

THE NEW TECHNOSCIENCES

IN BRIEF

- Technosciences combine the acquisition of knowledge with the development of new technologies and the production of new objects.
- They overturn familiar distinctions such as those between nature and technology, thereby raising challenging societal and legal issues regarding acceptance and acceptability.
- Examples include nanotechnology, synthetic biology and geoengineering.

WHAT IS IT ABOUT?

“Science and its teaching is free” – we are all familiar with this credo from the Austrian constitution. With the complete autonomy of the Austrian universities, it has been realised more than ever. Scientific freedom is undoubtedly an essential asset of our modern democratic constitution. Nevertheless, there are more and more cases where research is critically discussed, with growing calls for external control. Dedicated ethics committees are being formed to evaluate research projects and practice, funding programmes are subject to conditions and missions imposed by politics. How to make sense of this ambiguous situation?

An essential answer lies in acknowledging the emergence of a new innovation paradigm: a quest for basic scientific understanding is linked to promises of powerful intervention and comprehensive design. This characteristic combination of scientific and technological elements is labelled “technoscience”.

Biotechnological research on plants, animals and humans constitutes a prominent example. Genetic and molecular biological research is almost inseparably linked to the development of new intervention techniques and the production of new objects. Only recently, the development of the so-called “genetic scissors” – the CRISPR-Cas9 system – illustrated this pattern. The list of new constructs based on this technique ranges from herbicide-resistant crop lines to embryos with “tailor-made” genetic material. But how should we address such constructs? Are they natural organisms or technical artefacts? Is this still about nature or already about technology? Should they be patented and protected by property rights? Who takes responsibility for any adverse effects when placing them on the market or releasing them into the field? Should we actually be allowed to do so? Who could question or even curtail the freedom of such practices, and with what arguments?



Image: WikiCommons

Genetically modified mice with green fluorescent protein, a key component of cell research.

Similar discussions are being triggered by nanotechnology, neurotechnoscience and the so-called converging technologies that combine all these research areas. And geoengineering, as an attempt to influence the global climate by technical means in a targeted manner, also falls into this category.

BASIC DATA

Project title:	Techno-Epistemic Cultures
Project team:	Kastenhofer, Karen
Duration:	10/2014 – 09/2019
Funded by:	FWF

KEY RESULTS

Contemporary technosciences not only represent a novel fusion of knowledge-oriented basic research with standards and approaches of engineering that is new in the European context; they are also a reaction to the fact that research in general is increasingly required "to deliver", to provide solutions to societal problems and to foster the competitiveness of national economies.



Public protest against green genetic engineering.

In addition, an increasing medialisation of science has resulted in the launch of new technoscientific hypes and promises without giving due consideration to technical feasibility or social desirability. In the context of global economic competition even unrealistic visions can yield short-term profits. Individual concerns, evidence-based fact-checking or national regulatory approaches thus quickly turn into an unwelcomed competitive disadvantage.

However, technosciences often trigger disagreement amongst experts, public controversies as well as civil resistance. On the one hand, this is to be understood as a reaction to interventions to our living environment that are perceived as detrimental; on the other hand, public resistance also represents a general vote of no confidence regarding technoscientific innovation that is not being subjected to public debate and independent oversight.

WHAT TO DO?

Technosciences require specific governance approaches:

- *Re-evaluation*: there is a need for a critical rediscussion of scientific freedom and impartiality in the context of medialisation, political priority setting and industrial involvement.
- *Integrative approach*: technoscience must be considered in the context of existing innovation policies, regulatory instruments and social debate.
- *Evidence-based fact-checking*: not every promise of feasibility will be realised, and not every technoscientific revolution will take place. What is needed here is an independent, evidence-based assessment of technoscientific visions and their feasibility.
- *Acceptability and acceptance*: technoscientific innovations are to be assessed for their social acceptability on the basis of general quality standards, but also empirically researched for their actual social acceptance.
- *Tentative governance*: social debates and learning processes are essential for the robust governance of technosciences. Procedural, participatory and case-specific governance approaches are to be fostered in support of this.

FURTHER READING

Kastenhofer, K. (2020). *Emergierende Technowissenschaften - Am Beispiel von Systembiologie und Synthetischer Biologie*.
doi:10.1553/ITA-ms-20-01;
epub.oeaw.ac.at/ita/ita-manuscript/ITA_20_01.pdf

CONTACT

Karen Kastenhofer

Email: tamail@oeaw.ac.at

Phone: +43(1)51581-6582



IMPRINT: Owner: Austrian Academy of Sciences; Legal person under public law (BGBl. 569/1921 i.d.F. BGBl. I 130/2003); Dr. Ignaz Seipel-Platz 2, A-1010 Vienna; Editor: Institute of Technology Assessment (ITA); Apostelgasse 23, A-1030 Vienna; oeaw.ac.at/ita/en. | Frequency: The ITA Dossiers are published irregularly and publish the research results of the ITA. The ITA Dossiers are published in print in small numbers only and are made available open access to the public via the Internet portal "epub.oeaw": epub.oeaw.ac.at/ita/ita-dossiers | ISSN: 2306-1960 | This work is licensed under a Creative Commons Attribution 4.0 International License: creativecommons.org/licenses/by/4.0/ | ITA-Dossier no. 49en, September 2020 | epub.oeaw.ac.at/ita/ita-dossiers/ita-dossier049en.pdf |

