

HORIZON SCANNING

Emerging issues for EU policymaking

Issue 8

This is the eighth report from the ESPAS horizon scanning process which looks at “signals of change” – emerging trends and issues – that may appear marginal today but could become important for the EU in the future. From the list of 15 signals of change presented below, three emerging issues were perceived as potentially most impactful by policymakers:



MILITARY-GRADE SOCIETY

Photo by NEXT-AI on AdobeStock



**DIGITAL TECH GIANTS
BECOME STATE ACTORS**

Photo by Brazhyk on AdobeStock

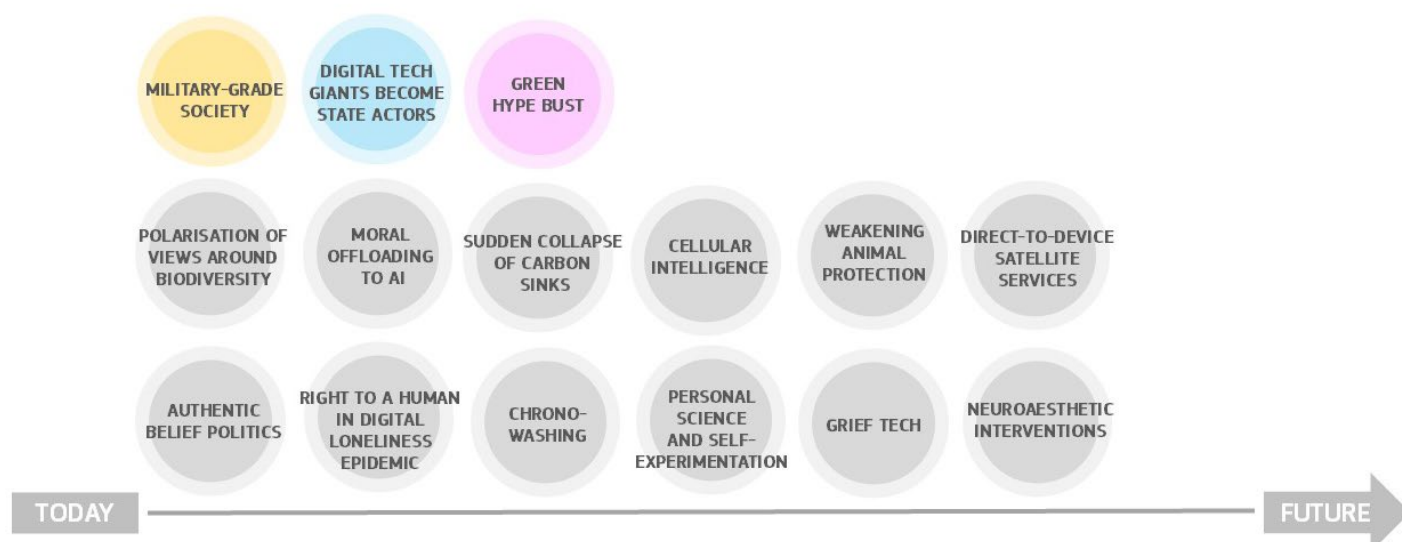


**GREEN
HYPE BUST**

Photo by TensorSpark on AdobeStock

The European Strategy and Policy Analysis System (ESPAS) launched the horizon scanning process, led by the Joint Research Centre and the European Parliamentary Research Service, in 2022. The signals of change were identified and developed via a series of workshops with participants from across the EU institutions and bodies looking at recent developments in multiple domains. The assessment of the most impactful signals was done through a survey followed by a prioritisation workshop, which explored the issues in more depth – a summary of this evaluation is presented on the following pages. The signals should be considered as new lenses for a different perspective on the challenges and opportunities the EU is facing now and in the coming years.

The complete set of 15 signals of change identified in recent horizon scanning sessions is presented below. Brief descriptions are provided at the end of the document.



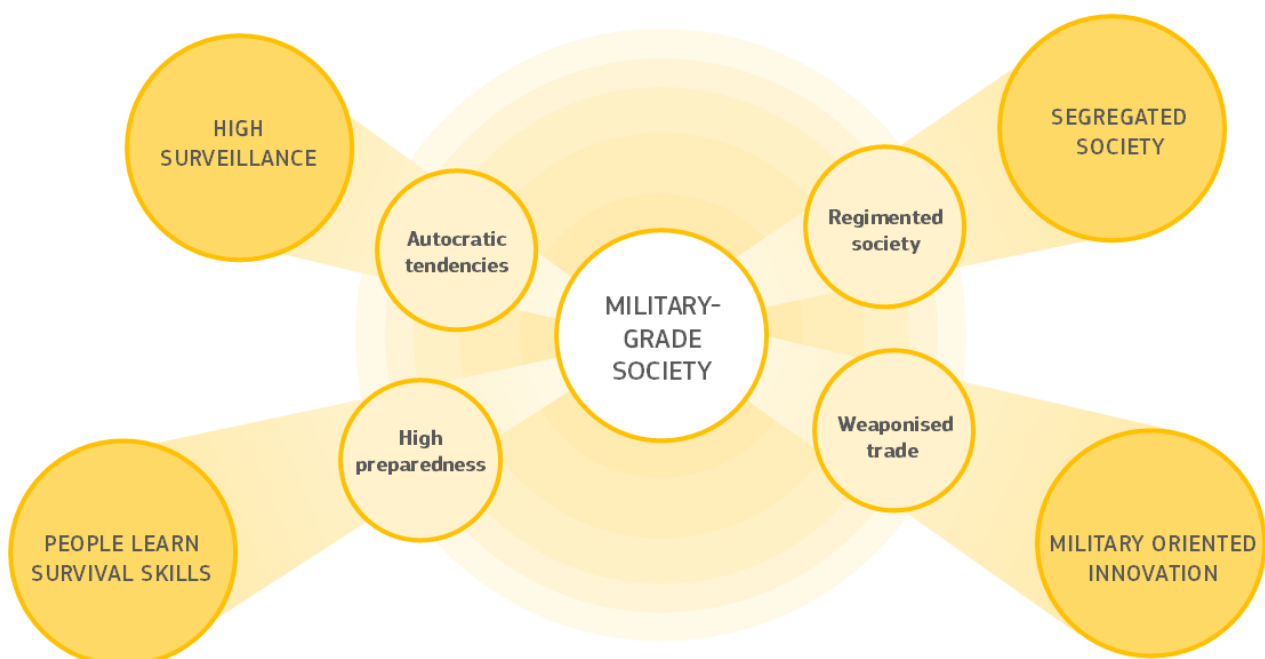
Military-Grade Society

As the definition of what is considered a “critical infrastructure” broadens to encompass a growing range of assets, the demand for military-grade protection for them will intensify. This evolution will require advanced security features to safeguard against on the one hand threats from hostile actions, such as cyberattacks, terrorism and war, and on the other hand natural disasters, including ever more extreme weather events in addition to phenomena not influenced by humans such as earthquakes. This drive towards more resilient infrastructure will lead to the integration of cutting-edge technologies and robust design principles to ensure durability and adaptability. By prioritizing military-grade protection, societies can enhance their preparedness, minimize vulnerabilities, and secure essential services, ultimately fostering stability and continuity in an increasingly unpredictable world. However, these enhanced security measures may make many of these societal infrastructures less inclusive due to the need to profile users to keep potential disruptors at bay.¹⁰⁸

How can it change our perspective?

Beyond making infrastructures more expensive to build, these developments are likely to change attitudes regarding durability, ease of use and overall resilience. It will also require taking a more systemic perspective when designing infrastructures.

Futures Wheel: An indication of potential consequences



What if the EU...?

...banned all non-EU actors from European infrastructures?

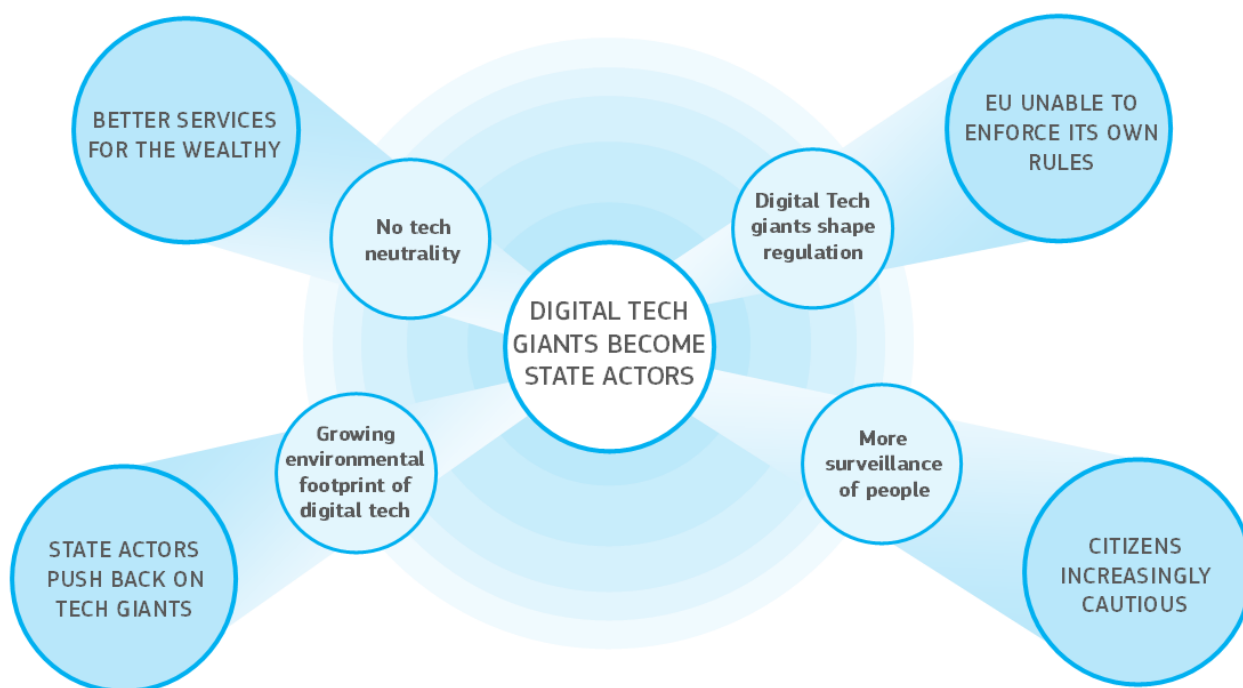
Digital tech giants become state actors

The digital technology giants are increasingly behaving like state actors, wielding influence comparable to that of national governments. Figures like Elon Musk exemplify this shift, with ventures spanning space exploration, social media, satellite communications, AI, and even a brief stint in government, shaping global infrastructure and policy. Meanwhile, Donald Trump's engagement with social media platforms underscores how these entities influence political discourse by amplifying or restricting voices. This dual dynamic — tech leaders acting as policymakers and platforms shaping political narratives — blurs the line between corporate and governmental power. As tech giants not only fill roles traditionally held by states but also wield enormous power to shape public opinion, questions about accountability, regulation and democracy become acute, challenging societies to rethink power structures in the digital age.^{2,3}

How can it change our optics?

The systemic governance challenges created by the digital tech giants globally are unprecedented in human history. This calls for fresh systemic thinking with a long-term perspective, clearly anchored on the values of the EU, to decide on what desired future should lead the path forward. Such an approach, embedding policymakers, civil society and economic actors, needs to be coupled to EU action at international level in view of the global reach of the tech giants.

Futures Wheel: An indication of potential consequences



What if the EU...?

...were to build a European information space with clear rules based on EU values, operating differently from the rest of the world?

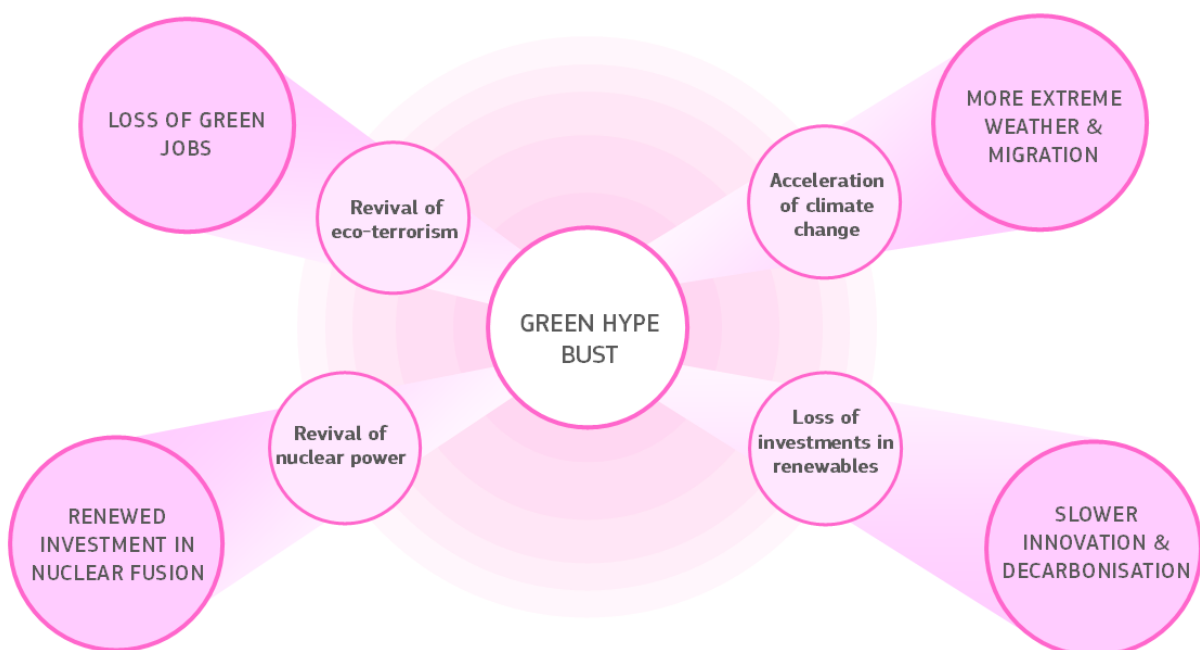
Green hype bust

Following the previous *greentech* hype bust in the years 2008-11⁴, the renewable energy boom is showing cracks. Lithium prices have been plummeting, signalling waning demand for electric vehicles and batteries. Once-ambitious projects like offshore wind farms and heat pump installations are slowing, with companies like Northvolt scaling back expansions and facing bankruptcy amid cost pressures^{5,6}. Public enthusiasm for net-zero goals is giving way to scepticism as energy narratives shift toward abundance, affordability and reliability over environmental sustainability. Policymakers and industries are grappling with the fallout, questioning whether the push for renewable electricity can maintain momentum or if a recalibration toward easier short-term energy strategies is inevitable.^{7,8} The analysis of the previous boom and bust showed that it has nevertheless helped develop a second wave of improved technologies through investment in research leading to a massive decrease in costs and more robust business models⁹.

How can it change our optics?

The previous boom and bust period showed that what is happening today is likely to be cyclical. Therefore, it is essential to focus policy on the fundamentals and to take a long-term perspective to maximise long-term benefits.

Futures Wheel: An indication of potential consequences



What if the EU...?

...were to reduce massively market risk for strategic investments and innovations serving the green transition?

Other signals of change

- **Polarisation of views around biodiversity**

Societal polarisation around biodiversity is increasing. While some advocate for urgent action to protect ecosystems, others remain sceptical or even resistant, often due to economic concerns, ideological differences or misinformation. This is reflected in debates over renewable energy, conservation policies and lifestyle changes required for sustainability. Polarisation complicates consensus-building and delays effective action, exacerbating environmental degradation. Additionally, disparities between nations and social groups — often linked to wealth, access to resources, and historical responsibilities — further deepen tensions.^{10,11}

- **Right to a human in digital loneliness epidemic**

The loneliness epidemic highlights the growing tension between human connection and digital technology. As automation increasingly replaces human interactions — e.g. through self-driving labs¹², automated fast-food services, drone responders — human relationships are commodified, alienating workers from clients and colleagues. Digital technologies, while offering constant connectivity, exacerbate social health issues by replacing meaningful connections with virtual interactions. Mental health suffers, and the "right to disconnect" becomes critical. Though AI may provide temporary support, it risks deepening isolation and inequality.^{13,14}

- **Sudden collapse of carbon sinks**

The faster than expected disappearance of carbon sinks signals that climate change tipping points are already upon us. Critical ecosystems like forests and rivers, which once absorbed vast amounts of carbon, are now under severe threat. Intensifying forest fires, particularly in northern regions, not only release stored carbon and disrupt ecosystems but hamper future capacity of forests to capture CO₂. Record dry conditions are depleting the Amazon River, threatening biodiversity and reducing its capacity as a vital carbon sink. Global change indicators are flashing direct warnings, highlighting the unprecedented risks to human civilization. With these feedback loops accelerating, urgent massive action is essential to mitigate further damage and protect the planet's remaining carbon-absorbing systems.^{15,16}

- **Personal science and self-experimentation**

Personal science is the practice of addressing personally relevant health questions through self-research^{17,18}. The availability of personal medical data (the quantified self) and new medical discoveries have created temptations for more daring self-experiments. Some technology advances, for example, allow anyone to make DIY versions of pharmaceuticals. The Anarchist Four Thieves Vinegar Collective uses machine learning to map chemical pathways for molecular synthesis and to suggest chemical reactions that would yield the molecule one wants to make. This is used to produce expensive medicines at a fraction of their commercial cost. Another case is that of pharmaceuticals that are difficult to access or whose use is controversial. The opinion of this collective is that everyone has a right to repair their body despite bypassing professional advice.¹⁹

- **Neuroaesthetic interventions**

Neuroaesthetics research explores brain, body and behavioural responses to engagement with the arts and other aesthetic sensory experiences - helping support health, mental and physical well-being and learning²⁰. The social isolation and deprivation from culture caused by the Covid pandemic has led to a somewhat increased appreciation for arts. For example, Ireland has decided to continue the *Basic Income for Arts Act* after a pilot phase. The program pays 325 EUR per week to 2,000 eligible artists and creative arts workers who have been selected randomly²¹. A neurological study in the Netherlands showcases how art stimulates the brain. The study, which used eye-tracking and MRI scans, found that brain stimulation was 10 times stronger when looking at real works of art in a museum than when looking at a poster.^{22[ORCID]} This opens a reflection on linking potential policy interventions in the domains of health, social policies or education to culture and creative sector actions.

- **Moral offloading to AI**

Despite all the concerns regarding AI, it seems that many people are putting their trust in AI when they are most vulnerable. A recent University of California study showed that about two-thirds of people allowed their minds to be changed by a robot in simulated life-or-death decisions. This demonstrates an alarming display of excessive trust in artificial intelligence and willingness to remove responsibility in crisis situations. Participants allowed robots to sway their judgment despite being told the AI had limited capabilities and was giving advice that could be wrong. In fact, the advice given by the robot changed people's decisions in about two-thirds of the cases.^{23[OBJ]} In a similar fashion to cognitive offloading (the reliance on the external environment to reduce cognitive demand), moral offloading could become more prominent as artificial moral agents emerge.^{24[OBJ]} Increased reliance on them could have consequences on a societal level (i.e., moral deskilling, restricted moral progress and moral responsibility gaps).^{25[OBJ]}

- **Grief Tech**

Emerging AI technologies aim to offer a form of "digital afterlife," creating avatars or chatbots of deceased loved ones for grieving individuals²⁶. These "grief tech" services include AI-generated messages, interactive avatars, and even VR-based recreations of the deceased, enabling continued interactions. Innovations such as QR codes on graves provide access to digital profiles of the deceased, while other services combine AI with therapy to mimic a loved one's presence. These technologies raise ethical concerns, including privacy, consent, and the psychological effects on users. Critics argue that grief is a vulnerable state, and these tools risk manipulation, prolonging grief, and blurring the boundaries of humanity. Moreover, as lifetimes generate increasing amounts of personal data, AI recreations grow more realistic, intensifying these concerns²⁷. Societal alienation from death may deepen, despite intentions to bring people closer to the reality of loss.

- **Authentic belief politics**

The desire for authenticity is prevalent in all areas of life, from experiences, brand marketing to entertainment. It has become a prominent concept in political discourse, as it plays an increasingly decisive role in political campaigning and elections²⁸. Citizens' main considerations for judging politicians' authenticity are ordinariness (down-to-earth), consistency (true to themselves), and immediacy (spontaneously saying what they think).²⁹ These aspects of authenticity are shaping the perception of claims of political truth.^{30[OBJ]} Politicians' conception of honesty has undergone a distinct shift, with authentic "belief speaking" that may be decoupled from evidence becoming more prominent and more differentiated from explicitly evidence-based fact speaking.^{30[OBJ]}

- **Weakening animal protection**

As the tensions between food security and biodiversity protection grow with increased climate change on the one hand and an unstable geopolitical situation on the other hand, the regulation of animal protection and welfare is being watered down. In the EU, downgrading wolf protection has been proposed due to damage to livestock³¹. Namibia and Zimbabwe decided on culling elephants to address the acute food emergency due to drought³². Overall, the Animal Protection Index of 2020 shows that since 2014 animal protection has either remained the same or weakened in many countries³³. Similarly, the World Organisation for Animal Health observatory shows that the number of new regulations on animal welfare has been significantly lowered since 2020.³⁴

- **Chronowashing**

More structured and organised approaches to think explicitly about the future, such as foresight or futures literacy have gained in popularity³⁵. The UN Pact of the Future highlights the strategic foresight capacities in public and international institutions to ensure long-term thinking and planning³⁶, with some countries such as UAE using it as part of their soft power in global affairs³⁷. However, as more scenarios and visions of the future flood different areas, accusations of "*chronowashing*" are appearing. This is where a focus on long-term thinking and superficial future solutions distracts from addressing current issues such as extractivism, racism, inequalities, environmental injustice and so on.³⁸

- **Cellular intelligence**

Biology's multiscale architecture (molecular networks to cells, tissues, organs, whole bodies, and swarms) could be considered as collective intelligence, solving problems at the cell, tissue, and whole-organism levels³⁹. The approach suggests that tissues, organs, and molecular pathways should be examined for learning and proto-cognitive capabilities, for example to train cells for desired gene expression levels, physiological states, or anatomical outcomes.⁴⁰ From this perspective cancer could be analysed as an intelligent species.⁴¹

- **Direct-to-device satellite services**

Direct-to-Device (D2D) communication in satellite networks enables smartphones and Internet of Things (IoT) devices connectivity without relying on terrestrial infrastructure using cellular technology (4G, 5G).⁴² Building space rather than terrestrial infrastructure for digital services in the longer term will challenge telecommunication business models but also the experience of space infrastructure being brought directly to users⁴³. Providing space products directly to consumers sparks imagination - Reflect Orbital promises "sunlight as a service" - a constellation of orbiting mirrors, which will beam sunlight after dark.⁴⁴ Although the business model focuses on solar power stations, it is the consumer-focused marketing that made the idea go viral.⁴⁵

ENDNOTES

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- ² <https://www.bbc.com/news/articles/cpqd4vw0ejeo>
- ³ <https://time.com/7177802/elon-musk-donald-trump-2024-election/>
- ⁴ <https://energy.mit.edu/wp-content/uploads/2016/07/MITEI-WP-2016-06.pdf>
- ⁵ <https://techfundingnews.com/northvolt-files-for-bankruptcy-how-europes-12b-battery-startup-crumbled-under-5-8b-in-debt/>
- ⁶ <https://northvolt.com/articles/northvolt-files-for-bankruptcy-in-sweden/>
- ⁷ <https://www.businesstimes.com.sg/companies-markets/green-hype-bailouts-nickel-industry-has-imploded>
- ⁸ <https://freetrade.io/news/the-green-energy-stock-bubble>
- ⁹ Vincent Giorgis, Tobias A. Huber & Didier Sornette (2024) 'Salvation and profit': deconstructing the clean-tech bubble, *Technology Analysis & Strategic Management*, 36:4, 827-839, DOI: 10.1080/09537325.2022.2060809
- ¹⁰ <https://www.nature.com/articles/s41558-022-01527-x>
- ¹¹ <https://cepr.org/voxeu/columns/climate-polarisation-and-green-investment>
- ¹² A self-driving lab (SDL), also known as an autonomous experimentation lab, is a research environment where automated robotic systems and AI work together to perform experiments and analyse data without direct human intervention. These labs accelerate scientific discovery by efficiently conducting experiments, analyzing results, and suggesting new experiments based on the data, all in a closed-loop system.
- ¹³ <https://healthhub.hif.com.au/mental-health/what-is-social-health-definitions-examples-and-tips-on-improving-your-social-wellness>
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- ¹⁷ Wolf, Gary & Groot, Martijn. (2020). A Conceptual Framework for Personal Science. *Frontiers in Computer Science*. 2. 10.3389/fcomp.2020.00021.
- ¹⁸ Kloppenborg Katharina, Price Ball Mad, Jonas Steven, Wolf Gary Isaac and Greshake Tzovaras Bastian 2024 Co-designing a wiki-based community knowledge management system for personal science. *R. Soc. Open Sci.* 11:240275, <http://doi.org/10.1098/rsos.240275>
- ¹⁹ <https://www.404media.co/email/63ca5568-c610-4489-9bfc-7791804e9535/>
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- ²¹ [Budget 2025: Basic Income for the Arts scheme extended with funding of €35m | Hotpress](https://www.hotpress.com/budget-2025-basic-income-for-the-arts-scheme-extended-with-funding-of-35m/)
- ²² Real art in museums stimulates brain much more than reprints, study finds | Neuroscience | The Guardian
- ²³ <https://www.sciencedaily.com/releases/2024/09/240904184540.htm>
- ²⁴ Frank, L.E. What Do We Have to Lose? Offloading Through Moral Technologies: Moral Struggle and Progress. *Sci Eng Ethics* 26, 369–385 (2020). <https://doi.org/10.1007/s11948-019-00099-y>
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- ²⁷ <https://ikuisuusmedia.fi/>
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- ³⁴ <https://www.woah.org/en/what-we-do/standards/observatory/implementation-of-standards-the-observatory-annual-report/monitoring-animal-welfare-standards/>
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- ³⁶ <https://www.un.org/en/summit-of-the-future/pact-for-the-future>
- ³⁷ [Global Futures Society Welcomes 20 New Members. Expands to 60 Institutions Worldwide — Dubai Future Foundation](https://www.dubai-future-foundation.org/global-futures-society-welcomes-20-new-members-expands-to-60-institutions-worldwide/)
- ³⁸ [Is Long-Term Thinking a Trap? | Environmental Humanities | Duke University Press](https://www.duke.edu/long-term-thinking-a-trap/)
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- ⁴⁴ [Mirrors in space could boost solar power production on Earth | Space](https://www.space.com/mirrors-in-space-could-boost-solar-power-production-on-earth)
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