2nd European TA Conference The Next Horizon of Technology Assessment

Book of Abstracts







Welcome to Berlin

THE NEXT HORIZON OF TECHNOLOGY ASSESSMENT

2ND EUROPEAN TA CONFERENCE BOOK OF ABSTRACTS



This publication was prepared as a part of the framework of the EU-funded Parliaments and Civil Society in Technology Assessment (PACITA) project. www.pacitaproject.eu



What is the next horizon of Technology Assessment? This striking question will set the scene for our 2nd European Conference within the PACITA project from February 25th-27th 2015 in Berlin. Not only does this question take on many aspects of TA, it also implies an element of self-reflection and spaces for discussion on where TA is headed and what the future may behold. The conference wants to offer a platform for researchers, practitioners and policy-makers from around the world to be a part of three days of discussions, presentations, exchanges, networking and exploration.

Berlin, it seems, is the perfect spot for such an undertaking. A melting-pot of science, art, music, fashion and theatre in the middle of Europe, it offers a unique location for bringing together an international audience to discuss the future of TA as well as how to tackle the grand societal challenges for the coming years and beyond. Inter- and transdisciplinary approaches are key to these future challenges and require spaces of interaction.

In the current pressing situation in our societies, advanced and "better" science and technology are often pointed to as the way forward. Yet, at the same time it has become obvious that the challenges are also caused by science and technology as decisive driving forces. It seems today that societal problems and their possible solutions are seamlessly interwoven with science and technology. Concepts such as Responsible Research and Innovation (RRI) aim to incorporate these linkages with the intention to consider possible social or ethical dimensions at an early stage of development. This intricate interconnectedness of science, society and policy and the related decision-making problems are the central subjects of Technology Assessment. TA as a concept of interdisciplinary, problem-oriented research, policy advice (such as parliamentary TA) and public dialogue is intended to support society and policy making by understanding the problems related to the challenges and by assessing available options for managing them. The hope is to identify socially sound, "robust", resilient and practical ways of shaping the future.

Keynote Speakers

50 sessions over three days covering an array of disciplines, topics and research question promise to take on these questions. Reflecting TA's capacities to deal with the grand challenges not only includes insights into the scientific and technological developments involved. Besides analysing societal debates, conflicts and problems of decision making it is also necessary to reflect on concepts, methods and instruments in order to support democratic problem solving and decision-making processes. What kind of data, knowledge and dialogue do we need around decision making in our societies? What does it mean to support socially sound and robust ways of socio-technical development in terms of programs and projects, institutions and capacity building, methodology and knowledge transfer? Next to this, the conference also includes special formats that specifically address parliamentarians, policy-makers as well as practitioners.

The organisers of the conference, the Karlsruhe Institute of Technology (ITAS/KIT), and the Technology Centre of the Academy of Sciences of the Czech Republic (TC ASCR) would like to thank all chairs and speakers for their valuable contributions to the conference. Only through this is it possible to offer a conference that speaks to many participants and takes on important and relevant questions. Our hope is that these will be fruitful and enriching days in Berlin during which we reunite with old friends, make new ones and engage in fruitful discussions and inspiring exchanges.

Julia Hahn, Lenka Hebáková, Leonhard Hennen, Tomáš Michalek, Constanze Scherz and Stefanie Seitz (Conference Organisers)

> Lars Klüver (PACITA Project Coordinator)

Technofideism and Climate Change Naomi Oreskes

Naomi Oreskes is Professor of the History of Science and Affiliated Professor of Earth and Planetary Sciences at Harvard University. Her research focuses on the earth and environmental sciences, with a particular interest in understanding scientific consensus and dissent. Her 2004 essay "The Scientific Consensus on Climate Change" (Science 306: 1686) has been widely cited, both in the United States and abroad, including in the Royal Society's publication, "A Guide to Facts and Fictions about Climate Change," in the Academy-award winning film, An Inconvenient Truth, and in Ian McEwan's novel, Solar. Professor Oreskes 2010 book, "Merchants of Doubt, How a Handful of Scientists Obscured the Truth on Issues from Tobacco to Global warming", co-authored with Erik M. Conway, was shortlisted for the Los Angeles Time Book Prize, and received the 2011 Watson-David Prize from the History of Science Society.

Technology Assessment as Political Myth? Roger Pielke, Jr.

Roger Pielke, Jr. has been on the faculty of the University of Colorado since 2001 and is a Professor in the Environmental Studies Program and a Fellow of the Cooperative Institute for Research in Environmental Sciences (CIRES). His research focuses on science, innovation and politics and in 2011 he began to write and research on the governance of sports organizations, including FIFA and the NCAA. He is also author, co-author or co-editor of seven books, including "The Honest Broker: Making Sense of Science in Policy and Politics" published by Cambridge University Press (2007). His most recent book is "The Climate Fix: What Scientists and Politicians Won't Tell you About Global Warming" (2010, Basic Books).

Overview of Sessions

ROOM NAME	Wednesday, 25th February 2015		Thursday, 26th February 2015			Friday, 27th February 2015	
	3:30 PM - 5:00 PM	5:15 PM - 6:45 PM	10:30 AM – 12:30 AM	2:30 PM - 4:00 PM	4:30 PM - 6:00 PM	9:00 AM - 11:00 AM	11:15 AM - 12:45 AM
Berlin	A1		C1 NTA		E1 Plenary Session	F1 NTA	G1 NTA
Prague	A2 NTA		C2 Seminar	D2 Panel Discussion		F2	G2 Panel Discussion
Lisbon	A3 PACITA Workshop	B3 Panel Discussion	C3 World Café	D3 Round Table		F3 Panel Discussion	G3
Vilnius	A4		C4 PACITA Seminar	D4		F4	G4
Sofia	A5 Seminar	B5	C5	D5		F5 PACITA Workshop	G5
Dublin	A6 Round Table		C6	D6		F6	G6
Liège	A7		C7	D7		F7	
Budapest	A 8	B8	C4 PACITA Dialog Forum	C4 Film Presentation		F8	G8 Panel Discussion

Table of Contents

- III Foreword: Welcome to Berlin
- V Keynote Speakers
- VI Overview of Sessions
- VIII Table of Contents

PARALLEL SESSIONS "A"

- 14 SESSION A1: Engaging Citizens in E-Participation and Policy Making on the National Level MICHAEL OPIELKA
- 16 SESSION A2 (NTA): Governance of Big Data and the Role of TA SERGIO BELLUCCI AND WALTER PEISSL
- 22 SESSION A3 (PACITA): Advanced Genomics in Health Care? Using TA to Design a Step-by-step Approach in EU Member States ANDRÉ KROM AND DIRK STEMERDING
- 24 SESSION A4: Experiences with Early Engagement Activities: The Problems of Pro-active Public Engagement JÜRGEN HAMPEL AND NICOLE KRONBERGER
- 34 SESSION A5: Responsible Research and Innovation – Governance and Policies RALF LINDNER AND NINA BRYNDUM
- 36 SESSION A6 (ROUND TABLE): Technology Assessment in East Asia: Experiences and New Approaches ANTÓNIO MONIZ, GO YOSHIZAWA AND MICHIEL VAN OUDHEUSDEN
- 38 SESSION A7:
 E-Infrastructures for Technology Assessment MICHAEL NENTWICH
- 44 SESSION A8: Assessment of Knowledge Production in Responsible Research and Innovation CHRISTIAN BÜSCHER AND ANDREAS LÖSCH

PARALLEL SESSIONS "B"

- 50 SESSION B3: Soil Technologies: A Need for More Responsible Soil Management TOMÁŠ RATINGER, TOMÁŠ MICHALEK AND GEERTRUI LOUWAGIE
- 60 SESSION B5: Integrated Approaches in Technology Assessment NILS HEYEN AND RASMUS NIELSEN
- 64 SESSION B8: Public Engagement in Responsible Research and Innovation GEORG AICHHOLZER

PARALLEL SESSIONS "C"

- 70 SESSION C1 (NTA): Responsible Research and Innovation in Europe – First Lessons Learned MICHAEL DECKER AND STEPHAN LINGNER
- 76 SESSION C2 (SEMINAR): Evidence-Based Policy: Public Controversies and Expert Trustworthiness GEERT MUNNICHS AND ANNICK DE VRIES
- 80 SESSION C3 (WORLD CAFE): The Future of Responsible Research and Innovation: Drivers, Barriers, Contradictions, Timelines, Crossroads and Scenarios PETRA SCHAPER-RINKEL, SUSANNE GIESECKE AND PETER BIEGELBAUER
- 84 SESSION C4 (PACITA): The Future of Ageing – Next Steps for Europe TORE TENNØE
- 86 SESSION C5: Security and Privacy Perceptions of European Citizens: Beyond the Trade-off Model MICHAEL FRIEDEWALD AND JOHANN ČAS
- 92 SESSION C6: RRI within Global Innovation Regimes: Producer Ethics, Consumer Freedom and Practices of Regulation ARND WEBER AND ULRICH DEWALD
 - SESSION C7: Approaching Synthetic Biology for Societa

98

Approaching Synthetic Biology for Societal Evaluation and Public Dialogue STEFANIE B. SEITZ

102 SESSION C8 (PACITA): Debating Future Citizen Engagement in European Policy-Making MARIE LOUISE JØRGENSEN

PARALLEL SESSIONS "D"

- 104 SESSION D2: The Importance of Strong Science Journalism in TA ANTOINETTE THIJSSEN AND JOOST VAN KASTEREN
- 106 SESSION D3: The Role of Research Evidence in Improving Parliamentary Democracy CAROLINE KENNY
- 108 SESSION D4: Robotics Technology Assessment: New Challenges, Implications and Risks? ANTÓNIO B. MONIZ AND MICHAEL DECKER
- 110 SESSION D5: Policy Making in a Complex World: The Opportunities and Risks Presented by New Technologies TIMO WANDHÖFER, SOMYA JOSHI AND STEVE TAYLOR
- 116 SESSION D6: Technology-Based Care Practices – A Critical Exploration in the Field of Elderly Care LINDA NIERLING AND BETTINA-JOHANNA KRINGS
- 122 SESSION D7: Indicators in Technology Assessment – Passive Choices or Reflected Options? NUNO BOAVIDA AND STEFAN BOESCHEN
- 130 SESSION D8 (FILM): Interactive BIO•FICTION Film Lounge WOLFGANG KERBE AND ANTONINA KHODZHAEVA

PLENARY SESSION "E"

132 SESSION E1: What's Next for TA? Experiences, Perspectives, Outlooks MILTOS LADIKAS, CONSTANZE SCHERZ AND JULIA HAHN

PARALLEL POSTER SESSIONS

- 134 POSTER CORNER 1: PACITA Project Results LEO HENNEN
- 140 POSTER CORNER 2: TA Projects MAHSHID SOTOUDEH
- 150 POSTER CORNER 3: TA Around the World CONSTANZE SCHERZ

PARALLEL SESSIONS "F"

- 158 SESSION F1 (NTA): Horizons and Incentives for Technology Assessment BETTINA RUDLOFF
- 162 SESSION F2: Visions of Technology Assessment (A Panel Discussion with Kick-Off Statements) KNUD BÖHLE, ARIANNA FERRARI, ANDREAS LÖSCH AND CHRISTOPH SCHNEIDER
- 166 SESSION F3: Responsible Research and Innovation for Energy Transitions GERHARD FUCHS AND JENS SCHIPPL
- 174 SESSION F4: Public Participation for Complex Policy Problems – Challenges and Recommendations ANNICK DE VRIES AND ARNOUD VAN WAES

180 SESSION F5 (PACITA):

Teaching, Learning and Engaging in, through and about Technology Assessment – Theoretical and Practical Perspectives on Teaching and Learning Dimension of Technology Assessment for Involved Actors BENEDIKT ROSSKAMP AND MAHSHID SOTOUDEH

182 SESSION F6:

Technology Assessment of Human Cognitive Enhancement JAN ROMPORTLAND ELLEN-MARIE FORSBERG

186 SESSION F7:

Potentials and Challenges of a Prospective Technology Assessment WOLFGANG LIEBERT, BERND GIESE AND JAN C. SCHMIDT

194 SESSION F8:

Beyond the Developed World: What Role for Participatory TA in the Energy Planning Processes of Developing Countries? WOLFGANG KERBE AND ANTONINA KHODZHAEVA

PARALLEL SESSIONS "G"

200 SESSION G1 (NTA): Varieties of Technology Governance and Opportunities for Technology Assessment STEPHAN BRÖCHLER AND BJØRN LUDWIG

206 SESSION G2:

Trajectories of Technology Acceptance: From Innovation to Operation – Exploring the Role of RRI and Social Licence to Operate NINA HALLAND JUSTINE LACEY

210 SESSION G3:

Drilling Deep for Heat: Chances and Challenges of Deep Geothermal Energy CHRISTINA TOBLER

212 SESSION G4:

Mobilizing TA for Responsible Innovation: Philosophies, Ethics and Stakeholders HARRO VAN LENTE, TSJALLING SWIERSTRA AND PIERRE-BENOIT JOLY

218 SESSION G5:

Horizon Scanning: Giving Policymakers the Long View JONATHAN WENTWORTH

222 SESSION G6:

Complementarity between Health Technology Assessment and Parliamentary Technology Assessment MARIA JOÃO MAIA AND GREGOR WOLBRING

228 SESSION G8:

Governance Networks – Fit for the Future? CHRISTINA MERZ, ANIKA HÜGLE AND SOPHIE KUPPLER

SESSION A¹

ROOM: BERLIN, WEDNESDAY, 3:30 PM - 5:00 PM

Engaging Citizens in E-Participation and Policy Making on the National Level MICHAEL OPIELKA (INSTITUTE FOR FUTURES STUDIES AND TECHNOLOGY ASSESSMENT)

AGENDA

The Study Commission "The Internet and the digital Society" in Germany BRITTA OERTEL (INSTITUTE FOR FUTURES STUDIES AND TECHNOLOGY ASSESSMENT)

People's Assembly in Estonia

- Crowdsourcing Solutions for Problems in Political Legitimacy HILLE HINSBERG (PRAXIS CENTRE FOR POLICY RESEARCH)

Visualising the UK General Election 2015 TV Debates GILES MOSS (UNIVERSITY OF LEEDS)

Engaging Citizens in E-Participation and Policy Making on the National Level

Chair: Michael Opielka

Session Description

Participation in the strict sense of the term means the active involvement of citizens in handling common (political) affairs. The typical goal of participation processes or procedures is the early recognition of elements for which the opportunities and dangers could be controversial and various hopes and concerns exist among different interest groups: Who will be among the "winners" and who will be the "losers" from processes of change? How can the different views of problems, bodies of knowledge, interests and interpretations of complex political situations from those affected and interest groups be fruitfully brought into public discussions in general and political decision-making processes in particular? The importance of online applications and social media in this regard is growing, and is also changing public dialogue processes and the work of political actors. The session presents new directions towards participation by the public.

In Estonia, The People's Assembly Rahvakogu (www.rahvakogu.ee) is an online platform for crowd-sourcing ideas and proposals to amend Estonia's electoral laws, political party law, and other issues related to the future of democracy in Estonia. The Assembly focuses specifically on five questions: the electoral system, political parties, competition between the political parties and their internal democracy, financing of the political parties, strengthening the role of civic society in politics between the elections, and stopping the politicization of public offices.

In the UK, televised leader debates are expected to take place during the general election in 2015. The Election Debate Visualisation (http://edv-project.net/) project is investigating new ways for citizens to experience, evaluate and engage with these debates. The project is developing a web application and video replay platform which will offer new debate visualisations, novel analytics on the argumentation and new forms of citizen feedback.

In Germany, the youngest example of this in Germany is the study commission "The Internet and the digital Society" for preparations of decisions on wide-ranging and significant issues in this field. The German Parliaments constituent resolution for the study commission in 2010 insisted that the commission offered possibilities for participation which would permit suggestions from the public to be incorporated into the work of the Commission in appropriate form. (www.internetenquete.de)

The session will share insights and experiences with citizen centric e-participation projects in Europe. Its' focus is on national Parliaments and today's approaches to inform and involve citizens in political dialogue and policy-making.

SESSION A²



ROOM: PRAGUE, WEDNESDAY, 3:30 PM - 6:45 PM Session organized by the Network TA

Governance of Big Data and the Role of TA SERGIO BELLUCCI (TA-SWISS) AND WALTER PEISSL (INSTITUTE OF TECHNOLOGY ASSESSMENT)

PART 1

Big Data: Trends, Opportunities and Challenges LYDIA HARRISS (PARLIAMENTARY OFFICE OF SCIENCE AND TECHNOLOGY)

Assessing Big Data – Experiences from Germany TIMO LEIMBACH AND DANIEL BACHLECHNER (FRAUNHOFER INSTITUTE FOR SYSTEM AND INNOVATION RESEARCH)

"If I Only Knew Now What I Know Then..." – Big Data or Towards Automated Uncertainty? STEFAN STRAUG (INSTITUTE OF TECHNOLOGY ASSESSMENT)

PART 2

How Should We Govern the Algorithms That Shape Our Lives? ROBINDRA PRABHU (NORWEGIAN BOARD OF TECHNOLOGY)

The Quantified Human: On the Digitalisation of Illness and Health STANS VAN EGMOND AND MARJOLIJN HEERINGS (RATHENAU INSTITUTE)

Big Data in the German Press: Analyzing Coverage Patterns ANTONINA KHODZHAEVA (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

Governance of Big Data and the Role of TA

Chairs: Sergio Bellucci and Walter Peissl

Session Description

Big Data is "the" buzz word nowadays. It is supposed to do everything: help farmers find the right seed, provide early warning for epidemics, and facilitate crime prevention. Prevention and forecast are the main directions of thinking with regard to Big Data. Taking all data available, scan, merge and interpret them and shape the future/decision making on the basis of existing (past) patterns.

- What does the change into a "society of probabilistics" mean?
- What does this imply for politics?

Questions like the above lead to the guiding questions of the session: "What makes an issue relevant for TA?" and "How can huge and complex problems/topics such as "Big Data" be addressed and operationalized for a knowledge-based policy advice in TA?"

This session will concentrate on problem definition, discussion of the actual demand for knowledge and the TA-relevance of the issue in different contexts.

Big Data has already been dealt with in different TA-studies. Some studies are more technologybased, but normally they deal with the complex relation between high expectations and potential undesired impacts of the technology on society. This leads to a need for regulation and discussion of ethical issues (privacy, data protection) that affect individuals and society as a whole.

Presentations during the session will examine the policy and TA-relevance of Big Data and the knowledge that can be provided by TA.

Big Data: Trends, Opportunities and Challenges Lydia Harriss

There has been an unprecedented increase in the quantity and variety of data being collected, stored, copied and analysed. In 2013 there were an estimated 4.4 trillion gigabytes of data globally, equivalent to approximately 120 DVD movies for every person on the planet. The total amount of global data is predicted to grow by about 40% year on year for the next decade. This rapid increase in the availability and complexity of data has led to the term 'big data', which broadly describes data with characteristics that make collection, processing, analysis or interpretation a challenge.

In 2014, the UK's Parliamentary Office of Science and Technology (POST) undertook a suite of work exploring how big data is being applied across a range of areas, such as business, health, policing, transport and research. This talk will give an overview of insights gained from our work, including: factors driving the growth of big data; how big data is being used to understand human and system behaviour and to develop new products and services; and the technical, ethical and policy issues that it raises.

Assessing Big Data – Experiences from Germany

Timo Leimbach and Daniel Bachlechner

Although big data experienced a high level of attention recently, a short review of articles and public debates reveals strong ambiguities and uncertainties. Besides much confusion about the question what big data actually is, often its potentials, for better and for worse, as well as its limitations are mashed up. Moreover, it often lacks a clear differentiation from related concepts as well as an understanding what types of big data applications exist and how they are used.

Instead, big data is more often used as a cipher for the fears and concerns or, in opposite, the promises and hopes of the digitalization as a whole. In particular the disclosure on the practices of the NSA and other intelligence services boosted this strand of discussion. Given this controversial situation, the need for technology assessment (TA) is as obvious as the challenges and risks it bears. Based on a pilot study for the Office of Technology Assessment of the German Bundestag on the combination of big data and cloud computing, the presentation will reflect on experiences made during the project as well as on the results of the study. In a first step, it will address the question how the blurry concept of big data can be tackled in a TA study. This includes questions asking for the extent of technical details necessary to understand concepts and applications, methods suited to map the various possible applications today and in future as well as possibilities to derive potentials and challenges of big data. Furthermore, it shows the considerations on the scope and focus of the study in relation to the current public debates. In a second step, it will present the main findings of the study. Although there are potentials and challenges in many areas, the presentation will first provide an overview and then focus on societal potentials and challenges in particular.

In this context, the implications of a shift from causality to probability on science, business, society and policy will first be described and analyzed. Subsequently, the presentation will address the societal impacts arising from it. This includes, among others, impacts on autonomy, partaking in society, transparency and participation, knowledge and innovation. In a final third step, needs for further research and political action arising from the impacts will be presented and stakeholder responses will be reflected.

"If I Only Knew Now What I Know Then..." Big Data or Towards Automated Uncertainty?

Stefan Strauß

Google does it, the NSA does it. Our banks, insurance companies and many others do it as well. In line with a new data mining paradigm a variety of actors is digging for gold to enrich their information and knowledge accounts. Against the background of large-scale data analysis of several petabytes, big data seduces to be the all-seeing eye of events that did not happen yet but might be computable with a certain probability. That the haystack extensively grows around the needle seems to be out of interest, because... who needs a needle when the whole haystack is worth a mint? The knowledge gathered by big data can be highly useful for several strategic decisions, early warning systems, load balancing etc. However, it also entails a number of risks not least for privacy and autonomy of the individual. The increasing complexity of big data analysis fed with increasing automation may trigger not merely uncertain but also unintended societal events. This contribution focusses on the thin line between overestimated expectations and underrepresented momentums of uncertainty that correlate with the big data discourse.

How Should We Govern the Algorithms That Shape Our Lives?

Robindra Prabhu

With the advent of Big Data, machine learning and algorithmic decision making are poised to influence ever larger portions of human activity. Be it online nudging, self-driven cars, patient risk scoring, credit evaluations, news aggregation or predictive policing, algorithms are becoming more pervasive in society and playing increasingly more important roles in day-to-day decision making. Yet we often lack to the tools and frameworks to tease out the ethical conundrums and the wider social stakes of these developments, especially in a policy context:

- What does it entail to hold an algorithm to account and how is it different from holding people or institutions to account?
- Are algorithms neutral and "fair", and if not, how do we identify biases in automated decision-making processes and design policies that protect against systematic discriminatory outcomes? What does it mean to design ethically sound algorithms or automated decision-making systems?
- When do data-driven inferences warrant action, and can we devise governance standards that apply to all sorts of different contexts and situations?

We attempt to explore these and other questions drawing on insights from recent TA-projects on predictive policing and algorithmic decision-making in the justice sector, the automation of knowledge work, privacy in the online sphere and mobile health.

The Quantified Human: On the Digitalisation of Illness and Health Stans van Egmond and Marjolijn Heerings

We humans are increasingly able to quantify, measure, monitor bodily functions closer to and in the body, with cheaper, mobile, quicker and invasive devices. Combining DNA and imaging data with data from biological samples, medical records and lifestyle data on patients and consumers, leads to promises of personalized medicine. In this presentation we investigate the development of digitalisation of illness and health in practices of selfmanagement and biomedical research, based on nine empirical cases. These developments allow new actors access into research and therapy, and empower individuals in maintaining a good health or in living with disease.

However, there is also a strong link between self-reporting by patients and the need for big data in biomedical research. Big data has become paramount for the advance of biomedical research. Some of these data comes from the field of self-management, for example from patients with diabetes type I and II, rheumatic arthritis and other. Hence, for biomedical research to advance, input from patients is needed based on self-reports, and given freely. This creates tension. It requires investigation, through empirical descriptions of quantification practices. Especially since the European Commission supports the development of large data infrastructures for biomedical research (through H2020, JTI, IMI and another), and the uptake of e-health for self-management for chronic patients. Yet not much is known of the effects of digitalization of illness and health on the involved actors in practice. Who gets better from it?

These technological and policy developments lead to a number of ethical, social and political questions; what are the consequences of changing definitions of health and illness. As the individual (lifestyle) may become a coercive factor in bringing about disease or in treating disease, this may change some of the responsibilities that come with caring for health and disease. What will be the role of the patient, the doctor, and other actors? How could these developments change institutional arrangements in health, the financing of healthcare, and to what consequences? In this presentation we investigate these questions.

Big Data in the German Press: Analyzing Coverage Patterns

Antonina Khodzhaeva

of TA

ce of Big Data and

Big Data is something intangible, but it is considered to have a significant potential in providing tangible impact in such areas as healthcare, agriculture, environment and transportation. Big Data has already been described as the "new oil" and an extremely important resource in the information society, which can influence the ways the new products and services are developed and decisions are made. Different from emerging technologies like synthetic biology or nanotechnology, where discussion on impacts of these technologies have already started before hardly any products were on the market, many private companies already use large amounts of unstructured and semi-structured data in order to predict future trends or track customer behavior. In this context media coverage can play an important role in creating public awareness, as well as in influencing public attitude towards this new technology and controversial issues surrounding it. In this regard, present study aims to shed some light on the media coverage of Big Data in the German press in the last decade. It explores the role of the media in creating awareness of issues around Big Data, and the way they are framed in the news.

SESSION A³



ROOM: LISBON, WEDNESDAY, 3:30 PM - 5:00 PM PACITA Workshop

Advanced Genomics in Health Care? Using TA to Design a Step-by-step Approach in EU Member States ANDRÉ KROM AND DIRK STEMERDING (RATHENAU INSTITUTE)

AGENDA

BÄRBEL FRIEDRICH

Vice President of the Leopoldina and representative of the Working Group on Individualized Medicine, Germany

EUGENIJUS GEFENAS Director of the Lithuanian Bioethics Committee, Lithuania

VERONIQUE RUIZ VAN HAPEREN Scientific Secretary of the Health Council of the Netherlands, the Netherlands

JOÃO LAVINHA

Head of the Research and Development Unit, Genetics Department, National Institute of Health (INSA), Portugal

JAROSLAW WALIGÓRA Policy Officer, Directorate Public Health and Risk Assessment DGSANCO, European Commission

Advanced Genomics in Health Care? Using TA to Design a Step-by-step Approach in EU Member States

Chairs: André Krom and Dirk Stemerding

Session Description

An important future challenge facing healthcare systems in Europe is how to deal with data and technologies provided by advanced genetic research. DNA sequencing technologies are rapidly becoming cheaper and faster. The expectation is that this will enable detailed risk profiling as the basis for targeted interventions, potentially improving health outcomes. It may lead to health care practices that are more personalized, predictive, preventive, and consumerdriven.

However, there is a clear threat that premature technology and market driven applications will inundate physicians and patients with meaningless or uninterpretable data. There is a wide gap between our ability to generate 'more data for less money' and our ability to understand them or validate their clinical utility. Political intervention is needed to guarantee that the use of genomic technologies in public health services does not lead to detrimental consequences.

These concerns warrant a step-by-step approach to the development and diffusion of genomebased information and technologies (GBIT). The challenge for policy-makers at the national and international level is what a step-by-step approach might involve in their own countries.

<u>Objectives:</u> The aim of this workshop is to examine what a step-by-step approach to the introduction of advanced genomic information and technologies in health care settings will require both from a European perspective and on the level EU member states, i.e. Portugal, Lithuania, Germany, and the Netherlands. These countries were involved in "The Future Panel on Public Health Genomics", one of three example projects of the PACITA project. The project mainly yielded conclusions on the European policy-level that have been summarized in a Policy Brief on Public Health Genomics and have been discussed during a Policy Hearing in Lisbon (January 2014).

By inviting policy-makers from different EU member states and from the European Commission, the workshop provides a unique opportunity: (i) to develop a fine-grained perspective on the introduction of GBIT in particular (national) health care systems; and (ii) to further promote parliamentary technology assessment (in general and concerning GBITs) in these countries and on a European level.

SESSION A⁴

ROOM: VILNIUS, WEDNESDAY, 3:30 PM - 6:45 PM

Experiences with Early Engagement Activities: The Problems of Pro-active Public Engagement

JÜRGEN HAMPEL (UNIVERSITY OF STUTTGART) AND NICOLE KRONBERGER (JOHANNES KEPLER UNIVERSITY)

PART 1

The Interface Between the Public and Science and Technology JÜRGEN HAMPEL (DEPARTMENT OF SOCIOLOGY OF TECHNOLOGY AND ENVIRONMENT, UNIVERSITY OF STUTTGART) AND NICOLE KRONBERGER (JOHANNES KEPLER UNIVERSITY)

What's The Problem With Upstream Engagement? The Case Of Synthetic Biology ALEXANDER BOGNER (INSTITUTE OF TECHNOLOGY ASSESSMENT)

Participatory Foresight – Experiences with a Qualitative Demand Side Approach NIKLAS GUDOWSKY, ULRIKE BECHTOLD, LEO CAPARI AND MAHSHID SOTOUDEH (INSTITUTE OF TECHNOLOGY ASSESSMENT)

Tangible Meets Narrative – New Methods for Public Engagement in an Early Stage of Technology Development

MARIE HEIDINGSFELDER, MARTINA SCHRAUDNER (FRAUNHOFER CENTRE FOR RESPONSIBLE RESEARCH AND INNOVATION) AND KORA KIMPEL (BERLIN UNIVERSITY OF THE ARTS)

PART 2

Enriching the Methodological Scope of Prospective Technology Assessment

– First Impressions from SYNENERGENE, the 'Mobilisation and Mutual Learning Action Plan' on Synthetic Biology

STEFFEN ALBRECHT, CHRISTOPHER COENEN AND HARALD KÖNIG (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

Challenges and Solutions of RRI-Problems in the Context of Neuro-Enhancement Technologies

CHRISTIAN HOFMAIER (UNIVERSITY OF STUTTGART), ELISABETH HILDT (JOHANNES GUTENBERG UNIVERSITY) AND RONJA SCHÜTZ (ILLINOIS INSTITUTE OF TECHNOLOGY)

Citizen's Debates about Neuro-Enhancement: The Spanish Case GEMA REVUELTA AND NÚRIA SALADIÉ (UNIVERSITAT POMPEU FABRA)

Feeding Hype or Anticipating Controversy? The Case of Neuro-Enhancement IMRE BARD (LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE)

Experiences with Early Engagement Activities: The Problems of Pro-active Public Engagement

Chairs: Jürgen Hampel and Nicole Kronberger

Session Description

One of the uncontested findings of research on technological innovation is that it is not a self driven process but a process which is shaped and directed by societal actors. This raises the issue of the legitimacy of this process. Modern concepts like upstream engagement and Responsible Research and Innovation (RRI) demand a societal dialogue in an early phase of the innovation process in order to expand the social basis of decision making processes to stakeholders and to the general public and to guide the innovation into a path which is supported by the public.

The demand for a societal dialogue in an early phase raises three major problems:

- 1. The first problem is related to the so called Collingridge-Dilemma. In an early phase of the development, before the closure of the technology, the knowledge about a technology and its consequences is so limited that a societal dialogue is hardly possible because of the vagueness of the topic. If societal dialogue is too late, it might happen after closure processes in the development of the new technologies.
- 2. The second problem refers to participation in dialogues. Upstream engagement and RRI assume that there is a general willingness to participate in any discourse on new technologies. Awareness of technologies may be very limited in an early phase. The willingness of people to participate in dialogue processes is not a given fact but a challenge for those organizing dialogues.
- 3. A third problem refers to stakeholder participation. Stakeholder participation requires active stakeholders. There are enormous differences in regard to stakeholder activities on different issues. There are well organized interests but also issues where it is difficult to find stakeholders which can be engaged.

While upstream engagement and RRI are more or less uncontested as concepts, the methodology of engagement becomes more important. In this context we invite papers which address experiences with public engagement activities in a very early phase of technology development (i.e. before a closure in the reflected technologies). Of particular interests are experiences in participatory projects in fields where stakeholders have not yet detected an issue as a challenge for their stakes.

The Interface Between the Public and Science and Technology Jürgen Hampel and Nicole Kronberger

Over the last decades, "the public" has gained in considerable importance for science and technology. Meanwhile it is a truism that the public has to be involved. The question, however, in what exactly the public should be involved in and in what ways this should occur remains controversial.

Over time a number of models have been proposed, ranging from public understanding of science over pTA (participatory technology assessment) and upstream engagement to the contemporary concept of RRI (responsible research and innovation). Each of these conceptualisations suggests different ways how to bridge the interface. Important differences - to name a few - include understandings of when participation should occur (early on or once the technology is well under way), who best represents the public (stakeholder groups or the general public), who should take the initiative for involvement (bottom up or top down), what exactly should happen during involvement, and what is to be done with the results of involvement.

The concept of Public Understanding of Science and Technology implies that the public has to be informed. Some say that the underlying assumption is the deficit-model, which assumes that scepticism towards science and technology is based on a lack of knowledge.

In the 1980s, the Danish Board of Technology developed the participatory model of the consensus conference with two innovations: first, the participatory model suggested that the public should be involved in decision making processes; second, the public is addressed as the general public where ordinary citizens are selected to debate on the issues in charge.

The concept of upstream engagement reflected one side of the Collingridge dilemma, that it is too late to discuss new technologies when the consequences are known because all the decisions have been already done and suggests to organize participatory projects in the beginning of the process.

The RRI concept tries to combine the participatory approach with the approach of stakeholder participation where organised interest groups discuss the issue in charge.

Each of these models suggests different problem framings and different understandings of the concept of participation. In this contribution we discuss challenges and problems that go along with the different conceptualisations and identify questions for contemporary projects aiming at public involvement.

What's the Problem with Upstream Engagement? The Case of Synthetic Biology

Alexander Bogner

In recent times, the introduction of new technologies goes along with an increasingly rich offer of participatory and dialogue events, aiming at providing an opportunity for both spreading the message of the new technology and discussing its potential ELSA implication. Since the boundary between basic research and technology development increasingly becomes blurred ("technoscience"), participatory and dialogue events therefore focus on 'upstream' technology development. Due to the complexity and detachment from everyday life lay people are not very keen to engage in such issues. Therefore, participatory procedures have to be initiated and organised "from the outside", by funding institutions and / or participation specialists, often from the field of TA. This trend is also mirrored at the European level. With regard to emerging technologies, the EU has set up a number of projects explicitly dedicated to the advancement of public dialogue and stakeholder involvement. Obviously, public engagement with science takes often the form of a project at present.

Drawing on experiences from SYNENERGENE – a FP 7 project aiming at fostering a dialogue between stakeholders and the public on synthetic biology – I will discuss some of the problems associated with public engagement becoming project-shaped. First, I will give a rough sketch over various engagement projects in the field of synthetic biology. Secondly, I will argue that with regard to emerging technologies project-shaped participation turns out to be the normal case: Public involvement becomes an event including a detailed choreography, pre-defined framing, invited participants and a clear termination. This implies, thirdly, that participation projects are challenging with regard to organisational aspects and I will explicitly draw on the issue of how to mobilise stakeholder and how to introduce a certain framing.

Beyond these organisational aspects, project-shaped participation raises the much more farreaching issue of legitimacy. This will be evident if we have a closer look at the organisation of science at present. Today, scientific research is tantamount to carrying out projects. In the age of making all kind of things becoming a project ('projectification') long-term undertakings are legitimate only by disassembling them into a series of projects. In this age certain expectations regarding how to do science are established and become influential. Under this perspective and with regard to our case of public engagement one might ask whether project-shaped participation might be considered the 'better way' of engaging – due to its rational organisation (compared to 'wild' and protest-shaped forms). Will selforganised participation, in other words, face new reservation with regard to its legitimacy?

Participatory Foresight – Experiences with a Qualitative Demand Side Approach

Niklas Gudowsky, Ulrike Bechtold, Leo Capari and Mahshid Sotoudeh

In this contribution, we want to give methodological insights and lessons learned from experiences with a relatively new method for engaging the public in policy advice for framework conditions of research and development: CIVISTI – Citizens' Visions on Science Technology and Innovation. This transdisciplinary, qualitative foresight method is a demand-side approach that identifies societal demands for future developments. CIVISTI asks how the future should look like, to be able to stipulate and govern innovations actively.

Within the method, citizens develop their visions regarding a desirable future in 30-40 years on the basis of their individual background and creativity. On the basis of values, hopes and fears incorporated in the visions, multidisciplinary teams of experts and stakeholders formulate recommendations for different addressees and on different time scales (i.e. R&D policy, technology developers, city planners or administrators). These results are then presented to all participants of the process for validation and prioritization, to ensure internal legitimacy and loyalty to the initial ten visions.

By asking citizens what the future should look like and then distilling recommendations for today and tomorrows decisions (and hence potentially also technology design), a setting for early upstream engagement is provided that somewhat evades the Collingridge dilemma in the first place: citizens do not need a profound understanding or representation of a certain technology to express what needs it should fulfill. It is the responsibility of decision makers to take up that information and act accordingly. A certain weak point of the method, if such engagement activities lack a proper link to intended addressees.

Our analysis will ground on experiences made during three applications of the method within different spatial (European, national and regional) and political scales as well as on different topics. The method was developed during an EU-project (civisti.org, Gudowsky et al. 2012) and tested in seven countries, aiming at providing advice on new, emerging topics for the EU R&D policy, namely Horizon 2020. Later, the method was adapted and applied in regional context, namely the city of Vienna, Austria, to address the specific topics "autonomous living of older adults" and "ambient assisted living" (CIVISTI-AAL, leben2050.at, Gudowsky et al. 2014). Currently, the method is also applied to generate advice for framing the long term research program of the Austrian Agency for Health and Food Safety (2013-2016). 'Future Foods 4 Men & Women' aims at looking at new and emerging topics concerning food safety and a healthy diet from a gender perspective and engaged citizens across four regions in Austria (www.ages.at/ages/futurefoods/).

References:

Gudowsky, Niklas; Peissl, Walter; Sotoudeh, Mahshid; Bechtold, Ulrike (2012) Forward-looking activities: incorporating citizens' visions. Poiesis & Praxis (online first: 15/11/2012). http://dx.doi.org/10.1007/s10202-012-0121-6

Gudowsky, Niklas; Sotoudeh, Mahshid; Capari, Leo (2014) Leben2050 – Bürgerbeteiligung in einer vorausschauenden Studie zu selbstbestimmtem Leben im Alter in Wien. In: Schrenk, Manfred; Popovich, Vasily V.; Zeile, Peter; Elisei, Pietro (Hrsg.), Proceedings REAL CORP 2014 (REAL CORP 2014); Vienna, S. 349-356. http://programm.corp.at/cdrom2014/papers2014/CORP2014_152.pdf

Tangible Meets Narrative – New Methods for Public Engagement in an Early Stage of Technology Development Marie Heidingsfelder, Kora Kimpel and Martina Schraudner

Public acceptance is vital to innovation. By synchronising long-term research trajectories with public preferences, we can ensure the viability of scientific and technological advances. This synchronisation requires a systematic method that can enable people both to think in terms of societal and technological co-evolution and to anticipate their future needs and wants. To this end, the interdisciplinary research project Shaping Future has developed an original participatory foresight methodology that is centred on design know-how and promotes innovative forms of preference articulation. Our paper will present the approaches and findings that guided the project and focus on the developed methodology.

To ensure the viability, sustainability and public value of prospective innovations, research and development must place more emphasis on the needs and values of society in its production of increasingly complex technological products (Owen et al. 2012). Recognising the value of public input, the European Commission has declared the cultivation of a participatory, knowledge-based innovation culture (Horizon 2020, EC 2011; Responsible Research and Innovation, EC 2012, 2013) and the transformation "from science in society to science for society, with society" (Owen et al. 2012; Schomberg 2013) to be major parts of its political agenda. However, the engagement of stakeholders in an early phase of the innovation process is a challenging task.

To establich a societal dialogue in a very early stage of the innovation process, Shaping Future sought to enable laypersons to articulate their expectations of prospective humanmachine interactions. By adapting approaches from both design and the social sciences, the project has developed a range of original visions of potential technological developments and an original methodology for shaping participatory research agendas. The developed method draws from innovation research, design know-how and the social sciences. At the core of the method lies a multi-staged co-ideational process that is centred on laypeople's input and is conceptualised, moderated and evaluated by designers and researchers. In our project, design know-how provided a range of practical tools for participatory processes. By engaging multiple senses and adding a non-verbal dimension to interaction, innovative articulation formats could help transcend purely verbal expression and, ultimately, foster shared insights into technological developments. In the context of highly heterogeneous groups of laypersons, design know-how also helped overcome communication barriers.

To present the experiences and findings at the 2nd European TA conference, the authors will present the approach and the utilized techniques in more detail, focussing on new methods of public engagement.

References:

European Commission (EC) (Ed.), Horizon 2020 - The Framework Programme for Research and Innovation, 2011, online available at: http://ec.europa.eu/research/horizon2020/pdf/proposals/com(2011)_808_final.pdf, last accessed April 23, 2014.

European Commission (EC) (Ed.), Responsible Research and Innovation. Europe's ability to respond to societal challenges, 2012, online available at: http://ec.europa.eu/research/science-society/document_library/pdf_06/ responsible-research-and-innovation-leaflet_en.pdf, last accessed April 23, 2014.

European Commission (EC) (Ed.), Options for Strengthening Responsible Research and Innovation. Report of the Expert Group on the State of Art in Europe on Responsible Research and Innovation, European Commission, Directorate-General for Research and Innovation, Brüssel, 2013.

R. Owen, P. Macnaghten, J. Stilgoe, Responsible research and innovation: From science in society to science for society, with society, Sci. Public Policy, 39 (6) (2012) 751–760.

R. von Schomberg, A Vision of Responsible Research and Innovation, in: R. Owen, J. Bessant, M. Heintz (Eds.), Responsible Innovation. Managing the Responsible Emergence of Science and Innovation in Society, John Wiley & Sons, Chichester, 2013, 51–74.

Enriching the Methodological Scope of Prospective Technology Assessment

First Impressions from SYNENERGENE, the "Mobilisation and Mutual Learning Action Plan" on Synthetic Biology

Steffen Albrecht, Christopher Coenen and Harald König

The field of synthetic biology is in an early stage of development. Even the definition and the contours of this new technoscience are still unclear, and public awareness of synthetic biology is low. Despite this early stage, a number of technology assessment (TA) activities have been conducted in recent years to sketch the potential impact of synthetic biology on human health, society and the environment and to assess ethical, legal and regulatory challenges. These TA activities include, among others, parliamentary TA (STOA, TAB), participatory TA (public dialogues in the UK), advisory committees (SCENIHR, US presidential commission) as well as several research projects.

A recent addition to the methodological scope of TA activities on synthetic biology has been the EU-funded mobilisation and mutual learning action plan SYNENERGENE. The aim of SYNENERGENE is to bring together stakeholders from science, policy making, and industry, but also civil society organisations, artists and educators to initiate and foster public dialogue on synthetic biology and mutual learning processes. Based on the conceptual idea of responsible research and innovation (RRI), SYNENERGENE extends the range of actors involved in TA activities as well as the methods employed, for example by sending "artists in residence" to synthetic biology labs or by engaging the public in science centres and theatres.

This paper aims at taking stock of the various methods that have been applied in TA activities of synthetic biology as cases of prospective TA. It shares the first experiences made with the methods in SYNENERGENE and compares them to the more traditional TA activities on synthetic biology. On the basis of these experiences, the paper furthermore reflects on how the concept of mobilisation and mutual learning, as part of the RRI framework, can enrich the methodological scope of prospective TA more broadly.

Challenges and Solutions of RRI-Problems in the Context of Neuro-Enhancement Technologies

Christian Hofmaier, Ronja Schütz and Elisabeth Hildt

The contribution will discuss challenges of stakeholder participation against the background of the still running EU-project "Neuro¬enhance¬ment – Responsible Research and Innovation (NERRI)" within the 7th framework program. NERRI is a collaborative project for which the concept of Responsible Research and Innovation (RRI) is central. The project design allowed partners to conduct Mutual Learning Events (MLE) in order to i) create a societal dialogue across Europe and ii) develop concrete options for governance on the basis of the MLE's outputs. The German partners Johannes Gutenberg-University Mainz and the Stuttgart Research Center for Interdisciplinary Risk and Innovation Studies conducted stakeholder interviews, focus groups and a science workshop on issues related to the emerging topic of neuro-enhancement and the possible future regulation of neuroenhancement technologies. Specifically, hands-on experiences with troubles during the stakeholder recruitment phase and the unwillingness of some Stakeholders representing users, producers, scientists and intermediaries to participate will be reflected on as well as problems related to the Collingridge-Dilemma appearing during in depth discussions. The vagueness of the issues discussed led to a halo effect regarding the transition of overall attitudes towards common knowledge terms like doping to neuro-enhancement. The contribution will illustrate this transition process and point out ways to deal with this kind of problems in public engagement activities.

Citizen's Debates About Neuro-Enhancement: The Spanish Case Gema Revuelta and Núria Saladié

The concept of RRI (Responsible Research and Innovation) involves social dialogue at an early stage of research, development or innovation to ensure the adequate progress of new technologies including the public participation in all its aspects.

NERRI (Neuro-enhancement Responsible Research and Innovation) is a 3 years European project (2013-2015) funded by the European Commission in the 7th Framework Program, with the aim to apply the concept of RRI into the field of "neuro-enhancement". This new line of research focuses on new treatments and their applications in order to increase human cognitive abilities, not only in individuals with pathology but also in healthy subjects. The activities called MML (Mobilization and Mutual learning) are a basic tool to implement this concept, being particularly important the logistics used to materialize the activities.

In order to assess the methodology of these activities of public participation, we present a quantitative and qualitative study based on the citizen debates on neuro-enhancement that took place in Spain during 2014 and conducted by the Universitat Pompeu Fabra (OCC-UPF), member of NERRI, as an example of public participation activities related to technologies at an early stage of development. The session organized in collaboration with the Spanish Foundation for Science and Technology, the National Museum of Science and Technology and the Association of Friends of the House of Science, which was held in May in La Coruna, and the scheduled to October which will be held in Cosmocaixa in Barcelona, will be analyzed. The main results of the votes of the participants at a number of issues like empowerment, therapy, normality, governance, among others issues related neuro-enhancement, that are performed during the meetings, will be presented.

Feeding Hype or Anticipating Controversy? The Case of Neuro-Enhancement

Imre Bárd

Over the past decade the topic of neuro-enhancement, that is, the use of neuro-technologies to enhance, augment or extend mental and sensory capacities, has attracted a lot of attention in both academic circles and the mainstream media. As neuroscience makes inroads into understanding more and more the workings of the brain in order to find treatments to neurodegenerative and psychiatric conditions, some hope that the fruits of these endeavours will prove beneficial for the healthy as well in terms of improving performance or extending capacities. Several national and international projects have addressed the ethical and social questions that may be associated with such developments. More recently, the European

Commission funded an initiative that is devoted to facilitating Europe-wide societal dialogue about the prospects and the desirability of neuro-enhancement, as well as the emerging ethical, legal and societal questions. Beyond facilitating such dialogue the NERRI Project (Neuro-enhancement: Responsible Research and Innovation) also seeks to contribute to the development of a normative framework for the governance of neuro-enhancement technologies.

Project members include representatives of several institutions from 11 European countries, who have conducted a broad review of available literature and interviewed over 120 stakeholders about their views on neuro-enhancement. The opinions emerging from interviews ranged from cautious optimism to downright rejection, and it also became apparent that neuro-enhancement is not an unambiguous notion, but rather a very broad and under-defined umbrella term that takes on different meanings for different societal actors in different contexts. Furthermore, neuro-enhancement may include multiple technologies ranging from pharmaceuticals to brain implants, as well as very different targeted traits, such as memory, executive function, decision-making, etc. This makes it particularly difficult to craft a normative framework, because neuro-enhancement is not a technology as such, but an intended or unintended possible effect of very different technologies.

Most importantly, neuro-enhancement at present is an area of promissory science, wherefore discussions about its likely consequences are heavily influenced by proposed, projected and extrapolated assessments of future possibilities about which the scientific community and other commentators are in great disagreement. This highlights the difficulty inherent to generating societal dialogue in the absence of empirical knowledge about particular technologies.

Drawing on the experiences of the NERRI Project's UK team this paper will address the challenges presented by early engagement with a potentially controversial, yet highly uncertain and promissory area of scientific research, and what these experiences might mean for broader discussion about Responsible Research and Innovation.

The next horizon of technology assessment

SESSION A⁵

ROOM: SOFIA, WEDNESDAY, 3:30 PM - 5:00 PM Seminar supported by the Res-AGorA Project (www.res-agora.eu)

Responsible Research and Innovation – Governance and Policies RALF LINDNER (FRAUNHOFER INSTITUTE FOR SYSTEM AND INNOVATION RESEARCH) AND NINA BRYNDUM (DANISH BOARD OF TECHNOLOGY FOUNDATION)

AGENDA

ULLA BURCHARD

Former Chair Of The Bundestag's Committee On Education, Research And Technology Assessment

JACK STILGOE

University College London

MONICA SCHOFIELD

TuTech Innovation GmbH and the European Industrial Research Management Association's Taskforce on Responsible Innovation

Responsible Research and Innovation – Governance and Policies

Chairs: Ralf Lindner and Nina Bryndum

Session Description

The up-take and development of RRI ranges from policy contexts to research on science, technology and innovation governance. In these, "responsibility" is interpreted with a twofold goal: a precautionary goal on avoiding the adverse impacts of research and innovation on society and a promotional goal of supporting desired research and innovation impacts. Some of the many inspirations for RRI governance can be found in foresight, technology assessment, responsibility frameworks, codes of conduct, CSR, etc. A growing number of studies questions the effectiveness and legitimacy of these instruments used in diverse settings. For instance, an obviously contested area is how the core notions of "desirability" and "responsibility" is to be understood both in relation to RRI governance itself and in relation to a given emerging technology and innovation area. Thus, the conditions and the governance instruments used in current RRI practice are underexposed and fairly unknown.

The sessions will discuss responsible research and innovations primarily from a research and innovation policy perspective with the aim to:

- 1. Enhance analytical understanding of current policies on responsible research and innovation.
- 2. Contribute to the analysis of the feasibility and desirability of different governance practice across different domains and actors within research and innovation, such as business, ministries, research councils, research foundations, NGO's, and civil society.
- 3. Discuss the development and usefulness of governance instruments that facilitate interaction and learning across these institutional and societal actors in a context of contestation.

These and related questions will be discussed by our three invited speakers who will bring an inspiring mix of different angles (public office and policy making, academia, industry) to the panel.

The next horizon of technology assessment

SESSION A⁶

ROOM: DUBLIN, WEDNESDAY, 3:30 PM - 5:00 PM Round Table

Technology Assessment in East Asia: Experiences and New Approaches ANTÓNIO B. MONIZ (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS), GO YOSHIZAWA (UNIVERSITY OF OSAKA) AND MICHIEL VAN OUDHEUSDEN (UNIVERSITY OF LIÈGE)

AGENDA

MASARU YARIME STIG, Graduate School Of Public Policy, University Of Tokyo TATEO ARIMOTO

GRIPS, RISTEX-JST

YOUNG HEE LEE The Catholic University Of Korea

JEONG-RO YOON Korea Advanced Institute Of Science And Technology

TAKAHIRO ENOKI The National Diet Library, Japan

SHINGO KANO Department Of Medical Genome Sciences, University Of Tokyo

Technology Assessment in East Asia: Experiences and New Approaches

Chairs: António B. Moniz, Go Yoshizawa and Michiel Van Oudheusden

Session Description

Integrating social and ethical concerns in innovation practice is a well-documented and debated issue in the United States and in Europe (namely through the EU-wide PACITA project). Related developments in other parts of the world are less discernible – at least to Westerns. Yet, as witnessed by the emergence of technology assessment (TA) in countries like Japan, TA and TA-like activities have a unique and long history and continue to play a role in contemporary science, technology, and innovation (STI) processes (e.g. in the area of citizen engagement with nanotechnologies, or energy policy).

Taking these observations as its entry point, this panel asks how STI governance is locally enacted in Asian knowledge-driven economies. Like their Western counterparts, nations like China, Indonesia, Japan, the Republic of Korea, Singapore, Taiwan, etc., have undergone, and continue to undergo, rapid science- and technology-driven industrialization. In these processes, TA and TA-like activities develop with STI policies and programs and typically do so in nation- and region-specific ways.

To render these processes, policies, and programs visible, and understand their implications for STI governance, this panel will discuss contributions that:

- Describe and conceptualize how TA and TA-like activities have emerged in Asian Knowledge-based Economies (KBE), and in what particular forms (e.g. academic and parliamentary TA programs, linked to certain technologies and/or actors, which methods are used and why, etc.).
- Reflect how these activities has evolved with, sustained, and/or countered, STI policies on the regional, national, and international level.
- Compare and contrast how TA is, or is not, institutionalized in Asian countries and regions, e.g. through initiatives to initiate or abolish various TA forms, such as health TA, earlywarning TA, and parliamentary TA; and/or point to prospects for TA capacity building.
- Situate the above processes within a broader theory of, and movement towards, new STI governance frameworks, such as anticipatory governance, responsible innovation, public engagement, and/or others.

By placing the development in historical, sociological, and comparative perspective, the panel seeks to open a space for critical reflection on the potential, problems, and limitations of initiating TA in Asia and draw connections to STI governance processes in other KBEs across the globe.

SESSION A⁷

ROOM: LIÈGE, WEDNESDAY, 3:30 PM - 6:45 PM

E-Infrastructures for Technology Assessment

MICHAEL NENTWICH (INSTITUTE OF TECHNOLOGY ASSESSMENT)

PART 1

Bibliometrics for Technology Forecasting and Assessment – Further Results and Future Prospects MARCUS JOHN AND FRANK FRITSCHE (FRAUENHOFER INT)

Patient Autonomy: Using an Online Narrative Tool for TA MARJOLIJN HEERINGS AND STANS VAN EGMOND (RATHENAU INSTITUTE)

Tweeting TA – Chances and Pitfalls of Microblogging in Technology Assessment RENÉ KÖNIG (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

PART 2

The use of international repositories and the definition of the TA research field: The case of RePEc ANTÓNIO B. MONIZ (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

openTA – A Web Portal Aiming at User Involvement and Sustainability MAIKE ABEL AND KNUD BÖHLE (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

The PACITA TA Portal – Achievements and Challenges Ahead MICHAEL NENTWICH (INSTITUTE OF TECHNOLOGY ASSESSMENT)

E-Infrastructures for Technology Assessment

Chair: Michael Nentwich

Session Description

The TA community, comprising both practitioners/researchers and their partners/addressees in politics and society, started using digital tools two decades ago. Today the Internet is both an everyday working environment and an indispensable source of information for TA. Skype meetings or the use of WebEx and similar videoconferencing platforms did not replace all face-to-face project meetings, but are increasing in numbers. In the last years some members of the technology assessment community tentatively started to use Web 2.0 platforms, such as social network sites (e.g. Facebook), micro-blogging (e.g. Twitter), or Wikipedia. More recently, two initiatives developed encompassing Internet portals making accessible a wealth of TA-related information and data. This evolving e-infrastructure, these initiatives and changing practices will most likely have an impact on how TA is organized and carried out in the future.

In this session we bring together papers both presenting the latest developments, platforms and practices and assessing how they potentially change the way TA is done. We shall ask whether the relationship between TA and its addressees in politics and society is changing and if so, in what respect. We shall explore what the actors involved (producers, co-producers and consumers) expect and need (and potentially are unaware of), what the current e-infrastructure is able to deliver and what seems to be missing. We will try to assess how the future digital working and communication environment of the TA community will look like and what factors may influence this development.

Bibliometrics for Technology Forecasting and Assessment – Further Results and Future Prospects

Marcus John and Frank Fritsche

For present-day researchers and decision-makers not so much a lack but contrary a plethora of information forms a challenge. Bibliometric methods offer the chance to tackle this ever growing amount of scientific publications by assisting researchers and decision-makers in gaining insight into the structure of a specific scientific landscape. Bibliometrics is a collection of quantitative and statistical methods, which aim to analyse scientific literature. It

relies on the bibliographic information of scientific papers stored in an appropriate data base. A typical bibliometric workflow comprises three different phases. The first phase covers the elaboration of a search query which aims to delineate the field of interest as accurately as possible. While the second phase deals with the acquisition and cleansing of the bibliometric data, the last phase covers the analysis and visualization of the data. Following the course of this workflow one can identify three different aspects, where bibliometric methods might be useful for technology analyses within the context of technology forecasting and assessment. First of all bibliometrics might proof useful for enhancing the process of information retrieval. Although one of the first of such approaches dates back to 2005 (Kostoff/ Shlesinger 2005), it was only recently, that a systematic investigation of this topic has been initiated (Mayr et al. 2014). The second aspect concerns the challenge of detecting emerging topics as early and correctly as possible, which might be addressed by bibliometric means. Admittedly any bibliometric approach to this task faces the major problem that bibliometrics is an inherently retrospective method. With this we mean that it is based on an analysis of previous publications and citations. Hence it remains an open question whether it is possible to detect trends for the future by eavesdropping into today's scientific communication. This contribution discusses this question by referring to the recently introduced approach named "trend archaeology" (John/Fritsche 2013), which examines historic scientific trends and looks for specific patterns within their temporal evolution. Finally, since bibliometrics is a quantitative method it offers the opportunity to visualize some facets and results of technology forecasting and technology assessment projects. This frequently underrated aspect might have a considerable impact on the process of knowledge transfer in such a project. In this contribution we will discuss the aforementioned aspects and demonstrate how bibliometrics might assist researches and decision-makers by gaining insight into the structure of a scientific landscape they are interested in.

Patient Autonomy: Using an Online Narrative Tool for TA Marjolijn Heerings and Stans van Egmond

For the project 'Patients know better' we used and online environment to involve stakeholders and to collect data, to gain insight into how patients give meaning to hospital care. Central to the project was an online narrative tool with which people could write a story on their experi-ence with hospital care and read and react to stories of others. In this paper we reflect on us-ing an online environment for TA. The aim of the project was to gain insight into the role of patients in the hospital as a socio-technical system. This in the light of recent political discus-sions on patient empowerment/ autonomy. Using an online narrative method tool, we analyzed how patients give meaning to their role within the hospital. We designed the website to en-hance the narrative aspects of the stories collected, to have patients reflect on their own sto-ries and to gain the relevant background information on the participants to further analyze their narratives. In the design we also considered how to

gain meaningful informed consent and protect the privacy of both respondents as subjects described in the stories. The online tool gives patients the opportunity to write and share their stories from a place and time of their choosing, while giving us the opportunity to reach and engage a large amount of respondents. Our website attracted over 10,000 unique visitors and we collected over 100 stories from unique respondents in the course of one year. However, we found that attracting visitors to our website and engaging them to write a story proved to take more effort and resources than expected. We used a wide variation of strategies to create awareness of the website ranging from newspaper adds to targeting specific internet fora with various results. While the stories we collected where quite diverse on the type of experiences described, respondents where predominantly higher educated and there was little diversity in the ethnical background of respondents. Also there was limited engagement of respondents with each other and due to the project design little engagement between different stakeholders involved in hospital care. The online narrative tool did give us rich and in-depth insight into how patients experience autonomy/empowerment within the hospital. We reflect on these and other lessons learned from using an online environment in TA for doing research on stakeholders' perspectives.

Tweeting TA – Chances and Pitfalls of Microblogging in Technology Assessment

René König

Technology Assessment

Twitter, the leading platform for microblogging, represents many of the heavily-debated aspects of social media: Some think it is an effective tool for networking and democratic discourse; others regard it as a useless waste of time and criticize its dubious business model. The sober perspective of technology assessment can help to partly overcome this divide and to get a more realistic understanding of the chances and challenges of Twitter usage. At the same time, the microblogging platform also appears as a promising tool for TA practitioners: It allows for easy interaction between diverse actors and disciplines and some of the core target groups of TA are heavy Twitter users. Several institutions and individuals working in the field have recognized that and maintain work-related Twitter accounts. The presentation gives an overview of these ongoing experiments, describing how Twitter can serve as an effective tool for networking and communicating in the field of TA. But the platform also comes with a number of pitfalls and serious challenges which will also be addressed. For example, Twitter users who follow hundreds of others may experience an information overload, while less active ones will hardly recognize its usefulness. Organizations are confronted with particular challenges, e.g. how to manage one single account for dozens of employees and how to deal with public criticism. But a closer look also reveals less obvious risks, in particular in regard to the questionable long-term sustainability of Twitter due to its business model. This might hinder Twitter to play a more crucial role in the e-infrastructure of TA, as the presentation will conclude.

The Use of International Repositories and the Definition of the TA Research Field: The Case of RePEc António B. Moniz

Some very large international repositories can organise bibliographic references around research topics. Not all repositories are able to offer good search engines or good statistical analysis. Most just provide a list of references not always relevant to the researchers' purposes. When one tries to organise information around a multi- or inter-disciplinary knowledge field (such as TA) the use of such repositories is highly valuable. But most platforms lack some kind of information. First of all not all are truly international: most only focus on literature in one language (e.g. English, or German, or French), or on specific countries or regions (as North American, European, Latin American, or just German, or British, and so forth). And others are too much focused on specific disciplines (as medicine, biosciences, economics, philosophy, or political sciences). With this paper we will present some needs for the organisation of such repositories to provide a not-narrowed/specialised knowledge field, and to assess one example of a repository that offers a convenient search engine and very good impact analysis. The case of repec.org provides more insights about the need to develop useful TA-related bibliographic databases and may help developing further some existing prototypes.

openTA – A Web Portal Aiming at User Involvement and Sustainability

Maike Abel and Knud Böhle

The openTA web portal offers several services which ease and support the provision of infor-mation, communication and cooperation among TA researchers. At present it mainly serves the German speaking TA community. Taking into account the interdisciplinarity of TA, the het-erogeneity of the TA-community and today's fast developing web technologies and media services, there are particular design challenges. In the talk, the history of the openTA project will be sketched, the underlying design principles such as cooperation, synergies, portability and openness will be explained and the services implemented so far will be presented. We will reflect on the achievements and difficulties encountered while developing the web portal and will discuss how openTA can become a sustainable TA-e-infrastructure element.

The PACITA TA Portal – Achievements and Challenges Ahead

Michael Nentwich

In the framework of the EU-funded project "Parliaments and Citizens in Technology Assess-ment" (2011-2015), coordinated by the Danish Board of Technology with partners from all over Europe, an Internet portal for technology assessment has been implemented and launched in 2012 (technology-assessment.info). The aim is to establish, in the long run, a world-wide one-stop-service for all kind of TA-related information. In particular, information about organisations working in the field of TA, TA projects, publications in that field, and TA experts are made available via the Internet site. The information can be accessed in three ways: (1) via a one-slit search box presenting the search results in four tabs (institutes/projects/experts/publications); (2) via an expert search-engine offering more options for each of the four categories of information; and (3) by exploring a hypertext system, e.g. browsing from an institute to its projects and then to related publications. In 2014, data from altogether 14 TA organisations have been collected and many more are in the pipeline. Currently the PACITA team is developing further the Portal to make it more encompassing, faster, and to enhance the user experience. Among others, the PACITA TA Portal cooperates with the openTA Portal of the German-speaking TA community, in particular with regard to including a world-wide TA news service and TA events calendar. In this presentation, I shall present the features of the Portal and discuss its current shortcoming and potentials for the future e-infrastructure of technology assessment.

SESSION A⁸

ROOM: BUDAPEST, WEDNESDAY, 3:30 PM - 5:00 PM

Assessment of Knowledge Production in Responsible Research and Innovation CHRISTIAN BÜSCHER AND ANDREAS LÖSCH (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

AGENDA

Governance of Nanomaterials as Laboratory for RRI JUTTA JAHNEL (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

From Assessment to Action: Tools for Implementing Responsible Research and Innovation IGNASI LÓPEZ VERDEGUER ("LA CAIXA" FOUNDATION)

Social and Humanitarian Expertise of Engineering and Innovative Projects Based on the RRI-Lab at the Technical University ELENA SEREDKINA, OLGA KOLESOVA AND NATALJA KOSHELEVA (PERM NATIONAL RESEARCH POLYTECHNICAL UNIVERSITY) AND IRINA CHERNIKOVA (TOMSK STATE RESEARCH UNIVERSITY)

A Complementary Approach to the Polysemy of Responsible Research and Innovation ROBERT GIANNI (UNIVERSITY OF NAMUR)

Assessment of Knowledge Production in Responsible Research and Innovation

Chairs: Christian Büscher and Andreas Lösch

Session Description

Studies on Responsible Research and Innovation are confronted with one challenge: How is it possible to introduce normative orientations in processes of research and innovation which could support the desired impacts of innovations? In our session we do not ask normatively: What are the right impacts for responsible or sustainable innovations? We rather explore in a functionalist manner the conditions for introducing normative criteria in the different stages of knowledge production in complex, multifaceted and dynamic innovation processes. With this exploration we aim to contribute to the overall research activities on RRI.

What could be the contributions of TA to an assessment of enabling conditions for Responsible and Sustainable Innovation? The following assumptions will guide the discussion:

- 1. Assessment of the evolutionary stage of the respecting field of the innovation: Since the conditions for introducing normative orientations vary from stage to stage, it is necessary to pinpoint the stage of evolution of the observed topic.
- 2. Assessment of the conditions of learning in organizations (and social subsystems) in relation to the evolutionary stage: Since the conditions for learning change within processes of knowledge production (vested interest, path dependencies, strict trajectories), it is important to detect the entry points of normative orientations.
- 3. Assessment of the functions of normative concepts in innovation processes: Since research and innovation processes need to cope with uncertainty and non-knowledge, it is necessary to assess the enactment capacities of normative orientations, exemplarily discussed for the precautionary principle, the concepts of transparency and sustainable development.

Consequently, we want to discuss distinctive analytical steps for the assessment of knowledge production in this session. Referring to concepts of STS, Innovations Studies and Sociology of Science, we call for contributions along the lines of the following evolutionary steps of RRI:

ñ		
ñ		
Q		
ົ		
5		
Ę		
Ď		
5		
Ē		
Ĭ		
2		
2		
D		
D		

	Emerging Fields	Stabilizing Fields	Institutionalized Field				
Dominant modes of knowledge production	Floating visions and expectations (expectation statements), spontaneous interactions between heterogeneous actors	Scientific-political agenda-setting, boundary works stabilizing the field, inclusion of actors by organized modes of stakeholder involvement	Established scientific- technological paradigms, coordinated collaborations between institutions and organizations, established regulatory bodies and formalized governance measures				
Learning conditions in knowledge production	From floating expectations to expectation statements about research agendas; problematization of regulatory gaps	From the discussion about the demand of new regulations to the installation of participatory procedures (e.g. multi- stakeholder dialogs, transdisciplinary monitoring procedures)	Formalized multi- organizational knowledge production as a functional part of an established regulatory and governance framework				
Guiding normative concepts	Precautionary Principle: general orientation and learning incentive	Transparency: communicative condition for organizational learning	Sustainable Development: flexible process orientation				

Governance of Nanomaterials as Laboratory for RRI

Jutta Jahnel

Governance includes the processes, conventions and institutions that determine how power is exercised in managing resources and interests, how important decisions are made, how conflicts are resolved and how interactions among and between the key actors in the field are organized and structured. This also involves how participations of various stakeholders is accorded (Lyall and Tail 2005). Responsible research and Innovations (RRI) sets new impulses for the roles and interactions of key actors in the innovation process. Stilgoe et al. (2013) characterized this concept with the four dimensions "anticipation, inclusion, reflexion and responsiveness". Von Schomberg (2013) transferred this abstract framing to the European research context as "a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products."

Risk governance of nanomaterials is an initial field for ideas and experimentations of RRI. Substantial and procedural problems with regard to the scientific risk assessment as well as the question about adequate risk management options lead to responsible and integrative guidelines for action during the early stage of innovation ("responsible development"). Especially, the European Code of Conduct for Responsible Nanoscience and Nanotechnologies calls for a "culture of responsibility". Stakeholder and the general public actively participate together with experts and innovators in deliberative processes, consultations or dialogues dealing with the safe handling of nanomaterials. In addition different frameworks were developed to openup traditional procedures of the expert based risk assessment. The risk-based decision-making proposed by the NRC (2009) is taking into account that scientific, social and ethical aspects of governance are closely interwoven. This model wants to intensify the communication and interaction between risk assessors and risk managers. Despite it is widely accepted that scientific activities cannot be performed in complete isolation or in a political vacuum, conventional scientific and political deliberations for the safe handling of chemicals take place in separate compartments, organized and institutionalized as risk assessment and risk management.

This contribution will elucidate the mutual relationship of risk governance developed for nanomaterials and the abstract and general steering concept of RRI. From the experiences in the field of nanomaterials we can get useful insights for the implementation of RRI in other contexts.

References:

Lyall, C.; Tait, J. (2005): Developing an Integrated Policy Approach to Science, Technology, Risk and the Environment. Ashgate Publishing Limited, Hants

Stilgoe, J.; Owen, R.; Macnaghten, P. (2013): Developing a framework for responsible innovation. In: Research Policy, Bd. 42 (2013), pp. 1568-1580

von Schomberg, R. (2013): A vision of responsible innovation. In: Owen, R., Heintz, M., Bessant, J. (eds.): Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society. Wiley, Chichester, pp. 51-74 NRC - National Research Council (2009): Science and decisions: advancing risk assessment. The National Academies Press, Washington

From Assessment to Action: Tools for Implementing Responsible Research and Innovation

Ignasi López Verdeguer

The concept of Responsible Research and Innovation (RRI) is becoming the talk of the day when discussing the future of science and technology systems all across Europe. Shared responsibility, anticipation, reflexivity, engaged publics, responsible actors and institutions, ethically acceptable and sustainable outcome... RRI has to find its way to address the great expectations placed on it and to contribute to solve the grand challenges faced by our society.

How to make all the above terms tangible? What does it take to become an RRI institution? What do the different actors involved in the R&I system need to push for a structural change towards this paradigm?

The project RRI Tools aims to answer these pressing questions. A multistakeholder consortium formed by research foundations, universities, science museums and other CSO's and education and industry representatives is to develop a set of tools to implement RRI throughout Europe. But building such an RRI Toolkit requires first listening to the real, practical needs and constraints of every actor, exploring and collecting already available

resources, and collaborating with other initiatives devoted to the same goals. RRI Tools is thus keen to establish a meaningful dialogue with Technology Assessment practitioners and scholars about what tools are needed from their perspective to successfully implement a Responsible Research and Innovation approach.

Social and Humanitarian Expertise of Engineering and Innovative Projects Based on the RRI-Lab at the Technical University

Elena Seredkina, Irina Chernikova, Olga Kolesova and Natalja Kosheleva

According to Technology Assessment (TA), scientific and technical development doesn't happen in a natural evolutionary way, but at least in principle is a planned determined process. In this respect the bench mark for the technology's analysis is not its substantial side (artifacts), but procedure aspect – ways, methods, "technology" of activity, functional side of technics. Thus, there emerges a question of theoretical explanation of innovations' management and control over scientific and technical development within TA.

The changes in modern science are linked to refocus of scientific activity from cognitive to project-constructive. Science is becoming gradually integrated into the system of interaction of science and technology, organized in accordance with new principles. This phenomenon is called technoscience. "It includes technological efficiency instead of the truth, knowledge as projects of activity, and model of cognition is construction" (I. Chernikova). The distinguishing feature of technoscience is a high social and practical directivity. Technoscience is not technical science, it's a new form of science organization, which integrates many aspects of natural science and technics as well as humanitarian cognition.

We would like to present our results and experience linked to our scientific and research laboratory RRI-Lab (Responsible Research and Innovation). It's worth emphasizing the main task of this one: social and humanitarian expertise of engineering and scientific and technical projects. It's very important to acquaint young engineers with the main principles of RRI and to develop at the initial stage responsibility to society in the process of realization of the engineering projects. The RRI-Lab has to deal with not merely the consequences, but with the desired models of the future.

New impulses of the TA can be realized only in the transdisciplinary communicative space. Transdisciplinary strategy of research means a conscious exit from the expert community and the involvement of various social actors to discuss problems connected with coordination of technical and socio-political events. Thus the emphasis is placed on responsible dialogue. These interdisciplinary analyses complemented with participatory processes involving stakeholders usually form the basis for the development of visions and long-term strategies. In the current work these research strategies is based on empirical material in the field of innovative medicine and the future of energy.

A Complementary Approach to the Polysemy of Responsible Research and Innovation

The scientific and technological progress of the twenty-first century offers new opportunities for enhancing various aspects of living and social interaction, especially in relation to innovative applications of information and communication technologies (ICT). The economic development builds most of its efforts on a strong innovation process able to face all the challenges rising in a globalized market.

At the same time, an uncontrollable progress also exacerbates normative clashes that are often hard to deal with. This scenario has been highlighted by various cases in recent R&I history the research on genetically modified organisms (GMO) or nanotechnologies, or the most recent hydro-fracking processes, where the resulting controversies had a broad resonance in society backfiring the economy.

Consequently, the societal challenges accompanying research and innovation cannot be handled only by a restricted research community, but shall be addressed through a substantive social engagement.

However, several difficulties also rise when trying to make different stakeholders agree on one issue. Indeed the contexts in which societal actors act and interact are quite complex and the perspectives within one same social system often appear significantly different.

These obstacles should be faced and discussed by reflexive processes focusing on the ethical issues always underlying R&I. Thus, under the light of an ethical stance, we will try to show how these differences do not need to be conceived as exclusive but mutually interactive.

The question that we then need to tackle is: what kind of governance structure would help developing RRI in an ethical way, one that could take into account the different normative sets embedded in the concept responsibility?

- 1. The basic structure required is one that can enact and subsequently enhance a participatory approach on the problems of RRI.
- 2. A second step would try to highlight the crucial role of a reflexive process able to take into account all the different factors at stake.
- 3. A third step would be to direct the path of this reflexive participatory approach towards an ethical understanding of RRI.

Through the six main keys for RRI proposed by the European Commission we would need to think of an approach that frames them in a complementary perspective. We shall develop a conception of RRI that could really foster interaction amongst normative sets and overcome the limits of unilateral perspectives.

SESSION B³

ROOM: LISBON, WEDNESDAY, 5:15 PM - 6:45 PM Panel Discussion

Soil Technologies: A Need for More Responsible Soil Management

Chairs: Tomáš Ratinger, Tomáš Michalek and Geertrui Louwagie

Soil Technologies: A Need for More Responsible Soil Management TOMÁŠ RATINGER, TOMÁŠ MICHALEK (TECHNOLOGY CENTRE ASCR) AND GEERTRUI LOUWAGIE (EUROPEAN ENVIRONMENT AGENCY)

AGENDA

Sustainable Soil Functions – Discerning Interests and Responsibilities of Farmers, Planners, Policy-Makers, Civil Society and Researchers KATHARINA HELMING AND JOHANNES SCHULER (LEIBNIZ CENTRE FOR AGRICULTURAL LANDSCAPE RESEARCH)

Link Between Resource Efficiency and Intensification: The Challenges for 'Sustainable Intensification' GEERTRUI LOUWAGIE (EUROPEAN ENVIRONMENT AGENCY)

Institutional Risks for the Implementation of Soil Conservation Technologies – The Case of Black Soils in Russia LADISLAV JELINEK AND INSA THEESFELD (MARTIN LUTHER UNIVERSITY)

Assessing the Farm-Level Costs of Providing Ecosystem Services through the Adoption of Modern Soil Cultivation System: The Case of Siberian Kulunda Steppe

MIROSLAVA BAVOROVA, NORBERT HIRSCHAUER (MARTIN LUTHER UNIVERSITY), OLIVER MUSSHOF (UNIVERSITY OF GOETTINGEN) AND ELENA PONKINA (ALTAI STATE UNIVERSITY OF BARNAUL)

Session Description

Degradation of agricultural soils through erosion, compaction and loss of organic matter provides challenges not only to farmers but also to society as a whole. Even though soils are generally categorised as a renewable resource it takes decades if not longer for soils to regenerate. Land, including soil, is also a finite resource.

Mainstream farming driven by the notion of cheap food and high consumption has grown in scale and intensified over the last century. It has brought with it a reduction of the spectrum of sown crops, deep ploughing, high use of fertilisers and pesticides, deployment of large and powerful machinery etc. The production and productivity has risen tremendously, but much at the expense of soil quality and fertility.

At the turn of the century new soil management technologies and practices like those used in conservation agriculture emerged and have spread around the Globe since. Reduced or no tillage, combined with vegetation cover (living or residues), is at the heart of conservation agriculture, leaving most of the plant rests in the upper layer of the soil. There is significant controversy about this practice in particular. The defenders emphasise that it protects against erosion, results in lower CO_2 emissions and has positive effects on soil biodiversity.

The critics argue that conservation tillage is deeply embedded in the productionist paradigm replacing one "bad" with other "bads". Reduced tillage challenges weed control, resulting in increased application of herbicides or the use of GMOs because of their specific resistance to some pests transmitted by the crop residues left on the surface. The most serious argument is that the motivation for turning to conservation tillage is not environmental protection but rather the reduced cost of agricultural production.

Despite the social importance of soil protection, no specific European legislation for soil protection has been established so far. Instead, soil protection remains a side-aspect of other environmental agricultural policies. Nevertheless, the non-renewable and finite character of the land and soil resource is recognised in the European Union's 7th Environmental Action Programme¹, through its thematic focus on natural capital, resource efficiency and human well-being. Against this background, it is crucial to frame the technological developments

Respon

More I

A Need

Soil Technologies:

¹ Decision No 1386/2013/EU of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 'Living well, within the limits of our planet'.

as described above in the resource efficiency context, and take account of the related challenges.

The objective of the session on soil technologies is to bring together various stakeholders in the process of development and adoption of soil technologies, i.e. natural and agricultural scientists, representatives of businesses supplying agricultural and particularly soil technologies, crop farmers, environmental pressure groups, policy makers and policy analysts to discuss:

- 1. the severity of soil degradation in the context of growing demand for food, growing demand for land as a base for the production of renewable energy and growing demand for land providing habitat of plant and animal species of wild nature.
- 2. lessons learned from the current development, spread and adoption of agricultural soil technologies and practice; how these technologies respond to the need for maintaining soil fertility for future generations while reducing the negative impacts on the environment/nature.
- ways forward to assess impacts of newly launched technologies on the society and recommendations for European policy on how to promote soil conservation in a context of highly commercial agriculture.

Sustainable Soil Functions – Discerning Interests and Responsibilities of Farmers, Planners, Policy-Makers, Civil Society and Researchers

Katharina Helming and Johannes Schuler

Maintaining sustainable soil functions depends on a variety of factors. One of them is that stakeholders involved in soil management and soil use take up differing roles and have discerning interests. At the same time, the responsibilities of stakeholders towards sustainable soil use are distributed asymmetrically.

In our presentation, we give an overview on the discerning interests and responsibilities of farmers, planers, policy makers, civil society and researchers. Farmers need soils as a production asset and have an interest in preserving its functions over a certain time span which is considered shorter than that of society as a whole. For planners, soils are the subject of their task to provide society with an optimal management of this limited resource. Policy makers need to balance their personal interest of gaining political power with their responsibility to find a sustainable pathway for soil conservation. Civil society is seen as an increasingly important stakeholder in the management of soils by either raising pressure on political decisions or by creating a demand for more soil friendly production methods. Researchers are expected to provide the evidence base upon which stakeholders may take decisions for sustainable soil management. By providing a deeper understanding of the different interests and responsibilities as well as the causal chain relationships between soil management and soil functions, researchers can help to address the right questions to right stakeholders.

Impact assessment in general and technology assessment in specific are means to structure the analysis of causal chain relationships between soil management decisions and soil functions. Thereby, ex-ante assessment can provide an anticipation of possible impacts of alternative management decisions. Trade-offs between soil functions become thereby visible and can be debated among stakeholders involved.

We will present methods and application examples of ex-ante impact assessment of soil management scenarios and how this helps to support decision making. This will include an analytical framework for impact assessment, interaction with stakeholders, scenario development, indicator selection and valuation methods. Examples will be provided at policy and farm management level for Europe and Africa. Benefits and drawbacks of impact assessment procedure will be discussed.

Link Between Resource Efficiency and Intensification: The Challenges for 'Sustainable Intensification'

Geertrui Louwagie

Across Europe and the world, accelerating rates of urbanisation, changing demographic and diet patterns, technological changes, deepening market integration, and climate change place unprecedented demands on land. Yet the availability of land is finite. This imbalance is unsustainable. Land must therefore be 'governed' in such a way as to preserve its potential to deliver goods and services.

These services are lost or weakened (due to disrupted water and nutrient cycles) when land is sealed for the development of housing, industry, commerce, or infrastructure. Some forms of land use and management, e.g. driven by agricultural land intensification or abandonment, observably result in degradation processes, like soil erosion, soil organic matter decline, habitat loss, or reduced nutrient cycling. Land fragmentation exacerbates these effects.

Such negative impacts can be referred to as dysfunctions and disservices and can further affect the economy or human health. They ought to be a cause of concern as the land medium integrates three spatial dimensions: the two horizontal ones of land cover/land use, and the third, the vertical one of soil and the underlying geology. Soil properties thus largely define the quality of land.

Land resource efficiency seeks an optimum level of land use and management in establishing appropriate shares between the different services provided by land. Resource efficiency

could be simply referred to as defining how efficiently the economy is using its resources. Applied to land and from an economic point of view, resource efficiency refers strictly speaking to a level of land resource use where costs and benefits are balanced such that they represent the optimal level of resource use in production and consumption activities. However, information is lacking to define this optimal level.

Where targets for land (e.g. limitations on the area of land take) have been agreed through political processes, cost effectiveness is likely to give better practical guidance. Cost effectiveness in general terms either maximises an outcome with given resources, or, achieves a given outcome with minimum resources. Following this logic and considering resource use to represent a socio-economic (rather than a purely financial) cost to society, cost effectiveness could be understood as either maximising the land services (e.g. crop yields) with the land resources available, or, obtaining a given level of services with the lowest amount of resources possible (i.e. by limiting the input of land resources).

The first option would most likely correspond to either intensifying service 'extraction', possibly through technological innovations, but equally by intensifying the use of additional inputs (e.g. water, and (in)organic fertilisers to increase crop production). The second option then corresponds to the afore-mentioned restrictions on land take (e.g. Germany's policy target of reducing land take from 100 to 30 hectares per day in the period 2002 to 2010).

If the first option is to be sustainable, decoupling is to be respected, implying that environmental impacts of land resource use are reduced while improving resource productivity (e.g. EU's Thematic Strategy on the Sustainable Use of Natural Resources (COM(2005) 670 final) and EU's 'Roadmap to a Resource Efficient Europe' (COM(2011) 571 final)). This means that increased land services should not result from increased inputs with detrimental environmental effects, like e.g. uncontrolled and excessive use of fertilisers and pesticides that lead to diffuse soil and water pollution. The question is then in how far technological innovations or other incentives could account for such optimisation, yet do not put additional pressure on the environment.

Alternatively to the above two options, scarce resources can be substituted. To stay with the example of food production, techniques like aquaponics (i.e. a food production system that combines conventional aquaculture) or vertical farming reduce the need for the land resource and thus provide some form of substitution. Likewise, reducing excessive food consumption and waste could provide potential for 'saving' land. Nevertheless, also here a virtual form of land saving has to be brought into the equation: Europe's use of land in third countries through imports of food and other biomass-based products (e.g. biofuels from palm oil plantations in Asia).

The presentation will call for solutions technology can bring in increasing land productivity (i.e. more output from less input) while respecting society's well-being, worldwide.

Institutional Risks for the Implementation of Soil Conservation Technologies – The Case of Black Soils in Russia

Ladislav Jelinek and Insa Theesfeld

Since 1950's, steppes with fertile black soils in South West Siberia have become an important production region in Russia. Recent investigations in the region have shown however, that poorly adopted agricultural management practices in these sensible semi-arid ecosystems are primarily responsible for numerous ecological as well as socio-economic problems (Frühauf and Meinel 2007). They need urgent solutions, as not adequately addressed soil degradation with consequent land abandonment will severely threatens not only the regional production potential but also livelihood of the rural population.

Supporting the agricultural soil conservation technologies is not only an agronomic and economic question, but also an institutional one. Institutions, such as property rights on land and the governance structures, such as advisory and monitoring mechanisms or land users registration mechanisms play a central role in the way how supporting policy measures could be implemented in order to become effective. Several supporting policies, not only command-and-control policies could be used to affect farmers' choices of conservation technologies. As being the most frequent policy style, the relationship (or fit) between a specific command-and-control instrument and institutional arrangement is considered in this paper (Theesfeld et al. 2010).

We use the crop burning prohibition – a regulation that should prevent farmers from historically practiced crop residues burning on agricultural lands - as a concrete example of a policy measure. To comply with the regulation farmers have to adapt to alternative land management technologies which result in new costs and benefit streams. Thus, despite the positive soil conservation effects after a period of 3-4 years, the reluctance to apply the alternative technologies likely appears. Despite such economic considerations, we provide empirical evidence for particular institutional factors hampering the implementation of this regulatory policy. The evidence shed the lights on the hampering factors that are connected with policy implementation within the Russian institutional environment.

Qualitative, problem-centered interviews with 15 farmers, policy actors, administrators and NGO were conducted in April-May 2014 in the Kulunda region (Altai Krai) and its capital Barnaul. We found several barriers that limited efficient implementation of the commandand-control driven policy measure. To structure the list of hindering factors, the identified barriers were grouped following the Williamson's (2000) classification of four levels of social analysis: a) limits connected with the resource allocation, b) governance structure problems, c) existing institutional environment, and d) cultural norms and social embeddedness.

a) Outdated technologies and difficult access to credit hindered the adoption of alternative soil management that would comply with the requirements. In fact, burning of the crop residues was often the cheapest and simplest technology, how to dispose it from the field.

Mulching or direct seeding in the stubble was the only option how to use the straw due to a significant drop in beef numbers and missing off-farm utilization. However, high investment costs and farm budget constraints severely limited farmers to invest in machinery that would allow them to change to a required technology. The necessary investments included the harvesting machineries, straw chopping accessories or the seeding machineries that can seed into mulch. Indeed, the most of grain harvesters were not equipped with the straw choppers in the time when the regulation was implemented. Well chopped straw pellets and their even distribution was a critical precondition on the steppe soil due to its short vegetation period. In addition to that, the new skills were required to use the required technologies.

b) Both representatives of the Central Administration of Natural Recourses and Ecology in Altai Krai - responsible for monitoring and sanctioning agricultural producers who offend against environmental requirements - and private land users stated that the monitoring and controlling requirements of the responsible agency had been underestimated, particularly for two reasons. First, the controllers are not adequately distributed over all regions to monitor equally. Second, unclear rules and complicated prosecutions severely limited the daily work. In fact, total area to be monitored amounted to 10.5 mio. ha, including more than 670.000 heterogeneous land users. Though the number of total violations was not available, the Administration admitted that the number of violation that ends up with the fine was insignificant.

The overwhelming general problem of the rule adherence was the identification of the actual rule-breaker. It turned out that finding enough evidence of who was responsible for the rule violation and should be prosecuted was extremely demanding and costly. Thus, not surprisingly on less than 5% of the identified offences were imposed penalties. The role of penalty as a preventative measure failed.

Another crucial institutional factor connected with the effective governance was an inadequately information spreading mechanism among farmers. In fact, there was no information available among farmers that would inform about the underlying objectives of the policy measure. Instead, part of the land users still believed about the positive effects that the residue burning incorporates. This also led to a high frequency of rule breaking.

c) Common and state land ownership shape strongly current land tenure system. The majority of cultivated land is under rented contracts and for the majority of respondents these rights are not secure enough to invest in the long- term sustainability of land. Farmers without secure land ownership titles have fewer incentives to prevent the reduction of the organic content, particularly in a situation when the crop residue burning is less costly in the short-run. Further, various institutional investors buying the land in the region expose local land users to further insecurity.

Summing up, while the factors like adjustment costs as well as monitoring mechanism can be addressed in short-term, the property rights and cultural values and norms among rural people do only change very slowly and often passes between generations. Following this, to increase

the effectiveness of the banning of crop residue policy measure, we suggest to accompany the current command-and-control regulation with additional incentive-based measures.

References

Frühauf, M., Meinel, T. (2007). Desertification in the Agricultural Used Dry Steppes in Central Asia. Proceedings of the International Conference Soil and Desertification – Integrate Research for the Sustainable Management of Soils in Drylands, May 5-6, 2006, Hamburg, Germany.

Theesfeld, I., Schleyer, C., Aznar, O., 2010. The procedure for institutional compatibility assessment: ex-ante policy assessment from an institutional perspective, Journal of Institutional Economics. 6 (03) 377-399.

Williamson, O. E., 2000. The New Institutional Economics: Taking Stock, Looking Ahead, Journal of Economic Literature. 38 595-613.

Assessing the Farm-Level Costs of Providing Ecosystem Services through the Adoption of Modern Soil Cultivation System: The Case of Siberian Kulunda Steppe

Miroslava Bavorova, Norbert Hirschauer, Oliver Musshof and Elena Ponkina

In the fifties and sixties of the 20th century the Soviet Union started to cultivate the natural grasslands of the Kulunda steppe which forms a large part of the Altai region. In 2011 a total of 67.000 km² of the Kulunda steppe were used for agricultural production. Mostly black chernozem soil and brown earth are used for arable crops. Cultivation practices which were aimed at achieving high productivity levels but which were not always well-adapted to the marginal ecosystem of the Kulunda steppe caused severe soil degradation and a depression of soil fertility and yield levels within a few years after first-time cultivation. Today, more than 50 % of agricultural land in the Kulunda steppe is affected by degradation (Fruehauf 2013).

In this paper, we concern ourselves with the socio-economic determinants of Kulunda farmers' land use decisions. We consequentially study the requirements that need to be met to make farmers adopt sustainable cultivation practices. The starting point of the investigation is the understanding that sustainable land use practices have to be voluntarily adopted by decision-makers on the farm level who make their choices according to their subjective perception of the relevant economic and natural conditions. If the provision of ecosystem services (such as carbon sequestration through reduced tillage systems) is perceived as being less profitable than conventional practices, profit maximizing farm managers will only provide such services if compensation payments are granted for the perceived net costs of provision. The necessary level of compensation has been labelled "willingness-to-accept" (WTA; cf., e.g., Hanemann 1991). It can be contrasted with society's "willingness-to-pay" (WTP) for ecosystem services. While assessing the WTP is not our focus, we know that there is only a scope of action to implement carbon sequestration projects in agriculture

if farmers' WTA is lower than society's WTP or if farmers can be convinced that the change of land use is not costly but increases the profitability of their farms.

The methodology for answering the research questions is the optimization procedures (linear programming) that have been receiving much attention in agricultural-economic research and teaching over several decades (cf. e.g. Heady and Candler 1958; Brandes 1974; Dent et al. 1986; Rae 1994; Hardaker et al. 2004, Mußhoff and Hirschauer 2007).

In this paper we present two models providing: I) a comparison of cost and sales in the Modern Canadian system with the Modified Soviet system as estimated by expert; II) a comparison of cost and sales of the Modern Canadian technology as assessed by the expert with the reality of one exemplar farmer in 2013.

The German expert in crop technologies in the Kulunda steppe (T. Meinel) has assessed the parameters of production activities when using both the Modern Canadian technology (MC) and the Modified Soviet technology in the forest steppe assuming good management and average weather. He also assessed the labour input. In the second model, for comparison, we use data of a exemplar private farm which cultivates 800 ha land and is located in the forest part of the Kulunda steppe. We have collected site- and farm-specific data in a field visit to the farm in June 2013 and subsequent correspondence.

The model I. -based on expert assessment- shows that for all crops the gross margin is higher in the Modern Canadian technology comparing to the Modified Soviet Technology. The highest gross margin can be achieved by soy beans, sunflower and flex (seed). Given the restriction of 1000 ha arable land and plant rotation restrictions, the following production program will deliver the highest gross margin: 250 ha soy beans, 330 ha sunflower, 250 ha rape seed and 170 ha flex.

The model II. shows that resulting from achieved sales and input variable costs, the gross margins for the selected crops differ between the farmer's and expert's technologies. The difference is highest with soya where the gross margin is more than twice higher (+110%) with the MC technology. This is mostly thanks to high yield expectation in MC by the expert. The variable costs in soya production are about twice as high in MC. In wheat, the gross margin with MC is about 10% higher. The variable costs are about 180% higher in MC. In pea's production, the gross margin with MC is 15% less, the variable costs 63% higher.

In the FOM model, the production program is optimized at the farm to maximize the total gross margin. In our case, as farmers could not assess the output and input of other crops then those already cultivated, the model involves only the already cultivated crops. Given the prices and the costs and applying the restrictions (cultivated area, plant rotation, machinery, labour), the highest possible total gross margin of 8418356 Ruble can be achieved with farmer technology and following crop area: 160 ha fallow, 200 ha soya, 240 ha wheat and 200 ha peas.

SESSION B⁵

ROOM: SOFIA, WEDNESDAY, 5:15 PM - 6:45 PM

Integrated Approaches in Technology Assessment

(DANISH BOARD OF TECHNOLOGY FOUNDATION)

Integrated Approaches in Technology Assessment

Chairs: Nils Heyen and Rasmus Nielsen

Session Description

In its FP7 Science-in-Society work programme 2010, the European Commission has called for new frameworks for integrated assessment of emerging science and technologies (EST). It is assumed that different assessment frameworks – such as technology assessment, risk assessment, or impact assessment – come to different and sometimes conflicting conclusions in assessing the impacts of EST and that this situation might foster societal tensions relating to EST developments. The call therefore asks for an "integrated framework" tending to a "more balanced assessment" of EST.

Integrated approaches to the assessment of technology and policy choices are found in several assessment traditions. They have been especially explored in the field of sustainability assessment. Historically, integrated approaches have been considered as particularly appropriate for assessing complex systems that are in danger of being reduced to their composite parts, and have as such been a subject of study within systems thinking. An important motivation for developing integrated approaches has been to avoid reducing decisions with important social and environmental implications to an economic issue. Also in the domain of technology assessment (TA), the concept of integration has been prominent insofar as TA in practice has always seen itself as having an integrating function. Furthermore, TA has played a significant role in the development of participatory methods for democratic deliberation on policies dealing with the future options and risks of science and technology development. With the aspiration of providing unbiased information to support decision-making in a highly political environment, TA from the very beginning aimed for neutrality rather than the classical ideal of objectivity. Focus has been on the ability to balance different scientific perspectives on the same problem, to identify neutral positions in areas of contention between stakeholders, and to identify viable options for technological development and policy.

However, although integration has implicitly been part of TA's aspirations, there is not much explicit reflection on what integration could mean in what context, for what purposes it could be used, and how exactly it could be operationalised. Methodologically, there still seems to be a lack of methods on how to integrate, for instance, different information dimensions, different perspectives on topics and framings of issues, or different assessments conducted by various actors.

AGENDA

Problem-Oriented Interdisciplinarity and Integration: Methodological Reflections and Considerations JAN C. SCHMIDT (DARMSTADT UNIVERSITY OF APPLIED SCIENCES)

NILS HEYEN (FRAUNHOFER INSTITUTE FOR SYSTEMS AND INNOVATION RESEARCH) AND RASMUS NIELSEN

Interdisciplinary Integration in Technology Assessment – A Report from Practice STEPHAN LINGNER (EA EUROPEAN ACADEMY GMBH)

TranSTEP: Getting an Integrated Perspective on Complex Technology Issues by Teaming Up Across Established Assessment Communities ELLEN-MARIE FORSBERG (OSLO AND AKERSHUS UNIVERSITY COLLEGE) Against that background, this session aims to reflect and shed light on the role of integration in TA, on possible conceptualisations of integrated approaches, and on challenges and potential benefits for processes of policy and decision making.

Problem-Oriented Interdisciplinarity and Integration: Methodological Reflections and Considerations Jan C. Schmidt

Among others, the term "problem" plays a major role in the various attempts to characterize interdisciplinary or transdisciplinary research, as used synonymously in this paper. Interdisciplinarity (ID) is regarded as "problem solving among science, technology and society", and as "problem orientation beyond disciplinary constraints" (cf. Frodeman et al. 2010). The point of departure of this paper is that the discourse and practice of ID have problems with the "problem". The objective here is to shed some light on the vague notion of "problem" in order to advocate a specific type of interdisciplinarity: problem-oriented interdisciplinarity that is based on a certain kind of integration: "problem integration". This kind of integration – relevant at the kick-off and the agenda setting – is the most challenging type in interdisciplinary research projects.

Interdisciplinary Integration in Technology Assessment – A Report from Practice

Stephan Lingner

Technology Assessment (TA) aims naturally at questions with societal relevance. These questions are often complex, ambivalent and prone to uncertainty. The specific frameworks of corresponding assessment endeavours are ideally constituted by these conditions as well as by the necessary abstraction levels, on which these questions have to be dealt with.

The complexity of TA questions addresses quite different relevant disciplines, which have to be represented properly within these frameworks – not only in an additive manner but also by reflexive approaches, which allow for deliberations on apparent and hidden facets of the same subject from different disciplinary and methodological perspectives. Realising corresponding frameworks are expected to reduce disciplinary or methodological biases of assessments, thus levelling individual or discipline-dependent subjectivities to some extent.

The paper will explore a rather simple but effective and well-established integrative TA approach used at the European Academy for many years. The approach is – however – limited to certain assessment domains. These limitations and related problems of giving broad advice will be also discussed.

TranSTEP: Getting an Integrated Perspective on Complex Technology Issues by Teaming Up Across Established Assessment Communities

Ellen-Marie Forsberg

The European EST-Frame project (www.estframe.net) has over the past three years studied the need for integration in assessment of emerging science and technologies (EST), by analysing assessment practices and engaging with assessment practitioners, policy makers and stakeholders. The insights gathered from this work have now been translated into a conceptual framework, which we refer to as the TranSTEP approach, with guidance for operationalising this in practice.

Using the TranSTEP approach involves initiating and facilitating assessment groups composed of people from different assessment backgrounds to integrate assessment perspectives on complex technology issues. Participants in such processes can be assessment practitioners from domains such as economics, risk assessment, ethics, foresight, impact assessment or technology assessment or from outside these domains. In order to ensure that all relevant perspectives are brought in, other actors might also be involved, such as private sector stakeholders, public sector decision-makers or administrators, and NGOs. The TranSTEP process is problem and learning oriented and requires continual use of facilitated dialogue focusing on systematic and collaborative situation analysis and transparent method reflection. The group will review current assessments in the field, based on the group's own problem formulation, and may initiate new assessments or dialogue projects if the current assessment base is insufficient for addressing the problem as the group has defined it. Ultimately the group will integrate this evidence base into advice to relevant problem owners.

This presentation aims to lay out the basic principles and practical process of the TranSTEP approach and explicitly relate this to different kinds of integration dimensions identified in the EST-Frame project.

SESSION B⁸

ROOM: BUDAPEST, WEDNESDAY, 5:15 PM - 6:45 PM

Public Engagement in Responsible Research and Innovation GEORG AICHHOLZER (INSTITUTE OF TECHNOLOGY ASSESSMENT)

AGENDA

Assessing Stakeholders' Needs and Constraints Related to RRI – Experiences and First Results of Stakeholder Consultation Across Europe Carried out by the **RRI-tools Project**

ILSE MARSCHALEK (CENTRE FOR SOCIAL INNOVATION)

'Challenging futures' of PTA Instruments: Conceptual Ideas Towards a Responsible Public Engagement

NINA AMELUNG (UNIVERSITY OF GOTHENBURG) AND CARSTEN MANN (TECHNISCHE UNIVERSITÄT)

The Limits of Public Participation for Complex Policy Problems ULRIKE BECHTOLD (INSTITUTE OF TECHNOLOGY ASSESSMENT, AUSTRIAN ACADEMY OF SCIENCE) AND HARALD WILFING (VIENNA UNIVERSITY)

Public Engagement in Responsible Research and Innovation

Chair: Georg Aichholzer

Session Description

Since its emergence as an overarching principle, postulated to govern science and innovation, Responsible Research and Innovation (RRI) is gradually taking shape through a growing debate and elaboration of the approach. However, how RRI can be institutionally embedded and implemented in practice is still largely an open question. Public participation and collective deliberation, long-practised instruments of technology assessment (TA), are regarded as cornerstones of the RRI programme. This session will jointly discuss public engagement in implementing RRI and the assessment of public participation designs, thereby linking issues of 'responsible innovation' and 'responsible governance'.

The presentations will contribute, a) to knowledge on multi-stakeholder perspectives of RRI and to the implementation of RRI in practice, based on the results of Europe-wide stakeholder consultations and their discussion; b) to reflection on participation design processes as governance innovations against the RRI background; and c) to the exploration of shortcomings and limits of public participation instruments for achieving the social robustness and legitimacy of technology projects. A further expectation is a critical reflection of the various participatory TA methods involved in the empirical results (e.g. citizen panels, multi-stakeholder workshops), as an input to method refinement.

Assessing Stakeholders' Needs and Constraints Related to RRI - Experiences and First Results of Stakeholder Consultation Across Europe Carried out by the RRI-tools Project

Ilse Marschalek

As RRI is still an emerging concept, concrete tools for awareness raising and implementation are needed. The RRI tools project (FP 7) aims to develop a toolkit providing such tools. It will also help to create communities of practise in Europe to ensure the use and evolution of the toolkit. In order to build those, the project consortium consists of 19 national centres - so called hubs - that are responsible for opening participation to a maximum number of stakeholders.

Widely, the importance of stakeholder involvement is growing in various fields, but especially for developing an integrative concept - such as that of RRI - in a participatory Responsible Resear

Public Engagement

The next horizon of technology assessment

manner, the involvement of stakeholder groups at an early stage is even more important. The RRI tools project applies a bottom-up approach to make sure that dimensions and criteria of the toolkit meet requirements and needs of the stakeholders, and thus augment the probability of the take-up of the concept as much as possible.

For the future building of wider communities of practice across Europe, the here introduced consultation method is considered as integrating stakeholders to contribute as initial contact points for awareness raising and further involvement. It therefore serves both objectives: introducing stakeholders to the RRI concept and carrying out a common understanding of the RRI concept, as well as extracting information to be used in the subsequent work of the project.

The core element of the methodology is a multi-stakeholder workshop, composed of representatives of all five targeted stakeholder groups: Policymakers; civil society organisations; business and industry representatives from various fields; researchers; and educators (both informal and formal).

The applied methodology of structured workshop format needs to be facilitated according to guidelines within a tight timeframe to ensure that all the objectives can be addressed sufficiently. Workshop guidelines have therefore been designed to offer a set of different techniques and exercises that should best help stimulate and steer discussions and, at the same time, provide structured and visible outcomes. The workshop format is easy to apply to be replicated in the different hub locations. Results of the consultation will be structured summaries of group discussions following the same guidelines and workshop techniques. The report from each hub will follow the same structure through provided reporting templates and thus allow for comparative data analysis sorted by stakeholder groups.

The consultation methodology consists of: A stakeholder identification process in each hub region, a recruitment process of identified stakeholders as consultation participants, a consultation workshop, and a short follow-up e-mail survey to validate and complement results.

The analysis of the results will be used by the project to feed the production of the toolkit. All workshops took place between September and December 2014.

'Challenging futures' of PTA Instruments: Conceptual Ideas Towards a Responsible Public Engagement Nina Amelung and Carsten Mann

Facing today's societal challenges require innovation in governance. In order to guide the development of future policies and new forms of governance, careful policy assessment is needed at an early stage of their development. This paper introduces a reflexive approach to assess participatory instruments established in TA with a "Challenging futures" method referring to new conceptual approaches in the area of technology assessment (e.g. Rip et

al. 1995; Schot and Rip 1997; Garud and Karnøe 2001; Rip and te Kulve 2008). We make the case that design and development of policy instruments follow similar dynamics and produces similar problems as have been diagnosed for technology innovations, and hence the need for dedicated efforts in assessing societal impacts and, in light of this, regulating its development. This refers to the demand articulated in the call for sessions that "it is also necessary to reflect upon concepts, methods and instruments to support democratic problem solving and decision making."

Within the "Innovation in Governance" research group, we study the emergence and development of policy instruments and identify innovation mechanisms and patterns. Taking citizen panels as an empirical example we traced their "innovation journey", from initial ideas until their establishment as a best practice solution in the toolbox of participatory methods. A special focus is on the formation and activities of actor groups such as public participation practitioners, academic experts, politicians and public administration staff that form around citizen panel designs and applications, in support of them. By strategically combining agenda-driven and applied research with the mobilization of political support, this "instrument constituency" helped to develop and establish citizen panels as acknowledged and widely applicable policy solution for taking the public into account. Based on insights about the social dynamics of citizen panel innovation, we pledge for opening-up the arena in which citizen panels, their functions and implications are negotiated. Increasing participation possibilities for concerned societal interests at an early stage of citizen panels design can lead to more dynamic learning/adaptive approaches that may prevent some of the secondary repair work after enactment. In this sense, we developed an interactive and anticipatory assessment method to address critical issues which should be taken into account for developing the innovation agenda for (participatory) technology assessment instruments further.

Similar to technology innovations, the idea is to reflect the design process with its "constituency" and to open the process of citizen panels design in direct interaction with affected societal groups and also critics. Citizen panels will be shaped in the process of their making, so that they respond and adapt to the projected situated contexts in which they are expected to be used. Practically, this comes down to the "Challenging futures of citizen panels" workshop format where a wide variety of international actors involved in citizen panel design and implementation were invited to identify and discuss issues and challenges for the future development of participatory methods. The discussion was based on scenarios in which participatory methods could develop further dominated by particular logics: commercial, political and scientific. Critical issues were that participatory instruments are often approached with a technical-methodological perspective which hides the potentially antagonistic values, worldviews and rationalities enacted in participatory designs.

The political nature of most controversies on how to conceptualise, organise, and implement citizen panels suggests that there is no objectively right or wrong design decision to be made. Any decision will be political in that it favors one approach suggesting particular notions of public engagement, science and technology by defining the roles of participants,

The next horizon of technology assessment

experts and the problem at stake and rules out others. Key challenges for the future are on the one hand to make these decisions and its underlying normative values and worldviews more explicit and on the other hand to allow affected publics of such approaches to judge and engage with them in their own terms. Therefore, different decision-making forms for the design and use of new policy instruments are required where participatory instrument design needs to become a matter of open contestation and discussion. We will conclude with inputs and suggestions for the discussion of the innovation agenda for instruments of (participatory) technology assessment.

The Limits of Public Participation for Complex Policy Problems Ulrike Bechtold and Harald Wilfing

One area where participation is classically required is when commons are at stake: land use (patterns), energy (generation), air (pollution) etc. commons which affect all individuals. Decisions which are made here concerning their location, management and distribution – require public legitimation. One way to provide for that is to organize public participation exercises. We aim to rethink this somewhat unilinear connection and examine the limits to this reasoning.

What is the significance of the individuals' liberty in relation to requirements and necessities of a sustainable society? To what extent is the individuals' freedom the main cornerstone which coins action and where exactly are the limits when the interest of the community is opposing to an individuals' interests. In other words where does a common interest (and sustainable development) outweigh individual freedom?

At the latest since the remarkable analysis of the societal state in times of "Post Democracy" (Crouch, 2004) public participation in decision processes deserves careful attention and rethinking. In times of decreasing interest in democratic decision-processes especially the information transfer necessary to allow informed decisions is critically and so far often underestimated (see also Gudowsky and Bechtold 2013). The importance of the specific knowledge of the participants and hence deciders should be re-emphasized: lesser interest in the process itself is accompanied by lesser interest in terms of the general issues at stake. This is a true challenge when there is a green energy transition due. The question of the role of expertise is inevitable: how easily can a process be corrupted by sometimes irrational arguments brought forward as loud as possible by mostly self-proclaimed "experts", who represent nothing but their own personal interests (e.g. "not in my backyard"). This is foiled by the participants as "experts of the practice" – hence the old slogan of the enlightenment: sapere aude! (= dare to be wise), (Kant 1784) achieves a quite contemporaneous value.

Focusing to an implementation process anteceding the construction of a wind park in Austria we aim to illustrate these borderlines mentioned above: the diverse but tightly interconnected driving forces and motivations of those in favor and those opposing the building of a wind park shall be identified. To what extent are the correlations as mentioned above prone "to abuse freedom" – in other words under what circumstances is participation abused to enforce the interest of single stakeholders and therefore may account for serious obstacles in terms of a green energy transition.

References:

Crouch, Colin: Post Democracy, 2004.

Gudowsky, Niklas; Bechtold, Ulrike: The Role of Information in Public Participation. Journal of Public Deliberation, 9 (1), Art. 3, 2013.

Kant, Immanuel: Answering the Question: What Is Enlightenment?, 1784.

SESSION C¹



ROOM: BERLIN, THURSDAY, 10:30 AM - 12:30 PM Session organized by the Network TA

Responsible Research and Innovation in Europe – First Lessons Learned

MICHAEL DECKER (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS) AND STEPHAN LINGNER (EA EUROPEAN ACADEMY OF TECHNOLOGY AND INNOVATION ASSESSMENT GMBH)

AGENDA

RRI Governance – Lessons from the FP7 Project GREAT PETRAAHRWEILER (EA EUROPEAN ACADEMY OF TECHNOLOGY AND INNOVATION ASSESSMENT GMBH)

Societal Desirability, Inclusive Innovation and Participatory TA – Input from the PROGRESS Project MILTOS LADIKAS (UNIVERSITY OF CENTRAL LANCASHIRE)

Specific Challenges for Responsible Research and Innovation – Industrial Contexts and Human Brain Simulation BERND CARSTEN STAHL (De Montfort University)

Making Sense of RRI in the SYNENERGENE Project CHRISTOPHER COENEN, STEFFEN ALBRECHT AND HARALD KÖNIG (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

Responsible Research and Innovation in Europe – First Lessons Learned

Chairs: Michael Decker and Stephan Lingner

Session Description

The demand for technology assessment (TA) seems to be still growing, which might be related to three main reasons:

- 1. Scientific and technological progress is continuously opening new space for human action into previously inaccessible terrain. Correspondingly, the question arises if and in what way normative limitations should care for orientation, when sensible values are at stake. For instance, the recent developments in synthetic biology or human brain research might challenge fears or moral beliefs on the acceptability to create new life or to intrude into one's personality, respectively.
- 2. New reflection topics of TA might also emerge from necessary changes and innovation of established technical infrastructures as well as of the organisational and institutional constitutions of modern societies. The demographic change within ageing societies and the energy transition ("Energiewende") in several countries might serve here as examples for grand challenges for society at whole and for TA in specific.
- 3. Finally, in democratic societies the current demand for participatory TA results from public claims to take part and share responsibilities in decision-making processes of large-scale projects. Corresponding expectations on governance also beyond the political arena were already put forward in the controversial debates on the German "Stuttgart 21"conflict, on nuclear waste disposal, on smart city concepts and on other large infrastructures or socio-technological systems.

However, beyond new topical problems more impetus emerged on conceptional levels. Among them the concept of "Responsible Research and Innovation (RRI)" seems to become most prominent here. This concept evolved from a European perspective within the 7th EU Framework Programme and shaped the objectives of the new research programme "Horizon 2020" significantly (v. Schomberg 2013). In parallel, RRI was discussed in contexts of foresight and research politics (CEC 2011, CEC 2013), in research within science and technology studies (STS) (Owen et al. 2013, Stilgoe et al. 2013) as well as from perspectives of TA and philosophy of technology (Grunwald 2011).

A central issue of RRI is the aim to assess intended and unintended effects of new technologies in early stages of their development. It reflects current research and innovation processes with regard to societally desirable targets like health or security against criteria
for sustainable development while respecting ethically acceptable values. This reflective approach aims at the improvement of research programmes with regard to grand societal challenges and at corresponding socially robust decisions. However, this issue is principally also an objective of TA and from this background certain questions arise with regard to the utility of the still vague defined concept of RRI and to early experiences with it:

- Which methodological foundations are specific for RRI assessments of emerging technologies?
- Which possibly new topical focuses are on the horizon of RRI studies?
- Which new governance structures are necessary for an effective implementation of RRI assessments? Recall, that the RRI concept has a strong impact orientation.
- How will the deliberate claims of RRI assessments be reasoned and justified? Which participatory elements or procedures are foreseen within this concept?

The above mentioned issues might also still apply for TA, thus questioning whether RRI is merely "old wine in new bottles" or not. Anyhow, RRI's explicit demand towards "responsible innovation" could set stronger emphasis on responsibility problems. This for example could possibly strengthen the role of ethics of responsibility in future assessments of scientific research, technology development and innovation. These and similar questions on the relation of TA and RRI will be discussed in this session both on theoretical or methodological levels as well as on the basis of case-specific projects. The debate will particularly centre on the concept of RRI and its realisation in selected relevant European FP7-projects.

RRI Governance – Lessons from the FP7 Project GREAT Petra Ahrweiler

This contribution looks at the RRI-induced changes in EU-funded research and at the implications these changes have for coordination and governance issues. Does Responsible Research and Innovation imply a new mode of governance? Does RRI change the research process and the related decision mechanisms towards something we can call an "RRI governance", e.g. by including many civil society organisations as partners in EU projects, who co-design (and shape) the research process, or by including ethical advisory boards as committees in EU projects, which accompany (and shape) all research steps?

RRI elements change the research and innovation process in various dimensions: (i) by anticipation and foresight (e.g. concerning potential harmful consequences), (ii) by accompanying permanent reflexion, (iii) by discursive, deliberative and participative opinion formation and decision making within value discussions, and by (iv) responsive behaviour of all participants adapted to responsibility aspects (cf. Owen 2013). These RRI elements (anticipate, reflect, deliberate, respond) can, on the one hand, belong to the

profile of a research organisation, where they can be more or less emphasised and more or less supported by organisational institutions and infrastructures (RRI profiles of research organisations). On the other hand, these RRI elements can be part of the life cycle of a research project, where they are processed more or less sequentially, or again and again addressed in various feedback loops with institutional manifestations in the management structure of the project (RRI life cycles of research projects).

Workpackage 4 of the GREAT project is about impact assessment of RRI elements implemented in European research. How does RRI materialise on the level of EU-funded research organisations, projects and programmes? What effects and impacts does this have on the research process? Does this imply new coordination mechanisms towards a "RRI governance"? For this, we look at the RRI profiles of research organisations and at the RRI life cycles of research projects in a specific European funding scheme in the 7th Framework Programme: the CIP ICT-PSP (Competitiveness and Innovation Programme, Information and Communication Technologies, Policy Support Programme).

The contribution will present first results from quantitative and qualitative empirical research on RRI profiles of participants in the CIP ICT-PSP and on RRI life cycles of the projects in this programme. Furthermore, the contribution will present work in progress: For testing the impacts of potential RRI policy interventions and changes, the above data and results from empirical analysis will inform an agent-based simulation. Asking what-if questions, we will experiment with multiple intervention options, diverse governance models and various scenarios for "RRI governance". The simulation of the CIP ICT-PSP landscape under different governance regimes will, for example, address questions how the research logics of participants and the RRI coordination mechanisms relate to each other, and whether compliance norms and regulations prevent innovation and global competitiveness in the long run.

Societal Desirability, Inclusive Innovation and Participatory TA – Input from the PROGRESS Project

Miltos Ladikas

The project PROGRESS (PROmoting Global REsponsible research and Social and Scientific innovation) brings together a global multidisciplinary team of RRI researchers, policy-makers, research funders, industry and non-governmental organizations, to explore the application of RRI in terms of social desirability. Of the three main components in RRI application: ethical acceptability, sustainability and societal desirability, the latter is the focus of the project as the least convergent part of RRI and the most related to grand challenges that societies are faced with. PROGRESS explores national funders strategies and innovation policies in Europe, USA, China, Japan, India, Australia, and South Africa in terms of practical applications of RRI components and with the aim of developing a strategy

The next horizon of technology assessment

for fostering the convergence of regional innovation systems at the global level. We have found that societal desirability is part of "inclusive innovation" that is prominent in every national strategy although its actual application is far from conclusive. When it comes to applying inclusiveness to enhance societal desirability, participatory approaches developed in TA are the only methodological candidates that RRI draws upon. This is another aspect that shows TA as a clear antecedent of RRI but, despite the methodological dependency that RRI has developed towards TA, one can argue that the new terminology introduced by RRI actually enhances the scope and outreach of TA in mainstream STI policies.

Specific Challenges for Responsible Research and Innovation - Industrial Contexts and Human Brain Simulation

Bernd Carsten Stahl

Current discourses on responsible research and innovation (RRI) focus predominantly on publicly funded research and innovation activities. It is easy to see that such research relies on public support for continued funding and there is an easy case to be made that it has to be legitimate and be socially acceptable and desirable (von Schomberg, 2013). Given the pivotal role played by the European Union in promoting RRI it is furthermore not surprising that much emphasis is placed on how principles and practices of RRI can be implemented in the context of European research funding (European Commission, 2012, 2013). The current discourse frequently assumes that research and innovation activities are undertaken within relatively straightforward project settings characterised by clear project structures and established project governance.

In this paper I will discuss problems arising in those case where these assumptions are not met. I will focus on two projects to provide data and insights into such issues. The first one is the "Responsible-Industry" project which focuses on the question of why and how RRI could play a role in research and innovation activities that are funded by companies. The profit motive of private research funding is not necessarily consistent with an attention to societal acceptability and desirability. The question thus is why industry might want to engage with RRI in the first place and which forms such engagement could take. During the presentation I will present the preliminary findings of a set of interviews 10 and the first round of a Delphi Study involving 150 experts to shed light on these questions.

The second project I will present is the EU Flagship Human Brain Project (HBP). This is an interesting case that raises specific RRI challenges due to its size and significant public interest it raises. The HBP aims to develop computing technologies to simulate aspects of the human brain to overcome fundamental limitations of neuroscience research and use the insights gained in this way to find cures for neurological diseases. While this general

aim of the HBP is likely to meet the standards of desirability and acceptability, the size of the project and its multidisciplinary nature raises a number of additional questions. In the presentation I will outline the findings of a work package of the project that focuses on "Researcher Awareness" where the directors of all 12 sub-projects were interviewed. Based on these interviews all HBP project members were surveyed and preliminary results from this survey will be presented at the conference.

RRI aims to be practically relevant and have an impact on real research and innovation activities. This paper will thus make an important contribution to the RRI discourse by providing empirical insights into RRI implementation in complex cases.

Making Sense of RRI in the SYNENERGENE Project

Christopher Coenen, Steffen Albrecht and Harald König

SYNENERGENE is a four-year project (2013 2017) funded by the European Commission, dedicated to responsible research and innovation (RRI) in synthetic biology. The project aims at initiating and fostering public dialogue on synthetic biology and mutual learning among a wide variety of stakeholders from science, industry, civil society, education, art and other fields. As a Mobilisation and Mutual Learning Action Plan (MMLAP), SYNENERGENE can be deemed a real-life experiment with RRI which might also support the further conceptualization of RRI. Mutual learning on prerequisites for shaping research and innovation according to societal needs - and on prerequisites for defining such societal needs - in synthetic biology (and beyond) is the first goal. The project aims to be innovative also on a procedural level and concerning its understanding of inclusive stakeholder interactions and public dialogues.

SESSION C²

ROOM: PRAGUE, THURSDAY, 10:30 AM - 12:30 PM Seminar

Evidence-Based Policy: Public Controversies and Expert Trustworthiness

GEERT MUNNICHS AND ANNICK DE VRIES (RATHENAU INSTITUTE)

AGENDA

Contested Science – Public Controversies about Science and Policy GEERT MUNNICHS (RATHENAU INSTITUTE)

Balancing between Expertise and Parliament: Daily Practices ARMIN GRUNWALD (OFFICE OF TECHNOLOGY ASSESSMENT AT THE GERMAN BUNDESTAG)

Public Controversies and Expert Trustworthiness - Reflection ROGER PIELKE JR. (UNIVERSITY OF COLORADO)

Practitioners Meetings about Science for Policy ANNICK DE VRIES (RATHENAU INSTITUTE)

Evidence-Based Policy: Public Controversies and Expert Trustworthiness

Chairs: Geert Munnichs and Annick de Vries

Session Description

Policymakers are increasingly turning to science to substantiate their policy measures. There is much to be said for this evidence-based policy. Policymakers assume that their policy decisions will be more persuasive if they can give scientific arguments to support those decisions. But the practice of invoking science is not always trouble-free. Recently, public controversies have raised, amongst others, about drilling for shale gas or the assessment reports issued by the Intergovernmental Panel on Climate Change (IPCC). These kinds of controversies are often associated with declining public trust in science. However, public surveys show that the public still holds 'science' in high regard. What they also reveal, though, is that public trust falls off sharply as soon as scientific research is used for commercial and policymaking purposes. These findings indicate a paradoxical situation: is it possible to perform evidence-based policies without affecting the trustworthiness of the scientific experts involved?

At the seminar the prerequisites for trustworthy evidence-based policy will be explored. In order to do so, we would like to address the following topics:

- How to bridge the gap between the different 'worlds' of scientists and policymakers? How can scientific findings be translated in conclusions or recommendations that are useful for policymakers? How to deal with the scientific uncertainties that are inherent in (for instance) health or environmental risk estimations, while being a nuisance for policymakers? Should we distinguish between 'academic' scientific research and 'regulatory' or 'serviceable' science?
- How should the public upheaval about drilling for shale gas, the IPCC reports, underground storage of carbon dioxide or electromagnetic radiation by mobile telephone masts [or other case studies] be understood? What (broader) concerns or interests are at stake in these controversies? How are they related to the scientific discussion on (for instance) health or environmental risks? What role do experts and policy makers play in response to public unrest?
- To what extent the case studies show public trust in science or a lack of trust? What • role do 'critical' experts play? Do public interest groups refer to scientific findings themselves?

Public Controvers

Policy:

Eviden

What lessons can be learned from the way that scientists and policymakers have dealt with public controversies?

Contested Science – Public Controversies about Science and Policy

Geert Munnichs

"Research shows...' is an all-too-common turn of phrase in policy reports and political debate. These two small words instill great confidence: they imply that policy-making rests on solid grounds, that it is based on objective facts. But opinions may be divided about the facts. We have witnessed repeated controversies in recent years concerning the way in which policymakers use science. The controversies have concerned such divisive issues as the underground storage of carbon dioxide, exploratory drilling for shale gas, and vaccinations against cervical cancer. We look at six recent controversies and attempts to answer the following questions: In what way do policymakers call in scientific expertise? How do other parties (local residents, local authorities, civil society organisations) respond? Is there a lack of trust in science in such cases? And what lessons can we learn from the way that policymakers and scientists have dealt with public controversies?

Balancing between Expertise and Parliament: Daily Practices

Armin Grunwald

The TAB is an independent scientific institution created with the objective of advising the German Bundestag and its committees on matters relating to research and technology. How does TAB manage to interact with the members of parliament of the German Bundestag? The director of TAB will give us insights in how members of parliament deal with (scientific) evidence and in how he himself succeed (or not) to deliver members of parliament the information they are in need of. He will elaborate further on the implications for the role of scientific experts and the status of scientific expertise.

Public Controversies and Expert Trustworthiness - Reflection

Roger Pielke Jr.

Roger Pielke Jr., known from his book The Honest Broker and from his insights in the use of science in policy making, will give reflections on the two presentations on both public controversies and expert trustworthiness.

Practitioners Meetings about Science for Policy

Annick de Vries

The difficulties of the use of science for policy making are broadly experienced. Several initiatives are set up to bring together the experiences and practices of evidence based policy. One of these initiatives is organized in cooperation by the Rathenau Institute, the Karlsruhe Institute for Technology (KIT), and the Graduate School of Public Policy of the University of Tokyo. The three institutes organize seminars that offer a framework in which policy makers and scientists are able to rethink the problems, their roles and their responsibilities. This presentation shows the usefulness of this initiative and will explore challenges for the future.

SESSION C³

ROOM: LISBON, THURSDAY, 10:30 AM - 12:30 PM World Café

The Future of Responsible Research and Innovation: Drivers, Barriers, Contradictions, Timelines, Crossroads and Scenarios PETRA SCHAPER-RINKEL, SUSANNE GIESECKE AND PETER BIEGELBAUER (AUSTRIAN INSTITUTE OF TECHNOLOGY)

AGENDA

What Should be the Future of Responsible Research & Innovation? ELISABETH BONGERT AND STEPHAN ALBRECHT (UNIVERSITY OF HAMBURG)

RRI as Political Innovation: Upcoming Challenges and Structural Requirements for Technology Assessment MICHAEL ORNETZEDER (INSTITUTE OF TECHNOLOGY ASSESSMENT)

The Future of Responsible Research and Innovation: Drivers, Barriers, Contradictions, Timelines, Crossroads and Scenarios

Chairs: Petra Schaper-Rinkel, Susanne Giesecke and Peter Biegelbauer

Session Description

This session on the future of RRI will reflect the international state of debate and research on RRI with the focus on analysing drivers of and barriers to RRI and to analyse contradictions, timelines, crossroads, and scenarios related to future developments of RRI.

As science and technology become more central to economic development, the question of future-oriented governance of science and technology gets raised repeatedly. A decade ago, the question addressed how to maximize the contribution of science and technology to economic innovation with the intention of enhancing competitiveness. Today, the question also includes how to use research and innovation to tackle grand societal challenges and to contribute to (environmental) sustainability. The concept of Responsible Research and Innovation (RRI) is a central discourse to address these new questions and demands. Technology Assessment, Foresight/ Forward Looking Activities (FLA) are established interdisciplinary approaches to support society and policy making by analysing, debating and shaping technoscientific issues related to the challenges and by assessing available options for governing them. Today's concepts of RRI are based on these approaches but aim at implementing RRI in a much broader context. TA and Foresight experts and scholars are examining research fields and emerging technologies that are crucial for the future of RRI. Starting from these studies we will analyse drivers, barriers, contradictions, timelines, crossroads, and scenarios related to RRI.

We invite contributions focusing on case studies and policy related projects as well as conceptual approaches and methodological questions towards the future of RRI.

The 2 hour session will be organized in two parts: First come 4 Pecha Kucha presentations followed by an interactive World Cafe.

The session invited papers to be presented as Pecha Kucha Presentations (Pecha Kucha: a presentation style in which 20 slides are shown for 20 seconds each), keeping presentations concise and fast-paced. The presentations deal with one or more of the following issues:

- What are the different futures of RRI from various perspectives?
- What are the drivers and barriers of developing and implementing RRI?

- What are the contradictions that are crucial for the further development of the concept as well as for the implementation of RRI?
- Examining the timelines, crossroads, and scenarios of future RRI

In the second part of the session, we invite scholars also to think of RRI in more comprehensive ways: in terms of processes and politics which need to be opened up to allow 'responsible research and innovation' to extend beyond a programmatic buzz word. The format of the second part will be a world café on the future of RRI.

What Should be the Future of Responsible Research & Innovation?

Elisabeth Bongert and Stephan Albrecht

Core elements of a challenging approach to Responsible Research & Innovation (RRI) include inter alia:

- Proactive research & analysis of impacts of scientific and technological development (e.g. TA, Foresight),
- Application of the precautionary principle during all stages of utilisation of scientific & technological innovations (Innovation governance [von Schomberg 2011].

These criteria are undoubtedly important elements on the way to establish a new culture of innovation. But, our presentation will argue, they entail an implicit precondition: Scientific & technological innovations are already presupposed as a matter of fact. But, as we've learned from the history of societies and the more recent history of TA & STS, innovations are complex and intertwined processes between actors from diverse societal groups & stakeholders. Innovations are from the very beginning in parts intentional, in other parts unintended and/or contested, especially regarding long-term impacts. Global scientific evidence shows that the industrial and economic metabolism, especially in OECD countries, is all but sustainable and jeopardizes the very fundaments of all societal development, namely the terrestrial and marine ecosystems.

So, in a perspective of reflexive and green governance (Weston & Bollier 2013), three core issues emerge:

- What is the umbrella of normative legitimation?
- Who sets goals & targets for responsible innovations? Who is legitimized? Which legal fundaments & participative processes are required?
- What means responsibility? Who is accountable to which institution(s)? Which are items of responsibility?

Our presentation will reason that there will be a long way to establish a culture of cooperative, deliberative and democratic culture of social & technological innovations.

RRI as Political Innovation: Upcoming Challenges and Structural Requirements for Technology Assessment

Michael Ornetzeder

In my understanding, the concept of Responsible Research and Innovation (RRI) aims to advance the technological innovation system as a whole by including and strengthening novel as well as already existing normative and procedural elements. Such an advanced innovation system should be able to deal better with the grand societal challenges of the 21st Century without neglecting possible negative side effects of emerging technologies. In this paper RRI is treated as an innovation by itself. Drawing on STS concepts of institutional innovation and recent transition and diffusion of innovations approaches relevant conditions for the success of RRI will be discussed. Taking this perspective, RRI appears as a socially constructed approach eventually aiming at long-term fundamental reform of the dominant innovation regime that is heavily based on economics of techno-scientific promises. However, RRI still is in an early formative stage of development, characterised by conceptual variation, limited actor-networks and a small number of practical experiments. Based on the state-of-the-art of RRI the paper will explore pathways for the further development of this institutional innovation (invention). In particular, we will discuss upcoming challenges and structural requirements for learning and experimentation in the field of Technology Assessment, which is treated as one of the main pillars of RRI.

The next horizon of technology assessment

SESSION C⁴



ROOM: VILNIUS, THURSDAY, 10:30 AM - 12:30 PM PACITA Workshop

The Future of Ageing

Chair: Tore Tennøe

The Future of Ageing – Next Steps for Europe TORE TENNØE (NORWEGIAN BOARD OF TECHNOLOGY)

AGENDA

HILDE LOVETT Norwegian Board of Technology

P. WINTLEV-JENSEN European Commission – DG Connect

C. RUBIO FENIN – Spanish federation of Healthcare Technology Companies

S.I. STORMO ANDERSSON Health and Care Services, Bjugn Municipality, Norway O. AITKEN

CSV / Volonteurope

Session Description

Europe is facing the ageing society. The growing population of seniors will increase the need for health care services, and with the declining access to workforce this challenges the traditional ways of caring for our elderly.

How can technology address this challenge? And what are the available options for policy makers?

The PACITA project "The Future of Ageing" has organized ten scenario workshops in Europe; in Denmark, Czech Republic, Hungary, Ireland, Catalonia (Spain), Norway, Wallonia (Belgium), Switzerland, Austria and Bulgaria. The scenario workshops engaged more than 300 European stakeholders and resulted in a number of vision and policy options for European policy makers. The results ranged from incentives for voluntary work, strong privacy protection and a call for more collaboration between private and public actors.

The session on "The Future of Ageing" will present the results from the project, show "best practice" initiatives from different countries, and engage decision makers in a forward-looking discussion on policy options for the ageing society.

SESSION C⁵

ROOM: SOFIA, THURSDAY, 10:30 AM - 12:30 PM

Security and Privacy Perceptions of European Citizens: Beyond the Trade-off Model MICHAEL FRIEDEWALD (FRAUNHOFER INSTITUTE FOR SYSTEMS AND INNOVATION RESEARCH) AND JOHANN ČAS (INSTITUTE OF TECHNOLOGY ASSESSMENT)

AGENDA

The Context-Dependance of Citizens' Attitudes and Preferences Regarding Privacy and Security MICHAEL FRIEDEWALD (FRAUNHOFER INSTITUTE FOR SYSTEMS AND INNOVATION RESEARCH) AND MARC VAN LIESHOUT (TNO STRATEGY AND POLICY DEPARTMENT)

The Security/Privacy Trade-Off Model – The Citizens' Perspective on a Politically and Scientifically Contested Concept JOHANN ČAS (INSTITUTE OF TECHNOLOGY ASSESSMENT)

Beyond the Security/Privacy Trade-Off Model – The Co-Constitution of Security and Data Protection and Its Limits ROCCO BELLANOVA AND J. PETER BURGESS (PEACE RESEARCH INSTITUTE)

Citizens' Engagement in Urban Security Policy – Potential and Limitations PETER BESCHERER (UNIVERSITY OF TUEBINGEN)

Security and Privacy Perceptions of European Citizens: Beyond the Trade-off Model

Chairs: Michael Friedewald and Johann Čas

Session Description

The relation between security and privacy is often conceived in terms of a trade-off: more security necessarily comes at the cost of privacy, and vice versa. Policy or technology choices are accordingly presented as requiring striking a 'balance' between these two competing values. For example, we are told to accept that our online and telephone conversations are monitored to allow law enforcement and intelligence agencies to identify and protect us from people with criminal intent. Or if we want to arrive safely at our flight's destination, we must accept our bodies being scanned for hidden weapons and explosives.

On the other hand, counter discourses seem to consider this idea as fundamentally wrong. The flawed nature of the trade-off model, or metaphor, is one of the basic premises of three currently executed FP7-Security projects: PRISMS, SURPRISE, and PACT, all three of which are involved in studying the relation between security, surveillance (technologies) and privacy, and public perceptions thereof derived by participatory technology assessment activities.

Moreover, many security measures come in the guise of implementing an information system, often involving generation and processing of digital personal data. Whereas such solutions are often criticised in terms of privacy and data protection issues, they also generate new sets of security issues, because information systems can be hacked, spoofed, otherwise defrauded and sabotaged, or misused. Rather than framing the immaterial costs of security measures in terms of a trade-off between security and privacy, in many cases it would therefore seem to make more sense to look into the question how security issues are transformed, shifted, and redistributed.

In this session, presenters, including representatives of the three projects mentioned, are asked to reflect on the trade-off model, its function, public perception and influence on policy making.

More specifically, we want to

• locate where and by whom the trade-off model is used, and to what effect. Is it mostly authorities when arguing for another privacy invasive measure, or is it also the way public understanding of the issue is framed?

- question what the notions 'security' and 'privacy' exactly mean when they are played off against each other, and which meanings this obscures. Is it always clear for example, whose security is played off against whose privacy?
- answer the question how the trade-off model can be defended or criticised,
- a special emphasis should be given to empirical work on citizens' attitudes towards security and privacy and how they come about. Which factors and actors are influencing these attitudes? Are there differences between different ages and sexes? Do regional and cultural differences exist?
- and, last but not least, discuss policy implications and recommendations that can be derived from the results of the research.

The Context-Dependance of Citizens' Attitudes and Preferences Regarding Privacy and Security

Michael Friedewald and Marc van Lieshout

The relationship between privacy and security has traditionally been seen as a trade-off, whereby any increase in security would inevitably curb the privacy enjoyed by the citizenry. The trade-off model has, however, been criticised, because it approaches privacy and security in abstract terms, and because it reduces public opinion to one specific attitude, which considers these technologies as useful in terms of security but potentially harmful in terms of privacy. This is especially important for decision makers in industry and politics who are often surprised about negative public reactions showing that citizens are not willing to sacrifice their privacy for a bit more potential security. Consequently the PRISMS projects is dealing with two central questions:

- Do people actually evaluate the introduction of new security technologies in terms of a trade-off between privacy and security?
- What are the main factors that affect public assessment of the security and privacy implications of a given security technology?

Addressing these questions is not simply a matter of gathering data from a public opinion survey, as such questions have intricate conceptual, methodological and empirical dimensions. Citizens are influenced by a multitude of factors. Privacy and security may be experienced differently in different political and socio-cultural contexts. Therefore PRISMS has not only conducted a survey of public opinion, but has also explored the relationship between privacy and security from different disciplinary perspectives.

The PRISMS project has approached the main questions by a large-scale survey among European citizens. Between February and June 2014 Ipsos MORI has conducted around 1,000 telephone interviews in each EU member states except Croatia (27,195 in total) amongst a representative sample (based on age, gender and work status) within each country.

The survey comprised questions exploring respondents' perceptions of privacy and security issues and values questions including political views, attitudes to rights and perceptions of technology. The core of the questionnaire, however, was a series of eight vignettes aimed to understand public opinion towards different privacy and security scenarios. The questions for each vignette included whether the practices described should be allowed; the impact on people's rights and freedoms; and a series of specific statement questions about each vignette.

In our presentation we will focus on the analysis of the vignettes, exploring differences between general attitudes towards privacy and security and citizens' valuation of these values in concrete situations. We will show to what extend the type of security situation is affecting the degree people value privacy and security. Finally we will also cover differences between countries or clusters of countries.

The Security/Privacy Trade-Off Model: The Citizens' Perspective on a Politically and Scientifically Contested Concept Johann Čas

A central premise of the presented research is that framing the relationship between privacy and security in terms of a trade-off is only one among several potential interpretative frames, and also that it may not be the most common way of approaching the security issue among European citizens. The SurPRISE project developed an innovative, original methodology to explore these issues, involving about 2000 citizens from 9 European countries in participatory technology assessment activities. Qualitative and quantitative methods they used to ensure that citizens not only have a chance to express preferences among a set of predetermined options, they also have an opportunity to voice their own views, ideas, knowledge and proposals. SurPRISE is meant to provide two types of outcome: (1) a deep scientific understanding of the rationale behind rejection or acceptance of security solutions; and (2) guidelines for security experts, providers, policy makers and regulators to increase the appropriateness and effectiveness of security measures embedded in complex social realities.

Two series of empirical research were conducted, large-scale citizen summits, in the range of 200 participants per country, and small-scale citizen meetings, involving about 190 persons in five countries in total, to validate and supplement the results of the large-scale citizen summits. At the citizen summits three surveillance orientated security technologies were presented and discussed, deep packet inspection (DPI), smart CCTV and smartphone location tracking (SLT), at the small-scale meetings to more technologies were introduced, drones and biometrics.

In the presentation the policy recommendations derived from the research will be put into relation to main insights gained from the participatory activities, e.g.:

- What does security and insecurity exactly mean to respondents, what are the main perceived security challenges?
- · How do citizens connect security issues/threats to surveillance-based security measures?
- How do citizens perceive surveillance in general, and with regard to security technologies in particular?
- How does surveillance itself affect, if at all, citizens' everyday life?
- How do people understand privacy and data protection?
- What do citizens know/believe about the legal framework and control relating to surveillance-based security technologies, and what kind of information/communication do they require?
- What kind of legal safeguards do citizens require, and how do safeguards contribute to the acceptability of surveillance orientated security technologies?
- To better understand the connection between trust and the fear of abusing power with regards to security agencies that employ these technologies;
- To assess the reasoning behind the acceptance and rejection of the trade-off approach.
- To understand whether the preference for alternative solutions simply represents votes against surveillance, or whether citizens have particular ideas and requirements for supplementing the surveillance-based solutions in general and in regard to the discussed technologies in particular.

Beyond the Security/Privacy Trade-Off Model: The Co-Constitution of Security and Data Protection and Its Limits

Rocco Bellanova and J. Peter Burgess

In the European Union (EU), data protection has become one of the main responses to the rise of security practices relying on data processing technologies. However, the mode of functioning of data protection is rarely that of the so-called 'security/privacy trade-off'. Data protection is rarely external to security measures: it does not posit itself as a given boundary to security technologies, but it actively engages with their very functioning, morphing their scope, their purpose and their deployment. The shift away from the 'balance' or 'trade-off' models is institutionalized by the creation and adoption of assessment methodologies, such as 'privacy impact assessments' (PIAs) and 'decision support systems' (DSS), where data protection contributes to the design of new technologies. In other words, data protection

tends to co-constitute security practices, even when it questions, or threats, their existence (as in the case of the data retention directive).

This contribution investigates the main ways in which data protection is translated into assessment tools, in particular PIAs and DSS. It builds on the research carried on in the EU funded project PACT, and especially on the study of the theoretical risks for the DSS to be "manipulated" in order to promote or undermine support for security interventions. Based on these cases, the paper analyses the possibility to use data protection as a form of critique of the political implications of the set up of security practices.

It is increasingly difficult to disentangle data protection from security practices. While data protection offers a privileged point of entry in the design of new security technologies, it risks fall in short in terms of its ability to fundamentally question their political implications.

Citizens' Engagement in Urban Security Policy – Potential and Limitations

Peter Bescherer

For quite some time, urban sociology has been conceptualizing cities as places of tense mass society and infrastructural difficulties, but also of a particular urban competence in coping with insecurity. Due to the coexistence of multiple realities, people in the city are constantly required to deal with strangers, negotiate conflicts and handle uncertainty (Lefebvre 2003). However, since the late 1990s, tendencies of social and spatial polarization (Kronauer/Siebel 2013) seem to affect the basis for citizens' perceptions of (in-)security. Although they had their share in causing the problems in the first place, local governments are aware of the current challenges. For them, one way of coping is the expansion of participatory options in policy-making. As critics have argued, it is hard to decide whether this kind of participation is a genuine democratic input or a political >trap< that reduces discourse to presumably technical choices that need to be affirmed by the population (Swyngedouw 2009; Wagner 2013).

Based on a sketch of recent urban developments, I discuss empirical findings relating to citizens' engagement in the field of security policy. Aim of the research project that's behind this study is to figure out how security is produced and distributed throughout urban areas, and how people perceive and affect local security policy, e.g. the installation of new technologies or the re-shaping of public spaces. Questions I seek to address in this context are: To which extent do citizens' movements exist dependent or independent from political incentives? To which extent do they resist and counter; or support and foster urban security politics? Do the social movements that came up with the urban distortions, especially the Right to the City movement (Harvey 2008), provide an alternative to the often apolitical forms of civic engagement?

RRIwithinGlobalInnovationRegimes

SESSION C⁶

ROOM: DUBLIN, THURSDAY, 10:30 AM - 12:30 PM

RRI within Global Innovation Regimes: Producer Ethics, Consumer Freedom and Practices of Regulation ARND WEBER AND ULRICH DEWALD (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

AGENDA

RRI and the Dynamics of Markets: Global Objectives Require Global Regulation ARND WEBER AND ULRICH DEWALD (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

Nanotechnology Assessment: An Emerging Research Field in Poland – Perspectives and Dilemmas TOMASZ STEPIEN (WROCLAW UNIVERSITY OF TECHNOLOGY)

The Future of RRI Theories: If Innovation and Research Were Caring? SOPHIE PELLÉ (CEVIPOF – SCIENCES PO)

Technology Assessment: Challenge and Chance for Humanistic Education and Modern Engineering

VITALY GOROKHOV AND GALINA GOROKHOVA (INSTITUTE OF PHILOSOPHY OF THE RUSSIAN ACADEMY OF SCIENCES)

RRI within Global Innovation Regimes: Producer Ethics, Consumer Freedom and Practices of Regulation

Chairs: Arnd Weber and Ulrich Dewald

Session Description

According to the concept of RRI, technological risks can possibly be mitigated by early involvement of stakeholders and by openness of researchers for taking into account social and ecologic concerns. Beyond this agreement RRI opens up for a range of conceptual as well as practical constraints when implementing its basic ideas. Regarding theoretical concerns, the ascription of responsibility might limit the freedom of researchers. Corporate research in particular may not be open to suggested modes of public participation in the first place. Even if processes are opened, in the future, citizens may either criticize technologies, or favor ones which go with risks. Furthermore, embedding RRI in a globalized economy is challenging. Therefore the session combines papers that address questions such as:

- How can principles of RRI be integrated in research on emerging technologies?
- How should responsibilities be ascribed to stakeholders such as researchers or citizens?
- When and how can civil society participate therein?
- How can ethical and ecological considerations within innovation processes been taken into account in the global division of labor?

RRI and the Dynamics of Markets: Global Objectives Require Global Regulation

Arnd Weber and Ulrich Dewald

"Responsible Research and Innovation" (RRI) proposes to align the direction of technological change to societally desired normative, e.g. ecological and social objectives ("grand challenges"). It aims to implement steering mechanisms along the complete innovation chain, from invention till market penetration (von Schomberg 2013). Although RRI attracted attention in the TA community, the concept, as used so far, bears some constraints. This is especially the case if assessed from an economic view.

Regarding the spatial scope, it is rather vague on its application in the economy as a whole, be it in an EU Member State, in the EU, or in the world economy. From an organizational

perspective, it is unclear how all research and development activities can be made subject to a new procedure of approval by specialists of technology assessment or by citizens. From an ecological perspective RRI would only make sense if applied at a global scale, e.g. to go beyond the responsibility assessment of single products. However, the proponents of RRI do not address basic economic conditions for innovating within their models: business secrets are key to survival in the global economy. So if companies discuss characteristics first with outside experts, citizens etc. they would have less secrets left to be used for their sales, be it unpatented knowledge or ideas to be patented.

Starting with these general concerns, the main aim of this contribution is to address realization conditions of RRI from an economic perspective. Doing so, we explore three areas of concern.

First, the paper will deal with the problem of desirability. If desirability is not left to the market, how are preferences supposed to be articulated and governed?

Second, what are the "responsibilities" in global supply chains? Addressing questions like these ultimately leads to concerns on the undesirable side-effects of contemporary modes of global capitalism: If a responsible product was designed within a best-practice RRI-scheme, how can undesirable side-effects of global-scale production be avoided?

Third, the paper will explore how RRI matches with other (global) regulatory measures. Although until now no global mechanisms to reduce emissions have been established, a discussion is necessary whether product-related concepts like RRI can replace such global efforts. RRI might be applicable for some new and emerging technologies. But if RRI is supposed to contribute to solving the "grand challenges", complementary regulation needs to be established at an aggregate level. Environmental economics proposes to limit undesirable use or emissions with globally applicable decreasing limits. This would leave it up to the market players to decide what exactly to consume and how much.

We intend to analyze three approaches to solutions of what can be labelled 'responsible production':

- 1. Apply environmental economics. If this approach faces difficulties, deal with those. For example, explore ways to indemnify potential losers.
- 2. Consider the use of ethics in global production. Explore questions such as: Is it imaginable that the world's product designers collectively improve ecological or social aspects? What could be done to limit the force of competition preventing this?
- 3. Develop concepts to make the world's most affluent consumers voluntarily consume less.

Nanotechnology Assessment: An Emerging Research Field in Poland – Perspectives and Dilemmas

Tomasz Stepien

Meanwhile nanotechnology assessment makes out the well-established part in the general conception and practice of technology assessment. At the same time, in the case of Poland, it still remains an emerging research field. Therewith the following considerations focus on two

main aspects of nanotechnology assessment: the theoretical, and then the practical (societal, educational and political) one.

From theoretical point of view the paper characterizes the nanodomain as an example of the development of techno-sciences including three main theoretical approaches: technology assessment (TA), science and technology studies (STS) and converging technologies (CT). Generally, in the case of nanotechnology it is an attempt to calibrate reciprocally to each other the indeed familiar but also slightly different theoretical approaches established in the last decade. The starting point is a review of theoretical and methodological coordinates constituting nano-domain as science and technology, what makes out the framework of nanotechnology assessment regime with questions related with the nanotoxicology and the precautionary principle. This includes also the ongoing debate with controversies and dilemmas in the field of nano-ethics, so for instance how to avoid the Collingridge dilemma related to nanotechnology assessment as an emerging field of research and first legal regulation in Poland.

From the practical point of view in the case of nanotechnology assessment in Poland we have a good chance to observe how these processes of modeling of technology assessment work. Is it too late or at the right time with respect to the ongoing in Poland changes in the system of research and higher education which oscillates between the post-academic and socially robust conceptions of science? Technoscience in general and nanoscience/nanotechnology in particular must remain transparent to the public and subjected to moral/political responsibility from the one hand, from the other hand in Poland there is a lack of public discussion about a new contract between science and society.

Moreover, the challenge remains to establish a theoretical and practical attitude towards nanotechnology that would be situated beyond utopian promises or dystopian fears. Hereby appears the educational dimension of nanotechnology assessment in Poland and the strategic role of the humanities by providing the necessary reflecting attitude, especially in the engineers' higher education. Basing on the elaborated hitherto analyses and experiences in the field of nanotechnology assessment the paper presents works and processes which are initiated in Poland in last few years.

The Future of RRI Theories: If Innovation and Research Were Caring?

Sophie Pellé

The paper first draws a picture of the current literature on RRI and shows that most conceptions fall into two types of theories. The first one rests on purely procedural dimensions (such as anticipation, inclusion, reflexivity or responsiveness, (for instance: Owen et al, 2013; Lee and Petts, 2013; Grunwald, 2011). The second one adds to these dimensions a substantive content that defines what responsibility is, in proposing to follow EU norms (among others: von Schomberg, 2011; an EC report, 2013) or in resting on a virtue ethics (Grinbaum and Groves, 2013).

The next horizon of technology assessment

Then, the paper emphasizes one possible future for RRI theory following a path initiated by Grinbaum and Groves (2013) and Groves (2006), but departing from it in several aspects. The paper investigates the conceptual and practical potentialities of the idea of care in the context of RRI. Moving beyond several classical oppositions (backward looking/forward looking conceptions of responsibility, consequentialist moral theories/deontological moral theories), the idea of care allows to escape from a too restricted conception of responsibility based on liability but also from the danger of diluting the idea of responsibility in complex causal chains which take place in large time-scales. Finally, anchored in a pragmatic tradition according to which moral judgements grow and evolve interwoven in a context, the idea of care offers both a sound theoretical framework on which building the future of RRI and a dynamic structure that can shape institutions and practices.

References:

Grinbaum, A., Groves, C. (2013). "What is the 'responsible' in responsable innovation". In, R. Owen et al. (eds) (2013a), pp. 119-142.

Groves, C. (2006) "Technological Future and Non Reciprocal Responsibility, The International Journal of the Humanities, 4 (2), pp. 57-61.

Grunwald, A. (2011) "Responsible Innovation: Bringing together Technology Assessment, Applied Ethics, and STS research", Enterprise and Work Innovation Studies, 7, pp. 9-31.

Lee R., J. Petts (2013) "Adaptive Governance for Responsible Innovation" In R. Owen et al. (eds.) (2013a), pp. 143-164. Owen, R., J. Bessant, M. Heintz (eds.) (2013a). Responsible Innovation. Managing the Responsible Emergence of Science and Innovation in Society. London: John Wiley.

Owen, R., P. Macnaghten, J. Stilgoe, M. Gorman, E. Fisher, D. Guston (2013a). "A Framework for Responsible Innovation". In R. Owen et al. (eds.) (2013b), pp. 27-50.

Report of the Expert Group on the State of Art in Europe on Responsible Research and Innovation (2013) Options for Strengthening Responsible Research and Innovation, Chair: J. van den Hoven.

von Schomberg, R. (2013). "A vision of responsible innovation". In R. Owen, et al. (eds.) (2013a), pp. 51-74.

Technology Assessment: Challenge and Chance for Humanistic Education and Modern Engineering

Vitaly Gorokhov and Galina Gorokhova

A typical feature of modern engineering is the differentiation of its various disciplines and functions. This differentiation, however, has not arisen instantaneously: complex cooperation of the various fields of engineering has developed only gradually. In my talk I will outline the development from the application of natural sciences to various types of engineering activities (invention, construction, design), which serve various spheres of engineering (machine building, electrical engineering, chemical engineering). Three main lines can be distinguished, which require different types of education: 1) production engineers, who have to combine the capabilities of a manufacturing engineer (production manager), 2) research and development engineers, who have to work as inventors and design engineers,

since these functions are closely associated with research. 3) generalist systems engineers, who organize and manage the various engineering activities.

After the Chernobyl catastrophe the scientific view of the world has changed. The need to have independent experts for technology assessment grew up, and the limitation of men's knowledge and scientific prediction was recognized. The need to inform the population and the political set about "normal" or extraordinarily situations near nuclear power plants is obvious. To fulfill this necessity, engineers (their know-how as well as their self-understanding) play an important role. They are very important in order to organize an independent environmental monitoring of the radiation situation near from ecological dangerous objects. In my talk I will discuss international information systems which democratize the visibility and availability of data. Only on the basis of full information it is possible to realize an independent individual choice. The lesson that should be learned from such catastrophes is to support technology assessment research including participatory methods. And this is also a question in the process of designing a technology.

This report is prepared for the RFBR-Projekt 15-06-02634 "Transformation of the Natural Scientific Experiment in the Social Sciences".

SESSION C⁷

ROOM: LIÈGE, THURSDAY, 10:30 AM - 12:30 PM

Approaching Synthetic Biology for Societal Evaluation and Public Dialogue

STEFANIE B. SEITZ (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

AGENDA

Differentiating the Discussion on Synthetic Biology MARGRET ENGELHARD (EA EUROPEAN ACADEMY OF TECHNOLOGY AND INNOVATION ASSESSMENT GMBH)

SynBio Politics: Bringing Synthetic Biology into Debate in the Netherlands VIRGIL RERIMASSIE (RATHENAU INSTITUTE)

The Need for Experimental Communication in Synthetic Biology BRITT WRAY (UNIVERSITY OF COPENHAGEN)

Biohacking as Citizen Scientists and the Global DIYbio Scene – an Introduction: Who Are Biohackers and What Is It About? RÜDIGER TROJOK (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

Approaching Synthetic Biology for Societal Evaluation and Public Dialogue

Chair: Stefanie B. Seitz

Session Description

Synthetic Biology (SB) emerged at the interfaces between molecular biology, biotechnology, organic chemistry, engineering, and informatics/systems biology just recently. The increase of knowledge and the recent advances in these fields have increased the ability to design and build robust and predictable biological systems using engineering design principles. Consequently, SB aims to develop biology as a substrate for engineering by adapting concepts developed in the fields of engineering which introduces a new quality of scientific development.

Beside first applications that are still rather "sophisticated biotechnology" SB produces also numerous visions and promises. Can SB contribute to the solution of the world's most significant challenges including energy supply, fighting disease, or even remediating polluted sites? And what about its risks for human heath, nature, and the society? These questions made SB quite early to an object of different kinds of assessments (including TA). This session aims to reflect on how SB can be approached and want to discuss the following questions:

- How can a societal assessment of SB succeed?
- What can "the public" contribute to this assessment of SB and how to integrate it in the political decision making process?
- How to promote public interest in SB and public dialog about it?

Differentiating the Discussion on Synthetic Biology Margret Engelhard

Synthetic biology is not a monolithic bloc, it is diverse and on the move. The general subfields are well described. However the large diversity of the disciplinary backgrounds of the scientists contributes not only to the structuring of the field but is also framing the individual research agendas to a great extent. On a closer look even the described subfields (engineering approach, synthetic genomic, protocell research and so on) are not eligible to reflect the realities of the research field. Also regional differences in research agendas and cultures between for example Europe and the US add up to the diversity of the field.

That makes societal evaluation of synthetic biology a challenging task and prone to misunderstandings. Confusions arise not only on the level of what part of synthetic biology

the discussion is on, but also on the level of the underlying concepts in use. Here some readjustments to do more justice to the heterogeneity of synthetic biology are suggested. \rightarrow Instead of directly reviewing the field as a whole, it is suggested to focus on characteristic features of synthetic biology that are relevant for the societal discussion.

An important example of these features is the enlarged depth of intervention. Some of these features apply only to parts of synthetic biology, where others might be relevant for synthetic biology as a whole. In the next step this refined view can be utilized for ethical evaluation, risk assessment, analysis of public perception and legal evaluation. This approach will help to differentiate the discussion on synthetic biology and to facilitate and support a problem oriented and sound evaluation of synthetic biology.

SynBio Politics: Bringing Synthetic Biology into Debate in the Netherlands

Virgil Rerimassie

In order to promote the proper societal embedding of synthetic biology, the Rathenau Institute has been actively involved in stimulating dialogue on the emerging field since 2006. One of the efforts was organizing a 'Meeting of Young Minds' in 2011: a youth debate between 'future synthetic biologists and future politicians'. The former were represented by participants of the international Genetically Engineered Machines competition (iGEM), the latter by political youth organizations (PYOs), linked to Dutch political parties. The Rathenau Institute found seven PYOs – varying from rightwing to leftwing and green to Christian – willing to commit to an intensive process aimed at formulating a tentative participants. Given the little amount of available data on how political parties gauge synthetic biology, an analysis of the debate may contribute to the understanding of where potential political sensibilities and concerns may arise.

The Need for Experimental Communication in Synthetic Biology

Britt Wray

This paper is concerned with the use and influence of imagination in 'performative sentences' about synthetic biology, and how an experimental role for the science communicator might be refreshed to nuance and critique such imaginaries. The paper begins with an analysis of depictions of synthetic biology as a revolutionary field that allows scientists to "not only alter nature but guide human evolution as well," where life becomes more than "as it could be," transforming into "life as we could make it be" (Pauwels 2013). Synthetic biology's 'economic calculus' that connects 'engineering practice to a plurality of life forms' has created

the condition upon which it appears unprecedented (Mackenzie 2013). I will demonstrate how this seeming lack of precedents ties it into discourses of 'bio-objectification' and what bioartist Oron Catts calls "Neolife". But is this lack of precedents real, or imaginary? According to Bernadette Besnaud Vincent, statements describing the technoutopian future of synthetic biology can be seen as 'performative sentences,'"sentences which do something in the world rather than (just) describing something about it." Part of the functional effect of these 'performative sentences' is that they mask the long history technosciences have of promising future revolutions that are born from a similar imagination of progress that is employed in synthetic biology. Following Vincent Besnaud, I will argue that there is a cultural amnesia at play in synthetic biology, which gets produced through its imaginaries. The second part of the paper explores how masked histories of technoscience, 'neolife' and bio-objects can be brought into a more productive relationship with synthetic biology discourse than is presently seen. I take this as an opportunity to revitalize the role of the science communicator in the discourse of interdisciplinary experimentation concerning the field at a time when the role of anthropologists, ethicists, sociologists and even artists are becoming increasingly well documented in synthetic biology for their critical contributions, but the role of the science communicator is left to steep in its confined status as "hype maker." I will explain how a new interactive science engagement experiment of mine that explores masked histories of technoutopian imaginaries is taking 'post-ELSI' research seriously, which declares we need new experiments in knowledge production between scientists, social researchers and their publics in synthetic biology that are "pluralist, reflexive, and promote mutual learning" (Rabinow & Bennet 2012, Fitzgerald 2014, Pauwels 2013, 225).

Biohacking as Citizen Scientists and the Global DIYbio Scene – an Introduction: Who Are Biohackers and What Is It About? Rüdiger Trojok

The topic is being discussed by a phenomenon of everyday but therefore even more pressing occurrence – the antibiotic resistance spread in bacteria. A problem affecting each and everyone of us, globally, that cannot be resolved by e.g. better regulation, but neither by a smart new invention. It needs scientifically literate public, to engage with the problem from a holistic point of view, working in accordance with smart governance as well as innovative and sophisticated technologies.

During the talk, latest innovations in the life sciences are addressed, as well as the potential to apply them outside of traditional laboratory research. The risks and chances, but also the challenges to face in order to realize this urgently needed solution will be laid out.

Finally, a first approach is taken to define requirements for the needed organisational structure and the role of citizen scientists within it, as well as for digital and biological technologies.

SESSION C⁸



ROOM: BUDAPEST, THURSDAY, 10:30 AM - 12:30 PM PACITA Dialogue Forum

Debating Future Citizen Engagement in European Policy-Making MARIE LOUISE JØRGENSEN (DANISH BOARD OF TECHNOLOGY FOUNDATION)

Debating Future Citizen Engagement in European Policy-Making

Chair: Marie Louise Jørgensen

Sesion Description

This session invites politicians, policy-makers, academics, and practitioners to actively engage in a dialogue forum on future citizen participation in European policy-making. The forum is structured around a number of rounds with pre-defined focal points, but it's the views of the participants which are in focus in this session. The dialogue forum is a great opportunity for people from different professional backgrounds to meet and share their point of views on the current as well as future role of citizen engagement in European political decision-making processes.

The forum revolves around practice. Initially, it discusses how the EU has approached citizen engagement up till now, and then it concludes with a final discussion about future citizen engagement in the EU. It takes its empirical point of departure in Europe Wide Views on Sustainable Consumption which is one of the three example projects in the PACITA research project. The event Europe Wide Views is a transnational citizen consultation which took place in 11 EU member states in October 2014 and engaged more than 1000 ordinary citizens. The citizens were invited to share their views on sustainable consumption and provide policy-makers with important input to future political decision-making processes. The consultation was based on the World Wide Views method where citizens at multiple national sites debate and vote on the same policy-related questions, and thus making transnational, quantitative comparisons possible.

To date, citizen engagement processes in the EU have primarily been limited to the EU Commission's Citizens' Initiative and research programmes. With this status quo in mind, the dialogue forum invites participants to share their views on what the future strategy on citizen participation in European policy-making should be. Starting empirically from the citizen consultation Europe Wide Views, the session wants participants to discuss how the gap between European citizens and the EU can be minimised, and thus making EU policy-making more inclusive and democratic.

The rounds of the session will each open with a short introductory presentation that provides the framework for the following discussions. Then, the participants engage in roundtable debates, and in conclusion, the rounds are ended with plenary discussions.

For more information on Europe Wide Views on Sustainable Consumption, the method and results of the citizen consultation, please visit http://citizenconsultation.pacitaproject.eu/.

SESSION D²

ROOM: PRAGUE, THURSDAY, 2:30 PM - 4:00 PM Panel Discussion

The Importance of Strong Science Journalism in TA

ANTOINETTE THIJSSEN (RATHENAU INSTITUTE) AND JOOST VAN KASTEREN (DUTCH ASSOCIATION OF SCIENCE JOURNALISTS)

AGENDA

JOOST VAN KASTEREN Chairman Dutch Association of Science Journalists

ANTOINETTE THIJSSEN Head of the Communications Unit of the Rathenau Institute

HANS PETER PETERS Social scientist at the Research Center Jülich and Adjunct Professor at the Free University of Berlin

NINA KRISTIANSEN forskning.no

MIĆO TATALOVIĆ Science Journalist for the New Scientist

JOHANNES RENDERS Rathenau Institute

The Importance of Strong Science Journalism in TA

Chairs: Antoinette Thijssen and Joost van Kasteren

Session Description

TA wants to engage and involve citizens, and wants to inform, influence and convince politicians and policy makers. This makes the media an important partner for TA institutions, and the quality science communication a topic of utmost relevance. The societal debate and dialogue on the implications of new technology takes for a large part place in the media, and these discussions often have a huge impact on politics and policy. The experience and expertise of science journalists, science communicators and columnists can (and often does) play an important role in these societal debates and therefore in the democratic decision-making process. The main questions that will be addressed during the session are: What is the significance of a strong, independent science journalism? What role do science journalists ideally have in a democratic society co-designed by science and technology? How can science journalism remain viable in the future? And most importantly, how can TA and science journalism work together in a mutually beneficial relationship?

The goal of this workshop is to explore and examine the opportunities and challenges involved when it comes to the cooperative relationship between TA and science journalists. Among these challenges are the difficulties experienced by traditional science journalism due to the economic crisis and the rise of the internet. Revenues are dropping and budgets are being cut, putting newsrooms under pressure and causing particularly specialist journalists to lose their jobs. In the face of these cuts many media simply resort to publishing (or broadcasting) press releases from the PR departments of universities and research institutions without checking or properly contextualizing the news. There are opportunities as well: In Europe and in the United States many initiatives are taking place to strengthen the position and the quality of science journalism. The European Commission has taken an interest by making responsible research and innovation one of the key concepts in the Horizon2020 program. The EC feels that strong science journalism can contribute to the much needed dialogue between science and society and to the empowerment of citizens.

The session with be moderated by Antoinette Thijssen (head of the communications unit of the Rathenau Institute, NL). Joost van Kasteren (chairman Dutch Association of Science Journalists, candidate for the chair of the European Science Journalist Association) and Johannes Renders (Rathenau Institute, NL) will present the findings of an ongoing research about the future of science journalism. A panel composed by three experts engaged with the field of science journalism will discuss the mentioned topics and answer questions from the audience. The panel is composed by Hans Peter Peters (social scientist at the Research Center Jülich, Germany, and Adjunct Professor at the Free University of Berlin), a prominent science journalist/writer, and a science mediator.

SESSION D³

ROOM: LISBON, THURSDAY, 2:30 PM - 4:00 PM Round Table

The Role of Research Evidence in Improving Parliamentary Democracy

Chair: Caroline Kenny

The Role of Research Evidence in Improving Parliamentary Democracy CAROLINE KENNY (PARLIAMENTARY OFFICE OF SCIENCE AND TECHNOLOGY)

AGENDA

DANIELLE BÜTSCHI TA-SWISS

MARA ALMEIDA Instituto de Tecnologia Química e Biológica, Universidade Nova de Lisboa

GRAEME COOK The Scottish Parliament Information Centre (SPICe)

ZLATKO ATANASOV Macedonian Parliamentary Institute

ROBERT SCOTT HEASLET National Democratic Institute, Serbia

JAN STAMAN Rathenau Institute

Session Description

Parliaments perform an important democratic function in overseeing and scrutinising Government, making new laws and debating the issues of the day. Research evidence is one type of information used to inform Parliamentary debate and scrutiny. Effective technology assessment and the use of research evidence therefore have the potential to improve public policy, enhance public services, contribute to the quality of public debate and thus strengthen democracy.

The UK's Parliamentary Office of Science and Technology (POST) is undertaking a research project to understand the role that research evidence plays in Parliamentary scrutiny, debate and legislative work in Westminster. It is keen to learn more about how parliamentary advice and support on research is organised in different countries and what lessons we can learn from our different experiences about how best we can develop infrastructure for advice and support on research evidence in parliament.

SESSION D⁴

ROOM: VILNIUS, THURSDAY, 2:30 PM - 4:00 PM

Robotics Technology Assessment: New Challenges, Implications and Risks? ANTÓNIO B. MONIZ AND MICHAEL DECKER (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

AGENDA

Robotics And Industry 4.0 - Discourse, Development And Consequences SABINE PFEIFFER (INSTITUT FÜR SOZIALWISSENSCHAFTLICHE FORSCHUNG AND UNIVERSITY OF HOHENHEIM)

How Robots, 3D-Printers And Digitalisation Bring New Opportunities For Norwegian Industry JON FIXDAL (NORWEGIAN BOARD OF TECHNOLOGY)

The Future Of Work And Production SIMONE EHRENBERG-SILIES AND SONJA KIND (VDI/VDE INNOVATION AND TECHNIK GMBH)

Robots Everywhere RINIE VAN EST (RATHENAU INSTITUTE)

Proactive Safety System Using Risk Analysis in a Human-Robot Collaboration M. NIITSUMA

QUESTIONS

What are the challenges with the integration of different technologies (logistics, ICT, materials, microand nano-engineering, bionics, mechatronics, etc.)?

Which new implications and risks arise with the intensification of use of robots in everyday life?

Is the way we understand the production activities changing due to robotisation? Which new features are emerging and will be usual in the future?

With dissemination of automation (in industry, health, agriculture) there is a trend to take humans out of their work environments? How will be the work of future?

Are there options for new design of work environments, or these are determined by the way technology is developed?

Robotics Technology Assessment: New Challenges, Implications and Risks?

Chair: António B. Moniz and Michael Decker

Session Description

Robotics technology has been applied to a wide variety of sectors and with a higher economic and social impact. In the last decades it has been one of the main elements of industrial manufacturing automation where about 1.5 million robots are currently operating, which means that 4 to 5 million workers are operating those systems. From 2014 to 2016, robot installations are estimated to increase by 6% on average per year. Besides this, in recent years the number of professional service robots has increased enormously in military and civil applications (around 130 thousand units).

Apart from this empirical facts published by the International Federation of Robotics, general discourses on robotics show an acceptance of the technology development processes, but new research is needed. In fact, more visions exist about robotics technology. This observation seems obvious in recent discussions about service robots in health sector where a wide range of expectations are transferred to this type of application from the experiences in industry. Although most robots are in industry there is also an increasing dissemination in service and field sectors. In the civil field, the sectors that are applying robots for work activities are agriculture, health, construction, professional cleaning, inspection, underwater and rescue. For the next years are expected to be introduced around another 100 thousand of this type of robots (source: IFR).

This technology represents already an important market with a growing impact factor, either in economical level, as in social one. The reality seems to be diverse from public opinion formatted by media more grounded on science fiction. At the same time, in the TA community this type of technology is gaining an increased interest, and there are some studies done at the national or European levels on robotic TA on legal and ethical dimensions, or on employment and safety issues. Our hypothesis is that this technology is shaping the way we are been related to the work environment and to the integration of autonomous systems in our daily life. This integration means also the development of strategies towards a continuous increasing productivity. For this reason we would like to discuss the dimensions of these developments, impacts and options from different national and cultural perspectives, and from different theoretical and ethical approaches.

SESSION D⁵

ROOM: SOFIA, THURSDAY, 2:30 PM - 4:00 PM

Policy Making in a Complex World: The Opportunities and Risks Presented by New Technologies

TIMO WANDHÖFER (GESIS – LEIBNIZ INSTITUTE FOR THE SOCIAL SCIENCES), SOMYA JOSHI AND STEVE TAYLOR (STOCKHOLM UNIVERSITY)

AGENDA

Finding and Analysing Online Data to Support Governmental Decision-Making Processes - the Case of Sense4us TIMO WANDHÖFER AND MAXIM BASHEVOY (GESIS – LEIBNIZ INSTITUTE FOR THE SOCIAL SCIENCES)

Analysing Social Media to Inform Policy-Making MIRIAM FERNANDEZ AND HARITH ALANI (THE OPEN UNIVERSITY)

Modelling and Simulation of Public Policy Problems – Sense4us Model Builder and Simulation Tool OSAMA IBRAHIM AND ARON LARSON (STOCKHOLM UNIVERSITY)

Assumptions to Artifacts: Understanding the Design Choices Underpinning the Sense4Us Project SOMYA JOSHI (STOCKHOLM UNIVERSITY)

Policy Making in a Complex World: The Opportunities and Risks Presented by New Technologies

Chair: Timo Wandhöfer, Somya Joshi and Steve Taylor

Session Description

New techniques are emerging to assist policy making, in particular where a vast body of open data from many different sources (including citizens themselves) is being made, and tools are emerging for its analysis and simulation. We propose to examine what the benefits to such innovations are, where any resistance comes from and what are the inherent tensions within this marriage of technology & governance.

We propose to do so via presentation and discussion of a multi-disciplinary EC FP7 named Sense4us. This project aims to investigate how techniques such as policy modelling and simulation, data analytics and social network discussion dynamics can benefit the policy making process. We will describe, and invite discussion and comment on, work regarding political language (semantic & sentiment analysis), simulation and decision support, the processes & products of policy making and citizen engagement within the context of open governance.

Finding and Analysing Online Data to Support Governmental Decision-Making Processes – The Case of Sense4us

Timo Wandhöfer and Maxim Bashevoy

Governmental policy makers face many problems in accessing information to support their policy making: they may not find enough information, they may be unaware of information that is relevant, or they may be inundated with information that is difficult to take into account because of its sheer size. The Sense4us EC FP7 project with the aims to investigate how techniques such as (1) policy modelling and simulation, (2) open data searching, linking and analytics, and (3) social network discussion dynamics can address these problems and benefit the policy making process.

The project is currently at month 16 of 36. Initial requirements from policy makers/ decision makers have been gathered, and an initial demonstration system has been developed, aiming to demonstrate how the research components of the project can addressing the problems above. This system will be demonstrated in the session via a first user story to compare a Twitter selection with a policy document to show potential benefits of the toolbox. We will also describe some of the research of the project on analysis of social media and decision support.

Analysing Social Media to Inform Policy-Making

Miriam Fernandez and Harith Alani

Recognising if a policy is well or badly received by the citizens, what elements of the policy are more controversial, and who are the citizens discussing about that policy are key factors to support policy makers in understanding, not only the citizen's opinions about a policy, but also up to which level the social media dialogs represent public opinion and should be used to inform the policy making process.

Making and implementing policy at any level of government is difficult, not due to a lack of information, but due to the difficulty of finding and aggregating the right data out of the sea of information which characterises our modern world. In particular, with the emergence of social networking sites, fast and continuous streams of data are being generated by citizens about a variety of topics, including their opinions and arguments about policies.

Social media is currently consider an important source of information from where policy makers can obtain the citizen's opinions and gain insights about the policy discussions emerging in this social platforms [IBM, 2012].¹ For example Twitter, with over 270 million monthly active users and 500 million tweets sent daily, has now become a goldmine for monitoring citizens' sentiment and opinions. However, summarising and extracting sentiment from these large and continuous streams of data constitutes a difficult and important research problem.

In addition, understanding who are the users discussing policy in social media and how policy topics are debated could help Policy Makers assessing how the citizen's views and opinions should be weighted and considered to inform policy making.

This talk describes the research and development conducted by the Sense4us project regarding the analysis of policy discussions and sentiment in social media. This research include methods to: (i) monitor and collect social media data, (ii) pre-process this data to extract relevant content and user features, (iii) analyse this data to extract insights from policy discussions (iv) compute the sentiment of the monitored discussions and, (v) identify the key characteristics of those users discussing policy topics.

1 http://www.businessofgovernment.org/blog/business-government/next-four-years-citizen-participation

Osama Ibrahim and Aron Larson

A large part of the research done within the area of policy analysis is to investigate the possibilities to incorporate new management technologies into public policy decision-making in a meaningful and practically feasible way that adds significant value to the process. The aim of the Sense4us decision support tools is to apply participation, cognitive strategic thinking and scenario-based planning in order to:

- model a public policy problem situation using a causal semantic network or a causal map, defined by a single user, the policy analyst or a domain expert, or developed as a joint model of the problem through a synthesis analysis of multiple users' cognitive understanding of the problem;
- simulate policy consequences and possible future scenarios on the causal model by quantifying the change transfer links connecting the model variables and generating change scenarios; and
- design alternative policy options based on a forward looking impact assessment in terms of economic, social, environmental and other impacts.

This research is guided by a review of contemporary public policy making literature and strategic management theory to gain a better understanding of the "how" of the policymaking process and the key factors influencing the public policy decision-making. The Sense4us tool provides decision support for the so-called "policy formulation stage" of the policymaking process.

A problem is viewed as an issue arising from a deviation from a goal or a standard. Those deviations originate in a change that propagates itself through causal connections. Our approach is integrating the quantitative modelling approach of operational research and intuitive dialectical process consulting. Once negotiated, the set of assumptions (problem model) becomes the explicit foundation upon which the choice problem is defined and policy options are appraised. Simulation techniques can support the policy decision process by allowing evaluation of the system dynamics present in the policy problem situation at hand.

This presentation presents a decision support simulation model for the European Union (EU) Climate and Energy targets 2030 as a case study of public policy decision making on the EU level. A system dynamics simulation model is derived from text analysis of verbal descriptions of the problem. A problem structuring method, 'Causal Mapping and Situation Formulation', is used for graphical representation and analysis of change scenarios. The resulting model, which is a complex topology of quantified causal dependencies among the problem key variables, can be used to simulate the transfer of change, i.e. the impact on societal factors given that a policy impose some change on controllable factors.

Assumptions to Artifacts: Understanding the Design Choices Underpinning the Sense4Us Project

Somya Joshi

Complexity is ever increasing in the data becoming available to us when making policy decisions. Ranging from sensors to text, from social media to expert repositories of knowledge. Policy decision makers are grappling with how to make the journey from noise to signal. The challenge that emerges is how to make sense of the open and big data allegedly at their disposal. At the same time, it is not easy to structure the chaotic nature of this information. Citizens and policy makers alike wrestle with how to intelligently filter information according to relevance, relationship and provenance. Thus not only does it become a concern of sense-making, but also one where trust needs to be built in. Finally, decision makers are increasingly coming under pressure to be more inclusive and co-create policy with stakeholders.

Standing at the crossroads of Big Data, Open Governance and an articulated desire for citizen participation, we ask what role do the technical design assumptions play in shaping policy?

Technological innovation in this context is embraced with rhetorical enthusiasm and seen as a de facto enabler or catalyst for more democratic decision-making. Is this really the case? In this presentation we start our journey by providing an in-depth conceptualization of engagement and a framework for understanding impacts emerging from this within policy. We provide an empirical & illustrative lens through which we can examine the process of participation – both as a political construct and as a technological artifact.

When considering the design of technological artifacts, Participatory Design (PD) has always been concerned with power relations [1]. It is an ethical and pragmatic stance that commits the designer to engage from the outset with those people affected by a design outcome. PD explicitly attends to designs not being neutral but creating power and agency for particular people. PD relies on partnership with participants in which participants bring essential knowledge of their own context and culture while designers bring technical and design facilitation skills creating opportunities for mutual learning and development. In our study we pay particular attention to this call for agency and context, when framing any discussion on participation and user engagement.

Taking this discussion to the next level, when we apply participatory design to the context of policy decision making, the common question which emerges is: how can citizen based knowledge – whether experimental, experienced or empirical – be integrated in processes that are orchestrated in the different stages of multi-level governance [2].

The collaborative approaches towards policy processes have been argued to secure their legitimacy by giving citizens and civil society organizations direct access to previously remote decision-making processes [3].

The panel presentation will allow for discussion and debate on the relationship between technical design choices when modeling and simulating decision processes and the perceived impacts these can have for policy.

References:

 J Simonsen & T Robertson (2012) (eds), Routledge International Handbook of Participatory Design. Routledge, New York, pp. 145-181. Routledge International Handbooks

[2] Loeber, A., Hajer, M., & van Tatenhove. (2005). Investigating new participatory practices of the "politics of life" in a European context. Final report – Theory and method. Participatory Governance and Institutional Innovation. Contract no. CIT2-CT-2004-505971.

[3] Hajer, M., & Kesserling, S. (1999). Democracy in the risk society – Learning from the politics of mobility in Munich. Environmental Politics, 8(3), 1–23; Healey, P. (1997). Collaborative planning. Shaping places in fragmented societies. London: Macmillan Press;

Innes, J. E., & Booher, D. E. (1999). Consensus building and complex adaptive systems. A framework for evaluating collaborative planning. American Planning Association Journal, 65(4).

SESSION D⁶

ROOM: DUBLIN, THURSDAY, 2:30 PM - 4:00 PM

Technology-Based Care Practices – A Critical Exploration in the Field of Elderly Care

LINDA NIERLÍNG AND BETTINA-JOHANNA KRINGS (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

AGENDA

Seeing Again. Ageing, Personhood and Technology IKE KAMPHOF (MAASTRICHT UNIVERSITY)

Future Technologies – Current Challenges: Future Assistive Technologies as Drafted by Engineers, their Effects upon Users and some Further Implications ULRIKE BECHTOLD (INSTITUTE OF TECHNOLOGY ASSESSMENT)

Robot Caregiver or Robot-Supported Caregiving? – The Performative Deployment of the Social Robot PARO in Dementia Care MICHAELA PFADENHAUER AND CHRISTOPH DUKAT (UNIVERSITY OF VIENNA)

About the Attraction of Machine Logic – the Field of Elderly Care BETTINA-JOHANNA KRINGS AND LINDA NIERLING (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

Technology-Based Care Practices – A Critical Exploration in the Field of Elderly Care

Chair: Linda Nierling and Bettina-Johanna Krings

Session Description

Usually, the discourse of ageing societies is posing a demographic challenge. In Europe, this challenge is covered by expectations of (new) technological developments which are going to resolve these challenges. Thus, technologies like Ambient Assisted Living (AAL), telecare systems or even the idea of service robots are very prominently discussed as potential solutions for this societal vision. Coupled with the problem of rising costs for health systems in European welfare states as well as the lack of qualified personnel, the use of technology in public debate often seem the only solution to overcome structural problems in elderly care. Surprisingly, the attraction of machine logic, here, seems to be only directed to allow elderly persons an independent living. Other implications of technology, like social, institutional or even cultural issues are rarely discussed within these expectations. The social construction of technological environments (Bijker et al. 1987, Grunwald 2010) in the field of elderly care seems widely lost within these technological visions. As these discourses show significantly, however, technical promises are commonly addressed to several social groups with different perspectives on care. Generally the addressees are the elderly people themselves, caring family member as well as professional nursing staff at the same time. How technologies should be support which situations of care interactions seems often widely unclear. Nevertheless, technologies seem the key player in these discourses when demanding the maintenance of the 'autonomy' of elderly people.

This session aims to address the missing linkages outlined above. It aims thus to contribute to the current debate on technology and care practice, by discussing both, theoretical contributions from the field of social studies of science and technology as well as empirical evidence from daily living practices of each of the affected group.

Seeing Again. Ageing, Personhood and Technology Ike Kamphof

Professional homecare organisation employ activity monitoring technology--often still in a semi-experimental stage—to keep a watchful eye on frail elderly clients. By placing motion sensors (and occasionally camera's) in the homes of frail elderly people homecare organisations aim to detect emerging health and safety hazards at an early stage. Activity monitoring allegedly supports the independence and quality of life of frail elderly people, enabling them to live in their own home longer while receiving more targeted and personalised care. Monitoring systems are also criticized for their vast surveillance power and for threats they entail that vulnerable people are reduced to data sets that confirm ageist stereotypes. These promises and fears, however, remain overly general and speculative when not supported by analyses that move beyond mere technological possibilities. In this contribution I present an alternative approach, based on a combination of phenomenological analysis and ethnographic fieldwork with three homecare organisations in the Netherlands.

Activity monitoring technology makes aspects of the daily activity of frail elderly people visible that normally fall outside of the observational range of formal and informal caregivers. It enables to see homecare clients in new, technologically enhanced ways. I will present how these processes of observing or "seeing again" take shape in practice and how respect, or disregard, for frail elderly people as persons is part of technologically mediated care. Caregivers use the technology as "extra eyes" to familiarize themselves with their clients individual needs. They also re-consider data provided by the technology, and, at times, close their eyes to overt data displays in order to respect their client's personal space. Complex processes of human and technological seeing and not-seeing combine to secure respectful ways of observing and caring for frail homecare clients. Nevertheless, I conclude that healthcare policy and design have to engage more closely with everyday care practice to secure technologically mediated care relationships as relationships of trust and respect, and to avoid unnecessary tensions that the technology currently raises in practice.

Future Technologies – Current Challenges: Future Assistive Technologies as Drafted by Engineers, their Effects upon Users and some Further Implications

Ulrike Bechtold

Four mobility and security scenarios from the European research project "Value Ageing", serve to think about potential challenges that may emerge from a widespread use of assistive technologies. The somewhat provocative question is whether certain technologies do not only reflect ethical considerations and societal values in their making, but in some respects, their use may directly effect upon these as well. This question, which reflects the social construction of technological environments for older adults as well as other demographics, benefit from applying a technology assessment perspective.

This contribution includes insights into the expectation of assistive technology to foster positive individual and/or societal effects as to:

- security,
- skills and cognition,
- autonomy and,
- a transfer of assistive technologies designed for mature individuals to other demographics (e.g. children).

Considering these effects, deciding what kind of assistive technology provides the best support also requires a societal discourse to commonly define what a society worth living in as an aged person should look like. We won't be able to discuss this without reflecting and consciously deliberating on questions which involve fundamental societal values and ethical principles.

To fully unfold its supportive function ambient assistive technology takes decisions (ICT, AAL, AmI, etc.). This requires defining good-bad, desirable-undesirable in advance. For the technology to properly work this choice is necessarily determined when the technology is still in development. However, actual applications and hence real-world settings may require quite different distinctions.

Robot Caregiver or Robot-Supported Caregiving? – The Performative Deployment of the Social Robot PARO in Dementia Care

Michaela Pfadenhauer and Christoph Dukat

Our technical point of reference to the subject of social robotics is the robot baby seal PARO. Because PARO is currently being deployed in Germany mainly as activation therapy for elderly people with dementia, we are conducting a long-term ethnographic study to investigate how this socially assistive robot is applied by professional care workers in a residential care centre for the elderly. The underlying general hypothesis on which our approach is based is that it is no means clear at the beginning of the development phase what a technology actually is. Rather, this emerges only in coordination with the context of application. Moreover, we hypothesise that the appearance and the performative deployment of a technical artefact are therefore interdependent. Only in combination with experiences – the experiences of others, imparted as knowledge, and first-hand experience of actually using the technology – are its design and technical functions of relevance to what it is regarded as being. Our video-assisted ethnographic study of the performative deployment of PARO as activation therapy for elderly people with dementia has revealed that the robot is deployed as an occasion for communication, on the one hand, and as an observation instrument on the other. In particular, the latter manner of use proves to be of relevance in relation to dementia because it creates an optional spatiotemporal communication setting, which can be sustained for a relatively long time.

Hülsken-Giesler, Manfred (2008): Der Zugang zum Anderen. Zur theoretischen Konstruktion von Professionalisierungsstrategien pflegerischen Handelns im Spannungsfeld von Mimesis und Maschinenlogik. Osnabrück

About the Attraction of Machine Logic – the Field of Elderly Care

Bettina-Johanna Krings and Linda Nierling

An ageing society poses a demographic challenge. In Europe, currently technologies like Ambient Assisted Living (AAL), telecare or even the idea of service robots are very prominently discussed as potential solutions for this societal vision. Coupled with rising costs for the health systems in national welfare states and a lack of qualified personnel, the use of technology in public debate seem often the only solution to overcome structural problems in elderly care. Surprisingly, the attraction of machine logic, here, seems directly connected with the independency of living conditions for elderly persons. Social, institutional or even cultural issues are rarely discussed within the social construction of technological environments (Bijker et al. 1987, Grunwald 2010) in the field of elderly care.

As these discourses show significantly, technical promises are commonly addressed to several social groups with different perspectives on care. Thus, very often the addressees are the elderly people themselves, family member as well as professional nursing staff at the same time. Although efficiency and control of care activities are implicitly mentioned with regard to the improvements of care practices, the theoretical focus of technological developments lies – as mentioned above - paradoxically on the concept of autonomy of elderly people.

The following paper will provide some results from a broad empirical study in elderly homes, which was conducted by a project funded by the German Ministry of Research. Facing consequently the perspective of working processes in care practice these results will be analyzed according to organizational, institutional and occupational structure within this field. By doing so, the introduction of technological innovations in the field of elderly care becomes another focus. Similar to medicine, health care also is embedded into a complex and technological-based health sector in Germany. Furthermore, recent qualification processes of nursing staff imply a high degree of technical environment. Nevertheless, technical innovations create fields of tensions within the occupational field which still are not considered comprehensively as the following quotation shows:

"The rational and efficient world of health care has a tendency to overwhelm the human and subjective world of patients and nurses. Therefore, excellence in nursing practice demands further involvement with issues related to ethical, gender, economic, theoretical, political and intellectual aspects of technology" (Bernard 2001 in: Hülsken-Giesler 2008:279).

Some elected issues, mentioned here, will be highlighted in the paper.

References:

Bijker, Wiebe; Hughes, Thomas P.; Pinch, Trevor J. (eds.) (1987): The social construction of technological systems. New directions in the sociology and history of technology. Cambridge, Massachusetts Grunwald, Armin (2010, 2. edition): Technikfolgenabschätzung – eine Einführung, Berlin

SESSION D⁷

ROOM: LIÈGE, THURSDAY, 2:30 PM - 4:00 PM

Indicators in Technology Assessment – Passive Choices or Reflected Options? NUNO BOAVIDA (UNIVERSIDADE NOVA DE LISBOA) AND STEFAN BOESCHEN (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

AGENDA

Can the Societal Impact on Innovations Be Measured? RAINER FRIETSCH AND PETER NEUHÄUSLER (FRAUNHOFER INSTITUTE FOR SYSTEMS AND INNOVATION RESEARCH)

The Inevitability of Interactive Development of Indicators for Responsible TA JACK SPAAPEN (AKADEMIE VAN WETENSCHAPPEN)

Integrity as an Indicator in Technology Assessment – Towards a Framework Connecting Motivational and Organizational Extensions of Quality Assurance OLE DÖRING (HORST-GÖRTZ-INSTITUTE, CHARITÉ UNIVERSITÄTSMEDIZIN)

Early Indicators in Technology Assessment OLE BERND GIESE AND ARNIM VON GLEICH (UNIVERSITY OF BREMEN)

Indicators in Technology Assessment – Passive Choices or Reflected Options?

Chairs: Nuno Boavida and Stefan Boeschen

Session Description

Technology Assessment (TA) is dealing with complex problems. The description of complex problems and the strategies for their solution are heavily influenced by the use of indicators. For example, the debate about risks of nuclear power plants shifted in the moment the indicator of climate neutrality came in, because nuclear fission seemed to be a "green technology". This use, selection and shift of indicators is not specific for this debate, but is to be found in any debate. With the use of indicators, the scope and quality of the problem addressed is fixed (e.g. sustainability: "Security of livelihood", or regulation of chemicals: "toxicity"). Therefore, the systematic look on the use of indicators in TA is key to critically analyse such problems, their description and political relevance.

Against this background, the selection of indicators is a sensitive, crucial and sometimes hazardous exercise during a TA study in two ways. On the one hand, there is the use of indicators by actors in the field under analysis. They frame the problem in a way which is in correspondence to their normative background and economic-political interests. In fact, their selection can entail options that are not neutral, trivial or conscious, creating an implicit and sometimes controversial space for "indicator politics" in the exercise. On the other hand, there are the TA-experts using indicators to describe the problem and to evaluate options of action and decision. Therefore, it is important to have a close look on the criteria to select indicators which may be based on their policy relevance, utility, analytical soundness and measurability, as well as on other (un) conscious factors.

In this session we reflect on the perils of the selection of indicators in both directions: the actors in risk-policy arenas using indicators for their purposes of describing and solving problems, and the TA-experts using indicators to analyse such processes. Regarding this tension, we want to address the following questions: Is there sufficient reflection on the selection of indicators? Is the selection of indicators misleading to certain technology options? Or is it opening new technology options? What exactly is the role of indicators in TA exercises? Do they describe the initial problem? Are we creating space for reflexivity regarding the selection of indicators? Is this space sufficient?

With regard to the construction of TA-expertise, the argument is that TA exercises need a clear formulation of the initial problem and the indicators used to do so. This procedure should allow a transparent selection of indicators that describe the problem. A TA exercise should also include

space to reflect about the inclusion and the non-inclusion of certain indicators. In addition, the analysis phase should include a reflexive process about the selection of indicators, before technology options are suggested and recommendations elaborated.

Can the Societal Impact on Innovations Be Measured?

Rainer Frietsch and Peter Neuhäusler

Innovation is an inflationary used term by policy makers, policy consultants and meanwhile also by scientists. The definition of innovation is often very general and crude, if there is a definition at all. In colloquial language it is often a synonym for something new or advanced, or it is used as an adjective to describe hip or hot topics. Innovation research defines innovation as the result of a process with the main components of invention AND diffusion (Grupp 1998). Something that is innovative needs to be new to the market or at least new to the company that offers the innovation (OECD 2002; OECD, Eurostat 2005).

Innovation research has long identified the role of society or social groups as an important cornerstone in the innovation process, not only being able to hinder or even prevent inventions, but also to be a crucial factor in the diffusion phase (Rogers 2003; Utterback 1994; Utterback, Abernathy 1975). The innovation systems concept in particular stresses the societal impact on innovation (Edquist 1997; Lundvall 1992; Nelson 1993). The role of customers as well as suppliers as a source of knowledge and as an ignition of new ideas has been acknowledged in many studies and even found its way into the standards of innovation questionnaires (Aschhoff et al. 2013; Peters, Rammer 2013).

On the level of national economies and beyond any particular technologies, there have been several approaches to measure the affinity, openness, aversion, and refusal etc. of societies towards technologies, inventions, and innovation. One of the most well-known empirical works has been done by Richard Florida (Florida 2002), but many others before and after him have also tried so (see for example Shcherbak 2013; World Economic Forum 2013).

This presentation will discuss perspectives and concepts of societal impact on innovation. A number of theses will be derived how societal factors might take effect. It will also clarify the term of social innovation compared to the definition of innovation that is used in empirical innovation research. Based on this, the use of the term social innovation in German policy making and the role assigned to society in the latest High-Tech Strategy will be assessed. Finally, a number of indicators meant to reflect societal impact and framework conditions for innovations are suggested and also an empirical comparison of these indicators for a number of innovation oriented countries is presented (Schubert et al. 2014).

References

Aschhoff, B.; Baier, E.; Crass, D.; Hud, M.; Hünermund, P.; Köhler, C.; Peters, B.; Rammer, C.; Schricke, E.; Schubert, T.; Schwiebacher, F. (2013): Innovation in Germany - Results of the German CIS 2006 to 2010, ZEW-Dokumentation No. 13-01, Mannheim, Karlsruhe: Zentrum für Europäische Wirtschaftsforschung, Fraunhofer-Institut für System- und Innovationsforschung.

Edquist, C. (ed.) (1997): Systems of Innovation. Technologies, Institutions and Organizations. London: Pinter.

Florida, R. (2002): The rise of the creative class: And How It's Transforming Work, Leisure, Community and Everyday Life, New York: Basic Books.

Grupp, H. (1998): Foundations of the Economics of Innovation - Theory, Measurement and Practice, Cheltenham: Edward Elgar. Lundvall, B.-A. (ed.) (1992): National Systems of innovation: towards a theory of innovation and interactive learning. London: Pinter.

Nelson, R.R. (ed.) (1993): National Innovation Systems. Oxford: Oxford University Press.

OECD (ed.) (2002): Proposed standard practice for surveys on research and experimental development: Frascati manual 2002. Paris: OECD.

OECD; Eurostat (eds.) (2005): Oslo Manual. Proposed guidelines for collecting and interpreting innovation data., 3rd Edition. Paris: OECD/Eurostat.

Peters, B.; Rammer, C. (2013): Innovation Panel Surveys in Germany. In: Gault, F. (ed.): Handbook of Innovation Indicators and Measurement. Cheltenham: Edward Elgar, pp. 135-177.

Rogers, E.M. (2003): Diffusion of Innovation, 5th edition, New York: Free Press.

Schubert, T.; Rammer, C.; Frietsch, R. (2014): Innovationsindikator 2014, Deutsche Telekom Stiftung; BDI (eds.), Bonn: Deutsche Telekom Stiftung.

Shcherbak, A. (2013): The impact of tolerance on economic modernization in a comparative perspective, 7 (4), pp. 6-15.

Utterback, J.M. (1994): Mastering the dynamics of innovation. How companies can seize opportunities in the face of technological change, Boston, Mass: Harvard Business School Press.

Utterback, J.M.; Abernathy, W.J. (1975): A dynamic model of process and product innovations. In: Omega, 3 (6), pp. 639-655. World Economic Forum (2013): The Global Competitiveness Report 2013-2014, Geneva: World Economic Forum.

The Inevitability of Interactive Development of Indicators for Responsible TA

Jack Spaapen

The development of indicators for research and technology has long been dominated by an approach that was inspired by linear models of the trajectory science-technologyapplications. Currently not only science is in transition (cf. science 2.0) but also the way scholars think about indicators and evaluation in general. And, more and more, also policy makers tend to switch position in their approach regarding the assessment of science and technology. In particular, this seems to happen at the European level, but also in a number of countries.

This change in perspective is inspired by a growing collaboration between academics, entrepreneurs, policymakers, NGOs and the wider public. In such new public private partnerships, there is a growing need for new kind of indicators to "measure " the success of the new research and innovation programs. In these, not only the quality of research and the applicability of technology play a role, but also other considerations come to the fore. In particular this regards social and cultural considerations, ethical issues, engagement of stakeholders and the wider public, etc.

Also, there is a growing resistance to the predominant presence of quantitative indicators, not only because they do not give the right kind of information for these new collaborative arrangements, but also because they tend to have a number of perverse effects, among which perhaps the worst are that they give the wrong incentives to the next generation of researchers, and that they block inter- and transdisciplinary research.

Indicators that do help these new collaborative arrangements therefore should be focussing on the interaction between the relevant stakeholders, and on the contribution they each deliver to the overall goals. The prime focus should therefore be on the development of the S&T agenda of the project or program and on how this is managed by the relevant partners. Secondly, one should discuss the kind of indicators best fitting the S&T practices and then jointly decide upon a limited set of indicators (because things have to be manageable). Such indicators are thus highly contextual, and supported by the participants in the project or program To be sure, when I talk about indicators, I not only think of quantitative data, but also of qualitative ones. The latter ones might be even preferable, given the early stage of development of RRI policy.

To be short, I see the development of indicators as a bottom up process, guided by the collaboration between relevant stakeholders.

Integrity as an Indicator in Technology Assessment – Towards a Framework Connecting Motivational and Organizational Extensions of Quality Assurance

Ole Döring

This presentation will introduce a work in progress with the purpose to establish "integrity" as an indicator in Technology Assessment. As part of a comparative and discoursive investigation into Chinese/Confucian and European/Kantian conceptual frameworks in ethics that as been developed over several years and through a series of Sino-European studies about the ethics and governance of health and life science based technologies, this emerging conception intends to connect motivational and organizational extensions of quality assurance, as a professional program of self-cultivation under conditions of adherence-based governance.

The paper will focus on cases described in the Lancet's debate on "Increasing value and reducing waste." (Series January 8 and 15, 2014) and elaborate the implications of these findings for the integrity of science, as a foundation for legitimate TA. It will then explore a strategy, how to advance the investigation's rationale, from a "reduction of waste" approach to a "rehabilitation of value" approach. It will argue that "value" in terms of quality has no habitat in the currently dominant science system (Forschungs-Betrieb), but without science as the author of value there is no sustainable measure for quality claims.

Rather than aiming to establish a pre-defined positive set of criteria for the assessment of technology, and as if technology were in essence a matter of engineering, this approach regards technology categorially as a practice. Hence, cultural, social and economic as well as individual motivational factors must be considered when describing the form and content of quality indicators. The practicability of sincere intentions and the freedom to make conscientiously "right" (or wrong) decisions, as opposed to mere pragmatic or prudential incentives, are conditions for a responsible practice of technology production as well as assessment. Integrity will be introduced as a procedural and plastic regulative idea that can serve as a principle and a virtue, to mobilise individual moral learning and institutional governance learning in terms of quality, because it makes it reasonable for the individual actor/scientist to be co-opted by the system.

This might appear ,,unrealistic", however, it offers a prospect of a learning curve in response to a widely perceived skepticism in the research system to safeguard quality. It exercises a practical anthropology of responsibility, trust and sustainability as a reasonable groundwork for quality development.

At the same time, this project proposes a cross-cultural framework for adherence-based governance culture, as opposed to compliance-based governance rationales.

According to this strategy, it will be argued, that science can be rehabilitated as "scientists own property", that cannot be alienated by secondary interests, such as ideology, administration, commerce or utility. Integrity can support science in generating indicators for TA that are owned by science. This is the precondition for science as a credible authority in discourses about TA.

Early Indicators in Technology Assessment

Ole Bernd Giese and Arnim von Gleich

Societal interventions that influence innovation processes as early as possible, if achievable already in the research phase of technological developments, have the highest potential for preventing negative path dependencies. This is particularly relevant if the character and the power of technologies by trend induce global and irreversible effects that cannot be corrected if necessary. Here the precautionary principle comes into play. At least some strains of nanotechnologies and of synthetic biology are examples for such technologies with an increased depth of intervention and thus long chains of effects in space and time. Due to their actual early stage of development - especially in case of synthetic biology - technological investigations in fact represent rather research assessment than technology assessment.

Therefore, measures in accordance with the precautionary principle have to deal with two types of knowledge-deficits: known unknowns and unknown unknowns. The first type represents a problem of socio-economic effort - or better: expense, because often it is simply not possible to test all conceivable effects or exposure scenarios of a new entity. The latter results from the power of a technology on the one hand, and from systems complexity on the other hand. The power of technologies increases the possibility of unforeseen effects and exposure. On the side of the affected systems, instabilities and nonlinear dynamics render a reliable forecasting impossible. And if above all only vague concepts for application exist, assessment is confronted with the need to change its analytical focus from the effects to the triggers: critical qualities and functionalities of new processes and products as early indicators for future impacts.

But what characterizes early indicators in this regard?

In chemistry, genetic engineering and nanotechnology ,reasons for concern' are already discussed as an appropriate strategy to identify early indicators. For chemicals they have even been implemented in legislation (cp. the European Union regulation for Registration, Evaluation, Authorisation and Restriction of Chemicals-REACH). Production quantity, persistence and bioaccumulative potential (quality), release into the environment, the ability to proliferate (in case of genetically modified organisms) and the mobility of nanoparticles in organisms and in the environment represent important indicators in this regard. In contrast to a number of other precautionary criteria that are related to specific effects, the indicators listed above imply a higher probability for exposure and therefore, besides hazardous qualities, refer to the second factor in the definition of risk. High exposure in connection with novelty or a non-natural character is now regarded as a reason for concern. This shift from effects to early indicators of exposure represents a new and advantageous perspective, as for a long time exposure was only considered when detrimental effects had already appeared. The advantage of indicators for exposure is their independence from currently unknown - or 'unknowable' (see above) - processes that are relevant for hazardous effects.

Using the example of synthetic biology our contribution gives orientation for the choice of early indicators that are relevant for risk-related investigations in prospective technology assessment. Furthermore we show that, despite the (still) hypothetical variety of biological entities enabled by synthetic biology, a characterization of their potential hazardous functionalities can be deduced from a number of assessable basic capabilities.

SESSION D⁸

The next horizon of technology assessment

ROOM: BUDAPEST, THURSDAY, 2:30 PM - 4:00 PM Film Presentation and Discussion

Interactive BIO•FICTION Film Lounge

WOLFGANG KERBE (BIOFACTION) AND ANTONINA KHODZHAEVA (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

Interactive BIO•FICTION Film Lounge

Chairs: Wolfgang Kerbe and Antonina Khodzhaeva

eva

Session Description

We invite you to explore the field of synthetic biology through a variety of films in an engaging and interactive session format. Synthetic biology is an emerging field of research that comprises knowledge, approaches and methods of biotechnology, engineering, and related disciplines with the overarching aim to create organisms with novel characteristics. Potential applications of synthetic biology can contribute to a bio-economy, the medical sector and may provide solutions to environmental challenges. With the advancement of the research in this field, many questions and issues, both already familiar and new ones, arise. These issues concern, for example, ethical implications associated with creation of novel living organisms, legal aspects of biosecurity, as well as fair distribution of possible benefits from use of the new technology.

Each film, which will be shown during the session, reveals a different perspective on synthetic biology, offering a good ground for reflections and discussions about ethical and societal implications, the current state and the future of this emerging technology. The session will also discuss which opportunities fictional portrayal of science can offer for critical reflection about emerging technologies and their implications. Films were originally screened during BIO•FICTION Science Art Film Festival, which took place in October, 2014 in Vienna, Austria. The aim of the festival was not only to engage scientists, social scientists, biohackers, artists and filmmakers in a discourse on synthetic biology but also to address ambiguities and paradox aspects of the field itself by offering an unconventional program. In this session we will discuss some of these aspects using films to stimulate a lively interaction between the participants.

The next horizon of technology assessment

SESSION E¹

ROOM: BERLIN, THURSDAY, 4:30 PM - 6:00 PM Plenary Session

What's Next for TA? Experiences, Perspectives, Outlook

MILTOS LADIKAS (UNIVERSITY OF CENTRAL LANCASHIRE), CONSTANZE SCHERZ AND JULIA HAHN (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

AGENDA

Consultating Local Municipalities about the Energy Infrastructure in Germany REINHARD GRÜNWALD (OFFICE OF TECHNOLOGY ASSESSMENT AT THE GERMAN BUNDESTAG)

The "Australian Perspective" on TA Institutions PETAASHWORTH (UNIVERSITY OF QUEENSLAND)

The Lessons Learned from Doing TA in Norway TORE TENNØE (NORWEGIAN BOARD OF TECHNOLOGY)

The Future of TA in Austria MICHAEL NENTWICH (INSTITUTE OF TECHNOLOGY ASSESSMENT)

Establishing TA in a Specific Context of Belgian Wallonia PIERRE DELVENNE (UNIVERSITY OF LIÈGE)

What's Next for TA? Experiences, Perspectives, Outlooks

Chairs: Miltos Ladikas, Constanze Scherz and Julia Hahn

Session Description

TA can look back on a long tradition with very different contexts in which it has been discussed, developed, practiced or institutionalized. Yet, with current grand challenges, such as the future of energy throughout our societies, we find new conditions under which TA has to reflect on its role and learn to deal with "open spaces of futures" (Grunwald), especially regarding decision-making. It is the intricate interconnectedness of science, society and policy that is the core of TA.

This calls for an exchange of experiences and lessons learned. Therefore we want to explore the different situation of TA in various countries and illustrate the numerous shapes it can take on. What can we learn about countries with a relatively long TA tradition; how has this changed and adapted over time? How can TA be established in countries and what existing concepts or traditions does it relate to? What do emerging concepts such as Responsible Research and Innovation mean for TA? What are future forms, methods and topics? What's next for TA?

In this session we will debate these questions revolving around TA with experts, practitioners as well as the audience and attempt to provide outlooks into the future of TA.

POSTER CORNER 1

ROOM: TA-TENT, THURSDAY, 6:00 PM - 6:45 PM

PACITA Project Results LEO HENNEN (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

AGENDA

TA Practices in Europe ANDRÉ KROM (RATHENAU INSTITUTE)

TA Parliamentary Debates DANIELLE BÜTSCHI (TA-SWISS)

TA Practitioners Trainings and TA Summer Schools DANIELLE BÜTSCHI (TA-SWISS) AND BENEDIKT ROSSKAMP (UNIVERSITY OF LIÈGE)

Expanding TA Landscape LINDA NIERLING (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

European Future Panel on Public Health Genomics ANDRÉ KROM (RATHENAU INSTITUTE)

European Stakeholder Involvement in Ageing Society MARIANNE BARLAND (NORWEGIAN BOARD OF TECHNOLOGY)

Europe Wide Views on Sustainable Consumption MARIE LOUISE JØRGENSEN (DANISH BOARD OF TECHNOLOGY FOUNDATION)

TA Portal MICHAEL NENTWICH (INSTITUTE OF TECHNOLOGY ASSESSMENT)

PACITA Project Results

Chair: Leo Hennen

TA Practices in Europe

André Krom

In this study, a new and open way of modelling TA, and in particular PTA, is developed. As the modelling does not take interaction with the parliament a priori as the main determinant of a PTA organisation, it is more open to a broader positioning of PTA in today's governance structures. (Parliamentary) TA is modelled as an activity at the interplay between the parliament, government, science & technology, and society. (Parliamentary) TA acts as a 'knowledge broker' between these four spheres. Such interaction takes place on three (interconnected) levels: the institutional, the organisational and the project level.

Our study confirms all four societal spheres to be important for Parliamentary TA. The analysis of the dynamics on the institutional, the organisational and the project level reflects how connections to all the four spheres are being made. Even for organisations that are embedded 'inside' parliament, building and maintaining credibility towards the 'outside' spheres of science & technology, society and government is important. Recognising and enforcing demand outside parliament has already proved to diversify the financial basis for PTA organisations.

TA Parliamentary Debates

Danielle Bütschi

Regarding the very complex nature of science and technology issues, policy-makers attending the TA debates expressed their need for independent and structured policy advice:

- TA should render facts understandable, present the possible consequences of innovations and shed light on the interests and values pertaining to them.
- TA should foster constructive dialogue among stakeholders and/or policy-makers, and generate ideas.

Knowledge-based policy making is increasingly challenged by the fact that science and technology are moving up to a global, or at least transnational level. According to policy-makers, cross-European TA projects should be fostered:

- Cross-European projects allow TA to combine a global approach to science and technology with an in-depth consideration of the national context and issues at stake.
- Cross-European projects may also offer a pragmatic way to introduce TA policy advice in countries or regions where no established TA institute is in place.

Continuous communication with policy-makers is necessary to anchor TA in the policymaking landscape and constantly show its added value to parliamentarians.

- In countries where TA is less developed, the discussions showed that the growth of TA practices is often slow because TA is not formally part of the decision-making process and hence may be seen as an unnecessary barrier to prompt policy-making.
- In countries where parliamentary TA has been institutionalized, its relevance or even existence – is not necessarily noticed by parliamentarians, which can lead to the closure of productive and successful TA organizations (e.g. OTA and DBT).

Expanding TA Landscape

Linda Nierling

Any approach for establishing TA structures in the countries explored has to take into account a set of socio-political context variables which are significantly different from those prevailing in the 1980s and 1990s when most of the European (parliamentary) TA institutions were set up.

Elements like a lively public debate on S&T policies are missing in some of the countries explored. Rather, S&T policy-making is busy modernizing the R&D system in order to keep up with global competition. In addition, capacities for interdisciplinary research in academia or public R&D institutions are underdeveloped.

While dissatisfaction with in-transparent, short-sighted and scientifically badly informed R&D policy making is widespread, political "entrepreneurship" for adapting TA like processes of knowledge based policy making including policy makers, scientific experts and civil society is suffering from a lack of motivation and resources.

The exploration activities revealed that despite existing barriers there is a role to play for TA by adapting to and offering support with regard to the existing deficiencies and problems of R&D policy making. Concerns about problems of R&D policy making often result in an explicit demand for 'knowledge-based policy-making' in the context of which the concept of TA is welcome as a means to underpin decisions with best available knowledge in an unbiased manner.

European Future Panel on Public Health Genomics André Krom

Developments in public health genomics (PHG) hold the promise to be beneficial for individuals and to promote public health. Central to this paper is the idea that given the range of uncertainties and ambiguities related to genome - based information and technologies (GBIT), the responsible introduction of GBIT in health care systems requires an incremental approach. The paper highlights policy issues connected to two major shifts connected to developments in PHG that challenge traditional boundaries.

First, the introduction of GBIT in health care systems challenges the boundary between research and clinical care. It entails complex data flows that raise a number of issues relating to infrastructural demands, intellectual property, data security and privacy, tensions between the needs of research and the needs of the individual, patient rights and professional responsibilities, and the potential feedback of (re)analysed data.

Secondly, the introduction of GBIT in health care systems challenges the boundary between clinical care (particularly diagnostics) and screening. Both diagnostics and screening involve potentially large amounts of information about an individual's genome, and raise new and challenging issues concerning quality assessment and how to deal with unsolicited information that might be generated from these tests. These issues could arise in a variety of health care settings in which whole genome sequencing tests find further application in established and new practices of diagnostics and screening. The possibility of screening the whole genome raises the question of what to screen for and when, and whether existing evaluative frameworks – concerning quality assessment and ethical and legal aspects of GBIT – are robust enough, or require fine-tuning.

These shifts have implications for the relations between all stakeholders. The responsible introduction of GBIT in the health care system thus requires an early dialogue in which these stakeholders are actively involved.

European Stakeholder Involvement in Ageing Society

Marianne Barland

How to deal with ageing societies is one of the grand challenges pointed out in the Lund Declaration. The demographic challenges demand social as well as organisational innovations. Technology promises new opportunities, but there are also challenges to be solved and ethical dilemmas to be considered.

This project has organised scenario workshops in ten European countries, where a broad group of stakeholders have discussed the future of ageing, new technology and innovation

in the healthcare sector. The discussions had the same starting point in three future oriented scenarios describing different futures: "One size fits all", "Freedom of Choice" and "Volunteering Community".

The policy issues and recommendations from the ten national scenario workshops indicate the status of how the participating stakeholders perceive the opportunities, but also emphasize the challenges and ethical dilemmas that have to be carefully considered when using technology in healthcare. The stakeholders agreed on the aspect that technology for care can only serve as support and not as a substitution for professional care. The discussions at the workshops reflect the organisation and quality of the healthcare services in the respective countries, in combination with political and social culture. Even with this multifaceted picture, there is a consensus that the issues and the recommendations above are important and relevant for all the involved countries.

Europe Wide Views on Sustainable Consumption

Marie Louise Jørgensen

The results from the Europe Wide Views on Sustainable Consumption are clear: Citizens are strongly in favour of policy-makers taking ambitious steps in order to foster a more sustainable consumption in society. Moreover, citizens want to take action in this process of striving towards a higher degree of sustainability in consumption. According to the participating citizens, sustainable consumption is not an issue that should be left to the market.

Generally, the outcomes of the consultation show that the EWViews citizens accept policy measures aimed at private consumption. However, citizens are mostly in favour of non-intrusive policy instruments. In order to encourage change in private consumption patterns, the use of financial incentives and awareness-raising are popular policy instruments among citizens. These policy instruments are directly linked to a key message from the EWViews citizens to policy-makers: it should be cheap and easy to consume sustainably.

The Europe Wide Views results are based on well-established principles for citizen participation and offer unique and detailed insights into ordinary citizens' views on sustainable consumption and the question of how to deal with this issue politically.

The 1035 participating citizens from 11 EU member states were selected to reflect the demographic diversity in their respective countries. The participating citizens were provided with balanced information about sustainable consumption and the policy debates on measures to foster a higher degree of sustainability in consumption. Moreover, and most importantly, the citizens were given time to deliberate with fellow citizens.

POSTER CORNER 2

ROOM: EAST GALLERY, THURSDAY, 6:00 PM - 6:45 PM

Chair: Mahshid Sotoudeh

TA Projects

TA Projects

MAHSHID SOTOUDEH (INSTITUTE OF TECHNOLOGY ASSESSMENT)

AGENDA

Exploring a New Approach to Socio-Technical Scenarios: Effects of 'CIB & Simulation' HANNAH KOSOW (UNIVERSITÄT STUTTGART)

Engaging the Public in Research and Innovation: Engage 2020 SONIA BUSSU (INVOLVE)

Designing Research Projects Engaging Civil Society Organizations SIMON PFERSDORF, STEFAN BÖSCHEN, MARTINE REVEL AND BERND STAHL (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

Swiss Urban NeighbourWoods – New Perspectives on Urban Forestry Governance REGULA KOLAR AND BIANCA BAERLOCHER (BERN UNIVERSITY OF APPLIED SCIENCES)

The Public View on an Ageing Society: Insights from Two Participatory Austrian Case Studies ULRIKE BECHTOLD, NIKLAS GUDOWSKY, LEO CAPARI AND MAHSHID SOTOUDEH (INSTITUTE OF TECHNOLOGY ASSESSMENT)

Exploring Participative Formats in Technology Assessment through Gamification WOLFGANG KERBE, OLGA RADCHUK UND MARKUS SCHMIDT (BIOFACTION)

Human Cognitive Enhancement & Personality IVETA FAJNEROVÁ, JAKUB GEMROT, JIRKA HORÁČEK (NATIONAL INSTITUTE OF MENTAL HEALTH), EVA ŽÁČKOVÁ AND JAN ROMPORTL (UNIVERSITY OF WEST BOHEMIA)

The Societal Impact of Security Technologies: Making European Security Research More Responsive and Responsible GEORGIOS KOLLIARAKIS (UNIVERSITY OF FRANKFURT)

Power, Policies and Algorithms: Technologies of Surveillance in EU Policies GEORG HUBER (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

Technology Decision-Making Process: The Example of MRI Purchase in Portuguese Healthcare System MARIA MAIA (UNIVERSIDADE NOVA DE LISBOA)

The approach of Constructive Technology Assessment for Brain-Computer Interface Technologies GABRIEL T. VELLOSO (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

High-Speed Train Technological System Coping with Change: A Contribution from TA SUSANA MORETTO (UNIVERSIDADE NOVA DE LISBOA)

Exploring a New Approach to Socio-Technical Scenarios: Effects of 'CIB & Simulation' Hannah Kosow

This poster deals with a new methodology to explore futures of socio-technical systems, combining the qualitative systems analysis CIB¹ with numerical simulation models. This hybrid scenario approach is currently promoted in the fields of energy and climate change research. Its expected effects are to enhance the classical 'Story And Simulation (SAS)' approach through the use of a qualitative but systematic scenario technique. A pioneer application of the approach has now been carried out in the megacity project LiWa: CIB has been used in combination with the simulator LiWatool to construct integrated socio-technical scenarios of Lima's water futures 2040.

We have systematically followed this pioneer application through an exploratory case study to find out what effects the use of the qualitative CIB within this hybrid scenario methodology had on the scenario process and on its outputs. Evidence was collected through participant observation, interviews with participants (n= 23) and document analysis. Conceptually, the analysis was based on a framework to analyse transdisciplinary methodologies (Hinkel 2008).

In the LiWa project, a group of stakeholders, facilitated by scenario-experts, has applied the CIB approach to construct a set of 'raw' CIB scenarios. The modelling and simulation has been carried out by water engineers. As the simulator was still under construction during the project, it was flexible to adaptations. The CIB analysis was thus able to steer the entire scenario process by providing a selection of internally consistent scenarios based on the shared conceptual model of the stakeholder group. These 'raw' CIB scenarios were, on the one hand, serving as a benchmark for the writing of narratives; on the other hand, they were translated into numerical sets of input parameters for the simulation. The dominant role of the CIB analysis and its narrow coupling with the simulator had some beneficial effects on the traceability of the process, especially with regard to the explicitness of assumptions on future developments. Furthermore, the internal consistency of the CIB scenarios has been handed down to the narratives and to the numerical input parameter sets. Still, at the end of the hybrid scenario process, some emancipation from the CIB scenario sample occurred, mainly triggered by the local stakeholder group. Nevertheless, overall consistency between narrative and numerical elements of the integrated scenarios was achieved.

1 cross-impact balance analysis (Weimer-Jehle 2006)

Engaging the Public in Research and Innovation: Engage 2020 Sonia Bussu

Engage2020 is a project funded by the European Commission (DG Research and Innovation) looking into how members of society are involved in science and technology policy today and, perhaps more importantly, how they could be involved in the future. The project investigates how, where and why societal actors such as civil society, consumers, employees, and ordinary citizens are engaged in the research process, from early policy development to the delivery of research activities. The results of Engage 2020 will inform the engagement strategy of Horizon 2020, a programme which will invest €80 billion into research and innovation between 2014 and 2020.

The overarching objective of Engage2020 is to increase the use of engagement methods by mapping exploring existing practice around public engagement in research and innovation and highlighting new opportunities for public engagement among researchers, policy makers and other interested parties.

The work package aims to identify methodological developments around societal engagement in R&I. Key objectives are:

- Identify emerging or existing practice, which may develop into new paths for societal engagement in R&I.
- Further develop existing methods in order to refine and adapt them for use in science and innovation activities.
- Encourage the development of new instruments and tools.
- Develop an informed debate among key stakeholders about the future of public engagement more broadly with a view to encouraging the future evaluation of activities.
- · Produce clear and succinct recommendations for key stakeholder groups.

Designing Research Projects Engaging Civil Society Organizations: Expectations, Influence Factors and Recommendations from the European Research Project CONSIDER

Simon Pfersdorf, Stefan Böschen, Martine Revel and Bernd Stahl

Our poster will outline the results of the CONSIDER project which has been funded by the European Commission (GA no 288928). Within the project, the consortium investigates variations of research projects engaging Civil Society Organizations (CSOs). We surveyed the coordinators of all projects funded by the six years lasting European Research Program 'FP 7' in order to find out how, why and to what extend CSOs have been involved into research projects. Among other insights, this study shows that the researchers' expectations towards

the meaning of CSOs for their projects range from increasing the external relevance of the research project over improving the dissemination process to providing substantial expertise or even driving the project. Therefore, the academic competences of the CSOs' staff vary. The governance structure of the project and especially the CSOs position inside or outside the consortium, are reliable factors when analysing the collaboration intensity within a consortium; whereas impact of the research project seems to be linked to interaction schemes and capacity building. Informed by the quantitative results, a qualitative study on twenty FP7' projects and ten projects funded by other sponsors was performed. It reconstructed the social realities of the different projects, identified enablers and barriers of participation and other influence factors determining the internal governance of the different projects. Through the comparison of the thirty projects we discovered six different project types which consider the variant roles and activities of CSOs and their specific importance for the production of new knowledge. In addition, the CONSIDER consortium developed guidelines from its research results and collected recommendations from different stakeholders. These guidelines and recommendations apply to different phases of a research project and should help funders, researchers and CSOs to design and organize research projects which meet their expectations.

Swiss Urban NeighbourWoods – New Perspectives on Urban Forestry Governance

Regula Kolar and Bianca Baerlocher

How do the spatial structures of socioeconomic, ecological and physical features of urban areas relate to one another and how do they change over time? This is one of the urgent questions relating to the ecology of cities within the sustainability discourse (Weinstein & Turner 2012). Specific to urban forestry, this question is: How do urban social life and green infrastructure, such as the surrounding forest ecosystems, interrelate and how will they be shaped in the future?

Societies are currently facing many challenges concerning the uses and benefits of natural resources. Against this background, issues of sustainability question how the future of humannature interrelations will be shaped. Transferring this question to the area of urban forestry means analysing urban forestry governance systems in relation to their surrounding natural environment. As scientific methodologies have so far not been able to offer integrated methods and approaches, we will first shortly introduce the basic theoretical approach to Urban Forest governance research. We combine this theoretical part with the latest findings in urban forestry governance research in order to frame the Swiss Urban NeighbourWoods (SUNWoods) project. With SUNWoods the focus is on a needs-oriented management of urban forests, aiming at reconciling different forest users' interests through long-term involvement and partnerships in forest management.

Additionally, we want to highlight how important changes of perspectives among stakeholders are and how this can lead to proactive cooperation and long-term partnerships (governance regimes). Concerning that issue we especially want to focus on equality and diversity aspects and the role of women participating in Urban Forestry governance processes.
The Public View on an Ageing Society: Insights from Two Participatory Austrian Case Studies Ulrike Bechtold, Niklas Gudowsky, Leo Capari and Mahshid Sotoudeh

There are several reasons why the ageing society – and the answers its challenges require, may be regarded a complex policy problem. Literally everyone is affected - everyone grows older and the likelihood that each of us will one day be a "silver ager", a "third-ager" or a nonagenarian - to mention only a few of the various attributes older adults are given nowadays – is quite high. Nevertheless the demographic change which implies that more of us (baby-boomers) will grow older (and hopefully) have more healthy years also poses fundamental challenges. Both, on national and EU level tensions are inevitable. National policies for the social security and health system are tested and shall provide more social security and better health services for a raising number of individuals whereas the budgets do not necessarily rise equally. However, the raising number of yet still considerably wealthy elderly persons also proves to be a promise – a huge market for technology and services is detected and about to be captured. Overdoing it a little one could say that the ageing society provides for numerous and contradictory narratives: "an ageing society that requires masses of economic allowances" and "an ageing society that supports the economy directly (buying things and services) and indirectly (supporting their families economically)", "an ageing society requires tailor made political actions" to mention only a few.

In our contribution we will present insights from two recent foresight projects, each of them addressing the grand challenge of an "ageing society". The European research project Parliaments and Civil Society in Technology Assessment (PACITA), with the case study "Future Ageing – Teleassistance in an ageing society" and the local Viennese foresight project Citizens' Visions on Science, Technology and Innovation – Ambient Assisted Living (CIVISTI-AAL).² Both projects used different methodological foresight approaches and involved different groups of actors. After a quick comparison of the main methodological and structural differences, we would like to introduce the results of each project. Thereby the outcomes shall be analysed in order to highlight:

- their theoretical usefulness,
- their practical usefulness and their actual grade of embedment in the national (Austria) and regional (City of Vienna) policy making processes.
- in what ways the two methods provide powerful instruments as to involve the public to deal with complex policy problems and
- whether certain methodological and/or structural adaptations would be sensible in order to improve the methods' power to embrace long-term participation.

As the ageing society poses a great challenge methods to facilitate well founded policy decisions that are sustained by a wide public will gain importance. This is all the more important as the upcoming two decades will be crucial whether old age will be a an integral and desirable part of our life in future.

Exploring Participative Formats in Technology Assessment through Gamification

Wolfgang Kerbe, Olga Radchuk und Markus Schmidt

Our study reviews existing serious computer games in the context of the life sciences. We assess different forms of participation in science through engaging in these games. In addition to focussing on a typology of science games we suggest to "fill the gaps" within this gamification/participation matrix with meaningful projects and thus reach out for applications in technology assessment. Beyond the use as stimulus material for discussion formats and mere information of stakeholders or members of specific "publics", gamification could also serve as a tool for decision making and for immersive, narrative and real time approaches to technology assessment.

Human Cognitive Enhancement & Personality

lveta Fajnerová, Jakub Gemrot, Eva Žáčková, Jan Romportl a Jirka Horáček

Our project aims at human cognitive enhancement (HCE) specifically addressing interventions into human cognitive capabilities and processes. Corporeal enhancement has already been widely studied (e.g. as a part of ethics of sport, cyber-culture studies, gaming industry, medical practices, robotic, etc.), whereas cognitive enhancement is a newly emerging scientific field due to its dependency on the cutting-edge technological developments across and within a wide range of scientific disciplines. However, even though the proposed research project will focus on the issues of human cognitive enhancement, carefully selected aspects of corporeal enhancement will be embedded in our approach to HCE. Thusly, we will be able to map the key moments in couplings of biological and technological that have the capacity to strongly affect and transform cognitive processes. These will be examined and discussed in the context of enhancing (AR Glasses technology) of the existing or "normative" human biological faculties, human personality, self-acceptance and ethical concepts.

We formulate the following hypothesis: A) cognitive enhancement can alter human personality and identity far more profoundly than corporeal enhancement; hence it more urgently requires a proper philosophical account; B) the long-term usage of AR glasses while navigating through the real environment can elicit changes in spatial navigation performance and brain morphology (such changes could be similar to that observed in expert taxi drivers, where the grey matter volume changes of hippocampus were described together with better navigation performance (Maguire et al, 2006)). The projects involves a very diverse set of mutually interconnected methods ranging from philosophy and ethics, through mathematics, logic and AI- technologies, to psychology, cognitive science and fMRI-based neuroimaging. The projects will be addressed in two steps:

² cross-impact balance analysis (Weimer-Jehle 2006)

1) Large-scale online survey addressing several topics will be created in order to: a) understand the relationship between the acceptance of human enhancement technologies (corporeal and cognitive) and the personality (Big Five NEO-PI-R and Cloninger's Temperament and Character Inventory -TCI), self-acceptance and personal ethical concepts; b) identify demographic and personality types with low or high acceptance towards HET and HCE technologies.

2) The survey of personality (NEO-PI-R/TCI) and HET acceptance will be used again in smaller group of participants to test the effect of AR glasses wearing on grey and white matter morphological characteristics and functional connectivity performed in magnetic resonance imaging (MRI) scanner. The prospective neuroimaging data (AR glasses wearing subjects and controls). Effect of AR glasses wearing on navigation performance will be tested using virtual reality tasks. Two virtual environments will be used to asses spatial navigation: 1) complex virtual city and simple virtual maze environment with similar complexity. Both environments will be used in two navigation tasks: a) in a way-finding task and b) in directed navigation (following of a marked rout), according to Hartley et al, 2003. Two versions of both environments will be created in order to test the effect of long-term usage of HCET on navigation abilities.

<u>Acknowledgements:</u> The study was supported by CZ09 Czech-Norwegian research programme 7F14236 and the institutional support from NIMH/PCP by MH CZ -DRO (PCP, 00023752).

The Societal Impact of Security Technologies: Making European Security Research More Responsive and Responsible

Georgios Kolliarakis

Security policy and, by default, security research are value-laden, contentious public policy fields. They ought to be informed both by expert evidence and by citizens' values throughout the R&D&I process. Yet, problem definitions, goals, and innovation paths for security research are predominantly shaped by interest groups from the industry. This imbalance in stakeholder participation has, in turn led to a biased "high-tech" understanding of security.

Public concern is growing about how new security technologies, such as biometrics, pattern recognition and detection, risk profiling, or the use of surveillance 'drones', impact on society. What is at stake with such technologies goes beyond issues of data protection and privacy, and poses fundamental questions about the blurred ethics of military and civil applications, non-intended and non-anticipated consequences, such as discrimination of minority groups, and feasibility and desirability of maximum-security societies. If ethics and societal impacts are to be properly addressed in current and future EU security research programmes then comprehensive appraisal by citizens themselves is required.

SecurePART addresses the issue of increasing and streamlining the engagement of civil society actors, being the ultimate beneficiaries of research on security technologies, during the policy cycle of security research in order to enhance both its legitimacy and its effectiveness. The three governance mechanisms suggested below contribute at different stages of the security research policy cycle to make both the process more accountable and responsive to the citizens' needs, and the results more socially and ethically acceptable:

- 1. Upstream & Streamline CSO Participation
- 2. Rethink the meaning of Innovation
- 3. Conduct impact assessments and evaluations

Responding to the European Security Strategy (2003) the European Commission launched the mission- oriented research Programme to advance European security through Research and Technology (2004). Budgeted with \in 1.4 B under FP7, and with \in 1.7 B under Horizon 2020, it is tailored to address four key areas: Fostering Resilience against Disasters and Crises, Fighting against Crime and Terrorism, Border and External Security, and Digital Security. The programme focus is on CBRNE detection, telecommunication data mining technologies, such as DPI, profiling and predictive analytics, biometric identification and pattern recognition, location tracking technologies, as well as surveillance in the form of drones and CCTV. Security research should be mission-driven and serving the five priority areas of the European Union's Internal Security Strategy (ISS): Disrupt international Crime Networks; Prevent terrorism and address radicalisation and recruitment; Raise levels of security for citizens/businesses in cyberspace; Strengthen security through border management; Increase Europe's resilience to crises and disasters.Two major issues have already raised criticism, e.g. by Statewatch, or the European Parliament:

- 1. The programme is supply-led, promoting industrial interests and not serving the needs of end-users or of the citizens at large.
- 2. The funded technological research raises serious ethics and fundamental rights questions and is fostering societal insecurity instead of security.

Power, Policies and Algorithms: Technologies of Surveillance in EU Policies

Georg Huber

The project aims to combine theoretical inquiry, technology assessment and policy studies, in order to examine technologies of surveillance, Big Data, automated decision making and their relation with policies of surveillance, policy making, policy implementation, relations of power and power structures. The policy of the EU is taken as an example.

The basis of the inquiry should be a three-level theoretical framework, drawing on the work of Michel Foucault for analysing the nature of power in the surveillance society, Jacques Ellul

for analysing long term trends in technology, Michael Hardt's and Antonio Negri's work for analysing the general political conditions in which-policy making takes places, and William G. Domhoff's Power Structure Research method (based on Michael Mann's network theory of power structures) to analyse the power structures and policy making in relation to the above mentioned technologies of and technological trends of surveillance. On that basis I aim to analyse one or several policies and the related technologies of surveillance in the EU with the above tool set with the aim of achieving an detailed insight into the interplay between power structures, policy making and implementation and technology in the EU and if possible, into the overall nature of surveillance by the state in the Western democracies. My project is interdisciplinary in drawing on the disciplines political science, European studies, political sociology, sociology of technology, philosophy of technology, and (as a tool of analysis) law.

Technology Decision-Making Process: The Example of MRI Purchase in Portuguese Healthcare System

Maria Maia

It is expected that decisions made in the context of the health system, are evidence-based and therefore supported by reliable studies, fulfilling population needs. Medical devices continue playing a role of unquestionable importance in healthcare, therefore the introduction, use and dissemination of these technologies should be based on technology assessment (TA) studies. However, these existing studies always seek a more economic orientation. The lack of studies encompassing a more holistic approach it is notable. This fact was indeed the driving factor behind this research.

Magnetic Resonance Imaging (MRI) is a very expensive and recent medical device with a promising future. For this reason, making a decision on its purchase should be a sensitive issue. Since 1988, the Ministry of Health has authorized the procurement and installation of expensive medical technologies in the public and private sector. However, there are currently no effective methods for regulating the distribution of health equipment in the private sector1. Neither is there empirical evidence that can shed light on how the decision-making process behind the purchase of such expensive technology is being done.

This research aim to contribute to a deeper understanding of the decision-making process characterization, namely regarding the acquisition of medical devices, taking the MRI as it's object of study. More specifically the aim is a) to identify the MRI availability in Portugal and b) the stakeholders actively involved in the technology purchase decision and c) to characterize the decision-making process by identifying the use of evidence, steps, goals and competences perceived by the decisionmakers.

The approach of Constructive Technology Assessment for Brain-Computer InterfaceTechnologies Gabriel T. Velloso

A Brain-Computer Interface (BCI) is a communication a system which measures and analyzes brain signals, converting them in real-time into outputs that do not depend on the normal output pathways of peripheral nerves and muscles.

According to the literature, BCI technologies raise ethical, legal, philosophical, moral and social issues. It is a rapidly advancing and emerging research field, whose assessment of these issues is crucial for supporting the development of the technology and its future decision making processes. Many questions have arisen concerning the potential for these technologies to change society and the social debate is only but starting within the community. Such questions must be discussed in an open and participative way – thus the Constructive Technology Assessment is considered the most appropriated approach in dealing with such technologies.

This work presents some partial results of the main study, and investigates the opinions of BCI researchers about some important challenges and future perspectives of BCIs for clinical applications.

POSTER CORNER 3

ROOM: WEST GALLERY, THURSDAY, 6:00 PM - 6:45 PM

TA Around the World CONSTANZE SCHERZ (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

AGENDA

Key Enabling Technologies in Renewable Energy Sector ZDENĚK KUČERA, TOMÁŠ VONDRÁK AND MICHAL PAZOUR (TECHNOLOGY CENTRE ASCR)

Foresight in the Information Age: Balancing Qualitative and Quantitative Data ERDUANA SHALA AND VICTORIA KAYSER (FRAUNHOFER INSTITUTE FOR SYSTEMS AND INNOVATION RESEARCH)

A Breakthrough Vision of the Region JOANNA EJDYS, KATARZYNA HALICKA, ALICJA GUDANOWSKA, ANNA KONONIUK AND JOANICJUSZ NAZARKO (BIAŁYSTOK UNIVERSITY OF TECHNOLOGY)

Role of Humanities in Education of Engineers ALEKSANDRA KUZIOR AND BARTŁOMIEJ KNOSALA (SILESIAN UNIVERSITY OF TECHNOLOGY)

Ethical Dimension of Engineer Practice in the Scope of Technology Assessment ELENA SEREDKINA AND MIKHAIL GAYVORONSKIY (PERM NATIONAL RESEARCH POLYTECHNICAL UNIVERSITY)

GrEAT – Study Group On Technology Assessment MARIA MAIA (UNIVERSIDADE NOVA DE LISBOA)

Introducing Forward-Looking Activities in the Czech Republic TECHNOLOGY CENTRE ASCR

Technology Has an Impact INSTITUTE OF TECHNOLOGY ASSESSMENT The Evolution of Key Enabling Technologies in Renewable Energy Sector – The EU Position in R&D Addressing the Need for Secure, Clean and Efficient Energy Sources

Zdeněk Kučera, Tomáš Vondrák and Michal Pazour

TA Around the World

Chair: Constanze Scherz

The Key Enabling Technologies (KETs) are supposed to be an essential source of innovations since they provide technological bricks which are fundamental for a great spectrum of innovative products and services as low-carbon technologies, effective utilization of energy resources, advanced information technologies or biomedical services and products. The topic of our contribution is to evaluate the role of KETs in societal challenges namely the quest for Secure, clean and efficient energy. We make use of the patent and publication data to appraise the knowledge generation and intellectual property growth dynamics in selected renewable energy sector (biomass/biofuels, fotovoltaics, fotothermics) and the role of broadly defined KETs in this particular energy sector. In the knowledge generation measured by the publication activities the EU was above the global average in all the leading KETs R&D this renewable energy field. In the second half of the decade EU is being overtaken by the rest of world both from the point of the involvement of KETs in energy research and fraction of renewable energy research being classified as KETs. The evolution of patenting activities provides a similar picture.

Foresight in the Information Age: Balancing Qualitative and Quantitative Data

Erduana Shala and Victoria Kayser

In futures thinking such as technology assessment (TA) and technology foresight, scenario planning is an established tool to address various aspects of S&T developments (eg. Van Der Heijden, 2005; Technology Futures Analysis Methods Working Group, 2004). Scenarios serve as a framework to think about systemic dependencies with impact on a specific technology.

Facing the information age, we claim that foresight acts far beneath is possibilities and needs a broader data fundament. Currently, foresight is strongly influenced by qualitative and participative approaches, especially when conducted with scenario planning. Yet, the precision and added value of future statements can be questioned due to different reasons as

the statements are biased or even wrong (eg. Henrich et al., 2010; Tetlock, 2005). In general, conceptual claims and epistemic reasons for the need for new data in future planning processes are raised (see e.g. Amanatidou and Guy, 2008; Grunwald, 2007; Meissner, 2013).

Therefore, we claim that qualitative results should be balanced by quantitative reflections building on the possibilities arising by new forms and amounts of data sources. Recent advances in scenario planning focus on software tools for consistency or cross impact analysis but not on information aggregation. Following, scenario planning holds potential for improvement. As the initial phase of scenario preparation is crucial for the success of the overall process, it is a central concern to reflect views from different origins. For this purpose we developed an approach considering qualitative and quantitative data to derive future paths building on a text mining framework. This may lead to an objective information aggregation hinting towards aspects that might be overseen otherwise.

As we concentrate on a methodological advancement of scenario planning, this may equally be applied to different purposes of technology futures planning such as TA, foresight, or strategic planning in general.

References

Amanatidou, Effie and Guy, Ken. "Interpreting foresight process impacts: Steps towards the development of a framework conceptualising the dynamics of 'foresight systems'." Technological Forecasting and Social Change 75, no. 4 (2008): 539–557. Grunwald, Armin. "Working Towards Sustainable Development in the Face of Uncertainty and Incomplete Knowledge." Journal of Environmental Policy & Planning 9, 3-4 (2007): 245–262.

Henrich, Joseph, Heine, Steven J., and Norenzayan, Ara. "The weirdest people in the world?" Behavioral and Brain Sciences 33, 2-3 (2010): 61-83.

Meissner, Dirk. "Instruments to measure Foresight." In Science, Technology and Innovation Policy for the Future, edited by Dirk Meissner, Leonid Gokhberg and Alexander Sokolov. Berlin, Heidelberg: Springer Berlin Heidelberg, 2013.

Technology Futures Analysis Methods Working Group. "Technology futures analysis: Toward integration of the field and new methods." Technological Forecasting and Social Change 71, no. 3 (2004): 287–303.

Tetlock, Philip E. Expert political judgment: How good is it? How can we know? Princeton, N.J.: Princeton University Press, 2005. Van Der Heijden, Kees. Scenarios: The art of strategic conversation. 2nd ed. Chichester, England, Hoboken, NJ: John Wiley & Sons, 2005.

A Breakthrough Vision of the Region: NT FOR Podlaskie – Nanotechnology Foresight for Podlaskie Region

Joanna Ejdys, Katarzyna Halicka, Alicja Gudanowska, Anna Kononiuk and Joanicjusz Nazarko

Podlaskie region is located in north-eastern part of Poland. Population is of over 1.2 million people. It is characterized by a relatively slower socio-economic development than most other Polish province. The slow socio-economic development is determined by the following indicators (numbers in brackets indicate positions in the ranking of 16 Polish regions):

- unemployment rate 12,8% (5)
- average paid employment in industry per 1000 population 43 pers. (16)
- GDP per capita 26 985 PLN (14)
- gross domestic expenditures on R&D per capita 116 PLN (11)
- gross domestic expenditures on R&D in relation to GDP 0,32% (14)

Main aim of the paper is to present results of regional foresight study in the contest of looking for long-term regional development perspective in a situation where the development of the traditional economic sectors no longer contributes to regional economic growth.

The project was located in one of the least economically developed regions of Poland (and of the European Union) with a low level of economic welfare, little business competitiveness and a low intensity of innovation in technology and product development. The project is based on the feed forward logic, which assumes that it is possible to effectively anticipate future changes in an economic environment.

Foresight approach adopted in the project helped to identified smart specialisation of Podlaskie region. NT FOR Podlaskie project is an example of systematic outlook and assessment of nanotechnology trends and possible developments, assisting better informed regional policy-making.

Methodology of the project takes into account the use of the following methods: STEEPVL analysis, SWOT analysis, technology mapping, key technologies, the scenario method and road-mapping. The main research methods were supported by brainstorming, moderated discussion and bibliometrics. One of the innovative elements of the project is that it applies the concept of triangulation to expert recruitment in three ways: (i) researcher triangulation; (ii) data triangulation; (iii) theoretical triangulation. Another innovative element of the project was a two dimensional assessment of STEEPVL factors by (i) taking into account the influence and importance of factors and (i) applying factor analysis in order to reduce the number of factors considered that shape nanotechnology development.

The use of specified methods finally made it possible to elaborate Nanotechnology Development Strategy for Podlaskie Region. The results of the project included:

- identify and map key nanotechnologies up to 2020,
- · identify the most important factors influencing the development of nanotechnologies,
- · put forward scenarios of nanotechnology development and
- stimulate a process of regional vision-building involving the key stakeholders.

The Nanotechnology Development Strategy for Podlaskie Region sets the direction for the introduction of nanotechnology into the economy of Podlaskie province and provides a sound proposal for a path towards the sustainable development of the region – as an regional smart specialization.

Role of Humanities in Education of Engineers Aleksandra Kuzior and Bartłomiej Knosala

In Poland as well as abroad lasts the debate concerning the usefulness of the humanities in society based on technology. The cause of this debate is on one hand the increasing meaning of technology in contemporary society, and on the other - belief that humanities are not useful. At the same time some authors try to defend the humanities by pointing Steve Jobs and his famous statement that great products of technology are being created on the crossroad of artes liberales and technology. In our paper we have two goals. Firstly we want to contemplate the nature of relationship between humanities and technology.

We want to ask how humanities and technology should be defined to find the point at which technology meets artes liberales. What is the role of humanistic inspiration in process of creating new technology? By talking about the inspiration of humanistic we think about social, ethical and even spiritual inspirations.

Secondly we want to ask about relationship between RRI and the presence of humanities subjects on the University of Technology - what kind of curriculum can sensitize future engineers to create responsible technology.

In this context we suggest to consider mandatory introducing to the curriculum such subjects as ethics of technology and philosophy of technology as preparation for the RRI.

These subjects are to make young engineers aware that the basis of all human activity should be made of ethical values, show, how to act responsibly and innovative at the same time, pay attention to the intentionality of human actions, form the habit of ethical reflection before proceeding to research and the habit to reflect on both positive and negative effects of one's activities, attempt to assess the risk. Such reflection should be the first step in research and innovation processes. Humanistic preparation of engineers is important not only because of the RRI, but also as a condition of development of responsible society that may participate in participatory technology assessment model in a more conscious way. It is worth noting that at the best technical university in the USA – the MIT – humanities represent 20% of all subjects taught. In Poland we must rather deal with the situation of humanities displacement from technological universities. In this paper we will also undertake such issues as what are the reasons for such treating of humanities and how it is in other European countries.

Ethical Dimension of Engineer Practice in the Scope of Technology Assessment (Case Study of RRI-Lab at the Technical University)

Elena Seredkina and Mikhail Gayvoronskiy

Modern analytical philosophy of technology marks out two directions: 1) theoretical philosophy of technology; 2) practical philosophy of technology. The first one is understood as the theory of technical activity. Thus, the philosophy of technology is becoming closer to the philosophy of science methodically, especially in terms of epistemology. Practical philosophy of technology acts as ethics of technology, or ethics of technology development and use. The problem of responsibility in front of the future generations for the social consequences of the scientific and technical revolution is becoming one of the important issues of ethical discussions. The problem of innovations is also on the foreground today.

The centre of the current work is the problem of Technology Assessment (TA) and Responsible Research and Innovation (RRI) correlation. It is obvious for us that RRI is a part of TA. In its turn, TA is understood by us as problem-focused research and applied philosophy of technology. RRI means that societal actors work together in the research and innovation process in order to control and manage high-tech development.

We would like to demonstrate how ideas of TA and RRI are implemented in our scientific and research laboratory RRI-Lab. First of all, we make an accent not only on applied, but also on theoretical features of TA. Following Prof. Armin Grunwald, we emphasize three dimensions in the state-of-art debates on responsibility problems: governance-dimension, ethical and epistemological. Many scientists point out that modern TA research is not sufficiently developed in the epistemology field. Prof. Grunwald even talks about "epistemological blindness" (die epistemologische Blindheit). We are overcoming this gap. From our point of view, innovations management in "risk societies" includes "the uncertainty principle" (epistemological dimension) and "vigilance principle" or "warning principle" (ethical dimension). Thus, we tie up into the whole the ethics and the epistemology in RRI program course realization.

It's also worth emphasizing that the main task of RRI-Lab is social and humanitarian expertise of engineering and scientific and technical projects. We think it's very important to acquaint young engineers with the main principles of RRI and to develop at the initial stage responsibility to society in the process of realization of the engineering projects. In this respect we support one of the key notes of the RRI: developed theory of TA has to deal with not merely the consequences, but with the desired models of the future. And this cannot be achieved without bringing young engineers to the understanding of ethics of innovative activity.

Thereby, Professor V. Gorokhov points out one more feature of TA. It is not just problem-focused, but also project-focused research. It means creative development and construction of the model of the desired future. And here we make a leap into the scope of ethics, into the kingdom of

freedom. And this is the new level of the "world-technology-person" system functioning. In the context of such "moral design" we consider the RRI program in the frames of TA.

Introducing Forward-Looking Activities in the Czech Republic

Technology Centre ASCR

Forward looking activities refer to various methods that are mostly foresight and forecast but also technology assessment and horizon scanning. The Technology Centre of the Academy of Sciences of the Czech Republic focuses in this area on the following activities:

- Applying different methods: foresight, technology assessment, citizen consultations, scenario workshops and road-mapping
- Exploring current and emerging issues: ageing population, emerging technologies, food, health, innovations, research and development policy, sustainable consumption, regional development
- Engaging relevant actors academia, business, experts, NGO's, policymakers, parliamentarians, researchers, professionals, officers and other stakeholders
- Providing support to knowledge-based policy-making
- Driving towards responsible research and innovation

Technology Has an Impact

Institute of Technology Assessment

The ITA studies the impacts new technologies pose on the environment, economy, and society. The results of our scientific work support policy-making, public administration, and the public with regard to issues of technology policy. The ITA carries out interdisciplinary technology studies with three aims:

- To understand the complex interplay between technology and society from multiple perspectives
- To concomitantly analyse technology development
- To contribute to socially responsible technology policy by advising policy-makers and society

SESSION F¹



ROOM: BERLIN, FRIDAY, 9:00 AM - 11:00 AM Session organized by the Network TA

Horizons and Incentives for Technology Assessment BETTINA RUDLOFF (GERMAN INSTITUTE FOR INTERNATIONAL AND SECURITY AFFAIRS)

AGENDA

Underestimated Assumptions and Conditions of TA Theories and Practices (in the Perspective of Technology Governance) LECH W. ZACHER (KOZMINSKI UNIVERSITY)

Characteristics of TA Institutions by the Difference of Governance LEE SEUNG RYONG (KOREA INSTITUTE OF S&T EVALUATION AND PLANNING) AND YEONWHA KIM (SEOUL NATIONAL UNIVERSITY)

Assessing the Sustainability of Products: The Hot Spot Analysis BRIGITTE BIERMANN (TRIPLE INNOVA)

Horizons and Incentives for Technology Assessment

Chair: Bettina Rudloff

Session Description

The basic paradigm of TA is, that technological progress, research and development can be influenced by objectively carried out studies of at best neutral research institutions, independent from third party money and stakeholders and with high public legitimation.

The results should potentially influence the decision making, whether and how to research, develop, apply and/or handle technologies at societal level. This leads to the question of Technological Governance: How societal decision making on technological progress is being made nowadays and can be made in future?

Papers in this session contribute on how this basic paradigm is fulfilled today and can be fulfilled in future considering an upcoming paradigm shift on the use of technology, taking into account sustainability aspects, ethical aspects, environmental pollution from feeding economical growth by population and industrial development driven energy demand, limited resources, effecting social aspects. For example, following questions can be focused on:

- How effective is TA today?
- To what degree TA can be considered as being established?
- How further development of TA and/ or TG approaches and concepts takes place?
- What are the future perspectives of TA and TG?
- What effects on appropriate methodologies are visible?

Underestimated Assumptions and Conditions of TA Theories and Practices (in the Perspective of Technology Governance)

Lech W. Zacher

TA theories and their subsequent practical activities have gained some substantial experience, especially in the US and Western Europe. So this experience is multiplicitly conditioned and culturally embedded. Not rarely it is overlooked in theoretical debates and practical recommendations. Lack of TA and/or its ineffectiveness in some countries or regions is a result.

Multiple diversities (economic, political, social, mental, cultural etc.) undermine the optimistic universalism of TA theories. Elaboration of TA models and strategies and evaluation of their potentialities require considering many indicators of various sort (both quantitative and qualitative, some only descriptive). Examples are numerous, e.g. GDP level and pace, high tech sector, military industry, R+D expenditures and strategies, structure of economy, innovativeness, structure of interest groups and lobbying, external influence (globalization, TNCs), government political will, business attitudes (CSR), social valuations of technologies and of quality of life (also working life), not to mention such, not only psychological attitudes, as reactive vs proactive or short term vs long term (increasingly important while sustainability is at stake).

Even in the EU there are differentiated conditions and problems (countries of the core and of peripheries). TA can help in cohesion and modernization. However – on all TA levels of theories and practices – such matters as consciousness (sensitivity), knowledge (comparative information) and imagination (visioning) should be carefully considered, weighted and measured (which can be called technology governance accountability). Applications and performance of TA approaches, methods and procedures depend fundamentally on these features within government, business and civil society. In transitional economies (as e.g. EEC) this is conditio sine qua non of TA success.

National and EU effort should be directed toward not only identifying and recognition of the aforementioned assumptions and conditions of TA theories and practices but also toward considering a broader concept and decision-making area – Technology Governance.

Characteristics of TA Institutions by the Difference of Governance

Lee Seung Ryong and Yeonwha Kim

The development of science and technology produces economic added values as we have expected from the beginning, but somehow it also causes unexpected effects such as environmental or ethical problems. As a society has mingled with S&T, an impact that S&T influences to the society has become more complex and huge, which makes concerns of the public about S&T bigger, and increases the importance of participation of civilians.

Technology Assessment(TA) was introduced in 1970 and has been institutionalized in various countries to carry out socio-economic responsibilities of S&T. But the methodologies and institutions vary depending on the purpose of TA and the culture of a society. USA has institutionalized TA at the assembly-affiliated organization and conducted with an expert orientation for offering S&T agenda to assembly man. Europe also has started TA closely related with parliament, but differences exist. While parliament governs TA directly in France and assembly-affiliated organization performs TA in UK, Northern European countries such as Denmark and Netherlands organize independent organizations for TA and put high priority to public participation. In Korea and Austria, TA has been institutionalized and performed by the administration. In the case of Korea, on the basis of "Framework Act on Science and Technology," the Government shall assess the effects of new S&T to the economy, society, culture, ethics, environment, etc., and reflect results of TA in formulating policies. And the Act recommends participation of civilian experts and civic organizations for TA.

The purpose of this study is to compare the characteristics of TA by differences of governance. We categorize TA governance into four groups: US OTA, assembly-affiliated, independence organizations and the government. Then we examine the relationship with stakeholders (parliament-government-society-science researcher) and the role of participants. Also the aims, methodology, emphasis in assessment and pros and cons of each TA governance will be analyzed.

Assessing the Sustainability of Products: The Hot Spot Analysis Brigitte Biermann

There is a lot of knowledge about single sustainability aspects of products and their life cycles. But industry still does not adequately tackle challenges from climate change, resource consumption, pollution and social inequalities.

European regulation on products for end consumers strongly covers safety issues, and increasingly energy and waste topics. But what kind of information do consumers find on products? Information on sustainability isn't obligatory for most of the products. And there are ony a few sustainability product labels with a strong regulative framework behind (for example the EU organic label or the EU energy label).

Some companies and industry associations go their own ways with product labeling, i.e. implement voluntary agreements or other voluntary governance approaches. And the result is that many consumers are confused and that most of them mistrust green claims on products.

This paper starts from the difficulty to cover all dimensions of sustainability, and explains the problems voluntary industry approaches on product labeling face.

As an example, this paper discusses the "Sustainability Hot Spot Analysis", which is a tool that helps to prevent unsustainable product features. It is being applied to a wide range of products and services since 2009. The paper discusses it on the background of the concept of Responsible Research and Innovation and criticism from scientists and industry.

The Sustainability Hot Spot Analysis is a semi-quantitative approach based on research and stakeholder involvement and has been used since 2009. It integrates social and environmental dimensions along the entire value chain of a product or a service. The relevance of each life cycle phase and of the most important environmental and social aspects is ranked as low, medium or high, based on scientific data gathered through literature reviews and stakeholder analysis. The result is a matrix that shows the most important focus areas and can be applied to product development processes. The aim of the tool is to contribute to shifting product systems towards sustainability and to increase transparency. The Hot Spot Analysis uses existing knowledge and discussions and is conducted in an interdisciplinary expert team. Its limits, but also its potential contribution for governance towards responsibility and transparent product labeling are discussed.

The next horizon of technology assessment

SESSION F²

ROOM: PRAGUE, FRIDAY, 9:00 AM - 11:00 AM Panel Discussion

Visions of Technology Assessment (A Panel Discussion with Kick-Off Statements) KNUD BÖHLE, ARIANNA FERRARI, ANDREAS LÖSCH AND CHRISTOPH SCHNEIDER (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

AGENDA

Visions of Parliamentary TA in Europe in the Light of the PACITA Experience MICHAEL NENTWICH (INSTITUTE OF TECHNOLOGY ASSESSMENT)

Envisioning the Type of Scientific Advice Deserved Most by the Members of the European Parliament

MARISÁ MATIAS (MEMBER OF THE EUROPEAN PARLIAMENT; CONFEDERAL GROUP OF THE EUROPEAN UNITED LEFT - NORDIC GREEN LEFT)

Establishing TA in Poland: Current Efforts and Outlook JAN KAŹMIERCZAK (MEMBER OF THE SEJM; SILESIAN UNIVERSITY OF TECHNOLOGY)

Approaches and Methods Used by the JRC Advising the European Commission FABIANA SCAPOLO (EUROPEAN COMMISSION JOINT RESEARCH CENTRE)

The Hermeneutic Analysis of Visions Applied to Visions of TA ARMIN GRUNWALD (OFFICE OF TECHNOLOGY ASSESSMENT AT THE GERMAN BUNDESTAG)

Visions of Technology Assessment (A Panel Discussion with Kick-Off Statements)

Chairs: Knud Böhle, Arianna Ferrari, Andreas Lösch and Christoph Schneider

Session Description

Technology Assessment (TA) started with the vision that something had to be done about the steering of technological change. Since then, TA has been concerned implicitly or explicitly with visions and futures of technological changes. Since the beginning of this century, and in line with the advent of new and emerging technologies (NEST), researchers in TA have turned explicitly towards visions of the future when analyzing processes of technological innovation, technology governance and socio-technical transitions. "Vision Assessment" is one common term for this new interest of TA in visionary ideas.

However, whilst visions of technological futures are the basis for much research in TA, it is less clear what the visions of TA itself are and how they are enacted in the practices of TA. In a way, TA may be looked at as just one specialized producer of socio-technical visions when arguing about the feasibility and desirability of research outcomes, innovation processes and societal transformations.

In the panel discussion we want to go a reflexive step further. What are the visions of and for TA in Europe and beyond? How should TA look like in the future? In which ways does TA enact visions of the future? The PACITA project, hosting this conference, is a relevant case in point as it envisions the EU-wide diffusion and institutionalization of TA. PACITA will therefore be the starting point to address the proper visions of TA itself, in a visionary, yet, also self-reflexive take.

The panel discussion will include statements that explicitly envision futures of TA from different points of view. The contributors will raise short and ideally provocative statements concerning the futures of TA followed by plenary discussions about these futures. In the end, by way of "visioneering", the panel will address the question: Does TA of today live up to its vision and what could or should be its future?

This session is organized and chaired by a group of researchers at ITAS who have started a project on "visions as socio-epistemic practices", addressing the role of visions in sociotechnical innovation and transformation processes. **Michael Nentwich** will describe his vision of parliamentary TA in Europe starting with his expectations when PACITA was launched, taking stock of achievements and disappointments at the end of PACITA to eventually outline his revamped vision of parliamentary TA in Europe.

Marisa Matias will share her view of the type of scientific advice Members of the European Parliament needed in scientific and technological matters. She is also asked to present her ideas on how TA could be strengthened at the level of the European Parliament - beyond the current practice of the STOA panel.

Jan Kaźmierczak will describe current efforts in Poland to establish TA resources at different levels, and sketch what he envisages to become real in the next years. He is further asked to address the special problems ex-communist countries are facing when institutionalizing TA (and related approaches of policy advice) and to share with us his vision how these problems might be overcome.

Fabiana Scapolo will present approaches and methods used by her unit when advising the European Commission on longer term policy options. Her presentation will focus on Foresight approaches and how these can be used to provide scientific and policy advice and how foresight contributes to strategic intelligence. She will also explore how different disciplines could be brought together and further developed to address complex issues that have implications for policy and European society at large.

Armin Grunwald is proposing a "hermeneutic turn" in the field of vision assessment. Instead of asking what visions could tell us about the future, the question he poses is what they can tell us about our present situation. Vision assessment thus turns into a diagnostic tool. In his statement he will apply this approach to visions of TA and explain how the hermeneutical analysis of TA visions could contribute to mutual understanding in the TA community, to reconstructing crucial conflicts, and to increased reflectivity.

SESSION F³

ROOM: LISBON, FRIDAY, 9:00 AM - 11:00 AM

Responsible Research and Innovation for Energy Transitions

GERHARD FUCHS (UNIVERSITY OF STUTTGART) AND JENS SCHIPPL (INSTITUTE OF TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

AGENDA

Improving Scientific Policy Advice with Respect to Responsible Innovation of Energy Systems

BERT DROSTE-FRANKE (EA EUROPEAN ACADEMY OF TECHNOLOGY AND INNOVATION ASSESSMENT GMBH)

Protest and Power: Diverging Perspectives and Expectations – The Extension of the German Electricity Grid. Can There Be Something "Third"? GOTJE BOSSEN, MARIO NEUKIRCH (UNIVERSITY OF STUTTGART) AND SÜMEYYE ÖZMEN (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

Fostering Responsible Action on the Consumer Side – A Role for Local Citizen Panels in Energy Transition Strategies? GEORG AICHHOLZER (INSTITUTE OF TECHNOLOGY ASSESSMENT)

Institutional Development and Responsible Innovation in the Transformation of the German Electricity System GERHARD FUCHS (UNIVERSITY OF STUTTGART)

Problems of Responsibility in Sociotechnical Systems – Control, Learning, and Actionability CHRISTIAN BÜSCHER (INSTITUTE OF TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

Responsible Research and Innovation for Energy Transitions

Chairs: Gerhard Fuchs and Jens Schippl

Session Description

The transition to an energy system not any longer based on fossil fuels and the advance of smart energy technologies count among the key societal challenges mentioned in the call for sessions and papers for the Pacita 2015 conference. Although there seems to be a broad agreement that something has to be done in these areas, developments seem at present more stalling than accelerating. Still, already observable as well as anticipated future challenges such as energy security, climate change or the global competitiveness of European economies require a careful design of energy related policy strategies. It is widely acknowledged that for coping with these future challenges technical and organizational innovations are needed. The energy system is deeply interwoven with societal processes and structures and, thus, is described by many observes as a complex socio-technical system that need to be transformed. A broad range of innovations are available and emerging that have the potential to contribute to such a transformation. But in many countries and also on the European level there are ongoing debates about what is it the right strategy in the Energy sector. So, there seems to be no clear answer on what is responsible innovation in context of energy transitions. Against this backdrop, the overall objective of the session is to better connect the academic and political discussions on energy transitions with the concept of responsible innovation.

An important issue in the present discussions centers around the questions what innovations in the energy sector can actually be called "responsible". Is it responsible to support innovations that might have a detrimental effect for the economy – as supporters of the old electricity regime claim when opposing support schemes for renewables – or that might lead to higher energy prices that put a heavy burden especially on the lower and disadvantaged strata of the population? Are innovations in renewables not also detrimental in many other respects to the environment? In other arenas it is being discussed whether further innovations along established technology trajectories (e.g. coal) can be called "responsible". The debates around the CCS technology would be a point in case.

The session intends to deal with these and related questions. In more detail it wants to ask

- What is the importance of responsible research and innovation for energy transitions?
- How are debates about innovations in the energy system "framed"?
- What is the meaning of "responsible" in these contexts?

- To what extent can TA provide guidance for enlightened discussions about responsible research and innovation?
- Is there a good practice for responsible research and innovation in the energy field, for socially sound, "robust", resilient and practical solutions?

Improving Scientific Policy Advice with Respect to Responsible Innovation of Energy Systems

Bert Droste-Franke

One of the large societal challenges of our time is the transition of energy systems from a conventional basis to low carbon options. As already visible through the first attempts, this means a change from a predominantly central system to a system with more decentralised components. This means also restructuring large parts of an existing and functioning system during continuous operation. New actors enter the scene including citizens which take over the role of energy suppliers. Triggers for all these changes were or will be decisions made on the basis of scientific policy advice relying on scientific research and expertise. Against this background, the EA European Academy implemented an interdisciplinary project group consisting of experts from the areas of technology assessment, analysis of energy systems, energy economics, applied ethics, theory of science, economics and political science which investigated how to deal with challenges for scientific policy advice emerging with the multiple innovations required for energy transitions (Droste-Franke et al. 2014).

In the paper, results from the EA project group are discussed with respect to their contribution to responsible research and innovation (RRI) in the energy area. Starting from the general notion of RRI, first attempts are made to identify characteristics which are expected from innovation processes and products in the energy area to be responsible as well as to derive respective requirements for scientific policy advice, particularly for technology assessment and foresight studies. The concept of robustness identified by the project group as basic aim for energy system development is introduced before general demands for appropriate scientific policy advice with regard to epistemic and social robustness are analysed. Furthermore, practical implications like the way of dealing with uncertainties and needs for keeping the option space high and narrowing it down again by considering societal interests, e.g. via participation, as preparation for policy decisions, using, beside others, a specifically derived characterisation scheme, shows gaps and shortcomings of current approaches. Concluding, proposed improvements of scientific policy advice and their importance for energy transitions are discussed as one element for implementing RRI.

References

Droste-Franke B, Carrier M, Kaiser M, Schreurs M, Weber C, Ziesemer T (2014) (to be published in December) Improving Energy Decisions. Towards Better Scientific Policy Advice for a Safe and Secure Future Energy System. Series "Ethics of Science and Technology Assessment", Springer, Berlin

Protest and Power: Diverging Perspectives and Expectations The Extension of the German Electricity Grid – Can There Be Something "Third"?

Gotje Bossen, Mario Neukirch and Sümeyye Özmen

The expansion of the power grids plays a crucial role in the discussions about the German energy transition. However, many projects are heavily contested by citizens' protests. Two main controversies are:

- 1. Will the commissioning of the new high-voltage overhead lines cause any threats to the health of citizens?
- 2. Does the grid expansion really serve the better integration of renewables or do conventional power stations primarily benefit?

These different concerns can be attributed to two actor coalitions: On the one hand there are the powerful promoters consisting of the established energy industry and the German government ("No health threats", "Grid expansion for the energy transition"). On the other hand there are various actors like citizens' initiatives, environmental NGOs, political parties such as Green and Left as well as critical scientists questioning the planned grid expansion in its current form ("Health threats", "Grid expansion for conventional power stations").

Our analysis takes a closer look at the expectations and perspectives of the involved actor coalitions. The conceptual starting point for analyzing the role and function of expectations in relation to technology is the sociology of expectations (Borup et al. 2006). We argue that expectations can develop into structuring frames and be compared (Goffman 1977). The research is based on data like press releases, open letters, websites of actors, expert interviews, and participant observation (Neukirch 2014).

High-voltage power lines have been installed for decades and there are no specific expectations addressing this technology. However, the planned grid expansion reveals that there is no consensus on the systemic and health effects of the new power lines.

We do not share the idea of neutral experts, whose statements referring to the grid-extensioncontroversy should be viewed as nonpartisan. In line with the codex of responsible research, we propose to view all statements related to the conflict on a partisan level and be transparent about it. This way, a public debate about the legitimacy of the various viewpoints can be promoted. We aim to contribute to improve the conditions for a continuous involvement of the public in the transformation and innovation processes of the energy system.

References

BORUP, Mads/ BROWN, Nick/ KONRAD, Kornelia/ VAN LENTE, Harro (2006): The Sociology of Expectations in Science and Technology. In: Technology Analysis and Strategic Management, Vol. 18, Issue 3-4, p. 285 – 298. Goffman, Erving (1977): Rahmen-Analyse. Ein Versuch über die Organisation von Alltagserfahrungen, Frankfurt am Main Neukirch, Mario, 2014: Konflikte um den Ausbau der Stromnetze. Status und Entwicklung heterogener Protestkonstellationen. Stuttgarter Beiträge zur Organisations- und Innovationssoziologie 2014-01.

Fostering Responsible Action on the Consumer Side A Role for Local Citizen Panels in Energy Transition Strategies?

Georg Aichholzer

With its integrated energy and climate change strategy ("20-20-20 targets") the European Union aims to combat climate change, increase energy security and strengthen its competitiveness. A transition to low energy and low emission structures is also dependent on cooperation from the actors on the demand side (in 2012, transport accounted for 31.8 %, households 26.2 % and industry 25.6 % of the end use of energy in the EU-28). This paper will focus on involving citizens as consumers into measures of energy saving and lowering carbon emissions. In particular, it will draw on results of a local level (e-)participation approach combining long-term individual consumption monitoring with feedback of carbon footprints, provision of supporting information, and opportunities for exchange among participants.

The analysis is based on, a) a review of recent participatory approaches towards a low carbon society, and b) empirical results from a large field study on a set of similarly organised participation processes in Austria, Germany and Spain. The inquiry was part of the European collaborative research project 'electronic environmental democracy' (http://www.e2democracy.eu), in Austria funded by the Austrian Science Fund (FWF): I 169-G16. Public participation processes were carried by citizen panels in seven small and large cities as well as rural communities in the three countries. Citizens collaborated with local governments over up to two years on achieving a reduction of CO2 emission levels by at least 2% per year.

Among other things, the results show that the local level with its advantages related to community aspects is a promising route for actively involving especially already sensitised citizens into energy saving and climate protection. Participation formats based on visible joint contributions of all stakeholder groups, community forming citizen panels practising eco-feedback as an awareness-raising and information tool, and a combination of electronic and traditional communication mechanisms are an effective support to energy saving and lowering carbon emissions. However, based on more long-term observation, the simple hypothesis "information saves energy" needs some qualification as sustaining saving efforts is a challenge and achievement rates tend to decrease over time.

Lessons learned and conclusions for organisers and public policy will focus on some key challenges:

- 1. Selection of effective participation formats (involvement strategy, government level, communication mechanisms, process design);
- 2. Involvement of the target population (reaching and mobilising major stakeholders and population segments, role of inclusive strategies)

- 3. Active and sustained commitment (e.g. use of options supplied, role of motivation, incentives, barriers, and communication mechanisms)
- 4. Measurement and attribution of tangible impacts (energy saving, behaviour change, carbon emissions, policy measures initiated).

Institutional Development and Responsible Innovation in the Transformation of the German Electricity System Gerhard Fuchs

The paper analyzes the role of institutions in the process of the transformation of the German electricity generating system. The transformation will be studied by distinguishing between three phases of institutional development. We will discuss institutional development rather than institutional change because the former term encourages us to remain attentive to the ways in which previous institutional outcomes can channel and constrain later efforts at institutional innovation towards "responsible innovation".

In phase one lasting from the late 1980s until 1998 the institutional setting of the electricity system was characterized by its decentralized and semi-public character, legitimized by the idea that electricity generation and supply constitutes a natural monopoly. As a "niche development" we observe the growing importance of actors interested in the development of renewable energies, which in those years could not really grow because of institutional and regulatory hurdles.

Phase two is characterized by a double institutional re-alignment. Due to liberalization electricity markets are created which become dominated by the four big utilities. Former decentralized entities are mostly bought out. A wave of merger and acquisitions takes place. In parallel but also somewhat disconnected from these developments, a new regulatory framework for the development of renewable energies had been created. The developing institutions for renewables had little overlap with the main stream electricity system. Different actors, rules and organizations were dominant. This resulted in a very dynamic development of the renewables sector.

Phase three finds its symbolic expression in the Energiewende decision of the Federal Government (2011). The constant growth of renewables and the definite end for nuclear energy necessitated a re-alignment of the electricity sector. Renewables no longer were a niche activity and the incumbent actors were forced to accommodate their business models to the new situation. The interests of incumbents and challengers are directly clashing and the government is working on a new market design. A process which is of yet undecided. The new institutions under construction, however, will neither mirror the "liberal market spirit" of phase two, nor the enabling mood of phase two as far as the renewables were concerned.

The next horizon of technology assessment

The paper will use the neo-institutionalist theory of strategic action fields as developed by Neil Fligstein and Doug McAdam to analyze the transformation of the electricity system. The theory puts the conflicts between challenger (renewables) and incumbent actors (utilities) center stage for explaining institutional stability and change. The case of electricity generation is insofar "special" as the field (more than others) is constantly the object of government interventions and prone to be influenced by the broader macrocultural discourse (nuclear energy, climate change). Institutions in this context are both constraining actions but also enabling new activities.

Problems of Responsibility in Sociotechnical Systems Control, Learning and Actionability

Christian Büscher

Analyzing the transformation of the energy system has become a task for interdisciplinary technology assessment (Schippl/Grunwald 2013). In this research effort, very basic questions lead to complicated theoretical and methodical questions: Transformation of what? Transformation into what? What are the triggers of the transformation? What are the appropriate theories and methods to analyze the transformation, i.e. the premises and the consequences of this transformation? A sort of lowest common denominator in answering these questions represents the notion of sociotechnical systems, which highlights the reciprocal dependencies of technical and social aspects of the transition (Büscher/Schippl 2013).

However, it appears to be difficult to define the research object "energysystem" in the strict sense of classic systems theory. Kröger and Zio (2011) have already argued that for infrastructures, complicated and complex systems are intertwined, which poses methodological problems of modeling systems and calculating their behavior. Edwards has proposed to analyze infrastructure systems as "linked series of sociotechnical problems" (Edwards 2004, 25). According to Edwards, the main reference is on structure and on the problem of maintaining control despite increasing complexity of systems, networks, networks of networks, and webs (Edwards et al. 2007). Transition research (Elzen et al. 2004; Smith et al. 2005) emphasizes the densification of structures and analyzes the institutionalization of sociotechnical regimes. This leads to the research problem of how change is still possible and what triggers "de-institutionalization", i.e., niche development, learning and experimenting capacities. In this sense the idea of mechanisms of reproduction are crucial, because actors confirm or refute social structures by their actions. It is therefore important to consider and understand different "field logics" that actors are inclined to (Fuenfschilling/Truffer 2014). Lastly, how actors are enabled to act in the context of energy provision is rarely addressed, although everybody agrees on the facts of increasing complexity and intransparency in technical and social domains. Actionability is a problem of coping with the uncertain future and contingent consequences of action, which can

hardly be explained by rational choice models alone, but must be addressed by issues of trust, confidence and acceptance in systems.

For the topic of this session, we need to consider multiple aspects of "responsibility" related to the distinctive problems in the above mentioned dimensions: (1) The more complexity installed, the more difficulties arise to actually attribute responsibility in terms of the successful transition of the overall system. However, to attain control the possibility to hold actors accountable is mandatory. (2) Enforcing change comes with the readiness to initiate, regulate, and organize sociotechnical experiments – and therefore to cope with contingency, uncertainty, and risk. Means to distribute responsibility among different actors have to be implemented in order to achieve some relief of the burden of unknown consequences of those experiments. (3) Both aspects together are necessary conditions to create the capacity to act (to operate) and achieve – in a functionalistic sense – the level of system-trust, which allows the future energy system to become "invisible" again: the taken for granted, familiar, and latent feature of everyday life. In this presentation I would like to discuss the notion of sociotechnical systems in three analytical dimensions highlighting factual, social, and temporal aspects to expose distinctive issues of responsibility.

References

Büscher, Christian/Schippl, Jens, 2013: Die Transformation der Energieversorgung: Einheit und Differenz soziotechnischer Systeme, in: TATuP 22, 11–19.

Edwards, Paul N., 2004: Infrastructure and Modernity: Force, Time, and Social Organization in the History of Socio-technical Systems, in: Misa, Thomas/Brey, Philip/Feenberg, Andrew (eds.), Modernity and Technology. Cambridge, London: MIT Press, 185–225.

Edwards, Paul N./Jackson, Steven J./Bowker, Geoffrey C./Knobel, Cory P., 2007: Understanding Infrastructure: Dynamics, Tensions, and Design, Ann Arbor: DeepBlue, abrufbar unter: http://deepblue.lib.umich.edu/handle/2027.42/49353.

Elzen, Boelie/Geels, Frank W./Green, Kenneth, 2004: System Innovation and the Transition to Sustainability: Theory, Evidence and Policy, Edward Elgar Publishing.

Fuenfschilling, Lea/Truffer, Bernhard, 2014: The Structuration of Socio-technical Regimes—Conceptual Foundations from Institutional Theory, in: Research Policy, http://www.sciencedirect.com/science/article/pii/S0048733313001893

Kröger, Wolfgang/Zio, Enrico, 2011: Vulnerable Systems, London, Dordrecht, Heidelberg, New York: Springer.

Schippl, Jens/Grunwald, Armin, 2013: Energiewende 2.0 – vom technischen zum soziotechnischen System?, in: TATuP 22, 4–10; http://www.tatup-journal.de/downloads/2013/tatup132_scgr13a.pdf

Smith, Adrian/Stirling, Andy/Berkhout, Frans, 2005: The governance of sustainable socio-technical transitions, in: Research Policy 34, 1491–1510.

SESSION F⁴

ROOM: VILNIUS, FRIDAY, 9:00 AM - 11:00 AM

Public Participation for Complex Policy Problems – Challenges and Recommendations ANNICK DE VRIES AND ARNOUD VAN WAES (RATHENAU INSTITUTE)

AGENDA

High-level Nuclear Waste Management and Politics of Public Participation in South Korea YOUNG HEE LEE (CATHOLIC UNIVERSITY OF KOREA)

"Enabling" Public Participation in a Social Conflict – Nuclear Waste Governance in Germany PETER HOCKE AND SOPHIE KUPPLER (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

Who's the Gatekeeper? Ensuring and Legitimating a Participatory Decision-Making Process in the Context of Nuclear Waste Management CÉLINE PAROTTE (UNIVERSITY OF LIÈGE)

Researching Expectations of Societal Actors in Designing a Long-Term Trajectory for the Belgian National Program on High-Level Radioactive Waste Disposal KRIS VAN BERENDONCKS (UNIVERSITY OF ANTWERP)

Public Participation for Complex Policy Problems – Challenges and Recommendations

Chairs: Annick de Vries and Arnoud van Waes

Session Description

Complex policy problems may require public participation, especially when characterized by large impact on society and with technological uncertainty. This session aims to provide and collect fresh insights in how to involve citizens in a policy problem that entails great technological uncertainty, a potentially large societal impact, and a very long time horizon. The storage of radioactive waste is such a policy problem.

EU member states are asked to make a national program for the management of radioactive waste. This program is part of the 2011/70/Euratom directive. This directive requires EU member states to clarify their national policy for managing radioactive waste disposal. The directive also requires that the 'public' should be given the opportunity to actually participate in the decision-making process about the management of radioactive waste disposal.

Long term public participation on radioactive waste management raises many difficult questions. For instance, how do we ensure that our children and grandchildren can join this participation process? Who has to participate in public participation? How can we make such a highly complex problem concrete enough for participation? Are we justified in passing responsibility for taking a final disposal decision to our grandchildren? And, how will we deal with progressive insights and developing technologies?

The presentations in this session are based on papers that give insights in ways of organizing long term public participation for complex policy problems in general and the storage of radioactive waste in particular. Our aim is to stimulate an interactive discussion and a well prepared dialogue between the paper authors and an appointed referent. This means that each paper author has to act as a referent of another paper author. Further, we start the session with a short general introduction of the problematic issues of dealing with radioactive waste, based on the parliamentary debate (which will take place in January 2015) on radioactive waste management in the Netherlands. We also give some dilemmas that we would like to address during the remainder of the session. We end the session by wrapping up and giving a short overview of the differences and the similarities of issues of policy making and public involvement in radioactive waste management.

Dilemmas concern issues such as how to organize public participation in a flexible but still concrete enough way, how to deal with potential intergenerational conflicting interests, how to deal with differences in perception of the urge of the problem. We use the Dutch context to illustrate some major challenges.

High-level Nuclear Waste Management and Politics of Public Participation in South Korea

Young Hee Lee

The politics of risk management regarding science and technology in modern societies is closely related to the conflicts between technocracy and democracy. Nuclear waste management system is a good case showing the politics of risk management and the "politics of expertise". The purpose of this paper is to analyze the evolution of nuclear waste management system and the politics of nuclear waste management in South Korea from the viewpoint of risk sociology and STS.

South Korea barely succeeded in securing low and intermediate level nuclear waste disposal site in 2005 after tremendous social conflicts. However, Korea is currently confronted with much more difficult task of high level nuclear waste (mainly composed of spent nuclear fuel) management coming from 23 nuclear power plants. Korean government's nuclear waste management paradigm can be characterized as technocratic: it has pursued elitist approach so far relying exclusively on experts and technical bureaucrats. No significant participation of civil society has been allowed until recently. However, Korea's anti-nuclear movement has been expanding its influence after Fukushima disaster and strongly demanded public dialogue program on nuclear waste issues as well as phasing-out existing reactors.

One of the recent responses from Korean government is the official launching of PECOS(Public Engagement Commission on Spent Nuclear Fuel Management) on October 30 last year. Does this mean a paradigm change from technocratic to participatory risk governance with regard to nuclear waste management policy? However, it has raised conflicts further rather than solving the problems after two anti-nuclear activists selected as members of PDC resigned immediately criticizing that most members nominated were pro-nuke people. Considering this, the politics of risk management on high level nuclear waste management issues will likely be more intensified in the near future. Based upon this situation, some policy recommendations will be proposed in conclusion.

Referent: Céline Parotte

Examples of discussion points:

- To what extent does public participation in itself depends on cultures and history of a country?
- What is needed for a paradigm change from technocratic to participatory risk governance with regard to nuclear waste management policy?

"Enabling" Public Participation in a Social Conflict – Nuclear Waste Governance in Germany

Peter Hocke and Sophie Kuppler

Two central challenges need to be taken into account when talking about public participation in nuclear waste governance in many countries: First, the historical development of the nuclear waste conflict and second, the challenge for political decision-makers, public administration, industry and the interested public to co-design a governance process over a very long period of time.

In Germany, the call for public participation in nuclear waste governance has been part of the debate between environmental organizations, civil movements, the interested public, the nuclear industry and responsible government organizations ever since explorations for a disposal site for high-level waste started at the Gorleben salt dome in the late 1970s. Thus, this debate is one central conflict line. In this context, "designing" public participation means to negotiate appropriate modes of participation with the interested public in order to be able to starting resolving the conflict.

"Enabling" public participation is necessary and only possible if the historical dimension is taken into account. Key components for a strategy on public participation need to be not only the formal working arrangements (citizen conference, public dialogue,...) but also need to include "working agreements", e.g. on transparency, as well as a clear division of responsibilities and clear interfaces between formal and informal decision-making processes.

Further, learning processes for all participating actors need to be organized, including industry and government officials. Such learning processes are also essential for "extending the life-time" of participatory processes. If participation does not become an essential part of the official decisionmaking processes, the interested public's will to participate and government organizations" will to integrate will quickly disappear if it emerges at all. Early planning and institutionalization of participatory processes combined with flexibility to react to future challenges is thus key.

This talk is based on our empirical research on the nuclear waste conflict in Germany and Switzerland as well as a literature review on the debate on long-term stewardship and governance arrangements. This is integrated in a broader discussion on technology assessment and debates about the use of technology in modern societies.

Referent: Kris van Berendonks

Examples of discussion points:

- To what extent does the design of public participation relate to the historical development of the nuclear waste?
- How to deal with a very long term horizon when co-designing a governance process?

Who's the Gatekeeper? Ensuring and Legitimating a Participatory Decision-Making Process in the Context of Nuclear Waste Management

Céline Parotte

In Belgium, Nuclear Waste Management (NWM) is conducted by a Federal Agency called ONDRAF - i.e. the "National Agency for Radioactive Waste and Enriched Fissile Materials". Adhering to a largely accepted vision, NWM is considered by ONDRAF as a long-term and complex issue, consisting in technical, social, economic and ethical questions. In this respect, scientific literature invites to clarify and address those aspects in a decision-making process that could benefit from meaningful public participation (Callon, Lascoumes, and Barthes 2001). In this context, many stakeholders (e.g. citizens, researchers, industrialists, civil society organizations, the European Union... and ONDRAF itself) are in demand of a "conductor" that can organize, ensure and legitimize such a participatory decision-making process.

Many questions emerge from this demand. Who can be the gatekeeper of this process? What could be his role? For which purposes? In addition to that, how should participation be organized/assessed/controlled? To that regard, the purpose of this paper is twofold. First, I elaborate a possible definition of "gatekeeping a participatory decision-making process concerning NWM in Belgium". Second, I question the possible role of Technology

Assessment (TA) - as an institution as well as a set of approached - in this context. To address those questions, I rely on a combination of theoretical and empirical materials -i.e. semi directive interviews with policy makers and members of Belgian and French agencies in charge of NWM.

Referent: Peter Hocke and Sophie Kuppler

Examples of discussion points:

- What is an efficient way to put public participation into practice?
- What are pros and cons of an external body that coordinates public participation?

Researching Expectations of Societal Actors in Designing a Long-Term Trajectory for the Belgian National Program on High-Level Radioactive Waste Disposal

Kris Van Berendoncks

In this paper we will present the approach we adopt in a research project that aims to engage a broad range of Belgian societal actors in designing a trajectory for long-term actor involvement in HLW, i.e. from the principled decision to closure. First, we will reflect on earlier experiences in the Belgian context: the consultation process that was set up by Niras/ Ondraf to prepare the Waste Plan, but also some relevant lessons that can be drawn from the Partnership approach that is used for LLW, for instance on how evolutions in representation is dealt with. From these experiences we will discuss why we deem it useful to invest in constructing scenario's for long-term involvement at this moment. Secondly, we will argue why we believe that 'backcasting' can provide a promising technique when applied to the issue of HLW. Contrary to 'forecasting' it is a method that departs from a desired future in order to go back in time and identify the steps that are needed to obtain this result (Robinson 2003). We will then proceed to showing how these considerations reflect on the design of our project and its practical layout. We will address issues such as stakeholder identification and mobilization, and how we hope to integrate different methods ranging from exploratory interviews to a Delphi survey and participatory scenario workshops. We will conclude by opening up discussion on how aspects of the decision-making process, such as representation, but also sociotechnical matters, such as R&R or monitoring, can be presented to the participating societal actors in a fruitful way.

Referent: Young Hee Lee

Examples of discussion points:

- What is an efficient way to put public participation into practice?
- Who should be involved in public participation? Who are the participants?

SESSION F⁵



ROOM: SOFIA, FRIDAY, 9:00 AM - 11:00 AM

Teaching, Learning and Engaging in, through and about Technology Assessment. Theoretical and Practical Perspectives on Teaching and Learning Dimension of Technology Assessment for Involved Actors BENEDIKT ROSSKAMP (UNIVERSITY OF LIÈGE) AND MAHSHID SOTOUDEH (INSTITUTE OF TECHNOLOGY

AGENDA

ASSESSMENT)

PACITA Summer Schools. On the Role and Use of Technology Assessment PIERRE DELVENNE, BENEDIKT ROSSKAMP (UNIVERSITY OF LIÈGE) AND CIARA FITZGERALD (UNIVERSITY COLLEGE CORK)

Training TA Practitioners: Sharing, Experimenting and Producing Good Practices DANIELLE BÜTSCHI (TA-SWISS) AND ZOYA DAMIANOVA (ARC FUND)

Designing a PhD Programme on Ta: An Evaluation of Five Years of Experience ANTONIO B. MONIZ (UNIVERSIDADE NOVA DE LISBOA)

Disciplinary Qualification in Transdisciplinary Research? Some Lessons Learned from the TRANSDISS-Project MICHAEL DECKER (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

TA Working Lunches and Their Exemplifying Role in Engaging with Parliamentarians NATHAN CHARLIER, PIERRE DELVENNE, CÉLINE PAROTTE, MAXIME PETIT-JEAN, BENEDIKT ROSSKAMP AND MICHIEL VAN OUDHEUSDEN (UNIVERSITY OF LIÈGE)

Teaching, Learning and Engaging in, through and about Technology Assessment

Theoretical and Practical Perspectives on Teaching and Learning Dimension of Technology Assessment for Involved Actors

Chairs: Benedikt Rosskamp and Mahshid Sotoudeh

Session Description

This session will explore the collective and individual learning aspects in, through and about Technology Assessment in terms of real world practices but also in terms of awareness of the existence and potential of formalized TA capacities.

Learning, Teaching and engaging bears a number of challenges in terms of communication, interdisciplinary or organizational settings. The present session will explore the teaching, learning and engaging of three interconnected target groups: Organizers of TA learning activities; Practitioners of TA; Users of TA (MPs and other addressees).

Presentations focus on practical experiences or offer the possibility of stepping back from established daily practices to reflect on « what are our challenges?» in terms of strengthening capacities, raising awareness, community building, expectation management, and communication strategies for TA.

Starting with latest lessons from two PACITA training and capacity building activities (Summer Schools and Practitioner Training) the panel opens up the discussion by inviting presenters to expose other learning and teaching experiences. By crossing those perspectives, mutual learning of all actors (practitioners, users, stakeholders) in the TA process is put to the centre of the discussion.

In the spirit of the PACITA mutual learning goal, the panel will engage in exchanges with the audience to identify the learning challenges and good practices for each of the involved actors in TA processes. Are there common challenges for teaching and training in different examples? Could academic training integrate aspects from the practical side and vise versa? What are the benefits and limits of simulation exercises? What approaches for the different target groups? Audience will be moderated through a number of previously identified questions and challenges.

SESSION F⁶

ROOM: DUBLIN, FRIDAY, 9:00 AM - 11:00 AM

Technology Assessment of Human Cognitive Enhancement JAN ROMPORTL (UNIVERSITY OF WEST BOHEMIA) AND ELLEN-MARIE FORSBERG (OSLO AND AKERSHUS UNIVERSITY COLLEGE OF APPLIED SCIENCES)

AGENDA

The Exoself: the Extended or Stretched Human? ANDERS SANDBERG (UNIVERSITY OF OXFORD)

Goodness Without Goals: What Is a Good Enhancement? BJØRN HOFMANN (UNIVERSITY OF OSLO)

Technology Assessment of Human Cognitive Enhancement

Chairs: Jan Romportl and Ellen-Marie Forsberg

Session Description

The advances in technologies have brought about unprecedented modifications of human bodies and cognitive capabilities, pushing the field of Human Enhancement (HE) or Human Cognitive Enhancement (HCE) far beyond the state imaginable just couple of decades ago. In the near future, we can expect even faster development changes and we will feel more fiercely the effects of a technogenetic spiral. This leads to rapid paradigmatic shifts in the concept of human self, identity, interpersonal relations, ethical issues etc. However, there is still no widely accepted public policy for HCE regulation.

The thematic session on TA of HCE would like to address the need for thorough ELSA-driven mapping of current regulation and governance initiatives in the HCE field, such as specific regulatory actions related for instance to privacy, as well as to soft law, such as codes of conducts, best practices, and standardisation and certification schemes.

The topic of the session is motivated by the joint HCE-related project of University of West Bohemia, Oslo and Akershus University College of Applied Sciences, Gjøvik University College , Prague Psychiatric Center, and Charles University in Prague.

The Exoself: the Extended or Stretched Human?

Anders Sandberg

Human enhancement can be described in terms of amplifying human capacities that already exist, and adding entirely new capacities. While much debate has occurred about biomedical enhancement directly affecting the human body, less investigation has been done of the various ways we expand our selves. In many ways we live surrounded by an 'exoself', a cloud of systems that linked to the self in a cooperative and persistent way, extending the mind and the body – vaccination systems, clothes, smartphones, our online agents, wearable computers. We outsource cognition and other functions to these systems. Under what conditions do this kind of system extend and enhance us, or merely stretch us to fit externally imposed norms? How do we assess the rapid growth of proposed external cognition?

Cognitive

Human

Ъ

Fechnology As

Goodness Without Goals: What Is a Good Enhancement? Biørn Hofmann

Human enhancement is frequently discussed from the perspective of (human) naturalness. Critics point out that enhancement breaches with norms of what is natural for (human) beings. However, it is challenging to define what is natural. Accordingly, proponents of human (cognitive) enhancement argue that enhancement is "natural," or from the "flaws of human beings" and from continuous historical improvements. However, concepts such as "flaws," "enhancement," and "improvement" presuppose a notion of good, i.e., that the direction of change is valuable. However, what conception of good is inherent in "human (cognitive) enhancement?" Arguments for human enhancement tend to be very vague on what makes the more or the added better. There appears to be a series of trivial biases inherent in several of the arguments for human enhancement, such as "more is better than less," "newer is better than old," "to know is better than not to know," and that high performance is better than low performance, as well as that doing is more important than being. Hence true (cognitive) enhancement presupposes a moral enhancement, i.e., an ability to define what is good, beyond blunt biases. Are we able to "enhance" our moral reflection over the (cognitive) enhancement, or are we just technological giants and ethical Lilliputians on yet another area?

The next horizon of technology assessment

SESSION F⁷

ROOM: LIÈGE, FRIDAY, 9:00 AM - 12:45 PM

Potentials and Challenges of a prospective Technology Assessment WOLFGANG LIEBERT (UNIVERSITY OF NATURAL RESOURCES AND LIFE SCIENCES), BERND GIESE (UNIVERSITY OF BREMEN) AND JAN C. SCHMIDT (DARMSTADT UNIVERSITY OF APPLIED SCIENCES)

PART 1

Implementation Strategies for RRI to adress the Societal Grand Challenges of Our Times RENÉ VON SCHOMBERG (EUROPEAN COMMISSION)

Problematizing New Technology: How to Make Sense of Synthetic Biology HELGE TORGERSEN AND ALEXANDER BOGNER (INSTITUTE OF TECHNOLOGY ASSESSMENT)

Combining Foresight and Constructive TA to Tackle the Collingridge Dilemma GABRIEL T. VELLOSO AND ANTÓNIO B. MONIZ (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

The Identification of New or Improved Functionalities as a Common Element of Prospective Technology Assessment BERND GIESE AND ARNIM VON GLEICH (UNIVERSITY OF BREMEN)

Demands, Challenges and Tasks of a Prospective Technology Assessment WOLFGANG LIEBERT AND JAN C. SCHMIDT (DARMSTADT UNIVERSITY OF APPLIED SCIENCES)

PART 2

Beyond the Anticipation of Consequences of Technology: the Hermeneutic Turn of Prospective Thinking ARMIN GRUNWALD (INSTITUTE OF TECHNOLOGY ASSESSMENT)

Beyond Parliament: Facilitating Political Engagement with Synthetic Biology by Reaching out to Political Parties VIRGIL RERIMASSIE (RATHENAU INSTITUTE)

Nano Risk Governance: Extending the Limits of Regulatory Approaches through Expert Dialogues ANDRÉ GAZSÓ AND DANIELA FUCHS (INSTITUTE OF TECHNOLOGY ASSESSMENT)

Potentials and Challenges of a prospective Technology Assessment

Chairs: Wolfgang Liebert, Bernd Giese and Jan C. Schmidt

Session Description

Attempts to introduce TA in early phases of the scientific-technological development are often seen as being inconsistent with the Collingridge dilemma. This "dilemma of control" is saying that in early stages of a certain technoscientific development the anticipation of consequences is (more or less) impossible and later, when problematic consequences have become obvious. change is not anymore possible or at least, expensive, difficult and time consuming. Revisiting Collingridge's considerations make sense in order to explore whether we can meet nowadays his (normative) goal to find "a new way of dealing with the dilemma of control" because Collingridge himself envisaged options for overcoming the dilemma. He suggested criteria in order not to run and to be trapped in the dilemma: corrigibility of decisions, controllability, maintaining flexibility (by preparing choice between alternatives), and robustness to errors. These demands can enable options for shaping technology (or at least: directing socio-technological innovation) even in its infancy and thus opening the door for the perspective of prospective TA. But we need also to explicitly consider and address the inherently uncontrollable technologies, in particular the "risk technologies". Prospective analysis with its focus on what is already present and observable is necessary also in these cases and should lead to the identification of possible interventions as well as strategies for a prevention of critical functionalities.

In recent years, TA scholars have explicitly worked on early stage procedures or even conceptual proposals aiming at prospective TA. The common denominator of these efforts is the emphasis on early stage orientation. Conceptual approaches explore the technoscientific character of relevant fields of concern, the reflection of corresponding potentials and intended impacts as well as unwanted but expectable consequences and how to deal with different forms of uncertainty (known unknowns, unknown unknowns) in terms of precaution. Furthermore normative dimensions were focused upon, encompassing criteria for assessment and judgement in the stage of R&D as well as reference to ethical concepts. Key elements also encompass the shaping orientation reflecting the scientific-technological core as well as relevant actors from scientists and engineers over politicians and industrial managers to citizens and consumers.

The aim of the session is to review the various approaches, their potentials or shortcomings, focusing on the earliness problem of TA. Opportunities and prospects for further improvements will be discussed.

Implementation Strategies for RRI to Address the Societal Grand Challenges of Our Times

René von Schomberg

Responsible Innovation implies, among other, the transition of 'risk' management towards 'innovation management'. The prospects of TA lie in the context of responsible innovation in the integration of foresight and TA. In my contribution, I will explicate the dimensions needed for an implementation of a TA/Foresight strategy to achieve social desirable outcomes of innovation processes by exploring technological options without making the achievement of these social desirable outcomes fully dependent on "technological progress". I will draw on examples what this means to address some of 'grand challenges' of our times.

Problematizing New Technology: How to Make Sense of Synthetic Biology

Helge Torgersen and Alexander Bogner

Whenever a new technology enters the arena of public discourse, a number of questions arise: what is it like? How can we make sense of what the scientists say? Sooner or later, the questions get more critical: What is it for? Is it dangerous? Is it morally acceptable? And what may be the fascination with it? This also happened with Synthetic Biology when it became a subject of debate. Initially, the floor seemed open for a variety of interpretations. Over time, a handful of major understandings emerged what SB is, what older technology it should best be compared with, how to discuss it and, hence, how to adequately assess benefits and risks.

However, these different interpretations are not without consequences, respectively. Subject to the dominant view, economic benefit, risk or ethics emerge as major perspectives, supplemented by a 'gadget' view that is more of an aesthetic character. These problematizations in turn determine how the new technology is viewed upon, what is perceived to be the problem and the advantage with it, how to adequately deal with it and whom to involve in the process of governance. In other words, these problematizations are highly relevant for policy.

In our contribution, we will elaborate the concept of problematization originating from a Foucauldian view and building on the literature on frames. We will show how they emerged with various technologies, how they gained ground and what repercussions they have. Finally, we will discuss the implications for Synthetic Biology.

Combining Foresight and Constructive TA to Tackle the Collingridge Dilemma: The Caseof Clinical Applications of Brain-computer Interfaces

Gabriel T. Velloso and António B. Moniz

Emerging technologies bring promises to solve many of the world's challenges. However, the risks related to these technologies are often unknown and unpredictable, given their initial stages of development. Its social impacts are unseen, unknown and sometimes unexpected. Combining the future aspects of Technology Foresight (TF) with Constructive Technology Assessment (CTA) could be an effective option to face the Collingridge dilemma. They represent a systematic process to produce judgments about the characteristics of emerging technologies, its development pathways, and potential future impacts, thus characterizing a certain type of a prospective TA. Brain-computer interface (BCI) is an emerging technology at its initial stages of development with a high level of uncertainties. It is a system which measures central nervous system (CNS) activity and converts it into artificial output without using the normal pathways of peripheral nerves and muscles, changing the ongoing interactions between the CNS and its external or internal environment. Its clinical applications allow for the replacement, restoration, enhancement, improvement and supplementation of human functions, which raises questions about ethics, morals and responsibility. It is also important to highlight that the role of responsible research and innovation (RRI) includes moral, epistemic and governance dimensions of responsibility for such technologies. But they also include the need for distributing these responsibilities between scientists, governments, and other social actors in a large group of stakeholders in an inter- and transdisciplinary process.

This presentation seeks to explore a future vision for a time horizon set in 2025 through literature review, interviews and a survey, in order to anticipate future developments and impacts in such a way that better shapes the decision making process of the clinical applications of BCIs considering its unpredictabilities and risks. Moreover, this paper aims to present partial results of a research focused on addressing important issues related to the challenges and future perspectives of BCI's, as well as its main implications on ethical, moral and philosophical issues. The results could establish a more comprehensive and distinct view of the innovation process and its consequences, promoting a better understanding of how these innovations will develop.

The Identification of New or Improved Functionalities as a Common Element of Prospective Technology Assessment Bernd Giese and Arnim von Gleich

Governance of emerging technologies based on a prospective technology assessment increases the potential to develop sustainable contributions, to minimize hazards and to avoid undesired extensions of exposure. If we try to realize this opportunity of early influencing technology design based on prospective approaches, we rather deal with research assessment and design than with technology assessment and design. Especially in the research phase of technologies or innovations, knowledge on possible implications of future applications is for the most part quite vague and fragmentary. Therefore, we have to shift our analytical focus from applications to the technology itself and to the new or improved functionalities it provides. New or enhanced functionalities make emerging technologies interesting in view of possible applications. They determine future prospects and hazards of processes and products and therefore finally possible technical, social and ecological implications. Analysis and assessment should start with the way in which these new or improved functionalities come into practice in the process of research, that is, with the theoretical (models) and practical (experiments) abstractions that are lead by hypotheses and scientific paradigms. All these aspects form what we call the "character" of an emerging technology in its specific forms with special focus on its depth of intervention and the resulting power of the technology (degree of hazards) and on the expectable length of induced chains of causes and effects in time and space (degree of exposure).

Because these areas are – at least partially – already subject of approaches in prospective technology assessment, it would be worth to discuss whether the analysis (and hermeneutics) of the genesis of new or improved functionalities of emerging technologies could become a common element of approaches in prospective technology assessment.

Demands, Challenges and Tasks of a Prospective Technology Assessment

Wolfgang Liebert and Jan C. Schmidt

The paper focuses on the question which tasks a Prospective TA (ProTA) should accomplish: What makes prospective approaches of TA necessary and what is ProTA aiming at? The attempt is made to answer these questions along the following lines:

Research and development is the basic driving force towards the future. In order to enable a prospective approach the current boundary conditions of research and development have to be considered and need to be analyzed: nowadays, most scientific-technological progress is being made in technoscientific contexts. This progress is enabled by societies (and companies) investing more and more into research. Therefore, earliness of assessment is of utmost importance in order to guarantee desirable outcomes and this assessment must compromise not only technology as a final product but also science, research and development itself. The so called "Collingridge dilemma" could be tackled by demonstrating shaping options in an early stage of R&D aiming at the avoidance of already visible hazards or risks and unwanted consequences, and the mini-mization of recognizable ambivalences of the development in case. On the other side, the "positive" objectives and the desirability of techno-scientific endeavours have also to be scrutinized. Considering intentions and potentials is a key element of ProTA. This requires the analysis of the inner-scientific dynamics as well as the socio-economic conditions of technological realizations and should lead to the consideration and assessment of realistic potentials and their differentiation from unrealistic visions and promises. It will turn out that fundamental questions are involved when considering the ethical justification or orientation of research programmes or projects. Do they reflect the need to positively tackle the grand challenges of our time? Or do they endanger the living conditions and the human identity and dignity on our planet?

It is necessary to provide the public and political decision makers with transparent information and independent assessment to allow for early decisions on and shaping of technoscientific projects and programmes.

Beyond the Anticipation of Consequences of Technology: the Hermeneutic Turn of Prospective Thinking

Armin Grunwald

The word 'hermeneutics' has been be used repeatedly in the scientific debates on responsible research and innovation (RRI). In this paper I present the thesis that this omnipresence is no co-incidence. Rather, technology assessment (TA) exercises, reflections in applied ethics, and studies of the ethical, legal and social implications (ELSI) must necessarily involve hermeneutic effort, in particular in the field of new and emerging sciences and technologies (NEST). The main objective of hermeneutic analysis is uncovering the (frequently controversial) meanings that are attributed to NEST and that mold the RRI debates. Subjects to hermeneutic turn, to no longer treat the understanding of the possible meanings of NEST in the RRI debates as a secondary feature, but to put them at the focus of analysis and reflection. In order to develop a concept of 'hermeneutic orientation' I reflect programmatically on the fields of study and methods that a hermeneutic analysis of techno-futures and visions should embody. This closes a blind spot in the previous RRI debates.

Beyond Parliament: Facilitating Political Engagement with Synthetic Biology by Reaching out to Political Parties

Virgil Rerimassie

Timing is a crucial element in order for a TA intervention to have an impact on the political discourse on an emerging technology. In this paper I would like to present the TA strategy the Rathenau Institute developed in order to facilitate early political engagement with synthetic biology (SynBio).

The Rathenau Institute engaged with SynBio quite early on. As a result of this effort, members of the Labor Party raised questions in the Dutch parliament to draw the attention of the cabinet to SynBio. For the years to come however, (and up until now), SynBio did not become a topic of debate in parliament. This is perhaps not surprising; SynBio is still largely confined to the laboratory. At the same time however, many TA organizations mapped the broad range of societal and political questions SynBio may give rise to. Moreover, the type of questions raised by SynBio cannot always be self-evidently answered from established political ideologies. Therefore, the Rathenau Institute perceived the need to establish more political awareness, before dilemmas become urgent. For this reason the institute decided to target the world of political parties, rather than parliament itself. Political parties should not be seen as unities, but rather as multitudes of organs and related bodies. Several of these bodies could fulfil a valuable role in examining the potential significance of emerging technologies for the political party they are connected to, such as: political think tanks, political youth organizations, and political working groups (advisory committees).

I consider three reasons why these organizations could play a valuable role in the early engagement with emerging technologies. First of all, sudden scientific breakthroughs can catch society and politics off guard. Given the challenging questions emerging technologies raise, the aforementioned political bodies could assist in formulating tentative answers from the perspective of the political party they are linked to. In doing so, they establish a knowledge base for members of parliament, from which can be drawn in case of a sudden technological breakthrough. From this point of view, engaging with political parties can thus be understood as knowledge and capacity building for members of parliament. Second, the aforementioned political bodies are also interesting TA clients in their own capacity. By shedding a light on a technological development from a particular ideological perspective, they contribute to the current debate on a certain technology. Third, engaging with such political bodies provides valuable empirical data on how political parties actually might understand a certain emerging technology. This allows interesting insights for organizations involved in the governance of the emerging technology at hand, but could also be taken into account by scientists and technology developers.

The Rathenau Institute puts this strategy into practice by reaching out to several political youth organizations, which were asked to formulate a tentative political vision on SynBio and defend it during a youth debate on SynBio, organized in the context of iGEM (the worldwide student competition on SynBio). The results of the debate as well as the process of facilitating the political youth organizations in their opinion making can serve as an example in the remainder of the paper.

Nano Risk Governance: Extending the Limits of Regulatory Approaches through Expert Dialogues

André Gazsó and Daniela Fuchs

Shortly after the Austrian nanotechnology research program ('Nano Initiative', NI) had started in 2003, the involved organizations considered some kind of accompanying TA necessary. Three years later, the fully fledged TA project NanoTrust came into life. The motivation for its set-up differed: TA institutions wanted to engage in a then new field, while organizations funding and managing the NI had in mind 'not to run into the same public communication disaster like with gene technology'. Thus, their main reason to deal with risk and safety issues was to prepare for a future public debate. Subsequently, the Health and Environment ministries showed up, asking for safety relevant data as a basis for regulatory decisions. As a consequence, NanoTrust has been co-funded by several Ministries for a decade (until 2016 at least). It is carried out at the Institute of Technology Assessment of the Austrian Academy of Sciences and shows several peculiarities that may be indicative for TA's role in assessing emerging technologies:

- Originally, the project intended to 'investigate risk and safety relevant issues regarding the use of nanotechnologies'. However, risk analysis and evaluation rules require setting the system limits properly narrow to ensure the validity of results. For nanotechnologies, the necessary focus on a very early phase of development entails extending the system limits far into the future, rendering statements on development paths more or less blurred. Consequently, uncertainties emerge rather than risks.
- The main project aim was to create robust and regulatory relevant knowledge. The high level of uncertainty, however, required organizing the process of knowledge creation mostly in the form of transdisciplinary expert dialogues. As a consequence, NanoTrust indulged in a variety of expert networks and risk assessment committees (Austrian Nanotechnology Action Plan, Nanoinformation Commission, etc.) right from the beginning.
- This brought another problem for TA: as the project developed into being part of the regulatory system it was no longer possible to remain in the role of an observer. TA not only provided reliable information and evaluated risk and safety relevant knowledge. Rather, its role also included initiating joint activities, coordinating and eliciting discussions and even suggesting aims and visions to be shared among partners in order to jointly organize the generation of new knowledge.
- These activities can only be credibly performed if the TA researcher' roles within such networks are unambiguous and are openly communicated to the partners. Therefore, the role of the NanoTrust project members had to be carefully reflected. Eventually, the decision was taken to adopt a role Roger Pielke Jr. would call an 'Honest Broker of knowledge'.

The results of the debate as well as the process of facilitating the political youth organizations in their opinion making can serve as an example in the remainder of the paper.

SESSION F⁸

ROOM: BUDAPEST, FRIDAY, 9:00 AM - 11:00 AM

Beyond the Developed World: What Role for Participatory TA in the Energy Planning Processes of Developing Countries? PETA ASHWORTH (UNIVERSITY OF QUEENSLAND) AND FRANS BROM (RATHENAU INSTITUTE)

AGENDA

Considering the Role of Energy in Eliminating Human Poverty PETA ASHWORTH (UNIVERSITY OF QUEENSLAND)

Public Engagement for Bioenergy with BECCS – What Can Be Learned from the Clean Development Mechanism? ERIK THORSTENSEN (OSLO AND AKERSHUS UNIVERSITY COLLEGE OF APPLIED SCIENCES)

Public Participation for Developing a CCUS Project in the Guangdong Region of China XI LIANG (UNIVERSITY OF EDINBURGH; UK CHINA CCUS CENTRE), PETA ASHWORTH (UNIVERSITY OF QUEENSLAND) AND YAMING LIN (NANFANG MEDIA GROUP)

A Critical Look on Rice Husk Gasification in Cambodia: Engineering and Sustainability NGUYEN HONG NAM (UNIVERSITY OF SCIENCE AND TECHNOLOGY OF HANOI), LAURENT VAN DE STEENE AND MINH HA-DUONG (NATIONAL CENTRE FOR SCIENTIFIC RESEARCH)

The Role of Hydropower Development in Trans-Boundary Water Sharing and Governance Arrangements in South Asia JUSTINE LACEY (COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION)

Beyond the Developed World: What Role for Participatory TA in the Energy Planning Processes of Developing Countries?

Chairs: Peta Ashworth and Frans Brom

Session Description

Access to basic energy is acknowledged as a critical pillar for achieving the United Nation's Millennium Development Goals. However, today there remain over 1.3 billion people without access to electricity and 2.6 billion people without clean cooking facilities. More than 95% of these people are either in sub-Saharan African or developing Asia and 84% are in rural areas (WEO, 2013).

A key feature of this session will be hearing firsthand, the experiences of a range of stakeholders working to deploy various low carbon energy technologies in developing countries. The processes they have used for technology deployment and the associated successes and/or failures of each will be examined. What have been the social, political, ethical and legal implications for each?

We propose to use Hennen et al's (2010) Typology of Impacts, to identify which dimensions of issue and impact are being addressed and what further opportunities may exist for participatory technology assessment (pTA) to enhance the overall deployment of energy technologies, and ultimately work towards the eradication of human poverty and improving the livelihoods of those less fortunate around the globe. The session will explore the responsibilities of the developed world, particularly those who export their resources to many developing countries in helping to alleviate poverty for those less privileged.

Questions include:

- What are the challenges for deploying large scale mitigation technologies in local communities currently without electricity or in fuel poverty?
- How do different political structures (across local, state and national levels) impact deployment of low carbon technologies?
- Does a national vision for energy impede or enhance deployment?
- What are the complexities and contrasts between the developed and developing world contexts for the energy planning mix and associated infrastructure deployment?
- What are the current (socio-technical) energy issues and their long term impacts for future generations?

- Can social unrest help to foster participatory processes (public engagement)?
- What are the associated ethical issues arising from the interplay of such considerations?

References

Hennen et al. (2004): Towards a Framework for Assessing the Impact of Technology Assessment. In: Decker, M.; Ladikas, M. (Eds.): Bridges between Science, Society and Policy: Technology Assessment - Methods and Impacts. Berlin et al. World Economic Outlook (2013); http://www.imf.org/external/pubs/ft/weo/2013/02/weodata/index.aspx

Considering the Role of Energy in Eliminating Human Poverty Peta Ashworth

In most developing countries many people still lack access to modern energy services, clean water, and basic sanitation. As an example, India's President Narendra Modi inherited the ongoing problem of supplying energy to one of the world's largest economies. The challenge is made even bigger by India's ambitions to meet rigorous renewable energy and carbon reduction targets. And yet 300 million Indians remain unconnected to the electricity grid with India's current energy deficit – where demand exceeds supply by 10%. The scenario outlined above is not limited to India but one that is faced in many developing countries and more broadly the globe as we try to address the challenges of affordable, secure and low carbon energy supply. The World Energy Council have developed a Sustainability Index (http://www.worldenergy.org/data/sustainability-index/) which ranks countries in terms of their ability to provide sustainable energy policies through the three dimensions of security, equity and environmental sustainability. This presentation will lay the foundations for this session by highlighting the differences that emerge between developing countries and those in the developed world.

Public Engagement for Bioenergy with BECCS – What Can Be Learned from the Clean Development Mechanism?

Erik Thorstensen

According to several scenarios for the global energy supply chain, reaching what is often presented, as the 450 ppm/2 degrees target in increase in global mean temperature requires carbon negative solutions. Amongst these solutions, the scenarios list both carbon capture and storage (CCS) as well as bioenergy with carbon capture and storage (BECCS). All models project that the main part of bioenergy will come from developing and transitional economies. Consequently, it is in these economies and countries that BECCS will be implemented to the largest extent while CCS remains the option for developed countries. It is an unquestioned assumption in this paper, that if climate mitigation strategies are to reach

their goal, they also need to be socially successful: they need to provide goods, benefits or values to the affected communities. It is not possible to compare BECCS to CCS directly, but it is possible to look at the public involvement in already existing biobased mitigation strategies under the UNFCCC to the public involvement in CCS. The current paper therefore studies inclusion of local stakeholders, communities and public into the already existing afforestation / reforestation measures under the Clean Development Mechanism (A/R CDM) and compares these qualitatively to the existing studies on public engagement on CCS. The purpose is to draw lessons from the A/R CDM to a possible implementation of bioenergy production with BECCS.

Public Participation for Developing a CCUS Project in the Guangdong Region of China

Xi Liang, Peta Ashworth and Yaming Lin

In China, to build a successful coal-fired power plant, authorities require an environmental impact assessment (EIA). The EIA includes four public consultations as well as a public hearing. These projects also require another public consultation process conducted through the Municipal Department of Land and Resources for land usage. In addition to the formal process, the project acknowledges the need for more informal engagement with the public to ensure they fully understand project objectives, to reduce the risk of public opposition. This paper will present the results of an early baseline study and workshops conducted with the general public in the Guangdong region to understand public attitudes towards a proposed CCUS project of China Resources Power (CRP) Haifeng. The CRP Haifeng project is the first proposed CCUS demonstration project endorsed by the Guangdong provincial government. The current plan of the demonstration programme aims to capture one million tonnes of CO2 from the CRP Haifeng power plant and transport CO2 to Chinese National Off Shore Oil Company (CNOOC)'s Huizhou Refinery to mix with CO2 from other high concentration sources. The mixed CO2 stream will be transported to an offshore CO2 storage site in the Pearl River Delta Basin.

A Critical Look on Rice Husk Gasification in Cambodia: Engineering and Sustainability

Nguyen Hong Nam, Laurent Van De Steene and Minh Ha-Duong

Rice husks are the indigestible coatings of grains of rice. They are produced in large quantities by the rice milling industry, more than 1 million ton per year in Cambodia. Rice husks are a biomass that can be used to produce electricity, requiring 1.6-1.8 kg biomass to produce 1 kWh of power. This is a two stage process: the biomass is first fed into

a gasifier which produces syngas and ashes, then the syngas is cleaned and burned into an engine where it saves diesel fuel. Since 2006 dozens of biomass gasification plants, typically around 200kW capacity, have been installed in Cambodia. Many have been in local communities currently without electricity or in fuel poverty. Our study will describe the sustainability challenges for deploying these technologies: how much does it depend on government intervention and on the state of the electricity market? What are the impacts of the gaseous, liquid and solid wastes? What are benefits for the local companies in term of profits, jobs and technology transfer? We will analyze how different political structures across local, state and national levels impact its deployment. We will show how the national vision for energy and agriculture converge to support this technology.

The Role of Hydropower Development in Trans-Boundary Water Sharing and Governance Arrangements in South Asia

Justine Lacey

Increasing aid funding is being directed toward supporting the development of solutions at the water-energy-food nexus in South Asia. This presentation examines the Australian Aid funded Sustainable Development Investment Portfolio (SDIP) which focuses on improving water, energy and food security in the three major Himalayan river basins – the Indus, Ganges and Brahmaputra. These basins span North-East India, North-East Pakistan and the bordering countries of Bangladesh, Nepal and Bhutan. The region also has an estimated 300 million people living in extreme poverty, which is the single largest concentration of poverty in the world. The focus of the SDIP investment is targeted at the three interrelated sectors of water resource management, energy access and agricultural productivity. The aim is to facilitate economic growth and improve livelihoods, targeting the poorest and most vulnerable, particularly women and girls. In terms of promoting improved trans-boundary water management and regional water governance, investment in hydropower is currently being explored as an option for increasing energy access among the population. Access to both water and energy in this context is driven by a variety of complex institutional and socio-political processes, including gender. This presentation will describe some of the challenges associated with negotiating these dual issues of resource access and security, and the potential opportunities for broader participation in these processes.

SESSION G¹



ROOM: BERLIN, FRIDAY, 11:15 AM - 12:45 PM Session organized by the Network TA

Varieties of Technology Governance and Opportunities for Technology Assessment STEPHAN BRÖCHLER AND BJØRN LUDWIG (NTA WORKING GROUP)

AGENDA

Comparing the Governance of Novel Products and Processes of Biotechnology JANUS HANSEN (UNIVERSITY OF COPENHAGEN) AND INGRID METZLER (UNIVERSITY OF VIENNA)

Ageing in Place, where Technology Assessment and Technology Governance Converge BARRY GUIHEN (VRIJE UNIVERSITEIT BRUSSEL)

Between 'Moralisation of Politics' and 'Politicisation of Ethics': Is There a Place for Ethics in Technology Governance? KATJA STOPPENBRINK (WESTFÄLISCHE WILHELMS-UNIVERSITÄT MÜNSTER)

TTIP and Transatlantic Cooperation on Technological Regulation: Between Technological Assessment and Emotion BETTINA RUDLOFF (GERMAN INSTITUTE FOR INTERNATIONAL AND SECURITY AFFAIRS)

Varieties of Technology Governance and Opportunities for Technology Assessment

Chairs: Stephan Bröchler and Bjørn Ludwig

Session Description

The term Government is nowadays increasingly substituted by the term Governance (Benz/Dose 2010). That has gained visibility by integrating actors of state as well as non-state-actors in treating public problems to increase political capacity to act (Blumenthal/ Bröchler 2006). Furthermore, for the field of technology and innovation policy the term of Technology Governance (TG) is establishing. (Bröchler 2012, 2013; Bröchler/Aichholzer/ Schaper-Rinkel 2012; Simonis 2012, 2013).

Technology Governance (TG) is a recent research approach within the broad field of governance studies (Bröchler 2013; Aichholzer/Bora/Bröchler/Decker/Latzer 2010). It is an instrument to analyze, how institutions and political and social actors in modern societies solve problems which result from the development and reproduction of socio-technological systems. It is important however to distinguish between TG in the political realm and TG in economy and science (Simonis 2013).

On the other hand the concept of Technology Assessment (TA) aims at identifying perspectives for technical solutions for the society without taking unwanted risks and side effects (Renn 2007). TA can be taken as a multidisciplinary institutionalized problem solving structure to shape socio-technical innovations. (Bröchler 2007, 2013). Main focus of the various approaches of TA is to provide decision makers with decision-relevant knowledge, also to assure the capacity to act (Ludwig 2003).

In bringing together the two concepts of Technology Governance and Technology Assessment, the panel seeks to identify strategies for RRI. On the one hand, RRI as an instrument of shaping socio-technological innovation will benefit from integrating TG-Research. On the other hand RRI requires knowledge about the innovation process and, additionally, when, where and with which instruments and concepts TA is able to shape the innovation process in order to achieve the intention of future social, environmental and constitutional soundness.

The panel will specifically focus on the question, how Technology Governance can enhance the performance of Technology Assessment in order to contribute to the concept of Responsible Research and Innovation (RRI).

Comparing the Governance of Novel Products and Processes of Biotechnology Janus Hansen and Ingrid Metzler

The emergence of novel products and processes of biotechnology in medicine, industry and agriculture has been accompanied by promises of healthier, safer and more productive lives and societies. However, biotechnology has also served as cause and catalyst of social controversy about the physical safety and social desirability of novel technologies. Such controversies have put the principles, institutions and instruments of governance, which has conventionally guided the interactions between science and society, under pressure. One outcome of this pressure is an increasing demand for (participatory)TA and RRI procedures and institutions.

While researchers in science and technology studies (STS) have done extensive work on the substance and processes of such controversies, they have devoted less effort to link their work to the broader tradition in political science and political sociology, which analyses more general principles and varieties of governance in modern societies.

This paper, which derives from collaborative work in an EU-funded 'COST' research network, presents an attempt to start to fill this gap and develop a conceptual framework for comparing and analysing new and emerging modes of governance affiliated with biotechnology in the light of more general approaches to governance. We aim for a framework that can facilitate comparative inquiries and learning across different contexts and applications, e.g. biomedical and agricultural applications, and across different polities and policy domains, e.g. different regional, national and supranational settings in order to better understand, among other things, the potentials and limitations of (p)TA and RRI.

We introduce five different dimensions of governance, which we discuss with empirical illustrations: 1) the dominant imaginaries of governance, 2) agency and accountability of governance, 3) governance objectives and instruments, 4) extension of the modes of governance, and 5) sources of acceptance/legitimacy.

Ageing in Place, where Technology Assessment and Technology Governance Converge Barry Guihen

Ageing is an emerging and wide-ranging issue. It promises to deeply affect the society we live in, with serious implications for our daily lives. Ageing, as a complex social issue (including tackling the heterogeneity of ageing, issues of perception and interpretation, and wellbeing), is attracting increasing interest in various related academic disciplines.

Among the variety of challenges, both individually and as a society, that ageing poses, supporting ageing in place is one which both governments and technology developers are increasingly eager to work on. Proposed technologies to address this include ambient assisted technologies, such as wearable and placed sensors, networked devices (in particular networked devices that collect or transmit medical data), and assistive robotics. However supporting ageing in place requires not only that technology be developed in a manner that sensitive to the needs and desires of end users, but also that policy initiatives and governance frameworks recognise the importance of innovative and societally desirable solutions to the challenges presented.

I will show that effective implementing ICT to support ageing in place is a dear case of the need to bring together TA and TG in that supporting older people in the home requires not just technological, but also social and political innovation. With the rapid development of ICT-based "solutions" there is now a greater need than ever to guide technological development in its early stages to ensure that as these technologies mature, they do so in a manner that is responsible, effective and consistent with our fundamental rights. Equally, it is essential that this process be supported with effective governance frameworks at a national and international level. Drawing from the knowledge produced by the VALUE AGEING (www.valueageing.eu) project, I will further argue that considering the needs involving older end users is meeting the criteria of RRI in that it recognizes that all societal actors must be involved in the early stages of research and innovation, making it both responsible and societally desirable.

This article will be relevant to scholars of elderly care, the ethics of technology and technology assessment as well as policy makers.

Between 'Moralisation of Politics' and 'Politicisation of Ethics' – Is There a Place for Ethics in Technology Governance?

Katja Stoppenbrink

Time and again ethics as an academic discipline has had hard times in defending its place within the variety of technology assessment (TA) concepts. The status of ethics within TA has often been the focus of specific investigations in interdisciplinary contexts. Now the integration of TA within the more recent concept of technology governance (TG) comes as a new challenge for ethics and its role in TA and TG respectively.

While policy-oriented TG (TG in the political sphere) is about the 'integration' of reactive attitudes of manifold actors vis-à-vis technological or innovative challenges, the 'classic' focus of different concepts of TA is to analyse, foresee, enlighten, clarify, etc. the actual or potential effects of a socio-technological innovation whether they be risks and side-effects or sufficiently foreseeable reactions by different groups of stakeholders. While 'ethics' is concerned with the normative acceptability (justifiability) of, say, uncertain or certain risks,

within the TA framework the inquiry into potential public acceptance is part of the factfinding studies on side-effects but does, strictly speaking, not belong to 'ethics in TA'.

In a TG perspective the possibly divergent moral discourses are integrated into the decisive policy discourse(s) whereas in a TA perspective 'ethics' is not concerned with the factual moral attitudes that different actors may utter and that can be turned into empirically collected data. Rather, 'ethics' conceives of itself as an academic discipline offering an expertise that is both substantially and methodologically special in kind and that – if 'applied' – is concerned with an overall analysis of the evaluative implications of some socio-technological innovation.

Grunwald (2013) has examined this fundamental, but often confused, difference in distinguishing "Ethisierung" and "Moralisierung". TG runs the factual risk of further 'moralisation of politics' or 'politicisation of ethics' whereas what ethics within TA aims at is, to put it in Grunwald's terms, 'ethical education' or even 'ethical enlightenment'. The evaluative dimensions may be lost in adopting an extreme TG perspective in which academic or professional ethics is but one actor among many and tacit discursive framing as to what counts as relevant becomes effective. However, this takes a turn if viewed from the perspective of responsible research and innovation (RRI). My claim is that TG implies RRI implies ethics. Ultimately, one can purport that there has always been some tacit presupposition that ethical TA must become operative in the political sphere. This implies a position on TG even avant la lettre.

TTIP and Transatlantic Cooperation on Technological Regulation: Between Technological Assessment and Emotion

Bettina Rudloff

The recent negotiations on TTIP are linked to public concerns and huge administrative challenges especially for handling the issue of food standards: the public debate is dominated by the fear of contaminated chicken or of hormone beef - both forbidden in the EU but allowed in the US.

But does an Agreement automatically lead to identical standards as a result of "technical governance"? And would that be always e at the American level, supposed to be weaker – the latter a question as well to be analyzed more carefully?

The EU and the US follow different and for longtime established individual approaches: this is true for both, technological assessment referring to food ("risk assessment") and for the respective governance structure ("risk management").

In addition, the perception of what to be assessed and managed ("risk perception") differs. These differences cause diverging political results, i.e. the prohibition or permission of substances like hormones for beef or the allowances.

But how can such differences are handled in negotiating an Agreement that envisage abolishing such trade barriers in terms of standards?

The presentation will identify the major differences between EU and the US on technological assessment and governance for food safety and will derivate possible options for negotiating cooperation.

Therefore different scenarios of cooperation that already existed in the past exactly between these actors ("veterinary agreements") but as well between the EU and other trade partners will be presented.

This regulatory experience shows a large spectrum for cooperation activities despite of national differences – starting from really harmonized and identical standards and ending by keeping national standards.

These options will be discussed for major challenges of TTIP regarding food standards.

SESSION G²

ROOM: PRAGUE, FRIDAY, 11:15 AM - 12:45 PM Panel Discussion

Trajectories of Technology Acceptance: From Innovation to Operation

- Exploring the Role of RRI and Social Licence to Operate

Chairs: Nina Hall and Justine Lacey

Trajectories of Technology Acceptance: From Innovation to Operation – Exploring the Role of RRI and Social Licence to Operate NINA HALL AND JUSTINE LACEY (COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION)

AGENDA

NINA HALL Commonwealth Scientific and Industrial Research Organisation, Australia

JUSTINE LACEY Commonwealth Scientific and Industrial Research Organisation, Australia

MILTOS LADIKAS Institute for Technology Assessment and Systems Analysis, Germany

JULIA HAHN Institute for Technology Assessment and Systems Analysis, Germany

PETA ASHWORTH University of Queensland, Australia

LEO HENNEN Institute for Technology Assessment and Systems Analysis, Germany

Session Description

A controversial discussion amongst Technology Assessment (TA) researchers and practitioners has emerged around the framing of acceptance of technologies. Despite the ambivalence on whether TA can, or even should, discuss acceptance, two approaches are already being considered, tested and applied. At the innovation end of technology development, Responsible Research and Innovation (RRI) considers acceptance in order to mutually identify an acceptable, sustainable and desirable innovation process and products (see Owen et al., 2012). At the operational end of technology implementation, Social Licence to Operate (SLO) seeks to secure community acceptance of certain projects, companies or industries, and is often grounded in stakeholder perceptions of the legitimacy of these activities (see Hall, Lacey et al., 2014).

These two approaches will be explored in an interactive and potentially provocative panel discussion involving leading researchers working on RRI and SLO. By introducing comparisons of RRI and SLO approaches to technology acceptance, they will chart the dangers and benefits of seeking acceptance - and identify the beneficiaries.

This session will provide a variety of perspectives from which to interrogate the defining features of RRI and SLO as they are applied in the exploration of societal perspectives and informing decision making on technological developments. Discussion questions may include:

- How do citizen roles, responsibilities and expectations intersect with current social debates about the selection and development of acceptable technologies?
- What are proposed indicators for an improved model of consultation that engages local stakeholders in technological acceptance?
- For both RRI and SLO, what are the similarities and differences in their approach to technology acceptance?
- How do case studies illustrate how RRI and SLO secure acceptance in an applied context, using international examples?
- Do the acceptance process from RRI during innovation flow on and enhance SLO during operation?

- Who are the beneficiaries from each process with regard to technology acceptance?
- Where acceptance has been secured through RRI or SLO, so they reflect a measure of equity amongst stakeholders?
- Are there any ethical challenges of seeking acceptance in applied settings? If so, how can these be managed or overcome?
- How effectively are governments, companies and citizens around the world working together (or not) in trying to determine the most acceptable and appropriate outcomes?

To maximise exploration and discussion, and in order to facilitate new dimensions to the comparison of SLO and RRI, this session will involve short overviews of RRI and SLO, examples of their applications in international contexts, and then a panel discussion including audience participation in shaping the debate.

This session will be of interest to social researchers, public participation and facilitation specialists, and RRI and SLO practitioners. The panellists intend to capture the session contributions by using the discussion to inform a co-authored journal article on this topic following this conference, with potential publication in the journal, Science and Public Policy (or similar publication).

References

Hall, N., Lacey, J., Carr-Cornish, S. and Dowd, A-M. (2014), 'Social licence to operate: understanding how a concept has been translated into practice in energy industries', Journal of Cleaner Production, online in press pp. 1-10. Owen, R., Macnaghten, P. and Stilgoe, J. (2012), 'Responsible research and innovation: From science in society to science for society, with society', Science and Public Policy 39 pp. 751–760.

SESSION G³

ROOM: LISBON, FRIDAY, 11:15 AM - 12:45 PM Panel Discussion

Drilling Deep for Heat: Chances and Challenges of Deep Geothermal Energy CHRISTINA TOBLER (TA-SWISS)

AGENDA

Energy from the Earth's Interior: Deep Geothermal Energy as the Energy Source of the Future? TA-SWISS

KATHY RIKLIN Member of the Swiss Parliament

GUNTER SIDDIQI Swiss Federal Office of Energy

JÖRG UHDE Axpo Power AG | Neue Energien

LASSE WALLQUIST Stiftung Risiko-Dialog

Drilling Deep for Heat: Chances and Challenges of Deep Geothermal Energy

Chair: Christina Tobler

Session Description

The session intends to increase participants' knowledge about deep geothermal energy by discussing technological, economic, political, environmental and social aspects of the issue. The session combines expert presentations and a panel discussion.

Deep geothermal energy is a clean, renewable and domestic source of energy that can be used for both heat and electricity generation. It has a low environmental impact and reliably delivers base load power, regardless of weather or wind conditions. Therefore, it might make a significant contribution to our energy needs without impacting climate change.

However, deep geothermal energy is also confronted with several challenges. The technology is still in its infancy and therefore poses considerable financial risks. Furthermore, geothermal drilling can trigger seismic events. In Switzerland, for instance, there have been two considerable earthquakes caused by geothermal drilling project. Such incidents might affect public acceptance and impede future geothermal research and drilling projects.

To shed some light on this matter, TA-SWISS has mandated a comprehensive and interdisciplinary study examining the opportunities and risks of deep geothermal energy. The research analyses geothermal technologies, economic aspects, environmental impacts, seismic and other risks, as well as regulation and public perception (for more information see www.ta-swiss.ch/en/projects/mobility-energy-climate/deep-geothermal-energy/).

This study, its results and recommendations will be presented and build the research-based framework of this session. Additionally, further experts (such as stakeholders or policy makers) are invited to present their experiences and talk about what kind of information they need to reach a decision. Finally, participants and experts debate the chances and challenges of deep geothermal energy.

This session aligns with the conference goals as it addresses the societal challenge of clean energy and climate change. Furthermore, its interdisciplinary approach combines engineering, natural- and social sciences and aims to offer a knowledge base for stakeholders and policy makers.

SESSION G⁴

VILNIUS, FRIDAY, 11:15 AM - 12:45 PM

Mobilizing TA for Responsible Innovation: Philosophies, Ethics and Stakeholders HARRO VAN LENTE, TSJALLING SWIERSTRA (MAASTRICHT UNIVERSITY) AND PIERRE-BENOIT JOLY (INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE)

AGENDA

212

Mobilizing TA for Responsible Innovation Philosophies, Ethics and Stakeholders HARRO VAN LENTE, TSJALLING SWIERSTRA (MAASTRICHT UNIVERSITY) AND PIERRE-BENOIT JOLY (INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE)

Between Industry, Politics and Civil Society: Is There a Place for Responsible Technology Governance in Poland? PIOTR STANKIEWICZ (NICOLAUS COPERNICUS UNIVERSITY) AND ALEKSANDRA LIS (ADAM MICKIEWICZ UNIVERSITY)

Three Questions to Responsible Innovation.

LISE BITSCH, MORTEN VELSING NIELSEN AND RASMUS ØJVIND NIELSEN (DANISH BOARD OF TECHNOLOGY FOUNDATION)

From TA of to RRI in Synthetic Biology DIRK STEMERDING (RATHENAU INSTITUTE)

Mobilizing TA for Responsible Innovation: Philosophies, Ethics and Stakeholders

Chairs: Harro van Lente, Tsjalling Swierstra and Pierre-Benoit Joly

Description

The notion of 'responsible innovation' has become fashionable amongst policy makers and knowledge institutes. Arguably, the rise of RRI will show considerable overlap with the aims, philosophies and practices of TA. The overlap, though, will not be perfect and this raises questions about both RRI and TA.

Technology Assessment has by now a history on its own. It has developed from exercises to predict and assess technological development in the 1970s, to methods for collective learning in the 1990s and approaches for co-construction in the 21st century. A range of approaches and methods have become established and used, including Participatory TA, Constructive TA, or Parliamentary TA. Some approaches stress innovation as an outcome, others see innovation as a process. A key feature is the inclusion of stakeholders as a means to gain insight and legitimation.

Responsible innovation has only recently emerged as an umbrella term. The notion combines strands from corporate social responsibility (CSR), value-sensitive design and societal dialogues on technology. RRI will imply different understandings and aims for NGOs, ministries, consultancies, firms or universities. In this session, we will examine whether and how the various strands of TA are capable to address the aims of RRI. In particular this entails the following questions:

- What are the basic assumption (philosophies) of TA and RRI: do they match or differ?
- How is ethical inquiry (not) part of TA?
- What is the role of stakeholders in TA practices? How does stakeholder inclusion sanction, guide and limit the process?

The organizers will present a position paper. The discussion in this session is devoted to designing a future research agenda.

Mobilizing TA for Responsible Innovation Philosophies, Ethics and Stakeholders

Harro van Lente, Tsjalling Swierstra and Pierre-Benoit Joly

The notion of 'responsible innovation' has become fashionable amongst policy makers and knowledge institutes. In the new Horizon 2020 calls of the European Union 'responsible research and innovation' (RRI) figures prominently as a condition and an aim in itself. Arguably, the rise of RRI will show considerable overlap with the aims, philosophies and practices of TA. The overlap, though, will not be perfect and this raises questions about both RRI and TA.

Technology Assessment has by now a history on its own. It has developed from exercises to predict and assess technological development in the 1970s, to methods for collective learning in the 1990s and approaches for co-construction in the 21st century. A range of approaches and methods have become established and used, including Participatory TA, Constructive TA, or Parliamentary TA. Some approaches stress innovation as an outcome, others see innovation as a process. A key feature is the inclusion of stakeholders as a means to gain insight and legitimation.

Responsible innovation has only recently emerged as an umbrella term. The notion combines strands from corporate social responsibility (CSR), value-sensitive design and societal dialogues on technology. RRI will imply different understandings and aims for NGOs, ministries, consultancies, firms or universities. A recent volume on RRI summarizes the aim as follows: 'to innovate responsibly entails a continuous commitment to be anticipatory, reflective, inclusive, deliberative, and responsive' (Owen, R., J. Bessant, and M. Heintz, eds. 2013, Responsible Innovation, Chichester: John Wiley & Sons, p. 29).

In this session, we will examine whether and how the various strands of TA are capable to address the aims of RRI. In particular this entails the following questions:

- What are the basic assumption (philosophies) of TA and RRI: do they match or differ?
- How is ethical inquiry (not) part of TA?
- What is the role of stakeholders in TA practices? How does stakeholder inclusion sanction, guide and limit the process?

The organizers will present a position paper and invite other papers to be presented. The discussion is devoted to designing a future research agenda.

Between Industry, Politics and Civil Society: Is There a Place for Responsible Technology Governance in Poland?

Piotr Stankiewicz and Aleksandra Lis

For more than 10 years of the European Union membership, Poland has been facing new challenges related to science and technology developments, such as the never-ending debate about cultivation of GMO, the recent nuclear power plant construction projects, prospects of shale gas exploration or clean carbon technologies. Because of public concerns raised by these developments and their possible impact on many dimensions of social life there seems to be a clear need for an appropriate technology governance approach. Such issues as introduction of nuclear energy and shale gas exploration can also provide good opportunities to develop, test and implement certain technological options assessments, and thus lead to the institutionalization of RRI in Poland.

Unfortunately, this is not the case. Important technological innovations are being introduced in Poland without a proper institutionalized reflection, based on opinions of industry experts and government advisors, at the same time neglecting interests and voices of civil society and relevant stakeholder groups. But, on the other hand, Poland is an associate member of the EPTA network (with the parliamentary Bureau of Research) and there is a growing academic community working on TA, which opens a window of opportunity for implementing the concept of responsible innovation in public life.

The goal of this paper is to analyse the chances and obstacles for development and institutionalization of responsible research and innovation in Poland. The analysis will be conducted using the interest-groups approach combined with fields of action perspective. An empirical data will be drawn from a research project conducted since 2012 on nuclear energy and shale gas exploration.

Three Questions to Responsible Innovation

Lise Bitsch, Morten Velsing Nielsen and Rasmus Øjvind Nielsen

A key innovative feature of recent calls for responsible research and innovation (RRI), by institutional entrepreneurs in the EC and academic stakeholders, is the attempt to shift emphasis from individual to collective responsibility for innovation processes. In these calls, the starting point for RRI is the ambition to, in an inclusive and democratic way, ask and answer the question of 'what sort of future we collectively want innovation to create for Europe? (Owen et al. 2012; Owen et al. 2013; Stilgoe et al. 2013; von Schomberg 2013). Among other features, the active involvement and reflection of stakeholders in research and innovation like governmental bodies, research institutions, corporations, NGO's and
civil society organisations and to some extent 'the public', is described as safeguarding the democratic and broad element of the process.

This call for 'participation,' however raises critical concerns about how participation will be realised in RRI. Three questions seem central: 1) Who should determine who should participate? 2) Who determines what happens to the outcome of participatory processes? 3) When, where, and how should participation take place? All three questions arise out of experiences with 'dealing with' powerful actors in participatory processes. Specifically, the questions point to challenges to attempts at ensuring democratic agenda-setting and decision-making on research and innovation. In a very practical sense, our concern is about the type of democracy we want RRI to facilitate?

In our paper, we illustrate the importance and complexity of these questions. First, we recount the role ascribed to participatory practices of involvement in recent conceptual contributions to the development of RRI. Then, we give three examples of 'participation' in EU projects: CIVISTI¹ and VOICES² as examples of the practical feasibility of democratic involvement in agenda setting for R&I, and SATORI³ as an example of mobilisation of participation for ethics in RRI. On this background we discuss the necessity of specifying further the notion of participation, as it occurs in RRI debates and research projects, in order to avoid the RRI concept becoming a fig leaf for business as usual.

From TA of to RRI in Synthetic Biology

Dirk Stemerding

In this presentation I will discuss our experiences with 'real-time' technology assessment in the context of a European project aiming at responsible research and innovation in synthetic biology (www.synenergene.eu). Synthetic biology (SynBio) is a new area of research and development in the life sciences focusing on "the engineering of biological components and systems that do not exist in nature and the re-engineering of existing biological elements". It raises questions in the context of RRI relevant to many different stakeholders, policy makers and the general public. Our project SYNENERGENE aims at mobilizing these different actors, bringing them together and facilitating a sustainable and fruitful dialogue in order to promote the responsible societal embedding of synthetic biology.

Synthetic biology offers huge potential for novel drugs and vaccines, as well as for 'greener' chemicals and biofuels. Nonetheless, this field also brings with it various challenges, ranging from regulatory issues of biosafety, biosecurity and intellectual property rights to potential environmental and socio-economic risks and related ethical questions. It is thus essential to establish an open dialogue between stakeholders, including the public, concerning the

technology's potential benefits and risks and to explore possibilities for 'collaborative shaping' of the field.

To put these activities in perspective I will first discuss the broader landscape of TA activities in terms of two dimensions. One dimension refers to 'policy making', 'societal debate' and 'research and innovation' as different spheres in which TA can be located. The other dimension refers to 'informing' and 'engaging' as different aims of TA. In terms of these two dimensions I will map and discuss different ways in which we have contributed to technology assessment of synthetic biology: moving from parliamentary TA in the sphere of policy making and societal debate to real-time TA in the context of responsible research and innovation. My question is: what does this movement add to the informing and engaging qualities of TA in terms of 'anticipation', 'reflection' and 'integration'?

I will argue that established traditions of TA offer various and fruitful approaches to anticipation and reflection, but what is mostly lacking is the element of integration. Integration we may see as an important driver and challenge for responsible research and innovation. From this point of view I will discuss the aims of the SYNENERGENE project and our activities in real-time technology assessment in terms of different models for integrating societal aspects in doing synthetic biology.

¹ Citizen Visions on Science, Technology and Innovation

² Views, Opinions and Ideas of Citizens in Europe on Science

³ Stakeholders Acting Together On the ethical impact assessment of Research and Innovation

SESSION G⁵

ROOM: SOFIA, FRIDAY, 11:15 AM - 12:45 PM

Horizon Scanning: Giving Policymakers the Long View JONATHAN WENTWORTH (PARLIAMENTARY OFFICE OF SCIENCE AND TECHNOLOGY)

AGENDA

Forward Looking Information for Policy-Making FIONA LICKORISH (CRANFIELD UNIVERSITY)

Scanning to Manage Disruption and Controversy WENDY SCHULTZ (CENTER FOR POSTNORMAL POLICY AND FUTURES STUDIES)

100 Opportunities for Finland and the World – Radical Technology Inquirer (RTI) for Anticipation/Evaluation of Technological Breakthroughs RISTO LINTURI, OSMO KUUSI AND TONI AHLQVIST (COMMITTEE FOR THE FUTURE, FINNISH PARLIAMENT)

Horizon Scanning: Giving Policymakers the Long View

Chair: Jonathan Wentworth

Session Description

The aim of horizon scanning is to help policymakers to take a longer-term strategic approach and make policy and legislation more resilient to future uncertainty. Politicians are required to address disputed, value-laden, complex, interacting and long-term challenges but elected for comparatively short terms of office. If the process and results of futures activities are not sensitive to this political decision-making context and organisational structure, the benefits will be limited.

The fundamental objective of discussing futures is to enhance the sensitivity of all actors – scientists, policy-makers and wider publics alike – to possible social, ethical and valuebased dimensions of plausible outcomes in a policy area through extrapolating present trends. Engagement of this kind thus fulfils a 'normative' rationale (allowing participants to discuss desired outcomes), an 'instrumental' rationale (facilitating learning about how systems function) and a 'substantive' rationale (improving the quality of policy decisions by bringing new forms of knowledge to bear on the policy-making process).

Policy debates are more constructive if they are far in advance of policy decisions and do not privilege any one particular type of knowledge or perspective over others. However, this is challenging in a parliamentary and public policy context and there is tendency to identify issues that are near-field and already gaining policy attention rather than those genuinely on the horizon (in the sense of emergent weak tends and signals not yet on policy agendas). This session would debate different approaches to designing horizon scanning processes to identify emerging topics of future legislative importance.

Forward Looking Information for Policy-Making

Fiona Lickorish

The focus of this presentation by Fiona Lickorish will be on forward-looking information in policy making, drawing on experience from working with the UK Government. The presentation will set out key definitions and approaches to 'forward-looking' which are used at Cranfield University, and describe the benefits and uses of horizon scanning and futures research. Using the example of Cranfield University's horizon scanning work for UK Government, Fiona will provide an overview of the methodological approach, including the process of identifying key factors and insights as well as methods used to organise, select and prioritise insights.

Fiona will also describe how insights from horizon scanning are used and communicated – linking to policy and informing evidence needs. In addition, the presentation will set out some of the reasons why Governments engage with forward-looking research, and other uses of horizon scanning work in supporting further research projects. Finally Fiona will set out lessons learned from her experience in futures research, such as: finding and selecting appropriate methods; involving and empowering critics; the power of multidisciplinarity; and ownership and keeping it relevant.

Scanning to Manage Disruption and Controversy

Wendy Schultz

Wendy Schultz will focus her presentation on the uses of scanning in particular and futures thinking generally for managing disruption and controversy, drawing on 30 years of futures research for governments, NGOs, and businesses. The presentation will connect horizon scanning to its intellectual roots in emerging issues analysis and issues management, as well as its interface with complexity theory. Exploring forward via horizon scanning is a challenging and risky endeavour, if done correctly: challenging because emerging changes disrupt current assumptions, and risky for policy-makers and political leaders because those disruptions can generate social and political backlash. When framed properly, horizon scanning offers insurance against disruptions by providing time to develop effective responses to emerging change.

Beginning with basic terms and conceptual frameworks, Wendy will describe both basic and state-of-the-art approaches to scanning and sensemaking scanning output, including expertbased approaches, semantic analysis systems, and crowd-sourcing platforms. Key to robust scanning is diversity of sources: diversity of scholarly disciplines is a start, but diversity of political ideologies, philosophies, cultures and worldviews is necessary as well. Web-based platforms make collecting diverse data increasingly easier and more effective. EIDOS, RAHS, Shaping Tomorrow, Sharpcloud, Futurescaper, Sensemaker, Hunchworks, Futurium are examples designed specific for futures research; StumbleUpon, Pinterest, and Pearltrees are examples of social software that can be effectively repurposed for scanning.

Wendy will offer examples of scanning 'lessons learned' from the USA, Canada, UK, EU, Singapore, Australia and New Zealand. Insights include scanning team composition; scanning data analytics and database support; creating opportunities for exploring not just emerging change but its impacts; sensemaking and prioritising emerging change; managing social and political implications via stakeholder engagement; and letting people know about emerging change and its impacts via clear and vivid messages – including design and experiential futures.

SESSION G⁶

ROOM: DUBLIN, FRIDAY, 11:15 AM - 12:45 PM

Complementarity between Health Technology Assessment and Parliamentary Technology Assessment

MARIA JOÃO MAIA (UNIVERSIDADE NOVA DE LISBOA) AND GREGOR WOLBRING (UNIVERSITY OF CALGARY)

AGENDA

Emerging Health Technologies – Challenges and Boundaries Between HTA and PTA MARIA JOÃO MAIA (UNIVERSIDADE NOVA DE LISBOA)

Options and Strategies to Drive Appropriate Use of Magnetic Resonance Imaging (MRI) in Austria

ÀGNES KISSER, JULIA MAYER AND CLAUDIA WILD (LUDWIG BOLTZMANN INSTITUTE FOR HEALTH TECHNOLOGY ASSESSMENT)

Trust in Health Information Systems – Adequacy of Policy-Level Control and Beliefs About Personal Autonomy

JODYN PLATT, SHARON KARDIA, PETER JACÓBSON, RENEE ANSPACH AND CHARLES FRIEDMAN (UNIVERSITY OF MICHIGAN)

Using the Innovative Emerging Framework of Ability Studies to Bridge HTA and PTA GREGOR WOLBRING (UNIVERSITY OF CALGARY)

Complementarity between Health Technology Assessment and Parliamentary Technology Assessment

Chairs: Maria João Maia and Gregor Wolbring

Session Description

Parliamentary Technology Assessment (PTA) and Health Technology Assessment (HTA) share the some origin and both act as a bridge of knowledge, between policy-makers and researchers, in order to support decision-making on technologies. However, their scopes of problems to address are different as well as the institutional context.

While HTA focus on economic and clinical evaluation in terms of efficacy and safety of new technologies, PTA tend to focus on the social and ethical impacts that society in general, is confronted with the introduction of such technologies.

We posit that more inter- and transdisciplinarity between HTA and PTA is warranted to maximize the utility of technologies for the improvement of health and well-being and high quality and equitable healthcare delivery.

By taking into consideration some procedures or methods used in PTA context, HTA could in fact enrich their studies, so, how to enhance the social evaluation aspects in HTA?

This panel aims to add (new) knowledge to the existing body of knowledge of the HTA community as well as the PTA community, in terms of a future co-collaboration between this two fields of research. Four different case-studies will be presented aiming to shed some light in this so needed knowledge.

Emerging Health Technologies: Challenges and Boundaries Between HTA and PTA

Maria João Maia

Nowadays, it is impossible to imagine a scenario were technology doesn't play a role in healthcare systems. In fact, it seems that this sector is becoming more and more technology driven, and less patient-driven.

Emerging health technologies such as nanotechnology, biotechnology, personalized medicine, robotics, and among others, are characterized by a rapid development, with

The next horizon of technology assessment

a different set of applications, involving different stakeholders. Their use is covered with uncertainties concerning risks, benefits and implications and also future development directions. Therefore, their introduction, use, dissemination, applications, etc, makes this a very challenging area for regulators and policy-makers when it comes to different levels of decision-making (at national or even international level), such as regulation and quality maintenance of care with constrained resources, for instance. On top of this, these decision-makers have to be present, that social and ethical concerns are raised with the introduction of such technologies.

Some emerging technologies are already being seen as promising futures for treatment and cure of diseases. For this reason, there is a raising interest in the application of such technologies, which leads to the need to acute and reliable information on its uses and consequences.

Conceived as a systematic and multidisciplinary analysis of the consequences of the introduction, dissemination and use of health technologies HTA is undoubtedly giving it's contribute in terms of studies and evidences. However these scientific evidences are still not being fully incorporated into the decision-making process.

PTA could be the answer since it takes into accounts the needs and expectations of political decision-makers.

In general, this presentation aims to reflect on the complementarities or boundaries between these two TA application fields. It is intended to analyse the gap between them, identifying barriers and facilitators that can aid the decision-making process regarding such technologies.

Options and Strategies to Drive Appropriate Use of Magnetic Resonance Imaging in Austria

Agnes Kisser, Julia Mayer and Claudia Wild

In 2011, 157 MRI scanners were in use in Austria (86 in hospitals, 71 in the extramural area). Overall, about 400.000 MRI scans were performed in Austrian hospitals in 2012. In relation to the total population, Austria is therefore well above European average both with regards to the numbers of MRI scanners and of performed MRI scans.

An increase of MRI usage due to 'the widening range of indications based on technical progress and the implementation of the EURATOM guideline 97/43 (shifting to examination techniques without ionizing radiation)' is expected. A widening range of indications, an increasing availability of the technology and a sustained increase in patient demand, amongst other factors, may also foster inadequate MRI use. The use of diagnostic imaging techniques despite an expected lack of impact on the course of disease/therapeutic outcome

under the specific circumstances is referred to as overuse (or overdiagnosis) – with negative consequences for the patients and health care systems.

The aim of this project is to analyse options and strategies to drive appropriate use of MRI for diagnosis and screening in Austria.

Research questions

- 1. Which criteria define, appropriateness/inappropriateness' of MRI for diagnosis and screening?
- 2. What recommendations exist regarding circumstances and indications in which MRI should explicitly not be used? Which of these indications belong to 'high volume' indication areas? For which indications is CT superior to MRI?
- 3. What recommendations regarding regulatory mechanisms and prioritisation criteria exist? What is the evidence for the effectiveness of these mechanisms in reducing overuse of MRI?
- 4. How is MRI currently being used in Austria: which criteria and mechanisms are applied for controlling the usage of existing MRI scanners?

Methods

We systematically search for disinvestment recommendations for MRI in the databases and DoNotDo Lists from international disinvestment programmes.

We perform a literature review for interventions aiming at improving the appropriate use of MRI and a websearch for pilot projects.

We interview Austrian stakeholders in the field to identify which options may be used in the Austrian context.

References

Österreichischer Strukturgesundheitsplan inkl. Großgeräteplan 2012

Health: Key tables from OECD - ISSN 2075-8480 - © OECD 2013

OECD (2012), "Medical technologies: CT scanners and MRI units", in Health at a Glance: Europe 2012, OECD Publishing. http://dx.doi.org/10.1787/9789264183896-31-en

Morrison, A. Appropriate Utilization of Advanced Diagnostic Imaging Procedures: CT, MRI, and PET/CT [Environmental Scan, Issue 39]. Ottawa: Canadian Agency for Drugs and Technologies in Health; 2013.

The next horizon of technology assessment

Trust in Health Information Systems: Adequacy of Policy-Level Control and Beliefs About Personal Autonomy

Jodyn Platt, Sharon Kardia, Peter Jacobson, Renee Anspach and Charles Friedman

Techno-social health information health systems share ever-increasing quantities of information to support collaboration in healthcare, public health, and research. Public trust in health systems that share information (system trust) is inversely proportional to the demand for regulatory oversight thus affecting priorities for change in this complex health policy context. This paper addresses two research questions regarding public confidence in the policy environment and perceived personal autonomy that may affect system trust. First, what individual-level (trustor) factors are associated with confidence in the policy environment and personal autonomy associated with system trust, after accounting for trustor characteristics?

<u>Methods</u>: We conducted a survey (n= 1,011) administered by the GfK Group using a probability-based web panel representative of the U.S. Multivariable and stepwise regression models identified predictors of confidence in the policy environment, perceived personal autonomy, and system trust. Independent variables measured trustor characteristics –expectations of benefit, knowledge, beliefs about privacy and medical deception, experience, and psychosocial and demographic factors – as well as trust in brokers of health information (healthcare providers, public health departments, and university researchers).

<u>Findings:</u> Trustor characteristics explained 32.5% of the variability in confidence in the policy environment and 19.9% of the variability in personal autonomy. Factors most strongly and positively (p<0.05) associated with policy environment included: having a positive view of data sharing and generalized trust. Knowledge negatively predicted confidence in policy. The strongest factors positively associated with personal autonomy included having a favorable view of data sharing and self-efficacy; knowledge was negatively associated with autonomy.

Positive predictors of system trust in the stepwise model (R2=0.573) included confidence in the policy environment, trust in healthcare providers, trust in researchers, favorable views of data sharing, expectations of benefit, identity theft, and altruism. Knowledge negatively predicted system trust. Personal autonomy, privacy, belief in medical deception, experience, and demographic factors were not statistically significant.

<u>Discussion</u>: In assessing technologies that facilitate health information sharing, policy makers should not let privacy overshadow factors that are as much a concern for assuring trust. Public engagement may leverage trust in healthcare providers and researchers and

should be authentic in efforts to build trust to avoid the danger of undermining trust by adding complexity to an already complicated system. Resources would be well spent by communicating the personal and social benefits of data sharing. These efforts would more likely to strengthen public trust than efforts to fill knowledge gaps or shift responsibility for data sharing from the expert to the public.

Using the Innovative Emerging Framework of Ability Studies to Bridge HTA and PTA

Gregor Wolbring

This presentation is part of the Session Panel: Complementarity between Health Technology Assessment (HTA) and Parliamentary Technology Assessment (PTA) which posits that inter and trans-disciplinarity between HTA and PTA is warranted to maximize the utility of technologies for the improvement of health and well-being and high quality and equitable healthcare delivery. I contribute to the panel the emerging innovative framework of Ability Studies that investigates ability expectation hierarchies, preferences and their impact. Ability Studies allows for the study of multiple subject formations, social relationships, and lived experiences based on diverse ability expectations and the actions linked to such expectations. Ability Studies can be used in inter-, trans- and intra- disciplinarily ways to perform system analysis, inform policies and advance knowledge and it can be used as a bridge between different Assessment fields including HTA and PTA.

Every individual, household, community, group, sector, region, and country cherishes and promotes numerous abilities and finds others non-essential. People of different cultures and countries have different expectations of their health systems, the scope of healthcare and how to achieve and maintain medical and social health. Canadians for example expect in the moment their health systems to have the ability to be sustainable, equitable, inclusive, accessible, innovative and responsive. Achieving and maintaining this vision depends on many factors, including the constant monitoring and evaluation of ability expectations developing within and outside of health system discourses; e.g. sustainability, ecohealth, healthcare and homecare technologies such as sensors, social robotics and bionics, human enhancement, aging well, health consumerism, quantified-self, personalized medicine and anticipatory governance discourses have developed ability expectations that impact expectations Canadians have of their health systems, the scope of healthcare, the meaning of health and how to achieve and maintain medical and social health. Ability Studies is a framework HTA and PTA can employ to understand ability expectation dynamics especially around emerging technologies and their impact on the meaning of health, the scope of healthcare and how to achieve and maintain medical and social health. This presentation will demonstrate the utility of integrating Ability Studies into HTA and PTA and its usefulness as a catalyst for innovation to practice.

SESSION G⁸

ROOM: BUDAPEST, FRIDAY, 11:15 AM - 12:45 PM

Governance Networks – Fit for the Future?

CHRISTINA MERZ, ANIKA HÜGLE AND SOPHIE KUPPLER (INSTITUTE FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS)

AGENDA

Measuring Impacts and Outcomes in Technology Assessment Research Centers MICHAEL REINSBOROUGH (KING'S COLLEGE LONDON)

Future Council as a Future-Oriented, Deliberative Governance Tool LEA SCHMITT (INSTITUTE FOR ADVANCED STUDY IN THE HUMANITIES)

Long-Term Partnerships and Equal Participation in Urban Forests REGULA KOLAR AND BIANCA BAERLOCHER (BERN UNIVERSITY OF APPLIED SCIENCES)

Governance Networks – Fit for the Future?

Chairs: Christina Merz, Anika Hügle and Sophie Kuppler

Session Description

Tackling the grand societal challenges often requires long-term thinking and planning. Governing such processes of change as well as the implementation of specific projects thus needs to deal not only with current challenges, but also needs to ensure that a mode of governing is established, which is conceived in such a way that it is "fit for the future", i.e. can theoretically remain intact for time periods of up to several decades.

Many of the challenges cannot be solved in established ways. In some cases the public calls for participation as they do not agree with the way that the government deals with a certain issue, in other cases the government might depend on stakeholders to implement a certain project or provide a certain service. Governance is considered as innovative approach to dealing with those challenges. Depending on different contexts and action fields, governance arrangements can take on many different forms.

Making such arrangements work over a long period of time needs careful planning. Aspects such as the organization of transparency as well as of checks and balances in decision-making, the design of interfaces between formal and informal decision-making (strongly regulated or sporadic), questions of responsibility, the organization of flexibility and the legal form of the network might play a role.

But how does this look in practice? In this session we would like to discuss this challenge from an empirical as well as practical point of view.

Possible research questions to be discussed are:

- How are different forms of governance networks organized to make themselves "fit for the future" (esp. with regard to transparency and decision-making) and are they successful? If yes, why?
- How to ensure long-term participation of stakeholders (motivation/structure)?
- Are there examples in which governments welcomed such long-term governance arrangements? If yes, what were the crucial aspects?

Measuring Impacts and Outcomes in Technology Assessment Research Centers

Michael Reinsborough

The Center for Nanotechnology in Society (CNS-ASU) is the largest of two National Science Foundation (NSF) funded centers to investigate the societal implications of nanoand other emerging technologies. An important goal of CNS-ASU is to integrate academic and societal concerns to better understand how to govern new technologies, from their birth in the laboratory to their entrance into society. Since it began in 2005, CNS-ASU has been involved in researching key issues, training a community of scholars, and engaging with publics, policymakers, science, and industry. The Center has sought not only to do the work of technology assessment but also to build anticipatory governance networks and to research and assess experimental methods of technology assessment.

Being able to assess the effectiveness of the Center requires new methods. Traditional metrics for center assessment (e.g., publication counts, citation analysis) tend to demonstrate the extent of research impact within the immediate researcher community. These means fail to account for other more diverse Center impacts that may play out across a broader community of publics that engaged with the Center. These impacts can take the form of learning and behavior (Guston 1999) and can be theorized to take place within the Center's Knowledge Value Collective (KVC; Bozeman, 2007). This paper describes the results of a CNS-ASU impacts and outcomes assessment. Data was collected from a survey of Center participants (N=798) and pool of follow-up interviews ((N=80).

Anticipatory governance has been defined as "a broad-based capacity extended through society that can act upon a variety of inputs to manage emerging knowledge-based technologies while such management is still possible" (Guston 2008, 2013, see http:// sss.sagepub.com/content/early/2013/11/15/0306312713508669). From the results of the Center assessment lessons on developing anticipatory governance networks are developed. By working with a broad variety of communities (various publics, stakeholders, commercial nanoscience entrepreneurs, science museum professionals, other academics, and nanoscience and engineering (NSE) researchers, policy workers) and matching their current capacity to engage with complex emerging technology the Center initiates future capacity for publics to govern emerging technologies. Examples of successes and failures are given with attention to anticipatory and deliberative foresight work with stakeholders and publics, sociotechnical integration research (STIR) with Nanoscience and Engineering (NSE) professionals, and science museums engagement work where publics are given the opportunity to explore their values in relation to emerging technologies.

Future Council as a Future-Oriented, Deliberative Governance Tool

Lea Schmitt

With its underlying transformation to a low-carbon society the energy transition is far more than a large-scale political or technical project. It is about a fundamental change of daily routines and a transformation towards sustainable life patterns. Furthermore, this transformation goes along with a deep cultural change, which consists in the shift from a present-oriented to a future-oriented perspective – at the level of individuals as well as of institutions. This indicates a big challenge because people as well as political systems are used to act in highly present-oriented ways – due to the fulfilling of their personal interests and the systemic logic of short-termed election rhythms or budgeting. Although there are precise political targets - the German federal state of North Rhine Westphalia recently regulated climate protection by law - clearly sketched out scenarios of a lowcarbon society's daily life are scarce so far. Furthermore, the public consensus on energy transition begins gradually to dissolve, but without a broad and voluntary support among citizen such a transformation will not be feasible. The challenge arising is to develop a kind of governance structure that can help to transform a present-oriented perspective of citizen and of the political system into a future-oriented one - in order to realize the energy shift and without weakening existing democratic values.

In this context it is essential to focus on cultural dimensions because infrastructure projects are always related to questions of livelihood and quality of life: How does someone want to live and develop in the future? To ensure broad public support, it is important to seek for links between an abstract future represented by the aims of energy transition and the perceptions, experiences and future visions of the citizen. An analytic focus on citizen, already being committed to sustainability or involved in processes of local change, is fruitful, as they represent a powerful resource within the transformation process: Firstly, their commitment is per se already a transformative practice as these people intend to change something. Secondly, committed people are potential multipliers to their social environments and distributors of transformative practices. Thirdly, they are already involved in local governance networks and processes. Last but not least, these people are the prime experts of their own environments.

Committed citizen could be gathered in a new form of public participation process named "Future Council". The aim would be to generate vivid and commonly shared future visions predicated on local and experience-based knowledge – issues people strive for with regard to quality of life and trends occurring in their daily lives. This "Future Council" could be a tool to institutionalize a future-oriented governance form between citizen and state actors, equipped with deliberative power. Thus the transformation to a low-carbon society would become a project of ongoing collaboration and reciprocal learning processes.

Long-Term Partnerships and Equal Participation in Urban Forests Regula Kolar and Bianca Baerlocher

How do the spatial structures of socioeconomic, ecological and physical features of urban areas relate to one another and how do they change over time? This is one of the urgent questions relating to the ecology of cities within the sustainability discourse (Weinstein & Turner 2012). Specific to urban forestry, this question is: How do urban social life and green infrastructure, such as the surrounding forest ecosystems, interrelate and how will they be shaped in the future?

Societies are currently facing many challenges concerning the uses and benefits of natural resources. Against this background, issues of sustainability question how the future of human-nature interrelations will be shaped. Transferring this question to the area of urban forestry means analysing urban forestry governance systems in relation to their surrounding natural environment. As scientific methodologies have so far not been able to offer integrated methods and approaches, we will first shortly introduce the basic theoretical approach to Urban Forest governance research. We combine this theoretical part with the latest findings in urban forestry governance research in order to frame the Swiss Urban NeighbourWoods (SUNWoods) project. With SUNWoods the focus is on a needs-oriented management of urban forests, aiming at reconciling different forest users' interests through long-term involvement and partnerships in forest management. (For a deeper understanding of the project and its aims we invite you to visit the poster session.)

Additionally, we want to highlight how important changes of perspectives among stakeholders are and how this can lead to proactive cooperation and long-term partnerships (governance regimes). Concerning that issue we especially want to focus on equality and diversity aspects and the role of women participating in Urban Forestry governance processes.







The European Technology Assessment Conference in Berlin is organized by the Institute for Technology Assessment and Systems Analysis in cooperation with the Technology Centre ASCR, as a part of the EU-financed FP7 project, Parliaments and Civil Society in Technology Assessment (PACITA).

