Innovation is about Social Change

Sustainable Development is often associated with calls for more innovation. But what exactly is the "right" kind of innovation? And how does innovation relate to policy priorities and societal concerns? We spoke with Sebastian Pfotenhauer, Head of the Department of Science, Technology and Society and Professor of Innovation Research at the TUM School of Social Sciences & Technology and the TUM School of Management.

Gesamter Artikel (PDF, D): www.tum.de/faszination-forschung-29

Bei Innovation geht es um gesellschaftlichen Wandel ⬚D

Innovationen werden in verschiedenen Gesellschaften stets unterschiedlich wahrgenommen, so Prof. Sebastian Pfotenhauer. In demokratischen Gesellschaften stoßen sie daher auf eine Vielzahl politischer Standpunkte und gesellschaftlicher Vorlieben, auch auf Widerstand. Pfotenhauer warnt davor, diese Konflikte durch ein pauschales Appellieren an die Vernunft der Menschen lösen zu wollen. Nachhaltige Innovation im eigentlichen Sinne beinhaltet nicht nur, Produkte und Dienstleistungen umweltfreundlicher zu gestalten, sondern muss auch gewährleisten, dass wir als Gesellschaft mit den Folgen von Innovation langfristig und sozial gerecht leben können. Hierfür müssen Innovationsprozesse im Hinblick auf eine stärkere Inklusion und Deliberation sowie im Hinblick auf die Legitimität von technologiegetriebenen Wandlungsprozessen und die Antizipation von unbeabsichtigten Konsequenzen verändert werden. Pfotenhauer leitet an der neuen TUM School of Social Sciences and Technology das Masterprogramm „Responsibility in Science, Engineering and Technology". Es ist beispielhaft dafür, wie die TUM die gesellschaftliche Verantwortung in den Mittelpunkt ihrer Bemühungen als universitäre Einrichtung stellt. ⬚

Link
www.mcts.tum.de/innovationsforschung/overview/

> *"People might reject innovations for reasons that have nothing to do with irrationality or ignorance."*
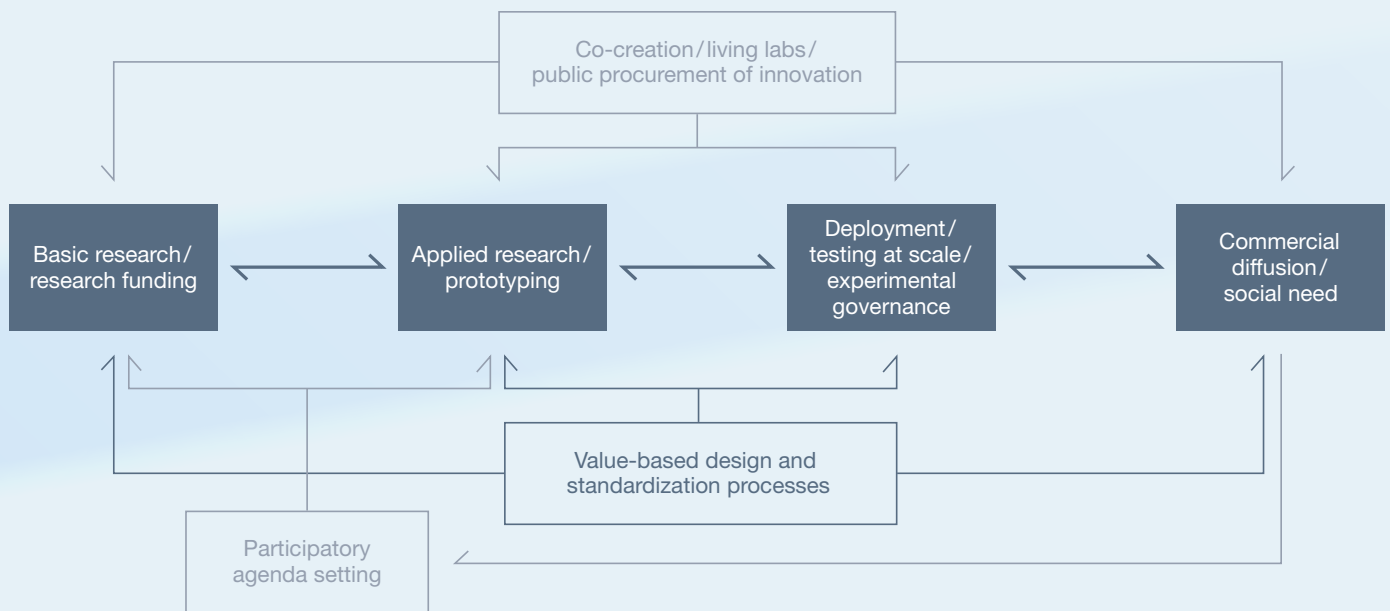>
> Sebastian Pfotenhauer

Professor Pfotenhauer, what is "good" innovation?
That's the question, isn't it? In the past, we have focused mostly on asking "What is innovation?" and "How can we get more of it?" Today, innovation is ubiquitous, both in the form of new products and services and also as a broader social discourse that drives companies and public policy. But the times are changing. In much of my research, I observe an increasing paradigm shift from simply "more innovation" – what I sometimes call a blind, one-size-fits-all "innovation imperative" – to a more nuanced understanding of *what kind* of innovation we actually want and need as a society.

So how does innovation play out in diverse societies and cultures?
Each society has its own way of dealing with, and producing, innovation. In a new paper, we analyze Bavaria's innovation culture, which by and large tries to preserve socio-economic structures rather than radically change them – in contrast to the more free-wheeling, disruptive Silicon Valley culture. Likewise, new technologies are always received differently in different societies. In the 1990s, for example, genetically modified crops were seen

Co-creation / living labs /
public procurement of innovation

Basic research /
research funding

Applied research /
prototyping

Deployment /
testing at scale /
experimental
governance

Commercial
diffusion /
social need

Value-based design and
standardization processes

Participatory
agenda setting

Innovation is still often conceptualized as a quasi-linear process, even though this depiction is highly reductionist. To account for more complexity, co-creative processes are often mobilized to explicitly blur the imagined stages of the innovation process. Participatory agenda setting, living labs, and value-based design and standardization are policy instruments that can help address societal goals, concerns and values during the innovation process.

in the US as an extension of existing biotechnologies, not fundamentally different or riskier, and were hence understood to be covered under existing regulations. In contrast, Britain chose an unusually scrupulous approach to genetically modified organisms after having recently been hit by the mad cow disease crisis, which considerably undermined public trust in risk management by government authorities and experts. Germany, against the backdrop of decades of strong environmental movements, took an extremely cautious, incremental course, with detailed regulation and publicly monitored, experimental procedures to test the effects of GM crops. Similar patterns can be observed with AI, robotics, neurotechnology, quantum technology or autonomous vehicles today – all technologies that we are currently studying in my group.

What conclusions do you draw from these findings?
At the heart of it all is a very simple insight: innovation is about social change. In democratic societies, new technologies will thus always encounter a diversity of political positions and social preferences, including resistance. Trying to resolve these conflicts of interests through appeals to the universal benefits of innovation or universal

rationality fails to recognize that people might reject certain technologies or expertise for reasons that have nothing to do with irrationality or ignorance.

So people, or rather their attitudes towards innovation, are changing?
Correct – as are the questions that we as a society ask innovators today. Traditionally, science and technology have been shaped mostly by small expert communities, such as engineers, scientists, policymakers and entrepreneurs – unfortunately, mostly indeed men. Yet, in the current world, with controversial developments posing such a stark challenge – climate change, the power of Big Tech, autonomous vehicles – this traditional top-down model seems insufficient. Sustainable innovation in this sense is therefore not just about making products and services more environmentally friendly, but also about making sure that we as societies can live with the consequences of innovation over the long term and in a socially just manner. This means changing innovation processes to take account of inclusiveness and deliberation, public legitimacy for technology-driven change processes, as well as the anticipation of unintended consequences.   ▷

Prof. Sebastian Pfotenhauer

is Carl von Linde Professor of Innovation Research at the TUM School of Social Sciences and Technology, where he heads the Department of Science, Technology and Society (STS). He shares a co-appointment with the TUM School of Management. He is also the coordinator of the federally funded "Munich Cluster for the Future of Mobility in Metropolitan Regions (MCube)". He tweets on all things related to innovation and society at @smpfotenhauer.

What needs to change to get everyone on board with sustainable innovation?

To address this, we need to focus more on the *process* dimension of innovation: How can we make meaningful changes "upstream" in innovation trajectories together with those that will be affected "downstream"? Let me give you two examples of large projects in which we've been trying exactly that. I am currently co-leading the large federal research cluster MCube – the "Munich Cluster for the Future of Mobility in Metropolitan Regions" – together with my colleagues Gebhard Wulfhorst (urban structure and transport planning) and Markus Lienkamp (automotive engineering). In this cluster, we have put a co-creative approach front and center by insisting that all projects need to involve TUM researchers, companies, and public sector partners, including civil society. We have also tried to balance technical with social science research programs, the latter, for instance on topics such as mobility justice, responsible innovation and local street experiments.

Likewise, I coordinated a large European Horizon2020 research project called SCALINGS – short for "Scaling up Co-creation: Avenues and Limits for Integrating Society in Science and Innovation". There, we analyzed the scalability of "Co-creative" innovation approaches in robotics, energy and autonomous vehicles, together with partners from 10 countries. Our key finding was that co-creative approaches are not easily scalable. A nursing robot in a clinic in Munich will therefore not work without further ado in a clinic in Barcelona. The reason is that the exact ways in which technology, users, and economic and policy conditions need to come together vary dramatically. All the more reason to bring the social sciences on board early and on an equal footing.

How do you address these challenges in your teaching at TUM?

TUM has taken a number of commendable steps to put social responsibility at the heart of its institutional mission, most notably through the launch of the new School of Social Sciences and Technology (SOT) and the expansion of the social sciences as equal partners of the technical disciplines. At SOT, I head the Master's program in "Responsibility in Science, Engineering and Technology" (RESET), which is supported by the Elite Network of Bavaria. There, we teach students with both social science and technical backgrounds to tackle questions at this critical interface. At my secondary home, the TUM

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School of Management, we have embraced responsible technology leadership as a core value and put in place additional incentive structures to emphasize the Sustainable Development Goals in teaching and research.

How can we ensure responsible innovation practices to meet different needs?
Well, what doesn't work are mere "check-box" approaches to treat questions of ethics and responsibility – as currently embraced by many funding programs, including the European Commission. We need to build reflexivity into the processes themselves, which means improving our organizational capacity to be responsive and allowing social scientists and civil society to ask inconvenient questions. For me personally, the biggest unused lever rests with the private sector. We are now relatively good at requiring "responsible" approaches in publicly funded research. However, most companies still lack a "social responsibility" approach to innovation. This is highly problematic since companies are the driving forces behind innovation in many sectors! You can see this tension in the very visible failures and criticisms of

initiatives such as Google's AI Ethics Board or the Facebook Oversight Board.

As a final thought, why is your research focus important right now?
Questions about the relationship between technology and society will not suddenly disappear or be resolved by a stroke of genius – on the contrary, they will become more central to everything we do as a society. Just think about how our understanding of sustainable mobility has changed twice over the past 3 years: starting with the pandemic, with massive implications for public transportation and remote work. And now again as a result of the Ukraine war, with supply chains disrupted and energy prices soaring. None of these are solely technological questions and they require a profound understanding of social, political and ethical aspects. ◼ *Eve Tsakiridou*

Annotation:

This interview is an adapted version of a longer text originally intended for the PRME report 2021 of the TUM School of Management.