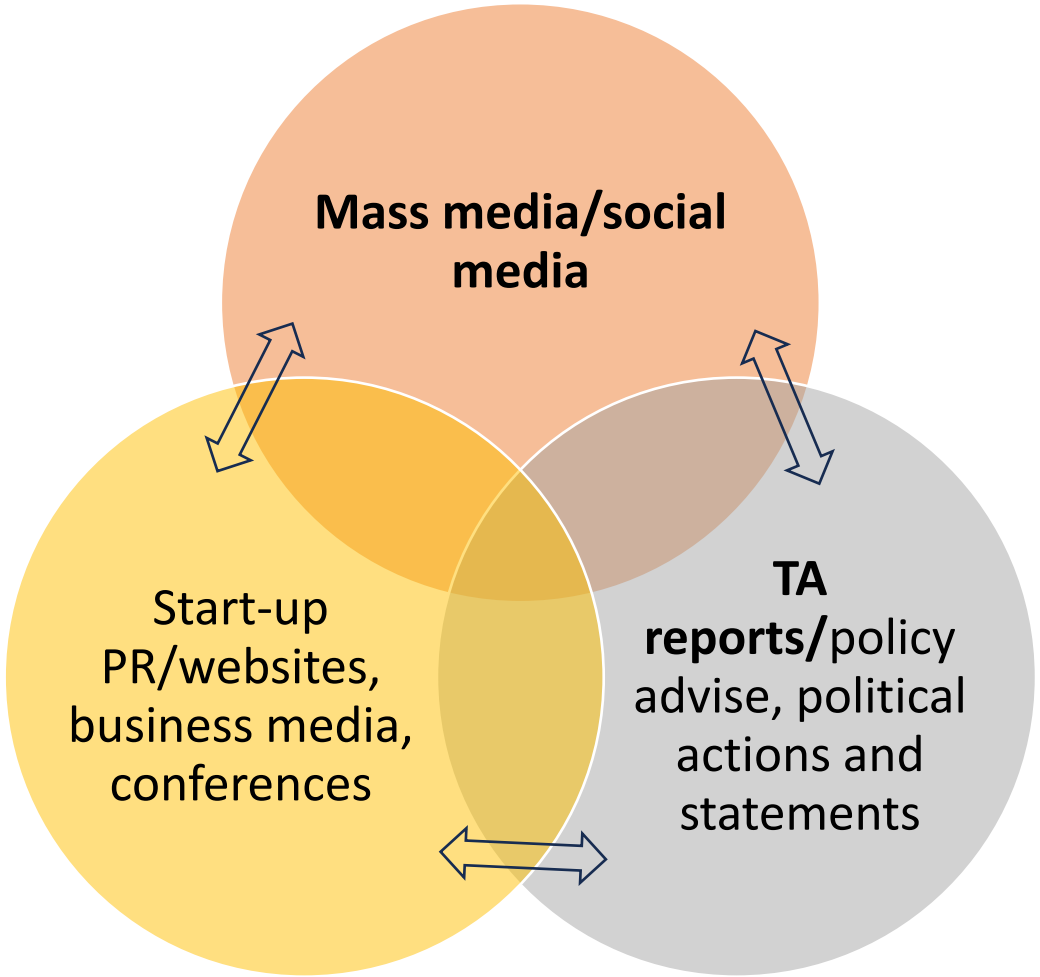


1. Is there a hype? What is hype? (how can we define, measure, and compare; already value-laden)

2. What consequences does hype have? (economic, political, societal implications, decision-making and trust in science; empirical vs. speculation)

3. (When) is hype and promising good/bad (what kind of hype in which context is ethically acceptable based on the negative and positive consequences, or fundamental values of science communication)


Complexity and scarcity of knowledge
Effects (resource spending, regulations, perception of science, …)
Qualitative hype descriptions/ definition
Quantitative hype descriptions/definitions

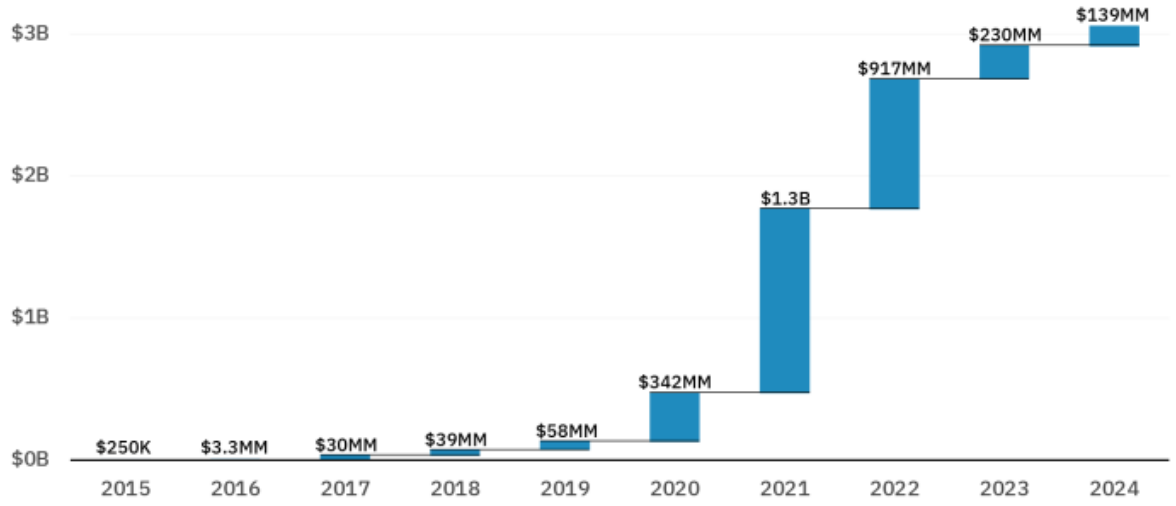

Mass media/social media
Start-up PR/websites, business media, conferences
TA reports/policy advise, political actions and statements

Obvious hype signs and effects 1

- Economy/private investments

Figure 3: Cumulative and annual investment in privately held cultivated companies

2015-2024



Source: GFI analysis of data from Net Zero Insights. Note: Aggregated data has not been reviewed by Net Zero Insights analysts.

https://gfi.org/wp-content/uploads/2025/04/2024_State-of-the-Industry_Cultivated-GFI24005.pdf

Annually 55B needed between 2024 and 2050 to realise full potential **(5B EU)**

https://gfieurope.org/de/blog/marktpotenzial-kultiviertes-fleisch/

Obvious hype signs and effects 2

Attempts to ban cultivated meat in Italy (successful)/several US states (Florida/Alabama successful), Romania, Hungary

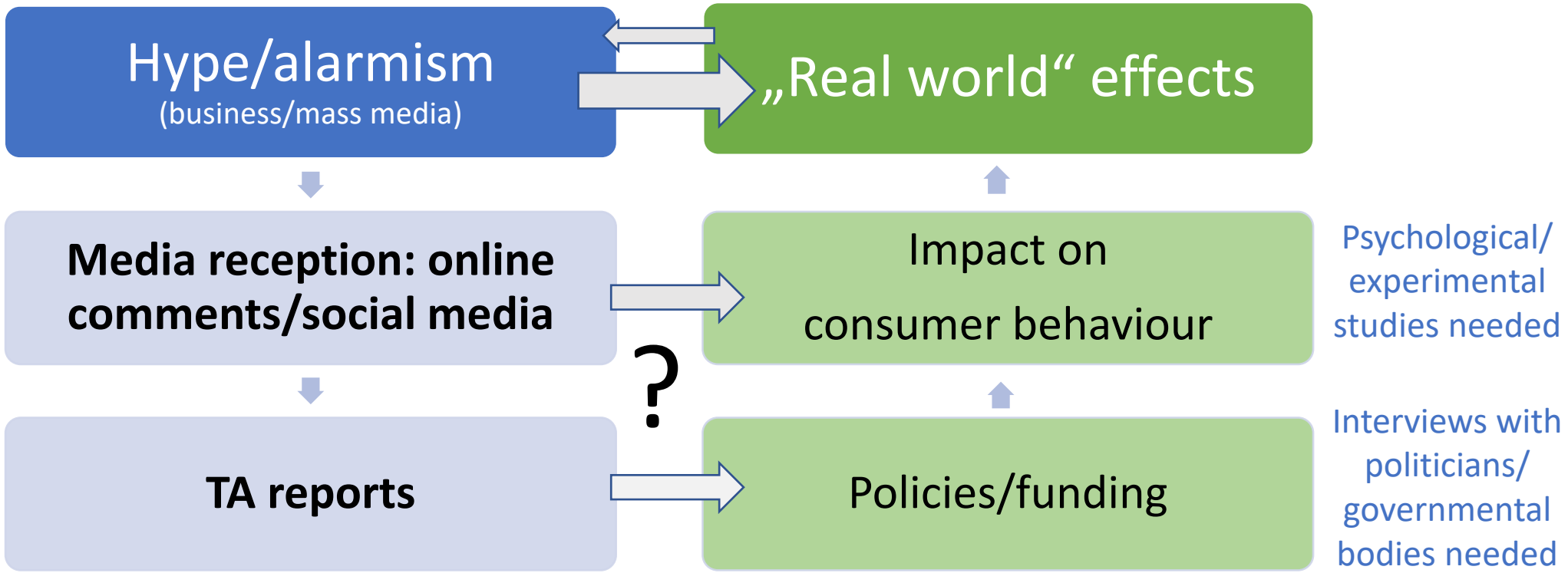
Spread of misinformation by right-populist politicians and meat industry

- Economic rationale: fear of the conventional meat lobby to lose market share
- Political rationale/"culture wars": hype as an opportunity and trigger for politicians, parts of the general public, and industry (explicit or implicit critique of conventional meat industry and eating habits not acceptable)→misuse of the topic to polarize and win voters
- Arguments reported/cited in mass media: "defense of Italian tradition", health risks, "Italy is the world's first country safe from the social and economic risks of synthetic food"

https://eating-better.org/news-and-reports/news/truth-lies-and-culture-wars-the-misinformation-we-face-in-pushing-for-a-sustainable-food-system/

https://qz.com/why-italys-parliament-banned-lab-grown-meat-1851032438

Less obvious hype effects: Aims and limitations



Understanding the Problem of “Hype”: Exaggeration, Values, and Trust in Science. Kristen Intemann. Canadian Journal of Philosophy (2022), 52: 3, 279–294. doi:10.1017/can.2020.45

Empirical insights from a media analysis: Overpromising and hype in news articles

(GER/NL, 2020-2023, n=200)

CLARITY (when and what)

(overpromising dimensions, see Gaillard et al. 2023)

Vagueness about the product characteristics

- regarding type of meat (beef, pork, chicken, steak/minced, hybrid with plant material)

(neglecting) CONTEXT

(see also Intemann 2022)

[CM has the] potential *to reduce agricultural greenhouse gas emissions by 78 to 96 per cent, use **99 per cent less land** and 82 to 96 per cent less water* (Business Insider, 2021)

- Nutrient needs?
- Dependency **on type of energy source**

(neglecting) COMPLEXITY (biological and infrastructure needs)

DECISIVENESS (how certain/likely)

Decisive exaggerations

- High market shares and short-term product launches ("disruption", "revolution", see Brown/Michael 2003)
- "You can already print a beef steak"

Gaillard et al. (2023) https://doi.org/10.14512/tatup.32.3.10
N. Brown,M.Michael, A sociology of expectations: retrospecting prospects and prospecting retrospects, Technol. Anal. Strateg. 15 (1) (2003) 3–18.

Lack of alternative visions/framings

technology-centred vision

https://geneticliteracyproject.org/wp-content/uploads/elementor/thumbs/3d-printing-of-meat-pe4w39jhnnuwqrwoord4f3wm7ks2j57w72667f8vhq.jpg

Böhm, I., Ferrari, A. & Woll, S. Visions of In Vitro Meat among Experts and Stakeholders. *Nanoethics* **12**, 211–224 (2018). https://doi.org/10.1007/s11569-018-0330-0

broader, CM-centred visions

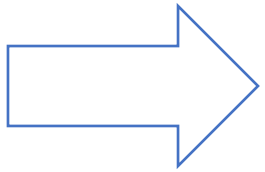
https://bistro-invitro.com/en/menu/

- **lack of comparison** with other protein alternatives
- lack of visions of a transformation of the food system with CM as **one of several innovations**, circular economy approaches, …
- **food security** and sustainability framing: “people will always eat meat”
- CM is **the sustainable option**, as other protein alternatives are not an option

Media hype

?

Public perception



Consumer behaviour

(dietary habits, willingness to buy CM)

Tracing effects of media hype on public perceptions of CM

Correlation of public survey results (with heterogenous methodology!) and hype signs/trends (need to be defined, for example, as volume of investments)

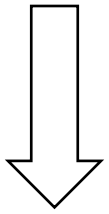
Correlation of online attitudes and hype signs/trends (problem: could be very dependent on the specific media article that is commented online)

Associations of content of articles/videos with readers`/commenters` attitudes (problem: did readers actually read (only this)the article?)

Qualitative signs: uncritical public attitudes towards overpromises (which could lead to disappointment and a loss of trust in science in the long run)

Qualitative signs: public concerns which seem to be fueled by hype/alarmism (as they refer to clearly defined overpromises)

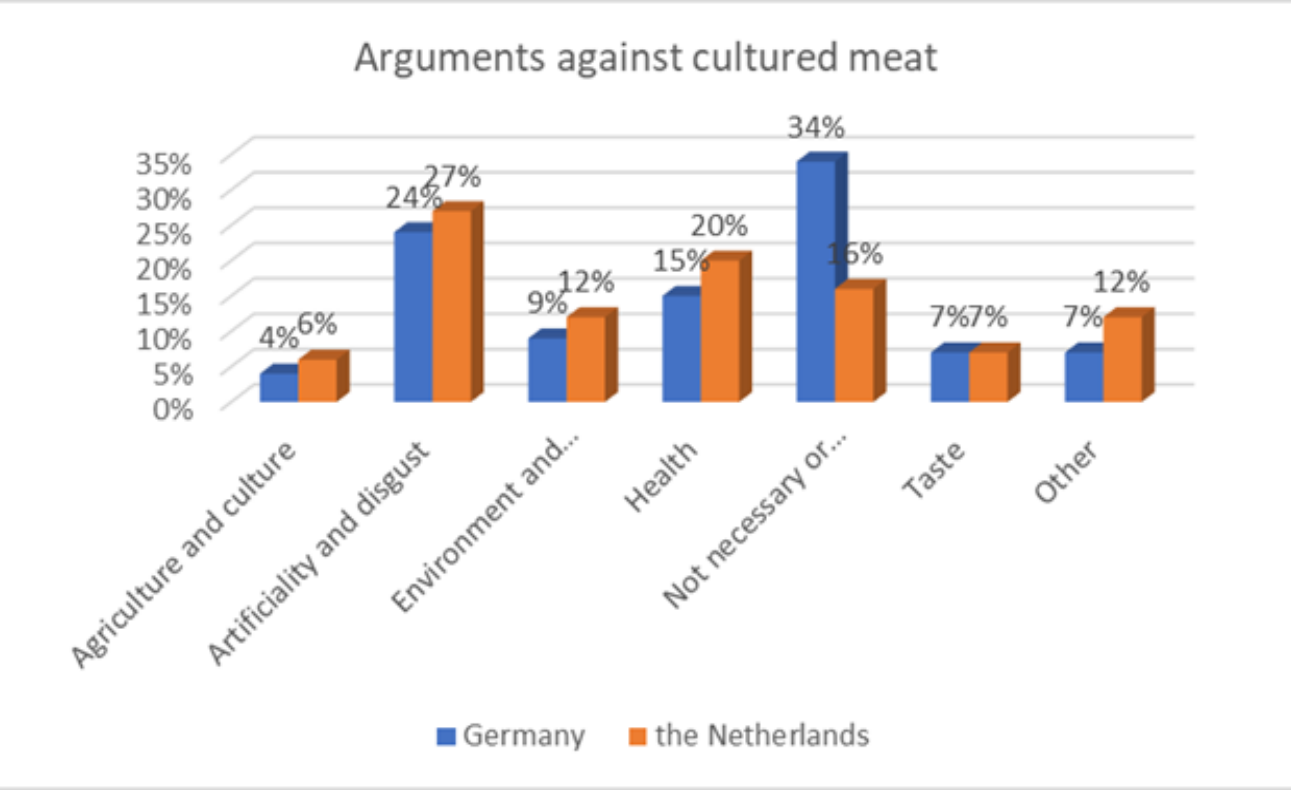
Interventional studies: show effects, but only for simple questions, such as risk perceptions



Concerns and skepticism in online comments

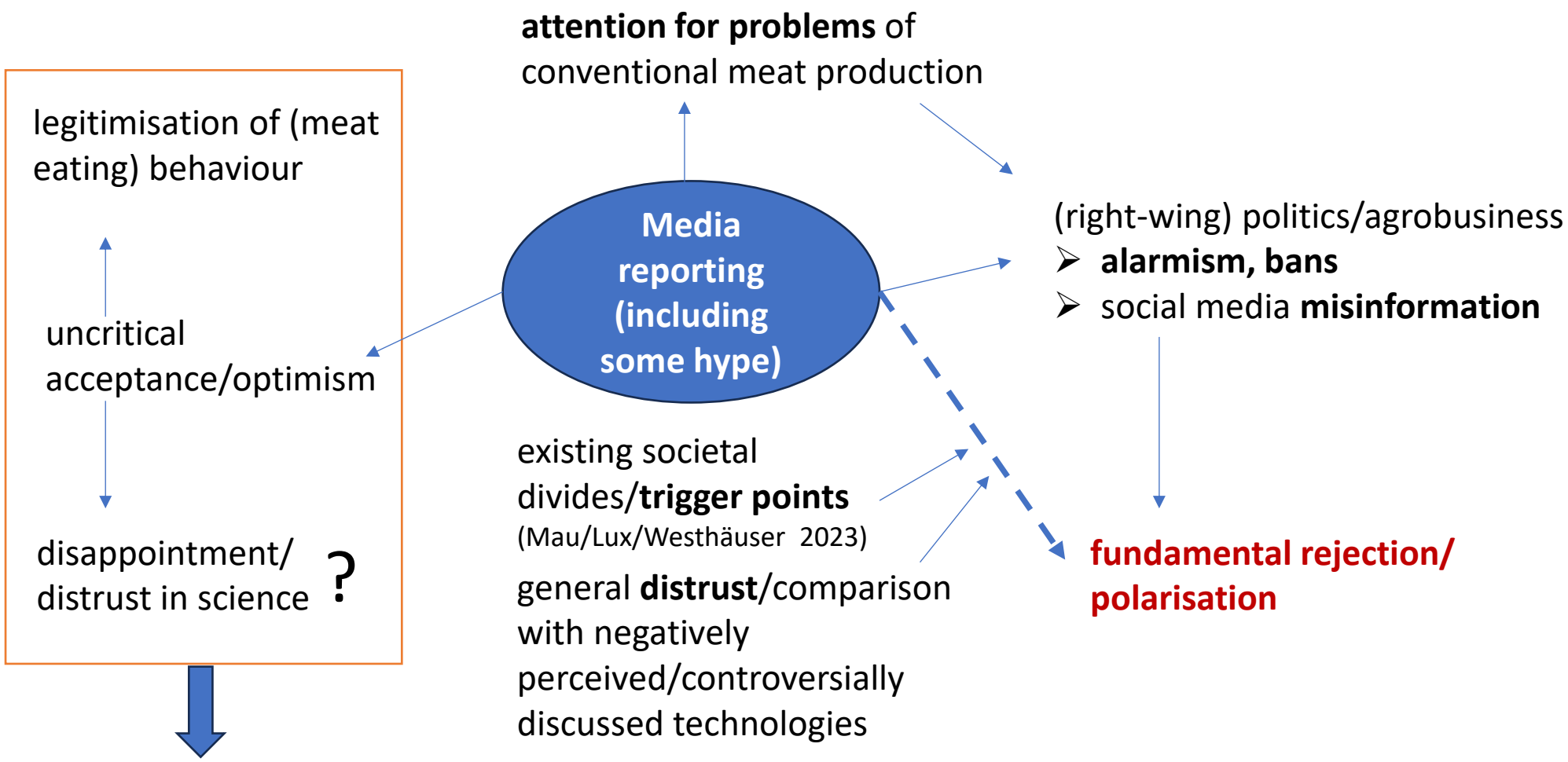
This is exactly where I see the great danger in the whole approach. Technology will invent something new so that we don't have to rethink our lives or even change anything. This is the attitude that will bring humanity to the brink of extinction. (G, 1:61 ¶ 689 in Spiegel 1)

*A healthy diet - and then lab-grown meat? *gag* Especially so that the companies can earn even more money? Better natural meat from local farms. (G, 3:23 ¶ 26 in Welt)*



Dutch and German YouTube videos/online newspaper discussion threads (n=25), 2020-2023, 470 commenters

The potential effects of hype on consumers



After the hype

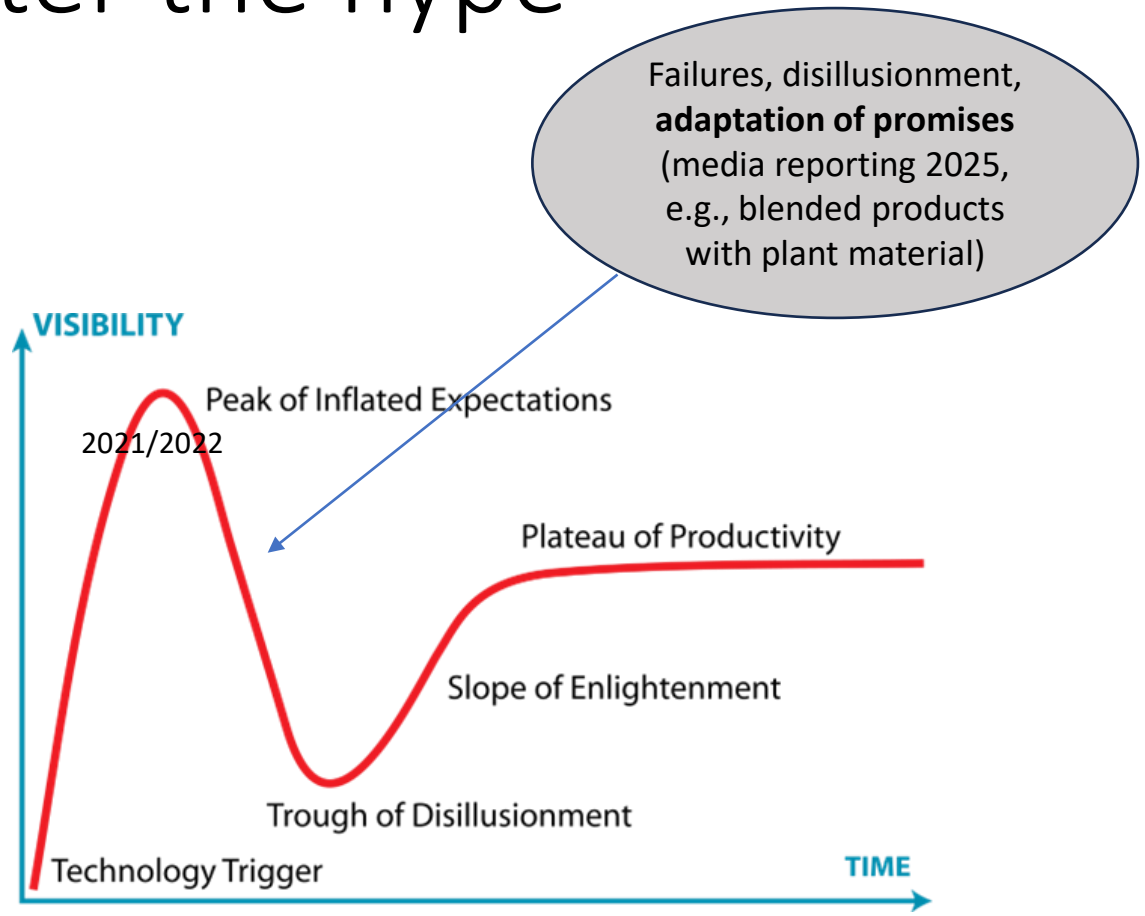
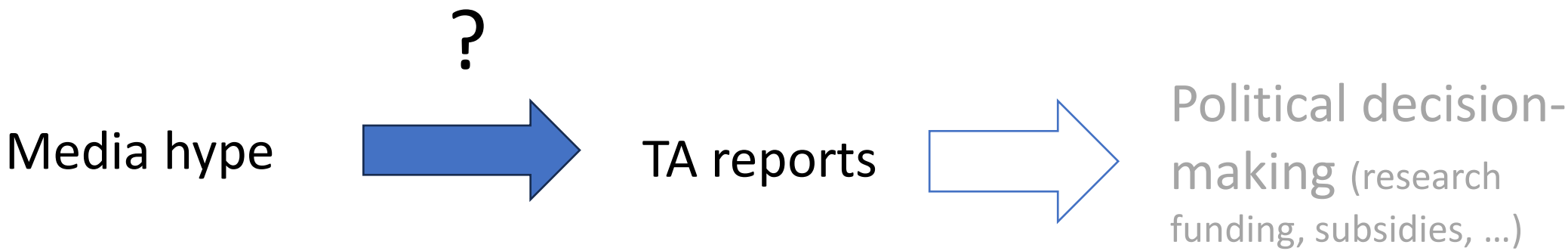


Image source: Jeremykemp, Gartner hype cycle – Wikipedia; adapted based on Newsletter New Harvest, Isha Datar, 21.12.2023

Resembles observation by Ruef/Markard (2010) for stationary fuel cells:

- although promises disappointed, **innovation activities continue** after the hype/fails on the project level
- probably due to the **stable frame that legitimizes the technology** and institutionalized funding structures/incentives
- **reconfiguration of promises** (see Lente et al. 2023: new actor network and (un)specific? application)

Ruef, A., & Markard, J. (2010). What happens after a hype? How changing expectations affected innovation activities in the case of stationary fuel cells. Technology Analysis & Strategic Management, 22(3), 317–338. https://doi.org/10.1080/09537321003647354


?
Media hype
TA reports
Political decision-making (research funding, subsidies, …)

CM in Technology Assessment reports

Framings/main opportunities: food security, economic growth, sustainability

Expected relevance of CM: 2030 niche product (AUS); early developmental stage (GER); early commercial stage, mid-range TRL (EU), one of several promising innovations in the food sector

Requirements/hurdles/uncertainties:

- funding for research ("technological breakthroughs") and industrial infrastructure (no concrete estimations)
- consumer acceptance (missing: how is it affected by the media?)
- implications for the job market, stakeholder views/interests

Global perspective?

- global effects have to be taken into account regarding food security (TAB)
- policy coordination (within EU)
- global cooperation vs. patenting? cultural aspects of consumer acceptance?

UK, AUS, GER, EU (POST, Australia's national science agency, TAB, STOA), 2022-2024

Potenziale und Herausforderungen einer zellkulturbasierten Fleischproduktion
Themenkurzprofil Nr. 62. Tobias Jetzke, Katharina Dassel (2023)

Innovation and technology in agriculture and alternative foods – POST (2024) DOI: https://doi.org/10.58248/HS82

Australia's Protein Roadmap – CSIRO (2022)

Alternative protein sources for food and feed. Elta Smith, Julien Etienne and Francesco Montanari (2024) doi: 10.2861/999488

On cooperation and patenting see: Holmes, D., Humbird, D., Dutkiewicz, J., Tejeda-Saldana, Y., Duffy, B., & Datar, I. (2022). Cultured meat needs a race to mission not a race to market. Nature Food, 3, 785–787. https://doi.org/10.1038/s43016-022-00586-9

Conclusions

MAIN OBSERVATIONS

- Reconfiguration of promises in the CM case (after the hype)
- Hype may not necessarily lead to public disappointment and distrust in science – but may contribute to (felt) societal polarisation nevertheless

TA and CM – inorporate more critical and NORMATIVE VIEWs?

- TA organisations that engage with cultivated meat recommend more research and funding; national (economic) perspectives instead of global TA
- What we (TA) can/should do: point out alternatives, necessary investments/costs of hyped technologies (often overlooked), and misleading framings („food security“); examine industry promises (more) critically, incorporate media reception as an assessment dimension and area for policy recommendations?

HYPE STUDIES

- Compare cases to find patterns of technological and environmental characteristics and the effects of hype (Lente et al. 2023)
- Beyond speculation: more experimental/investigative hype studies needed: Key questions: how does CM hype affect attention for other alternatives and meat eating behaviour, but also trust in science?

Harro van Lente, Charlotte Spitters, Alexander Peine, Comparing technological hype cycles: Towards a theory, Technological Forecasting and Social Change, Volume 80, Issue 8, 2013, Pages 1615-1628

Thank you!

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