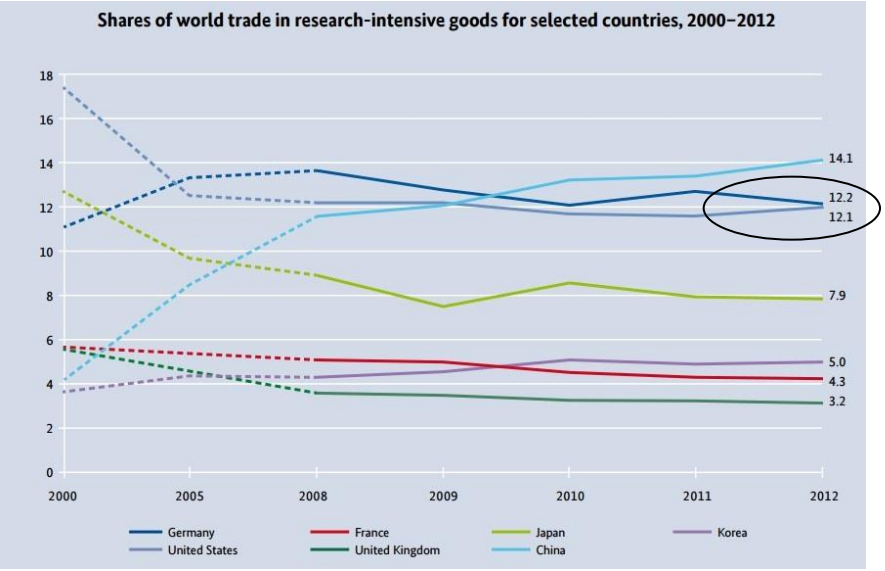
Sustainability Science Debates in German STI Policy

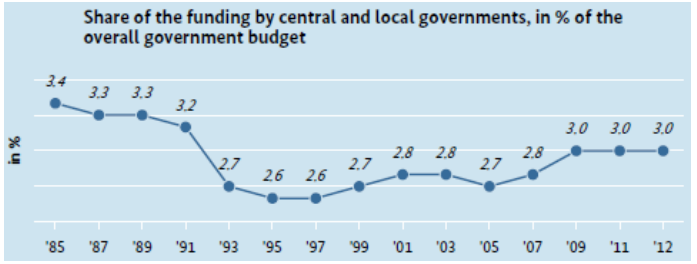
Status quo / outlook

Lutz Möller, German Commission for UNESCO

Germany: Context and background

- High GDP PC (rising), low unemployment (declining), containing public debt
- Importance of industrial sector (26% of GDP), even rising recently
- High R&D investment of corporate sector (BERD/GDP ~2%, 66% of GERD)
- Strong conviction of STI's importance for economic growth
- Overall R&D intensity ~ 3%





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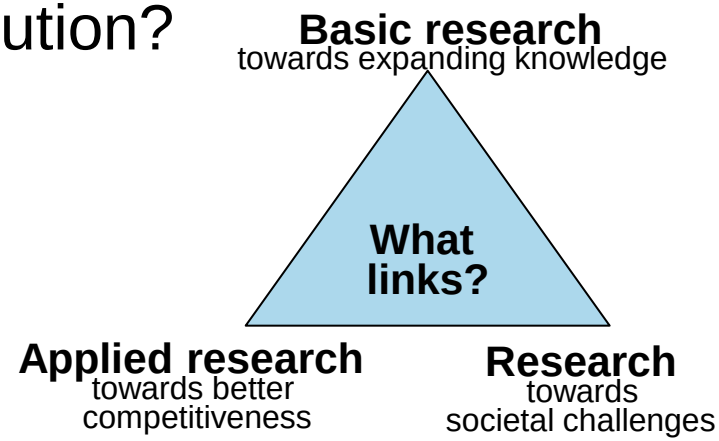
Germany: Context and background

Shared responsibility of federal government (mainly BMBF) and *Länder* governments

- BMBF 2016 : 16,4 billion € (2006: 9,3 billion €)
- Länder governments: ~11 billion €
- 400+ universities, 16,000+ courses, 2 million+ students
- German Research Foundation (DFG): competitive funding, 3 billion €
- German Council of Sciences/Humanities (Wissenschaftsrat): Evaluation
- National Academy of Sciences Leopoldina, regional academies, acatech: Policy advice
- Max Planck Foundation: basic research in 83 institutes
- Fraunhofer Society: applied research in 80 institutes
- Helmholtz Association: 18 large-scale research facilities
- Leibniz Association: 87 interdisciplinary institutes
- Governmental research institutes; independent research institutes
- German Academic Exch. Service (DAAD), Humboldt Foundation, etc.

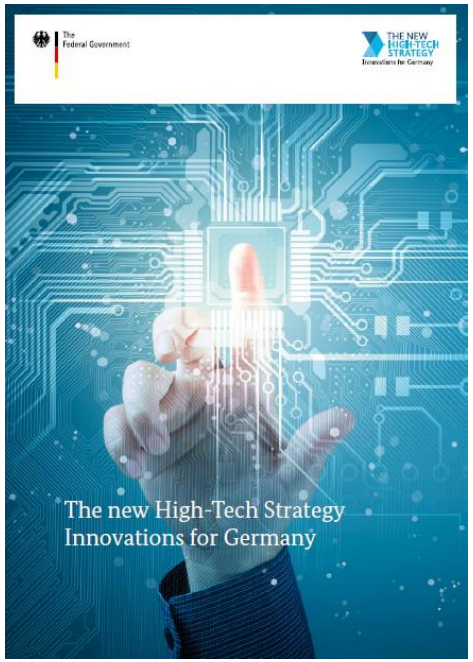
Dimensions of STI policy

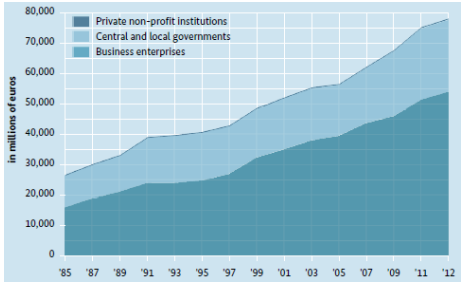
- How much resources, which distribution?
- What framework conditions? i.a.
  - Career tracks
  - Balance of higher education and research
  - International cooperation
  - Technology assessment (TA)
  - Intellectual property regimes
  - Ethical considerations
- How to evaluate STI quality?
  - How to measure “excellence”? Publications, patents, third-party funding?
  - Evaluation schemes of projects, individuals, institutions
- Impact of other policies (e.g. trade, medicine, agriculture)



Germany: Context and background

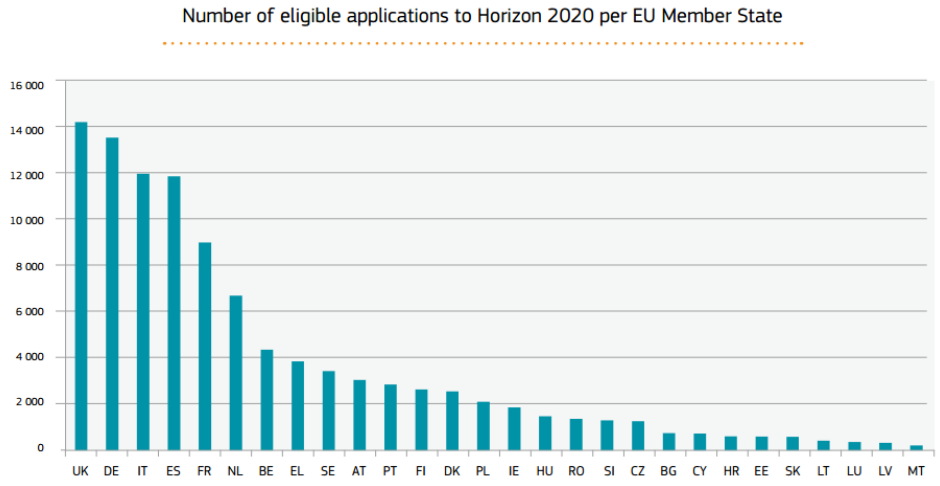
- Strong, elaborate STI policies
- Central instrument: *High Tech Strategy*
  - 10 forward-looking areas (energy, climate-adapted cities, biomaterials, personalized medicine, mobility, age, web, diets, industry 4.0)
- Role of R&D in the private sector
- Excellence Initiative (=sharpening university profiles)
- Pact for Research and Innovation
- *FONA 3 – Research for Sustainability*





Germany: EU context and background

- Horizon 2020 – EU STI programme with 80 billion €
- Goal: to implement the “Innovation Union” and further develop the ”European Research Area”
- 17%: European Research Council
- Future and Emerging Technologies; Flagships: Graphene, Brain Research
- Also regional funds (InterReg, EFRE, ESF)
- Possible detrimental effect in other countries, with “copy-paste“ “smart specializations“ and “copy-paste“ science policies



What is SuS?

Some tentative elements:

1. Problem-oriented, i.e. oriented towards a “real problem” defined in the world (with stakeholders, co-design), *not mainly* addressing a research question as defined by the scientific community
2. Structurally and methodologically suitable to have potentially useful results (options to make the world more sustainable)
3. Drawing upon all available knowledge, from all relevant disciplines and all relevant stakeholders (co-production)

German SD policies

Ambitious and credible SD efforts for more than 15 years

- SD strategy since 2002, national SD council since 2001
- SD progress reports in 2008 and 2012, internat. peer reviews
- Important successes, e.g.
  - Material and energy efficiency,
  - Air and water pollution
  - Renewable energy feed-in tariffs, “Energiewende” of 2011
- *Germany continues to be an unsustainable society. Much more profound societal change is necessary.*
- *2015/2016: Review of the national SD strategy in light of Agenda 2030; 1st submission of SDG report in June 2016*

Key German SuS policy

FONA research funding programme by BMBF since 2004

- Research funding of altogether close to 2 billion Euro
- Support for the German SD strategy
- Society/economy, energy, global change, resources, earth system
- Sup-programme SÖF on socio-ecological systems (~5%)
- FONA3 launched in September 2015

FONA Goals

- Networking of research and the industry, esp. SMEs
- International networking, including with dev. countries
- Expanding transdisciplinary research concepts

FONA
Forschung für nachhaltige Entwicklungen
BMBF

German SuS examples

- Helmholtz Association
  - Promising transdisciplinary initiatives, e.g. involving consumers into energy scenarios,
- University of Luneburg:
  - Sustainability department
  - *All* first-year university students have to take a course on sustainability / research accountability
  - MSc, Dozens of sustainability-focused courses
  - Sustainability report, EMAS; UNESCO Chair
- University of Sustainable Development Eberswalde
- Institute of Advanced Sustainability Studies
- EcorNET, incl. Wuppertal Institute, etc.
- ~150 sustainability courses + ~200 related courses

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5 key questions

- SuS and academic freedom
- SuS and transdisciplinarity
- SuS – an “own field” or “pervasive”?
- SuS: “Sustainability” or “grand challenges”?
- SuS and “transformation”?

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SuS and academic freedom

Intensive debate in the German public

- SuS more than routine science policy? Co-production and co-design as challenges to (methodological) academic freedom?
  - No, co-production/co-design are *no universal* scient. principles
- "Mission-orientation" and "being normative, value-based" - challenges to academic freedom (at content level)?
  - Academic freedom depends on societal freedom; societal freedom depends on long-term societal viability
- SuS – is it "solutionism"?
  - No, any science results in options; politics chooses solutions

SuS and transdisciplinarity

- Interdisciplinarity – of course!
  - Analogy to “agricultural research”
  - From engineering to the humanities
- Transdisciplinarity:
  - Everybody with relevant, needed knowledge, in particular stakeholders (officials, mayors, company reps, NGO reps…)
  - Including indigenous knowledge (cp. current IPBES debate)
  - Methodological incorporation, evaluation and classification of knowledge, in dialogue with stakeholders, decision-making within science
  - Co-design of research questions and of research projects (content and methods), ultimate decision-making within science
  - Application of results through dialogue, *not only* technology transfer

SuS – an “own field” or “pervasive”?

- “Own field”?
  - Strong focus on co-design and co-production
  - Not exclusive focus on generating knowledge, but also potentially useful results
- “Pervasive”?
  - Need of engineering, natural sciences, social / human sciences
  - Need of basic and applied research
- But no, many scientific questions obviously do *not* need co-design, do *not* need co-production, do *not* need interdisciplinary approaches.

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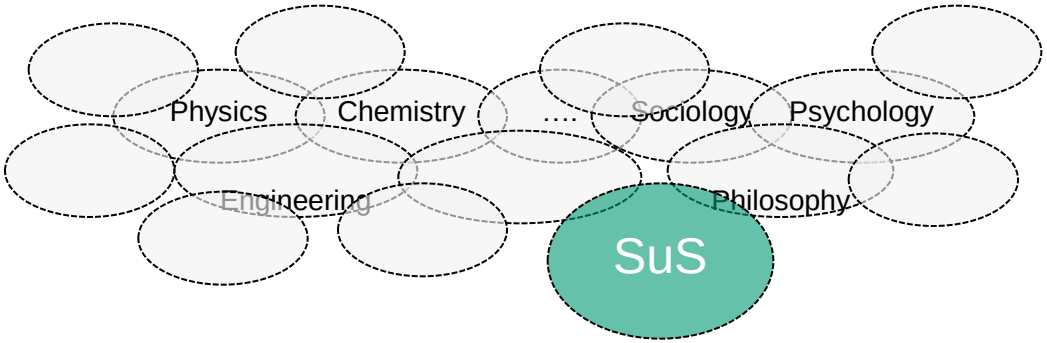
SuS – an “own field” or “pervasive”?



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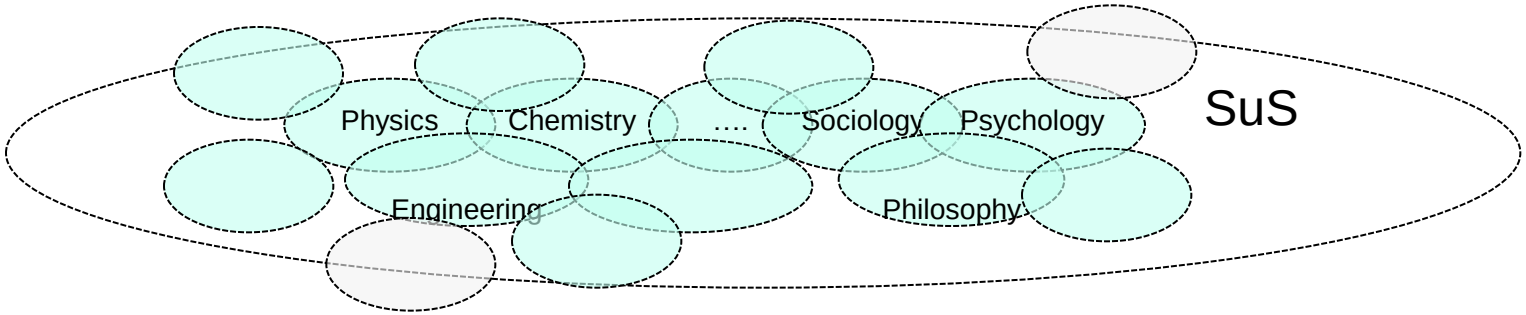

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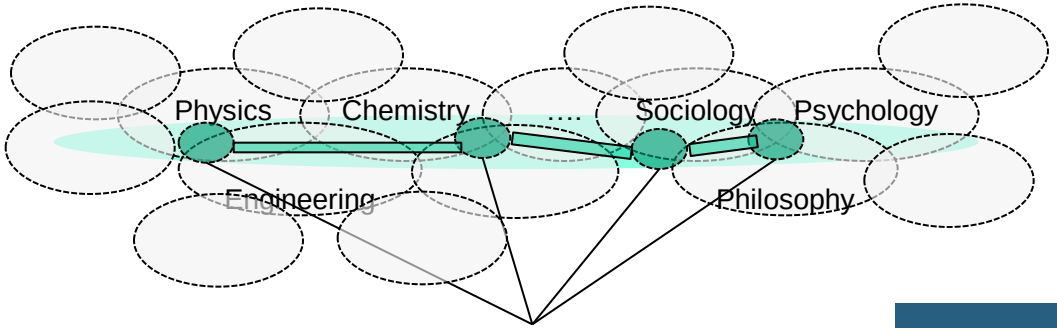

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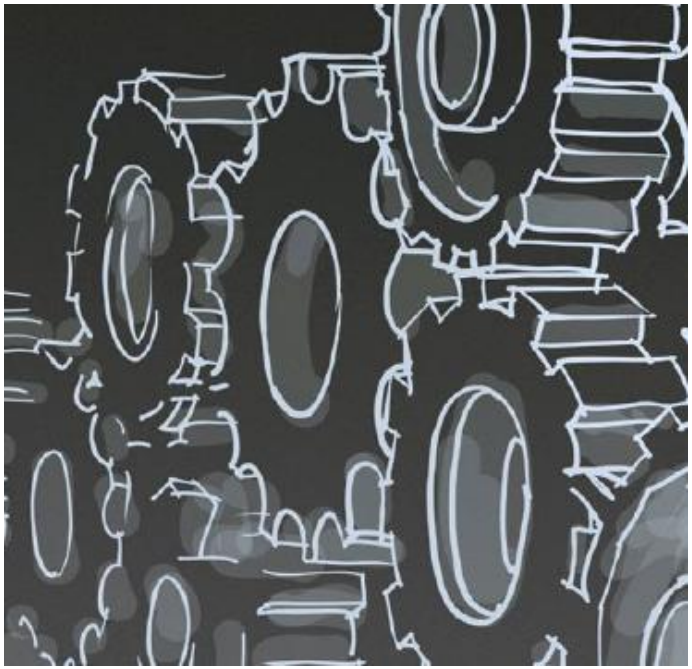
SuS

SuS and “grand challenges”

- “Grand challenges” multiply defined, e.g. in Horizon2020
- Great overlap of catalogues, e.g. food security, health, energy, freshwater, oceans, demography, raw materials,…
- Excellent formulation in SDGs
- “Sustainability” is preferable over “grand challenges”, highlighting
  - Normative dimension
  - Conflicts between goals
  - Sustainable development as a goal, not a state
  - Emerging challenges, no exhaustive list
  - Local challenges can be crucial, multi-level impact
  - Feedback loops/rebound effect, thresholds, tipping points

SuS and “transformation”



— Should science be an engine or catalyst for transformation of the entire society?

— Should SuS be a catalyst for science, e.g. involve (civil) society into all questions of priority setting of science policies *(strong* co-design)?

→ Science can be transformative, but difficult to require this as a goal

→ Science needs to be more open to society in general

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Way forward

- Overcome the petty dispute on SuS (in particular the debate on academic freedom)
- Need for strong new incentives for co-design and co-production
- Need for new evaluation schemes and criteria for
  - Project proposals
  - Individual scientific careers
  - Success of groups, departments and institutes

  beyond “Impact Factor publications”, patents and funding

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Some key references

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Picture credits

- Most picture credits due to BMBF – “The new High-Tech Strategy Innovations for Germany” (= HTS)
- Slide 1 – Thinkstock, as in BMBF Education and Research in Figures 2015
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