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Keynotes

Do digital platforms have politics? Future(s) of Democracy in the Era of Artificial Intelligence

SCHAPER-RINKEL, Petra
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Starting from the controversy whether and which political qualities technical artifacts and infrastructures have, this talk explores the political in AI-based platforms and infrastructures and asks about the future of the political - and with it about the future(s) of democracy in Europe. I will analyse the utopian and dystopian visions of the future that visioneers and critics develop in relation to the potential and risks of AI / machine learning, and identify their fundamental political implications. The promise and critique of AI focus on the existing state of governance, not on the possible futures of the political. In the last part of the talk, I will give an outlook on what scenarios emerge when the future options of the political are linked to different futures of AI.

The Sustainable Transformation of Cities: Anticipation, Experimentation and Governance

WEBER, Matthias
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The debate about the pathways to move towards the achievement of the Sustainable Development Goals has moved cities into the focus of policy attention. The collective ability to transform cities is decisive whether or not we will be able to reach our climate targets, but also whether important social inequalities will be reduced or not. Sustainable innovation in its various forms is regarded as key to the transformation of cities, but the main challenge consists of generalising innovations so that they become integral parts of the structural and institutional tissue of cities.

Conceptually, the sustainable transformation of cities will be addressed by drawing on theoretical underpinnings from transition studies, innovation studies, and governance studies. While transition studies have very much emphasised the importance of experimental processes and various forms of learning to shape ‚solutions that work', (urban) governance studies emphasize the importance of an appropriate balance between stakeholder participation and political-administrative steering of change. Governing urban transformations in time requires managing reflexively this field of tension between bottom-up concentration and top-down orchestration, while taking into account constraints and opportunities as defined at higher policy levels.

Drawing on experiences and examples from a range of – mainly European – cities, current practices will be used to illustrate key mechanisms for governing the sustainable transformation of cities. In particular, the focus will be put on i) the formation and use of visions in guiding urban decision-making, ii) the practices of nurturing, generalising and

embedding of innovations in the urban context, and iii) capacities and capabilities of local authorities in governing urban transformations over sustained periods of time.
The theoretical and empirical considerations will be used to distinguish between different modes of transformative governance of cities, ranging from deliberative to hierarchical. The sustainable transformation of cities requires the ability to mobilise these different modes of governance in a flexible manner, geared to the different phases of a transformation process.

Is a gender just AI possible? How to overcome objectivity claims, bias and discrimination

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TU Braunschweig, Germany

Artificial intelligence, particularly machine learning approaches, is often built on data from or about users. Hence, this technoscientific endeavor is intimately and inextricable entangled with the social and its subjectivities. Nevertheless, some proponents of the field claim the neutrality and objectivity of AI's results (Loftus et al 2019). Examples are algorithms developed to detect cancer from photos that promise to make better decisions than medical experts or recruiting software that is assumed to make more precise predictions of workers' future performance than any human recruiter. Such expectations, however, were meanwhile debunked by numerous case studies, which demonstrate biases with respect to gender, race, economic conditions or other social categories (Adamson & Smith 2018, Daston 2018). Such results rather point out discrimination by AI systems and algorithms (O'Neil 2016, Benjamin 2019). Feminist STS researchers analyzed that the use of AI algorithms with data from the past can reproduce existing social inequalities of these times instead of creating livable worlds (Prietl). Moreover, probabilistic methods tend to reinforce social norms and stereotypes. Also, new conferences in computer science (e.g. the FAccT conferences, Hildebrandt & Castillo 2020) indicate that we cannot reduce problems of bias to the data used for the training of algorithms, but also need to take into account the methods, the algorithms - and their social contexts.

The aim of my contribution is twofold. By drawing on feminist science and technology studies (Suchman 2007, Barad 2007, Haraway 2016), I will propose a theoretical framework how to analyze these phenomena as entanglements of humans, data, methods, algorithms, discourses, histories, imaginaries, social structures etc. By discussing the knowledge politics of two empirical fields, health apps for diagnosis and technical support of employment process , which - as parts of the realms of medicine or labor market - relate to different socio-material imaginaries of objectivity and subjectivities, I will also ask how to re-configure these apparatuses towards a more gender just AI.

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Stream A: Open Science: Rethinking the Science and Society Relationship

Session A.1: Governance, Leadership and Stakeholder Engagement for Sustainable Transition

Chair: THAKORE, Renuka
University College of Estate Management, United Kingdom

Delphi Method for Consensus Building in Systems-thinking, Transdisciplinary and Sustainability Research

THAKORE, Renuka
University College of Estate Management, United Kingdom

The purpose of this paper is to examine the application of Delphi method to generate target knowledge in a transdisciplinary research design for sustainable transformation. The paper will consider the research design and its strengths and weaknesses in engaging with relevant stakeholders and identifying critical strategic factors essential for increasing energy efficiency and sustainability of the English Housing system.

Systematic in-depth literature review was carried out to identify a list of critical barriers to the essential conditions required for sustainable transformations in the English housing system, and those immediate relevance to the English housing stakeholders were used to formulate the survey questionnaire. A statistical exploratory factor analysis method was applied to evaluate correlated and commonly agreed perspective of the English housing system on very important barriers to 5INs (Investment, Information, Initiative, Innovations and Incentives), which contributed to systems-knowledge development. A key objective of systemic evaluation was to avoid any bias in the evaluation. Therefore, further evidence was gathered through a Delphi study comprising of two rounds of questionnaires.

Delphi Round I was used for structured engagement with the expert domain of the English housing system on strategic capabilities criteria relevant to energy efficiency and sustainability. This round evaluated interventions, challenges, impacts and core values. The responses received in Round I were analysed using descriptive analysis and a collective common perspective on various strategic interventions were identified to inform Round II. Delphi Round II was used for consensus building. This established emergent strategic capabilities agreed by more than 80% of the participants. These two rounds had captured a balanced subjective and objective perspective of the participants based on constructivism and interpretivism.

Evidence for target-knowledge gathered through Delphi method, comprising of two rounds of questionnaires, allowed for critical evaluation of strategies aligned with energy efficiency objectives and support sustainable transformations in the English housing system as well as generating target-knowledge. The target-knowledge was instrumental in

informing the strategic (STRIDES) model developed by a focus group of key industry participants following Delphi study, and further the model was subjected to validation by another focus group of key industry participants.

This research evidence a research method that can be applied by academics and practitioners to investigate innovative and emerging strategies in the sector, where multi-disciplinary perspective is strived for. This research demonstrates that Delphi method is significant in soliciting target knowledge and consensus on emerging strategies in the housing sector. The administration, development and analysis of two Delphi questionnaires are discussed in length, so that Delphi method can be applied to generate a rich and new information. This research further suggest that Delphi method provides practicality, interactivity and exchange of dialogue through expert consultation, inevitably, a requirement for a transdisciplinary research for sustainable transformation.

Practices in sustainability transitions: Review, reflections, and research directions
SVENNEVIK, Elisabeth Marie Cassidy
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The role of users in transitions is receiving increased attention. Users are suggested to contribute beyond a consumer position to system change towards sustainability. Concepts concerning practices, in particular originating from social practice theories are proposed useful to handle these additional aspects of users. Social practice theories are therefore increasingly applied in transition studies, but there is still no overview of the application of these theories in sustainability transition research. This article addresses this gap and presents a review of research on social practices in transitions studies. The review reveals how social practice theories are applied in sustainability transition research for more than studying users. The review reveals how this concerns six dichotomies: consumption and production, normality and novelty, stability and instability, micro and macro levels, social and technical change, and flat and hierarchal levels. Reflecting on this, I suggest that social practice theories can be used for sustainability transition studies in a 'practice innovation system' PIS approach. A PIS approach can offer an innovation system perspective where practices concern the innovation and diffusion process as both a collective and an individual act and contributes to the generation of innovation-related externalities. Research directions can build on this.

A virtual deliberative public engagement study on heritable genome editing among South Africans: study protocol
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There is a dearth of public engagement in Africa on human heritable genome editing. This paper outlines the protocol for a virtual deliberative public engagement on this topic among South Africans. The study intends to create a platform for a diverse group of 25–30 South Africans to engage with facilitators and each other on fifteen policy questions regarding heritable genome editing, with a focus on: a) the prevention of heritable

genetic conditions; b) editing for immunity; and c) editing for enhancement. Participants will be expected to study the provided resource materials and pass an online entrance exam – aligning with the protocols of the Harvard Personal Genome Project. In this way, the commitment to the process, openness to deliberation, and basic knowledge of the candidates will be assessed to ascertain whether they are suitable participants for the deliberative engagement. The aim of the study is to understand the views of South Africans on human heritable genome editing so as to inform further research and policy, and to analyse the process and effect of deliberation on opinion.

What is the role of governance on the real estate market in China?
LIU, Chunmei
UTC-Costech, France

Urban life is or will be the majority lifestyle in most parts of the world. To integrate into the city, each new urban worker must face the real estate market to find accommodation, work, and integrate into social life. With real estate prices taking off in the past 20 years, integration into major cities is becoming increasingly difficult, especially in megalopolises - this phenomenon is similarly affecting Shanghai, Paris or London.

Faced with urban challenges, how can state decisions promote sustainable development in the real estate market sector? In China, the implementation of "progressive reforms" is becoming an important economic, political, and social debate.

What's more, the climatic challenge requires the extension of the durability of urban buildings, considering that 40% of the environmental impacts linked to buildings could be eliminated if the average lifespan of buildings in China went from 30 years to 50 years.

The governance of very rapid urbanization in China must respond to the challenges of a real estate boom fuelling financial speculation which is a major factor of instability for the Chinese future economy growth. This governance problem essentially concerns three levers: 1, the background of macro-control between the central government and the provincial governments; 2, the interactions between private property developers and local authorities; 3 the adaptation of management plans and their achievements to social pressure.

The ways of acting on these three levers at the same time was obtained by a modification of the institutional arrangements, essentially: a) property rights; b) the introduction of a highly liberalized market economy; c) the relationship between the centre and the local communities via the leading role of the Communist Party. The introduction of a private property right of the building for the user and a temporary concession of land depending on the nature of the use: commercial, industrial, housing which feeds the huge infrastructure financing needs. Is this formula, halfway between the pure market economy and the classical socialist economy, a Chinese specialty or does it join the new modalities of the mixed market economy? The recent French law proposal seems to show the contagious, even universal, nature of "Chinese specificity".

This communication is not only based on my thesis "Determinants of a BLM (Building Life Management) in Chinese cities focusing on maintenance", under the supervision of Yann Moulier-Boutang, defended on 22 November 2019, it also joins the points of the recent thesis by Lucie Morand, "The plan, a tool generating sustainable urbanization strategies: the example of China, case study on Xiamen", under the supervision of Jean Attali, defended on 16 December 2019.

Grassroots circularity and the local communities potential for enabling socially sustainable solutions

DOMARADZKA, Anna; ROSZCZYNSKA-KURASINSKA, Magdalena
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One of the main aims of circular economy is prolonging the utility of different products or objects by reuse and repair. Circular ideas and related technologies inspire both the policymakers as well as creative and skillful individuals, who give new life to the old items, buildings, or whole neighborhoods. In the view of the global climate crisis and the resulting green policies, it is crucial to encourage solutions, which refurbish rather than build from scratch, to save valuable resources and reduce waste.

To enable success of circular economy policies we need to take a closer look at social context in which they are implemented. Our research suggests that the sustainability of circular economy solutions depends not only on the political or economic context, but most importantly on the ability of people and communities to change their behaviour and a way of thinking. Some communities remain unfertile ground for circular policies and technologies, while others take matters in their own hands to avoid losing places or objects that have social value. We observe that many grassroots initiatives that embody the goals of circularity – like local energy markets based on blockchain technology or adaptive reuse of cultural heritage – stem from such local activist groups (Domaradzka, 2018). Our goal was to understand what builds this capacity for self-organization and enables the embracing of those innovative solutions by residents and local institutions.

Despite the importance of those initiatives, they seem to be understudied in the context of the circular economy (Geissdoerfer et al., 2017). We aim to fill in this gap and show the role of local communities is creating socially sustainable circular solutions. We suggest defining this local potential for implementing and embracing circular solutions as grassroots circularity (Roszczynska et al., 2019). Our preliminary results show that the potential for adoption of new solutions depends on several specific characteristics of local community like trust, diversity and openness. Using the social sustainability framework (Missimer et al., 2017) as our starting point, we operationalise and test the dimensions of grassroots circularity and offer insight on how it can be diagnosed, measured and developed. We believe that the concept of grassroots circularity allows widening the circular economy model to include the neglected bottom-up potential of local communities.

In our study, we use a mixed-method approach. First, we conducted a qualitative analysis of in-depth interviews and documents regarding several cases of circular projects in Poland, Italy and Sweden. Second, we conducted the two-stage quantitative study in which we tested the tool designed to measure the potential of local communities to embrace the change introduced by circular economy policies. The resulting approach merges the specificity of circular economy with the social sustainability concept to allow for better diagnosis and implementation of new environmentally sustainable policies. While focusing on the grassroots level we hope to contribute to a better understanding of the role and capacity of local communities in introducing and upholding the circular economy ideas in the bottom-up fashion.

Developing Local Woman's Economic Resilience in the Ex-Post River Flood Disaster through the Participatory Empirical Approach of FGDs and SMEs -Based "Sustainable Resilience Patternin Actions" in West Timorese Female Land,Indonesia

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In the development of economic resilience for local women in the West Timorese female land of the Benanain river flood disaster, in the sixteen affected villages of West Malaka Subdistrict of Malaka Districtin Western Timor Island, East Nusa Tenggara Province (NTT), Indonesia, women have an important and prominent role in supporting their household's financial resilience after the floods occur. Participatory empirical research with critical studies but analyzed in policy continues to be a constraint and a fairly problematic issue that remains in the space and reach of rural communities until now that has not been resolved. The purpose of this study is to analyze the framework of an empirical participatory approach, i.e., FGDs and SMEs together with key local stakeholders, especially women with their major livelihoods as traditional cloth weavers, in additional focus on critical discussion forums about "women, resilience, and flooding"in the West Timorese female land in 2016. FGDs and SMEs were found to be new empirical approaches that are able to build stimuli regarding familiarity in discussions, encouragement, feedback, and interest to respond, light discussion in terms of flexibility that still aligns to the implemented discussion forums' protocol, relief-feelings with fan and the practiced of initiatives that help complement information from other participants, and exchange information , knowledge and opinions that uphold tolerance and respect manner one another between participants. Increasing woman economic resilience, especially for those128 women traditional weavers where have been spreading over 16 villages affected by river floods, in Malaka through the FGDs and SMEs, it was noted that there were some solutions in form of a "sustainable resilience pattern in actions" in their economic resilience that could be useful for themselves in a longer term development(sustainable) in the post-flood disaster recovery actions; and they have obtained such resilience pattern of sustainability. So, in this research's conclusion, dealing with anticipating the provision of monetary capital for recovery can be prepared before the flood disaster occurs(ex-ante). This"sustainable resilience pattern in actions" can be described as an initiative-based practical system and it was found effective in actions through this participatory approach discussion in this female land.The result of draft's

discussion is thus used also as a confidential material of evaluation and policy for local decision makers at local level.

Session A.2: In- and Outside Open Science

Chairs: TAUBERT, Niels[1]; BARLÖSIUS, Eva[2]
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Explaining field specific forms of sharing – the influence of epistemic conditions on mechanisms of knowledge integration

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Open science advocates and an increasing number of political stakeholders and research funding agencies encourage researchers to publicly share the various instantiations of scientific knowledge that are generated during the research process, in particular research data, but also computer code, method protocols, or material specimens. Critical for the success of this vision is the readiness of research groups to share those tools and resources that they have created. Up to now, however, we have only a limited theoretical understanding of what drives the sharing of these resources in different fields of science, and how variation across fields, as documented e.g. by the survey data released by the State of Open Data Report 2019 (Digital Science), can be explained.

The study I will present seeks to contribute to a theory of field-specific forms of sharing by looking specifically at the question how sharing decisions are influenced by the epistemic conditions for research in a field. It is based on a comparative case study of two research specialties in the physical and chemical sciences. It looks at existing patterns of sharing and withholding in the context of the knowledge production processes of these research specialties, at a time (2007-2009) when open research data as a topic was raising its head but not yet a pervasive theme. The comparative analysis of the empirical data on research processes and sharing decisions in the two research specialties reveals field-level differences in sharing decisions that are linked to the way in which scientific knowledge claims are produced and integrated into the shared knowledge base of those research specialties. The analysis shows how epistemic conditions of research influence sharing decisions, by understanding epistemic conditions as action conditions that trigger, enable or restrict mechanisms for knowledge integration that involve acts of sharing. Work to extend the comparative analysis to include further research specialties (in ecology and astrophysics) is ongoing.

The existing literature on open science and sharing often zooms in on one particular type of resource, with a lot of emphasis given to ‘research data.’ By contrast, the focus in this study is on a wide range of epistemic resources (incl. tacit knowledge, material substances, research data, and method know-how). As a result of this more holistic perspective and the empirical data collected in this study, the relevance of knowledge integration processes for explaining patterns of sharing is highlighted, and the research

question shifts from why do researchers in the two research specialties differ in decisions to share to how and why do the two research specialties differ in the way knowledge is integrated?

I will conclude by discussing the question what insights this study might provide with regard to the potential for a future, more wide-spread adoption of sharing practices under the banner of 'open science'.

The Epistemology of Open Science

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What kind of science is envisioned by Open Science (OS) advocates? Since the advocacy literature is predominantly affirmative, an answer to the question is timely for at least two reasons: (1) Since OS is a movement but not yet a reality, empirical evidence as to its benefits is rare (even though OS advocates would like to convince readers otherwise, see e.g. Tennant et al. 2018). (2) OS sometimes involves quite radical changes to the way research is being done. It is not clear whether such changes would in fact be beneficial (and for whom). How do OS advocates conceive science, e.g. with respect to explanation, causality, and data? What is the epistemological stance of the movement?

The presentation analyses the vision of science transported in advocacy literature, based on the underlying assumption that OS is in fact attempting to reform science along the lines of platform capitalism (Mirowski 2018). The function of OS is thus to legitimize data-intensive science by appealing to the (supposed) values of academia, e.g. the four norms identified by Robert Merton. Based on the observation that OS advocates have so far been unable to produce compelling evidence as to OS's positive effects, the paper attempts to offer an alternative explanation of its popularity. The presentation shows that open science is best understood as the legitimizing rhetoric of data-centrism and "industrialized" research. Evidence is provided in two ways: In the form of a discourse analysis, and by showing how arguments to the effect that open science has positive effects fall short on (at least one of) two respects: a) they either are empirically unfounded (there is not much empirical evidence to support these claims), or b) they are normatively unsound (i.e. they are implausible given other aspects of academia or contradictory at worst). Even the most prominent literature is surprisingly devoid of overarching visions for science. This suggests that OS is either devoid of a vision, which seems to be at odds with the movement's otherwise very pronounced normative claims ("open science is better science"), or it has a vision but is reluctant to articulate it. Given the diverse backgrounds of Open Science advocates, I suspect that an overarching epistemological stance will be hard to come by. Effectively, the OS movement transports, explicitly but more often implicitly, a rather conservative image of science along the lines of large, collaborative, industrialized research projects.

Future society: Open science as driver and enabler of societal change

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In the discussions about the knowledge society it is a common place that the relations of science and society are changing in a fundamental way. It is, to a large extent, unclear what this change implies. It is often argued that new kinds of arrangements, contracts or appropriations are introduced that enforce accountability of science for societal consequences as well as an orientation towards applicable knowledge. Without doubt, there is some grain of truth in this, but these diagnoses mostly fail to discuss the position science is put in. More or less implicitly science is regarded as the main driver and enabler of societies' transformation. This leads to a paradoxical situation: On the one hand, it is claimed that science is substantially engaged with the transformation. On the other hand, it is argued that societies enforce new and pervasive kinds of appropriations of science. This puzzle raises the question who is the driver of the process and what will its result be? The question shows that there is a need to re-think and re-conceptualize the relations of science and society and to ask for possible hegemonic positions of one of the two. In other words: Do science and society act as relatively independent fields or systems? Is the role of an infrastructure assigned to science in which it is regarded as a provider of knowledge for the benefit of society? Or does science occupy a powerful position and determine the transformation of society?

This question is too broad to be answered. Therefore, we will focus in our talk on open science and ask in what ways science and society are linked in these conceptions. This focus refers well to the overall question as open science indicates concrete political programs that aim to re-shape the internal structure of science in ways that could be interpreted as political assertion of a new relationship between science and society. On the other hand, the legitimizations of these interventions are based on the assumption that science is the main driver of the transformation of society and the most important factor that allows society to respond to current challenges.

Policy papers on open science usually include justifications for the need of making science open. These justifications have to explain what open science is, to whom science should be made open, and what advantages will result from it. The case allows us to reconstruct the ideas about the relations of science and society inherent in such programs. The empirical basis for our presentation is a content analysis of the EU-documents on open science. We will consider three main issues: How are science and society brought together, and how do they interact? Which justifications are given for these kinds of interactions? What kinds of future societies are imagined by making science open?

Session A.3: How Responsible is Your Research? RRI in Making and Doing

Chairs: ANSLINGER, Julian; KARNER Sandra
Interdisciplinary Research Centre for Technology, Work and Culture (IFZ)

Co-creating responsible innovations. Reflecting on insights from user-company collaborations

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The development of new technologies and products should increasingly contribute to solving social challenges such as sustainability, integration or health. This demand stands behind the idea of Responsible Research and Innovation (RRI), which has been promoted in recent years by science and politics as a concept for aligning innovation processes with social values and needs. A key assumption of RRI is that stakeholders play an important role and that sustainable solutions will be outcomes of collaborations of a diversity of actors (co-creation of innovations). While RRI is well-embedded in science and politics, there is still potential for companies to get involved with a wide range of actors in the development of innovations. The insight that citizens or users are an important voice in articulating societal needs and issues is not yet widespread among companies.

Hence, in the EU funded project "www.LIVING-INNOVATION.net" we implemented a series of co-creation workshops (or so-called LIV_IN-Labs) that involve industry leaders (such as Siemens, Telefonica, Atos and Ottobock), experts and lay citizens who experimented with responsible ways of co-creating innovations. So far, a first round of LIV_IN-Labs has taken place with nine events in the Netherlands, Germany, and Spain. In line with the LIV_IN approach, these workshops tackled topics in the area of smart homes and smart health. Furthermore, a specific focus has been placed on shaping digital services according to the needs of a diversity of groups like older and visually impaired people. In our paper, we will report about the experiences with, and findings from, these co-creation events.

Regarding the evaluation of the LIV_IN-Labs, we derived a set of quality criteria from a comprehensive literature review. These criteria address all key aspects of a RRI-based co-creation event, focusing e.g. on the workshop goals and expected results, recruitment and selection of participants or result processing. Our findings from the evaluation of these criteria are based on both qualitative and quantitative survey tools, which allow a multi-perspective outcome: Firstly, evaluation criteria where used to estimate the overall quality of the labs. Secondly, the labs were evaluated from the perspective of companies ("lab leaders"). Thirdly, we shed light on the participating citizens' and users' views by assessing their votes gathered through a feedback questionnaire.

Based on these three perspectives, we will discuss how successful the labs were in terms of their potential for co-creation and RRI and whether they deliver on the promises associated with these concepts. The questions we are interested in here are, for example, whether and if so how the different systems of science, economy and society and their respective logics of action can be integrated under the concept of RRI. In this context we critically examine on the one hand the participatory approach. On the other hand, we also critically reflect on the role of science as a mediator and translator between enterprises and citizens. We conclude with identifying recommendations for running responsible innovation processes in business-user collaborations.

Universities, the categorical imperative and responsible research

ARSOVSKI, Slobodan; DYMITROW, Mirek; BRAUER,
Chamber of Certified Architects and Engineers, Republic of North Macedonia

Universities, as Western cultural institutions, can look back on a long development spanning several centuries. In terms of cultural significance, this puts them into the same league as the church, the state or major banks, to mention but a few. In our modern world of increased globalization and digitalization, universities are tasked with educating an ever-growing number of students. Inadvertently, this also leads to an inflation of the value of academic degrees, let alone to mention the actual quality of the skills that are being taught to students. Governments and other stakeholders are increasingly becoming interested in responsible research and innovation practices.

This presentation looks into the consequences of the so called "impact agenda" and what it signifies for the trustworthiness of scientific knowledge. We understand the impact agenda to be the push to evaluate the quality of research based on its outcome (end), compared to its rigor (mean). Departing primarily from research conducted at European universities, we contend that reducing the role of the university to that of mere impact facilitation, accreditation and skills acquisition for its students, may prove detrimental to the respect for the university as an institution. Not only are universities running the risk of underappreciating what they do, but they are also fueling a greater division of society in which the citizenry is trained to use highly sophisticated conceptual tools without being provided the complex understanding needed to wield it competently egged on by research chasing an ever elusive 'impact'. We argue that the society-wide increase of polarization – fueled by such a dynamic – will increase unless the universities actively acknowledge and embrace their role as shapers and stewards of Western culture.

Within our analysis, we discuss the emergent 'impact or starve' paradigm to explain why such transgression of the categorical imperative are normalized and not widely publicized and problematized. We reflect both on the individual and collective consequences for knowledge production. Specifically, we draw attention to the unintended consequences that arise when the external value hierarchy of society rewards such an end focused assessment structure in terms of student numbers, research funds, and prestige, which supposedly justifies such ends. Inadvertently, such development ossifies contemporary

values in the long term, and devalues the contribution of universities to the development of ideas.

Ensure Value Sensitive Design Responsibly for Social Sustainability: A case of E-Vehicle Design in Delhi, India

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Pre-existing value-biases of the socio-technical landscapes percolate through the innovation process to the 'design' itself. This results in a skewed user pattern, as is the case with less visibility of women in India's emerging e-mobility system. The compromised 'social sustainability' of the up-coming e-vehicles has an economic cost to innovators and the environmental cost to society at large. There is a need to identify these biases and anticipate the desired values from the stakeholder's perspective, to provide reflexive feedback to the innovators. This study's primary objective is to anticipate the gender-sensitive desired values from the women's perspective for future e-vehicles. This research study has used both secondary and primary data. For collecting primary data, a field study was conducted in Delhi. The research was designed by using the modified RRI Framework. The RRI framework was modified to make it conducive to the need of developing countries like India. The universe of the study included stakeholders- women, e-vehicle innovators & manufacturers, e-vehicle drivers. Survey and semi-structured interviews were conducted among the identified stakeholders. Collected responses were transcribed and analyzed. The study has revealed the desired values of the- comfort, safety, aesthetics, cost, convenience, support & service quality. Each of these values has been defined based on the responses from the field study to make them practical, relevant, applicable, and ready to be embedded in the e-vehicle innovation process. These anticipated values need to be considered from the ideation level of the design of the future e-vehicles.

Transdisciplinary Approaches to tackle Societal Issues in the realm of Artificial Intelligence

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Sexist recruiting tools, racist facial recognition, algorithmic detection of human rights violation via satellites, AI-controlled misinformation in social networks, AI-supported wildlife conservation, fully autonomous weapon systems... Whichever the negative or positive consequences of current artificial intelligence (AI) systems, it is undeniable that the impact of AI on our society is growing steadily. The speed of further AI-development is so rapid that technology assessment can hardly keep up. Therefore, different approaches are needed to tackle societal issues of artificial intelligence in a timelier manner.

Given the enormous and unpredictable impact of AI systems on society, a transdisciplinary approach to AI development seems particularly beneficial.

Transdisciplinary research has claimed to produce "robust knowledge" and user-friendly designed innovations by incorporating knowledge beyond academia. Keywords like stakeholder engagement, participatory design, and responsible research and innovation (RRI) all conveyed the promise that different perspectives on the social impact of the technology developed would be considered during the design or research process.

But does this assertion also apply to a technology such as artificial intelligence, which—at least at first glance—seems incomprehensible to a layperson? Further, what knowledge and which perspectives do we need in order to design ethical, secure, and social just AI-systems? And how do we ensure that all relevant knowledges are included? Who defines what is relevant?

With our submission we plan to answer such and related questions by presenting insights from the transdisciplinary projects dAIalog.at and VEKIAA: dAIalog.at aims at creating new methods of participatory technology design for the field of Artificial Intelligence (AI) through workshops with laypersons and experts. By collaborating closely with work councils, the project VEKIAA on the other hand investigates how the workplace integration of digital assistants based on Artificial Intelligence (AI) can be done in the most responsible way possible.

Virtual Reality Training: A human-technology-reflection loop as precondition for responsible innovation processes

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The interdisciplinary project "Virtual Skills Lab", that is funded by the Austrian Research Promotion Agency (FFG), is based on the assumption, that complex social competencies such as empathy, the ability to reflect or to constructively solve conflicts, are key in a contemporary work environment. Therefore, the project examines how social skills can be trained by using Virtual Reality (VR) scenarios as learning environment. Within a transdisciplinary process a research prototype, which simulates interactive VR scenarios in order to strengthen social skills, will be developed and tested.

Proceeding from a perspective of Responsible Research and Innovation (RRI) (Von Schomberg 2013) the paper argues that a transparent and inclusive approach to technological innovation is paramount. Algorithmic discrimination, the lack of transparency and misuse of privacy are just a few of the main challenges of learning technologies (Royakkers et al. 2018). Particular attention is paid to the aspects of ethics, gender and diversity as well as participation of stakeholders. The later implies a human-centered co-creation design process (Pfeffers et al. 2007) to make technological innovations subjectively more acceptable and effective, in which ethnical, gender and diversity aspects are critically analyzed and reflected throughout the whole course of technological development, realization and implementation. Being able to prioritize, consider and reflect the needs, fears, expectations and goals of potential end-users from the beginning on will be shown as a key advantage of such a process.

Based on the outcomes of 27 expert interviews as well as on the results of the human-centered co-creation design process, which was realized in cooperation with people of the middle management of an Austrian company, the paper concludes: For the development of technologies, like the intended prototype, that will be operating on an emotional level of potential end-users, a constant human-technology-reflection loop has to be embedded in the research process.

Agent-based modeling approach to studying Innovation Value Chains
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Implementing responsible research and innovation (RRI) principles in the context of complex innovation value chains (henceforth IVCs) and innovation networks (henceforth INs) represents a major challenge for companies and policymakers alike. A major part of this challenge is identifying leverage points—often called "RRI openings"—where policy or organization interventions can most effectively contribute to achieving RRI goals. By targeting these RRI openings, it is generally believed that a close to optimal configuration of policies and incentive structures can be found. Unfortunately, the complexity involved in understanding where these RRI openings is daunting. Also unfortunately, there is no clear way of unifying research on IVCs and INs despite abundant empirical evidence of their coexistence.

In order to overcome this hurdle—so that we can examine RRI openings—we extend IVC theorizing by allowing more than one firm to develop IVCs together. Through participating in such IVCs members form innovation networks. Since firms can participate in more than one IVC either simultaneously or consecutively, there is a crisscrossing effect between IVCs. We call sets of these crisscrossed IVCs webs of innovation value chains, or WIVCs.

With these extensions to IVC theorizing we employ agent-based modelling—a methodology particularly apt for dealing with complex system analysis—to identify RRI openings in WIVCs. Fortunately, SKIN, a well-established agent-based model focusing on INs, already exists. To accommodate the proposed theory developments, several adaptations and extensions for the existing SKIN model are suggested. For example, we suggest using multiple agent types with four RRI keys assigned to each agent. The model incorporates open access, public engagement, ethics, and science education as RRI-keys influencing development of innovation processes.

The proposed model is showcased through a real-world example from the European additive manufacturing industry.

The value of the paper is three-fold. First, it provides a way to bridge the gap between IVC and IN theorizing. Second, it provides a model that can be implemented and used for studying RRI openings. Third, it provides a showcase on how the model can be adapted with contextualized data.

The paper is based on results from Horizon 2020 IAMRRI projects exploring RRI in subsamples of automotive and medical industries in Europe.

Transformative Potential of Citizen science for Social Research Democratisation: comparing perspectives of citizen scientists and scientist from academia
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Kaunas University of Technology, Lithuania

Nowadays citizen science aims for multiple social goals including but not limiting it to scientific findings. As a type of participatory research, it can be a tool empowering citizens to develop solutions to the challenges of their communities. Moreover, citizen science might show its transformative potential of the democratisation of research. However, this potential highly depends on an enabling environment in which citizen act as well as the general context and perceptions of society and scientists from academia. The studies have shown that there is strong distrust among academicians in citizen science data quality, robustness of the research methodologies, etc.

This paper is aimed at the analysis of how citizen science could contribute to the changes of knowledge production in Central and Eastern Europe. We will present a case study that focusses on Lithuania. Citizen science can be named as invisible, still not fully recognized in Lithuania. The paper is based on qualitative interviews with scientist from academia and citizen scientists. This paper has been developed under the research project "Citizen Science as an Innovative Form of Citizen Participation for Welfare Society Development" (CS4Welfare), funded by Research Council of Lithuania (Agreement No. S-GEV-20-6).

Session A.4: Open Science: Closing the Gap between Scientific Expertise and Policy-Making?

Chairs: WIESER, Bernhard; REICHMANN, Stefan
Graz University of Technology, Austria

Open data practices out of the spotlight: what we can learn from initiatives that collect data on the socio-political and economic impacts of the pandemic and its management
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The Coronavirus crisis shows us not only, how fragile and sensitive our living environments are, it also points to the importance of robust knowledge production across geo-political boundaries. It has become apparent that we are far from having an overview of the situation. Everywhere researchers and journalists call for more data to combat the spread of the virus, and for more evidence to understand policy measures, yet for more evidence to base policy measures upon. In some areas data is already available, openly shared, and successfully used for research, such as the genetic sequences of the different types of virus. In other domains, however, data are pouring in slowly, are not publicly accessible or

simply not available at all, i.a. for the study of the socio-economic determinants of the pandemic. The presentation spans selected initiatives that aim to systematically collect and standardise data on the socio-political and socio-economic handling of the pandemic and to establish infrastructures for open exchange. Based on the findings of the study "Open Science Diplomacy" (2019-2020, S4D4C.eu), I will elaborate how science policy (and science diplomacy) could support and coordinate the openness and international cooperation of such initiatives, so that open data practices can first help to stop the pandemic and tackle its wider impact, and second provide the basis to define the necessary principles and protocols for future access to socio-political and socio-economic knowledge in times of crisis – and not only then.

Matthew effects in Open Science?

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Scientific knowledge is a key resource for achieving societal and economic goals. Open Science promises to fundamentally transform scholarship to bring greater transparency, inclusivity and participation to research processes, and increase the academic, economic and societal impact of research outputs. Yet access to scientific products and processes is not made uniform simply because they are made available via the Internet. How equitable is implementation of Open Science, in particular for those at the peripheries?

The existence of a "Matthew effect" (a feedback loop where (dis)advantage tends to beget further (dis)advantage) in science has long been recognised. In 1968[1], Merton proposed that already successful scientists tend to receive disproportionately high recognition or rewards in comparison to their less-famous counterparts. Since then, studies have identified the ways in which effects of cumulative advantage in research play out at the level of article citations[2], journals[3], institutions[4], departments[5], and countries[6], as well as the individual attributes of researchers including race[7] and gender[8]. These effects are known to be at work across a range of scientific activities, including peer review[9], public engagement[10], and funding acquisition[11].

This paper presents a review of knowledge to date on the extent to which Matthew effects are at play in the transition to Open Science. In so doing, it will bring further critical self-reflection to the Open Science agenda, moving it beyond the current state-of-the-art, to facilitate evidence-based policymaking.

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Some challenges of new Open Science strategy for R&D evaluation systems: the case of Slovenia

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If European Commission's (EC) Strategy of Open Science should become new modus operandi in context of R&D evidence-based policy and practice, it is need to make a lot of changes in predominant national R&D evaluation systems of many EU-Member States. As it is noticed by a lot of EC expertise reports (e.g. Progress on Open Science, 2020, Next generation metrics, 2017, etc.), in the context of national R&D evaluation systems, the priority must be given to the next-generation metrics and new forms of peer review. These changes will allow to validate a broader range of academic activities (and not to stay by "obsolete" traditional metrics). The big challenge is how to realize these strategic goals of open science in Central and East European countries. Namely, they just went through short period of transition, in which establishment of (traditional) bibliometric and peer review instruments (first time introduced in these countries) did positively impact on the accountability, transparency and internationalization of former voluntary political regulation of R&D. Following the changes in organization and functioning of R&D evaluation after 1990, national R&D policies in this part of Europe have used in many

cases very strict audit (quantitative) monitoring of R&D output in academic science. Therefore the radical and top-down destruction of existing R&D evaluation systems (e.g. to extend the quality of publication to all forms publishing, to abolish scientific citation as measure of impact of scientific knowledge, etc.) is not necessary the best scenarios for the future. In the context of the debates about the new open science policy platform, where voice of all stakeholders involved in R&D matters must be heard, there is better option to find the balance between qualitative and quantitative approach, between the long-living measures of excellence and new measures of societal impact of science, between conventional bibliometric indicators and new indicators of altmetrics, etc. In my contribution, I will focus on the case of Slovenia as EU-Member State with a small scientific community, where on the one hand the implementation of strategy of open science offers a lot of opportunities to create new models of production and evaluation of scientific knowledge, but, on the other hand, because of incompleteness, does represent also some risk . My contribution will be based on my sociological and empirical (bibliometric) analysis of functioning of small scientific communities (the case of Slovenia) in the last two decades.

Can Open Science close the evidence-policy-gap?

REICHMANN, Stefan; WIESER, Bernhard
TU Graz, Austria

In recent years, the use of publicly available scientific outputs by policymakers has been claimed to be one of the benefits of Open Science (e.g. Tennant et al. 2016; Pilat and Fukasaku 2007; Olesk et al. 2019). Additionally, many countries have created advisory bodies and liaison offices to facilitate the knowledge transfer (KT) process. However, there is yet little empirical evidence as to the effectiveness of these measures with regards to the uptake of scientific results by policymakers. The relationship between evidence and policy is thus frequently described as a "gap" (Ellen et al. 2014; Boecher 2016; Choi et al. 2016; Cairney and Oliver 2017), highlighting the difficulties that stand in the way of using scientific evidence in policymaking. In the context of Open Science, the knowledge transfer process is usually modelled as a unidirectional process (Olesk et al. 2019: 2), as the utilization of publicly available knowledge without involving the knowledge producers. This paper draws on evidence from health policy and (to a lesser degree) biotechnology and climate science to argue that (1) some aspects of the KT process are conducive to a dynamic of cumulative advantage ("Matthew effect") with respect to the sources of knowledge utilized by policymakers and (2) there are considerable differences within the group of policymakers with respect to roles and associated information seeking behaviours.

We conclude that the prospects of Open Research Practices (e.g. Open Access to publications, adherence to the FAIR data principles) to remedy the evidence-policy-gap described above must be reconsidered; while Open Research Practices may be conducive to some of the KT mechanisms (e.g. policy papers from public servants who draw on scientific literature), KT often operates on the level of personal (or at least prior) acquaintance (e.g. in the case of policymakers and researchers). Those stakeholders in a

position to draw on scientific expertise (civil servants) are rarely able to directly influence policies.

Session A.5: Connecting.Ideas4Research

Chairs: KLEINBERGER-PIERER, Harald; WERNER, Matthias
FH JOANNEUM, Graz, Austria

Responsible research and innovation (RRI) measures in the additive manufacturing webs of innovation value chains

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The project IAMRRI investigates the webs of innovation chains in additive manufacturing and the openings for RRI keys. RRI stands for responsible research and innovation and is an approach that anticipates and assesses potential implications and societal expectations. The goal is to support the design of inclusive and sustainable research and innovation. RRI can be applied with the so-called six RRI keys (ethics, gender equality, science education, open access, public engagement, and governance). This contribution investigates each RRI key in the three phases of the innovation chain process, namely the phase idea generation, the phase product development, and the phase innovation diffusion. The measures of the RRI keys in these three phases are elaborated and described. The output of the measures are defined. Furthermore, the interrelation of the RRI keys in the AM innovation system with a cross-impact assessment is carried out.

Regional Development with RRI Approach

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Regional development performed with people affected in the region for their innovation ecosystem is the emphasis of this contribution. Responsible research and innovation (RRI) is a transparent and interactive process. The interplay and cooperation of actors in the innovation ecosystem considers development of technologies into a broader context. Forward looking methodologies underline this approach and engages industry & business, science & research, public organization, civil society. The engaged stakeholders co-create societal accepted, sustainable, ethical innovations. The proposed approach supports embedding science and progress in technology development into society. This approach is applied for the transition of traditional industry regions into digitalised territories.

Digital ethics in practice: Implementing ethical principles to guide participatory use of video recordings in higher music education

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In this study we reflect the sustainable and responsible use of digital content in instrumental- and vocal pedagogy. The aim of this contribution is to raise awareness of ethical principles in dealing with videographic, instrumental and vocal lessons. Finally, our aim is to give pedagogical recommendations for teachers in the ethically justifiable use of videography. We take into account the empathy of everyone involved, as well as ambiguity, complexity and diversity in the interpretation of the data.

From Mechanical Turks to Open Science: Reflections on Crowdsourcing in Science with a Historical Approach

KLEINBERGER-PIERER, Harald
FH JOANNEUM, Graz, Austria

"Crowdsourcing" in the early 21st century is strongly connected with modern society, based on digitalisation and computer technology, and is often seen as a modern form of outsourcing. However, although the term "crowdsourcing" was shaped in recent years, methods of crowdsourcing as defined today have already been used in science and humanities long before.

This presentation will provide a historical approach for an open reinterpretation of the definitions of crowdsourcing. The main characteristics of crowdsourcing will be demonstrated by comparing crowdsourcing projects in science & humanities from the Early Modern Times until today.

Implementing a crowdsourcing process in the field of physiotherapy to support innovation

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Background: According to the health professions register, 15.973 physiotherapists are currently registered in Austria. The Austrian profile of competences for physiotherapists is composed of seven roles, one of the is the innovator. To fulfill this specific role, physiotherapists need to formulate relevant research questions in their professional field. Open innovation science could help to fulfill this role in everyday practice.

Purpose: The aim of this study was to develop a crowdsourcing process, which enables implementing of a systematic process to gather, analyze, select and synthesize information. This approach can help colleagues in their role as innovators. Additionally, it could lead to an increase of new and relevant research topics.

Methods: The development of the crowdsourcing process was based on the results of an online survey, which took place in the first half of 2020. So, it was decided to offer an interactive online mini symposium with free access for all interested practitioners in Carinthia. In addition to the presentation of the collected research results, the participants evaluated the crowdsourcing process regarding the chosen format. Finally, problem statements out of everyday practice were collected for further research.

Results: Around 80 physiotherapists took part in the mini symposium. 21 of them evaluated the format via feedback. 100 % rated the event format as "completely suitable" (47.6%) or "mostly suitable" (52.4%) for communicating current research results. 40 % found the level and the comprehensibility of the event "completely suitable" and 60 % "mostly suitable" for presenting research results. For 95% of those surveyed, the duration of the event was "completely suitable" (65%) or "mostly suitable" (30%), The quality was rated "very good" by 40 percent of the participating physiotherapists and "good" by 60 percent. In total 5 subject areas for further research were identified.

Conclusion: For participants in crowdsourcing projects, it is important to be informed about the results at the end of the projects ("very important" - 73.7%, "rather important" - 26.3%). The chosen format should therefore be tailored to specific groups and compact. Furthermore, a low-threshold access to the projects and practice-relevant topics which are easy to understand can be recommended.

Build it, fly it, share it! – Challenging drone narratives in online communities of practice

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Drones are currently all the hype – Be it as the 'pandemic drone' (Weller, 2020), adaptions of drone-technology to monitor the spread of Covid19, disinfect surfaces, to deliver broadcasts or – beyond 'the pandemic' - as delivery-systems for goods (and even people!), as weapons of war (Rothstein, 2015; Chamayou, 2015; Gusterson, 2016; Benjamin, 2013), as toys for (sometimes adult) children or companions on ones' travels. (Weller, 2019) This invasion of various fields of application by drone-technology has – by now – put 'the drone' in a mystical box of 'can do everything-technology' alongside A.I., 3D-printing and other contemporary technologies. Not unlike 3D-printing, drone-technology is not something only big corporations tinker with: From drone-racing all the way to playful drone-warfare (airsoft / paintball), drones have been taken up by various DIY-communities and adapted to fit their needs. This adaption-process goes far beyond mere technological tweaks or 'sticking whatever it is you need to be flying' to a multicopter-platform: It more fundamentally challenges narratives of what a drone may be expected to be / do. This negotiation-process is particularly visible within communities of drone-making practices. Being a fundamentally digital technology, drone-technology hereby particularly affords the formation of online communities of practice (Zhang & Watts, 2008) that exchange ideas and advance drone-narratives and -technologies within online-settings. In a first step, the goal of this paper - as a part of a dissertation-project - is

to analyse and map out how such online-communities contribute to the re-making of drone-narratives, how they challenge existing ones and what technologies / other technological narratives they connect to. In analysing this process, this furthermore allows to re-conceptualize online communities of practice in terms of their shared efforts toward the re-making of drone-narratives. Finally, contrasting drone-making within these communities against established drone-narratives and -practices may give insights into approaches to facilitate innovation-processes concerning drone-technology and -narratives from a governance / innovation-policy perspective.

Reach more than one target group: bamboo as the new wood?
WAKONIG-LÜKING, Tim; WEINRAUCH, Stefanie
FH JOANNEUM, Austria

The change in Central European forests due to climate change has an impact on the construction industry. The expected decrease of the currently predominant types of timber can be met with various strategies. One option is the cultivation of bamboo as a fast-growing, woody grass species in Austria. However, this is linked to the establishment of a completely new value chain, starting with agricultural cultivation and the production of a wood-like material through to industrial or craft processing. In order to coordinate potentials and risks at an early stage, an online survey was started to attempt a more in-depth discussion with interested stakeholders in this value chain. The challenges in contrast to earlier participatory processes are presented in a short presentation.

Digital Ethics as research ethics: implications for research practices and research organisation
WERNER, Matthias
FH JOANNEUM, Graz, Austria

In the last years, discussions about “digital ethics” are receiving increased attention in general public debates and are no longer a topic in academic discourses only. At the same time the topics that are being addressed under the label of “digital ethics” are very broad and diverse. In many cases they go beyond questions of ethics in R&D or technology design, also examining media usage practices and their effects, ethics of digital business models, or needs of regulation of policy vacua due to technological change.

In the sub-project strand on “Digital ethics and RRI” of our project Connecting.Ideas4Research we ask for ethically relevant aspects of digitisation for research processes and research organisation at our universities. For this, a narrowing of the broad notion of digital ethics was needed. In my contribution I want to outline an understanding of digital ethics in the context of research practice that points to specific problem dimensions and that can identify different areas of action. I will argue that universities’ R&D activities face ethically relevant aspects not only in respect to the objects of research (e.g. technologies of digitisation) or research questions (enabled by the

spreading of digital approaches to all disciplines) but also in respect to research practices and methods (e.g. in technology design; usage of digital research tools).

Stream B: Digitalization of Society

Session B.1: Social Innovation Cha(lle)nging Digital Urban Governance

Chair: CERTOMÀ, Chiara
Sant'Anna School of Advanced Studies, University of Turin, Italy

Right to the better city – from the grassroots to smarter policies

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The rise of information and communication technology and growing urbanization are two trends increasingly shaping our modern societies. What emerges at the intersection of those processes are diverse smart city policies and ICT tools embedded in the urban environment. While we often focus on analyzing smart city policies from the perspective of their economic effectiveness or technological 'coolness', less is being said on the role of the citizens and their rights in the context of ICT implementation. This paper takes the perspective of human-centered urban development (Landry et al. 2019) in analyzing social consequences of digitalization of urban society.

Our analysis aims at theorizing the consequences of technological developments in the context of urban policy-making and quality of life, from the grassroots perspective. It strives to better understand how new technologies can shape the wellbeing of urban residents, and their ability to exercise their "right to the city" defined by Lefebvre (1968) as freedom to make and remake our cities according to principles of sustainable development, democracy, equality and social justice.

In previous work of one of the authors (Domaradzka 2018), different components of right to the city were laid out. Here, we 'unpack' the mobilizing frame of right to the city further, to include the digital rights "to" and "in the city". This work will build on "digital right to the city" concept (Shaw&Graham 2017, Foth, Brynskov&Ojala 2015) focused on digital and virtual aspect of exercising citizens' rights. However, it also advances the „right to the smart city" theory grounded in basic research and existing theoretical achievements. Based on the synergy of several sociological and psychological theoretical concepts we will present the impact of technological innovations on urban quality of life, social cohesion and democracy/power relations in terms of residents' ability for mobilization and participation.

The starting point is the concept of right to the city, understood as a basic right defining the citizenship status of residents. Following Marshall's (1977) ideas of political and social citizenship, it focus on how the right to the city connects the urban policy level (political) with citizens' wellbeing and activism (social). On the political level, we analyse the concept of the smart city, studying participation and consultation technologies, as well as algorithms employed in city management. On the social level, the role of

grassroots activism in creating tools for citizens control, better life quality and mobilization is of main interest. This includes diverse social innovations rooted in circular economy (Roszczyńska et al. 2019), citizen science initiatives, coding community products, and urban movements activism fueled by social media (Sowada 2019, Domaradzka 2021).

Linking the smart city concept – focusing on urban changes brought by technology – with the right to the city theory, allows to create a framework for studying modern cities in a more comprehensive way. It also helps us better understand how ICT can be used for citizens' empowerment and building human-centered smart cities.

Evolution of Trust in the Domain Name System (DNS)

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It is well known that trust is an elusive concept that cannot easily be translated into technical context. Nonetheless, the penetration of digital communication in nearly every aspect of our private and public life, raises the question of how to integrate or realize trust over technical infrastructure: whatever factors may be influential in building trust, mediated communication, e.g., digital communication, almost always lead to loss or at least inhibition of cues or signals that are crucial to construction of trust relations.

In general, trust in digital communications is based on the idea of trust through authentication in terms of identification: the common approach is to bind real identities with digital representations and to let the communication partners decide whether to trust each other or not. Such bindings are done through the so-called trusted third parties (TTP) which are responsible for vouching for the correctness of a binding, that is to ensure if a digital representation, e.g., the domain name polizei.berlin.de, corresponds to a real-life entity, e.g., the police department of City of Berlin. In context of the World Wide Web, one prominent example of such TTP is the domain name system (DNS) which is responsible for binding domain names to IP addresses, i.e. the translation of human readable names to hard-to-remember numerical addresses.

But what amounts to designation of an entity as trusted? Do technical measures suffice to establish trust between communication partners in the virtual world in a similar fashion compared to the real world? These and similar questions can be answered by reviewing how such systems have been evolved from merely technical solutions to complex ecosystems overarching both the technical and non-technical aspects. We take the example of the DNS, which reveals how a purely technical approach was evolved over many decades into a comprehensive socio-technical ecosystem, we show how technical practitioners were initially reluctant to address policy and organizational issues, and finally how laws and regulations were shaped around the new technology. Our goal is not only to recognize the conceptual discrepancies between different fields of study, e.g., trust in computer sciences versus sociology, but also to acknowledge the

necessity of knowledge exchange required to development of practical technical solutions beyond research and experimental settings.

Place-based re-politicisation of socio-digital entanglements in urban governance. A collectively designed critical research agenda on Digital Social Innovation
CERTOMÀ, Chiara
Sant'Anna School of Advanced Studies, University of Turin, Italy

The mushrooming of Digital Social Innovation (DSI) initiatives and their adoption in urban governance is a recent phenomenon that has been only partially investigated in scholarly research. Particularly the socially progressive and regressive aspects of DSI practices in the context of neoliberal cities require special consideration. With the aim to enrich the nascent critical debate, the paper suggests that a place-based, collective analysis and discussion can help at exploring the socio-political implications of DSI in the city life. To this end, the paper describes the realisation and presents the results of a scenario-building process in the city of Ghent, Belgium in which expert citizens analysed DSI initiatives adopted in urban governance, their future perspectives, together with possibilities and threats these bring about. The collective discussion shows that, while DSI processes can produce progressive changes in urban governance, it is fundamental to consider under what conditions and at what costs these changes are happening, and whether their consequences are always desirable.

Session B.2: Digitalisation of higher education: revolutionising education or the digitalisation of traditional solutions?

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Sharing what was learnt, about future-proofing professional education, from a study that examined how sets of professional digital requirements and the content & delivery of a programmed of social work education coalesced to support student digital development in preparation for profession practice in a world that is enmeshed with the digital
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It is the relevance of the educational system through which students pass that influences how prepared they are to practice in their field. Whilst this presentation is located in social work education the findings are relatable across higher education, given that few, if any, disciplines or professions have been unaffected by digitalisation.

The rapidity of digitalisation has been widely felt across the social world for a significant amount of time, however, social work education has been historically slow to respond; or slow to respond in ways that are consistent, or that are consistently useful to the

professional task (LaMendola, 1987; Turner, 2016). Social work has had a long and 'turbulent' relationship with technologies (Baker et al. 2014, p. 486), hindered by the misappropriation of technological systems in frontline practice (Sapey, 1997) and a lack of attention to the digital in social work education. Even within the context of the current global pandemic, that has driven the need for digitally mediated methods, comments such as 'I am a high-touch person, not a high-tech person' and 'I am a people person, not a tech person' (Robbins et al., 2016, p.391) can still be heard across the profession.

Social work education, similar to other professional programmes of learning, is regulated by a host, or 'plethora' of requirements (Narey, 2014, p.9), some of which do not always or easily coalesce with, or translate to, the practice sphere. Regardless of this social work educators remain responsible for the design of a curriculum of learning that prepares students to engage with the complexities of the social world.

This presentation reports on findings of a study designed to 'Examine the Contribution of Social Work Education to the Digital Professionalism of Students, for Practice in the Connected Age'; and it does so from the student point of view. A solution, or way forward is suggested; one that provides all students of social work with opportunities to be digitally practice prepared. It adds to, and moves beyond the 'teach with' technologies premise, so that digital knowledge and digital values are thought of on a par with digital skills. The 'teach about' technologies emphasis is crucial to how professional practices are informed, because it is this that will prepare future practitioners with the abilities to challenge and engage with the digital inequalities and complexities of the digital turn.

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Construction Practices of Open Educational Resources in Digital Infrastructure Systems

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The openness movement in open science focuses mainly on open access and open data. Since the Humboldtian model of higher education institutionalized a holistic combination of research and studies, both of these dimensions are entangled in modern universities. Thus open education has to be an important issue of opening science as well. In Germany a newer media didactical discourse proposes to enrich this debate of OER infrastructure

with concepts of open educational practices (OEP). These practices are about how to foster open education not only out of infrastructure but out of specified pedagogical doings to open education up. But the term practice is also being used without reflecting its meaning in social science practice theory and its deeper understanding (Bellinger & Mayrberger, 2019).

This contribution develops a theoretical model of construction practices of OER in digital infrastructure systems. It develops a plenary (Schatzki, 2016) of OER practices, which aims to describe the interaction order of OER practices in situations of constructing OER in digital infrastructure systems by teachers in higher education, to provide a contribution to the current OER debate and socio-material practice theory.

Practice theory is able to discuss three dimensions of entangled socio-material practices: transformation, reproduction, and action capabilities (Schäfer, 2016). Transformation will ask about: What should OER achieve in a sense of their political framing? The transformation of their political framing trough a model of OER and technical reproduction of OER in infrastructure provides a discourse of OER practices. Reproduction will ask: What are intended achievements of OER provided in infrastructure? Infrastructural systems do not only provide reproduction of OER in sense of enable reuse, they also reproduce the model of OER in their media performance. Action capabilities will ask about: How do epistemic cultures (Knorr Cetina, 1999) affect using infrastructure to construct OER? Transformation and reproduction affect the structural and institutional framing of practices and action capabilities.

The main questions are pointed out of this model are: How do teachers develop and construct their learning and teaching materials and how do these practices fit to the model of OER and OEP? How does infrastructure support OEP? This theoretical framework enables to compare methods of open science like open access, open data, and open science tools with practices of open education and how can open science and open education use their lessons learned and economies of scale? These questions will be investigated by an ethnographic study.

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The purpose(s) of learning and the digitalisation of higher education

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There is an interesting situation in higher education considering the discrepancy between the possibilities for change and the permanence of actual practices. While it seems that new technologies claiming to have the potential to revolutionise education emerge almost every month, teaching and learning practices tend to remain relatively stable. This contradiction is interesting in itself and may lead to the assumption that higher education institutions, as well as their staff, are conservative in nature.

While this assumption might be true, there is also an alternative explanation for this lack of change. Namely, that teaching and learning are themselves complex and ambiguous processes with multiple, often contradictory, functions and purposes. So, while new technologies and procedures (such as adaptive learning systems, learning analytics, virtual reality- and simulation-based education, blockchain, MOOCs) are able to and most likely will have a significant impact on higher education, they do not address the underlying questions about the nature and purposes of teaching and learning. We argue that without answering these questions, higher education institutions will not be able to utilise these technological affordances. In order to simplify this complexity, this paper draws on two future visions about education from the past.

The first vision belongs to Skinner who imagined a fully technologised school where students progress in their own pace in a well-defined, linear sequence of a learning trajectory, their understanding and retention are often tested, they receive immediate and regular feedback from the system. In this vision, learning objectives are defined beforehand and learning materials are broken down into small units in order to help students acquire the necessary knowledge and give them a sense of accomplishment. The impersonality and technologised manner of teaching and learning in this vision guarantees that anxiety, fear of punishment and feeling of uncertainty are minimised.

The second vision was elaborated by Rogers who emphasises that real learning (in his definition: learning which leads to positive behavioural change) is always self-directed. In other words, the questions must come from the learners themselves and teachers should not impose a predefined set of materials, learning objectives, and in turn, a way of seeing the world on them. Interestingly, the most important prerequisite of education is not a well-structured process of learning but a genuine human connection between people. Without the presence of trust and psychological safety, learning cannot be deep and long-lasting. The role of the teachers is to facilitate the process of learning: to be available, to share their knowledge and experience if and when the learners require guidance.

Both of these visions are normative, prescribing specific norms, roles and purposes regarding the practices of teaching and learning. We argue that educational technologies available today can support the realisation of each of these visions. Moreover, while these

visions do differ in fundamental aspects, there may be ways to utilise their insight in a complementary manner.

New Perspectives on Interaction in Higher Education Digital Learning Scenarios
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Due to the Covid-19 pandemic, higher education facilities have transitioned to various forms of distance teaching and learning, leading to a rapid increase of digitalization measures that will most likely also influence teaching and learning in a post-pandemic future.

In our contribution we aim to answer the following question: How do teachers and students experience opportunities for interaction in digital learning scenarios? Using qualitative data from an ongoing research project, we explore the perceived potentials and risks of the Covid-19-induced digitalization of both teaching, learning and working in selected Austrian universities. The collected data includes interviews with students as well as scientific and non-scientific university staff.

Preliminary results indicate a considerable awareness of the changes in the meaning of interaction in digital teaching and learning scenarios. In contrast to digital learning, regular face-to-face interaction is characterized by what Goffman (1967, 1983) calls a physical "co-presence" of the interaction partners, in this case teachers and students. In digital learning, opportunities for interaction must be created intentionally by employing a number of techno-didactic measures, such as choosing a specific digital learning scenario (e.g. videoconferencing), using available software-functions within the digital infrastructure (e.g. Zoom's "raise hand"-feature) and specific didactic interventions (e.g. encouraging students to ask questions).

Interaction partners in digital learning situations can only refer to each other via technological means. Knorr-Cetina (2009: 69) uses the term "synthetic situation" to denote situations which are "augmented (and temporalized) by fully or partially scoped components". Scopic systems enable their users to collect, observe and project different kinds of information relevant to interaction situations by using telecommunication technologies. Because of their contingent and fluid nature, synthetic situations may be continuously rearranged by the interaction partners according to their specific communicative needs. For example, in digital learning situations, students may use video-conferencing software to interact with their peers and teachers, while simultaneously employing different software applications to view lecture slides, take notes and chat with their peers. In this context, the affordances (Hutchby 2001) of scopic communication technologies enable and constrain specific possibilities for interaction.

Drawing on this literature, we aim to discuss the challenges of providing opportunities for interaction and participation in digital learning scenarios and to point out the significance of interaction for different academic disciplines and skills. Specifically, it is our objective to

focus on the different perspectives of both teachers and students and to trace how opportunities for digital interactions are enabled by specific techno-didactic measures (Pinch 2010). In doing so, we want to offer an analysis of how interaction is experienced in digital learning and teaching scenarios from an STS perspective.

A Digital Technology Assessment Lecture – Chances and limits of digitalisation for Technology Assessment (TA) lectures for engineering education

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TA is an inter- and transdisciplinary research field, which provides a comprehensive insight into the expected opportunities and potentially negative consequences of new technologies. TA contributes to the generation of knowledge for decision support and to cope with socio-technical problems in the context of scientific and technological change.

In the previous 20 years TA has been integrated in curricula of different engineering disciplines and been categorized under topics such as ecological process evaluation, process assessment, Life Cycle assessment, risk evaluation, technology and society, but seldom under the label of 'TA'. In this contribution, we present an example of digitalization of a TA specific lecture – Impact of technological development – Introduction to the theory and practice of technology assessment (TA), 2 ECTS – at TU-Wien for participants from different engineering disciplines. The course is conducted by external lectures from the Institute of Technology Assessment (ITA). Digitalization promises to improve the flexibility of education. Nevertheless, there are practical limitations for digitalization not only regarding the infrastructure, but also, according to the interactive character of TA courses and the need for generating an inspiring environment for reflection on interactions between technology and society and the need for special Micro-TA hand-on projects for didactic reasons.

A TA lecture for engineering education should mainly:

- provide initial theoretical and practical insights into the role and use of TA and the way it can be applied in engineering work,
- address complex interactions of technology and society from different perspectives in real world examples,
- focus on societal challenges and define their relations to technical solutions,
- address intended and unintended consequences of technology,
- reflect on values that promote or inhibit technical innovations.
- A TA lecture should enable students for:
- identification of TA-relevant topics,
- reflection on multiple legitimate needs,
- learning by doing in interdisciplinary projects,
- understanding the need for participation and dialog with experts, stakeholders, decision-makers and the public in the process of knowledge generation and decision-making.

The objectives for knowledge acquisition of the lecture at TU Wien are the following seven: (i) to provide basic knowledge on TA, to provide knowledge on application of TA for (ii) policy advice, (iii) shaping technologies, (iv) innovation management, (v) society advice, (vi) reflection on methods and (vii) provide a space for the exchange of knowledge between students from different disciplines. Knowledge acquisition was supported in 2021 through distance learning for

objective (i) through pre-recorded presentations by lecturers for theories.
objectives (ii) to (vii) through
micro-projects by small interdisciplinary groups,
time slots for interdisciplinary discussions and,
moderated video conferences via Zoom,
interactive exercises using breakout sessions.

The performance was evaluated based on the quality and intensity of the interdisciplinary team work to identify technical, societal and ethical implications of technology, short essays and poster presentations by students on micro-projects on topics such as distance learning, intermodal transport, smart homes, or green biorefinery. In this contribution, we will discuss the future strategy for such courses based on the primary achievements and discussion of chances and limits of new education methods and tools.

I know where I'm going: new paths in online assessment methodologies

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Higher education has adapted to the new reality. Digitalization, online and face-to-face teaching, hybrid teaching are keywords in higher education used in the past year. However, all of them are not new. Teachers are expected to be able to successfully communicate with students and provide a valid and reliable assessment. But how can it be achieved in a virtual environment? Has assessment also changed? Do we need to learn how to interact with our virtual students in order to provide a reliable assessment? Do students have to learn to be involved in the online learning process? Many questions need to be answered. Our proposal looks to shed some light on assessment methodologies. We will present what is known as Single Point Rubric (SPR). Based on student-self assessment as an effective component of formative assessment, SPR involves students in their peers' feedback and evaluation. But is there any relevant change to adapt SPR to virtual environments? The objective of our presentation is to provide food for thought about the new virtual reality in our classrooms and boost a constructive discussion on online assessment methodologies.

Digitization and research work: a post-time politics

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The communication analyses information collected through a survey about the experience of time and ICT (Information and Communication Technologies) use involving young researchers. ICT use within the context of academic and science work has made a long way until COVID-19. Gradually, many transformations occurred during the last decade that also changed the shape of the academe and science time. Increasing activities were already made possible to do outside the university physical walls and transferred to many other distinct places. However, COVID 19 pandemic has made this possibility expand enormously, as ICT has also provided many different means of responding to ever different requests, in all sorts of matters, including collaborative work. These colossal moves into digitalization in academy and science is highly leading to the experience that time is "disappearing". However, this experience is not understand the same way by researchers, and there are variations to consider also between women, and man. Analysing the results of a survey done in Portugal, this communication addresses these questions, debating the interest in thinking of a post-politics of time and gender in academe that includes a more extensive analysis about the meanings and the value ascribed to time. The authors also debate the implications of these results for rethinking the gender equality plans at the universities.

The role of influencers on young people and its consequences for the development of teaching competence in nutrition and consumer education

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In our digital multi-option society material, social and emotional needs are satisfied at high grade through offers from the profit-oriented and highly digitized market system. Social media emerges as a relatively new meta-level between market and consumer regarding the complex influencing factors on individual consumption routines. Orientation-giving social media influencers are a central factor in these dynamics (see Waldner & Mittischek, 2020).

In particular young people are regularly exposed to influencer content on social media platforms, reflecting values and individual ideologies and manifests to a significant extent in nutrition and consumer socialization of young generations. For nutrition and consumer education this mandates educators to learn a deeper understanding of the impact of influencer's media content on the nutritional and consumer behavior of children and adolescents in order to grasp the magnitude of the emotionally conveyed everyday reference and the symbolic power.

The EKo-K.I.S.S. project, supported by "Zukunftsfonds Steiermark", addresses this issue by developing media-didactic concepts for nutrition and consumer education at schools

and universities based on social science studies. The central question of the project is: (How) do Influencers affect the reality of young people's life in terms of nutrition and consumer literacy, and which are the challenges arising with regards to gender-sensitive, intersectional media didactics? The research project comprises a multi-stage design incorporating perspectives of teachers, university lecturers and students of teacher education, as well as children and adolescents at school.

In our presentation we discuss initial results of the quantitative survey amongst Styrian pupils, school teachers, lecturers and students of teacher education and put them in context with qualitative data from expert interviews and group discussions with secondary school pupils.

These data should form the basis for didactic action orientations in teacher education and professional development of educators, leading to increased and differentiated representation of this topic at school.

Publication from project: Waldner, I., & Mittischek, L. (2020). Können Influencer/innen einen Beitrag zu nachhaltigen Konsumhandlungen liefern? Ergebnisse aus der EKo-K.I.S.S.-Schüler/innenbefragung. Didacticum, 2(1), 156-189. https://didacticum.phst.at/index.php/didacticum/article/view/40 [2.3.21]

Session B.3: Digitalization as a Transformational Force for Transcultural Communication

Chairs: BAUMGARTEN, Stefan; TIEBER, Michael
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Uberization of Translation: Impacts on Working Conditions

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Cloud-based digital labour platforms, encompassing on-demand translation work via apps and websites, have grown exponentially in recent years, and have significant consequences for translation workers. Drawing on the findings of our MA research (Fırat, 2019), this presentation aims to advance our understanding of this relatively novel phenomenon of digital labour platforms by exploring their ramifications for translation workers from a labour studies perspective. To this end, the following research questions will be addressed within the scope of this presentation:

How do digital labour platforms impact the working conditions of translation workers? What are the risks and challenges of digital labour platforms for translation workers?

In order to provide some plausible answers to our questions, we utilize Cognitive Capitalism Theory (Moulier-Boutang, 2008/2011) and submit the findings of a small-scale, quantitative survey conducted with 70 translation workers living in Turkey and working on/

for digital labour platforms. Our research concludes that the introduction of digital labour platforms into translation production and business networks has not yet provided any significant contribution to the working conditions of translation workers based in Turkey. Rather, it is argued, their working conditions have been rearranged and reorganized in accordance with the principles of the cognitive capitalism era. According to survey findings, engaging in such work on digital labour platforms exposes translation workers to the risks related to employment status, adequate income, work-life balance, social protections, free agency, bargaining power, dependence on the platform, fair allocation of risks and rewards, and data collection, protection and privacy.

Measuring the value of human translation in the time of digitalisation--but for whom?
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The 'value' of work is difficult to define and/or measure. This is the case for, and a sticking point of, human translation in increasingly technologized working environments. This paper will first examine how the value of translators' work has been defined and measured in translation studies. Such evaluation methods are divided between quantitative and qualitative methods. Most commonly used quantitative methods are those used in process studies. By using modern technologies such as eye tracking, they try to quantify translators' work efforts through parameters such as temporal, technical and cognitive efforts. On the other hand, qualitative evaluation methods lean to rather slippery notions such as creativity or cultural understanding. The paper will then move on to discuss what implications these different evaluation methods have for different stakeholders, particularly translators and work providers of translation (such as LSPs and clients) in this time of digitalisation. The author will map out the current disciplinary landscape of translation studies, paying special attention to the recent prominent development of cognitive and sociological strands of translation studies, and argue that an excessive emphasis on quantitative evaluations has the risk of undermining the true value of translators' work. In conclusion, the paper will propose a new disciplinary expansion into directions of economics and politics in order to produce socially fair and productive scholarship to frame the assessment of the value of translators' efforts, taking into consideration the relevance of beliefs and programmes such as neoliberalism and Universal Basic Income.

From the Booth as Cage to the Platform as Shared World: Reflections on Conference Interpreters as Lived Bodies in Digital Transcultural Communication
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"The nearest thing we have in interpreting to a cage" is the description by Cronin for the interpreting booth in his critique of positivistic trends in interpreting research (Cronin 2002:390). But the booth as cage does not only evoke a guarded, fenced, opaque zone. It is also an intimate space, surrounded with an aura of mystification. A myth with two ideological components seems to make simultaneous conference interpreting in the

booth for many of the lay as well as expert audiences the most professional form of translation: On the one hand there is the belief in effective, almost frictionless, simultaneous interlingual transfer with the support of advanced booth technology and via expert interpreters. Often less informed participants in conferences listening to simultaneous interpreting, especially when the booths are not present in the conference locations, tend to confuse the technology with the interpreter: The interpreter's body is forgotten, the voice as remainder of the body is instrumentalized (cf Dizdar 2014). The second component of the myth shows us the booth as a closed performative space that is enacted as an exquisite location for the authorized only, i.e. the interpreters who are technologically and technically highly specialized. What happens then to the lived/felt body of the interpreter when the protecting and empowering walls around the booth vanish and when the booth is turned into a digital environment and a virtual shared world? At this point I would like to read against the grain the bodily entanglement of the simultaneous conference interpreter in the booth versus in digital mediatized communication (Remote Simultaneous Interpreting RSI). The work of the sociologist Gesa Lindemann on lived/felt body, embodied space, presence of the body, mediatized communication and her rereadings of Plessner's concepts of mediated immediacy and shared world (Lindemann 2010, 2015, 2020a+b) provide the theoretical framework for my reflections.

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Job profiles and required competences in the age of post-editing

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The professional translation market has been deeply influenced by the ongoing digitalisation and the increasing application of artificial intelligence in several aspects of the translation process. Most prominently, machine translation (MT) systems that have become established tools to create draft translations for post-editing (PE). While some fear the extinction of the profession in the long run, the demand for professional translations is continuously growing (csa-research.com 2019[1]), especially for specialized translation and audiovisual translation. Hence, translators must adapt to new market requirements to stay up-to-date and profitable, creating a win-win situation for both translator and client.

As presented in Nitzke et al. (2019), many competences for PE overlap with those presented in translation and revision competence models (PACTE (2005), EMT Expert Group (2009), Göpferich (2009), or Robert et al. (2017)), some need to be adapted, others are additional. Building on this initial model, we want to present a revised model for PE competences that better suits aspects of practical PE. The model puts translation competences (including bilingual, extralinguistic, and research competences) as the foundation of PE competences. The columns of the model are three PE specific competences, namely error handling, MT engineering, and consulting competences. The model is topped by risk assessment and service competences. The model will be discussed regarding PE in traditional translation and subtitling (Bywood et al. 2017).

Further, we want to explore three job profiles that arise according to the columns of the model. In our opinion, these job profiles are promising perspectives for translation students and professional translators who want to position themselves anew on the changing market. Finally, we want to discuss how and to what extend translation curricula need to be adapted to prepare students for the presented job profiles and what additional training professional translators might need to adapt to those job profiles.

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Translation and machines: artifacts, instruments and the evolving role of the translator

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The advent of neural machine translation has undoubtedly affected the translation industry, speeding up the digitalization process, taking translator productivity to new heights, and lowering production prices. One of the immediate consequences is the gradual depletion of the traditional role of translators, who see their work reduced to the revision of isolated segments produced by a machine. The risk of translation becoming a marginal activity is high (Pym 2014, 37) if the task is simplified in the mechanical substitution of words and phrases detached from the communicative context in which they originated. We can even think of the subrogation of the essential work of translators, who are forced to leave their main job in the hands of the computer.

This trend, which, on the other hand, is not alien to other production processes or services, can be explored in the light of a tension between “artifacts” versus “instruments” (Alonso and Calvo 2015): an artifact is an isolated object that performs a series of functions without having any relationship with its user, while the instrument is associated to the user as an essential part of a process. From this perspective, we can analyse both the technological object itself and the different ways in which users (or society, by extension) interact with it. Obviously, this vision is much more enriching and opens the possibility of observing technology from a point of view that encompasses not only the tool itself and its functions, but also who uses it, why, where and how. In this presentation, I will use this framework to analyse the changes that the latest developments in machine translation have brought to the job profile and workflows of professional translators. My contention is that linear processes of translation that conceive machine translation as an artifact are obsolete, and that only by considering this technology as an instrument can translators remain in control of the process.

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Using SCOT for the study of Human-Computer Interaction in literary translation: a proactive and flexible approach

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The study of technology advancement in translation has only recently started to include sociological approaches. In particular, Olohan (2017) identified the Social Construction of Technology (SCOT) framework devised by Pinch and Bijker (1984) as particularly suitable to uncover social and power dynamics at play in the technologisation of translation. This being said, the ways technology design, development and implementation affect translators from a socio-cultural standpoint are still relatively under-studied, especially as related to literary translation.

This research project tried to fill this gap by adopting the SCOT framework to study literary translators' attitudes towards technology and how these influence their self-imaging strategies. In particular, it has done so by taking advantage of SCOT's flexibility as a framework and adapting it to the study's specific needs. In fact, the framework has been employed in a proactive way to identify controversies among relevant social groups as they arise, rather than carrying out a retrospective analysis of a single technological artefact. This, in order to devise suitable closure mechanisms before adverse effects of technologisation become engrained in translator's workflows, as they have in non-literary translation (O'Brien, 2012). Moreover, literary translators were prioritised as a social group to compensate for the lack of opportunities they have had to voice their interpretations of technology and become an active part of its development and implementation in their profession.

A total of 150 literary translators participated in the study by sharing their attitudes and perceptions via means of a questionnaire. This paper will present the study's findings, highlighting how a SCOT-informed analysis allowed to uncover the link between how literary translators choose to (re)present themselves in society and how they see technology. Ultimately, it is argued that SCOT could pave the way for pre-emptively identifying issues in the relationship between humans and technology, and act as a springboard to devise suitable closure mechanisms, initiating a conversation around the topic of translation technology that is inclusive of different, relevant standpoints.

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Do we need a social licence to operate in translation?

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As machine translation (MT) becomes more widely used, the dichotomy between MT for assimilation (MT as the final intended output) and MT for dissemination (MT as a step in production) becomes more polarised. For reasons of computing cost, energy cost, data availability, and the financial imperative to eliminate linguistic constraints within their networks, big technology companies have taken the lead in MT for assimilation. Language service providers (LSPs) increasingly use MT for dissemination (among other automation technologies) as they try to whittle down costs and create growth and returns for investors and shareholders in an economic environment where growth globally has slowed. There is a degree of crossover as some LSPs use MT resources intended for assimilation, but the main effect of big tech MT and the accompanying hype is to push MT into use cases for which it was previously considered inappropriate.

Within large-scale translation production networks, this has led to two main approaches to automation. One involves atomising the translation process by sending decomposed segments of text, the MT output for which has been deemed to be of unacceptable quality, to translators for quick, contextless turnaround. The second approach aims to relieve translators by automating portions of their tasks. Both increasingly assume constant availability and quick turnaround times. There are two reasons to question the sustainability of these approaches. One relates to energy use and CO2 output; the other is work system sustainability. I consider that unless worker satisfaction and motivation are considered as part of an ongoing and effort to achieve a balance between stakeholder needs in the long term, there will soon be a lack of talented translators available to the industry. As a corrective, stakeholders could reward companies' ethical and sustainable behaviour with a 'social licence to operate', a positive indicator for consumers and workers.

Translation Machines and the Anthropo-Politics of Translation Studies: A Polemic

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This polemic addresses and criticizes the 'anthropo-politics' of Translation Studies: the drawing and maintenance of borders between the 'human' and the 'non-human'. In this

context, the 'non-human' refers to algorithmic entities also known as translation machines. Translation machines have become central agents of transcultural communication in the present, digital age. In fact, it can be assumed that translation machines such as Google Translate currently produce the vast majority of translations worldwide. However, the more machines populate its subject area, the more Translation Studies seems to shield itself from this new reality and focus on the human translator as the "proper" agent of translation and transcultural communication. Andrew Chesterman's "Translator Studies" or Anthony Pym's call to "rehumanize" the discipline are only a case in point. But by doing so, it does not engage with these digital transformations, it merely reacts to them und resorts to anthropo-politics, the practice of drawing and maintaining the borders of the 'human'. I argue that the anthropocentrism inherent in this practice needs to be reflected and overcome if Translation Studies wants to come to terms with the transformations brought about by digitalization.

Session: B.4 Standardisation and the Digital Society

Chair: RICHMOND, Karen McGregor
Danish National Research Foundation of Excellence for International Courts, Denmark

Should We Trust Automated Vehicles? Developing European Standards for Trustworthy Automated Vehicles

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Automated vehicles bring the great promise of better, safer and more efficient transport. But how do we make use of this great potential while making sure that the technology reflects and adheres to the values and rights we hold dear? The aim of this contribution is to share the findings from the VERDI project ("Trust in digitisation using the example of systems for (partially) automated driving and driver assistance"), where an interdisciplinary team is conducting a research on the trustworthiness of driver assisted systems (SAE L3) by developing and testing interdisciplinary criteria and survey methods that can be used for future standardization and certification processes.

The contribution will first provide insights into the theoretical foundation of trust and what constitutes a trustworthy driver assistance system. Our research so far suggests that trust is a central concept for the adequate use of automated systems: Inappropriate trust ("over-trust") can lead to a system's misuse or abuse, too little trust ("under-trust") to its rejection, i.e. non-use. The expected benefits of highly automated driving systems can only manifest if users (as well as all other road users involved) encounter automation with a degree of "calibrated trust", thus know the limits of the system's functions and in which situations it is appropriate to trust it. In a second part, the contribution will present the first findings of the VERDI survey methodology and the VERDI Criteria Catalogue for trustworthy driver assistance systems.

VERDI uses the knowledge gained in two H2020 projects. The first project, TRUESSEC.eu, delivered a multidisciplinary Criteria Catalogue for trustworthy ICT based on European

values and fundamental rights. The Criteria Catalogue, which is comprised of a set of requirements (Core Areas - criteria - indicators), addresses security and privacy as the most discussed values in the tech community, nevertheless, it also includes other less researched values such as autonomy, transparency, anti-discrimination and respect. The second project, SCOTT, builds on high-level principles and aims to translate these into a framework which outlines the processes needed to incorporate trust early in the design process. The framework is being applied to 15 specified use cases focusing on how to design trustworthy wireless technology. VERDI builds on these findings and will result in a VERDI Criteria Catalogue for trustworthy driver assistance systems and a set of regulatory recommendations.

'Open Source' Investigatory Standards and the 'Berkeley Protocol'

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This paper argues for the convergence of national, and international, standards of forensic investigation, in order to comprehensively address the investigatory challenges which the forensic science and criminal justice communities must both address when conducting criminal investigations: challenges relating to bias and contamination of samples, non-expert reporting, and the poor foundational validity of 'open source' and forensic 'pattern-matching' techniques. Whilst it is conceded that international criminal investigations may pose unique challenges, not least those related to temporal and geographical factors, it is posited that such problems are not resolved through resort to divergent system of expert, and inexpert, investigation. Indeed, divergence and stratification may harm ongoing international efforts to develop higher quality, and comparatively more accurate, forensic techniques, of the type recommended by the US NAS/NRC and PCAST, reports, the Australian NIFS literature, and the House of Lords Science and Technology Committee Report, 'A Blueprint For Change.'

These reports make a number of recommendations which align with the efforts of international standards-setting bodies (ISO), national accreditation bodies (UKAS), and national/EU regulators (NIFS, FSR, EAFS). However, training, and forensic investigation in the international criminal law field remains beyond the ambit of formal national, regional, and international, quality assurance mechanisms. The use of non-experts to source, and process, open source data, is similarly unregulated, despite having been subject to recent attempts to inculcate protocols and quality assurance mechanisms. These efforts are founded upon a number of propositions, which this paper critiques:

- The procedures of the international Criminal Court necessitate a non-standard approach to forensic investigation.
- Forensic investigations of online, and digital, material constitute a sui generis category of forensic investigation which necessitates a new approach to standard-setting in forensic investigation.

- ‘Open Source’ evidence collection by non-professional - and inexpert - agencies, and individuals, is necessary in order to meet the challenges of international criminal investigation.

The paper addresses these propositions in light of national and regional forensic and investigatory standards, arguing that the current approach may propagate significant risks, including (but not limited to) cognitive and sampling biases, contamination of samples and the use of non-standard equipment, chain-of-custody risks, and the absence of administrative quality assurance mechanisms. The paper concludes with reference to the publication of the Berkeley Protocol on Open Source Investigation, and asks whether the ‘democratisation’ of expertise, and the promulgation of a ‘new forensics’ contained therein is either necessary, or achievable.

Critically reviewing smart home technology applications and business models in Europe

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Smart home technologies refer to devices that provide some degree of digitally connected or enhanced services to occupants. Smart homes have become central in recent technology and policy discussions about energy efficiency, climate change, and innovation. However, many studies are speculative, lacking empirical data, and focus on costs and benefits, but not business models and emerging markets. To address these gaps, our study presents data from semi-structured expert interviews and a review of the recent literature. Although we draw from empirical data collected in the United Kingdom, we place our findings in the context of Europe because the UK has access to European markets for smart home technologies and platforms. Our sampling strategy included experts from Amazon, Microsoft, the International Energy Agency, government, academic, and civil society stakeholders. We identify a diversity of definitions associated with smart home technologies and draw from our data to discuss applications centred on digital connections, enhanced control, automation, and learning. We analyse fifteen distinct business models for smart home technologies, ranging from energy services and household data monitoring to assisted living, security and safety, and new advertising channels (among others). Our assessment ought to guide future innovation patterns, technology deployment, and policy activity relating to smart homes, especially insofar as they can deliver energy services more affordably or help meeting carbon mitigation priorities.

The missing standards and norms in the development of automated urban heritage preservation risk monitoring system

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In her seminal 1985 paper, Shoshana Zuboff (1985, p. 5) writes: “Technology defines the horizon of our material world as it shapes the limits of what is possible and what is barely

imaginable." Various smart technologies in use today have already proven they can extend the horizons of possibility. Such systems as AI, for example, "display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals" (EC AI HLEG, 2019a).

Management of certain tasks and processes in domains such as finances, health, energy, public safety, and smart cities, for example, increasingly involves the use of AI (Etzioni & Etzioni, 2016; Lyytinen et al., 2018). The governance responsibility, however, still rests with human authority, and no attempts have been made to define the standards for the 'degrees of autonomy' for technology. The task of developing such standards is complicated by the fact that governance of complex systems is embedded in large regulatory and technological context, the existing and/or desired design principles of which are often too complex or obscured to allow for easy and reliable automation of the governance function.

Urban heritage preservation (UHP) risk monitoring is one of such cases in rhetoric on smart city. UHP in Lithuania appears to be the case of regulatory design failure, where the substantial statutory base comprised of national and international legislative and normative acts is (mis-)matched by inadequately low resources to implement the monitoring in practice. On the one hand, this creates a perfect venue for the development of automated risk monitoring solutions with help of systems based on the integration of such technologies as 3D special scanning and AI-based image processing, and providing them with advanced control and communication functions. On the other hand, development and implementation of the novel technological solutions cannot be accomplished without re-definition of the extant regulatory framework to include both (legitimation of use of certain) technology standards and (definition of certain) standards for governance of such systems.

In this paper we present a case study of digitization attempt of UHP based on smart technologies of 3D scanning and AI-based image processing. The case study of digitization of urban heritage preservation reveals a gap in research and best practice on plethora of standards- and standardization-related issues in the rhetoric of smart city, such as:

- The role and representation of societal stakeholders in smart systems standardisation.
- Legitimacy and influence of different players in standards development.
- Potential ethical issues in smart systems standardisation.

At the general level, this study has implications for the rhetoric on smart cities and autonomous governance systems, the transitioning of public administration to e-services, and the broader context of Network society. This study helps identify specific issues and contexts where the adoption of novel IT solutions requires adaptations to the extant heritage preservation practices and the legislative system, and where the technology standards and/or social/organizational norms are required for the development automated solutions for UHP risk monitoring.

Session B.5: The Digitalisation of Markets and Big Data as a Threat to a Democratic Society

Chair: ROBERTSON, Viktoria
University of Graz, Austria

Epistemic power shifts created in behavioural predictions of online platforms

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In her book and more recently in an article for the New York Times, Shoshana Zuboff discusses epistemic inequality as one issue of online platforms in the age of surveillance capitalism. Zuboff suggests a "power shift from the ownership of the means of production, which defined the politics of the 20th century, to the ownership of the production of meaning." In our research, we analyse the epistemic power shift emerging through behavioural predictions of online platforms and put this analysis in relation to the work of contemporary philosophers such as Latour and Foucault.

Information in surveillance capitalism originates in human action. It includes a wide range of behaviour from querying computers to bodily movement. From this information, large platforms build knowledge mostly without reference to theories. Its validity and indeed its value relate to the predictive power, or more precisely to the value of predictions determined in auctions. Different from mere technical or scientific knowledge, the predictions concern human action. This behavioural knowledge also creates power. Zuboff identifies skills harvesting, i.e. the power to control labour markets and the instrumentarian power to influence people's behaviour. In addition, large surveillance platforms also build epistemic power. This includes the power to know and to learn. When information becomes knowledge it also represents a power relationship. We are therefore witnessing a case of a historical transformation (Foucault 1976, p.39 ff.) in which new knowledge-based power relationships are established.

The epistemic power emerging in online platforms includes the power to perform dedicated experiments with users as research subjects, such as behavioural responses to online games, news etc. Such experiments have the potential to further increase the predictive power of the harvested knowledge. These experiments don't necessarily have to be pursued with any conventional research ethics: e.g. information regarding the objective of the experiment, explicit consent, or special consideration of vulnerable groups of people including, for example, children.

Latour (2010, p.23, p.49) describes the political power shift towards technology through public experiment. He uses the examples of Archimedes' lever that demonstrates the translation of a geometrical and physical assertion to a technical dispositive – and thus a shift from geometry to geopolitics. In a similar vein, the new data-based surveillance capitalists construct knowledge not only for economic exploitation and technological (and instrumentarian) power. It is part of a much larger politicization. However, different from

Foucault's (and Latour's) observations, the new power is not just the power arising from sheer technical capability. It is not just the political positioning of the scientist on the side of the politician, nor the power to be right in public demonstrations of technically enabled power. Large online platforms and networks build on their action-based predictive and instrumentarian power to establish new epistemic and political power relationships.

In this way, they become new political powerhouses that may on occasion even side with the politician. But they have established themselves also as potentially autonomous political power players, especially on an international level where they have largely escaped effective regulation to date.

European policy against political disinformation

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In recent years, the spread of disinformation on online platforms and micro-targeted data-driven political advertising has become a serious concern in many countries around the world, in particular as regards the impact this practice may have on informed citizenship and democratic systems. The European Commission (EC) has recognised the exposure of citizens to online disinformation and micro-targeting of voters based on the unlawful processing of personal data as one of the major challenges for European democracies. In a response, the EC has been building and implementing an overarching European approach to tackle these challenges through various policy instruments ranging from regulation to industry self-regulation. This contribution maps the key instruments contained in the approach and draws out the key principles upon which it builds: data protection; transparency; cooperation; mobilising the private sector; promoting diversity and credibility of information; raising awareness; and empowering the research community. In the online environment, the principles applied to legacy media require further elaboration as the problem of electoral disinformation cuts across a number of different policy areas, involving a range of public and private actors. Political disinformation is not a problem that can easily be compartmentalised into existing legal and policy categories. It is a complex and multi-layered issue that requires a more comprehensive and collaborative approach when designing potential solutions. The developing EU approach reflects the necessity for that overall policy coordination. While being a significant step in the creation of a common EU answer to the challenges of disinformation and political manipulation, especially during elections, the European approach requires further elaboration, primarily to include additional layers of transparency. This entails transparency of political parties and of other actors on their actions in the election campaigns, as well as more transparency about internal processes and decision-making by platforms especially on actions of relevance to pluralism, elections and democracy. Furthermore, the attempt to propose solutions and relevant actions at the European level faces two constraints. On the one hand, it faces the power of global platforms shaped in the US tradition, which to a significant extent differs from the European approach in balancing freedom of expression and data protection. On the other hand, the EU approach confronts the resilience of national political traditions in

member states, in particular if the measures are based on recommendations and other soft instruments.

Platforms, commercial APIs and the right to privacy

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The current COVID-19 pandemic did broaden and accelerated the trajectory towards ubiquitous computing and deep mediatization (Hepp, 2020) as more and more time is spent online. Consequently, people are uploading more content and data whilst unknowingly leaving even more digital traces on the World Wide Web, which is dominated by the business model of platforms. This business model is on top of the gradual standardization of web protocols which is an ongoing process from the 90's onwards that has resulted in the centralized servers and the development of commercial coupling of protocols and application programming interfaces (APIs) that are data intensive. Especially the commercial APIs can be interpreted as the driving force behind the development of networks dependent on data and other software pieces as they are the focal point which enable the influence of platforms to extend beyond the constraints of their geographical locality of their hardware. Another reason for the exceptional popularity of APIs lies in their inability to discriminate between 'resource data' and its metadata: from the point of view of an API's entity-relationship database model, it's all just data, "since there may not be any distinction in how different pieces of data are stored, the API may provide access to both resources and metadata" (Pomerantz, 2015: 193). The presentation will try to demonstrate how this ambiguity in the functioning of commercial APIs results in company bypassing of Article 11 of the European General Data Protection Regulation (GDPR), which deals with individual rights and handling personal data, e.g., due to the technological opacity of the APIs platforms can attempt to bypass the right to privacy by claiming they gather non-personal or demographic data without imposing clear limits on its potential reuse for predictive analytics. In the conclusory remarks, the presentation will provide an answer to the question whether the European implementation of the right to privacy in an online context should shift from individual control over one's personal data towards the regulation of inferences that can be made from metadata sets.

Should online political micro-targeting be a European competition law concern?

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The power of big technology companies in modern societies is undeniable. In the European Union, one of the legal regimes that counters the power of dominant firms is European competition law (and its national counterparts). European competition law does so by curbing the negative effects of market power, where those effects are felt in the marketplace - on consumer welfare, consumer choice, or the market process. However, in its current understanding, European competition law is not aimed to counter negative effects of this power on democracy. A formidable example of how giant platforms, such

as Facebook, might impact democratic processes is, of course, the Cambridge Analytica case, in which detailed psychographic data-profiles were used to nudge citizens towards political preferences.

In our contribution we would like to tease out whether European competition law can and should be used to combat the negative effects on democratic processes that arise from the power of big technology companies. We will explain, first, why the most prevalent interpretation of European competition law focuses predominantly on market effects and why this might have to change, considering the powerful positions of (some) giant platforms. We will then zoom into the issue of political hypernudging and conceptualize its potentially problematic nature. Built on the theoretical foundation of behavioral economics, hypernudging strategies allow digital platforms to harness their users' cognitive limitations and predispositions to influence their decision-making through reassembling their choice environments in a highly personalized manner. For the purposes of this article, a hypernudge refers to any intentional feature of online choice architecture that alters users' behavior in a predictable way without prohibiting any options or significantly changing their economic incentives through algorithmically executed dynamic personalization processes.

Hypernudging stems from the accumulation of data and its combination with vast algorithmic power that may lead to manipulation of users' preferences. These users might be user-consumers presented with personalized advertisements or pricing offers. Such hypernudging might have a negative impact on consumer choice. Would this commercial behavior constitute an abuse of a dominant position of a market, the negative effects of hypernudging may be countered by European competition law's prohibition. The users might equally be user-citizens, being influenced on issues extending beyond the market concerns: it appears that users often undertake both roles at the same time, they are citizen-consumer-users. Hypernudging users' preferences towards a political (in)action, even though it originates from the same source of heaping of data and algorithmic capabilities, is not something European competition law can tackle – there is no clear market-effect, no negative impact on consumer welfare. Our contribution will deconstruct this argumentation, show the obstacles one runs into when trying to apply current European competition law provisions to hypernudging user-citizens and argue why and how such hypernudging might have to be construed as a European competition law problem.

Session: B.6: Digital Platforms and the Transformation of Public Communication

Chair: SCHRAPE, Jan-Felix
University of Stuttgart, Germany

Inverted Crowd-Control: Integrated online participatory videos and the struggles of keeping them alive

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Within the last couple years, video-material has gained relevance in the realm of social sciences not only as a means for documentation from the researcher's point of view – for example ethnographic fieldwork (Redmon, 2019) - but also as data-source in themselves. Examples include the analysis of participant-videos – videos taken by participants within a specific setting themselves (Schmidt & Wiesse, 2019) – or the analysis of how 'video experts' deal with video-material within their profession (Tuma, 2017). In drawing on both these approaches – taking into consideration the situatedness of participant-videos as well as how they are being made sense of by viewers - we identify a relatively new trend within social media that we describe as 'Integrated online participatory videos': What this term refers to are videos that emerge in the live co-production of video-content by streamers, their 'offline environment' (including a variety of actants from other people to technological artifacts) and an 'online-following', engaging in a creative interplay. While, broadly speaking, co-creative videos like this have been the topic of previous studies (Martins, 2019), we hereby explicitly focus actors' practices that contribute to this aspect of integration - this binding-together of online- and offline- environments, and reflect on the role that technological artifacts or, in this context, technological 'audience-streamer-bridges' play in the emergence of such videos. To exemplify this relationship and to trace the specifics of these binding actors, we draw on observations of two streaming-websites, Twitch and Chaturbate. By drawing on studies on temporal choreographies (Felt, 2015), we seek to demonstrate that this 'binding' is an ongoing process that requires continuous engagement and interaction on a variety of levels, hereby analysing the very conditions that are required for this 'bound' relationship between associated actors to persist or, on the other hand, that lead to the failing and / or reparation of this relationship.

Do locative media platforms change communication patterns in urban public places?

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My talk deals with a special part of the public sphere, namely urban public places. Public places are the historical nucleus of the modern public sphere, but in the information age these places seem to have lost much of their importance to mass media and the Internet. With the advent of mobile Internet, however, the question arises as to whether new forms of digital platforms, namely locative media, can contribute to a revitalization of public places as local centers of public communication. Locative media is an umbrella term for a

new kind of mobile apps, providing users with digital information about their social and material surroundings. Mediated through the interfaces of mobile devices, locative media apps transform urban places into a new form of "hybrid space" (de Souza e Silva 2006) that is composed of material and digital elements. In my talk, I will discuss how different locative media platforms might reinforce or change patterns of communication in public places.

Urban sociologists like Anselm Strauss (1976) or Lyn Lofland (1973) have pointed out the central importance of public places as sites for encounters where strangers with heterogeneous backgrounds can meet and communicate with each other. Some of these places are breeding grounds for specific social worlds, such as urban scenes, while other places take on the role of arenas making it possible to experience the social and cultural diversity of urban life. I build on this line of sociological research and present an analytical concept for distinguishing different manifestations of public places according to how they facilitate and restrict communication between urbanites. I propose to describe the public places of modern cities along two analytical dimensions. On the one hand, I distinguish urban places according to their degree of accessibility. On the other hand, I distinguish urban places by observing the elaboration of knowledge that is necessary to participate in local communication. Three patterns of communication result from these dimensions: civil inattention, small talk, and sociability.

Against the background of this concept, I investigate the potentials of two locative media platforms to change the ways we communicate in public places. The first platform (Ingress) is a mobile game adding virtual objects to perceptible space in order to turn urban places into a playground. The second platform (Foursquare) is a recommendation service enabling users to annotate urban places with digital photos, ratings or comments. My comparison draws on conceptual and empirical work conducted by the research team of the LoMUS project, which is part of the Collaborative Research Center "Re-Figuration of Spaces" at TU Berlin.

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Pushing crime prevention: Apps to make citizens responsible for crime?
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In "Culture of control", David Garland discusses the controversial concept of "responsibilization": the transfer of criminal justice responsibility from governmental authorities to private actors; organizations as well as citizens. Typical Examples are the privatization of prisons in the US, political and police support for the development of

neighborhood watch, and framing female victims responsible for being raped due to being alone on dark public spaces.

The dimension of responsibilization, I am concerned with, mainly regards the relationship between police and citizens. Public relations and local prevention strategies are main tools for the police to shift responsibility to citizens: through information dissemination with the goal of protecting oneself and supporting police neighborhood crime prevention measures.

Taking current concepts of media technologies into account, both the semantical as well as technical aspects of information dissemination are crucial to the reproduction of responsibilization: not only the message but the medium have to be considered.

How technologies shape the work and the perception of police have already been investigated in numerous research studies. Whereas in the past, technological developments, such as motorized vehicles and landline telephones promoted a centralized police, current platformization of (internal) police work is generating a new contiguities between the police and the public. Presence and interaction of police on twitter and facebook can be viewed as an example of how media technologies enable new forms of public relation and of prevention.

By merging these two strands – responsibilization and technologies utilized by the police – my research explores, how these strategies are embedded in media technologies of the police. Therefore, I focus on mobile apps made available to the public by the German speaking police offices. Unlike twitter or facebook, the infrastructures and interfaces of these apps are specially developed for the police. This paper is mainly concerned with the medium and does not consider the transmitted content (yet). Therefore the analysis starts with a structured comparison of existing applications and their features using the comparative analysis described by Dieter et al. (2018). In a further step these functions are analyzed regarding the responsibilities they ascribe to the police and to citizens.

The connection between the underlying technologies of mobile apps and strategies of responsibilization seems not far to seek, if apps are understood to structure behavior; and installing one is the first step towards becoming an ‘active citizen’.

The geography of knowledge landscapes – how to navigate toward health in the digital environment

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The knowledge appears crucial when considering how to maintain health and combat diseases. The current healthcare system endures transformation from medical paternalism toward person-centered care. Being positioned in the center of the healthcare system, the individual is entitled to make decisions. However, the person-centered care is

characterized by unbalanced relationship of citizens being users with medical professionals being providers of the knowledge necessary for decision making. The person-centered care envisions the partnership between the educated and licensed professionals and to-be-assisted individuals in need. However, the real-life situations involve the complex interplay of participants, technologies, interests and expectations. There is no doubt that the health-related choices should stay in hands of the users having autonomy to decide on own body and mind, however the levels of randomness, manipulation or naivety included remain unclear.

Subsequently, the digital environment appears as easy-to-access handy solution for individuals to find the required knowledge. The health is not of interest only for the sick, but in particular healthy individuals. The medical content is fairly represented in the digital sphere, and comprehensive in sense of readable collection of medical research, professional reviews and dedicated web pages created and curated by professionals. The concept of health literacy assumes individuals empowered by digital tools to increase their health-related knowledge. Having health literate citizens would ease the unbalance of knowledge needed to establish the functional person-centered care. However, the phenomena observed in digital public communication are far from this idealized framework. The digital environment creates a hypertrophied picture of medical abilities, introduces direct-to-consumer marketing strategies and initiates the confusing power-play of global scope. Subsequently the current healthcare system encounters digital environment more as a liability than as advantage, lacking the understanding of the complex relationships of the digital society.

Highlighting the need to understand the dynamic of health-related knowledge in the digital environment we have introduced the metaphor of knowledge landscapes – a 3D representation of the knowledge distribution across both offline and online communication spaces. Understanding how the landscapes are shaped and how to navigate toward the relevant knowledge could eventually contribute to understanding health-related interactions introduced by digital society.

The offline experiences of linear knowledge transfer influenced the initial perception of landscapes geography as coordinate system based on knowledge complexity (simplifications being located in the landscape close to the user and detailed nuances located far from the user) and context (attractive and familiar solutions are situated as ready-to-accept, and repulsive and unexperienced positioned as to be rejected). The linearity of this concept implies the different length or tortuosity of the trajectories through the landscape until reaching the target – relevant and individually suited knowledge. However, in addition to this linear representations, the digital environment appears complemented by non-linear relationships, where the geography reflects the significant distortions of space and time. The knowledge itself is not an absolute category but changes all the time, while the trajectories are more jumps through individualized hyperspaces. Understanding these non-Euclidean types of geometries could contribute to healthcare strategies embedded in the digital society.

Goodbye World. On the incommensurability of technical and meaning processing communication.

STAPLES, Ronald; PEETZ, Siglinde; STEINBACH, Vincent
FAU Erlangen - Nürnberg, Germany

We have never communicated with machines and we never will. All we have done so far to communicate with machines are detours in order to be able to communicate with each other via machines. The foundation for this statement is the differently designed logics of communication of machines and social systems. Social systems communicate by processing meaning. According to Luhmann, communication consists of the three parts of information - message - understanding. Connectivity and recursiveness are generated based on meaning. Machines, on the other hand, communicate causally and logically and therefore exclusively via information. Technical communication is therefore established causally and is only causally connectable and recursive.

Following these assumptions, we notice, that social and machine communication are incommensurable. Nevertheless, social systems manage to bridge this hiatus and produce the illusion of communicating with machines. Social Interface, a concept and term coined by Bernd Miebach accomplishes this. First, it addresses machines as human in the communication process by attributing behavioral expectations (Verhaltenserwartungen) to machines. Second, it assists contextualizing or reconstructing the information that machines emit in the communication process. In conclusion: Social Interface is the communicative reconstruction of machines by social ergo meaning processing systems.

Producing and meanwhile bridging the illusion of communication with machines Social Interface enables the development of user interfaces and user experience as fields of economical and scientific interest to construct the bridge between human and machines more pleasant, intuitive and simple or at least more productive. At the same time, more elaborated software and hardware (e.g. Industry 4.0, Internet of Things, Smart Home, …) expand the possibilities of communicating with machines and place new challenges on the users of Social Interface. The spectrum ranges from the area of algorithms, rating systems and purchase decisions to the (humanoid) design of machines which - also audibly - produces the illusion of speaking to us.

Session: B.7: Artificial Intelligence, Machine Learning and Deep Learning - a Challenge for the Social Studies of Technology (?)

Chairs: HÄUSSLING, Roger; SCHMITT, Marco
RWTH Aachen, Germany

Artificial Intelligence as 'innovation imperative': the discursive construction of Artificial Intelligence by politics, science and mass media in Germany

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Scientific disciplines as well as technologies are no fixed entities, but are discursively and practically constructed by social actors (e.g. Beck / Niewöhner / Sørensen 2012). Based on this understanding, the release of the AI Strategy of the Federal Republic of Germany in November 2018 emerged as a discursive event triggering negotiation processes between politics, science and media that have vitally contributed to the recent social construction of AI. Since the strategy was published following the release of AI strategies by several other countries, I assumed that the current construction of Artificial Intelligence in Germany might be influenced by the apparently renewed international political interest in AI. In order to investigate the way Artificial intelligence was constructed in this context in Germany, a qualitative content analysis (based on Mayring 2015; N = 42; length per document approx. 12-50 pp.) of strategic political, scientific and journalistic documents on AI was conducted. The main aim was to answer the question: How do science, politics and media mutually construct Artificial Intelligence within public discourse in the context of the release of the German AI Strategy?

The results illustrate that Artificial Intelligence is mainly discussed in the context of economic utilization. AI is primarily considered as a technology providing multiple beneficial applications. Moreover, engagement with AI is presented as a necessity to preserve national competitive potential in the future. For that reason, engagement with AI in both working life and education is implicitly turned into an 'imperative' for all members of society. Concerning this matter, the investigated discourse resembles other discursive constructions of so called future technologies. Since, for example Schaper-Rinkel (2006) observed that public discussion about nanotechnology centers on potential economic benefits and an inevitable need of promoting nanotechnology in order to economically and technologically compete with other countries. Given the fact that AI just like for example nanotechnology is almost exclusively discussed referring to profit opportunities, the gained results confirm theoretical approaches which assume a strong attachment of knowledge production to the demand of entailing technologic innovation today (e.g. Etkowitz & Leidesdorff 2000).

In sum, the investigated discourse mirrors the so called 'innovation society' in which the deliberate shaping and promotion of (technological) innovation is at the center of social action and public debate (cf. Hutter et al. 2015). AI seems to have turned into the reference point of a discourse that comprises not only current scientific and technological

developments but that constructs visions for a supposedly desirable and inevitable future in which AI plays a central role in all realms of society.

The presentation summarizes the result of my MA thesis. By making reference to the STS perspective on technological development that was illustrated at the beginning and is illustrated by the famous assertion that 'it could be otherwise' (e.g. Woolgar and Lezaun 2015), I would like to critically discuss the way politics, science and media discursively construct Artificial Intelligence in Germany today as a mainly beneficial technology that will become an inevitable part of all areas of our future life.

Borderland encounters – evolving professional identities between human and machine learning processes

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In the last decades, the self-image of many professions has profoundly changed. Besides technical competences, interpersonal skills have been gaining more and more importance. Nowadays, the ability to take initiative and to assert oneself, but also to care for others and take their perspective, are considered as essential requirements in many professional settings (Kanning 2009). On the one hand, the ability to relate to other persons and to cooperate are no longer seen as inherent personality traits, but as communicative, behavioral and interactive techniques that can be trained, constituting by that an essential aspect of a person's professional identity. On the other hand, social and interactive skills are still seen as distinctive trait of mankind. However, an increasing number of commercially available interactive training applications constitute a borderland in which human and machine learning processes regarding the development of social skills intertwine.

We conceive of this borderland as a field in which human and machine learning processes encounter and blend in many ways. There are characteristics shared by human and machine learning processes, above all the evolution and recognition of patterns. Still, whereas machine learning processes function exclusively on the basis of pattern recognition, human learning and interaction is characterized by an openness that includes breaches, failures, external appraisal, critical reflection, and other forms of transformation that can only be interpreted against the background of individual or collective developments within a given historical, cultural or societal context (Schütz/Luckmann 1973, Fuchs 2020, Künkler 2011, Brinkmann 2011).

We analyze the case of an ongoing prototyping project which involves the development of a Virtual Reality (VR) environment for the training of social skills. In this environment, trainees interact with a virtual agent. This consists of speech recognition and conversational artificial intelligence (AI) as mediators of the human-computer interaction. If this type of training environment is combined with technologies like the tracking of eye movement, detection of facial landmark for emotional (micro-) expressions or the measurement of physiological markers such as skin conductance, machines can become

emotionally intelligent entities that can aptly capture the cognitive and somatic state of the human trainee. In other words, the virtual agent develops "empathy".

Using the case of the VR environment for the training of social skills, we outline a new theoretical approach for mapping the borderland between human and machine learning processes in the field of social skills training. We discuss our case study within the framework of Tarde's (1893) laws of invention and imitation. 'Invention' refers to the openness and spontaneity of human interaction and behavior. 'Imitation' stands for the evolution and diffusion of behavioral patterns. We explore in which sense and to what extent the use of machine learning in the context of social skills training impacts and transforms the way behavioral patterns emerge, diffuse and vary across the field of organizational agency.

Patent law and artificial intelligence collide: A South African approach to the future
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It is uncertain whether artificial intelligence (AI) would, or ought, to be allowed to be inventors (and whether they should be granted legal personality) globally, and in South Africa – and, if so, how this system should work. Given that AI inventorship offers a great advantage and can enhance economic and human welfare, it is necessary to engage with these issues and policies from a South African perspective. This is because AI inventorship will afford certainty to businesses, fairness to research, and uphold scientific progress. It will reward human creativity upstream from the AI's invention. Recognising AI inventorship may offer further advantages, such as promoting disclosure and commercialisation. AI inventorship would give recognition to the inventing system, thus allowing businesses to promote such systems with the number of patents issued, and encouraging the development and commercialisation of autonomous inventing technologies.

In South Africa, AI has grown in relevance and is becoming immensely important in terms of governmental goals and public policy in lieu of the Fourth Industrial Revolution. Central to the Department of Science and Technology's new Draft White Paper on Science, Technology, and Innovation is the objective of creating a digital/information-based economy in order to foster the Fourth Industrial Revolution. A key driver of this is to create an enabling environment for innovation – much of which depends on the patent laws of a country. South Africa is currently undergoing patent reform, making this the opportune time to deal with these issues and set the ideas for how the law and AI should interact in the future – especially given the fact that AI is likely to alter the way in which the economy and society function. Furthermore, given that innovation is increasingly becoming more of a task for AI to undertake, it is imperative for developers of AI (across the board, from data scientists, to engineers and programmers) to have access to funding for their developments, which depends largely upon legal certainty as to the intellectual property rights (patents) that are extended.

This contribution will concentrate on the imperative for legal reform as a result of AI innovation. Considering AI inventorship rights will contribute to the fields of both AI and patent law and thereby assist policy makers in South Africa by better informing them of what the issues are, what the issues will be, what the international views are, and what South Africa should do going forward. Stakeholders, such as scientists and inventors, will be better informed and have legal certainty as to their position with relation to any inventions that may wholly result through AI. Furthermore, creating a thriving AI environment by encouraging investment serves to both enhance human welfare and increase the economic growth of the different industries in the South African economy. Creating this environment will draw foreign investment and ensure that South African inventors do not leave the country due to unattractive legal regimes.

Artificial Intelligence Applications on Social Fronts: A Source of Biases and Divides

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As Artificial Intelligence (AI) is expanding prolifically in every aspect of human life, the need for its responsible application is also arising very fast. The first and far most significant issue is being observed biases generated by several automation. These biases are because of the heavy usage of discriminative algorithms and collaborative algorithms, magnifying all sorts of biases during the training part of these systems.

This study focuses on biases caused by AI on the web and ponders upon two main issues:

a) the sources of these biases and factors which accelerate/ propagate these biases
b) possible Impacts of these biases on social systems.

Although there are 108 types of biases present in automated systems, we are considering bias in gender and sexual diversity for this study. We believe the skewness and distribution of classified bias in the open image datasets (used for deep learning algorithms) as two broad classes of observations. To achieve the mentioned research objectives, we carried experiments to analyze the effect of variable skewness and distribution of bias on different classifiers. These experiments will also quantify which part of the classifying algorithm is influencing the bias most.

This study will help to draw an evolutionary social framework and support the sustainability of existing ethos. This work will help combat several divides caused by excessive automation (AI, Machine Learning, and Deep Learning) and facilitate an inclusive society.

What is "Truly Human"? A Perspective On Human Identity Motivated by Soul Machines' "Digital Human"

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This paper discusses an embodied conversational agent that its creators promise is "an AI-powered Digital Brain, creating truly human interactions instead of robotic responses, allowing for deep and authentic connections between human and machine." This raises the question, what is "truly human" according to Soul Machines? One reason the Digital Human troubling because the way this blurring takes place is through a gendered epistemology of what is "truly human" that it enacts through representations of traditional norms about gender. To illustrate this, I draw three themes about what "human" means according to Soul Machines from behind the veneer of the company's marketing blurbs. Namely, that the agent is "human" in the sense that it (i) can behave independently of (other) humans, (ii) reproduces (some of) the functions of the human brain, and (iii) can display and sense emotions. In the first part of the paper, I then argue that whatever might be essential about being human from the perspective of the Digital Human, it has to be able to be turned into data. For example, it is through a live camera feed that the Digital Human constructs its human interaction partners. Paradoxically, this obscures the human body, which tends to disappear from existence by being made visible to, and turned into data by, such sensing technologies. Notably, the liminal zone where bodies are turned into data is a site of both oppression and opportunities for resistance. Drawing on science and technology studies and critical perspectives within affective computing, I argue that the Digital Human's understanding of human reflects a historically-privileged, cognitivist rationality that is facilely assigned to various computational technologies, with only a narrow interest in the consequences. Since, an embodied conversational agent seems "truly human", in this view, only if one accepts certain deeply problematic and exclusionary ideas about what being human means. I develop this point over the first half of the paper, by drawing on the example of traditional concepts of gender and the subservience of women enacted through the Digital Human's virtual assistants. In the second half of the paper, I outline ways to take responsibility for this technology that include suggestions for a more reflexive design process and a reconfiguration of the Digital Human that reflects the diversity of human identities. Towards this end, I draw suggestions about what is needed in order build a inclusive, sensitive Digital Human from feminist approaches in HCI. Since mine is the perspective of white, cis-male researcher, I address the final section to the challenges surrounding advocacy and allyship. For, while privilege is a power I can use on behalf of others, I risk simply imposing my own values by occupying the position as speaker. In this situation, I argue participation is a necessary, but not a sufficient aspect of avoiding a patronizing gaze on what "truly human" means. This paper queries the Digital Human's understanding of human, and both the power relations involved in turning humans into data, and those of addressing this from a position of privilege.

Session B.8: Robots and the (Dis)simulation of the Human World

Chair: SHIN, Heesun
Korea Advanced Institute of Science and Technology (KAIST), Korea, Republic of (South Korea)

Robotising Social Spaces: New Sites of Affective Relationality in Care
DE TOGNI, Giulia
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Technological developments in AI in combination with assistive physical technologies are currently facilitating the production of the first generation of the so-called 'social robots'. The latter have been developed to interact with humans via a communicative range that includes 'emotional' responses. These emotionally perceptive or 'intelligent' robots represent a new site of affective relationality in care, and their emergence raises new ethical and social as well as technological questions. For instance, they raise questions about the ways in which emotionality and sociability should be and are being algorithmically configured and how care recipients might perceive and respond to such algorithmic sociability. These questions include the nature, quality, and scope of the relationships that robots can or should have with humans; how the perceived role and the value of human relationships might influence the development of sociable robotic technologies; and how these technologies may, in turn, influence the nature of existing relationships between humans.

Despite the range of possible applications of emotional robots in health and social care, there are problematic questions which remain unsolved for instance around the integration of social robots into health and medical care teams. More empirical research is needed to determine how this integration may work in practice and how it may affect care relationships, in particular the doctor-patient relationship but also medical team members' relationships (affecting notions of trust, liability, accountability, and responsibility). For instance, it is not clear what will happen to the nature of care provision if it is no longer provided by human nurses but by robot nurses. Moreover, it remains unexplored what might happen once the nature of emotional and social intelligence are modelled into robots. To model it, the designers will need to have some conceptualisation of emotional intelligence that they can replicate into the machine. However, who decides what emotional and social intelligence is, in the first place, and if the designers are using a particular conceptualisation of it (instead of another one) to build social robots? The appearance of social robots in everyday settings challenges the sociological imagination to consider not only whether robotising social spaces induces new ontologies, but also to consider whether scholarly descriptions of these emerging socio-material collectives 'forget' fundamental aspects of human personhood.

Robots in Virtual Disasters: The Role of Fieldwork and Test Fields in Disaster Robotics

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What is fieldwork? For social scientists like anthropologists, fieldwork is one of the ethnographic methods to understand a strange society or community, usually conducted for a long period. For scientists, fieldwork refers mostly to practical work conducted in the natural environment other than a laboratory or office, with the objective of collecting raw data. For robotics engineers, fieldwork is a means to validate their robot design, prove system functionality, and gain confidence that their robots will perform as expected. Unlike many other disciplines where the field is regarded as equivalent to "the raw" or the "real world", fieldwork in robotics is usually conducted in the virtual world, simulated upon the engineers' decisions. A close look at the designs and the operation of robots in the fields, therefore, lets us understand the robotics engineers' assumption, expectation, and imagination towards the world living with robots.

Fieldwork is a common methodology for robotics engineers but it becomes even more important for field robots like disaster robots, which are expected to operate in harsh, unstructured, and changing environments. Since it is difficult for engineers to bring their robots to natural disasters, they often build test fields that sim- ulate various kinds of disasters. The Robot Test Facility at the National Institute of Standard and Technology (NIST) in Maryland, U.S. and the Fukushima Robot Test Field in Japan are the examples of the test fields for disaster robots. As a staged world, test fields allow the engineers to have a disaster in their hand.

This paper narrates the development of disaster robotics by highlighting how fieldwork at test fields plays a pivotal role in the robotics engineers' making sense of disasters and their robots. Since 2016, the South Korean government has promoted the Robot Project for National Safety and opened the Disaster Robotics R&D Center (DRC) in the city of Pohang. A part of the plan included building up a mock-up disaster environment to test and verify the performance of the robots. Drawing upon a case study of the test fields at DRC, I show the ways in which the engineers simulate the natural disasters into test fields by reducing them into quantifiable and reproducible units. By building up testing platforms, sequencing the platforms into a disaster scenario, and re-ordering the platforms, the robotics engineers place virtual disasters in front of them, instead of placing themselves to natural disasters. The simulated disasters in test fields render past and future disasters into a present tense and transform small and large disasters into scalable units, enabling the engineers to repeatedly test their robots without actually having to bear the danger. This paper points out that, despite the advantages of the virtuality, test fields dissimulate or distort some of the intrinsic features of disasters.

Humatic Walking: How Robots Simulate and Produce Walking with Paraplegics

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Can complete paraplegics, who have lost their walking ability, stand up and walk again with the help from exoskeleton robots? If and when they do walk again, what kind of walking would it be? Would paraplegics and exoskeleton robots have to simulate unaided human walking, or will they produce unique walking with its own gait and rhythm? Based on months-long observations of a South Korean research team of robotics engineers, physical therapists, and paraplegics, we explore how a distinctive form of walking is conceptualized, simulated, engineered, and embodied. We call it "humatic walking," as it is a combination of human and robot walking, physically and figuratively.

Our research attempts to go beyond disparate interpretations of the exoskeleton technology for paraplegics in engineering and disability studies. In the technological circle, exoskeleton robots are often coupled with a futuristic promise to free paraplegics from wheelchairs; robots will enable disabled people to re-walk. On the opposite side, disability studies scholars criticize the new robotics technology as a form of medical oppression, unwanted correction, and forced normalization, which will reinforce the distinction between the normal and the pathological rather than empowering disabled people.

By characterizing the walking of a paraplegic in (or with) an exoskeleton as humatic rather than either human or robotic, we highlight the actual production of walking and the emerging relationship between paraplegics and robots. Through our fieldwork since 2019, we find that humatic walking is comprised of three modes of walking: test walking, air walking, and cooperative walking. In "test walking," robotics engineers first simulate paraplegic walking with their non-paraplegic bodies. With this embodied knowledge of walking, they develop a walking algorithm and run the codes on computers. "Air walking" is produced when researchers have an exoskeleton robot walk in the air without a person inside. By analyzing the robot's air walking, the robotics engineers and physical therapists can detect potential safety problems before incorporating the human component in humatic walking. Finally, "cooperative walking" is enacted on the training track by physical therapists, robotics engineers, and a paraplegic wearing the exoskeleton, as all of them walk side by side. As experts of their own bodies and of humatic walking, the paraplegics offer feedback on how the robot feels on their body and how the human and robot elements should be arranged for better humatic walking. This feedback goes into a new walking algorithm that is revised continually.

Humatic walking is not an imperfect simulation of normal walking; it is a new form of walking made possible by simulation, programming, and training of bodies, machines, and codes. In our analysis of the production of humatic walking, paraplegics do not perform a passive role as beneficiaries, victims, or "end-users" at best, but rather work as co-developers who participate in technology development. This analysis of how humans

and robots simulate, produce, and embody a new kind of walking together offers a more grounded perspective on the intersection of body, disability, and technology.

Everyday Life Centered Approach (ELCA): Sociological Perspectives on Agent-like Robotic Systems

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Agent-like robotic systems are perceived and treated by humans as being social due to their built-in computational models enabling them to recognize and display cues for social interaction and communication, as well as the design strategy of anthropomorphism or zoomorphism. Promoted as a support for people in daily tasks and capable of initiating social relations, these agent-like robotic systems are envisioned to be a part of human everyday life in the roles of assistances, coworkers, and companions. Investigations and discussions about how to simulate the various constitutional and complex dimensions of everyday life for social human-robot interaction are often over-simplified or considered merely as a backdrop despite recent sociological interest and research into this notion. This is unfortunate, because an uncomfortable tension arises when attempts are made to simultaneously introduce agent-like robotic systems into everyday life with the promise of effortlessness and the claim that the technological advancement of social robotics provides unprecedented conditions for everyday life. In this presentation, we will bring together different sociological perspectives on the development and use of agent-like robotic systems to propose that focusing on the specific notion of everyday life can function as an analytic lens for future empirical-driven research in social human-robot interaction, which we name the "Everyday Life Centered Approach" (ELCA). In order to make our argument, we will first show how ELCA enables understanding and sensitivity to the three constitutive dimensions of everyday life: 1) the interpretive processes and regulations of everyday life activities, 2) the inter-subjective construction of meaning, and 3) the inclusion and engagements with various sorts of materials. These three dimensions are identified in our ELCA approach in terms of action, meaning, and materiality. We continue by explaining that the interpretation of everyday life varies among different knowledge groups who actively participate in the development and integration of agent-like robotic systems into society. This adds to ELCA the considerations of everyday life from the perspectives of both the third-person (external) and first-person (internal). Towards the end of this presentation, we will briefly discuss how preliminary data from a long-term household study of the agent-like robotic system VECTOR can be viewed through the ELCA lens. We believe that ELCA can further the analysis and understanding of the subtle redefinitions, reframing, and reconfigurations of everyday life when exploring long-term social human-robot interaction in unstructured and dynamic environments. As such, the ELCA extends the scope of analysis already established by the more popular approaches of User-Centered Design (UCD) and Domestic Robot Ecology (DRE).

Simulating the Healthy Body: How Exoskeletal Devices Invent New Forms of Capability in Rehabilitative Environment

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Recent robotic developments in rehabilitation such as exoskeletons draw attention to new ways of perceiving impairments. While simulating human walk or movements of the arms, exoskeletons redefine basic experiential parameters such as "motor intentionality" (Merleau-Ponty [1945] 2012: 112-113; Pacherie 2018), but also various forms of "feeling" one's body as being abled. They also challenge impairment because they engage the body of the user in forms of specific "body work" (Gimlin 2002). This refers especially to the process of learning to train with the exoskeleton which may be variable from person to person. If the body is our primary site in the world, in the sense that it situates us, when using an exoskeleton, the human body becomes re-situated, because its experiential possibilities are newly defined. Being verticalized after years of sitting in wheelchair or seeing one's image in a mirror while walking with an exoskeleton may be challenging experiences for a person with a motor deficiency.

Hence, exoskeletons are markers of a partial transition from "I cannot" to "I can", and they perform it by way of simulating walking or various movements of the arms. However, the models used to train the impaired persons in clinics or labs are elaborated starting from healthy bodies. In this sense exoskeletons simulate healthy movements while dis-simulating the specific impaired movement of its users. This opens the possibility to interrogate how the contextual use of exoskeletons in clinical environment changes the status of the person in that s(he) becomes "temporarily abled", and correlatively how the clinical space becomes for a short time, a space of corporeal normality.

The aim of this presentation is to explore how new forms of motor capability emerge due to the use of this type of technology in the medical field and what role is played by the simulation of a healthy body implemented in the robot in this process. To do so, I will rely on qualitative empirical material in the form of narrative interviews with users of exoskeletons in rehabilitative environment and experts who design this type of technology. The concrete impairment examples which shall be considered are spinal cord injury (SCI) and stroke (CVA). I will show how the use of exoskeletal devices and their simulating healthy motility patterns contributes to a new understanding of capability in a confined space (that of the lab or of the clinic) from a sociological perspective. Theoretical background from the phenomenology of the body (Merleau-Ponty [1945] 2012; Gallagher 2012; Zahavi 2019) shall also be used.

Standardisation & Service Efficiency: A Video-Based Study of Two Robotic Hotels in China

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Robotic services create new forms of standardisation in robotic hotels' services by means of automated systems and services provided by intelligent machines and robots. Previous studies have highlighted the positive influence of standardisation on job efficiency and claimed that standardisation improves efficiency (e.g. Rizter 1993; Karatepe et al. 2004; Chen et al. 2009). Automated machines' introduction to services has triggered the birth and development of the 'new' form of standardisation. More recent studies have illustrated the remarkable process of robotic services (e.g. Pan et al. 2015; Collins 2015; Pitsch 2016; van Doorn et al. 2017), and examined the crucial interactive moments in human-robot interaction (e.g. Pitsch et al. 2009; Kuno et al. 2007; Murphy et al. 2007). However, those studies mainly examined their theories in semi-automated service settings where nobody has talked about situations in fully automated self-service places; besides, since researchers mainly conducted analysis from an organisation-oriented viewpoint, the field of studies upon customer-oriented perspective is waited to be filled.

Drawing on ethnomethodology and conversation analysis (EMCA), the data of this study was collected through video recording in two robotic hotels in China for over two years. This paper aims to analyse the service efficiency of standardisation in robotic hotels. First, the paper describes problems, and inconveniences customers encounter when using intelligent machines and robots. In doing so, the researcher investigates the organisation of problem-solving in this specialised setting and the practices for seeking human assistances' help used by customers in robotic hotels. Second, the paper examines whether standardisation in service-providing improves service efficiency in comparison to traditional registration processes. More precisely, this study explores the validity and usefulness of pre-programmed self-service systems for shortening time and improving participants' convenience in robotics service settings.

This study reveals the problematic interaction between human user and service machine and presents how customer recruiting and seeking help from human assistants when problems occur. Consequentially, this study also documents how customers and human assistants collaboratively solve the problems and manage the current tasks through embodied actions in-situ. This paper finds that the practical problems which emerged in robotic settings seem to be the direct opposite to the prior claim that standardisation promotes service efficiency. The self-registration process takes time to accomplish, especially when the facial recognition system fails to capture the necessary information, halting registration progression, or when customers cannot get help on time without a human assistant being on the spot.

Saving Private Medipep or not? The aborted adoption of a "medical assistant" robot in a French old people's home

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"Medipep", compound of "medical" and Softbank Robotics' iconic robot "Pepper", was launched on the French healthcare market in 2018 by the start-up Spin'r, and briefly tested with a sample of users that it's supposed to help on a daily basis - elderlies with some degree of dependency, care workers - as it's meant to be available 24 hours a day to verbally interact and check health parameters with the latter whenever they need it, and to both store and transmit the collected data to (at least one of) the formers, in order to alleviate their workload and give them more time for "social contact" with the elderlies in dependent old people's homes (EHPAD).

This presentation relates the challenges to bridge the gap between this basic scenario/ rationale, which highlighted the uncertainties about the robot's real potential and future upgradings - handicapped by its inability to move around the care home, and to manipulate connected tools itself - as the proper quality of the Medipep, and the long, complex and uncertain setting of long-term experiment with the robot in a public retirement home near Paris, an experiment which didn't happen eventually as another robot was chosen (Paro). Bridging this gap meant the necessity to involve users with a strongly underestimated diversity of profiles and remaining capabilities, to find a middle way between the fuzzy solutionism of Medipep's builders and the wariness of the old people's home director, and to negotiate the promised autonomy of the robot in order to make it work and thus, worth a public funding by local health authorities.

Throughout the fieldwork - ethnography of demos of the robot, interviews with Spin'r CEO, care workers and residents, a two-month observation of daily routines and interactions in the old people's home preparing the robot's arrival - the very identity of the robot was constantly questioned, disputed, re-scripted from care workers' professional experience and the elderlies' expectations and reactions, and was thus very diverse : "another" useless investment/stride for innovation in social-medical care, a fake interlocutor/possibly a companion, a very basic/very futuristic tool, and so on. The outcome of the "adoption" of Medipep was bound to the EHPAD director's slow disillusionment about the current and upcoming functionalities of the robot and the impossibility to rent the Medipep instead of buying it ; but arguably it was also related to the disconnection between its proponents and its final users' idea of how care workers apprehend their job with severe time, space and human resources' constraints, of how elderlies, especially those suffering from anxiety, express their lack of company, self-reliance and affection.

Gender and Feminist Aspects in Robotics and HRI

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The fact that our artificial interlocutors i.e. voice assistants are more often, than not perceived as "feminine" at least, when it comes to the connotation of their voices, or societal and gender stereotypes they reproduce, has already disseminated to the broader publics, and is not only an issue in feminist debates around these technologies. While voice assistants mainly perpetuate stereotypes via voice and speech, a robotic embodiment can do both i) even strengthen these stereotypes on a more embodied level or ii) be a tool to once again reflect on these assumptions and disrupt these hierarchical categories of modernity, as suggested by Donna Haraway in her Cyborg Manifesto (1985). In this contribution I want to, firstly, give an overview and review on literature dealing with gender and robotics, respectively human-robot-interaction research and discuss "typical" research setups, which mostly work within a gender binary, emphasizing gender differences and thereby reproducing existing gender stereotypes and secondly, present alternatives given by existing literature, as well as discussing possibilities to tackle this topic from a (or more likely different) feminist and gender sensitive perspectives. Leading and underlying questions of this endeavor are Where do we want to encounter robots? Should they be humanoid, and why? In which cases? Why should or shouldn't they be gendered and which implications might this "gendering process" have? What does it mean, if a study shows that a feminine/masculine/gender neutral robot is "more accepted" by the study participants?

Important sites for these discussions will be the care sector and the domestic sphere (where we will encounter some of our troubling conversational agents) as well as more industry driven fields such as sex robots and war and/or security robots.

Although, no ultimate "recipe", "algorithm" or "panacea" for creating robots in a feminist, and gender-sensitive or non-binary way will be given at the end, this contribution should encourage the creation of alternatives for our potentially "robotic future".

Empowering users by co-producing a bedside cuddly soft robot: a case study from a Japanese nursing home

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As the new coronavirus infectious disease (COVID-19 pandemic) has highlighted, there is now a new focus on the introduction of telemedicine, and applications of remote monitoring and care delivery models as countermeasures for the spread of the virus and the protection of older people in nursing care facilities. Prior to the pandemic, the potential benefits of assistive technologies including robots in health and social care have

been widely highlighted in many countries. As the silver economy matures, manufacturers are emphasizing development and production of more efficient and effective care robots in response to increasing demand (e.g. heavy care burden, shortage of workforce). While evidence began to be reported on the effects of robotics-aided care on older people, the impact of using robots in care settings has not been sufficiently evaluated, particularly experience and perceptions among older people and care professionals. Moreover, usability and user-friendliness of these care robots have rarely been tested from users' point of view, and the 'efficiency' and 'effectiveness' can only matter if users' needs are sufficiently met. Moreover, in social care settings, there are some users (older people) who cannot verbally express their needs.

Since 2016, the authors' research team has been conducting research in this area, examining and evaluating the effects of SARs and other types of assistive technologies (ATs) on users, both care recipients (older people aged 65 years old and over) and care professionals in residential nursing homes.

While the benefits of applying robots and assistive technologies are recognized, the current limitations and weaknesses have also been identified. One of them is the inadequacy of user-centered design, resulting in the lack of engagement and enthusiasm among users (in this case, older people and care professionals).

In order to overcome this challenge, this paper reports the process of designing and developing a more usable and compact bedside communication robot with an input/output device, connected to existing technologies (e.g. monitoring camera, biological sensor). The participants of the study (25 female, 5 male; 86.8 +/- 6.8 years old) were located in a nursing home in Tokyo, Japan.

In the past experiments, it was pointed out that care has been suboptimal for those who cannot press the nurse call button when they need assistance. The residents had difficulty hearing and understanding what communication robots were saying. The hard shell of commercially-available robots gave a cold impression for both residents and staff. From staff's point of view, there has always been an issue of having to go to the room to see what has happened to a resident each time a nurse call was pressed, particularly during nighttime. By adopting user-centered design and drawing on past experience, users' feedback was reflected in the iterative steps of robot development. A soft shell robot was developed with an input/output device which is connected to the nurse call button and the monitoring camera. The paper highlights the importance of the situated approach for designing these socially assistive robots.

The study was in part financially supported by the Japan Keirin Autorace Foundation.

Session B.9: Digitalisation and Work: Perils and Promise

Chairs: MEACHAM, Darian; GIANNI, Robert
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A relational perspective on digital labour and future scenarios of platform-based work

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Digital platforms arrived in the sociological discourse and in the humanities, as can be seen in many recent platform-related publications. Owing to their exclusive character, classifying or evaluating these platforms remains controversial. Despite the multifaceted nature of theoretical approaches dealing with digital platforms, a classification turns out to be difficult because of the variety of potential platform-types. A lack of (theoretical) analytical robustness with which to analyze platforms consequently leads to a vague extrapolation of social, ethical and legal implications (ELSI) of digital platforms. Current contributions are primarily based on individual cases and system-theoretical approaches, which depict platforms as a social phenomenon being part of organizations and placed at the fringes to supervise the system's environment (Büchner 2018, Kirchner 2019, Nassehi 2019). According to Dolata (2018), digital platforms are not at all an innovative business model, as is often claimed in sociological discourse, but rather the fundamental transformation of areas of life at the macro-level, which were previously excluded from the economic interests or institutionally secured, especially highlighting the economization of contractually secured employment relationships. Additionally, new and specialized forms of platform related digital labour affects traditional industrial relations (Staab 2019). Following the relational approach, platforms are not only digital-organizational add-ons to supervise and integrate the systems environment, but also complex interfaces that have been used to link formerly heterogeneous processes in between the micro- and macro-level (Häußling 2015, Schwarz 2017). To generate a substantial insight on how digital platforms influence work-, social- or commercial relationships, it is required to analyze precisely what kind of processes are linked and what kind of relations emerge. To suit the topic of digital platforms, (a) a model for analyzing digital platforms that is reliable and that reflects the relationship between platform operators and participants (for example: sellers, buyers, employees) is needed. In addition to this, (b) a concept for the structured, appropriate reflection of ELSI and ergonomic aspects of digital platforms, leading to scientific method of accessing scenarios of digital labour in the future, is of interest (Brandl et al. 2019, Zweck 2013).

As part of our current research project »INDIZ«, we aim to discuss potential future scenarios of digital labour based on a theoretical model of platform classification. Our database covers a survey of 39 semi-standardized Interviews, which are analyzed by an interdisciplinary team. Considering the range of digital platforms, we'll analyze the main relations of a so called »metaplatform« as a macro-level sociotechnical phenomenon like Amazon, Facebook or Microsoft (Staab 2019: 172) in comparison to another established, but rather small digital platform. By analyzing diametrically different companies, we will

show that depending on the considered platform different consequences may be expected for the future development of digital labour and society. In this way, we'll join perspectives of the expansion of labour, acceleration of traffic and centralization of (economic) power in digital market environments, but also contribute to technological and optimistical perspective of decentralization and democratization of labour and science. Finally, two future scenarios of platform-based work are presented for further discussion.

Does Working from Home Really Improve the Life-Work Integration? Gender Gaps and Differences between Recognised and Non-Recognised Home Working Time

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Balancing work and private life presents a challenge for most employees today and has been further exacerbated by the corona-related lockdowns. Particularly working women with children have again increased the amount of time spent on unpaid work during the pandemic (e.g. Craig and Churchill, 2020) and are confronted with harmonising these competing demands. Working from home (WfH) is currently discussed as a way for employees to meet these challenges. However, studies have produced ambivalent results regarding WfH and its impact on the interrelation between work and private life. They indicate better work-life balance (e.g. Grunau et al., 2019; Powell and Craig, 2015), no impact on work-life balance (Hayman, 2009; Peters et al., 2009) or even more work-family conflicts (Wight and Raley, 2009).

Previous studies only included whether or not WfH is used (e.g. Abendroth and Reimann, 2018; Kurowska, 2018) but could not take further WfH conditions into account. We address this research gap, distinguishing between recognised and non-recognised home working time when analysing the interrelation between work and private life. Recognised home working time is defined as a working practice that enables employees to perform work for the company from home with the working time at home being fully recognised. In contrast, non-recognised home working time is not fully counted by employers and might, for example, be done from home before or after a working day. This distinction is particularly relevant with regard to gender and family-specific differences. We assume that these forms of home working time have different effects on the Life-Work Integration (LWI) of women and men due to gender-specific expectations and attributions regarding their performance in occupational and private life. While we expect women to benefit more from recognised home working time, we assume that non-recognised home working time will worsen their LWI more compared to that of men.

Using data from the German BIBB/BAuA Employment Survey 2018, Life-Work Integration is found to be positively associated with recognised home working time and negatively associated with non-recognised home working time. We also find gender-specific differences in the relation of WfH and LWI. In contrast to our assumption, recognised home working time has a more positive effect on their LWI for men than for women. In

line with our expectation, non-recognised home working time particularly worsens the LWI of women. While for men, it makes no difference whether they do not work from home or home working time is unrecognised, for women there is a substantial negative effect on the possibility of taking private demands into account.

The results show that WfH can be an effective means of coping with increasing challenges in the integration of private and professional requirements for employees if home working time is recognised. However, it is also evident that this does not apply to all employees to the same extent, but varies dependent on further characteristics, such as gender and family responsibility.

Emotional labour in the development of data-driven technologies in private-public partnerships

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Nordic countries are internationally considered as leaders in producing combinable data on their citizens' encounters with public institutions as well as in the digitalization of public services. Public-sector professionals increasingly collaborate with private-sector IT companies in developing data-driven technologies for the sake of cost-saving and cost-efficiency. This article presents the results of two-year ethnographic study of the collaboration between the Knowledge Team of a public-sector organization and a private IT company in developing and maintaining a data analytics product in one Finnish regional healthcare and social service organization.

The article extends the previous analysis of power dynamics as materialized into the data-driven technologies to capture often remaining as invisible emotional and affective labour related to data and development of these technologies. To date, feminist scholarship shows that data work embeds gendered, classed and raced technology (Irani, 2015 in D'Ignazio and Klein, 2020). For example, research show how women scientists in laboratory (Kerr and Garforth, 2016) and women as "invisible technicians" (Shapin 1989) provided marginalized, under-appreciated and under-paid care practices.

This study draws on the feminist call for recognition of the social, cultural, historical, institutional and material conditions under which data is produced and utilized in private-public partnerships along with the questions about the identities of the people who create and use it. Much of emotional and affective labour around data and new data-driven technologies, including coordination of public-private partnerships, remains invisible and uncredited.

Building on the STS theme of the invisible labour (Star and Strauss, 1999) and feminist scholarship (D'Ignazio and Klein 2020; Hochschild 1983; Haraway 1990) to highlight the importance of care and emotions in making of data and technologies, this study captures various types of emotional and affective labour embedded in collaborative development of data-driven technologies. By bringing together these two streams of research, this

study enables also to account for the professional positions of those performing these types of labour.

The results point at three types of emotional and affective labour that are identified: 1) emotional labour of experts of private IT company who cope with the feelings of disappointments of clients or when they try to understand the clients' needs; 2) affective labour of public sector professionals who engage in caring practices for data that is utilized, and 3) their emotional labour as ways to cope with laborious collaboration. Making emotional and affective labour visible can facilitate to improve the processes of technology design, development and implementation. The results of this study contribute to the understanding of mechanisms through which salient cultural values and practices become materialized into technologies.

Has incredible dr. Pol reached his due-date? How data-driven technologies affect veterinarians' accountability practices

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Professionals are often presumed to be subdued to regulative control, especially as such accountability practices are increasingly reliant on data-driven, calculative and automated technology (i.e., networked information systems). However, current (human) subject centred and representationalist notions of accountability deprive us from further understanding how professionals become positioned and position themselves and how their accounts produced in these positions relate to their moral and ethical responsibilities.

Drawing on our longitudinal ethnography of Dutch veterinarians as confronted with increased regulative control to decrease the use of antibiotics in veterinary and farming practices, we propose a conceptual model in which two co-constitutive accountability logics – 'accounting for care' (conduct) and 'care for accounting' explain how professionals in their accountability practices try to reconcile the sometimes irreconcilable: their moral responsibility to the proximate other (e.g., the animal) and their ethical responsibility to the distant (third) other (e.g., the regulator). Our model contributes to current debates on how professionals are best to be regulated by showing how professional responsibility takes place in the 'borderlands': a space of indeterminacy in which professionals' decisions and responsibilities are weighted and actions and accounts are only temporarily and situationally felt as 'appropriate' and responsible. Based on our results, we suggest more attention needs to be paid to particularly regulators' moral responsibility to continuously warrant for how their accountability apparatus does not induce professionals toward dualistic notions of being responsible, yet support them being in the borderlands.

The MBA programme of Industry 4.0 profile at the SUT as an example of different educational forms organised within the STS (science-technology-society) scheme

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The presentation will describe modern forms of technical educational opportunities for managers, specialized and carried on within the path and context of current technological revolution and Industry 4.0 profile.

Current global social and technological development requires and enforces new competences on managing and executive staff of technical and industrial sector. The new set of expected professional attributes includes not only managerial and technical knowledge and abilities, but also the psychosocial and business competences. The last-mentioned aspects take place basing on proper mental preparation and readiness of staff for courses' automation and new business models in the process of digitalisation.

The proposed presentation will focus on examples of research directions and practical implications. Results of empirical research being carried on the probe of active managers will be presented. Those will concern aspects of demand for competences of the future which are profiled for industry of the future, have regard to hard technical qualifications, managerial skills and social skills and abilities.

New educational model within the MBA type of post-diploma studies considering the interdisciplinary nature of managerial modules and the most important pillars of the Industry 4.0 will be presented. Those clue parts include: incremental processes, cybersecurity, autonomous robots, augmented reality, processing of large data sets, cloud computing, processes simulation and visualisation, business models for Industry 4.0 and technology and product assessment.

Additionally, presentation of the good STS (science-technology-society) scheme practices implemented in the educational process of Master of Business Administration studies programme is foreseen.

The case of the first experimental group of the MBA studies of the Industry 4.0 profile opened in Poland at the Silesian University of Technology in Gliwice within the ministerial support of the Dialog Programme will be presented as one of proposed solutions. Short description of the Dialog Programme itself and its principles of support for activities within areas of research excellence, science for innovation and humanities for development will be mentioned shortly as well for being the development tool offered to Polish universities by the Ministry of Science and Higher Education.

The Emerging Technology of Autonomous Cars: Issues of Social Engagement and Co-production

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As automation and digitalisation has been integrated technologically, organizationally and socially in the public transport regimes, are expected to affect all traffic participants, including drivers and passengers of Autonomous Vehicles (AVs) as well as the other transport users, including those travelling in non-automated vehicles of the surrounding traffic in mixed flows.

Automated vehicles have already been emerged as niche innovations in the incumbent transport regimes even in urban transport schemes, with several examples throughout Europe. Their integration has been based on visions and expectations developed by experts and stakeholders, however it also depends on public perceptions, attitudes, needs and concerns about the technological future, the urban mobility as well as the mobility of specific social relevant groups.

During the last decades, citizens' interest and concern over issues related to the development of technology have intensified, related mainly to the regulation, management and elaboration of technological policies, while the concept of public participation has become also central to research connected to transportation issues. In this context, the issue of autonomous and connected cars is a crucial topic, with questions related to vehicles taking over control from drivers, change of mobility habits, ethical dilemmas, as well as the imperative need of training for adapting to this technological evolution, being some of the key issues and challenges relevant to the emergence and integration of autonomous vehicles in the road transport regime. This is also depicted in the latest Roadmap on Automated Driving of the European Road Transport Research Advisory Council (ERTRAC), where user awareness, acceptance and training formulate the first priority challenge.There are many factors that expected to influence the acceptance and the evolvement of the ongoing transition period, like the acknowledgment of benefits, familiarisation with the new types of vehicles, provision of incentives, etc., along with the way to address publics' concerns regarding the use of automation (e.g., lack of trust to the system, cybersecurity issues, liability and responsibility issues, etc.).

The aim of this paper is to provide a concise overview of the current public acceptance and levels of public participation in relation to the technology of autonomous cars in the European countries (indicatively Austria, Belgium, France, Germany, Greece Italy, Spain, Sweden). The paper studies the role of experts in shaping the visions and imaginaries of AVs in Europe and in legitimizing dominant concepts of risks and of participatory design. We show how experts' views and visions have marginalized specific perceptions of risks and challenges by users and citizens in general and have shaped specific modalities of participation in the design of AVs systems. Outcomes are based on mixed methodological approaches, including analysis of technical and policy reports in order to

unravel the public framings of the autonomous cars, critical analysis of existing cross national surveys, as well as realisation of survey and interviews with experts in selected national settings and different areas (e.g., research, industry, authorities, etc.).

Out of Control: Work Practices and Technology Experience in Connected and Automated Production Environments

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This work sheds light on workers' experiences and work practices when collaborating with automated systems in the context of production work. The introduction and application of automated and connected technical systems, such as collaborative robots, assistance systems for guiding workers, or "smart" tools (e.g., screwdrivers) brings about significant changes for workers on the shop floor. Subsumed under buzzwords like "Industry 4.0" or "Smart Factory", such work environments can be characterized by an increasing complexity of systems and processes, as well as indirect and unexplicit interactions with the specific technological systems, e.g., the interaction with an automated assembly line. Drawing on in-depth examinations of workers' experiences with technology, interactions with the deployed systems, and associated work practices, we provide insights into current developments as well as reflect on opportunities and challenges for future developments from a workers' point of view.

In the presented research, we specifically ask: How do workers experience working in such automated and connected work environments and what kind of work practices can be observed? The presented research draws on ethnographic fieldwork in several production work environments, where humans are closely working together with automated systems: Working on assembly lines, maintaining complex machinery, and operating automated and (to some extent) autonomous production equipment. Specifically, we want to shed light on the topic of experienced (and lived) sense of control when working with automated and connected machines. By describing different facets of experienced control and related work practices, we want to draw attention to the additional and partly unnoticed effort (hidden work) that is done to maintain or regain autonomy and control in work with automated systems.

Specifically, we will describe three facets of experienced control and related practices that we have identified in our studies: (a) constantly "being ahead" of the processes at work, which facilitates autonomy in the sense of time (e.g., to fix mistakes) as well as personal freedom in how to get work done; (b) appropriating ("making one's own of") the systems and things through personalization and individual work (place) design (e.g., to keep up with the required pace at the assembly line); and (c) humans versus machines "struggling for control" (e.g. in case of system malfunctions). With this research, we aim to make visible some issues of experienced control with automated and connected systems in current developments in production work, as well as to provide orientation for the worker-centric design of future "smart" systems for production environments.

In search of successful implementation of assistive technologies in care sector: Applying a framework for Responsible Research and Innovation

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The work of caring for others involves hard physical, mental and emotional work (Lopez, 2006). It is been pointed out that care work is undervalued and the social care sector has been underfunded for many years. Due to the challenging work environment, recruitment and retention of care professionals has been a big public policy issue. In Japan, this is often echoed in the idea of 'care crisis', given the rapid pace of increase in its ageing population. In recent years, the 'care crisis' has been a strong driver for the introduction of robotic technologies in the care sector in Japan, although the uptake of technology has been rather slow and gradual.

The digitalization of care work can be met with fierce resistance and opposition, as there is still a strong belief that care should be delivered by human beings rather than by robots and assistive technologies (Suwa et al., 2020). Previous studies highlight the difficulty of successfully implementing assistive technologies in care settings (Wigfield et al., 2013). The adoption of technology has been seen as a stressor for frontline staff in the workplace (Sellberg & Susi, 2014). Barriers to using technology are largely associated with cost, design and usability of devices and services. Mismatch between needs and solutions provided by technology, lack of experience, as well as lack of training for staff, were also found to be significant barriers.

There is a great challenge in managing the under-resourced social care sector, while recognizing the potential benefits that can be brought by assistive technologies, including robots, for improving the quality of the workplace for caregivers as well as care recipients. The question should therefore not be whether but how these technologies can best be implemented and integrated to ensure person-centered care delivery. Specifically, the application of assistive technologies requires careful consideration of users' needs, rights, and workforce development implications, which are captured by the concept of Responsible Research and Innovation (RRI).

This paper seeks to address the question 'what changes can digitalization bring to the workplace in nursing homes?' by re-examining empirical studies conducted in a nursing home in Tokyo. In this testing site, a variety of assistive technologies (e.g. infrared monitoring cameras, sleep monitors and communicative robots) have been introduced since 2016, and have previously been shown to improve standards of care. By applying and reflecting on the framework for RRI in ICT (Stahl & Coeckelbergh, 2016), the paper illustrates a positive impact of utilizing socially assistive robots and safety monitoring systems (e.g. reduced stress levels of care professionals during nightshifts), while

presenting some challenges both in terms of implementing devices and embedding them in care processes.

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Session B.10: Models, Simulations & Algorithms - Policy Support in the Digital Age

Chairs: BAUER, Anja[1]; CAPARI, Leo[2]; FUCHS, Daniela[2]; UDREA, Titus[2]
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Between hard numbers and argumentation tools: the roles of models in EU's Sustainability Impact Assessments

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Within EU's trade and investment policy, as an exclusive competence carried out by the European Commission, modelling tools are fundamental to all policy evaluation and formulation phases. Models are used to produce forecasts and evaluate potential consequences of planned and implemented policies, yet also serve to empower and legitimize public policy. In this sense, computer-based simulations are not neutral tools solely providing analysis and direction to policy questions, but also influence socio-political discourses through performative effects. Modellers reframe policy questions, make relevance decisions and construct scenarios based on assumptions regarding parameters, based upon which they derive specific policy recommendations. Modelling at the science-policy interface, thus entails specific evidence practices that entangle multiple epistemic, political and social rationalities, demands, principles and norms.

In this presentation we analyse the roles of computational modelling within EU trade Sustainability Impact Assessments, as central instruments of EU's evidence-based policy initiatives. In recent trade negotiations rounds, modelling capacities have increasingly developed internally within DG Trade and shifted away from external consultancies. Against this background, we investigate the institutional set-up of modelling and ask what are the roles of modelling in SIAs as perceived by different actors? And how does the shift to internal modelling influence the authority of models in the SIA process and trade negotiations?

Based on two recent cases of SIAs, i.e. TTIP and EU-Australia, we first examine how contrasting understandings of the roles of modelling, between policy makers and modelling experts, structure debates around the perceived economic benefits of trade. We then show, how both the modelling and the trade negotiation processes continuously influence one another within SIAs. In this sense, modelling internally, within DG Trade, exposes disagreements on the model setup with the external consultancies undertaking the SIA. Finally, we further discuss the implications of conducting modelling internally, within DG Trade. Importantly, SIAs are evaluation instruments constructed to be independent from the EU Commission. While there are certain advantages to in-house modelling, there is a trade-off for SIAs in terms of the authority of expertise, in favour of flexibility and consistency.

Outsourcing Sovereignty? Examining the Business behind Automated Decision Systems

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Increasingly, government agencies are employing automated decision systems (ADS) in efforts to improve the effectiveness and efficiency of public services. However, the proliferation of such technologies in sensitive areas such as criminal justice (Angwin et al., 2016), social welfare (UN OHCHR, 2019), or employment (Cech et al., 2019) has raised serious concerns among journalists, academics, and civil rights organizations. The list of worries is long and includes issues such as the violation of privacy rights or the "automation of inequality" (Eubanks, 2018) through biased algorithms. What aggravates the problem is that there is often insufficient information about the software and its real-world application, contributing to a culture of secrecy and concealment that limits or even prevents public oversight.

One reason for this lack of transparency is that ADS are frequently not developed 'in-house' but bought from private companies that tend to treat their algorithmic formulas as trade secrets. This not only reduces public accountability but may also negatively affect the level of insight and control that administrative bodies have over their own systems and the processes that build upon them. What can thus be observed is an outsourcing of decision-making competence that challenges established due process procedures. As Verkuil (2007: 1) has argued, "government[s] exercise sovereign powers. When those powers are delegated to outsiders, the capacity to govern is undermined."

This paper aims to shed some light on the companies developing ADS for government purposes, focusing on software sold in the European Union to different federal agencies. Based on an exploratory literature review, the paper seeks to provide answers to two main questions: What type of companies are developing ADS for official uses and what can be said about the nature of the relationship between corporate and state actors in this context? As ADS-based solutions pervade ever more aspects of contemporary life, a better understanding of the business behind these systems seems paramount.

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Changing risk governance? The ambivalent case of modelling the risks of nanomaterials

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How do specific carbo nanotubes affect lung functions in the long-term? How do nano zinc and nano titanium dioxide particles accumulate in water and soil? Should the production of nanomaterials be restricted if we are not yet able to determine their exact environmental and health impacts and how should we manage such risks? Such questions are central to nano risk assessment and governance. While traditionally such questions have been dealt with by means of conventional methods such as animal testing, the use of computational modelling is increasingly developed, tested and applied for generating and validating evidence in support of the governance and regulation of nanomaterials in the light of lacking experimental data. These methods aim at closing data gaps regarding emission of nanoparticles to and their fate in the environment and alongside the life cycle, assessing their effects, or supporting decision-making under uncertainty.

In this presentation, we ask whether and how the use of computational modelling changes respective risk assessment and governance discourses and practices. As STS has shown, techniques and technological artefacts affect, objectify and stabilize related scientific and political negotiations in a specific way and are not to be treated as neutral and objective representations of the world, but rather entail epistemic practices, political and social preferences and values (Jasanoff 2004). CMS for nano risk assessment and governance serve as an example for how negotiations around risks are scoped, performed and settled by techniques and technologies. Often perceived as a "black box", we lay out how CMS contributes to opening up or closing down of risk discourses and how these dynamics are affected and re-produced as part of an evidence-based

policy regime. Our analysis is based on qualitative text analysis of scientific journal articles on modelling in nano risk research and related governance aspects, as well as interviews with modellers, policy actors and (industry) stakeholders.

We find that in-built assumptions of modelling tools allow openness with regard to the technological level (e.g. concerning questions such as 'which properties should be modelled'). Overall, we find that computational modelling of nano risks strongly corresponds to a scientific risk discourse, which, on one hand, recurs an expertocratic understanding of governance, therefore restricting the scope of negotiations from the outset.

On the other hand, the (at least aspired) applicability of such tools in real-world contexts (e.g. industry) reinforces the understanding of governance as dispersed among a variety of societal actors, bringing together risk-based and innovation-oriented discourses, therefore further strengthening a move towards societal allocation of governance practices.

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This study is part of the project CoMoPA (https://www.oeaw.ac.at/ita/en/projects/computationalmodelling-for-policy-advice/overview/) that investigates the computer modelling for policy advice in three policy areas.

'Crisis', Control, and Crimmigration: Biometric Surveillance in the Policing of Migration

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Automated facial recognition and advanced forensic DNA analyses are becoming dominant technological surveillance means for 'crimmigration' control. 'Crimmigration' describes the increasing criminalisation of migration based on the perceived 'crisis' of mass migration and its negative impact on national stability and welfare, materialising in overlapping crime and migration control regimes. In this paper we analyse policing of migration through biometric technologies as the reproduction of social practice of security.

We bring together Elizabeth Shove's notion of social practice with Radin and Kowal's concept of ethical regimes. Ethical regimes consist of bureaucratic structures, systems, interpersonal relationships and values that legitimise the use of biomaterial and data. This analytical synthesis supports us in exploring how biometric technologies deployed in the policing of crime circulate into the policing of migration: (1) Technologies as materials (audio-visual recordings, DNA, fingerprints, analysis kits, software etc.) are inscribed with assumptions about validating identity and suspicion. (2) Forensic competence can move

in abstracted forms of expertise independent of the context and ethics of application, creating challenges for technology deployment. (3) Biometric technologies, often taken for granted as reliable, useful and accurate policing tools, travel from crime into migration with meanings which construct criminal suspicion of migrants.

In order to evidence the complexity and difficulty of achieving accountability and responsibility for the ethical governance of biometric technologies in policing, we trace (i) how goals, risks, benefits and values of biometric surveillance technologies are framed, and (ii) how the legitimacy of their deployment in policing of migration is constructed and negotiated.

Session B.11: Algorithmic Inequality. Intersectional Divisions in the Digital Society

Chairs: LOPEZ, Paola[1]; EYERT, Florian[2]
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"Computer Says No": Algorithmic Decision Support and Organisational Responsibility

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Algorithmic decision support (ADS) is being used in more and more domains every year (such as human resources, welfare, policing etc.). Promises of higher efficiency and ``better'' decisions stand in contrast with problems of transparency, explainability and, fundamentally, the question of responsibility. % We distinguish accountability from responsibility by considering accountability to be a macro feature describing the entire socio-technological system surrounding ADS (including the legal framework, user interfaces and everything in between), whereas responsibility is concerned with attribution at a more concrete and micro level, focussing especially on the organisational embedding of ADS systems.

While in many work environments the people tasked with making decisions supported by algorithms retain the final responsibility therefor, they in most cases do not have a choice or say in whether and how to employ ADS systems in their work. This raises questions and conflicts of interests between different levels of organisational hierarchies, with possible impact on the livelihood of people without the agency to exert relevant influence on these decisions.

Many employees in middle management could find themselves in a position where they are still responsible for the quality of their decisions, while they are at the same time expected to not only make them faster and with a higher throughput than before the introduction algorithm support, but also to test and validate these decisions suggested by an algorithm they might only partially understand at best. Increased use of algorithmic support in decision-making also exacerbates the risks of discrimination and inequality, both on an individual level (since the expected higher throughput rates afford the

decision makers less time to consider any possible discriminatory impact their decisions might have) as well as on an institutional level, as biases and unfairness in ADS systems have the potential to affect a substantially larger number of people than any individual decision maker's biases.

In our study, which forms the final step in our research project on responsibility in ADS systems, we will analyse the different levels of an organisation and the associated degrees of agency related to the processes of introduction, usage and evaluation of ADS systems. We will also perform a mapping of the degrees and fields of responsibility and accountability in these processes to the various actors and roles in such an organisation. As a first step towards solving the problems we have identified, in cooperation with the Vienna Chamber of Labour and in close discussion with experts from academia and industry, we have developed guidelines and prototyped a supplementary digital tool called “VerA” to assist with responsibility mapping, point to discrepancies and problems as well as provide guidance on to how to avoid them.

The privilege of anger. Speculating about Embedded Bias in Voice Assistants
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Attribution of gender roles is inevitable, even for so-called neutral artifacts like machines. Stereotypes about gender fluidly embed themselves in emerging technologies like artificial intelligence applications through economic and socio-cultural practices. That is why my project conducted an experiment to research linkages between AI, design, gender and gender bias, based on Judy Wajcmans techno feminist framework (2004), the Feminist Chatbot Design Process (Young 2017) and speculative Design (Dunne/Raby 2013). The outcome was an interdisciplinary installation called MiauMiau which had the goal of confronting users with their reproduced or incorporated images of gender and AI. For my contribution I would like to give an overview about this unconventional research approach and present and discuss results of my research.

Most users choose to let Siri & Co. speak with a female voice and conceive their intelligent voice assistant (IPA) as a „she“. This perception is emphasized by speech patterns: IPAs stereotypically speak very polite, give affirmations, signs of listening and suggest instead of dictate. Unfortunately, the new wave of AI falls into current gender role stereotypes of passive women who obediently take orders and seek pleasure in care work. How can we change this narrative and start breaking away from the gender clichés embedded in IPAs?

To find answers a interdisciplinary artistic experiment was conducted to research how design, representation and stereotypes are entangled. I asked myself: What if Siri could become angry? Would users stop interacting with her?

I wanted to observe what happens when user-embedded gender bias towards IPAs is confronted with unexpected conversational patterns breaking away from underlying

gender stereotypes. So I decided to conduct a „Wizard of Oz"-experiment using speculative design methods and a sociological theoretical approach. An actress „played" the part of an IPA called „MiauMiau" and interacted with users as part of an experimental installation. MiauMiau aspires to be a kind of „Anti Alexa", meaning that MiauMiau shows character traits which are not available for conventional IPAs, like declining to answer questions, demanding fair pay for her work and defending herself in cases of abuse. In other words, it has alternative embedded conversational patterns.

The interactions between users and MiauMiau were recorded and participants were also asked to give feedback about their interaction experience in form of a questionnaire. Right now I am in the stage of evaluating my findings.

Framing bias in AI policy: diagnosis & prescriptions

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Concerns about algorithmic bias is a widely debated and studied topic in the field of digitalization and Artificial Intelligence (AI) (see e.g. Noble 2018; Simon et al 2020). This paper aims to contribute to the examination of this topic by focusing on framing bias in AI policy. Importance of framing is widely recognized in Science and Technology Studies (Jasanoff 2003). The ways in which the problems are framed influence what can be done about them and how they can be acted upon (Rein and Schon 1996). Examination of how issues are framed sheds a light on values, ideas and interests involved in governance.

This paper will analyse how bias is framed in AI policy documents. Since 2016, national governments, international organizations, think tanks and consultancies have launched AI strategies, policy papers and reports setting priorities, addressing concerns and making recommendations (Ulnicane et al 2020). In this paper, we will explore how these AI policy documents frame bias, its causes, consequences and recommendations to reduce it. The paper will take an intersectional approach to frame analysis of bias by looking how diversity characteristics such as gender, race and ethnicity are addressed in AI policy.

The paper aims to unpack complex and diverse framings of bias in AI policy including expectations that AI will help to overcome human bias versus concerns and evidence that it amplifies long-standing structural inequalities; multiple causes of biases from historical injustices to socio-demographic characteristics of programmers; impacts of algorithmic biases in a range of sectors from jobs to justice leading to discrimination and exacerbation of inequalities; as well as recommendations such as regulation and public policy, participation of marginalized and vulnerable groups, technical fixes, increased diversity of AI workforce, and importance of multidisciplinary research. Furthermore, analysis will consider different organizations and actors involved in framing bias in AI policy, their interactions and positions in setting diagnosis and providing prescriptions for this problem.

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Mapping Gordian Knots in Developing Fair ML Tools for Medicine and Healthcare

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Artificial intelligence (AI) and machine learning (ML) are seen as big hope within the field of medicine. Algorithmic tools including ML are framed as being a key feature for overcoming future challenges of healthcare, such as helping to reduce costs that may result from an ageing population and fewer health care professionals being available. Some also anticipate ML could lead to more equality in health care, as it seems more objective than humans.

Hopes are high, however, before ML will be able to show which influence it has, different aspects should be considered. Scientists and stakeholders pledging for ethical ML usually take into account fairness, accountability, transparency and robustness as key features. Many statisticians claim, that statistically we have all we need to make ML fair. I claim, however, that there are still different Gordian knots that should be considered (or tried to solve) when tackling the endeavour of developing ML in a way that ensures social equality. In this talk I would like to map out two of those knots that could also be described as "aporia", problems that cannot be solved, because it lies in their very nature to be unsolvable.

One knot is what I call "the privacy vs. participation dilemma". It means only people whose data is part of the training data for ML will in the end have been considered for the end product. This stands in crass contrast to privacy issues, which are especially salient for people who are part of a minority population. Thus, the dilemma is: either one will provide their data or one will not be considered within the tool. This raises ethical questions above all for groups who (for good reasons) might not want to share their data or are statistically too small to be taken into account, such as intersex and transgender people.

The second knot is the re-introduced tension between social constructivist and poststructuralist approaches vs. materialist approaches. ML usually works with strict categories. Therefore, bringing ML into certain fields means old categories are being reproduced, but also new categories might emerge. Considering constructivist and poststructuralist understandings of categories, which focus on the social construction and deconstruction of categories, the introduction of ML and its mechanisms of categorization, classification and objectification should be watched with critical eyes. Within medicine, this prompts known questions of naturalization of categories, such as gender and race, which feminist science and technology studies worked on relentlessly to deconstruct. On the other side: how can specific groups of people be considered within an ML-tool without using categories? What is the role of materialist approaches and strategic essentialism? Are there possibilities to develop more fluid categories?

I suggest these questions should be openly discussed. Different stakeholders (including patients) should be involved in the decision processes of which ML we would like to have and for what purposes it should be used.

Why Ethic Guidelines are not Enough, or How Current Critique of Digital Data Technologies Preserves Power

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This paper wants to contribute to the long-standing tradition in STS to analyze the relation between power relations and technosientific practices by focusing on the current push for ethics in AI as the dominant form of criticizing digital data technologies and coping with this critique. It argues that thinking about the disturbances in the wake of digitalization in terms of ethics does not allow for challenging the existing social structures of power and symbolic hierarchies in our society, and that it is therefore necessary to shift our focus of attention from questions of ethical behavior and fairness to questions of social inequality by (amongst others) reconsidering the lessons to be learned from (feminist) STS.

Within the context of current trends in digitalization and datafication, digital data technologies are becoming powerful means for producing knowledge, making decisions and governing society (e.g. Houben/Prietl 2018). While these technologies and their results are often believed to be objective and neutral, numeral cases of algorithmic discrimination have begged to differ, as the CfP for this session has already pointed out. As a reaction, a call for ethics can be observed that so far has mostly taken the form of either self-regulatory approaches such as the implementation of ethic frameworks, guidelines, and boards or of endeavors to create moral machines and fair algorithms by building ethical considerations into these technologies.Mona Sloane (2019) has criticized the hype around ethics as a smokescreen for carrying on with business as usual: Rather than initiating a genuine push towards social justice and equality, ethics are largely employed to gain competitive advantage between companies, industries, or nations. While I am sharing this skepticism, I will argue that we need to take the critique of an

'ethical' approach towards solving the problems occurring the context of digitalization a step further, and I will do so by taking a closer look at the epistemological assumptions informing the so-called ethics in AI, especially the proliferating ethic guidelines.

Drawing on an analysis of prominent ethic guidelines, I will sketch three shortcomings and limitations of thinking about (good) digitalization in terms of ethics: (1) assuming the existence of a rational and autonomous (human) being as the subject of any – ethical or unethical – action, (2) following a rather narrow causal thinking that focusses on 'errors to be fixed', and (3) centering on the (un)fair distribution of (material) resources. Based on this critique, I will reconsider some of the lessons that (feminist) STS can teach us about the relation of technoscience and power in order to identify alternative ways of looking for solutions and constructing 'better' technologies.

Session B.13: Open and Collaborative Forms of Organisation for the Production of Knowledge and Material Artefacts in the Global South

Chair: REINAUER, Tobias
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Makerspaces in Sub-Saharan Africa from the founders' perspective: what, why and how?

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The number of makerspaces around the world has been growing exponentially for the past decade (Gershenfeld et al., 2017). This year "makerspace" officially entered the dictionary (Merriam-Webster, 2021). These community-based design and fabrication workshops are enabled by digital fabrication tools (such as 3D printing, laser cutting) and they enable geographically dispersed actors to collaborate via digital platforms. Thus, makerspaces encourage more open and collaborative forms of production by facilitating the free exchange of Open Source Hardware.

Although makerspaces have been largely overlooked as they are not viewed as a 'mainstream' solution, the recent COVID-19 pandemic has showcased the potential of makerspace networks to rapidly respond in times of crisis (e.g. face masks, face shields, spare parts for ventilators) (Corsini et al., 2020). Extant research suggests that makerspaces may be especially advantageous in regions with limited manufacturing infrastructure, including in Sub-Saharan Africa (Fox, 2015) . Despite this, little is known about makerspaces in Africa and they remain largely understudied in the academic literature (Seo-Zindy & Heeks, 2017).

In response, this research offers an ethnographic case study of a makerspace in Malawi from the founders' perspective. This provides an in-depth, longitudinal study of the makerspace during its response and recovery to the COVID-19 pandemic. The study focuses on the following research objectives: (1) to explore the characteristics of a makerspace in Sub-Saharan Africa – what constitutes a makerspace in this context? (2) to investigate the potential value of these spaces – why are they needed? (3) to better understand how they support innovation and entrepreneurship – how do they work? The findings of this study contribute to limited research to data on makerspaces, as well as the literature on resource-limited innovation and entrepreneurship.

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Charitable Communities: Between Helping Hands and Techno Imperialism

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In this talk I will present the concept of charitable communities to describe an emergent organizational form aimed at the development and production of material goods for recipients marginalized by prevalent modes of industrial design, manufacturing, and distribution.

Charitable communities emerge, as the technological means of hardware design and production, such as CAD software and 3D printers, become widely available to private citizens. However, in contrast to the user-innovation communities theorized by von Hippel (2005), charitable communities are neither primarily composed of users innovating for their own needs, nor of paid professionals aiming to appropriate the results of open-source development (Dahlander and Magnusson, 2005). Rather, charitable communities are composed of well-meaning private citizens looking to utilize their readily available

design- and production technologies to meet specific humanitarian challenges, such as the lack of assistive technologies in countries of the Global South or the initial lack of equipment during the Covid-19 crisis. I will argue that charitable communities hold a massive potential for invention as well as large-scale production. This potential stems from their combination of the principles of open-source development, a readily available technological infrastructure (e.g., internet, 3D printers), and a large number of volunteers with basic knowledge of digital fabrication. Yet, they are also particularly susceptible to exacerbating local problems by delivering unsuitable technologies. These problems reflect their structural lack of knowledge pertaining to the requirements of potential users and use-contexts as well as the specialized products needed to meet those requirements (e.g., prostheses, ventilators). Hence, the main challenge for stabilizing these communities as sources of humanitarian innovation lies in mediating the interaction between community members, potential users, and industrial stakeholders.

I demonstrate the basic dynamics of charitable communities by presenting results from a five-year-long study of Alpha, a global network of thousands of volunteers dedicated to the design and production of upper limb prostheses for recipients underserved by the dominant order of production in the field. Triggered by a typical user innovation, Alpha soon turned into a charitable community of 3D printing enthusiasts providing low-cost hand prostheses to US American children. While Alpha's products became successful in this particular niche despite their various shortcomings (e.g., in terms of mechanical functionality), the community met with major problems as they started to expand their production model to Haiti and other countries of the Global South. In these new contexts, their lack of knowledge about user requirements and the specificities of prosthesis design led Alpha volunteers to deliver dysfunctional and outright offensive products to recipients. Yet, following these initial problems, Alpha managed to reorganize its production model. Moving away from the model of a US-centered community of volunteers relying on internet-based communication, Alpha is now based on a network of localized chapters. In these chapters, that have sprung up in dozens of countries, volunteers now cooperate with both potential users and professional prosthetists. Investigating Alpha's transformation thus promises to deepen our understanding of the ways in which charitable communities may stabilize and become an important new form of humanitarian innovation.

Building niches through ICT: evidence from a community of small wind turbine developers

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The study of niches for technological and social innovations forms a central pillar in research on transitions towards more sustainable systems of production and consumption (Kemp et al., 1998; Schot and Geels, 2008). In this paper, we focus on the role that information and communications technology (ICT) can play in the development of such niches. We define ICT broadly as telecommunications and computers enabling users to

transmit and access information, for example, through messaging, video conferencing, and file sharing on digital repositories. These channels allow geographically dispersed communities to exchange information quickly and cheaply and, as such, may facilitate key niche development processes, including network building, knowledge exchange, and the formation and articulation of expectations and visions.

To investigate the potential of ICT for the development of niches, we conduct a case study of a global network of organisations that develop small wind turbines for local manufacture. Members of this network, many of which are located in the Global South, make extensive use of ICT to collaboratively build and freely share knowledge about technical designs and project development. Their goal in doing so is to enable others to replicate their turbine designs based on locally available manufacturing inputs and to develop projects across various kinds of local contexts. We study the role of ICT-facilitated interactions in this niche by means of a survey-based social network analysis (building on Caniëls and Romijn, 2008; Hermans, 2013; Morone et al., 2015). This allows us to explore a variety of network-wide and actor-specific parameters for different kinds of network ties that members of this niche have developed.

Select studies in the literature on economic geography (Grabher and Ibert, 2014), user innovation (Hyysalo et al., 2013; Claussen and Halbinger, 2020), and sustainability transitions (Hyysalo et al., 2018; Meelen et al., 2019) have investigated how geographically dispersed communities leverage ICT to drive technological innovation and diffusion. We add to this literature by presenting the first study focusing on the role of ICT in niche development processes. By focusing on the case of a network that has extensively used ICT for its core activities, we highlight the opportunities, but also some of the limitations that relying on such channels entail.

Stream C: Towards Low-Carbon Energy Systems

Session C.1: Just Transitions, Whole Systems, and the Lived Experiences of Decarbonisation Pathways

Chairs: SOVACOOL, Benjamin
University of Sussex, UK

Unattainable proximity: Solar power and peri-urbanity in central Burkina Faso

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In the community of Zagtouli, close to Burkina Faso's capital, Ouagadougou, lies West Africa's largest solar power plant. This is a 33 MW, on-grid, photovoltaic plant. Operational from late 2017, it produces electricity for Burkina Faso's public energy company, SONABEL. The electric grid built between the plant and Ouagadougou crosses Zagtouli in its middle: however, electricity connections throughout the community are markedly non-homogeneous. In particular, most of the southern half of Zagtouli suffers from a condition known in the literature as 'under-the-grid': namely, close to the grid but unable to connect to it. The benefits stemming from the presence of the nearby plant, therefore, remain unattainable for a large share of the local community. Drawing on an ethnographic investigation of energy practices and uses conducted in Zagtouli, we employ the theoretical framework of energy justice to analyse the connection between local justice issues and national electrification strategies. We claim that the national preference for on-grid, centralised plants may not adequately respond to the need for a more just local energy distribution; and that for peri-urban areas that are not planned to be fully connected to the grid in the short term, smaller-scale, decentralised solutions may be more appropriate to achieve full electricity access.

Decarbonisation and its discontents: A critical justice perspective on four low-carbon transitions

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What are the types of injustices associated with low-carbon transitions? Relatedly, in what ways do low-carbon transitions worsen social risks or vulnerabilities? Lastly, what policies might be deployed to make these transitions more just? The presentation answers these questions by first elaborating an "energy justice" framework consisting of four distinct dimensions—distributive justice (costs and benefits), procedural justice (due process), cosmopolitan justice (global externalities), and recognition justice (vulnerable groups). It then examines four European low-carbon transitions—nuclear power in France, smart meters in Great Britain, electric vehicles in Norway, and solar energy in Germany—through this critical justice lens. In doing so, it draws from original data collected from 64

semi-structured interviews with expert participants as well as five public focus groups and the monitoring of twelve internet forums. It documents 120 distinct energy injustices across these four transitions. It then explores two exceedingly vulnerable groups to European low-carbon transitions, those recycling electronic waste flows in Ghana, and those mining for cobalt in the Democratic Republic of the Congo. The presentation aims to show how when low-carbon transitions unfold, deeper injustices related to equity, distribution, and fairness invariably arise.

Energy Democracy: A Digital Future?
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In recent years, conceptual development of energy democracy has been substantially expanded in relation to social and environmental theories and associated normative goals. However, energy democracy remains under-explored in light of a parallel trend: energy digitalisation. From both technical and policy perspectives, digital and data-driven technologies increasingly underpin the reliable functioning of a low-carbon energy system where coordination and flexibility services support capacity to incorporate a mix of intermittent renewable electricity generation. The digital energy space - with its dynamic constitution of new technologies, actors, roles and responsibilities - thus represents a flux of emerging power dynamics with potential for wide-reaching social and environmental impacts. This paper aims to develop the concept of energy democracy within the evolving context of energy digitalisation, drawing from democratisation literature across energy, digital and data-focussed fields. In doing so, the paper will examine dynamics at the juncture of energy, digital and data infrastructures that include interrelated material (e.g. devices, telecommunications networks, generation technologies), 'informational' (e.g. data, statistics, decision-making algorithms), and governance (e.g. policy, strategic) elements.

The paper will consider three research questions. 1. How do current conceptualisations of ED deal with energy system digitalisation? 2. What are the limitations of current understandings of ED in light of energy system digitalisation? 3. Where and how might the concept of ED be adapted to digital changes and can any case studies be identified? To answer these questions, the paper will firstly present brief reviews of the concepts of energy digitalisation and democratisation. Analysis of potential emergent forms of 'digital energy democracy' will then be grouped around three themes that stand out in a changing digital socio-technical environment: ownership, access, and control. Analysis will be structured to reflect the key aspects of energy democracy revealed by existing literature (e.g. Szulecki, 2018) and will discuss of the degree to which current conceptions of energy democracy can incorporate the implications of digitalisation-driven change. The paper will conclude with reflections on how digital energy democracy might interact with energy policy landscapes that are increasingly reliant on digitalisation to meet Net Zero goals.

Towards Low-Carbon Energy Systems: product innovation from Scandinavian companies

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To reach the CO2 target emissions, we need to accelerate the transition to sustainable energy technologies. Viable, low carbon, technological products that reduce the negative impact on climate change need support through society. To meet society's expectations to address the complexity of social, economic, technological and environmental aspects, top-down approaches will struggle to gain support and impede the implementation of initiatives since technologies have power only in association with human agency (Geels, 2002). Interestingly though, niche innovative technologies that are supported by diverse actors (consumers, civil society, politicians, and governments) are the ones that are likely to flourish since they satisfy some of the expectations of democratic decision making.

In this paper, I present real-life and real scenarios of smart technology innovation products that support the transition towards sustainability in the context of Scandinavia. In particular, I analyse the cases of three different company that developed innovative products in the sectors of housing illumination, waste management and E-mobility, respectively. The focus was on identifying multi-level perspectives (MLP) (Rip and Kemp, 1998, Geels, 2002) and socio-technical transitions (Geels, 2005). Multi-dimensional interactions (external and internal factors, including the learning process, culture, policies and practices) were analysed from the transcripts of semi-structured interviews with the company owners.

I shed light on three research questions: 1. What are the practices, cultural values and infrastructure behind these organisations? 2. What are some of the challenges and barriers they face? 3. What are the opportunities for society to participate actively in sustainable energy transitions?

Thematic discourse analysis allowed for the identification of awareness of the need for societal change to fight the climate crisis and instances of advocacy for clean technology to solve it. Among the motivation for the creation of the specific products for the niche companies was the need for creating smart products for household owners, providing viable alternatives to car ownership, and developing smart solutions that municipalities could implement into their management tasks.

The three companies believe in the potential of their technologies to reduce CO2 emissions through the adoption of innovative green technologies. However, they pointed out a still-dominant oil mentality (oil- and green-based companies are seen as competing equally for innovation funds, and green innovations as not being embraced as expected or promised by the governments). These entrepreneurs consider such a state of affairs could obstruct the potential that niche-actors have for executing systemic changes, mitigatory climate actions, as well as for shaping socio-technical transitions. Furthermore, they expressed the importance and wish for regulations, policy programs, as well as

economic incentives to green companies. They believe society can support sustainable energy transitions, however, envisage the need for deep-ecology views to generate the cognitive or ideological cultural changes needed on the different actors to lead the required lifestyle change.

The paper explores the local perspectives of Scandinavian company owners, giving insights into the role they see other actors should play. I conclude by making recommendations for policies changes.

Singular steel visions: Energy justice in low-carbon industry transitions
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Steel production is the single biggest industrial emitter of greenhouse gas emissions globally and linked to an array of socio-ecological injustices from mine disasters and air pollution to the infringement of indigenous rights. To comply with the Paris Agreement, the EU steel industry must undergo a rapid energy transition and reduce its emissions to zero by mid-century. As a result, industrial actors have begun to communicate strategies aimed at the transformation of their production methods, and policy makers have published a series of documents to support and steer industry in its endeavours. Heavy industry such as steel production is often referred to as "hard-to-abate" quoting several reasons, including the technical difficulties of decarbonising current production processes, the lack of low-carbon technological alternatives and the high degree of technicality of the debate around transforming the sector. Although this label is started to be contested, there seems to be wide-spread consensus for hefty governmental support for the industry.

Examples of past energy transitions show how benefits and burdens have often been distributed unevenly between different actors (Jenkins et al. 2016; McCauley et al. 2019; Sovacool et al. 2019). However, low-carbon transitions in heavy industry have so far been out of the focus of both sustainability transition research and energy justice scholarship. With this contribution I aim to begin to fill that gap. Here, I dissect the transition of the steel industry by means of an energy justice framework with three tenets: distribution, recognition, and participation. I first conceptualise the steel industry transition as socio-technical systems change through applying an energy system perspective that traces the main energy and material flows associated with the transition. Empirically, this first step is informed by the most relevant policy plans on EU level as well as the broader industrial decarbonisation literature. Second, I use the energy justice framework to highlight injustices associated with the socio-technical systems change. Finally, I discuss the applicability of the used framework to contribute to empowerment, or as John Dryzek put it, the "enlightenment of those suffering at the hands of power in the interests of action on their part to escape suffering" (2009:3) and reflect on possible refinements.

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Session C.3: Incumbent enterprises and sustainability transitions

Chair: KUNGL, Gregor
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Ambidexterity as a firm's dynamic capability to contribute to societal transition

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The literature of strategic niche management SNM and transition management TM are complementary (Loorbach et al. 2006) to inform a theory of systemic and societal change towards e.g. sustainable development, instigated by adoption of sustainable technologies and the creation of a new socio-technical regime. Any stablilized or existing socio-technical regime at the meso level associated with a technology is enclosed by the socio-economic landscape above it at the macro level and a flurry of underneath activities at the micro level and peripheral to the mainstream technology experimenting with alternative technical principles or formulations. Such peripheral activities usually take place at protected spaces or niches. The multi-level perspective MLP of transition management as described is mostly studied as policy tool, and the business implications have received scant attention. This paper explores how the MLP shreds light on the implications of the role of incumbent firms, an important category of actor, could play in transition. Logically, incumbent firms have invested lots of resources in the processes, relations, and networks in optimizing the existing socio-technical regime and are thus resistant to nascent technologies which would disrupt (Christensen 1997) the order of things. However, if the incumbent commands excessive managerial or financial resources to work with new ventures in the niches and incorporate such nascent technologies into their existing portfolio, they (the incumbents) are in the best position to develop synergies among the existing technologies and the new technologies. To exploit such potential synergies, incumbents firms must have a broad or diversified technology base (Granstrand et al. 1997) beyond their immediate products so that they develop assimilative capacities even to peripheral development. In addition, such incumbents could disproportionally influence their suppliers, distribution channels, or other material stakeholders via indirect externalities effects so that such other actors would also follow. Fundamentally, the

incumbents are in a position to address or capture a large emerging market share thus leveraging both static, dynamic economy of scale (learning by doing), and to internalize crosslearning (Shum et al. 2008) among incumbent technologies and emerging technologies within the same portfolio. This will build an economy of increasing return (Shum 2017) which underpins and consolidates the emerging socio-technical regime to replace the incumbent one. Our proposed "program" of transition at the firm level therefore suggests that a technologically diversified firm is in a position to be ambidextrous (O' Reilly et al. 2008) to exploit and explore and to develop an economy of increasing return to nascent technologies under development at the niches. Such incumbents are positioned to play a critical disproportional role in the formation of the new socio-technical regime. The rest of the paper covers a study of a local electric utility company in Hong Kong: the China Light and Power which besides its fossil fuel generation capacity has operated different renewable technologies plant at smaller scale and dispersed geographically, we will study how learning among all these technologies take place and how a social and technology learning mechanism could be instituted in order to reap synergies among these technologies.

Urban utility companies: a key-actor for the resilience of energy systems in transition in federal countries

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Energy sectors in many European countries are turned upside down. Fundamental technological changes, debates on social justice and pressing global warming scenarios are only a few major challenges endangering the resilience of energy systems. To maintain the functionality of energy systems in transitions is therefore critical to support a successful transition towards sustainable energy systems. In this contribution we present results form a study of urban utility companies in Germany and Switzerland and discuss them as local incumbents which can support the resilience of transitioning energy systems on an urban level. The understanding of incumbents' behaviour in sustainability transitions in the energy sector is gaining increasing scholarly attention. However, two key structural characteristics of many incumbents in the energy sector are hardly taken into account: they are mostly public companies and they are operating in infrastructure network industries. Furthermore, studies on incumbents in the energy sector do not consider the multi-scalar situation of federal energy governance systems, as in Germany and Switzerland.

In this contribution, we first briefly portray urban utility companies, their characteristics and roles the in federal energy governance systems of Germany and Switzerland. We then present six analytical categories which support the conceptualisation of local incumbent actors in energy systems. Finally, we discuss the urban utility companies´ agency in energy transitions and how they support system functionality against the conceptual background of resilience theory.

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The role of incumbent innovation intermediaries and engagement with low carbon technologies: A case study of the UK oil and gas sector

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In recent years the role of innovation intermediaries in low carbon technologies has become an increasing focus of research (Kivimaa et al., 2019). Innovation intermediaries are seen as key actors in the development of new technologies, supporting the interaction between technology, markets, firms, and institutions (Howells, 2006; Stewart and Hyysalo, 2008). In doing so they can take different roles and positioning, working between actors, as well as between actors and technologies (Moss, 2009).

Whist most of literature has focused on the role of intermediaries engaging with niche and disruptive technologies, there is a lack of research of incumbent orientated intermediary organisations (Sovacool et al., 2020). Such organisations are therefor at risk of being overlooked in relation to their strategic positioning, reorientation strategies and diverse roles they may play engaging with low carbon transitions.

Combining theories from the fields of innovation intermediaries and sustainable transitions, this study seeks to examine the role of incumbent innovation intermediaries in the UK oil and gas sector, and their engagement with new low carbon technologies. Whilst there have been a number of studies into the oil and gas sector and low carbon technologies, these have tended to focus on incumbent firms (Hansen and Steen, 2015; Mäkitie et al., 2018), resulting in a current lack of research into innovation intermediaries in the industry. Data is collected from semi-structured interviews within incumbent innovation intermediaries as well as key industry actors in the UK energy sector to chart the policy and industry backdrop against which the incumbent’s strategic positioning took place. The primary data is complemented with an analysis of organisational and industry reports, media publications, and policy and regulatory documents.

The analysis shows how such organisations can, through diverse roles, manage the dual challenge of supporting new innovation while maintaining previous path dependencies. In addition, how incumbent innovation intermediaries go beyond technological orientated

innovation through the creation and articulation of new visions and collective expectations. Furthermore, how through managing perceptions of neutrality and legitimisation, they can create new networks and coalitions with low carbon technology developers. In analysing the underlying factors behind such engagement, this can help better understand the motivation behind such strategic positioning and reorientation, and the roles incumbent innovation intermediaries can play in sustainable transitions.

Opening up the regime, and unlocking path dependencies: Case study comparison between South Africa and China's energy transition

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This article explores why some countries continue to be locked into the fossil fuel regime, while others rapidly shift towards renewable energy. It will compare two emerging economies, South Africa and China, and the shifts in both country's electricity systems. The case studies use a combination of the socio-technical regime and institutional theories to understand incumbent resistance, the role of power and politics in path dependency, and the kinds of conditions in which incumbents could reorientate towards radical innovation. Building on scholars in the field which pay attention to the process of regime destabilisation, decline and erosion (Turnheim and Geels, 2012 Kungl and Geels, 2018), as well as regimes that actively resist change, shaping regime rules through an institutional process (Smink et al., 2015, Yang et al., 2020), a reorientation towards radical innovation and an engagement in multiple-regime interactions. These case studies comparison shows that South Africa's energy transitions has undergone at first resistance by coal-based incumbents against recently introduced renewable energy programme (Ting, 2020), towards reorientation into gas for power generation (Ting, 2019). Conversely, China has demonstrated a more radical shift towards renewable energy. In this instance, the coal power investors in China has seen significant market loss, and has therefore, reoriented their investment towards the development of renewable energy power plants. Drawing on different sources of data (primary and secondary data), the paper identifies critical historical events to construct the storylines of the regime changes in the two countries from 1998 to 2018. Based on sustainability transition and institutional theory studies, we will develop several hypotheses. The preliminary research findings suggest that the two countries' coal power regime hold different degrees of incumbency (discussing the embeddedness of an industry into the society), and windows of opportunities (external pressures, such as political agenda, local environmental issues, and internal capabilities, such as the local industry development). The overall research therefore contributes to both conceptual and empirical understanding of unlocking the regime.

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The pursuit of sustainable energy systems in incumbent utilities: insights from corporate deals from 1990 to 2019

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Delivering a low-carbon future depends significantly on the decarbonization of the electricity industry. Over the past years, electric utilities have experienced pressure to redefine their business models amid the need to transition to a sustainable energy system. As a result, utilities have had to rethink their position, and how they engage in adaptation efforts to deliver a low-carbon, digital, and decentralized electricity sector. Any configuration to deliver this ambition includes the need for utilities to innovate their business models by experimenting and integrating new technologies, such as solar distributed generation and data-driven customer engagement devices in the form of In-Home Displays and smart meters.

In this study we focus on how incumbent utilities have adapted their business models to include sustainable energy activities. We build on Zott and Amit's (2010) framing of the business model as an activity system, to capture how utilities expand the boundaries of their business to integrate sustainable energy activities. We analyze data on 756 boundary-spanning transactions (mergers and acquisitions, joint ventures, and strategic alliances) of 20 European utilities over three decades (1990-2019). These transactions provide detailed information on the boundary-spanning activities undertaken by incumbent utilities and allow us to understand the areas of sustainable energy innovation in which utilities engage, and how they engage, by considering the characteristics of the underlying contractual arrangements.

Our findings show that utilities pursued 20 sustainable energy activity types across the following activity themes: renewable electricity generation, smart electricity management, emerging technologies, and sustainable mobility. We find a prevalence of renewable energy activities, particularly wind generation. The combination of renewable electricity

generation and smart electricity management indicates a focus on systems integration. We also find a preference for integrating sustainable activities into existing business models through mergers and acquisitions. We conclude that utilities focus on activities that directly contribute to decarbonization, but which also reinforce their dominant business logic of electricity generation and supply.

We provide valuable findings for utility executives and policy makers on how utilities are redesigning their business model activity systems to meet the need for sustainable energy systems. Furthermore, we expand our understanding of business model adaptation for sustainability by focusing on how incumbents' experiment and redesign their activity systems to unlock new sources for value creation.

Session C.4: Energy policy advice: What kind of scientific advice is needed to support the sustainability transition of energy systems?

Chairs: CAPARI, Leo[1]; ORNETZEDER, Michael[2]; SUSCHEK-BERGER, Jürgen[3]
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Challenges and synergies for the local energy transition in the Netherlands and Hawaii

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The energy transition is already underway across the globe. In this paper, we look at two very different approaches in the implementation of renewable energy projects – the Netherlands and Hawaii. In the Netherlands, 27 suburbs are acting as pilot areas for the goals to transition from gas to alternative energy sources by 2050, and initiatives are implemented that allow for novel techniques as well as novel ways of cooperation and governance. Meanwhile, the U.S. state of Hawaii is ambitiously attempting to reach its 100% renewable portfolio standards (RPS) goal by 2045 through the implementation of solar and wind projects across its islands.

The main question to be answered by looking at these two cases is how the current transition approach can enable reaching the sustainable development goals locally along with other policy targets, and which synergies and challenges arise during this process. The results are grouped around four themes: (1) technologies; (2) data management; (3) government/policies; and (4) society. This study examines these themes for each case and proposes potential solutions to each of the challenges where possible, as supported by relevant literature. Special attention is paid to the educational and human resources required for the energy transition, as the initiatives in the case studies are intended to be scaled and sped up in order to fulfill the national transition targets.

By showcasing these two diverse examples of local implementation of the energy transition, this analysis assists in providing insight on the challenges for diverse communities around the world, as well as informs and inspires transitioning communities.

Who Owns the Wind? Wind Theft as a New Challenge for the Sociology of Not Knowing

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The expansion of renewables gives rise to multifaceted social conflicts, most prominently conflicts over the distribution of benefits and burdens. In this regard, the issue of "wind theft" is a particularly interesting issue. The term wind theft denotes the effect when neighboring wind farms lower each other's power production efficiency by reducing wind speed and thus "stealing" wind and decreasing profitability (Pryor et al. 2020). Due to changes in the direction of wind and wind speed, the extent of wind theft can hardly be assessed. In a legal sense, it is also nearly impossible to identify the "victim" and the "offender" (van der Horst & Vermeylen 2010). With the ongoing expansion of wind power, it is likely that wind theft will become a more and more virulent issue leading to respective social conflicts. Especially, since in public discourses on renewables, wind is commonly framed as a public good where usage by one party does not restrict its usage by another party.

In this presentation, we lay out a conceptual approach for analyzing wind theft from a sociology of non-knowledge or "ignorance studies" perspective and, by so doing, make this phenomenon and its uncertainty implications better accessible for sociological analysis. We thereby contribute to deepen the theoretical understanding of the unavoidable governance of non-knowledge in the context of renewable energy transitions.

Policy advice for the development of a hydrogen economy; strengthening the role of techno-economic assessment as a means of supporting energy transitions

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A Scopus search of research publications using the keywords (techno-economic) AND (energy) reveals that between 1980 and 2020, nearly 6,000 articles, books, book chapter and conference proceedings (referred to collectively as academic publications) listing these two words as part of the title, abstract or as a keyword, were published, growing from about 150 in 2008 to more than 1,500 in 2020. A similar search based on levelized cost of energy (LCOE) as the indicates a growth from 4 publications in 2008 to 458 in 2020, this upward trend looking likely to continue for 2021 and onwards. The surging interest in techno-economic assessment (TEA) as a means of promoting the development

of renewable energy technology has not previously been so widespread, and is partly the consequence of being able to recount a positive story.

However, there remains a broader question as to whether TEA has any role in policy, and whether it has any impact of facilitating sustainability transitions. In a previous publication (Walwyn, 2020), it was argued that institutional change is only possible at the confluence of four separate preconditions, namely an escalating problem, an increasingly favourable techno-economic solution, the clear policy framework, and most importantly, coherent political support. In this presentation, the author will report on the role of TEA and LCOE in the development of policy for the support of the hydrogen economy in South Africa (Walwyn, Bertoldi and Gable, 2018). The application of TEA without a broader understanding of the socio-technical regimes is illustrated. It is argued that TEA on its own will be insufficient as a means of supporting the energy transitions. The same techniques must be used to identify weaknesses in existing socio-technical regimes and thereby develop a policy framework within which to both destabilise incumbents and gather political support.

From models to policies - Energy System Modelling at the science-policy interface

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The transition from a mainly fossil fuel based energy system to a carbon neutral and renewable energy system is a socio-political and well recognized necessity in order to address climate change. One of the central challenges for policy makers and other relevant actors is the balance of the energy trilemma (environmental sustainability, energy equity and energy security). To assist this balancing process energy system modelling is increasingly used to inform and advice decision makers in defining policies, roadmaps and investment strategies for the transition to a renewable energy system. Science plays an important role in this context. Scientists are developing new and are constantly improving existing energy modelling frameworks. Therefore, they address the above mentioned challenge of the energy transition – not only on a technical level, but also on a socio-political level – and by doing so they co-shape future technological and socio-political paths. At this science-policy interface the applied modelling activities have a particular role. They are used to coordinate and translate the practices of the two different social worlds of politics and science. Hence, energy system models are an important aspect for the boundary work between these two social worlds, they are so to say boundary objects (Star & Griesemer 1989) that coordinate between science and politics and simultaneously allow these worlds to remain stable (van Egmond and Zeiss 2010). Furthermore, energy system models allow to integrate political and epistemic ideas and views, thereby creating discursive spaces and allowing for a mediation between scientists and policy-makers.

In our proposed contribution we will present the results from two case studies in which energy system modelling was used to inform energy policy making. The UK Clean Growth Strategy and the Portuguese Roadmap for Carbon Neutrality were both supported by the

energy modelling framework TIMES. Research groups in UK and in Portugal have adapted the TIMES modeling framework to suit their national energy related context and have established different modes of practice on how the modeling tool is utilized at the science policy interface. We discuss what implications these different settings and constellations of the science and policy interface potentially have on the policy advice practice. The empirical data for our work is based upon interviews and document analysis related to the two cases. So far, we find that a central difference is the degree of involvement of researchers in the overall modelling process. In one case researchers act more as a supportive force to further develop the capabilities of the modelling approach if the demand for this is expressed, whereas in the other case the modelling activity for informing policy making is performed mainly by the research group. This also seems to relate to the aspect if in-house modelling capacities and competences (e.g. in a ministry) exist or not. The findings from the case studies shall act as a starting point to define a typology of how computer modelling can inform policy making and how boundary work is performed at the interface between science and policy.

Technology Assessment in the context of the energy transition

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Only recently the new national conservative-green government decided that Austria should become a leading player in Europe regarding the transition of the energy system. The highly ambitious goal is to achieve carbon neutrality by the year 2040. This calls for a radical change in many areas of society and it is clear that the energy sector has a key role to play. In the long run the transition of the energy system will involve new technologies and infrastructures but also new institutions and social practices. Such a transition goes far beyond a shift in the fuel mix or the replacement of dominant technologies. In this presentation I will address the relevance of Technology Assessment (TA) in the context of the energy transition. Using the example of a recently finished study on the future of electricity storage for the Austrian Parliament, I will argue that it is of vital importance to identify unintended side effects, possible risks and systemic inconsistencies from early on to inform decision-makers and consequently enhance the societal value of innovation in the energy system.

Sesssion C.5: Frames, imaginaries, and storylines in European shale gas futures

Chairs: AXSEN, Jonn[1]; SOVACOOL, Benjamin[2]; MARTIN, Abigail[2]; STIRLING, Andy[2]; WILLIAMS, Laurence[2]
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Fracking and BECCS Discourses: A Comparative Case Study

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In 2019 the UK became the first major economy in the world to legislate to end its contribution to global warming by 2050, thus increasing the ambition of the Climate Change Act 2008. For the UK to achieve the 2050 target, it will need to prioritise rapid cuts in greenhouse gas emissions – largely through the adoption of low-carbon sources of energy. Prior to the recent moratorium, fracking was considered as a part of the UK's low-carbon transition. The 'Guidance on fracking: developing shale gas in the UK', published early in 2019 also mentioned fracking as energy technology that could support the transition to net zero emissions by 2050, as it has overall lower CO2 emissions compared to traditional fossil fuels. However, due to its link to seismic activity and the government's efforts to fast track permitting applications for exploratory fracking, it was also subject to vehement public protests and the polarised discourse, evident in the intensive media coverage, was at the front and centre of the public energy debate for the past few years. Conversely, BECCS (Bioenergy with carbon capture and storage) was featured in the UK government's 2017 Clean Growth Strategy plan, and numerous CCC and IPCC reports, as an essential part of the low-carbon transition, presented as the 'silver bullet' technology. Its perk as a negative emissions technology lies in the potential of capturing and storing carbon indefinitely and thus enabling a future with lower carbon emissions without a drastic reduction in energy consumption. Equally to fracking, the UK is the front runner in Europe, as it launched the first BECCS project of its kind in 2018 at Drax power station. This paper will present the rationale for comparing BECCS and fracking discourses (Hajer, 1997) and will highlight the way in which both energy technologies are uniquely positioned in the low carbon transition energy framework in the pursuit of lower carbon emissions. Both energy technologies have not reached the intended scale of use, as fracking remained in exploratory stages and the CCS part of BECCS is yet to be realised and is currently being investigated at Drax. This enables the study of discourses and key storylines as they develop in real-time against the backdrop of the ongoing low-carbon transition. Especially, as both energy technologies, although having lower CO2 emissions than conventional fossil fuels, also have the potential to have worse environmental effects than conventional fossil fuels. For example, fracking is associated with water and air pollution (e.g. methane and NOx) and BECCS is only then of use as an emission mitigating energy technology if the carbon reduction modelling includes the import of biomass and the carbon can indeed be stored indefinitely without leaking. This paper will explore the fracking and BECCS discourses (Hajer, 1997) using results from a secondary data analysis of UK newspapers (ongoing), as a part of a comparative case study of

BECCS and fracking discourses, for which the main fieldwork will commence in Spring 2020 and will be ongoing during the time of the conference.

Humanizing hydrocarbon frontiers: the "lived experience" of shale gas fracking in the United Kingdom's Fylde communities

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In this study, we explore the lived experiences of communities at the frontier of shale gas extraction in the United Kingdom. We ask: How do local people experience shale gas development? What narratives and reasoning do individuals use to explain their support, opposition or ambivalence to unconventional hydrocarbon developments? How do they understand their lived experiences changing over time, and what sorts of coping strategies do they rely upon? To do so, we draw insights from semi-structured interviews with 31 individuals in Lancashire, England, living or working near the only active shale gas extraction operation in the UK until the government moratorium was announced in December of 2019. Through these data, we identify several themes of negative experiences, including "horrendous" participation, community "abuse," disillusionment and "disgust," and earthquakes with the potential to "ruin" lives. We also identify themes of positive experiences emphasizing togetherness and community "gelling", environmental "awareness," everyday energy security with gas as a "bridging fuel," and local employment with "high quality jobs." Finally, we identify themes of ambivalent and temporally dynamic experiences with shale gas that move from neutral to negative regarding vehicle traffic, and neutral to positive regarding disgust with protesting behaviour and the diversion of community resources. Our study offers context to high level policy concerns and also humanizes community and resident experiences close to fracking sites.

Shale gas imaginaries and state agency in the emerging global gas production network

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This paper brings STS and political ecology into conversation with economic geography to highlight the role of states in the emergence and organisation of global production networks (GPNs) for shale gas. Through historical comparative analysis of efforts to develop shale gas resources in the United States, the United Kingdom and Argentina, the paper examines how authoritative, nationally-specific visions about the future of shale gas are formulated and rehearsed. Examining these visions reveals the interplay of political, economic and cultural forces in GPNs, highlighting diverse forms of state agency in the form of national imaginaries, policies and planning initiatives that have been fundamental to the expansion of shale gas production and gas-fired power consumption in all three countries. This study generates novel insights for understanding GPNs as contested terrain, upon which non-firm actors, including national governments and diverse publics, steer and challenge industry accumulation strategies.

The resonance of shale development policy frames amongst UK publics and communities

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This paper investigates the resonance – or discursive power – that dominant and counter frames that are utilised in the UK policy debate over shale development achieve amongst public audiences. A number of studies have analysed the framing of 'fracking' in the UK context, with many attempting to assess the resonance of the various frames that have been identified. However, the resonance of shale development frames has itself rarely been the subject of direct, primary empirical research. Adopting a mixed methods approach, we initially identified nine key dominant and counter frames that are most frequently utilised in the UK policy debate over shale development through a large-scale analysis of policy documents (n=1,557), supplemented by 30 stakeholder interviews. We then assessed the resonance of these identified frames with (1) local community members in a region experiencing exploratory shale development (Fylde, Lancashire) through semi-structured interviews (n=31) conducted between April and June 2019, and (2) a broader 'diffuse' public through a UK-wide survey of approximately 1800 UK citizens fielded in August and September 2019. We discuss how the resonances of frames varies according to demographics and values, and explore how the various aspects of resonance – trust, credibility and relevance – have posed challenges for the framing strategies of policy actors. Finally, by way of a conclusion, we reflect on how the UK shale development case demonstrates the difficulty of crafting resonant frames in anticipatory political debate.

Session C.7: Sustainability transitions and institutional change

Chair: KRIECHBAUM, Michael
TU Graz and University of Graz, Austria

Insights into experimental practice. The ambivalence of standardization and flexibility of regulatory experiments

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International agreements like the Sustainable Development Goals (SDGs) and the Paris Climate Agreement inherently require the change of institutions. In this context, institutional frameworks with a focus on sustainability transitions require the capacity to deal with multidimensional problems. Certainly, innovation policies are fundamental to support sustainability-oriented innovation and strengthen their impact in order to accelerate the transition to sustainable development. Regulatory experimentation is a means for institutional change in innovation policy which has become popular the recent years. Regulatory experiments can broaden the options to introduce new regulatory instruments, assess their impact and support innovation within the regulatory framework.

A growing strand of literature has revealed the various types of experiments that foster sustainability transitions. A large share of this research has analyzed the role of experimentation in energy transitions. While functions of experiments to initiate niches, expand niches and enable niche-regime interaction have been broadly discusses, the connection between experiments and institutional change is still not fully understood. Recent papers (e.g. Köhler et al. 2019, Caniglia et al., 2017) have called for deeper insights into experimental practice and influence on institutional settings. This study addresses the role of flexibility and standardization of regulatory experiments to effectively support institutional change. Our research question addresses the influence of regulatory experiments on institutional change concentrating on institutional logics: Which role does standardization play for regulatory experiments? How does a flexible experimental design shape regulatory experiments to enable the upcoming of sustainability-oriented innovation and support change processes? Our exploratory approach is based on a comparative analysis of 27 international regulatory experiments with focus on sustainability transitions (14 with energy focus) on the basis of document analysis and 23 expert interviews. Our preliminary results reveal that regulatory experiments vary in the dimensions of hypothesis testing, interaction between actors, causality identifying and screening as well as monitoring of learning processes. Variations can be explained by inherent experimental logic and contextual conditions of the cases. Our paper draws on these findings to conclude with practical dimensions and policy implications.

Barriers and opportunity for efficient waste collection in Switzerland

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Even though sustainable and clean technologies are currently available for most major publicly governed socio-technical regimes, they are often not used in a systematic way that would maximize potential benefits. This is particularly true for technology adoption, where the availability of sustainable solutions in a given sector and geopolitical setting is by no means indicative for their actual utilisation. In this paper the authors explore barriers and opportunities for socio-technical change in the public sector on the case of a possible transition to more energy efficient waste collection systems in the context of Swiss municipal waste collection.

In Switzerland, the waste management sector was subject to extensive technological, organisational and institutional change related to waste recycling and general waste management. Curiously, this change did not significantly extend to waste collection, where the incumbent system has remained mainly unchanged from its 20th-century configuration. Based on the availability of potential innovations and new technological solutions, as well as the current state of the system, it would appear that there is major improvement potential for waste collection. However, the authors have observed that this change does not happen. Even in cases where private actors attempt to take proactive roles in supporting new technological solutions that would both reduce costs and increase

efficiency, public communities seem reluctant to take any risks associated with socio-technical change despite the promise of performance improvements.

Inheritance in public policy and the risk aversion of local politicians (Woolthuis 2005, Feiock et al. 2010) have since long been described in literature. Traditional transition barriers such as existing infrastructures respectively sunk costs connected to them, incumbent actors and actor coalitions expressing political power aimed at maintaining the status quo, or the absence of necessary technological or institutional supporting factors decrease the likelihood of system change. Even in cases where transition processes take place, they mainly follow a transformation or reconfiguration pathway (Geels and Schot, 2007), dominated by incremental change, with incumbent actors remaining in place and dominant socio-technical configuration changing only slightly.

In this study, the authors collaborated with a waste logistics company, focusing on the case of an innovative, energy efficient municipal waste collection system developed by the industry partner. The partner company attempted to implement the system in six different locations in Switzerland between 2012 and 2019, with varying degrees of success. Conceptualizing municipal waste collection systems as locally situated socio-technical regimes, the authors investigated the presence of system- or environment-level barriers that influenced a potential transition of these regimes. Further, the necessity of deploying "positives" such as expectations and promises in overcoming risk aversion and policy inheritance is explored.

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The role of fossil-fuel incumbents & the reorientation of their business models in the energy transition

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This paper explores how fossil fuel incumbents engage with the energy transition, and how they attempt to reorient their business models in that context. It contributes to research by operationalizing Bidmon & Knab's framework (2018) that lays a foundation to incorporate business models in the multi-level perspective. Based on a qualitative comparative analysis of three firms in the sector, this research provides insights on incumbents' strategies and organizational dynamics supporting business model innovation, as well as the challenges they encounter during this process. Empirical

findings reveal that ambidexterity was observed in all cases, but with different foci. While some firms adapt and improve their current fossil-fuel-based business models, others engage in radical transformations. Moreover, incumbents are already endowed with commercial and project management skills that are transferable to a more sustainable business model, but they often lack the financial capabilities and know-how to carry investments in renewable energy. Overcoming carbon lock-in is rendered more challenging with investors' expectations, which pivot around capturing value from fossil-fuels. As for the role incumbents play in the wider socio-technical transition, this paper posits that the reality is more complex than the dichotomous role portrayed in the literature, as they may impact the transition in more than one way simultaneously. Nonetheless, destabilization of the existing system and the reorientation of its incumbents can be steered by an adequate mix of creative destruction policies that exert enough landscape pressures on the firms, while addressing some of their challenges to enhance windows of opportunities in renewable energy.

Sustainability Transitions and Deep Institutional Innovation

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The COVID crisis has focused attention on the urgency of addressing current and imminent crises of global proportion, and invites a fresh approach for how to harness technology so that we may "bounce forward" in the transitions towards greater sustainability and human development that are crucially needed. But as policymakers chart a course for STI, it is critical to avoid well-known fallacies about technology, including technology determinism, naïve technological optimism, and the view that technology can be seen as distinct from its social, ethical, political and cultural contexts. Indeed, the scale and pace of technological change, alongside the socially disruptive consequences of new technologies, have created a growing perception that the future of work, democracy and other aspects of social order will require new forms of technology governance.

Even some of the most useful approaches to the governance of technology have not escaped from a narrow focus on technology as a vehicle of change. Responsible research and innovation (RRI) has emerged as an important approach and set of practices aimed at integrating ethical and social issues more directly into innovation and into the governance of science, innovation and technology. This framework aims to engage in a science, technology and innovation that is more anticipatory, inclusive and goal oriented. Nevertheless, existing RRI practices, by focusing largely on technologies outside of their social and political context, have not adequately come to terms with the complexity and multi-institutional nature of the problems we face.

Solutions must begin with the right models for deep institutional change. The so-called DIIS model (Hughes et al. 2021) presents a re-conceptualisation of the role of

technological change in transitions. There are four primary axioms. First, achieving planetary sustainability requires deep institutional change across multiple social institutions (technology, politics, economics, gender, class); second, institutional changes are occurring within the context of multiple cascading crises; third, transformations must be constrained within ethical boundaries; and fourth, transformation in one institutional arena (e.g. technology) is occurring in deeply coupled interactions with other social institutions (e.g. politics, economy, gender). The paper will explore how what is already known about the processes that drive the emergence of new institutional settings within socio-technical niches (e.g., formation of expectations, learning processes, building of actor networks), can be applied to the governance of technology within the broader framing of DIIS. The paper ultimately argues that while existing approaches to technology policy are moving in the right direction, they should seek to address technology within its economic, political and social systems.

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Diffusion barriers of sustainably cooled housing in Vienna – A sectoral innovation system analysis

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This explorative case study adopts a sectoral innovation system (SIS) approach when investigating the factors affecting the diffusion of sustainably cooled housing in Vienna. Underlying the approach is the idea that sectoral specificities regarding its actors (individuals, organizations), institutions and technology base, as well as their interactions, affect sectoral (eco-)innovation.

Research is split in two. First, the system structure is mapped to identify key actors and institutions, as well as their interactions. Data needed for the structural mapping is iteratively collected by means of expert interviews with experts along the energy-building-innovation nexus and augmented with results from a desk study of policy and technical documents. Next, semi-structured interviews with 7 real-estate developers involved in completed or ongoing construction of sustainably cooled housing projects are conducted. The decision to focus on the developer follows directly from the results collected during the system structure analysis, that demonstrate the developer's central role as project decision maker. SCH projects included in this study are selected based on in-depth internet research, and by means of snowball-sampling. To allow for a range of perspectives, special attention is paid to sample heterogeneity (RE developer firms

varying in size, ownership, building project size, geography, selected energy concept). The interviews are analysed using standard content analysis to identify systemic barriers and link them to building blocks of the IS framework.

I expect to find that central SHC blocking mechanisms largely derive from the project-based and highly fragmented nature of building processes, persistent social norms pertaining to space cooling, and the complex regulatory environment inherent in the building sector. Results will highlight crucial diffusion barriers, thus providing valuable insights for targeted environmental policy-making in the Viennese housing sector. Moreover, it can provide strategic innovation management advice for space-cooling technology and installation firms currently operating in subsystems of the SHC-IS.

Digital Organising Logics and their Symbolic Grounding: The Case of Information Standards

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What changes in social organisation occur with digitisation? What theories can help us answer this question? Material practice perspectives have been invaluable for illuminating changes in organising practices that occur with new technologies, but the digital transformations now underway entail large amounts of data and algorithms – complex symbolic systems not directly amenable to material practice approaches. To better understand how social organisation is transforming in the digital age, we need new theories that foreground relations between symbolic systems and material practices. This paper develops a digital organising logics lens to address this challenge, and applies it to the case of information standards.

In developing our lens, we draw on two streams of research from the institutional perspective, which has been deemed "a prolific lens to study digital innovation and transformation" (Hinings, Gegenhuber & Greenwood 2018: 52). The first stream we draw from involves typifications. We begin with a review of how categories and classification schemes – basic typifications – are foundational in the development and maintenance of social organisation (Berger & Luckmann 1967; Mary Douglas 1986). We then elaborate this view of typifications with insights from information science (Jacob 2004) to explain how data structures and information standards – more formalized typifications – are foundational for digital technologies, yet different from the typifications usually associated with social practices. In particular, we highlight structural and logical distinctions between the typifications embodied through social practices and those that undergird digital technologies.

Building on this approach to typifications, we draw from a second stream of institutional theory – Friedland and Alford's (1991) institutional logics. Friedland and Alford theorize institutional logics as sets of complementary symbolic constructions and supra-organisational material practices. Both the symbolic constructions and the practices are materially grounded via symbols, and they are linked to each other through immaterial

transrational referents so that changes in symbolic constructions translate as changes in practices, and vice versa. These pairs serve as organising principles. We demonstrate how this lens is useful for characterizing the relationship(s) between organising patterns and typifications according to their logical structures, and we highlight its value for analyzing social organisation associated with digital systems.

With this lens on digital organising logics, we next focus it on information standards in particular, illustrating how different logical structure(s) of digital data enable and constrain different organising practices. Empirical examples from several domains are provided, including information standards for air quality monitoring, for carbon sequestration and for cybersecurity.

Finally, we note that variations in resulting social organisation can be ordered along a scale of human-oriented vs. machine-oriented systems (Mann & Brooks 2011) which characterizes degrees of brittleness vs. resilience. Nevertheless, we caution that full understanding of how digitised social organisation evolves requires taking into account the imbrication (Ciborra 2006) of technologies and institutional logics over time and across levels of analysis. Theoretical and practical implications are discussed.

Stream D: Gender, Technology and Society

Session D.1: Inequalities in Higher Education: (Intersecting) Theoretical, Empirical, and Practical Examinations

Chairs: FROEBUS, Katarina; SCHEER, Lisa; KINK-HAMPERSBERGER, Susanne; MENDEL, Iris
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Time to PhD
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This presentation seeks to provide an overview of how PhD candidates are experiencing time during pandemics. On the basis of a survey done in Portugal, the paper examines the results of studies and reflections made about the topic, in the light of time and gender studies. Part of the existing analysis proposes that pandemics has provided an optimal context for PhD students to concentrate on their thesis, and generated more quantities of time to dedicate solely to research work, especially writing. Nevertheless, other analysis tend to state that pandemics is a complex time, permeated by the effects of various factors and discrepancies which affect negatively the amount of available time, as well as the subjective experience of time. Describing the results attained, the presentation explores some main questions addressing time and gender issues, and discusses possible key questions to discuss and consider at institutional and policy level.

Improving equality in scientific careers: the Care Factor proposal
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University of Milan, Italy

In academia, as in other spheres work, there exist some disparities. They are associated with discriminations based on ethnicity, gender, discipline (e.g. some research topics are considered more mainstream than others are, as well some research methods) and so on.

A relevant issue concerns the hidden (male) cultural model and related tacit assumptions underlying the (academic) evaluation of the scientific productivity. In addition, concerning the latter, several research studies on care-giving highlighted the inversely proportional relation between care activities and scientific production, i.e. a slowdown on scholarly productivity. The latter could prove to be detrimental when the candidate takes part in recruiting or promotion processes, as the number of publications is often used as an important criterion in evaluation.

The correlation does not, in the first instance, pertain the theme of the genre, but who (man or woman) is engaged in care (so that both motherhood and fatherhood). Moreover, in the new generations care activities are (albeit slowly) further harmonizing, with a greater response of men to the responsibilities and demands from the domestic sphere. However,

since they are still women to be more engaged in the care, this correlation is particularly unfavorable to them.

Reconciliation policies and promoting family-friendly cultures, environments and workplaces (Evans and Grant 2008; Ward and Wolf-Wendel 2012; Mason, Wolfinger and Goulden 2013) are certainly useful tools to help dilute this effect. However, they require social and cultural changes that are (unfortunately) not immediate. Hence, practical proposals in the short and medium term to reduce inequalities in scientific careers are urgently needed. For this purpose, "affirmative actions" can help.

One of these actions could be the use of the Care Factor, an index to weigh the scientific productivity of a candidate who is involved in child-rearing. It could be a transitional instrument, certainly not permanent, but useful to balance the gap between those who are involved in care activities and those who are not. However, the Care Factor should not be conceived of as a proposal to reward, but not to penalize those who care for children.

The viability of the Care Factor is being shown by Acumen, an EU Seventh Framework Program funded European project, which aims to find assessment parameters, not so much of the research as the work of researchers. For example, in its Guidelines for Good Evaluation Practices (April 2014), the calculation of academic age is based on a conventional value which considers the number of children raised (p. 10), special allowances and other 'penalizing' factors (like illnesses, part-time jobs etc.). This presentation will describe the Care Factor proposal.

Exploring gender bias in Austrian education: Seeing what students are exposed to

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Those who pursue science, technology, engineering and mathematics (STEM) careers are the modern drivers of innovation. Their daily accomplishments make a significant impact on the economic competitiveness of first-world countries. Due to a continuous emergence of new technological areas, the STEM job market is further growing and, consequently, choosing a STEM career promises lower unemployment rates and higher salaries. Despite a pressing economic need for qualified STEM personnel and many initiatives for increasing interest in STEM subjects engagement levels remain poor. Especially women are strongly underrepresented in STEM and particularly in engineering sciences (OECD, 2016). Over the past two decades, significant research efforts have been made to investigate, understand and address processes and causes that lead to the evident gender gap.

One line of research considers stereotype threat the root of the problem. Stereotype threat in the context of education describes a phenomenon, where people who belong to a negatively stereotyped group (e.g., young women in the field of STEM) have a poorer performance and less interest in the subject than other equally qualified groups (e.g., young men). This is often explained by the fear of confirming the stereotype (Steele et al.,

2002). However, even one role model can significantly influence a person's beliefs about potential success in a field, while the perception of dissimilarity to stereotypical role models (e.g., nerds in engineering) can cause women to reinforce their doubts about their abilities in a specific field. Following this argument, the efficacy of such a role model is based on the perceived similarity to its observer, which may depend on a wide set of characteristics that essentially exceed gender.

The here presented research takes a glimpse on student and gender representation of Austrian Universities' marketing material. In particular we look at viewbooks and homepage representations of bachelor programmes which is available to young students in the career information process. Results indicate that marketing materials illustrate an overrepresentation of women in comparison to real-life statistics. However, we find that the presentation of each gender still replicates existing gender stereotypes.

Dealing with Institutional Diversity in Higher Education: Challenges to STEM Education in Germany

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Higher education institutions worldwide are increasingly confronted with new institutional challenges, particularly due to ongoing internationalization processes at both local and global level. In light of the demographic changes and the already emerging shortage of skilled labor, attracting and retaining international students constitutes a challenge not only for the higher education institutions and the today's global knowledge economy, but also for the society. In Germany, the STEM majors are the most popular among international students, and therefore measures to retain them after graduation could play a helpful part in bridging the gap. Universities of Applied Sciences are particularly attractive for international Engineering students in Germany, in comparison to universities (47 % vs. 28 %) (DAAD/DZHW 2019: 49). Despite this, the drop-out rate (41%) of international students in Germany's Bachelor programs in STEM subjects is relatively high (Heublein et al., 2014).

This paper draws on the findings of a German Federal Ministry of Education and Research (BMBF) funded research project "Migration, Diversity, and Social Change in the Engineering field" and examines institutional change in higher education by comparing three Universities of Applied Sciences in economically dynamic regions of Germany. Using a qualitative methodology, it discusses how and to what extent academics and higher education stuff understand and respond to the challenges of internationalization processes in these transforming institutions. Additionally, it attempts to define which organizational factors as well as institutional structures and measures influence internationally mobile students' successful completion of an engineering study program, particularly within the context of high drop-out rates among international students in Germany.

Starting the cultural CHANGE at University of Žilina through the implementation of the Gender Equality Plan

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University of Žilina, Slovak Republic

University of Žilina, which can be based on its offered study programmes characterized as a traditionally technical university, started the implementation of the Gender Equality Plan (GEP) in 2018 within the frame of the H2020 project CHANGE. GEP implementation became possible thanks to the knowledge basis provided by the project partners. Specificity of the CHANGE approach lies in the application of practical measures in the field of gender equality already during the project lifetime whereby the plan itself is seen as a living document amended according to the organisation's needs. Mentioned approach with its flexibility enabled the GEP to become the strategic tool of the cultural change towards gender equality at University of Žilina.

However, the driving force of the started transformation of the university cultural environment has its roots also in external factors- in decreasing demographic curve of the Slovak republic, decrease of interest in university studies in recent years and adaption to EU policies and principles of the European Research Area. In the country in which is the state universities' funding still significantly depending on the number of students, described external factors made universities face new challenges. In the competition to gain students, they have to seek for new target groups, potential students who could be addressed. Faculty of Informatics of University of Žilina applied some practical actions targeting especially female high school students. They succeed to double the share of female students in bachelor study programme Informatics within five years. Faculty of Informatics is among faculties of University of Žilina in the field of approaching girls as future students the island of positive deviation.

However, the gender equality topic can not be narrowed only to attraction of girls to STEM study programmes. Drafted GEP therefore concentrates on more areas and tries to involve the whole university, not only one particular faculty. In the initial stage of the project implementation quantitative and qualitative analysis were performed in order to map the status quo in institution. Results were presented to the university management. Qualitative analysis helped to understand the perception of gender equality in the institution. Following survey on Employees' Satisfaction at Work revealed the need for more flexibility at work in relation to working hours. After the rector's approval some practical changes suggested by the CHANGE Transfer Agent- HR manager have been incorporated into the university collective agreement, which regulates relations between university and its employees.

There was an effort made to map the employees 'perception of career progression of female researchers and teachers at University of Žilina in comparison with their male colleagues. 48,3% of respondents think that progressing career at University of Žilina is not more difficult for female staff, 37,7% indicated the answer “I do not know”. With aim to raise gender awareness at university, further actions were realized (some of them in

close cooperation with CHANGE ambassadors- volunteering project supporters) and three gender trainings organised so far.

From the principles of justice to the co-creation of knowledge and change. Developing a Student Disability Strategy at a Hungarian university

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The objective of present paper is to reflect on the process of developing a Student Disability Strategy at a Hungarian University Faculty. The reflection attempts to embrace the theoretical underpinnings (in terms of social justice and disability); the process itself and the (potential) impacts.

The process of developing a Student Disability Strategy started in 2018, and it is still ongoing. The objectives of the process are: (1) co-creating knowledge about current challenges and the meaningful ways to further the equality of disabled students; (2) co-creating change: using the process as a means to initiate changes within and outside the university; and (3) developing a workable Student Disability Strategy for the Faculty.

The process is based on the collaboration of several actors: (1) a group of researchers at the Faculty, who facilitate the process. The members of this group are experienced in participatory research and non-traditional teaching forms (e.g. service learning), and are also active members of the local civil society; (2) disability professionals: members of various local disability organizations and the colleagues of the Disability Service Centre of the University; (3) experience-based experts: students with various disabilities; and (4) the teachers and the administrative staff of the Faculty. The process is a combination of systematic knowledge creation (using various methods), critical reflection and action. Hence, it resembles a participatory action research process (but with some substantial differences).

We use the capability approach of Amartya Sen (1999, 2009) and Martha Nussbaum (2000) to provide a joint theoretical basis for discussing social justice and disability. In line with Sen's (2009) "Idea of justice", we argue that in order to eliminate injustice, we should focus on actual social realizations instead of the principles and institutions of "perfectly just" societies. Due to behavioural transgressions and further factors, injustice could occur even in case of perfect institutions. Hence, emphasis should be placed on human lives, experiences and realizations.

Accordingly, the way disability is understood throughout the process goes beyond the medical, the social (and also the ICF) models of disability. The process attempted to put emphasis on lived-experience and various forms of oppression; and acknowledges the diversity of values and objectives when furthering social change. This understanding of

disability is also reflected by the process design. Traditional hierarchies (between forms of knowledge or types of knowledge holders) were deliberately transgressed. These transgressions challenged the existing structures (mind-sets and hierarchies within the universities) and also created impacts within and outside the university. The process contributed to the emergence of new forms of cooperation within and between the university and the local civil sector. Since the process is still ongoing, we can only detect some initial impacts yet. Their scope and extent are yet to unfold, which also means there is still room for intervention in this respect.

Increasing diversity in Higher and Adult Education Institutions – practical experiences from the DivCap project

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FH JOANNEUM, Austria

In the presentation the question how (Higher) Education Institutions deal with diversity and promote equality and social justice will be explored based on the EU project “DivCap”. "DiversityCapacities - Improving the Capabilities of Adult Education Institutions to Deal with Diversity (DivCap)" is a project founded by Erasmus+ KA2 Strategic Partnership – Adult Education. It runs from November 2018 to July 2021 under the lead of FH JOANNEUM - Institute for Social Work, with educational institutions from six other European countries: Germany, Greece, Croatia, Italy, the Netherlands and Spain.

In DivCap, which is an application-oriented project, the issue of equal access and treatment of disadvantaged groups in educational institutions is explored (for disadvantage in higher education see e.g. Karakaşoğlu 2016, for discrimination in adult education Sprung 2011). The aim of the project is to enhance awareness about diversity issues at a personal and an organisation level in educational institutions. Furthermore, practical measures and guidelines to promote equality and a discrimination critical environment will be developed. In a first project phase, the situation in two educational institutions per partner country is analysed and recommendations are developed. In a second phase recommended measures are implemented in the participating institutions. As a final result, general guidelines will be developed, abstracted from the findings in the case studies and pilots.

Theoretical, we work with a diversity-oriented opening approach. The term "diversity-oriented opening" intends to take into account the criticisms of Diversity Management (DM) concepts and Intercultural Opening (IO) approaches. IO approaches are criticised for their focus on the (assumed) cultural differences, as it is also laid out in the term. DM approaches that focus on different dimensions of diversity are criticised for their economic arguments and that they hardly address power and dominance aspects (Schröer 2018). The approach "diversity-oriented opening" on the one hand, considers different dimensions of diversity in an intersectional perspective and thus avoids the reduction to cultural dimensions. On the other hand, it also focuses on the approach of "opening", which is about equal access and improved services and learning opportunities for disadvantaged groups in institutions in a social justice perspective. The term is also

increasingly used in practical projects in which organisational development processes are implemented with this perspective (see e.g. zebratl 2014; Bildungsteam Berlin-Brandenburg e.V. 2018).

In the paper, the results of working on the issue of diversity with adult and higher education institutions across Europe will be presented. The presentation will give insights into the processes and activities in selected pilot organisations as well as overarching lessons learnt and good practices.

Session D.3: Let´s talk about money, sister! – Governance strategies for structural change in science and research

Chairs: THALER, Anita[1]; DAHMEN-ADKINS, Jennifer[2]
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Relevance of funding for structural change and its limitations

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Gender equality plans have a long tradition to support structural change in research performing organisations (RPOs). Numerous institutions have been supported through structural change projects funded by the European framework programmes. These projects have been evaluated and draw an ambivalent picture of the sustainability of change achieved in the period of funding. To strengthen the implementation of gender equality plans and increase the commitment of RPOs to pursue gender equality objectives efficiently, the European Commissions plans to make gender equality plans an eligible criterion for applications in Horizon Europe. In doing so the European Commission reinforces its commitment to gender equality and asks the same from applying RPOs.

What can we expect from this approach? If RPOs have to have a gender equality plan when submitting a proposal to Horizon Europe, they will have one. But will this contribute to structural change or will it become another bureaucratic requirement RPOs have to fulfil in the application process? Will it be more than just a tick box exercise? Which framework conditions will be necessary to ensure that it will be more than that?
To discuss these questions, I will refer to experiences made in a structural change project funded in the context of Horizon 2020: TARGET – Taking a reflexive approach to institutional transformation for gender equality.[1]

A European initiative has only limited potential for innovation at national level if gender equality objectives differ at European and national level. Therefore, it is necessary to embed a European initiative in a political discourse about gender equality. Such a gender equality discourse should lead to a shared understanding of gender equality objectives and the rationale behind gender equality policies. In times of anti-gender movements and

a renaissance of traditional norms and values in several countries, such a discourse is a challenge as well as a precondition for the proper functioning of steering mechanisms like compulsory gender equality plans.

From the perspective of RPOs, funding alone is not a sufficient incentive to pursue sustainable structural change. Hence, it is important that RPOs are addressed by a European or national policy discourse about gender equality as described above. The motivation to engage in gender issues increases when gender equality is perceived as a criterion for excellent research and a characteristic of a modern organisation which is attractive for national as well as international experts.

At institutional level is helpful when gender equality objectives are compatible with or supported by other strategic goals of the organisation (e.g. excellence, organisational reform). Furthermore, it is necessary to build up gender competence among members of the organisation and to establish a cooperation with gender experts who support the development and implementation of gender equality policies. This underlines the importance that the responsibility for gender equality is not assigned to one expert or a specific unit in the organisation but shouldered by a community of practice.

[1] For more information see www.gendertarget.eu

The hidden potential: Gender in research funding of strong innovators

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In academia, business and industry, research grants are important elements to promote science, boost the economy and support researchers on their career paths. However, they are also powerful instruments to materialize and prioritize major principles of policy and social values such as gender equality and equity. An in-depth analysis of research funding processes and organisations (RFOs) might reveal inherent gender biases that could be mitigated through a variety of intervention tools, thus promoting a better diverse and equitable research and innovation landscape. This paper presents research results based on 41 expert interviews exploring gender in research programmes and funding in three "strong innovator"-countries of the EU project CHANGE: Austria, Germany and Israel.

All three countries manifest high research intensities, represented by the gross domestic expenditures on R&D as percentage of their nominal gross domestic product (GDP): Austria – 3.19%, Germany – 3.13%. Israel – 4.5% (EU average: 2.19%). However, in terms of women's presence in research and research funding they manifest gender imbalances. For example, Austria's share of women researchers is 29.5% (EU average: 33.4%), of which the share of women researchers in the higher education sector is 39.9%, and only 17.1% in the business sector (European Commission, 2018); In Germany, the share of female

researchers is 28% - 38.7% in higher education, but only 14.7% in the business sector (EU-28 average: 20.2%; SHE Figures, 2018). And in Israel, although the research intensity is the highest among the examined countries (4.5%) and the percentage of female doctoral graduates is higher than the EU average (IL 49.7%; EU: 47.9%) other measures of women's presence in research and research funding are relatively worse than EU averages, e.g. women to men ratio of authorship: IL 0.52, EU 0.55; funding success rate: IL 2.7, EU 3.0; Glass ceiling index IL 2.33, EU 1.64. (SHE Figures 2018).

These figures suggest gender imbalances in funding processes regardless of place, policy, regulation or budget. Although much effort is put in research in the examined strong-innovator countries, their high scientific potential might not be fully materialised due to unconscious biases along the 'leaky pipeline' of grant application and evaluation. Nevertheless, some good practice examples for gender-balanced or gender-inclusive research programmes and processes do exist in those countries, such as: legislation and regulation, mandatory training courses for evaluators focusing on unconscious biases, presence of gender experts in committees and supportive instruments or programmes for young female researchers. These results are now used as the basis for knowledge co-production processes with stakeholders from RFOs and policy makers, in order to promote gender-equal research funding processes in RFOs in the respective countries and beyond.

Learning from the feminist movement: why money matters for gender equality?
MUÑOZ, Irene García; BELLOSO, María López; CABRERA, María Silvestre
University of Deusto, Spain

From the Beijing Platform for Action to the approval of the Sustainable Development Goals, self-reported support to women's rights and gender mainstreaming by the international community has undoubtedly increased. However, evidence shows that this discourse has not yet translated into an effective level of investment on either the topic or the organizations whose mandate is exclusively oriented to gender equality.
OCDE reports show how development assistance dedicated to gender equality continues to represent a very low share. According to their data, only 4% of all the bilateral official development assistance (ODA) has gender equality as a primary objective and a meagre 34% of the total ODA as a secondary one. (OCDE, 2020) It is widely recognised that despite investment limitations the feminist movement has spearheaded change and women's rights progress, through effectively organising (Hessini, 2020). However, the feminist movement and gender machinery have always been clear about the importance that funding and resources have on the progress of women's rights. As stated by UN WOMEN "commitments to gender equality mean little without the financial resources to back them up" (UN WOMEN, 2020). Hence, funding decisions hold enormous power and transformation potential in case they commit explicitly towards gender equality.

The Association for Women in Development (AWID) has been monitoring and analysing which and how resources were reaching feminist movements since the 2000s. Their work has proven as a reference source of information for the movement. As they put it

"Through our research and analysis, we examine how funding practices can better serve our movements (…) Above all, we build collective strategies that support thriving, robust, and resilient movements"(AWID, 2019).

All this accumulated knowledge opens a reflection on practices and analysis that feminist scholars and advocates could apply within the research-funding scene. As Hussu mentions in her analysis of gate-keeping in academia "gate-keeping in research funding is fundamental not only to the definition of scientific excellence but more generally to the construction of scientific knowledge" (Hussu, 2004). Understanding how the funding system operates, learning from others on how to analyse the gender funding landscape and apply action, can be a key lever for change for gender equality in research.

Therefore, this paper based on theoretical analysis and document review, aims to portray main findings on the importance that resources and funding plays for gender equality; it will reflect on what has been the feminist movements' tactics and strategies to influence the funding scene; as well as, which are gender machineries recommendations at this regard.

All of this, to establish a dialogue with the situation of research funding and gender equality, complemented and grounded with some specific experiences from the Spanish and/or Basque context in this sphere.

European research funding organizations: change agents for gender equality in research?

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Competitive external research funding is an important driver in developing successful academic and research careers. Success in acquisition of external funding is frequently used as one key criterion of scientific quality in academic recruitment. Research funding organizations (RFOs) allocating external funding to researchers are important gatekeepers providing opportunities and support to research development for selected funding recipients. Research funding therefore shapes the opportunities to succeed in the increasingly competitive race for positions, publications, subsequent grants, and prizes. Gender gaps or gendered patterns are shown to exist in the application behaviour, in success rates, in the size of grants, and in decision-making positions about grants. Some of these gender gaps are related to gender biases in funding allocation, some to persistent and entrenched gender inequalities within the scientific community – resulting in unequal distribution of money and resources for research between regions, organizations and individuals.

To what extent and in which ways do funding organizations in Europe act as change agents for gender equality in research, in policy and in practice? We explore this question by drawing on ongoing empirical research conducted in the Horizon2020-funded European research project GRANteD (2019-2023) on grant allocation disparities from a

gender perspective. In five national research funding organizations in Europe we analyse the framing and content of formal policies, including gender equality policies related to funding allocation. We are especially interested in how these policies are implemented in practice, specifically how they impact the work and decision-making practices of the panels evaluating research-funding applications. In addition to analyses of policy documents, we conduct interviews with RFO staff and chairs and members of evaluation panels to identify gendering practices and processes in the funding allocation, especially at the panel level.

The paper presents some preliminary results of our fieldwork in two national RFOs both of which have developed explicit gender equality policies related to funding allocation. Based on these two cases we will discuss how these policies are implemented in assessment practices, and how they may contribute to fairer and more equal funding decisions, more equal distribution of money and consequently to more equal career opportunities.

A Community of Practice and Gender Budgeting in research and higher education organisations

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University of Iceland, Iceland

In this presentation we will critically reflect on the opportunities and obstacles of Community of Practice (CoP) in developing and implement ing gender budgeting to challenge gender biases in decision-making of research performing organisations. We employ a case study based on the GenBUDGET CoP. The CoP includes sixteen members in ten research organisations. Through 'Targeted Implementation Projects' (TIPs), the CoP aims to develop shared knowledge on how to implement gender budgeting, a relatively new strategy in gender equality within research performing organisations, to progress the objective of gender equality in decision-making. In their TIPs, the CoP members assess gender impact of certain financial managerial mechanisms within their research organisation, such as salaries, workload allocation schemes and internal research grants processes, and formulate measures to enhance gender equality. The analysis explores the po tential for an international CoP to harness inter-institutional cooperation and create knowledge about gender budgeting, when general know ledge about the strategy is at different place. How does the support provided by the ACT community enable the collaboration? The analysis draws on the experiences and knowledge documented on the CoP's monthly meetings, including the Cop members experiences with the TIPs, the progress of their work and the opportunities and barriers they face in their own organisations. The findings reveal that the collaboration has been successful in advancing the CoP members knowledge on how to apply the gender budgeting strategy within research organisations. The TIPs have been useful in developing shared knowledge on the gender dimensions of various financial managerial processes. However, some of the CoP members have faced resistances in progressing their gender equality work, although,

being part of an international intra-institutional CoP has proved to be a supporting factor in progressing the work towards gender equality.

Budgeting for equality in RPOs
ADDABBO, Tindara
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Though in the past 50 years considerable progress towards equality of women and men in the labour market has been made, yet the process is far from being completed. Severe gender imbalances persist in earnings and careers of women versus men in European Countries, as the EIGE gender equality index clearly points out. Many research and higher education institutions still generate and tolerate gender inequalities along several dimensions and are characterized by a high degree of both vertical (glass ceiling phenomena, with few women being able to reach the top of the ladder of jobs) and horizontal (concentration of women in jobs at the bottom of the career ladder) segregation. It is an established fact that few women yet have reached top positions in academia and research organizations and many women still experience slow career progression (European Commission, 2019).

This paper will focus on the role played by gender budgeting in RPOs for reaching gender equality. The implementation of Gender Budgeting (GB) in RPOs (Addabbo et al., 2015; Erbe, 2015; Rothe et al.,2008; Steinþórsdóttir et al., 2016, 2017) is analysed with the aim to detect best practices in terms of its sustainable impact, its being embedded into a systematic approach or wider strategy, its transferability to other organisation/ sector, innovative approach, extension of gender impact analysis. Case studies will put in evidence the inner resistances encountered in the implementation of Gender Budgeting and the strategies enacted to overcome them. RPOs gender budgeting practices will be put in relation also with the national and regional normative contexts and with the degree of gender equality in the contexts analysed to focus on the impact of network and crossfertilization or limits in reaching gender equality across different institutions.

Gender equality and social justice in funding ‚European excellence': The case of the European Research Council
HOENIG, Barbara
University of Graz, Austria

Research funding policies in the European Union enjoy a long tradition of promoting strategies for gender equality and social justice in transnational collaboration of problem-solving, mission-oriented and interdisciplinary researchers across Europe. However, with the European paradigm of research funding shifting towards funding investigator-driven projects of individual top researchers, cultural and political objectives of scientific excellence have often been perceived as contradictions to those of gender equality and social justice instead of considering them fundamental preconditions for achieving excellent and ground-breaking frontier research.

The paper examines the case of the European Research Council (ERC) as an European funding initiative that has been called into life in the mid-2000s by the European Commission, and since then has successfully promoted thousands of excellent researchers from all fields of scientific research in the European Research Area and beyond. In detail, the paper reports and discusses a) both initial and more recent norms and strategies of the ERC's gender policy, b) its effects in improving gender equality and social justice in funding of top researchers, and c) its relation to some exemplary strategies of improving funding for excellence initiatives by implementing gender equality and social justice at national level.

Findings are based on extensive comparative research that combines qualitative and quantitative methods of social research in examining a sample of researchers from twelve countries and six disciplines across more than a decade of call years. Results show positive effects of more recent strategies of implementing gender equality in ERC procedures of funding scientific excellence. Simultaneously, funding for excellence initiatives at national level remain highly heterogeneous and often reflect remarkable differences in terms of gender equality and social justice across countries. The paper will also discuss how and to what extent European funding initiatives for research excellence do have an impact on national research funding strategies for improve gender equity in science policy.

A practical experience of gender mainstreaming in research funding: small but flexible

LASINGER, Donia
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More and more research funding agencies (RFOs) follow the European path and install strategies to promote gender equality in their funding schemes as well as in their internal structures. This applies to national actors as well as regional and local players. Our contribution to the STS Conference 2021 is sharing the experiences of a small, private and local funding agency with the process of gender mainstreaming, namely the Vienna Science and Technology Fund (WWTF). Based in Vienna, this basic research funding organization supports research that is done by Viennese researchers and plays therefore an important role in the local scientific environment. The practical example will give insights into structural as well as cultural changes in WWTF to foster gender equality. With this contribution we want to share the specificities and the conditions of WWTF, as a small but therefore flexible actor that is embedded and involved in regional policy dialogue, networks and structures.

One main opportunity was given by being partner in the European project GEECCO. The soon finished four-year project is funded by the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 741128 and aims to promote gender equality in research performing (RPO) and research funding organizations. Therefore, WWTF had the possibility to analyze in depth the status quo of processes in its organization in regard to gender equality. A strong emphasis was put on analyzing

internal structures, processes, funding activities as well as the interconnection with research performing organizations (mainly universities). This critical internal view was combined with ongoing exchanges with RPOs (local universities) as well as with national and international RFOs. Based on a good internal knowledge of the status quo in the organization, best practice examples were compiled in the course of publishing a report on best practices regarding gender mainstreaming activities of (mainly European) RFOs. These measures were screened and adapted to the own needs. This includes the implementation of measures like

- internal discussions, presentations and workshops to raise awareness for gender as cross-cutting issue in the organization itself and to trigger cultural change
- adaptation of evaluation criteria regarding research teams (gender balance) as well as research content (gender dimension) in funding activities and panel/reviewer compositions (gender in decision making)
- implementation of new sex-disaggregated indicators as well as establishing of a monitoring routine of these
- establishment of learning loops in the organization to control and adapt the process accordingly
- fostering the exchange of local RFOs and RPOs regarding gender mainstreaming
- knowledge exchange in order to learn from other organizations and their experiences including strategies to overcome or deal with resistances and to avoid obstacles and pitfalls

Even if the EU project is nearly finished, the outcomes are still processed and included in ongoing efforts to further strive for gender equality.

Stream E: Mobility: A Socio-technical system on the Way to Sustainability?

Session E.1: Electric Mobility and Vehicle-to-Grid in Transition(s)

Chairs: SOVACOOL, Benjamin[1]; KESTER, Johannes[2]; DE REUBENS, Gerardo Zarazua[3]
[1]Sussex University, UK; [2]University of Oxford, UK; [3]Aarhus University, Denmark

The Evolution of Vehicle-to-Grid: A Review of Contemporary Barriers and Opportunities

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Executive summary: Vehicle-to-grid (V2G) requires the involvement of many stakeholders, from OEMs to consumers. However, an increasing number of stakeholders are starting to recognize the potential benefits of providing V2G services and adopt the technology. Business models arise as delivering V2G services are becoming financially attractive. Although the adoption is progressing steadily, there are still many barriers to overcome before V2G is ready for mass adoption. This review aims to create an overview of the contemporary barriers and opportunities on the roll-out of V2G technology.

Introduction: In 1997, Willet Kempton of the University of Delaware pioneered the technology which would become known as Vehicle-2-Grid (Kempton & Letendre, 1997), allowing vehicles to absorb excess electric energy when the power demand is low and return electric energy to the electricity grid when the power demand is high. With the increasing capacity of renewable energy sources, the need for electric energy storage increases. Photovoltaic panels (PV) generate electric energy during the day when the demand is lower than the evening peak demand when households are consuming relatively more power. Electric Vehicles (EVs) are batteries on wheels and have great potential to support and stabilise the electricity grid. Cars are parked unused most of their lifetime, creating a perfect opportunity to utilise their battery in the meantime. This review collates the barriers and opportunities of several projects and studies conducted within the European Union.

Methodology: This review follows a semi-systematic approach, analysing the results of primarily European Union (funded) projects and studies- including the United Kingdom - to synthesise the key barriers and opportunities identified regarding the mass roll-out of V2G.

Preliminary results: 1. Technology: modern bi-directional units communicate with a back-office, whereas obsolete models were operating in isolation. The ChaDeMo protocol is primarily used for bi-directional charging; however, CCS is becoming a dominant standard, which is already trialling bi-directional charging (Manthey, 2020). Battery degradation used to be a significant concern, but evidence suggests V2G could extend

the battery's life (Cenex, 2020). 2. Configuration: often, bi-directional chargers are installed 'behind the meter', making it easier to pass the homologation. In the UK, grid codes have been amended, making it easier to enable vehicle-to-grid services. EV batteries charge on direct current (DC), which means alternate current (AC) from the grid needs conversion first. Usually, the conversion occurs in the charging unit. Still, bespoke experimental cars exist which convert currents themselves for bi-directional charging, also known as AC bi-directional charging. 3. Procurement: as the technology is still in the early phase, the hardware is expensive. However, research shows that unit prices will decline significantly in the coming decade (Element Energy, 2019). In this phase, the delivery time could be extensive and often requires a good understanding within the organisation. 4. Business models: consumers benefit financially from delivering grid services with fixed tariffs. Flexible tariffs could significantly improve the business model's effectivity when providing grid services. Nowadays, aggregated services emerge, reducing the number of hurdles for consumers to adopt innovative technology.

Providers and Practices: How Suppliers Shape Car-Sharing Practices

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Social practice theories can be useful for studying changes in mobility systems as regards automobility practices. However, many studies address the demand side and the user practices of consumers, without examining the supplier side. This Norwegian study focuses on the role of providers in car-sharing practices, using data from household interviews with car-sharing users, stakeholder workshops, and interviews with providers of car-sharing services. How are car-sharing providers shaping car-sharing practices, and with what implications? How do business models and platform technologies affect car-sharing practices? The results show how new car-sharing service companies, in addition to established firms such as car dealers and car rental companies, affect car-sharing practices by offering several alternatives for accessing cars. The implications of this are discussed, noting how car-sharing practices are shaped by car-sharing providers in the recursive relationship between practice-as-entity and practice-as-performance. The conclusions offer a critical view of how the providers contribute to various kinds of car-sharing understandings, as well as the implications for policy and practitioners.

Testing Green Futures by Exhibiting Electric Vehicles on Jeju Island, South Korea

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Jeju, the largest island off the coast of South Korea, is ambitiously promoting electric vehicles (EV) with an island-wide renewable energy grid. Jeju is publicizing itself as the "Mecca of EV," under the overarching regional policy called "Carbon-Free Island Jeju 2030 (CFI 2030)" initiated in 2012. The CFI 2030 aims to replace all oil-guzzling cars with EVs until 2030, along with infrastructure including EV charging stations, and sustainable energy generators (i.e. wind turbines and solar panels). The goal of the CFI is to reduce carbon emissions on the Island to 'zero' until the year 2030, by setting the whole Island as

a “test bed” of energy policies as a responsible response to climate change (Jeju Provincial Office, 2015).

Jeju Island has become a test bed of carbon-free futures. Since it has been renowned for its image of a pristine tourist destination, the Island has had a mission in South Korea to maintain its position as Korea’s show window of ‘green’ energy. Jeju excluded coal energy out of its area and included petroleum, liquid gas, renewables, and electricity (from the Korean mainland) in its energy mix. At the Paris Climate Agreement in 2015, Jeju was presented as a key demonstration site of Korea’s progressive carbon actions. Among the three main categories of the CFI — renewable energy, EV, and smart grid — EV is the most heavily funded and frequently advertised item. Jeju has been promoting electric car industries through annual EV expos, automobile magazines, and even a sing-along song for the lay public: EVs Running with the Wind. The provincial government of Jeju Island has also been giving incentives to Jeju residents who are willing to buy an electric car, all under the justification that Jeju has to replace all cars into electric vehicles until 2030.

In this paper, I investigate how Jeju’s promotion of EVs is coordinated with the art of exhibiting. The underlying goal of the CFI 2030 plan is to demo a carbon-free future on Jeju, and see if the future is desirable, or at least possible. The role of EVs in the CFI policy is not merely showing Korea’s technological advancement by putting green mobility on stage. Rather, its role is to exhibit Jeju’s future as a green and enjoyable place for both its residents and tourists. In test beds like Jeju, I argue, exhibiting plays a political and inevitable role in testing technologies. Exhibiting is not merely for showing how much progress the policy is making. They are, in fact, the essence of testing futures. They also provide the political motivations for the society to keep the test going. This paper will be based on on-going field research on Jeju Island. I analyze electric vehicle events, advertisements, regional energy policy reports, and documents on EV demonstration sites to show a critical role of the Jeju test bed: to exhibit a Carbon-Free image with the mobile lives of people on Jeju.

Assessing high-resolution mobility data to evaluate the potential of electric vehicles for storage provision

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Although both intermittent renewable electricity supply and increased electricity demand from electric vehicles challenge distribution grids, electric vehicles can also support grids by providing storage services. Bidirectional charging, which enables vehicle-to-grid, can further expand these services. However, the potential to provide storage services depends on the flexibility of (dis)charging events. As mobility behavior affects one of the main sensitivity factors for storage provision – plug-in rates – investigating electric vehicle use after adoption in context of the transport system is crucial for the successful integration of electric vehicles and storage provision.

Using multi- agent transport simulation to account for modal split and heterogeneities in driving patterns, this paper investigates differences in the use of electric vehicles between socio- demographic groups to derive different driving profiles and charging behaviors. Based on detailed mobility data with high temporal and spatial resolution, we aim to determine the potential for flexible (dis)charging. The data on departure and arrival times, locations, and travel distances allow deriving conclusions on dwell times, charging start-times, plug- in times, and the resulting shifting potential of the charging load to support storage provision. This study also derives implications for charging infrastructure at different locations, such as home, work, and public charging and makes conclusions about the frequency of charging.

Using detailed mobility data allows quantifying the potential of electric vehicles for storage provision. The differences between socio- demographic groups highlight the importance of the use phase of technologies that rely on user behavior for successful integration into the energy system. By investigating the flexibility potential of charging load, this paper can provide insights for policymakers to tailor incentive schemes for storage provision to different electric vehicle users and avoid grid reinforcements.

Vehicle-to-grid and socio-technical transitions beyond electric mobility
SOVACOOL, Benjamin
University of Sussex, United Kingdom

This presentation defines and charts the barriers and future of an emerging low-carbon source of mobility that could dramatically reduce emissions, create revenue, and accelerate the adoption of battery electric cars: vehicle-to-grid technology. This technology connects the electric power grid and the transportation system in ways that will enable electric vehicles to store renewable energy and offer valuable services to transmission operators. To understand the complex features of this emergent technology, the presentation explores the current status and prospect of vehicle-to grid and then individually details the sociotechnical barriers that may impede its fruitful deployment. Finally, the presentation concludes with a policy roadmap to advise decision-makers on how to optimally implement vehicle-to-grid and capture its benefits to society while attempting to avoid its impediments. This combines literature on vehicle-to-grid, mobility, transitions, sociotechnical systems, and electric power systems along with original data collected by the authors on the array of challenges and benefits to vehicle-to-grid. The examples in the presentation cut across technical integration of research, economic analyses, and sociopolitical challenges based on novel mixed methods (quantitative and qualitative). Thus, the presentation will ensure that readers from a variety of backgrounds will gain a more comprehensive understanding of vehicle to-grid and its potential for wide-scale implementation in the transport and electric systems.

Assessing the socio-demographic, technical, economic and behavioral factors of Nordic electric vehicle adoption and the influence of vehicle-to-grid preferences

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A growing number of studies have examined the influence of socio-demographic, economic, and technology factors on electric vehicle (EV) adoption either from a single or two dimensions. This study investigates the interconnected impact of socio-demographic, behavioral, economic, and technical factors associated with EV adoption interest and the influence of vehicle-to-grid mobility on preferences. Using hierarchical regression analysis, we examine the impacts of six dimensions relating to socio-demographic, technical, economic, and behavioral factors in a survey (n = 4885) across Denmark, Finland, Iceland, Norway, and Sweden. Using the approach of hierarchical regression step by step, this presentation presents the results of examining the impacts of six dimensions relating to socio-demographic and behavioral factors, including mobility practices and sustainability behaviors, economic factors of purchase intention, including expected vehicle cost, time frame, and intention of buying a new vehicle and technical factors of both conventional fuel vehicle performance and distinct attributes of electric mobility (such as range, charging, batteries, etc.). While examining the scope and extent that these interconnected factors influence EV adoption, we attempt to address the following research questions: (1) What are the essential socio-demographic factors are influencing EV adoption without considering other factors? (2) What are the critical mobility practices and financial attributes influencing EV adoption after considering socio-demographics? (3) What are the distinct conventional vehicle and electric mobility attributes influence EV adoption by considering the factors above? (4) Is there any carry-over effect from conventional vehicles to electric mobility preference in influencing adoption? (5) Is there a spell-over effect from sustainable behaviors and value to adoption? (6) What are the different electric mobility preferences across current and previous EV owners, and conventional vehicle owners? And (7) taken together, what are the significant factors influencing EV adoption after accounting for all the factors?

InnaMo Ruhr. A Concept for integrative, sustainable Mobility between the Universities of the Ruhr Area

CEPERA, Kay; KONRAD, Julius; WEYER, Johannes
TU Dortmund, Technology Studies Group, Germany

The Ruhr area is one of Europe's largest polycentric metropolitan areas with around five million inhabitants. Since industrialisation, it has faced significant structural changes concerning the inhabitant's workplaces: Many people now cover larger distances to reach the university they work or study at. The four campuses of the 'Universitätsallianz Ruhr' (UAR) have a total of 120.000 students and 14.000 employees. 2014, 52% of the employees and 17% of the students at Ruhr University Bochum stated to use their private car to reach campus. We expect these numbers to be even higher for transfers between campuses, since transfers between the UAR campuses by public transport take between 67% and 100% more time than transfers by car.

These circumstances offer a large potential while implying that a solely technology and supply focused approach might not be sufficient to establish faster transfer possibilities inside the UAR without producing a large increase in traffic and emissions. Therefore, we suggest a social-science approach that focusses on understanding both individual mobility practices as well as their macroscopic aggregates in order to shape a sustainable transition of the entire socio-technical system.

This paper presents a concept for an interdisciplinary approach that aims to facilitate said transition for the UAR. As this is work in progress, we aim to develop a transition scheme and discuss the states of science and technology that are relevant for our project. Further, we present a discussion of study results regarding the need and demand for mobility in the examined region.

This scheme sees transition from a Multi-Level Perspective as suggested by Geels. It initially includes an examination of the status-quo of transport in the Ruhr area. Here, it becomes evident that due to a modal split that is heavily oriented towards motorised individual transport and due to the excess of travel time when using public transport, there is an obvious lack of supply with adequate means of transport. Thus, the second step includes the examination of individual mobility practices and needs by conducting guided interviews for the examination of the practices and a large-scale survey among the universities' population for the examination of the specific needs. This step especially aims to cover the point that as Kulvivat points out, the acceptance of technology is based on both cognitive and affective components, that therefore both need to be taken into account by a transition concept.

This is followed by scenario development that combines preliminary studies with the mentioned surveys. As our prior research shows, mobility transitions can be facilitated by aligning the parameters of a transport technology to user's needs concerning the dimensions of comfort, ecology, travel time and costs. The scenarios are then to be simulated with agent-based modelling in order to optimise them. Based on these results, tools for an integrative mobility management are to be developed and then tested in a real-world laboratory.

With this approach, our concept aims to facilitate interaction between science, economy and society in order to yield solutions that can then be applied in everyday service.

Stream F: Life Sciences - Biotechnology

Session F.1: New Techniques for Plant Breeding and Genetic Engineering: Epistemic Issues, Qualitative Changes and Socio-economic Aspects

Chairs: LALYER, Carina R.[1]; FRIESS, Johannes L.[1]; GIESE, Bernd[1]; LIEBERT, Wolfgang[1]; BRAULT, Nicolas[2]
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The promises of New Plant Breeding Techniques: old wine in new bottles?

BRAULT, Nicolas
LaSalle Beauvais Polytechnic Institute, France

The abbreviation NPBT (New Plant Breeding Techniques) refers to any of a heterogeneous set of multiple techniques for plant breeding. In this communication, we would like to focus specifically on the site-directed nuclease techniques (ZFNs, TALENs, CRISPR/Cas9), because they are considered as targeted mutagenesis: in that sense, it becomes possible to introduce targeted improvements into a given variety and to accelerate the effect of breeding in crop species.

These NPBT are presented as the solution to all the problems that agriculture in general and plant breeding in particular are facing today: for example, according to a booklet made by the University of Wageningen[1], NPBT can be used to create “varieties with durable disease resistance against pathogens” or to remove “gluten from wheat for the benefit of coeliac patients”. It also states that “further developments in NPBTs indicate that traits such as resilience against drought and salt stress, and consumer quality factors such as fruit taste, can also be effectively addressed using genome editing”. In brief, NPBT will allow breeders to create all desirable traits that customers are looking for: a healthy, tasty and sustainable food.

Beyond the policy, regulatory and commercial issues at stake, we would like in this communication to address an historical and societal issue: the promises of an evolution made to order has indeed a long history, which goes back, according to Helen Anne Curry[2], to the application of X-Ray at the beginning of the 20th century, and continues with the colchicine during 1930’s, and the radiation after World War II. And most of these promises were not kept, even though some techniques are still used by breeders.

Therefore, it is quite legitimate to ask whether these techniques are really new, not from a technical point of view of course, for which there is no doubt, but concerning the promises and the possibilities that are put forward by those who promote theses techniques as a kind of panacea.

In other words, we would like to know if the targeted mutagenesis is really targeted, but also if it is necessarily beneficial and with no risks: is it possible to give a plant any trait we want or is it a more complex situation? Do these techniques really reduce or eliminate off-target mutations? How can we be sure that these techniques won't lead to the apparition of completely new, undesirable and potentially dangerous traits? Moreover, if these traits are inheritable, what could be the consequences on a long period, both for the plant, but also for biodiversity and the humanity, especially if most of these modifications are undetectable?

[1] http://www.isaaa.org/kc/cropbiotechupdate/article/default.asp?ID=16408. Consulted on 19/01/2020
[2] H.A. Curry, Evolution Made to Order: Plant Breeding and Technological Innovation in Twentieth-Century America , University of Chicago Press, 2016.

Agriculture and Biological Warfare: History and Legacy

AUCOUTURIER, Etienne
Independent researcher, France

The link between biological and chemical warfare and agriculture is rarely highlighted and little studied. However, not only have humans been targeted in the major military programmes of the 20th century selectively targeting living organisms (biological and chemical warfare programmes), but also their agricultural and livestock resources. The first uses of so-called bacteriological weapons were even, at the beginning of the 20th century, directed primarily against animals and plants useful to humans, rather than directly against humans themselves, as was the case with chemical weapons for the first-time during WW1. Pest control campaigns using chemical or biological agents have inspired and served as tests prior to the development of biological and chemical weapons systems directed against humans. In return, military research on toxic chemicals (such as nerve gases) or microbiological agents has found civilian applications in agriculture. In our paper, we will first show that this aspect of biological warfare was central in military programmes and that synthetic poisons and biological agents have been also engineered for this specifically military purpose of targeting food resources.

Then, by way of comparison, we will look at the contemporary legacy of this military project to target agricultural resources and at the risks associated with contemporary advances in biotechnology in this area, through the study of cases such as that of the contemporary field genome editing programme conducted by the American agency DARPA (Defense Advanced Research Projects Agency), called Insect Allies. This and other emblematic projects involving Horizontal Environmental Genetic Alteration Agents (HEGAAs) to genetically modify plants directly in the environment rather than in the laboratory could be a technological revolution in the field of plant breeding. The ability of these HEGAAs to edit the genome of eukaryotes directly in the environment can not only change the traits of eukaryotes during their lifetime, but also produce heritable genetic alterations in them, thus shifting the activity of plant breeding from the laboratory to the field.

Since in the past, such technological advances in agriculture have found political and military applications, we will propose as a third step a bioethical analysis of these projects and technologies, in order to better assess the contemporary issues at stake in terms of human health and food safety.

How to frame breeding systems and technological advanced for governing varietal and genetic diversity in crops?

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Breeding systems produce genetic and varietal diversity. Having diversity of varieties guarantees farmers access to those cultivars, which fit their needs for crop production in terms of yields and qualities of these crops. Farmers reach their targets within their farming system by picking varieties depending on abiotic factors, such as soil and climate conditions, biotic factors, such as pests and weeds, and their preferred cropping system. New varieties adding to varietal diversity can only be created by breeders if they have sufficient genetic diversity in their breeding material. Genetic diversity determines the traits of a crop available to the breeder and thereby the future potential for improving varieties' performances. Genetic and varietal diversity are highly interdependent and are jointly determining yields and qualitative performances.

Institutional arrangements structure the breeding system and affect conditions of breeders, farmers and other actors. Institutions channel the exchange of genetic material between breeders, influence the varieties contracted by multipliers and thereby availability to farmers. Regulating the breeding system may lead to desirable or undesirable outcomes - e.g. whether there are enough different varieties to choose from for farmers. Likewise, institutional arrangements determine whether a breeder possesses the right breeding material and incentives to produce new varieties. Therefore, the challenge for actors who craft institutions is to design them such that varietal and genetic diversity can be maintained over time. Accordingly, we ask: what governance challenges arise in breeding systems for the provision of varietal and genetic diversity?

Breeding systems are complex adaptive systems with diverse social and ecological entities interacting with each other dependent on previous outcomes. For example, genetic material available to individual breeders determines the kind of varieties released to the common gene pool. At the same time the pool of genetic material shared among all breeders of a crop serves as basic input to the next crossing, again creating new varieties being fed into the gene pool. To understand what governance challenges, arise from these complex social-ecological systems (SESs), we need to frame them as SESs providing varietal and genetic diversity. Previous studies dealing with the governance of varietal and genetic diversity are rare and typically frame seed, breeding material or traits merely in terms of rivalry and excludability.

Future changes in breeding such as new breeding technologies or technological advances like automated phenotyping technologies bring new challenges and change to the

system. So far, however, the foundation for sustainable transformations in this sector is missing. We see this as a first step towards bringing together insights on cases of breeding systems and pathways for future regulations of these.

Socio-economic relevance of novel genetically modified organisms

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Due to substantial improvements in genome editing a variety of new genetically modified organisms (GMO) intended for release may soon be tested or used in applications. In particular, novel invasive environmental biotechnologies (NIEB) as e.g., gene drives or Horizontal Environmental Genetic Alteration Agents (HEGAAs)[1] put forward new ways to rapidly spread desired genes in natural populations.

Gene drives are targeted at vectors for disease (e.g. malaria-transmitting mosquitoes), invasive species or agricultural pests. Besides the intended beneficial effect, releasing such modified organisms into the natural environment has the potential to lead to undesired ecological consequences at different organizational levels, from species, communities to landscapes.

The currently envisioned use of HEGAAs is the spread of genetic modification agents, namely viruses, to confer desired traits onto crop plants. Additionally, the viruses are planned to be spread by insect vectors to infect the targeted crops. While potential ecological consequences may be on par with those of gene drives, HEGAA's mode of viral spread is far superior being more likely to cross spatial and species boundaries.

These modifications may either modify or suppress wild populations of animals or plants. However, using such a technology does not only affect ecosystems but can also lead to powerful and new consequences in the socio-economic, political, ethical and legal realm. Following the precautionary principle and the three pillars of sustainability, an early assessment of the use of novel environmental biotechnologies is pivotal to determine the possibility and extent of beneficial as well as adverse effects. Ramifications may have their source e.g., in differences in national regulatory frameworks, national borders, protected cultural assets, different perceptions of nature, farming practices as well as lack of transparency and public trust.

In the hypothetical event of a release into nature, the above mentioned examples (gene drives and HEGAAs) are used to explore potential impacts at the societal level. Selected effects are being presented, analyzed and discussed. Some areas of interest are (a) sustainability (b) legislation, (c) global ethics or (d) responsible research/innovation and uncertainties.

[1] Reeves, R. G., Voeneky, S., Caetano-Anollés, D., Beck, F., & Boëte, C. (2018). Agricultural research, or a new bioweapon system? Science, 362(6410), 35–37. https://doi.org/10.1126/science.aat7664

Stream G: Predicting, Promoting and Shaping Socio-technical Change

Session G.1: Cultures of Prediction

Chair: DAYÉ, Christian
Graz University of Technology, Austria

Hazy Skies, Uncertain Futures: Technopolitics of Air Quality Forecast in South Korea
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This paper analyzes how the practice of air quality forecast produces the responsibility of the state, the meaning of scientific accuracy, and a new culture of prediction in contemporary South Korea. In recent years, public awareness of the health risks from particulate matter (PM) has grown exponentially in East Asia. In South Korea, the high concentration of PM was even legally declared as a national disaster. With rising public concerns, predicting the atmospheric condition has become an imperative scientific agenda for the government to secure its political authority and trustworthiness. In an attempt to predict the atmospheric futures, the South Korean government has commissioned the National Institute of Environment Research (NIER) to develop a numerical model that forecasts PM concentration by simulating physical movements and chemical reactions of atmospheric components. The research resulted in the world's first daily forecast of PM.

The NIER forecast received mixed reactions from the public. On the one hand, the forecast provided health-concerned citizens with a science-based guideline to organize their daily behaviors, such as allowing children to play outside. On the other hand, the inaccuracy and inconsistency of the forecast fomented debates on the model's simulation processes, the quality of its raw data, and the strict policies for disclosing its results. Scientific and political distrust grew as some civic activist groups started to compare the NIER forecasts with the simulations by similar institutions in the US, Japan, and China. Some citizens even came up with their own rudimentary forecasts, using unverified information sources and methods. The public's practices of criticizing, comparing, and even concocting atmospheric futures, in turn, prompted the NIER scientists to change their forecast practices.

This paper follows this mixed reception over the NIER numerical model and examines how its introduction reconfigured the scientific and political values of air quality forecasting. The study first analyzes documents produced by NIER and activist groups to show the different expectations scientists and citizens had on the PM forecast's capability and its sociocultural use. I focus on how the acceptable degree of accuracy had to be negotiated between the political parties who have different cultural understandings of air quality prediction. Through in-depth interviews with NIER experts, the study also

discusses how the public's active engagement in the forecast affected the scientists to adopt certain algorithms, datasets, and policies of releasing and displaying the predicted results. In this process, previously black-boxed practices on atmospheric simulation were questioned to cope with emerging knowledge claims regarding the model. Finally, I highlight the NIER scientists' promotional activities to publicize their process of producing detailed datasets in order to gain superiority over other forecasts. In conclusion, the study argues that the air quality prediction in South Korea is a part of a broader technopolitical process of co-constructing the legitimate form of scientific knowledge and governance over the atmospheric risks.

Predicting and shaping socio-technical futures – the case of scientific-technologic narratives

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Decision processes dealing with socio-technical change, e.g. those underlying the governance and funding—both public and corporate—of research and development, are subject to high degrees of uncertainty. The further the consequences of decisions extend into the future and the more complex the issues in question are, specific forecasts become more and more inaccurate. But to take well-informed decisions, decision-makers need to have at least some idea of the consequences their actions might provoke in a less or more distant future.

In this context, future-oriented scientific approaches such as technology assessment or foresight studies are a means to generate orientational knowledge which helps decision makers to cope with this uncertainty. To this end, future-oriented research needs to consider approaches for prediction that go beyond the calculability of mathematical models.

An important element of such prediction beyond computability is the consideration of scientific- technologic narratives. Such narratives, understood as the core content of a story or a narration of science and technology, serve to reduce the complexity of future developments and to facilitate the contextualization of specific research areas, technologies, or more encompassing socio-technical developments. But unfortunately, narratives are often opaque, sometimes interest-driven, and tend to hide contradictory aspects.

Their role concerning future-oriented research, discussion, and decision-making is manifold: On the one hand, as narrative patterns they represent the starting point from which future developments can be reflected upon—in other words, they are input for future-oriented research and discussion. On the other hand, scientific-technologic narratives are central to the communication of technology assessment and foresight results into politics, business and society and serve decision- makers as a complexity-reducing basis for decision-making. And finally, scientific-technological narratives are

crucial for the development of societal support for science and technology, e.g. in terms of social acceptance.

Thus, narratives play an essential role in predicting and shaping socio-technical developments and de facto are a decisive element of every future-oriented research, discourse, and decision-making. Considering this, it is surprising that their role has not yet been systematically examined in technology assessment and foresight projects.

Against this background, we are currently conducting the research project "NarrativForITA", which aims to open up the topic of scientific-technological narratives for systematic analyses within future-oriented research and decision-making. Based on an assessment of the narratives prevalent in a specific research area—the field of artificial photosynthesis—, we present central characteristics of scientific-technological narratives, their functions, why and how they work. Proceeding from there, we are able to break down the narratives into their components (factual, emotional, normative, etc.) and thus deconstruct them. Finally, our approach will be cast into both a methodology that allows a systematic narrative analysis to be integrated in future forecasting projects and recommendations for dealing with narratives for decision-makers and discourse participants. Thus, we hope not only to contribute to an objectification of the discussions on future science and technology, but also to gain insights into how socio-technical narratives influence the generation and development of scientific predictions, political visions, and societal expectations of future socio-technical perspectives.

Cultures of prediction, theoretically enhanced: How the concept of cultures of prediction can profit from a more serious engagement with previous thinking on culture

DAYÉ, Christian
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In their seminal book, Heymann, Gramelsberger, and Mahony (2017, 20) defined five dimensions of the concept of cultures of prediction: (1) the social role of prediction; (2) the character and significance of computational practices; (3) the domestication of uncertainty; (4) the degree of institutionalization and professionalization of predictive expertise; and (5) the cultural impact of predictive practices and claims. While this dimensionalization is both plausible and sophisticated, it still assumes a very restricted understanding of the term culture.

In my presentation, I will revisit some selected classical sources on the notion of culture with the question whether or not they allow us to improve the dimensionalization proposed by Heymann et al. In its current version, for instance, this dimensionalization appears not very interested in those processes of demarcation, of drawing limits between the insiders and the outsiders that have been identified as a major source of cultural integration by writers such as William G. Sumner or Georg Simmel. Also, the Heymann et al. dimensionalization lacks a sensibility towards the historicity of culture development. Such historicity could be explored by assessing the relative importance of lines of

descendance within cultures, by describing their hierarchical and functional structuration, or by identifying the basic dichotomies and myths that subcutaneously inform the "web of meaning" (Geertz) that any culture of prediction represents.

Using my own research on the early development of US futurology as a background, I will critically discuss whether and how such additional perspectives might be integrated in the dimensionalization proposed by Heymann et al.

Reference:
Heymann, Matthias, Gabriele Gramelsberger, and Martin Mahony. 2017. "Key Characteristics of Cultures of Prediction." Pp. 18–41 in Cultures of Prediction in Atmospheric and Climate Science: Epistemic and Cultural Shifts in Computer-based Modelling and Simulation, edited by M. Heymann, G. Gramelsberger, and M. Mahony. Milton Park, New York: Routledge.

Session G.2: STS & Design – Design for Sustainability, Design for Society

Chair: EGGER, Stefanie
The Invisible Lab, Graz, Austria

Barriers to sustainability in the consumer electronics sector: applying transition theory at the global scale

COLE, Nicki Lisa
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Twenty-first century life is increasingly facilitated by use of electronics and all indicators suggest that our collective reliance on them will only continue to grow in coming years. Accompanying widespread use is an overall positive attitude toward electronics given their association with values of progress, innovation and productivity, as well as efficiency and sustainability. Yet, the impacts of these global supply chains are in direct conflict with the goal of achieving sustainable systems. From mining to assembly, research shows that violations of labor rights and laws, community disruption and displacement, and environmental destruction and pollution of air, water and land are systemic problems. These conditions have persisted for decades despite acute awareness of them within the industry, the uptake of CSR practices and voluntary compliance measures, the growth in awareness of sustainable supply chain management, and past and ongoing efforts to regulate the industry.

In response to this troubling reality, this project seeks to provide new sociologically informed insights into the barriers to social and environmental sustainability in the electronics sector. Drawing on strands of literature including critical political economy, critical globalization studies, transition theory and the multi-level perspective, this project focuses on identify socio-structural, economic, relational, ideological, cultural and racial barriers to sustainability at global, national and local levels.

The main objectives of this project are:

- To use the sustainability transitions and multi-level perspective frameworks to analyze smartphone supply chains, which serve as an exemplar case of the consumer electronics industry as a whole.
- To identify and classify past efforts at sustainability transitions within the sector as either successful or unsuccessful, and to identify the barriers to and facilitators of sustainability in smartphone supply chains by examining past and ongoing attempts.
- To use the critical globalization approach, buyer-driven supply chains framework and sustainable supply chain management frameworks to further analyse these findings.
- To bring findings and existing theoretical concepts together to posit a new theory of sustainability transition for a global industry, which can function at the global level and be applied to managing sustainability transitions within global supply chains.

Based on these objectives, 4 research questions have been formulated:

- What efforts at transitions to sustainability have occurred or are presently occurring within global smartphone supply chains? Which have succeeded or failed?
- Are there observable niches in which sustainability transitions have been attempted, achieved, or are ongoing? How do these relate to the global, national and local landscape(s) and regime(s)?
- In identified cases of attempted or achieved transition, what factors—namely actors, institutions, ideologies, knowledge and values—have been influential in acting as barriers to or facilitators of sustainability transitions?
- What are the theoretical implications of considering these findings in the context of sustainability transition theory, sustainable supply chain management and the critical globalization approach?

This conference presentation details the background and theoretical framework that undergirds this project.

Convivial digital technology - a method for analysing and designing IT

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The concept of “convivial” (rough translation: life-friendly) technology goes back to Ivan Illich's work “Selbstbegrenzung – Tools for Conviviality” from 1973 and refers to technology that respects life on earth as well as it improves human (co)existence. It therefore focuses on then needs of people and it's effects on society as well as unhindered access to it by everyone.

The scholar Andrea Vetter recently updated and concretized Illich's general concept and created the practically applicable “conviviality matrix”, which can be used for analysing (information) technical devices and therefore provides a tangible and concrete framework for technology assessment. Resource consumption plays a major role as well as e.g. the involvement of users and those affected by technology into the data modelling, software design and decision making processes in general. By including those processes into the

framework, the analysis and discussion of power structures becomes part of the socio-technical assessment.

In my presentation, the basics of this convivial view of technology will be presented, the matrix method introduced and then extended to also analyse internet services and apps/ software. In addition, issues of data protection and IT security will experimentally merged with the framework. In doing so, I want to help extending the discussion about concrete tools to rethink technology design in terms of sustainability in a broad sense.

Designing with the social? – Or, how Science and Technology Studies came to matter in architectural design practices

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In recent times, design disciplines and Science and Technology Studies (STS) have been gravitating towards each other. As a result, debates around (1) what STS concepts, approaches and methods can do for design, or (2) how design practices can enhance social science methods, have emerged. However, how (and if) STS might be providing alternative paths in design practices and politics remains unclear.

In order to develop ethnographic insights into this, I am following (in my PhD project) an internationally reputed scene of Spanish architects who engage with concepts, notions and methods from the realm of STS and STS-inspired anthropology in order to suspend modernist architectural design principles. Thereby, the Department of Architecture of the University of Alicante in Spain has developed into a key ethnographic site, since most of the members of this scene are, or have been teaching design studio courses there.

By analysing these design studio courses at this university, I explore in detail how architectural design practice is there preformed, paying special attention to the relationship built and maintained with STS; and, in doing so, I will reflect on different potentialities of and (productive) misunderstandings with STS in the making of alternatives in doing design.

This presentation will consist of two parts. In the first part, I would like to discuss the role of STS in the making of architectural designs by analysing the case study of the so-called "Alicante Modell of designing and researching". And in the second part, I would like to give a more critical account from the perspective of a social scientist (me) that works with and on STS by referring to the case study on how Design has started to adapt STS concepts, notions and methods.

Designing for everyday objects. The 3 C's: Convention, Convenience, Connection

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Our wallets are constant companions through our everyday life. Not only do they come in all shapes and sizes, they can also be found in various digital and analogue forms. Despite the multiple models of wallets, preferred forms manifest themselves in social groups. For this we must become aware that we define and live the concept of normality shaped by our environment. [1] Elizabeth Shove writes in her article "Converging Conventions of Comfort, Cleanliness and Convenience" about the three "C's": comfort, cleanliness, and convenience. Shove's analysis of environmental measures and aspects in the consumer society through the 3 C's paints an exciting picture of our society as standards are defined. In the course of my work I would also like to shed light on an everyday object and question the given social norms here. For this purpose I use Shove's methods of analysis in order to analyse the chosen everyday object from different angles: Convention, Convenience, Connection.

"The Adult Version of Head, Shoulders, Knees & Toes is Wallet, Glasses, Keys & Phone." [2] Hardly any other object is such an essential part of everyday life as the wallet. No matter how you are socialized, or what age, sexual orientation, religious views or other distinguishing features you may have - a wallet unites us all. Based on my analyses and research methods, I directed my question for this abstract into a practical orientation, since it seems only reasonable to advance a practical discussion about an everyday object used as much as a wallet. Here I raised the question how a purse can emphasize its materiality and formability without losing its functionality?

In regard to this question I developed a concept for a wallet that is not only formable in many ways, but also stands out through its materiality. The concept consists of a sheet of paper that can be folded in several different ways by the owner. The decision on the folding method depends on the owner's expectations of the wallet. Thus, a paper sheet can be turned into a coin purse, a wallet with space for customer and credit cards, or even a clutch for more storage possibilities

Influenced by my newly defined 3 C's and the practical analysis, I would like to propose a prototype discussion at the conference, discussing which needs and views need to be included in the design of everyday objects and giving the opportunity to present and comment on the prototype.

[1] Vgl. Shove: Comfort, Cleanliness and Convenience, 395
[2] NN: Quote, online

Are we ready for digital phenotyping? Some critical remarks

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The trend in international health policies is to advocate for digital support in the realm of health services and patients' self-management. Digital phenotyping (self-tracking of health-related data, behavioural data, passive data, etc) represents an avenue of consideration. However, there is still little systematic or discursive research looking into the state of the art. A fundamental challenge lies in the diversity of codes and approaches to digital phenotyping and lack of dialogue between the range of disciplines concerned with digital phenotyping. That often results with medical engineers overlooking the ethical, social and legal issues surrounding digital phenotyping that the humanities and social sciences discuss with little true understanding of the technology. This study aims to critically explore the ethical, legal and social challenges that have been identified in the literature and which are relevant to the implementation of digital phenotyping technologies, to underscore the gaps in the literature and to call for a cross-disciplinary approach to emerging health technologies. This paper reports a critical synthesis of studies focused on the ethical, legal and social challenges of digital phenotyping in supporting the self-management of patients. We identified relevant literature, characterised the discussed technology, and discursively explored its impacts and the proposed solutions to identified challenges.

Our results show that the literature, perhaps unsurprisingly, concentrates overall on technical rather than ethical, legal and sociological perspectives, which limits understanding and thus successful implementation. Ethical issues mostly concern privacy, rarely expand to more complex ethical issues, and focus on ex-post thinking rather than ex-ante approaches. Some attention is paid to the social challenges of digital technologies implementation and impacts on the delivery of care (implications for medical staff, acceptability and engagement for patients) but health system performances are biased towards efficiency and effectiveness rather than equity. Lack of legal regulation primarily underscores the lack of data sharing protection and overlooks more complex legal issues such as data donorship.

The advent of digital phenotyping means that data prioritisation and selection is critical. We believe that to achieve the desired outcome technology can provide, ethical reflection on the processes of sourcing, control, processing, implementation and management of such metadata is essential in order to maintain trust among health actors, promote equity, and ensure adequate control of risks and deviances. It is therefore crucial that a clear code of ethics be drawn up for the design, implementation and use of personal health data within such a new dematerialised health ecosystem. Based on our analysis, we provide guidelines and recommendations for stakeholders involved with the design, engineering, production, implementation and use of digital phenotyping technologies – an ethical data valuation model to clearly define roles and responsibilities in the life cycle of health data. This will require a cross-disciplinary collaboration and a

participatory approach which will ensure that the integrity, ethics and quality of the data is maintained, from their sourcing to their processing.

Controversial wallet: A practical experiment on privacy & visibility
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Privacy has always been a part of human nature, in an attempt to maintain individuality and avoid unnecessary or harmful exposure. What should be private and what should not, is a fluid term that changes with time and is relevant to cultural, social and ethical standards.

Privacy extends both into digital and analog aspects of life. A good example of that analog privacy is our wallets. It is very common for traditional wallets to include an interior display area, mainly used for placing photographs. In an experimental context, I tried to redesign the traditional wallet by moving that display area to the exterior.

Since a wallet is a tool we care about a lot, and which we, therefore, carry and protect, it is natural that we choose to put valuable things in it. The valuable artifact which we are referring to, however, is neither something valuable itself (like cash) nor valuable for what it does (credit card) but something valuable for what it means to us personally. A picture of a loved one, a reminder of good times, or a record of proud achievements are some of the many possible items we can choose to place in our wallet while endeavoring to maintain as much privacy as possible. Placing our intimate artifact in the exterior of our wallet would inevitably make us feel exposed. Do we assume the risk of potential exposure and loss of privacy when we accept the exterior orientation of our personal artifacts? Analyzing an area of our lives where we freely share personal moments and memories will help us understand the reasons why we are threatened by such an alteration to the traditional wallet. Consequently, it would be interesting to study social media posting.

When it comes to social media, since we are encouraged to share intimate moments and memories with the whole world, we sometimes take the initiative to do so. The external placement of the display in the traditional wallet does exactly the same thing but in an analog way. It encourages the owner to publicly display private memories in the form of printed photographs.

The same picture of ourselves with a loved one has a different value when posted on social media than when put into our wallet in a printed form. The answer to why the value of such a personal artifact changes lies in the medium. A digital picture is nothing tangible while a printed one is a real item, an item we can experience with more senses than mere sight. It has a physical presence and it takes up space: therefore, we need to care about it more because we cannot rely on a securely backed up digital hard drive to maintain its existence.

Privacy is something extremely important for the individual but also something with ambiguous boundaries in the digital era. The design of the exterior display, accordingly, is an experiment intended to upend our notion of privacy and cause us to consider what determines it.

How STS can help designers to implement sustainable options for single-use coffee cups

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The single-use coffee cup has come to symbolise modern life for many individuals living in the global north, where perceived pressures of time, busy lifestyles and balancing work with constant information technologies conflict with stopping at a coffee shop to drink the beverage within the setting. The problem presented with single-use coffee cups is the waste created when the cup has served its purpose. In the UK alone, it is estimated that less than 1% of cups are recycled, with the majority being sent to landfill. The landfill is the preferred choices for many other countries, whereas others incinerate the waste - both are thwarted with environmental problems as leakage into the ground or air poses an ecological challenge. The limiting waste options are created as an entanglement of materials in the single-use cups production results in the recycling option being limited due to being classified as contaminated waste streams. Most cups are created with paper-board but commonly lined with a polyethylene (PE) coating to prevent liquid leakage.

Designers have been creative in working towards a solution to this waste problem, from creating edible single-use cup made from a biscuit mix to creating cups that compost. These solutions are fraught with their own problems from spoiling the taste of the beverage, to the requirement that the cups are sent to industrial compost facilities that can ensure they compost in specific conditions.

In my cross-disciplinary research, I am working closely with a Chemistry scientist who is exploring new biodegradable plastics that will both perform highly within single-use coffee cups and degrade under mild conditions – preferably using home-composting systems. This co-configuration of materials is vital for items that are used widely, where small (but significant) technological advances can make larger positive environmental impacts. This presentation will discuss the barriers and drivers for change for the replacement of the currently non-degradable plastic lining in coffee cups with more sustainable materials.

The transparency problem – Tacit dimensions of design

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We as designers conceive of and create the technical world we are surrounded by. When predicting, promoting and shaping socio-technical change, an important question in both

Design Research and Science, Technology & Society Studies (STS) is how socio-technical configurations are shaped and how, in turn, they shape us.

These two disciplines have a lot in common: Both try to take into account people and things at the same time instead of looking only at one of the two. Bearing in mind that users and objects configure each other, it is remarkable how much our creative process is guided by the language and the metaphors we use, and in what various ways they stimulate design processes.

However entangled the world of artifacts – the technical world – and the social world may be, it is hard to put a finger on the invisible ways in which objects guide our behaviour. Because most of the countless interactions with physical objects that happen every day flawlessly dissolve in our usual behaviour, so we are hardly aware of these interactions. Brushing teeth, making a phone call, eating, washing our hands, driving a car, riding a bicycle, using public transport, working on a computer, writing texts – the only occasions when one of these interactions surfaces in our conscious awareness is when the interaction is either unexpectedly joyful or when there is an interruption in our intended flow of actions: a bottle seems impossible to open, an automatic door does not slide open as expected, I cannot operate the elevator because I am carrying groceries in both of my hands, buying a ticket at the ticket machine is so complicated or takes so long that I miss my bus. Most of the time the user knows what she is expected to do with certain objects, she can read the affordances in her surroundings. But how is this kind of communication possible? How come I seem to understand what things are trying to tell me?

How are affordances designed into objects? Still, this concept needs the responding human being to be able to read or perceive what things are able to tell them. Therefore, ways of knowing and forms of (tacit) knowledge are of great interest for designers. How is knowledge “distributed” between objects and users? This will lead to discussing the possibilities for and responsibilities of designers, who obviously are able to design that process of „Translation“ (Latour).

Observations, short videos and photos of everyday interactions will help explore certain aspects of the phenomenon under investigation and relate the findings to the broader discourses in Design, Design Research and Science, Technology & Society Studies.

Railway Bridge as an Actor-Network Node: Historical Case Study of Design, Development, and Sustainability of the Railway Network along the Mura and Drava river regions

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We wish to describe the story of the railway bridges' design and sustainability across the Mura and Drava regions in four countries: Austria, Slovenia, Croatia, and Hungary. Railway

lines in these Mura and Drava river regions opened from 1857 until 1924. Specifically, we are considering more in detail the missing cross-border railway bridge in Gornja Radgona and Bad Radkersburg, which was mined at the end of World War II. These railway lines form a network that we will call the Mura-Drava-Railway network. In 1924 Mura-Drava-Railway network had an estimated 440 railway kilometres. Today, in 2021, two missing links in an estimated length of twelve railway kilometres prevent the Mura-Drava-Railway network from being formed, reformed, and to perform in its whole again. The former missing link is before mentioned bridge and the latter is the Slovenia-Hungary cross-border railway section between Lendava and Rédics.

We will trace a discursive and a visual layer and the multidimensionality and simultaneously versatile agency of the railway bridges in the Mura-Drava-Railway network. We will use Actor-Network-Theory to form an actor-network of analysed railway bridges. With this historical case study, we will analyse the existing network of railway bridges and the influence of its designs on the upgrades, electrification and automation, maintenance, and accordance with the modern standards for passengers and freight railway transport. Additionally, we will assess the impact of current railway bridges and this one missing cross-border bridge in the Mura-Drava-Railway network on its regions' sustainable development.

To assess the impact of these current bridges and the one missing on the sustainable development in the Mura and Drava river regions, we will use strategic and political dimensions, normative ones, and analytical ones as part of our case study analysis. By standard design, railway bridges are supposed to have a special case to be mined in the case of war. Several bridges in the Mura-Drava-Railway network have been mined in World War II. Except for the bridge in Gornja Radgona and Bad Radkersburg, all other railway bridges in these regions have been re-constructed.

Our discussion of these bridges in the Mura-Drava-Railway network's current settings will connect and contribute to strengthening the intersections of Design Research with Actor-Network-Theory and Science and Technology Studies, Sustainability and Anthropology of Transport Infrastructure.

Cars for Future? Imaginaries of (Auto)Mobility by technical scientists

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The climate-damaging emissions from road traffic and other social and ecological problems associated with traffic point to the necessity of turning away from individual automobility and a socio-ecological transformation of mobility systems. This includes political as well as socio-economic and cultural changes. The role of actors from the field of technology is central to this but has so far been underestimated in transformation research and literature. We therefore analyse the extent to which technical scientists contribute to the stabilization of the automotive system, while at the same time forming a basis for institutional change and providing technological and social corridors for

transformation. To this end, we bring together theoretical approaches from the fields of transition and transformation studies as well as science and technology studies and engineering studies. The qualitative analysis is based on sixteen expert interviews with technical scientists from the fields of vehicle technology and transport studies working at Austrian universities, universities of applied sciences and non-university research institutes. On this basis, we examine ideas and expectations about the future of the (auto)mobile system and the understanding of sustainable mobility among technical scientists and show at which level a transformation is argued for a development towards sustainable mobility. In the course of this, we show the scientific approaches, social positioning and basic assumptions of technical scientists. We identify both persevering forces and entry points for a transformation and discuss how they can (re)define their role for a socio-ecological transformation.

Although the analysis reveals a differentiated picture of technical scientists and their ideas, persistent forces predominate which have a stabilising effect on the system and thus block rather than promote approaches to social-ecological transformation. We therefore consider a change in the role of technology scientists in the transformation of the mobility system to be necessary.

The points of entry could be a changed self-image and a repositioning in society. A new paradigm in the technical sciences is necessary, in which technical-scientific actors must open up to social processes and negotiations. The understanding of research in the technical sciences, their own role and positioning in society and must be reflected, questioned and redefined in order to make existing power relationships visible and to be able to break them down. Furthermore, participatory processes in cooperation with organised civil society actors should be promoted and intensified. This will also enable the democratic anchoring of (technical) scientific knowledge production and practice.

Human demands of sustainable aviation: contributions of feminist STS to aeronautical engineering

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Both globalization and individualization have led to a continuing increase in global air traffic. At the same time, climate change has created a substantial need for sustainable mobility offers. Young people, particularly the ones who sympathize with or even actively participate in movements like ‘fridays for future#, ask for energy-efficient, preferably zero-emission concepts to meet their mobility demands. In order to deal with these contradictory requirements, engineering projects largely aim at technological innovation. In this context, assumptions on the meaning of sustainability often remain implicit. Moreover, actual needs of human actors affected by recent and future development of aviation are hardly taken into account.

In order to close or at least reduce the mentioned knowledge gaps within aviation engineering, we regard feminist Science and Technology Studies (Akrich 1992, 1995; Berg

1999; Cockburn, Omrod 1993; Hofmann 1999; Wajcman 2004) as well as critical design research as rewarding approaches. With reference to that, we would like to present and discuss the methodological approach we apply in our research project on human demands of sustainable aviation. The project is embedded in a larger research cluster funded by the German Research Foundation (DFG) in which different university and non-university research institutes take part. Our project aims to give an answer to the question: How can feminist Science and Technology Studies and related research fields contribute to aeronautical engineering considering socio-ecological demands of aviation? For this purpose, we use the practice-based ontological design approach proposed by Nold (2018) as an overall research framework. Following the notion of ontologies as socio-material realities that emerge out of a co-construction of science, technology and social actors, it aims at sensitizing researchers and developers for multiple perspectives by using methods from ethnographic and participatory design research. With reference to feminist Science and Technology Studies taking a stand for marginalized perspectives, this framework allows us to explicitly shed light on affected, but overlooked humans in order to include their requirements in the engineers' knowledge base and decisions. According to Nold's approach, we organize our research into three steps:

1) First, we analyze the given ontological infrastructure of the overall research project, namely the applied instruments and metrics the engineers use to measure and predict future aviation scenarios, with regard to their tacit notions of sustainability and underlying assumptions of social requirements.
2) Second, we investigate passengers' and residents' different desires and demands of sustainable, safe, reliable and low-noise aviation in order to contrast and challenge engineers' concepts of sustainability.
3) Third, the qualitative findings will be implemented within the engineers' quantitative metrics and tools in order to become part of their simulation and optimization models targeting future sustainable aviation.

By referring to our project as a case study, we would like to discuss how feminist Science and Technology Studies can contribute not only to reveal shortcomings and blind spots of technological concepts and approaches, but also to democratize technological innovation processes with regard to urgent social and ecological challenges.

Pathways to Addressing the Sociocultural Issues affecting Sustainable Energy Consumption and Maintenance of Nigerian Electric Energy Infrastructure

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Nigerian governments have over the years made several attempts to solve electrical energy problems that have plagued the nation for several decades. Despite the heavy investments, privatization and other far reaching policy improvements made to address the problems, the country is still suffering from epileptic energy supply due to frequent breakdowns and other related issues. This study examined the sociotechnical factors affecting energy consumption and maintenance of energy infrastructure in Nigeria. The

goal of the study is to identify effective sustainable changes that could be made to address the perennial problems. The methodology of the study involved an intensive literature survey and site observations. There was also a survey of trends in government energy policies and investments in energy programs/infrastructures both at the Federal and State levels. Information were gathered from government and energy agencies websites and thoroughly studied. In addition, trends in attitudinal/behaviour changes with regard to energy use by consumers and attitudinal/behaviour changes in technicians involved in repairs and maintenance of Nigerian energy infrastructure were examined. Preliminary results from the ongoing study showed a significant attitudinal problems in form of not paying electricity bills, leaving the light on even in broad daylight when it is of no use, equipment theft, illegal connections, bribery of electric technicians and agency officials, carefree attitude and lack of attention to quality in maintenance, acquisition of aging and outdated equipment. Identified solutions to the problems include consistent public education on the need for sustainable energy consumption, citizens mobilization and empowerment to resist unscrupulous technical officials against illegal connections and theft, reorientation and retraining of electrical technicians on a regular basis, and investment in participatory design and production of electrical equipment of locally appropriate size and technological complexity. It is believed that implementation of these recommendations will go a long way in solving, or at least ameliorating, the Nigerian electric energy situation.

Designing robots: of explicit genderlessness and queer potentials
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In the context of the H2020 project GEECCO four literature studies were produced last year. The studies each summarize the state of knowledge and the most important discourses from women's studies, feminist research and gender studies from four different fields of research: energy, mobility, Human-Computer-Interaction (HCI) and robotics.

Against the background of these literature reviews I would like to reflect on the following questions: What are the most important similarities but also differences in these discourses? How does robotics differ fundamentally from the other research areas? Which options for the design process of robots result from this?

Stream H: Sustainable Food Systems

Session H.1: Transforming the food system

Chairs: KARNER, Sandra[1]; PATAKI, György[2]
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The future of the European food sector: Trends and scenarios

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Food value chains include all stakeholders who participate in the coordinated production and value-adding activities from the cultivation of agricultural commodities to the final consumer goods embracing intermediate steps like packaging, logistics and sale. These value chains are increasingly challenged concerning their role in reaching the sustainable development goals. A certain profitability in all stages is needed to ensure economic sustainability, wide benefits to society will contribute to a social sustainability and environmental sustainability needs positive or neutral impact on natural surroundings and natural resources. These diverse demands have different effects throughout the different stages of the food value chain, for example, environmental aspects play an important role in agricultural practice, but to a lesser extend at the stage of selling products.

Societal, technical, ecological, economic and political trends influencing the different stages of the food value chain are identified and their interactions between each other are analysed using an influence analysis. In this study, we argue that the various trends can have a reinforcing, but as well mitigating effect on the food chain, which needs to be considered when thinking about the future development of the food sector in 2035. Furthermore, some developments have a greater influence on certain stages of the value chain, while others affect the whole system.

Following the systematic of a holistic innovation system approach we understand the food value chain embedded in a bigger system of institutions, politics, infrastructure, socio-cultural context and various actors from society, science, finance, education, economy and public sector. Therefore, we not only investigate trends directly related to the food value chain, but as well those beyond and in this point in time not obviously related to it. For example, we looked at the trends "Blockchain and Smart Contracts", "A.I. and Machine Learning" as well as on "Local Food Circles" or "Vooking/Vegan/Gluten free" with their different levels of proximity to the food sector.

Depending on how strongly the different trends actually unfold in the coming years, it will have a great impact on the developments within the food value chain. Different future scenarios, derived from these trends will show alternative frameworks, their impact on the future value chain and the whole food sector in the year 2035. These alternative scenarios will be used in context of the FOX (Food processing in a Box) project in order to evaluate

different food processing technologies within the scope of the identified future world. More than 25 European partners are working together in this project to transform complex large-scale industrial applications for processing fruit and vegetables into small, flexible and mobile local production units. These innovative technologies are more resource-efficient and take greater account of seasonal product availability and consumer demand. In addition, the expectations of farmers, small food businesses as well as the needs of the entire food chain and consumers play an important role in the project.

Boosting a sociotechnical niche through broad public consultation. Insights from the Senegalese agroecological niche

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Agroecology is considered by many scholars as a promising approach to make agriculture and food systems more resilient and sustainable. Despite the profusion of small-scale initiatives, broad agroecological transition is still hindered by deep lock-in phenomena and path dependency. In this communication, we report empirical findings from on a one-year participatory observation research within the Senegalese 'agroecological niche', at a very crucial moment of its journey. When we started our research, the niche was composed of heterogeneous stakeholders, networks and platforms, each developing their own projects and agenda. All agreed that more synergies and strong policy changes would be necessary to unlock agroecological transition in Senegal. However, they couldn't join forces and come up with uniform policy messages due to low organisational capacities, competition between sub-groups and lack of shared vision on the conceptual foundations of agroecology. In May 2019, niche actors have eventually decided to gather within a unique Alliance in order to conduct an advocacy strategy. This alliance was called DyTAES (French acronym for "dynamic for an agroecological transition in Senegal").

The first action of DyTAES was to carry a broad consultation of rural actors throughout the whole country. From August to October 2019, a team composed of DyTAES members has conducted field visits, focus group discussions and participatory workshops within the 6 agro-climatic regions of Senegal. In each region, their sought to: (i) capture the main challenges and difficulties experienced by Senegalese farmers; (ii) identify grassroots agroecological innovations; (iii) collect the policy recommendation of the communities.

At the conclusion of this process, niche actors had aligned and stabilized their policy discourse around two major claims addressed to the Senegalese Government: (i) creating a national arena for policy dialogue involving public administration, civil society and researchers, in order to build an agroecological transition policy; (ii) Supporting and funding real-size experiments in pilot territories, in which ground actors would design and implement their own 'territorial agroecological transition plan'. These claims were indicated in a report that was directly addressed to the Senegalese Government, and published on the occasion of an event called 'The Agroecology Day' (January 2020).

Thus, within a very short period of time (around 6 months), the Senegalese 'agroecological niche' has gained considerable momentum. The consultation process played a key role in the niche structuring: (i) it strengthened the linkages and improved mutual trust among niche actors; (ii) it enabled vision alignment on the main practices and values embodied in agroecology; (iii) it prompted new alliances, thus broadening the niche's boundaries; (iv) it increased the visibility of the Senegalese agroecological movement at both national and international levels; (v) it provided legitimacy and weight for the agroecological movement and its ideas; (vi) it provided a stepping stone for rising political leaders who embodied the niche's values.

The major role played by the consultation process in the niche strengthening should be discussed in the light of the literature on strategic niche management and transition management.

Tools in the Making: Breeding Crops for Gender Equality in African Agriculture?
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African women farmers have often been overlooked or disadvantaged by crop breeding programmes, despite their essential contributions to agriculture. This has led to the development of crop varieties that are less adapted to the needs and preferences of women, thus contributing to maintaining gendered inequalities and disadvantages. Consequently, actors in international agricultural research and development have started to promote the need for gender-responsive crop breeding. In 2020, the CGIAR Gender and Breeding Initiative (GBI) piloted two gender-responsive crop breeding tools (the G+ Tools) in several African-based breeding programmes. Many questions exist about the nature and effectiveness of such an approach in making technological innovation more gender equitable. In this paper, I assume a praxiographic approach and a feminist science and technology studies (FSTS) sensibility to "follow the tools" in their construction, circulation and use. I analyse their performative roles, paying particular attention to how gender becomes enacted in the process, making the case for a co-constructive understanding of gender and crop breeding. As such, I contribute to the field of FSTS by demonstrating the fruitfulness of expanding its onto-epistemological scope to include the relatively unexplored area of crop breeding for development in an African context.

Agri-food Regime dynamics, technoscience and sustainability transition politics in Greece
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The agri-food socio-technical system faces increasing challenges during the last decades due to its unsustainable features. Since the mid-90s, landscape pressures from the EU to the agri-food regime have manifested as challenges, namely food security, climate change and loss of biodiversity. Researching their effect in Greece, we study the cases of wheat and olive oil as two domestically emblematic agricultural products with cultural and

political dimensions in the Greek society. The key research questions of the paper are: How incumbent actors have appropriated pressures and responded to current challenges that the regime is facing? How niche actors fashioned their alternative pathways towards their integration in the regime and its transformation? We argue that the validity, credibility and viability of science and innovations are co-produced with meanings of sustainability that gives political legitimacy and power and configure incumbency in the case of the two products. We stress that the material entanglements of sustainability contribute substantially in the transition politics and the making of transition pathways. While we study the two products as two separate cases their contribution in the agriculture production, their extensive cultivation and the common themes we address would empower us to provide insights about the Greek agriculture regimes dynamics and the configuration of transition pathways.

Wheat and olive oil are examined as valuable elements of the Mediterranean diet and the two major cultivations of the Greek agri-food regime by area. This is done by focusing on each system's dynamics, their critical challenges and diverse paradigms of agri-food niche-innovation. Both wheat and olive are cultivated in large monocultures of increased inputs and increasing mechanization. Selection of specific varieties has marginalised others. Climate change has a significant impact upon the health of these cultivations due to unusual draughts or heavy precipitation in critical developmental stages of the plants.

Similar responses have emerged to the shared challenges of crop yield increase, consumer demand for safe and quality products, minimised environmental impact and decreased outputs. Pinpointing their critical aspects, we examine the introduction of adapted seed varieties, of precision and smart technologies, as well as alternative modes of production like organic agriculture.

This study draws from interviews of state actors and stakeholders and other primary and secondary sources (special press, technical literature, scientific journals, regulations, and EU and state reports) following a critical view of the MLP approach, by highlighting issues of governance as fundamental themes in sociotechnical transitions (Smith et al, 2005; Stirling, 2018).

Transforming the Bulgarian food system – from organic food production to re-inventing traditional food technologies and taste

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The case study presented is of a successful Bulgarian food company Harmonica exemplifying the ongoing transformation of the national food system initially started as a small organic yogurt brand meanwhile transnational operating business in over 20 countries in Europe, Asia and the Middle East.

Through the prism of a proposed socio-technical interpretation of the economic approach of so-called global value chains (Gereffi) the process of creating new food production and

consumption practices is described. Considering the synthesis of the environmental, social and technological dimension through the competences of the involved actors in the innovation process of a start-up business, an example is given for the generation of not only an economic value, but re-inventing traditional food technologies and taste.

Thus, the embeddedness (Granovetter) of the food chain transformation in the local political, social, economical, technological and environmental context is exemplified. Surprisingly the sustainable values are seen only as a necessary, but not sufficient condition for the innovation process. The re-construction and re-invention of the traditional food taste (on the demand side) coupled with applying traditional craft technologies (on the supply side) gained much more significance in changing social practices, thus fostering social innovations and entrepreneurship not only in the food sector.

Diverse Economies of Sustainable Food. Transformation in Practice

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The disaster of capitalist agribusiness and food industries is becoming ever more painfully visible. At the same time, alternative practices abound. Organic production within existing market structures may still be the dominant "alternative", yet there's many other promising developments, including community supported agricultures, cooperative farmer's outlets and distribution schemes, direct marketing platforms, food coops, sharing hubs and zero-waste activism. Whether they be organized as social businesses, informal cooperations or formal cooperatives, or as gift economies reaching beyond the market – what these alternative food networks (AFN) share is a different set of values, aimed at promoting sustainability and the common good, and a different way of doing things, in a solidary and cooperative fashion. It is in this our most original economic metabolism with nature where obviously much of today's social innovation is taking place, beyond capitalism and tradition.

In our contribution, we shall emphasize and endorse these developments from a "diverse economies" perspective (Gibson-Graham 2008[1]). By performing in our account the reality of these "other economic worlds", we aim at supporting their realization, as scholars. This post-structuralist, post-capitalocentric perspective is being mirrored by a practice-theoretical approach to transformation. In the empirical accounts we provide, we show how people, in practice, go about collectively enacting their ideals, while still pragmatically relating to existing institutional arrangements. Again, we shall endorse this crudity and hybridity as evidence for the possibility of change – and for the potential to still do better. In our closing outlook we shall introduce a current project ("CoopsForFood") that focuses exactly on that potential, in an effort to make existing AFNs more socially inclusive, efficient and broadly available as an "alternative mainstream".

[1] Gibson-Graham, J.K. (2008). Diverse economies: performative practices for 'other worlds'. Progress in Human Geography, 32 (5), 613–632.

Food Security policy recipe: challenge of a transformational policy approach

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Hunger and malnutrition are not a new challenge in global, regional and local agendas. A broad variety of actors on different levels and with different expertise are involved in looking for a "food security recipe". Despite of celebrated positive trends in hunger and malnutrition eradication of the beginning of 2000s, officials recently reported a recurrent increase of people suffering from food insecurity. The limits of the current policies and technologies are reached. One way out of this dilemma is seen in a transformational approach to a more holistic policy design that represents the focus of this contribution.

The bias and discrepancies in today's policy designs towards Zero Hunger, which result in asymmetries and a worsened Food Security situation in many developing countries in the present are rooted in the past. It is pivotal first to gain a deeper understanding of underlying ideas, beliefs, goals, approaches, instruments, which form a Food Security paradigm and thus shape the policy response. By means of an expanded historical investigation inquired through an analytical framework based on a modified policy belief system by Sabatier (1993) and embedded into the Hall's (1993) theory of policy paradigms and framework of ideational power, I reconstruct evolution of Food Security paradigms and policy designs between the end of World War II and today. Linking it furthermore to the four-level model of policy evaluation by Fischer (1993), I conduct an in-depth analysis of different structures of food policy arguments and the legitimation of food policy choices over time.

Based on findings drawn from the first stage, I argue that despite a heralded deliberative and democratically formulated Food Security policy approaches, de facto the food security policy designs are shaped by geopolitics and ideologies and are increasingly based on the use of technocratic policy expertise. Such approach is legitimised through the "regimes of truth" constructed by multiple players involved into policy making, and results in the technocratisation of the choice of policy instruments to achieve Food Security, rather than focusing on developing a more holistic policy design.

This contribution challenges the orthodoxy of positivist approaches to policy designs for Zero Hunger demonstrating that previous technological developments, shifts in policy approaches, and food crises did not give rise to essential changes in the Food Security paradigm. Therefore, the World Hunger Problem urges a transformational rethinking of policy design science towards a genuinely democratic and deliberative policy making approach, with greater attention to contextualised accordingly country or region specifics policy designing instead of fixing the problem through standardized technocratic instruments.

Assessing future of water supply and demand for agriculture, industry and energy sectors in Central Asia under ≥ 2.0°C regional climate change condition

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As the Central Asia region is more sensitive to climate change compared to the global average, the ground air temperature is predicted to rise from 1.4 °C to 3.5 °C by 2050. Climate models also indicate a possible change of normal annual precipitations in the range from -11% to +18%. These temperature and precipitation scenarios may affect future water withdrawals. The effect of these changes will vary by user sectors, depending on each sector's sensitivity of water withdrawals to temperature and precipitations. The agricultural sector is the dominant user, while the power sector is the largest industrial water user in Central Asia, accounting for 30-35%. Approximately 20-25% of freshwater withdrawals are used for energy purposes. This article analyses the current and future issue of water demand for agriculture, industry, and energy production in five Central Asian countries (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan) under climate change conditions. Through exploring resource scenarios, this article could assist policymakers in Central Asia in designing more effective eco-environment management plans and strategies in the face of climate change.