

# Impact assessment and grand challenges

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# Our context

- We are involved in a new 8-year centre – OSIRIS – oriented at studies of impact of research
- Ambitious goals
  - to build bridges between the different communities studying impact
  - to understand impact from the perspective of the “receiving” end
- In this paper we aim to start a conceptual discussion to understand research impact, using the context of grand challenges with an aim to inform future research agendas and policies

# Starting point: impact

- Impact has become an ever more important concept in science policy
  - Long tradition of measuring (economic) benefits from research and development (R&D)
  - Increasing emphasis on non-economic impacts for a wide range of stakeholders
  - Clearer link between demonstrating impact and receiving research funding
  - But the field of impact studies is fragmented with little knowledge accumulation; uneasy relationship with other popular policy terms like “grand challenges”

# Two central terms

- Impact
  - Very different perspectives
  - Impact as a recognisable point in time versus impact as the continuous results of a long-term process
- Research
  - Also very different perspectives
  - Research as a specialised activity leading to identifiable outputs (publications, patents etc.) versus research as an interactive process that may also involve society

# Context/angle: grand challenges

- Grand/ societal challenges dominating science policy rhetoric about research towards a social purpose
  - Tied to a “sense of urgency” and central rationale behind new priorities and new funding instruments in the EU, in countries and in powerful private foundations
  - Suggested and embraced by some academics as a justification for support of research, feared by others as the end of blue skies research
  - Multidimensional concept related to different areas
  - Difficult to operationalise; missing link between the macro-level discourse and the practice of R&D
  - Science funding and practice only one element of a bigger picture towards tackling challenges

# Communities studying impact

- Economics of R&D
- Research evaluation
- Studies of academic engagement/technology transfer/knowledge exchange
- Evolutionary studies of specific technologies and products
- We see it as useful to discuss the distinctive characteristics of these communities from the assumption that they can possibly be combined to better understand impact in the context of grand challenges

# Economics of R&D

- Main emphasis: what is the return on investments in R&D in general and related to specific policy instruments?
- Focus on relatively few output indicators, primarily macroeconomic indicators and impact of research in firms
- Central topics related to additionality, public goods, spillover effects, appropriability etc.
- Close relationship to summative evaluations
- Grand challenges:
  - particularly relevant for economic challenges; potential for constructing quasi-economic indicators related to health, environmental issues and more
  - uneasy relationship between grand challenge rhetoric and terms like “productivity”, “benchmarks” etc., but
  - a macro-economic underpinning of grand challenge policies

# Example: Norwegian evaluation of policy instruments

- Focused on innovation and value creation effects
- Quantitative analysis with emphasis on measurement problems
- Main finding: the instruments have clear additionality effects
- Highlights economic “grand challenges” including the transition from a natural resource based economy to “something else”





# Research evaluation

- Main emphasis: how can science funding, instruments and organisations be designed in a way that increases the propensity for (desirable) impacts?
- Focus on different types of impacts (economic, policy, health, environment) for various stakeholders, and on process aspects such as interactions between researchers and users and the “context of application”
- Often used for formative evaluation, specific methods (ASIRPA, SIAMPI), more qualitative and action-based methods, e.g. PIPA (participatory impact pathway analysis)
- Interested in all types/fields of research and possible tensions between types of impact
- Grand challenges: relevant for all – but not widely used; combination of multiple interventions on multiple target groups, complexity and heterogeneity of processes is a major issue when addressing grand challenges

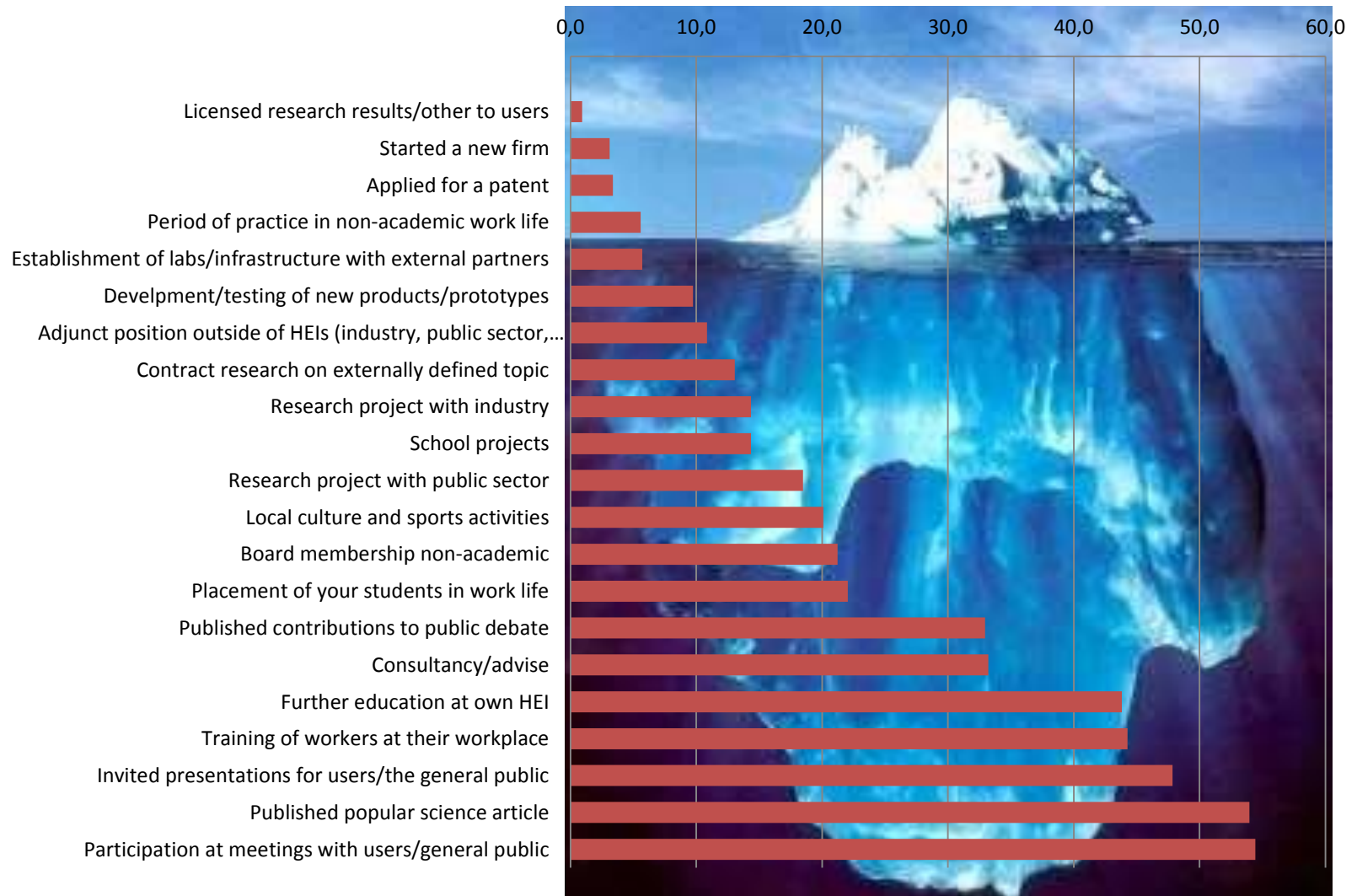
# **Example: recent Norwegian evaluation of social science institutes**

- Combination of various elements
- Traditional survey to users of the institutes
- Impact case studies based on the UK Research Excellence Framework Template
- Emphasis on different types of impact and highlights various grand challenges (peace, social welfare etc.)
- The evaluation is ongoing, but case studies already used to argue for the legitimacy and usefulness of social science institutes

# Academic engagement

- Main emphasis: how do researchers interact with and transfer knowledge to non-researchers?
- Focus on different channels/mechanisms of interaction
- Broadened perspective over time; from studies of commercialisation of STEM research to all forms of engagement for all types of researchers
- Academic starting point with no direct relationship to evaluations; studies often critique “simple” and “linear” policies
- Grand challenges: so far not a central topic, but highlights the variety of ways in which research may address such challenges; weakness that these studies mainly target researchers rather than users

# Example from recent Norwegian engagement study

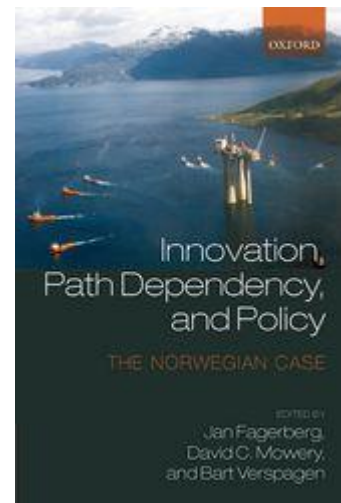


# Evolutionary studies

- Main emphasis: how do new research-based technologies and artefacts emerge, develop and diffuse?
- Focus on long-term processes and the interaction between scientific, technological, social and other factors and contexts
- Involves many different specialties (STS, history of technology, evolutionary innovation studies)
- No direct relationship to evaluations (emerging?) and often with aim at contributing to broader understandings and theory-building
- Grand challenges:
  - rarely addressed directly,
  - many relevant historical cases

# Example: study of the evolution of the Norwegian innovation system

- Highlights how modern high-tech industries like fish farming and oil and gas have long historical roots in low-tech technologies and industries
- Demonstrates the extremely long time perspectives involved in impact of research
- Can potentially be used for discussing the path-dependent and long-term nature of grand challenges



# Stylised representation of the four communities

		Impact	
		<i>Point/output</i>	<i>Process</i>
Research	<i>Output</i>	<b>Economics of R&amp;D</b>	<b>Research evaluation</b>
	<i>Process</i>	<b>Academic engagement</b>	<b>Evolutionary studies</b>

# Fragmentation

- Assumption: the fragmentation between these communities is a challenge not just for impact studies, but also for relating impacts to grand challenges
- Fragmentation is based on different fundamental (ontological, epistemological) or pragmatic (availability of data, context of evaluation) conceptions about the nature of research and the nature of impact
- Perhaps also different conceptions about why research is important/is funded



# Building bridges

- To improve understanding of impact, we need a clearer link between the macro and micro level
  - More than (dis)aggregation, cf. recent debate on “microfoundations”
  - Move the macro-oriented grand challenges discourse further
- We need a way to combine a focus on outputs with a focus on processes
  - May require better longitudinal approaches including historical methods – but is costly and impractical?
  - Can outputs be tied to specific grand challenges in a meaningful way?
- Addressing the quantitative/qualitative divide?

# Discussion points

- Does an emphasis on grand challenges require a different kind, a more holistic formative approach to research evaluations, with new forms of engagement during the impact assessment itself?
- What work needs to be done in order
  - to define and operationalise grand challenges in a better way?
  - to understand the impact of science on the very formulation and direction of the grand challenge itself (not its “solution” only)
- How to map and understand
  - the non-scientific actor landscape and
  - the various interactions with science that make science have an impact on the way GC develop?

Thank you for your attention!

We would appreciate input for our long-term research agenda and perspectives

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