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Dirnagl, Ulrich; Misselwitz, Philipp; Ruhrort, Lisa; Simon, Dagmar

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## Crossing Borders, Creating Together: An Interdisciplinary Dialogue on Transdisciplinary Knowledge Production

*Ulrich Dirnagl, Philipp Misselwitz,  
Lisa Ruhrort & Dagmar Simon\**

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**Prologue:** »Grenzen überschreiten, gemeinsam gestalten: Ein interdisziplinärer Dialog zur transdisziplinären Wissensproduktion«. Due to the Corona pandemic, it was necessary to cancel the conference “Positionality Reloaded. Dimensions of Reflexivity in the Relationship of Science and Society” at short notice. At the time, in May 2020, it was quite uncertain how far-reaching the consequences of the pandemic would be. This also affected the panel discussion that we had planned in order to collect practical and application-oriented perspectives on transdisciplinarity in academics. As restrictions of traveling and gatherings on social events across the globe intensified, digital conferences gradually developed into an effective format for academic exchange. In this respect, we were thrilled when we were able to save the two-hour panel discussion “Crossing Borders, Creating Together: An Interdisciplinary Dialogue on Transdisciplinary Knowledge Production” on 15 June 2020 using a live video broadcast. The main questions from the conference served as a guide: To what extent do academic publications and knowledge production rely on reflexivity and self-reflection? What consequences does this have for the self-positioning of researchers in the tense relationship between academia and society? The question of how meaningful academic activities are *in* society and *for* society correlates directly with the question of the relevance of transdisciplinary research, that is occasionally addressed as a possibility, a demand, a request, or even a necessity. While the other contributions in this collection primarily discuss these questions from a theoretical standpoint, the panel discussion was conceived as an “empirical counterpart.” The objective was to explore and discuss the opportunities and challenges that arise in transdisciplinary research practice from different functional perspectives: such as political

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\* Ulrich Dirnagl, QUEST Center for Transforming Biomedical Research, Berlin Institute of Health at Charité, Anna Louisa Karsch Str. 2, 10178 Berlin, Germany; [ulrich.dirnagl@charite.de](mailto:ulrich.dirnagl@charite.de). Philipp Misselwitz, Technische Universität Berlin, Fakultät VI Institut für Architektur, Straße des 17. Juni 152, 10623 Berlin, Germany; [misselwitz@tu-berlin.de](mailto:misselwitz@tu-berlin.de). Lisa Ruhrort, Wissenschaftszentrum Berlin für Sozialforschung, Reichpietschufer 50, 10785 Berlin, Germany; [lisa.ruhrort@wzb.eu](mailto:lisa.ruhrort@wzb.eu). Dagmar Simon, EVACONSULT, Emserstraße 22, 10719 Berlin, Germany; [dagmar.simon@wzb.eu](mailto:dagmar.simon@wzb.eu).

and mobility research, medicine, or architecture and urban planning. For this purpose, we invited four participants, whom we will introduce below.

**Keywords:** Patient and stakeholder engagement (PSE), evidence-based medicine, clinical trials, meta research, reflexivity, positionality, methodology.

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## Participants<sup>1</sup>

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**Dr. Lisa Ruhrort** is a social scientist and heads a junior research group funded by the *Federal Ministry of Education and Research (BMBF)* at the *Berlin Social Science Center (WZB)*. Researchers from various disciplines work together on the “MoveMe: The Socio-Spatial Transformation to Sustainable Mobility Behavior” project using an inter- and transdisciplinary approach (original title: “MoveMe – Die sozio-räumliche Transformation zu nachhaltigem Mobilitätsverhalten”). Previously, she worked in the *Institute for Integrated Transport Planning* at Technische Universität Berlin and at the *Innovation Center for Mobility and Societal Change (InnoZ)*. In addition, she regularly works in an advisory capacity as an expert in different processes related to sustainable mobility and transport policy, including as the coauthor of a report about self-driving cars on public roads for the German Green party: *Alliance 90/The Greens*.

**Dr. Dagmar Simon** is a political scientist and had a lead position at WZB for many years. There, she headed the “Research Planning and Research Coordination” unit as well as the interdisciplinary “Gender, Work, Organization” group and the “Science Policy Studies” research group. She worked at the *Institute for Research Information and Quality Assurance* as an academic coordinator. Additionally, she was the managing director of *TU-Campus EUREF*, an interdisciplinary institute dedicated to researching urban and energy-related issues. Currently, she is the managing director of *EVACONSULT* and a visiting researcher at WZB.

**Prof. Dr. Philipp Misselwitz** is an architect and urban planner based in Berlin. In 2013, he was appointed Chair of *Habitat Unit* – a globally networked research and teaching unit that focuses on exploring urbanization processes in the Global South – in the *Institute of Architecture* at Technische Universität Berlin. Recently, his research has focused on user-driven urban development processes and coproduction approaches in planning, migrant urbanism,

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<sup>1</sup> The German-speaking panel discussion was recorded with the permission of the participants and then transcribed. For better readability, the transcript was edited and abridged by the editors of this special issue and then sent to the speakers for revision and approval before being translated into English.

This panel discussion was moderated by Cornelia Schendzielorz and Ajit Singh.

urban-rural urbanization processes, translocal spatial production, and transdisciplinary teaching methods in the field of urbanism. Since 2017, he is Visiting Professor at the University of Witwatersrand in Johannesburg, South Africa. He is also a partner in the planning consultancy Urban Catalyst and regularly advises the *German Corporation for International Cooperation (GIZ)* and various *UN-Agencies*, global think tanks, and city networks.

**Prof. Dr. Ulrich Dirnagl** is a professor for clinical neuroscience and director of the *Department of Experimental Neurology* at Charité university hospital in Berlin. Moreover, he is a member of the *Berlin Institute of Health (BIH)* and founding director and research group leader at the *QUEST Center*, which is devoted to transforming biomedical research under the guiding principles of “Quality, Ethics, Open Science, and Translation.” Additionally, he serves as a board member in the *NeuroCure Cluster of Excellence* and researches at the *Center for Stroke Research*, which is also one of his main topics of investigation. Dirnagl hovers between the realms of clinical work and research.

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## Panel Discussion

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*Cornelia Schendzielorz*: To kick off this panel discussion, we would ask you to provide us with a brief overview of your research activities in collaboration with practitioners and researchers. What does this collaboration look like, and how do you achieve your results together within this transdisciplinary research process? Mrs. Ruhrort, would you be so kind as to start?

*Lisa Ruhrort*: With regard to your question about how I collaborate with fellow practitioners in my research, I would first like to mention that I am currently in charge of a junior research group dedicated specifically to transdisciplinary topics, which is being funded by the Federal Ministry of Education and Research. In many respects, this is an unusual configuration, since many junior research programs are targeted explicitly at a single discipline. And this aligns nicely with my own research profile because I work with issues related to ecological transformation. This field has always argued that it is necessary to work closely with people in the field. It is important to enter into dialogue with practitioners in order to understand where the starting points lie for socio-ecological transformation. What this means in concrete terms for my work in the junior research group is that we have a program that deals primarily with the region of Hanover. There we would like to implement a *transition management* process. We are organizing a series of workshops with a core group of stakeholders, such as individuals from the administration of different municipalities within a region or from civil society. All of these actors are interested in promoting sustainable transformation in the transport sector. The process is structured so that we feed in our research results,

provide input, and then share this information with practitioners to see what would be feasible and desirable in their eyes. While doing so, we strive to *enable* the practitioners to develop their own paths of action in order to overcome certain obstacles in this process.

At the same time, I have been working closely with actors from the mobility sector for many years now. This primarily involves highly practice-oriented research projects. The research and development projects at InnoZ<sup>2</sup> were related to mobility: for example, the use of electric cars in practical applications. Practitioners from the automobile industry or *Deutsche Bahn* (the German Federal Railway), for example, always played a role in these contexts. Currently, I am expanding on this work by bringing together actors from different sectors in various workshop processes, such as providers of mobility services with actors from the realms of public administration and transport policy. The purpose behind this is to sound out and comprehend what opportunities are available in terms of transport policy to ensure that these new services are sustainable but at the same time to make them possible in the first place, since there are of course a great many hurdles to overcome in this area. This is always a balancing act between the different interests. Research plays a very interesting, albeit very tense, role in this process.

*Cornelia Schendzielorz*: Thank you so much. Would you mind chiming in here, Ms. Simon?

*Dagmar Simon*: I would love to. I have been involved in both transdisciplinary research and in various types of transdisciplinary academic and political consulting. I would like to take the opportunity to talk about our work on the EUREF Campus<sup>3</sup> because, in my opinion, this is a unique format that has proven to be more profitable perhaps than the typical clusters we have grown accustomed to over the years. We have a large research project that is still underway there. I am now only involved as the chair of the advisory board of the “Mobility2Grid” – a research campus funded by the Federal Ministry of Education and Research<sup>4</sup> aiming to promote cooperation between the academic community and the business world. It is unique in that it is planned for

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<sup>2</sup> InnoZ is the “Innovation Center for Mobility and Societal Change” in Berlin. The original purpose behind InnoZ was mainly to research social, technical, political, and economical innovation processes in the mobility and transport sectors, especially with regard to the impacts of demographic and structural economic change.

<sup>3</sup> The EUREF campus in Berlin-Schöneberg is an inspirational place. More than 3,500 people work, research, and learn here today from more than 150 companies, institutions, and startups in projects related to energy, mobility, and sustainability – within a cooperative, open, and collective context. For more information, see <https://euref.de/>.

<sup>4</sup> The “Research Campus: Public-Private Partnership for Innovation” funding initiative by the Federal Ministry of Education and Research supports large-scale and long-term approaches to location-based cooperation between academics and industry within the framework of the German government’s High-Tech Strategy. For more information, see <https://www.forschungscampus.bmbf.de/>.

a relatively long period of time. We have received funding for up to twelve years, provided that we work together at the same location as a *sine qua non*. This meant combining concepts for a decentralized, regenerative power supply with mobility concepts on this EUREF Campus. Sharing a location over an extended period of time was a key aspect of this project. At that time, I was working at WZB.<sup>5</sup> We were part of the game on the one hand, and we simultaneously initiated an accompanying research program on the other. This campus brought actors together that had never before collaborated with one another in the field of mobility and power supply. It included large corporations such as Vattenfall, start-ups, spin-offs, colleagues from the Technische Universität Berlin, from non-university research institutions, small consulting firms – so a very colorful mix. I think that one of the deciding points was a collective, practical *doing*. We had what we in the academic community call a *boundary object*<sup>6</sup>: a *micro-smart grid*<sup>7</sup> that could be used to see what you were doing and where progress was being made in terms of power generation. We researched and worked on the first driverless cars. The differences between the academics and the representatives from the commercial enterprises did not blur, but a sort of joint research and development began to take shape. As a research campus, one specific criterion for success was obtaining both practical and academic results. And we actually saw role changes: The people from *Schneider Electric*, a commercial enterprise, insisted on conducting more basic research, and my social science colleagues became enthusiastic tinkers all of a sudden. The shared location and ample time together really proved to be a good thing. The typical two-year or three-year projects are not sufficient for such purposes. Things always need to be submitted for revision, and it is necessary to incorporate space for reflection. That worked out quite well, and we gradually managed to achieve mutual recognition and accepted each other's respective reference systems. Engineers and social scientists are not exactly a dream team in the first place, not to mention industry representatives. That is why I believe that, aside from the place and time, these boundary objects – like the micro-smart grid – were so important, which we refer to as a *boundary spanner* in academic research. These are people, project managers, who are very familiar with both systems, in the worlds of business and academics. They understand how differently the systems operate. This made it possible to “translate” concepts for a technical infrastructure into a theory and concept design. To put it in the words of Susan Star, these boundary objects were important because they allowed for an interpretive flexibility when very different actors were collaborating with one another, even if there was

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<sup>5</sup> Berlin Social Science Center.

<sup>6</sup> For more information, see Star and Griesemer 1989, 387-420.

<sup>7</sup> The micro-smart grid makes it possible to monitor how much regenerative energy is generated, consumed, and fed into the grid on the EUREF Campus. For more information, see <https://euref.de/entry/zeemobase-micro-smart-grid/>.

no fundamental consensus. That is why this serves as an interesting and successful example.

*Cornelia Schendzielorz*: My sincerest thanks for your diverse insights. Mr. Dirnagl, would you mind continuing and sharing the medical perspective with us?

*Ulrich Dirnagl*: I can give it a try, although a “medical perspective” might prove difficult for me. I have trouble distinguishing between the different terms: transdisciplinary vs. interdisciplinary vs. practitioner, and so on. That is not the same in my field. Interdisciplinary, as I know it in medicine, is another type of interdisciplinary. The medical field consists of many disciplines, and they frequently work together – “the heart” with “the brain” or “the intestine” with “the brain” – because humans are made up of all these different parts, and a single illness usually affects most of them. There are branches specialized in each area: neurology, gastroenterology, hematology, etc. It is not always easy when they get together. Even if they all speak the same language, and usually all of them are doctors or scientists, these specializations often lead to a limited view and perception nonetheless. This then becomes clear, for example, when reviewing interdisciplinary research grant applications. Allow me to illustrate this using an example. We once tried to submit an interdisciplinary immunology and neurology cluster and failed splendidly. The neurological expert thought that our immunologist colleagues were practicing neurology from the Stone Age. By contrast, the immunologist expert argued that we neurologists were practicing prehistoric immunology in the project. Nobody was willing to think outside of their own box.

But I think that your understanding of transdisciplinary extends beyond this: along the lines of “trans-somewhere-else.” In my day-to-day business, I see junctions to philosophy, for example, in the *Mind and Brain* graduate school,<sup>8</sup> which is also funded as part of the excellence initiative. As a stroke researcher, I see myself as more of a plumber. There is not much room for philosophy. We are more concerned with clogged blood vessels than with what acute damage has been done to the brain, and we look to see which of the patient’s functions are failing. Therefore, I could not say from my own perspective what the success factors for transdisciplinarity are. But it seemed important for me to present funding models that could bring together scientists from different disciplines, both in the context of training and collaborative research.

Furthermore, I think of transdisciplinarity in terms of what we call *patient stakeholder engagement* (PSE). That is also a relatively new thing. Medical scientists tend to practice science that narrowly passes the patient by. They are interested in quantifying specific things, like *outcomes* in studies: the size of a

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<sup>8</sup> For more information, see <http://www.mind-and-brain.de/home/>.

stroke on a CT, for instance. These outcomes are then collected in studies with the patients. But if you ask the patients whether a certain outcome is really relevant for them or whether it might be more important for them to be able to walk up four flights of stairs or get dressed by themselves, it turns out nobody has ever asked that before. That would be what is known as a patient stakeholder interaction, which we are just now starting to use. This is not easy, and we have experienced a great deal of failures so far. It is something where lots of crossover is necessary, this “trans-somewhere-else-entirely,” which is proving challenging for us. Even the BMBF has recognized this and is now promoting it strongly. That is a good thing. But no one really knows how to do this well and how to actually measure the resulting success. The mere fact that we are now including patients in the design of the studies is certainly patient and stakeholder engagement. However, whether the studies are better in the end as a result and whether the patient is ultimately better off due to this research still remains to be seen. Even the question of how to evaluate such stakeholder engagement is fascinating. I do not have any answers to this yet. But I know the questions, and that is a step in the right direction.

My experience with meta research is probably somewhat close to the proper meaning of interdisciplinary. Here we are trying to carry out a type of *behavior change intervention* among our doctors. In the process, we show them where there are problems in their research on the one hand, and we want to help them improve the quality of their research on the other, while at the same time influencing the reward and career system in academic medicine so that it is more quality oriented. This brought me closer to sociology. This has been a very constructive and educational process for me. The fact that people who understand both worlds are involved is encouraging. In my opinion, sociologist Martin Reinhart is a prototype of this with his multidisciplinary background in biology, informatics, philosophy of science, and sociology. For us, someone like this is extremely helpful because we can talk to someone who is not likely to throw up their hands in defeat right away. I could provide plenty of practical examples where this is not exactly the case. If you would like to conduct evaluation research in a setting with doctors and scientists, and you introduce a “hardcore sociologist” who explains in a fifteen-minute pitch what he has planned for this project, this will often be met by a great deal of incomprehension at first. These are two entirely different worlds. They speak different languages. They think differently. They use different methodologies. Someone who says the same thing but adjusts the language to the target group can get their foot in the door. Then all of a sudden, a dialogue is established, which is extremely helpful. The success factors I see and that were already mentioned by the previous speaker are as follows: you need to be on site, you need to work together on something, and you need certain people. Not everyone has to be able to do everything. That would be

horrible. Instead, you need people who can act as a bridge and who understand the different disciplines.

*Cornelia Schendzielorz:* Thank you so much. Mr. Misselwitz, could you give us an overview of your research and work as an architect?

*Philipp Misselwitz:* Yes, thank you. I can embellish on much of what was already said. But I would like to start by saying something fundamental about architecture and urban planning at universities. We consider ourselves as an integrative field between social science and technical disciplines, between more theoretical and practical approaches. This means that the disciplinary boundaries within which we operate are often quite blurred. At universities, this regularly arouses the suspicion that we may not be so academic after all. We tend to approach questions through real-life settings, concrete spatial situations and specific urban actors operating on multiple scales. That is very much the opposite of an ideal-typical laboratory constellation. Cities are *moving targets*. This means that our point of departure is a chaotic, complex situation that is in constant flux. Urban problems are “wicked problems.” Solutions we might propose have ripple effects and repercussions on the urban systems they are part of. We are often caught in the middle of burning social debates and controversial situations. This surely holds true for many of you, too. I only wanted to emphasize that our starting point is a situation characterized by very different knowledge bases and knowledge cultures, ranging from technical expert knowledge to the embedded and situated knowledge of local urban actors. The knowledge that we need to understand urban complexity therefore needs to be *coproduced*.<sup>9</sup> If, for example, we want to investigate how infrastructures or public spaces change under certain conditions, how cohabitation works in an urban setting, or what needs to be done in order to prepare cities for climate change, we need to involve a variety of actors – various technical disciplines, political actors, citizens, and so on – to coproduce transformation knowledge<sup>10</sup> as a basis for technically sound, locally sensitive, and just solutions. For me, this also means that interdisciplinary and transdisciplinary approaches in fact become blurred.

Currently, we are focusing chiefly on the Global South. We are working in cities in which the majority of spaces are produced without any framework of planning. The default mode of urbanization globally is what we often refer to as “informal.” With a rigid disciplinary lens or a classical planning approach in mind, such conditions appear hopelessly disorderly and messy. So, what are alternatives to steer transformation beyond a purely expert-driven approach? What knowledge base do we need? We need an integrative holistic approach that combines an understanding of the physical and material conditions or urban ecosystems, the situatedness in a specific political economy,

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<sup>9</sup> Huchzermeyer and Misselwitz 2016; Misselwitz 2018.

<sup>10</sup> Pohl and Hirsch Hadorn 2008; Schneidewind 2015; Gao, Langguth, Lynam, and Misselwitz 2020.

and the *embedded knowledge* of the users engaged in informal construction and self-provisioning practices. It is not easy to grasp this complexity initially and then to reduce it to the extent that one can develop solutions that work. Increasingly, applied research projects therefore resort to a *living lab* approach. This means exposing ourselves to concrete situations where multi-actor driven transformation is ongoing and where we can participate as researchers. This requires us to assume a very complex role and to reflect on ethical accountability. If, for instance, you are working in a neighborhood in Medellín, Colombia, gaining access as a white European architect or planner can be tricky because the neighborhood might be in danger of being demolished or displaced. In this case, gaining access first involves establishing trust, defining rules for cooperation, and sometimes even formalizing agreements. Many times, we are immediately asked the question “What can you offer us in return for investing our time to work with you?” We cannot only extract knowledge for our own academic agendas. We find ourselves at a critical interface for somehow combining diverse expectations from different stakeholders and the challenge to structure and moderate an appropriate process that respects sensitivities and time resources of others.

Furthermore, it is necessary to incorporate space for self-reflexivity in relation to our own positionality and the way our engagement in a living lab situation changes the local power balance. Our engagements are shaped by our own normativities and values, which often produces conflictual and therefore profoundly political situations. That is something that funding agencies generally do not want to hear. It is more comfortable to fund transdisciplinary projects that do not cause any trouble or expose conflicts or become too political.

*Cornelia Schendzielorz:* I have a follow-up question: What role do the people you mentioned play in the research processes? Who plays what role, and who assigns the roles? Do the participants choose their roles themselves, can they demand or compete for a certain role, or are the roles already assigned as part of the respective format?

*Philipp Misselwitz:* Well, I think it would be particularly interesting to reflect on how we engage with actors that bring non-academic or embedded knowledge to a research project. For example, there are residents who possess innate, practical knowledge: people who acquire it through their day-to-day work, in a neighborhood that developed in a completely informal context and that has hardly any resources at its disposal to survive under extreme circumstances. If you want to understand how these social, economic, cultural systems work in order to make meaningful interventions, then you need to work together with the residents. There is no way around this. To do so, we need to decenter our own specialist academic knowledge and shift into a role of integrative moderator. The process of knowledge creation then has to be

negotiated amongst all partners. Sometimes, a simple formalization fixing rules of engagement, expected outputs, formats of participation, intellectual property rights, etc. can help to build trust and ensure transparency. Architects and planners often assume these integrative roles in professional contexts. We can learn from this for research contexts too. However, I would be interested to know what the other discussants' experiences are with the different roles in such processes.

*Dagmar Simon:* Well, I do not think that there is a *one-size-fits-all model*, but rather there are many different models. In the end, it also depends on what the research topic is or on the area of application. For example, when technological development is involved, it is crucial to include the role of potential users in the process from the beginning. In many cases, you develop a certain piece of technology, and then nobody wants to use it because maybe it is far too complicated. It is important to add that not enough attention is paid to gender differences: for example, on the research campus. I think it is really important to take them into account from the very beginning, and the processes or applications that are usually shaped by gender stereotypes also need to be called into question. Especially when long processes are involved and not just a workshop, it is essential that you allow for and include other perspectives as well. That can be decisive in terms of ensuring that the cooperation is productive. Therefore, a process perspective is crucial if you are aiming to contribute models capable of gaining wide social acceptance in the case of the grand challenges related to the energy and mobility transition. This field is currently lagging behind in this regard. In my opinion, it is important to keep one thing in mind, speaking as a political scientist: We speak a great deal about these participatory models within the framework of *real-world labs*, *living labs*, *test beds*, etc. Whatever name they operate under, these processes always deal with positions of power. It is impossible to avoid this, but you need to be aware of it. Certain interests need to be enforced in this case. Therefore, especially in these ambitious long-term processes, I think it is important to always reflect on the following: Who are we speaking for? What are our roles? What normative presuppositions find their way into the process; do they need to be questioned?

*Ulrich Dirnagl:* In the field of medicine, we are still far away from even knowing how to do this. I can illustrate the problem with an example: We sent out surveys to the doctors at Charité hospital with one question asking whether and how they practice stakeholder engagement. The answer from the physicians was always the same: "Yes, I do that. I do clinical trials." In other words, for the average medical doctor, *patient involvement* means conducting clinical trials that involve patients. At the same time of course, it is true that patients represent populations that can be very specific to one disease and also extremely heterogeneous. Stroke patients, for example, often suffer from

speech impediments. This gives rise to very practical questions: How do you involve someone who can no longer speak properly? An even greater problem is how do you introduce patients to the subject of study without being paternalistic and without pretending beforehand what you want to hear from them? After all, the doctors generally come up with the idea for the study themselves. If they are honest and mean well, and if they really want to practice PSE, then they will seek advice from the patients who are involved and modify their study accordingly. In order to do so, they have to explain to the patients what they are actually doing, what a study is, what randomization and blinding are, and so on. This means actually beginning something like this with a crash course in study methodology and design. As a result, this is often left to patient organizations. In part, these are then considered “professional patients.” In other words, they are patients who have become experts as it were in the course of their illness and who now act as officials practically in the field of their illness. Without a doubt, some of them are very well informed. But in fact, they have become alienated to some extent from the group they are supposed to represent. At the same time, they are now courted and influenced by other groups. Many patient organizations are influenced by the pharmaceutical industry, for example, since it finances them. As a result, the interests of the pharmaceutical industry might suddenly creep into your study through PSE. My only intention is to show how complicated this can be in our field and how insecure the respective procedure is. There is no manual that you can open up and consult. That is why it is first important to consider how to go about something like this in principle: How do you find the right patients? How do you talk to them? How do you listen to what they say? I think that this is all possible, but I do not know if you can really call it a science. It is more of a discipline that is still in its infancy. England has made the most progress in this regard, not Germany. In England, they are much further along concerning patient participation in research studies. We are in the process of learning from them, but we have not been able to put a great deal of that into practice yet.

*Cornelia Schendzielorz:* How is it that England is so far ahead of us?

*Ulrich Dirnagl:* That is a good question. Maybe it has to do with the fact that England is the birthplace of evidence-based medicine. In essence, in most places in the world academic medicine is still eminence-based. Evidence-based medicine means that experts use a transparent methodology to determine which therapies would be recommendable and which would not be. It is a methodology that quantifies and evaluates existing evidence in order to reach conclusions that say “this is certain,” or “there is not enough evidence to support this because more studies are necessary.” The British were the first to carry out sound clinical trials. Maybe this is also because their hierarchies are flatter than the academic career structure found in Germany. And

perhaps this is compounded by the fact that they have the tradition of seeing beyond their own four walls and asking themselves if what they are doing is more than just busy work – in terms of producing visible academic articles – and can actually serve to help the patients. And then you quickly realize that you cannot do anything for the patients if you do not inquire about the patients' perspective and ask what they think is important.

*Lisa Ruhrort:* Yes, I agree entirely with these observations: It is all about understanding and analyzing power relations in the fields of practice in which you are involved. Mr. Dirnagl mentioned that you often have to deal with lay people who are actually experts to a certain extent and who are themselves also involved in the power constellations that prevail in the respective field. This is the case with the pharmaceutical industry and also with mobility research. Of course, the transport sector is first and foremost a huge economic system containing very powerful actors. We can see this every day in transport policy. This is especially true for the automobile industry. In my field of research, I deal with new mobility services. These are not real niche players, but rather they are associated with the automobile industry, for example. I am very familiar with that feeling you get when you are sitting in a group of people who are very open when participating in such a process and who engage in dialogue as equals. But you also have to take a step back from this and see how much money and power is behind the people represented there. However, in my opinion, one difference between medicine and social sciences is that the medical industry itself is a very powerful system since the doctors are also backed by a large financing system. As social scientists, we play in a different league because we conduct our research on a much smaller scale in terms of financial reasons. In any case, I believe that fields such as medicine could stand to learn from the social sciences in terms of how they analyze situations from the outside, detached from the power constellations in play. This means taking into account the role of the pharmaceutical industry, the role of the patient organizations, etc., or in our case, that of the consumer organizations, such as those in the automobile sector. However, after analyzing these power constellations, I can then engage in a real dialogue with the people sitting across from me all the same. These reflection processes can deliver important insights, even if they are influenced by powerful interests.

*Ajit Singh:* Thank you very much for the insights into your working fields. As our discussion has shown so far, a very important component of transdisciplinary research seems to be that the different research participants collaborate and research simultaneously and copresently in the same place. I would like to take up one aspect and discuss it with you in more detail: Which actors do you work with and what image do you have of them? Because this seems

to have a direct consequence for your own positionality in the field. Ms. Ruhrort, can you once again start to tell us more about your experiences?

*Lisa Ruhrort:* I would be happy to elaborate on my last point. As it happens, I would say there are two main groups of actors: First, there are the cities and the administrative actors in those cities. These include stakeholders who often have major ecological interests or relatively high ambitions to implement a change toward ecological sustainability. Sometimes I see problems arise when people get stuck in a sort of echo chamber, in which they increasingly have contact with the actors advocating the change and much less frequently with the “opponents” of that transformation process.

Second, essentially as an antithesis, I work with the supply side of the transport sector, that is to say, with the economic actors. This can also create a great deal of tension because they defend entirely different interests than the city administrations do. This constitutes a direct contrast. But that is what makes it so interesting to research: Looking precisely at this field of tension and trying to create a type of arena in which these actors can meet on “neutral territory.” In acting as a “neutral observer” I can sound out where there are interfaces between them.

*Ajit Singh:* If I understand you correctly, this means ensuring a sort of mediation between the different positions and not simply pushing through your own agenda?

*Lisa Ruhrort:* Yes, this involves a type of mediation, but of course it also means gaining knowledge. It is great if you can act as a mediator, creating something new in the process, which is a good thing. But actually, the focus is on gaining knowledge, and you take advantage of the fact that these actors want to meet but have not found the occasion to do so. You can use this to observe and understand how they think. You gain this insight when they talk to each other. But you really remain the third actor looking in from the outside.

*Dagmar Simon:* Social scientists are extremely popular as moderators or supervisors in such processes. However, that can be quite problematic since you are sometimes confronted with paradoxical requirements: on the one hand, you try to move things forward from a “neutral” process perspective, while on the other hand, you introduce insights from the social sciences in order to lead the “project” in a certain direction. These two perspectives can certainly clash with one another. You need to be aware of this. I would like to add something about the term *positionality*. In relation to social scientists and especially sociologists, this involvement in such transdisciplinary processes is not entirely without difficulties, even if it is within the framework of a large-scale research project like the research campus. With regard to positionality, this is a persistent problem that constantly makes it necessary to find a balance. This holds true in particular for young social scientists who are still “on track” and still plan on staying in the academic system. Working with

practitioners and being responsible for such processes takes a great deal of time. To put it bluntly, this time is taken away from the time for your own publications. If you take a look at what is ultimately acknowledged in the current German academic system, it is closely related to the evaluation and acknowledgment regimes of the disciplinary cultures. These regimes are different in sociology than they are in urban planning or engineering, for example, since collaboration with practitioners is already part and parcel of the latter. That is not the rule for social scientists, who would surely gain a great many insights that they could reuse for their own research through transdisciplinary cooperation. But they are not thanked for this.

*Philipp Misselwitz:* I would like to address a point that was mentioned earlier: My observation is that the massive budgets in the German academic research funding system often result in a tendency for the funding agencies to prestructure funding programs – especially transdisciplinary ones – to an extreme degree. Certain groups of actors are left out intentionally or privileged based on the program logic. In addition, the very formal application systems we are required to follow force us to prestructure our research approaches in a very detailed way. This can limit the openness and flexibility needed for transdisciplinary research explorations once the project actually starts. We encounter unexpected issues and conflicts, new actors, unforeseen developments when we are in the field, and we then have to somehow counteract the predefined parameters. The very point of engaging in transdisciplinary approaches is to embrace these uncertainties fully and learn from them. Instead, we are risking producing foreseeable results already premeditated in our research applications. The question arises: How can we balance the impact that funding might have on predetermining project outcomes while also addressing the understandable expectation of research funding providers to know where we are heading?

*Cornelia Schendzielorz:* Maybe you can illustrate this using a specific example. What I mean is, are imbalances of power, social inequalities, and hierarchies contingent upon transdisciplinary knowledge production or upon something else? How do you deal with them? Can you influence them in order to make the residents' voices heard as well, for example? How do you go about making necessary decisions?

*Philipp Misselwitz:* How do we go about this? First of all, we need to acknowledge that not all funding programs are suitable for transdisciplinary approaches. Foundations are often more willing to fund need-oriented and demand-driven research and are less inclined to insist on rigid prestructuring. Secondly, the success of a transdisciplinary project obviously really depends on a very careful selection of competent, non-academic partners to help facilitate field access and co-steer the research. If one settles for a certain constellation too early, it may prove impossible to change it later on. Going

with the most visible partner may prove detrimental. Selecting partners takes time and sensitivity and going past individuals and organizations that could in fact assume a problematic *gatekeeping* role. A more nuanced view of a local situation, a better understanding of local power dynamics, and competencies of stakeholders often only emerges gradually.

*Cornelia Schendzielorz:* Another interesting point is the previously mentioned alienation of the people involved in the respective project from those they are supposed to be representing. Aside from the aforementioned example of the patients, I could imagine that such charged relationships also exist elsewhere. Can you think of any connections in this regard, or do you have any specific recommendations on how to deal with this? How do you moderate these constellations in decisions so that everyone is able to participate in the most appropriate way?

*Philipp Misselwitz:* It really depends on the project and the questions it tries to answer. Long-term medical research projects that Mr. Dirnagl might be involved in might require a very stable *sample set* of people who are willing to collaborate over a long period of time. For us, working on urban transformation projects sticking with the same people or organizations might be very limiting. As I mentioned before, understanding local urban dynamics more deeply requires going beyond gatekeepers and neutralizing their desire to shape outcomes. Local communities are not monolithic, often deeply divided and understanding internal frictions and conflicts can be key. Local conflicts can provide very important insights and clues.

*Dagmar Simon:* Yes, I think we are talking about very different issues in terms of the practical cases or applications. I would be interested to know what Mr. Dirnagl thinks about the extent to which patients in the clinical trials should be allowed to influence the type of study or the question being investigated. After all, we are repeatedly talking about *coproduction* and *cocreation* processes. But this is by no means typical everywhere, nor is the practice of involving everyone who has an interest in the issue or in the question.

*Ulrich Dirnagl:* Let us look at alienation first. The problem with alienation is real because exerting influences is intrinsic in this context in particular. But even without these influences, the patients who do this undoubtedly change. And suddenly they might even start thinking – this is our experience – a little like doctors, and then they lose some of what it means to be a patient. This happens in part because we have trained them to understand what we are doing. Therefore, there is also something else that has not yet been mentioned and that is important in my opinion: representation. The question is whether they even represent what we are looking for. What is of interest to us for the specific study. Around 500, 1,000, or sometimes more than 10,000 patients are involved in a large medical study. This is because the patients are so heterogeneous. But you cannot recruit 500 or 1,000 patients into such a

process. You have to select 10 or 20. If you have 30, then it is already like a town hall, and you will not know how to manage them all. But if you only have ten, and only two or three of them do the talking, and they may talk a lot because they could have idiosyncratic interests, then they will suddenly influence what happens with the other 1,000 patients, who are not actually represented by these people at all. This begs the question of how to select the patients in the first place.

*Ajit Singh:* That brings me back to the challenges of interdisciplinary and transdisciplinary research. When scientists from different disciplines work together, there are always different preconditions and more or less explicit assumptions about how to conduct research. This means that different disciplinary cultures and communities of practice have to converge methodologically in some way. In the context of transdisciplinary research, we are not only dealing with researchers in the classical sense, but also with people from civil society, or with certain actor groups who are relevant for the research but not trained in doing research. What conditions have to be created for transdisciplinary research to work in practice? What knowledge needs to be communicated and mediated for transdisciplinary research to be possible at all? How does this work for you in your respective research fields?

*Ulrich Dirnagl:* How do we bring in these patients or prospective study participants in the first place? Yes, that is incredibly difficult. On the one hand, we would of course prefer for them to be “naive” since they should be participating in the process as patients. However, if I do not explain fundamental concepts to the patients, such as randomization and blinding, or how such a study is generally structured and then analyzed at the end, then they will not be able to contribute or make suggestions, which would be more important. Therefore, in my opinion, that is something for which – and I can only keep repeating this – we do not really have any good answers yet, and we are struggling to find a solution. There are surely multiple approaches. One approach is to use patient organizations, which claim that they are representative for their constituents. But the question is whether or not they really are in the end. We have also worked with individual patients who were former patients of ours and were not part of any organization. But we actually failed in that endeavor. We realized that it was nearly impossible due to the extremely different educational backgrounds and the very different conceptions of what the objective of such a process is and of why someone is even participating in something like that. The people involved are not just investing their time and taking a risk by participating in a study; now they are also expected to spend time deliberating with us on how to carry out studies for future patients. That is asking for an enormous amount of altruism!

*Cornelia Schendzielorz:* I think that is a really interesting point. Of course, that is particular in the case of the patients involved and the need for altruism,

while at the same time this raises the question of what is required to ensure competent participation, or which conditions need to be met to achieve the intended type of participation. These conditions can demand both a sort of impartiality or even naivety and a minimum level of competence. I suppose the answer to the question regarding the extent to which the participants need to serve as representatives varies significantly from one field to the next since sometimes it is necessary to compensate for strong private interests and altruism does not play a very big role. I would like to ask this question – what is the relation between representation and participation – to the rest of the group.

*Philipp Misselwitz:* I can relate to what Mr. Dirnagl said, despite the differences between our disciplines. It is important for us to be completely aware of the fact that these are expectations for transdisciplinary projects, which include people who are not academics. Just as we have certain expectations and interests, so do the other people involved. It can be difficult to mediate between the different parties. The research funding often imposes very limited possibilities. For example, in most projects it is absolutely impossible to fund non-academic actors and to pay them for their time. We have to find other solutions, emphasizing that a research project can lead to a win-win situation for all parties involved. Our research goals might be clear. But why would certain stakeholders work with us for three or four years and invest a great deal of their time? What do they gain in the end? To negotiate this can be difficult. We are regularly asked by Berlin refugees whose housing situations we are currently investigating whether we can give them an education certificate from Technische Universität Berlin. We try to find ways to acknowledge their participation in a research project by writing letters or issuing informal certificates. We need to recognize that defining clear benefits is of interest to all parties involved, even if those benefits can be very different for each side.

*Lisa Ruhrort:* I would like to add here that you have to ask yourself, whatever the difficulties, “Why?” “What do we stand to gain, and what is the added benefit?”; and I think it is a huge benefit. After all, you have to regard all of this input that you get, with all its imperfections, as a type of corrective measure for the assumptions you had when entering a certain field of research. That is probably true for the medical field, just as it is for my own field. As a researcher, you have certain preconceptions of how the people in this field think: for example, how the different actors in the administration think about certain problems. At any rate, you figure out what is not valid, what does not hold true with regard to what you thought would be the case. Of course, that is a minimum expectation that you can have. But I think that it can have a great impact in terms of you reflecting on your own position as a researcher. In this regard, I see a similarity to the paradigm of *Verstehen* in qualitative

social research. To achieve this kind of understanding, you often need to be “irritated” or “stimulated” by outside perspectives.

*Dagmar Simon:* I have two points to add here: The question of representation is of course extremely important in certain subject areas, especially if power constellations play a big role. But it is also important to point out, when talking about a specific type of collaboration, that representatives of certain groups are not exactly the most suitable people for working together, at least in the medium term – especially when you need to accept the fact that sometimes you will have to take two steps back, that you might not see any results for a while, and that the results might not be apparent all at once. That can be a tricky problem. To some extent, you have to accept that certain interests, perceptions, and opinions will not be represented right away. You have to try to compensate for this somehow. That is the first point. The other is that there is often a huge difference in knowledge and there can be glaring knowledge gaps, especially when working together with representatives from civil society. There is no beating about the bush. You have to find a way around this. Many times we talk about the fact that we have these different types of knowledge – practical knowledge, theoretical knowledge – and we bring them all together. We attempt to do so of course, but it is not possible to dismantle the hierarchies just like that. It is definitely worth taking the time to understand what hierarchies exist and how you can handle them in each individual case. This notion of equitable participation in such transdisciplinary processes is a lovely idea, but it does not work so well in practice.

*Ulrich Dirnagl:* I would like to pour some cold water on what Ms. Ruhrort said. After all, those were assumptions, and it is extremely plausible to assume that we can learn how to make a process better from those for whom we are doing the research. In our case, we have these “aha” moments when it suddenly becomes clear that certain outcomes are not at all relevant for the patients. But that is *false validity*: it makes a lot of sense, but there is no evidence that it can really lead to better studies. I am a protagonist in the matter, so I am really arguing against myself right now. But I also endeavor to find evidence that this does in fact have positive effects. After all, you could just as easily construct a bunch of negative, non-intended effects from such measures. I would even take this one step further and dare to ask, “Where is the evidence that transdisciplinary research is productive?” That is a lot of *sweet talk*, but Alexander von Humboldt failed in this respect. What happened to his holistic view on nature? That is not where we are today. We have tons of specialists. Humboldt was the great interdisciplinarian and transdisciplinarian after all, but we cannot revert to his mindset. So, I will formulate my question more precisely: Where is the evidence that what we are suggesting here is actually a good thing? Where has it been demonstrated that these processes that we have been mentioning really produce positive outcomes and that they are

better than what we had before when they were not transdisciplinary? I am excited to hear what you have to say. I am not trying to provoke you in any way. I am simply interested to know what you think because I would like to take a look at the method you used to prove this. Then I intend to adapt this method and apply it to our stakeholder engagement.

*Cornelia Schendzielorz*: I would like to pass this question on to the rest of the group and add another question of my own: What concept of evidence do we rely on when we adopt this measure?

*Dagmar Simon*: I think Mr. Dirnagl hit a sore spot indeed here. We understand a large portion of transdisciplinary research – even if there are X definitions of transdisciplinary – simply as research in which we cooperate with other social actors from different disciplines on a joint process. By all means, there are several publications<sup>11</sup> in which we can see from a process perspective that these different perceptions, these different interests, and these different conceptions of the issues have all made the subject much richer and more interesting. You are faced with new perspectives, and you are also forced to change your own perspective. And I think that has already made an impact. But I myself would say that the process perspective has become the most dominant in research on transdisciplinary approaches. The process is elemental, as are the questions “Who do we include?” and “How do we include them?” It is difficult to show what the final result of this is. Whether an outcome is considered interesting or important depends on the question and on who you ask. So far, there have been very few studies on this because nobody has ever really cared about it. Rather, they are more concerned about the conditions needed for a transdisciplinary process to succeed. The second problem is the question “How can we evaluate this?” This is not possible with quantitative indicators. Even in the case of a narrow question, such as the economic impact of research, an assessment based solely on licenses, patents, and spin-offs would result in a very one-dimensional perspective. However, when dealing with transdisciplinary research processes, this is much more challenging. This can really only be represented qualitatively. In that case, you are always faced with a structural disadvantage; for instance, in the basic research that measures quality based entirely on the articles in international refereed journals with a high reputation. I am slowly coming to a head, but dealing with “adequate” criteria and indicators is really a problem in the wide range of evaluation processes. In the UK, they made an interesting attempt at this with the REF (*research excellence framework*), the successor of

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<sup>11</sup> Scholz and Steiner 2015; Thompson Klein 2014; Maasen 2010; Maasen and Dickel 2019; Ukowitz 2014.

RAE<sup>12</sup> (*research assessment exercise*), as an assessment system for all higher education providers. The research departments were obliged to write down on six to seven pages where their research is practice oriented and how that has changed their research agenda, and they were asked to not just outline how much of their research was communicated on television and radio stations or other types of media. That is not very popular in the UK, nor is the whole cumbersome reporting system, but I thought it was an interesting approach. Nevertheless, it all counts as roughly 20 percent of the entire evaluation. That is quite a lot. Here in Germany, we list everything. We write down every event, every interview, every workshop, and so on, but in the end, that all hardly matters, at least in many disciplines. There are exceptions. Of course, the disciplinary cultures also dominate the reference systems.

*Lisa Ruhrort:* I also believe that we as social scientists cannot and should not converge entirely on the term “evidence,” which has been dominant in the natural sciences and the medical field for quite some time and has proved successful there. I do not think that we need or want this as a standard, at least not exactly in this form. Mr. Dirnagl, you said that the method you mentioned is still in its infancy in the medical field. The question is what this will be like in 20 years when we look back on these studies. Maybe we will indeed see that they have improved. That is entirely possible. But of course, this can only be seen after lengthy processes so that we have a sufficient number of studies to compare with each other in turn. But I can imagine that we will actually see this effect – unless of course we realize that we should have defined other outputs for these studies. Needless to say, then it would be difficult to measure this study using the same standards. But I think that the social sciences need other standards for success in any case, and Ms. Simon already suggested this. What is exciting for me as someone who works with socio-ecological research is the catchword *policy advice*: what comes out in the end so to say. In other words, can I generate input for politics that is relevant for the political questions that are raised? It seems fairly obvious in my field that the quality of this potential input can be improved by entering into dialogue with people in actual practice. Now when I see doctoral students who have very little experience with practitioners, I get the feeling that tons of little light bulbs start to go off in their heads as soon as they start talking to people in the field. They realize, “Oh, that is different than I would have imagined.” In my opinion, these are the standards for success that we should be observing in our field. Surely this also has to do with the fact that I work in a very problem-oriented field of research, with the basic normative structure that is

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<sup>12</sup> The Research Excellence Framework (REF), formerly the Research Assessment Exercise (RAE), is the central assessment system for higher education providers in the UK, which is used as a basis for distributing research funding. As such, this system plays a key role for higher education providers, see: <https://www.ref.ac.uk/about/what-is-the-ref> (Accessed 07.06.2021).

predominant in socio-ecological research. That is a bit different than in basic research – the same can be said for sociology or the social sciences.

*Ajit Singh:* I would like to ask a question at this point that addresses a temporal aspect with regard to your past experiences. In your opinion, has transdisciplinary research changed in some way over the past years? To put it more precisely: Whether and to which extent have there been any observable substantial shifts of relevancies in transdisciplinary research? And how have the specific groups of actors you are collaboratively working with been changed over the last years?

*Cornelia Schendzielorz:* And if I might add something quickly, to what extent is transdisciplinarity a requirement for research in terms of the research process and the input created in the process? Or is it more of a requirement for the results to be located at the output level? And are there any temporal tendencies or current shifts in this context?

*Ulrich Dirnagl:* I already mentioned that PSE, (that has always been my example), is relatively new. It has existed for a couple years now and is being practiced more and more. The BMBF has even gone as far as to include in its calls for tenders for clinical trial programs a requirement saying that you have to integrate such a process in some way into all studies that receive government funding. That alone will cause this to become a more common practice. But there is another field where I see transdisciplinarity starting to take off: namely, with meta research. That applies at least to the field in which I work or in the biomedical sector in general. This all started with problems that we discovered in connection with the reproducibility of our results. Over the last ten years, this has given us cause to reflect on how we practice science, on how we reward and evaluate scholars in the system. I would say that all of these things are completely new. Ten years ago, there were surely a few people who were pursuing this in the philosophy and sociology of science. But now the fields of medicine, biomedicine, and natural sciences are also interested, and there has been a great deal of activity as a result. However, I do not think we have reached the end. This is all just the beginning, and you read in the newspapers, especially now with the COVID-19 pandemic, about the debates being sparked concerning *preprints* and how the *review process* works and all those things. That is a debate that would never have taken place ten years ago. In that sense, I really believe that something huge is taking place.

*Philipp Misselwitz:* I would agree that things are changing at the moment. The growing awareness of a socio-ecological crisis with regard to sustainability and climate change has considerably helped us to realize that technology fixes alone do not work. We are realizing how important it is to think of transformation as a societal process. Science cannot simply deliver solutions. Transitioning towards sustainable futures needs to be negotiated with the help of better science-society-policy interfaces. For me, that also legitimized

the call for more transdisciplinary research in line with transformation research. On a meta scale, global agendas, such as *Agenda 2030*, the *New Urban Agenda*, and the *Leipzig Charter*<sup>13</sup> can provide some guidance and framing. References to such agendas already get copied and pasted into research tenders. But much more research is needed to understand how such goals can be implemented in local contexts.

*Dagmar Simon:* I would like to touch on the question from Cornelia Schenzielorz again. Often requirements are defined for the process, or if you think about calls for tenders and large-scale funding programs, there are requirements for who should participate and how the constellations of actors should be set up. This is always linked with the expectation that the result of the research process will then be different, better, or more interesting. Strangely enough, there is not much interest in taking a closer look at this. At least it is not processed in any way. Now that we have so many transdisciplinary research projects, I would think that this would be an extremely interesting subject of study for academic researchers. It would also be interesting for the funding agencies. They are the ones who tend to dismiss it. The main concern is ensuring that the entire process was correct and that the stakeholders were involved, and so on. I would like to take this one step further and put into perspective whether or not these projects include structural modifications or major changes. From an institutional perspective, what we have been seeing in the last ten years is that transdisciplinary research – and I say this deliberately – has been exaggerated, arising to some extent from the “backwater” of socio-ecological research (from the standpoint of academic research). That has been encouraged with large-scale funding programs. And we see this being used more and more at universities and institutions of higher education, for a long time now, as long as they can conduct research. We investigated this based on the excellence initiatives for certain excellence clusters. It was also exciting to see these questions being addressed by the academic community, and not simply because it was a funding requirement but rather because it was an inherent development, motivated intrinsically. We took a look at it in marine research. We can no longer regard it solely from the perspective of marine biology, but rather we need a broader field. In that sense, we are seeing some institutional changes. The *German Council of Science and Humanities* (Wissenschaftsrat) serves as a good barometer for this since it has published several papers in the last few years on knowledge transfer in applied research, and so on.<sup>14</sup> If it has reached that level, then it is already fairly

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<sup>13</sup> The respective documents can be found under the following links:  
[www.bmz.de/de/themen/2030\\_agenda/](http://www.bmz.de/de/themen/2030_agenda/);  
<http://www.habitat3.org/wp-content/uploads/NUA-English.pdf>;  
[https://www.bmu.de/fileadmin/Daten\\_BMU/Download\\_PDF/Nationale\\_Stadtentwicklung/leipzig\\_charta\\_en\\_bf.pdf](https://www.bmu.de/fileadmin/Daten_BMU/Download_PDF/Nationale_Stadtentwicklung/leipzig_charta_en_bf.pdf).

<sup>14</sup> Wissenschaftsrat 2020, Drs. 8289-20.

established in the academic system. But we are still far away from ensuring that all research is transdisciplinary, and no one is making a case for that either. We need basic research. We need different types of research. But the recognition of differences in an academic reference system is still a distant future. And that would be essential, among other things, in order to provide young scholars with a point of reference. What you are doing is not just second best. Rather, it is a type of research that is just as legitimate and that merits equal treatment, something that allows you to make a career out of a more practice-oriented approach in core academic institutions and not just in engineering sciences. I think we need a different reputation regime in the academic system; that would be a real step forward.

*Lisa Ruhrort:* I would like to reiterate quickly that I am facing the exact same problem as a young researcher. The question of how much time to invest in transdisciplinary work is a question that you ask yourself basically every day. Because first of all, it is not as recognized as the strictly mono-disciplinary articles that you submit. That is simply a big problem. As a result, I have not yet seen this powerful, sweeping change, even if the debate surrounding it has changed. As Ms. Simon said earlier, the reputation system, at least in the social sciences, has not really changed all that much.

*Ajit Singh:* Thank you for your comprehensive outlook. I would now like to open the discussion to our other participants.

*Séverine Marguin:* My question builds on this nicely because I wanted to ask about the researchers' perspective on this exact issue. How has the self-image of the researcher changed within the context of this increasingly transdisciplinary research in the academic system? Ms. Simon has already said a great deal about this. I have one more question to develop this further: Does the increase in transdisciplinary research also change the understanding of basic research? For example, to the extent that you think that there is either transdisciplinary research or basic research, and then you have to decide your career path based on one or the other, and if you have gone too far in one direction, then you get stuck on a one-way street and you can no longer change that track. My question is whether there is much interaction between the realms of transdisciplinary research and basic research, or how fluid are the borders between the two? Not necessarily just in terms of careers, but also at the content level. And what would need to be done in order to ensure that both research approaches do not just seem like opposites?

*Dagmar Simon:* That is indeed true, and it is important to keep this in mind. Things like basic research and practice-oriented research are classifications. They are also very, very shrewd in terms of ensuring funding and political support, since one can succeed with the and the other with foundations or ministries. Academic research has shown the Deutsche Forschungsgemeinschaft (German Research Foundation) that these clear demarcations exist as

terms, and they make sense to a certain extent since otherwise we would be faced with a veritable smorgasbord. But of course, there are never rigid boundaries as we know them from a rhetorical figure. What we have seen in the fields of research that we have investigated, such as marine science, is that there is in fact more openness and a tendency to open up still further. On the one hand, as a result of some kind of pressure since it is necessary to arrive at a practical application somehow. On the other hand, this is closely connected to role models and how academics understand their roles. In certain research areas, excellent basic research and practical application are not contradictory. And if experienced researchers can demonstrate this, that you can pursue a career with this, then that will send out an important message to the younger generation. The problem with opening fields of research is that a great deal happens implicitly, and this is not explicitly communicated to the outside world. A certain image of research processes has been perpetuated, but we are in reality working a bit differently already. Communicating this to the academic communities and beyond would also be an important step, in addition to stressing that such research does not mean having to compromise on quality, but rather that the opposite is likely true.

*Philipp Misselwitz:* I can only underscore what Ms. Simon just said, and I think a certain degree of self-reflection is good for us when we consider how the German system might be overstructured and bureaucratic. More money in the system does not always help and can reinforce disciplinary bubbles or narrow self-referential work. We collaborate a great deal with partners in the Global South in contexts that do not have the luxury of generous funding. And there it is perfectly logical that you have to conduct research that is extremely relevant to society and practical, no matter what methodologies you use and in which fields you research, and that you always have to justify this from the beginning. Emphasizing societal relevance can also help to go beyond disciplinary boundaries, the compartments Ms. Simon mentioned we tend to pigeonhole ourselves in. I wonder if Ms. Simon agrees with me that sectoralization and disciplinary fragmentation might also be a specific German problem at this moment?

*Dagmar Simon:* Yes, it is also a German problem to a certain extent, such an academic system. To be honest, it is not much different in France; the Anglo-Saxon systems go about this a little bit differently.

*Cornelia Schendzielorz:* I have a follow-up question on this. Various reasons were brought up explaining why it is necessary to include certain actors in a way that can be labeled transdisciplinary. These include both normative-ethical reasons, in addition to reasons that are closely related to benefits such as gaining knowledge or specific applications that are driven by a need for utility, for example, to improve medical treatments. Both motivations were mentioned frequently. Now I would like to know whether or not both the benefit-

driven and the normative-driven dimensions exist in all fields. To what extent do these coincide with the specific requirements or particularities of the respective fields, and are these two dimensions weighted differently as a result?

*Dagmar Simon:* That is difficult to answer because it is often a mix and it is simply different from one field to another. I think that we always have to keep one point in mind: the questions concerning occupational biographies. A few years back, we conducted a large number of interviews with young researchers in the field of biotechnology, with postdoc students in particular, at various institutions including Max Planck Institutes, which are always top tier of course. A relatively high number of them were also project managers with fixed-term contracts, which is now common practice at Max Planck, and the young academics swing from a two-year contract to the next one-year contract and so on, precisely in a phase where they might also be wanting to start a family. Those are not by any means research conditions that reflect what they originally imagined. Some of them then migrate to the corporate sector. Interestingly enough, they realize that it is not all that terrible there. They always have crazy preconceptions, thinking that you sit up in the galley so to say at universities, while you can do whatever you want at *Max Planck Institutes*. These are interesting experiences from occupational biographies. What I am trying to say with this is that we are now dealing with – thank God – a generation of researchers who say that certain conditions in this system, such as these short-term contracts, are no longer acceptable and that they are destructive, especially for basic research. I think we also need to bear this in mind to a point in this entire debate. We always have to consider that 80 percent of the employees working at Max Planck Institutes with fixed-term contracts end up leaving the academic sector. That is a huge number.

*Ajit Singh:* Thank you very much for your very reflected and thought-provoking closing words that raise a number of questions relevant to all of us at the specific level of our career. Finally, I would like to thank all of you for attending this online discussion and for your great contributions, as well as all of the other participants who were here with us today under these extremely interesting conditions.

*Cornelia Schendzielorz:* I would also like to thank all of you for the tremendously enriching contributions and varied impressions of research in practice, together with its conflicts, dilemmas, opportunities, successes, and continued potential for development.

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