11.15 - 12.30

Science Assessment for Stimulating Broader Impact

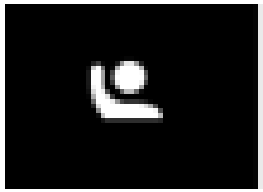
Paul Wouters (chair) – Leiden University
Rainer Walz – Fraunhofer Institute for Systems and Innovation Research
Martina Kadunc – Impact Monitoring at the European Commission, Slovenia

Science Assessment for Stimulating Broader Impact

Barbakan room

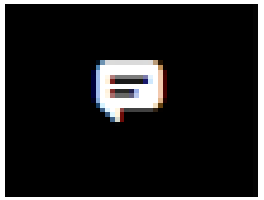
Impact of Science

4-6 November, Krakow



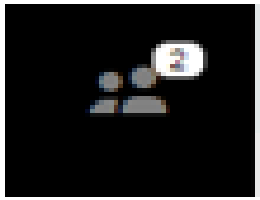
Broadcast permission:

- Turn on your microphone and/or camera
- Participate in the discussion



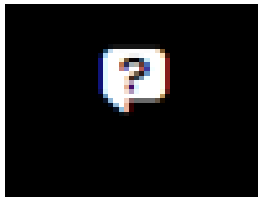
Conversations:

- General remarks
- Discussion
- News (links)



Who are the attendees?

- Speakers
- Participants



Q&A:

- (Targeted) questions
- Speakers answer the questions live

Lay out view:
Full screen, Tiled, Thumbnail

AESIS

#IoS20

CWTS
Meaningful metrics

Science Assessment for Stimulating Broader Impact

Paul Wouters

AESIS 2020 4 – 6 November 2020, Krakow, Poland

Universiteit Leiden

Recommendations AESIS 2017

- Develop new evaluative methodologies to both *enable* and *make visible* societal impact of scholarship and research as well as interactions between researchers and society
- Re-orient academic assessment systems towards incentives for interaction with society; end assessments that basically promote academic arrogance and insularity
- Combine quantitative with qualitative evidence of impact and always put the evidence in context (keep in mind: *Measuring is Changing* and *Context Counts*)

Measuring is changing

- What counts as excellence is shaped by how we measure and define “excellence”
- What counts as impact is shaped by how we measure and define “impact”
- *Qualities* and *interactions* are the foundation for “excellence” and “impact” so we should understand those more fundamental processes first
- We need different indicators at different levels in the scientific system to inform wise management that strikes the right balance between trust and control
- Context is crucial for interpretation and standardization

CWTS

HEFCE 2010 impact indicators

- Delivering highly skilled people;
- Creating new businesses, improving the performance of existing businesses, or commercialising new products or processes;
- Attracting R&D investment from global business;
- Better informed public policy-making or improved public services;
- Improved patient care or health outcomes;
- Progress towards sustainable development, including environmental sustainability;
- Cultural enrichment, including improved public engagement with science and research;
- Improved social welfare, social cohesion or national security;
- Other quality of life benefits.

CWTS

Avian influenza research

- How are research agendas formed by funding initiatives?
- The landscape of public avian influenza research is not directly driven by expectations of societal outcomes
- Three drivers interact:
  - industry priorities
  - publishing pressures
  - mandates of public health organizations
- Broad governance agendas are needed

Wallace, Matthew L, and Ismael Ràfols. 'Institutional Shaping of Research Priorities: A Case Study on Avian Influenza', SPRU Working Paper Series, 2016-02, Version July 2018.

CWTS

Problematic alignment?

- How do researchers integrate Grand Challenge type of funding opportunities in their agendas?
- Tension between normative goals and epistemic and social uncertainties
- Risk of lock-in into unproductive research lines
- Conflicting temporal configurations

Wolfgang Kaltenbrunner (2020): Managing budgetary uncertainty, interpreting policy. How researchers integrate “grand challenges” funding programs into their research agendas, Journal of Responsible Innovation, DOI: 10.1080/23299460.2020.1744401

CWTS

How to translate funding into research priorities

- Multidisciplinary research not stimulated by assessment on past publications and funding success
- New funding mechanisms needed?
- Sandpit model as example

Maxwell, Kate, and Paul Benneworth. 'The Construction of New Scientific Norms for Solving Grand Challenges'. *Palgrave Communications* 4, no. 1 (December 2018). https://doi.org/10.1057/s41599-018-0105-9.

CWTS

Scope of the session

- *Demonstration of impact assessment in practice*
- *What role does impact assessment play in orienting research on impact on Grand Challenges (defined broadly)?*
- *Is academic evalution well aligned with Grand Challenges agendas?*
- *If not, what change is needed towards “a transformative university”?*

IMPACT OF SCIENCE 2020

ANNUAL AESIS CONFERENCE

4-6 NOVEMBER 2020 KRAKOW, POLAND

SCIENCE ASSESSMENT FOR STIMULATING BROADER IMPACT

Increasing the impact of research for sustainability – lessons from the evaluation of German FONA program

Prof. Dr. Rainer Walz
Fraunhofer ISI, Karlsruhe

Fraunhofer ISI

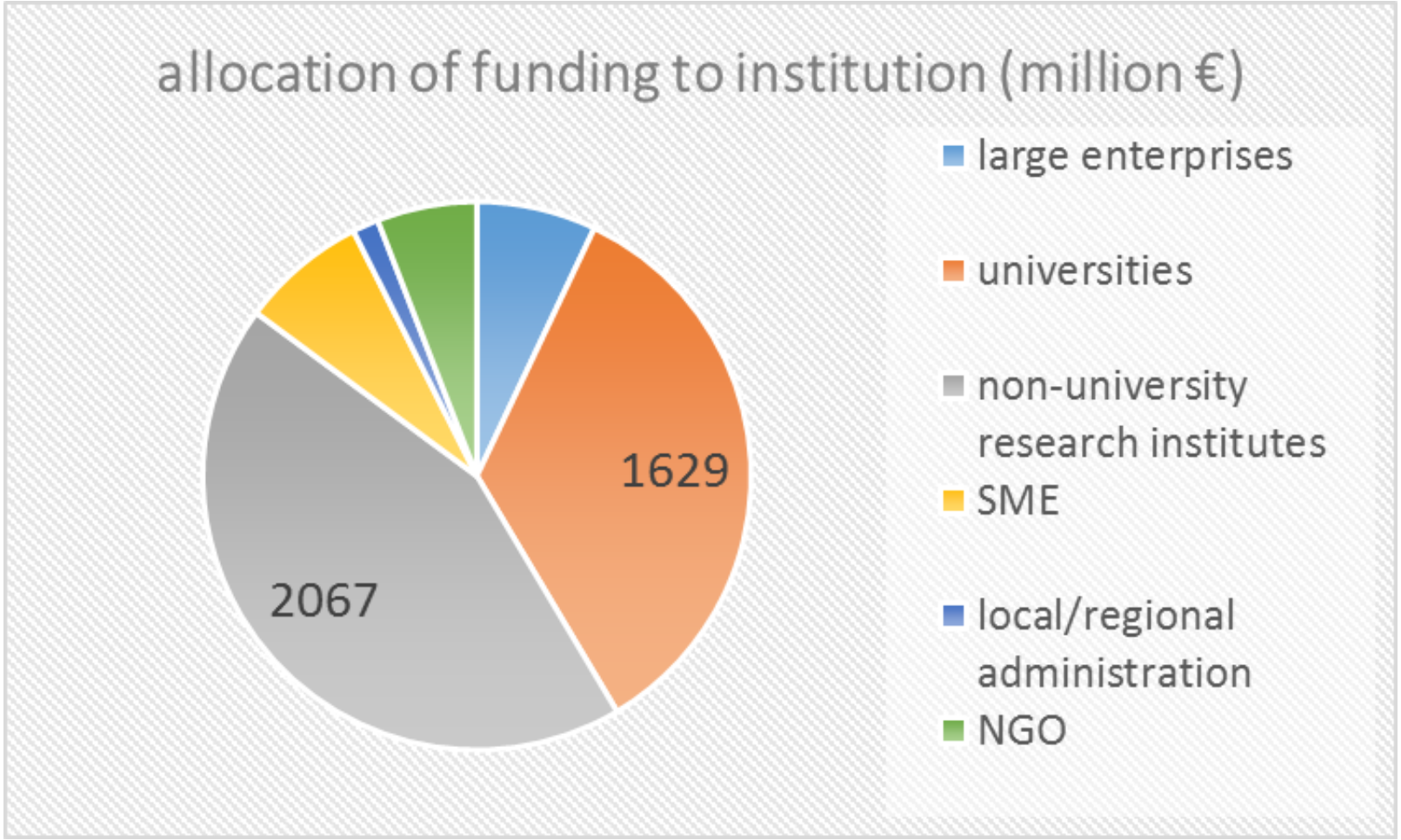
Content

- What is FONA?
- Evaluation of FONA impact
- Evaluation of FONA characteristics: Can FONA transform the research system?

What is FONA?

Forschung für Nachhaltigkeit

- FONA = German framework program for sustainability research
- established 2005 by German BMBF
- funding of about 10,000 research projects with a total funding of about 5 billion €
- learning program, with 3 phases so far



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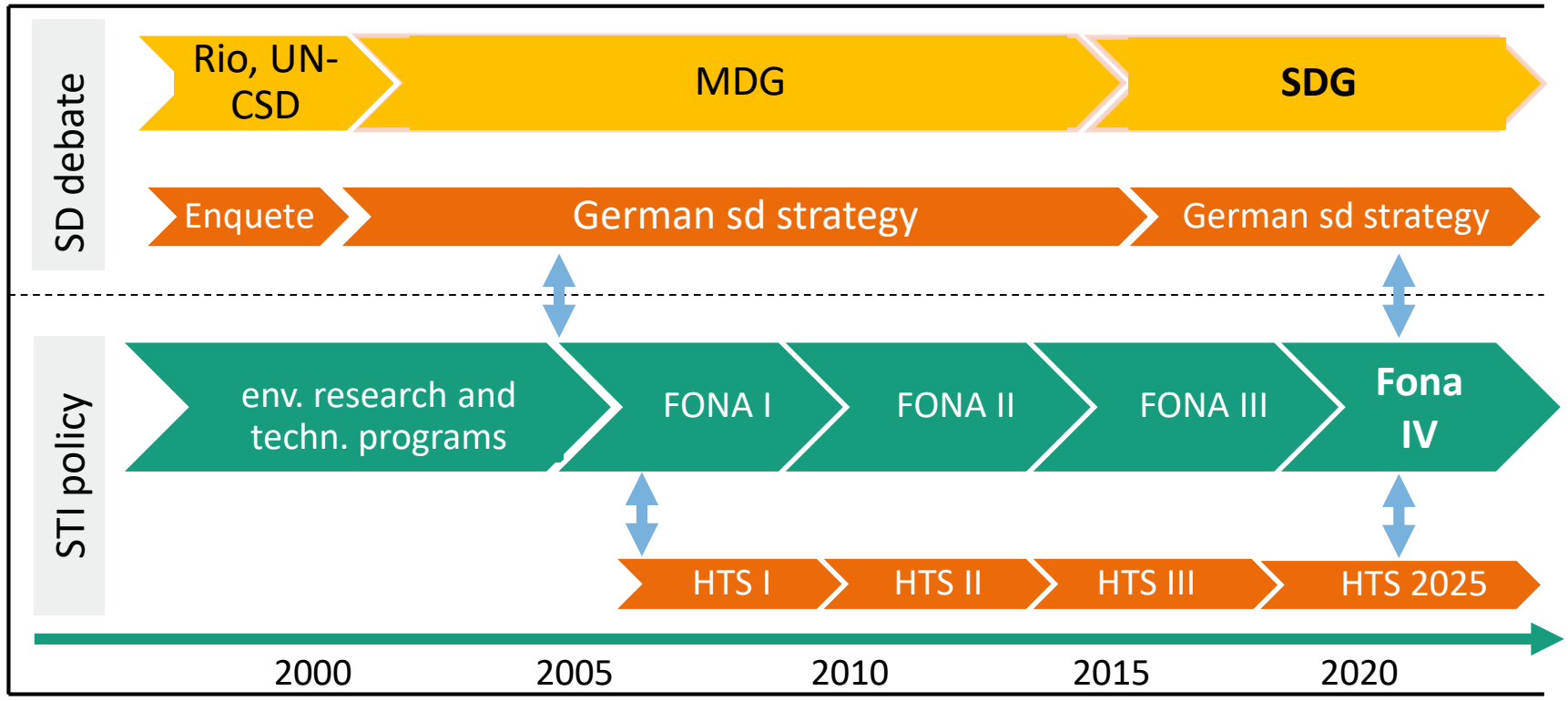
evolution of FONA and SDG

start: opening up of env. research



perspective: core of STI policy for SDG

Fraunhofer ISI

Impact mechanisms FONA: focus of presentation

- traditional impact pathways
  - scientific output and capacity building researchers
  - transfer of project results to application
- strategic approach: FONA characteristics of research
  - interdisciplinarity
  - transdisciplinarity
  - system perspective

evaluation:
impact achieved?

evaluation:
importance of characteristics?

meta-analysis:

Can FONA transform research?

Limits to FONA approach?

Evaluation of FONA impact

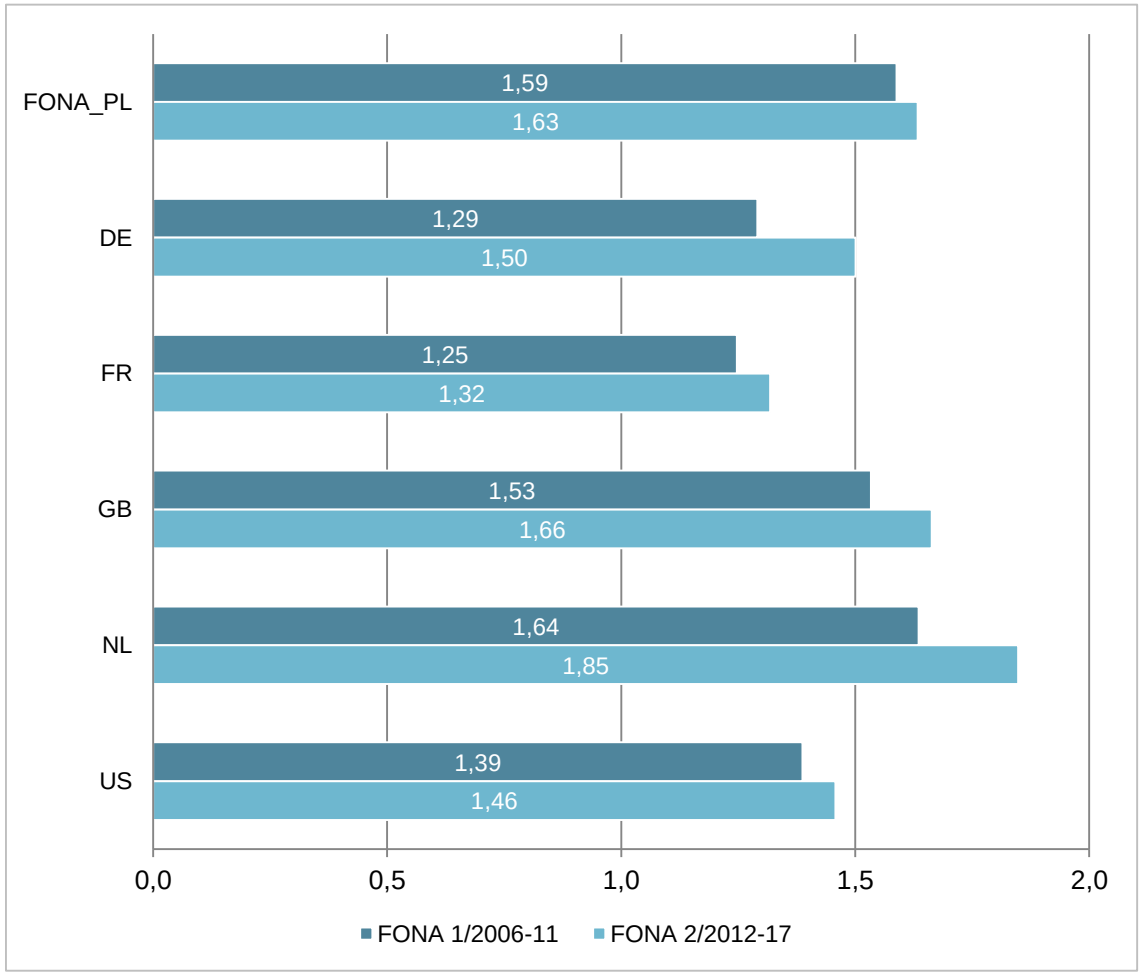
Evaluation methodology

- analysis of program structure
- publication analysis
- online survey among project leaders
- focus groups
- case studies of 20 specific programs within FONA

Scientific output and capacity building

- strong publication record
  - higher as for German average in specific field “sustainability”
  - field specific FONA publications cited almost as much as publications from German researchers in DFG or EU-Projects (publication paradox?)
- capacity building
  - many PhD students
  - build-up of qualifications also valued outside academics
  - mixed results for academic careers

relative citation ratios in the field „sustainability“



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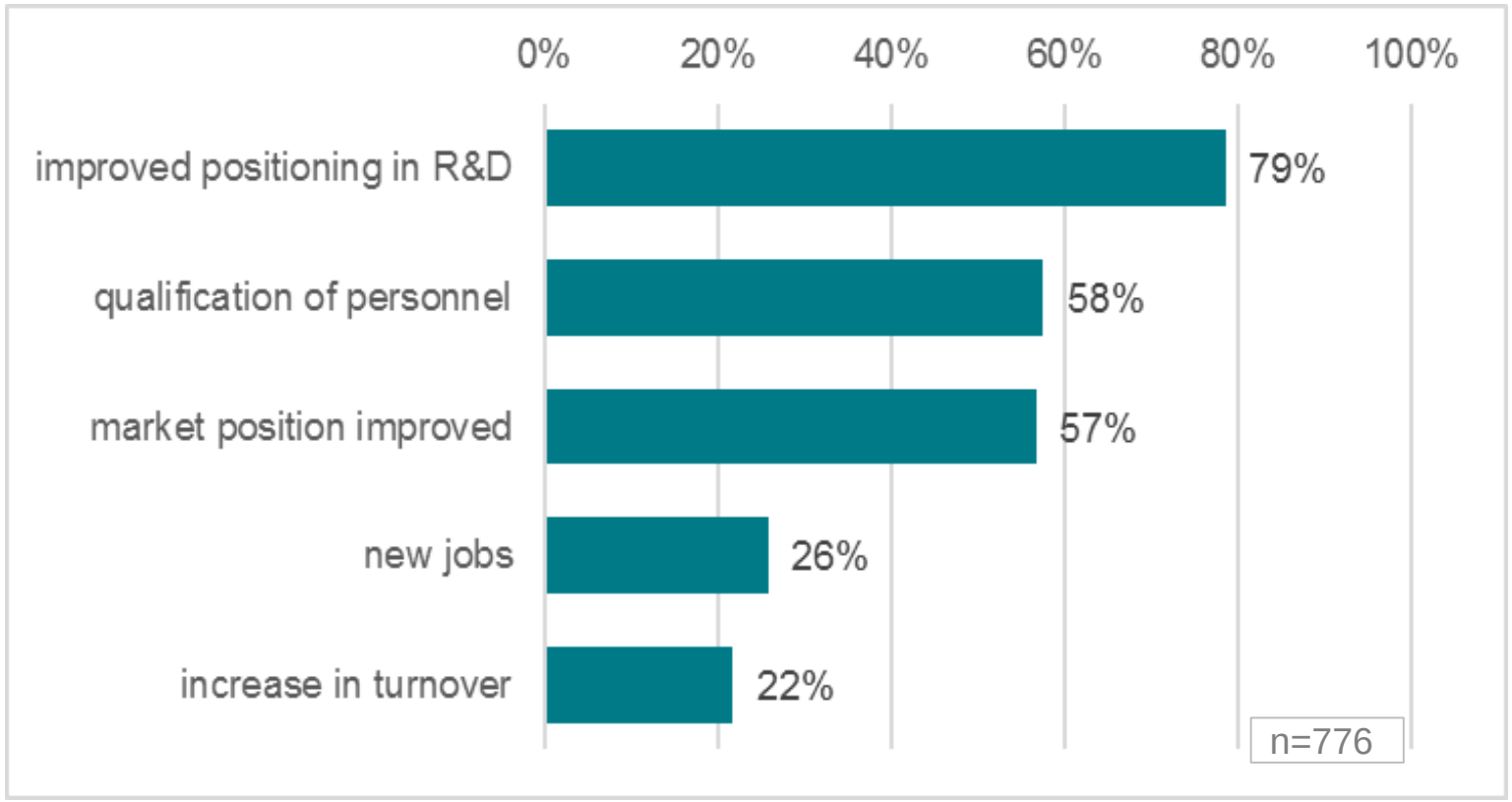
Impact on Business

- Positive economic effects: increase in innovation, market position, jobs
- first impulses to adapt internal structures towards sustainability



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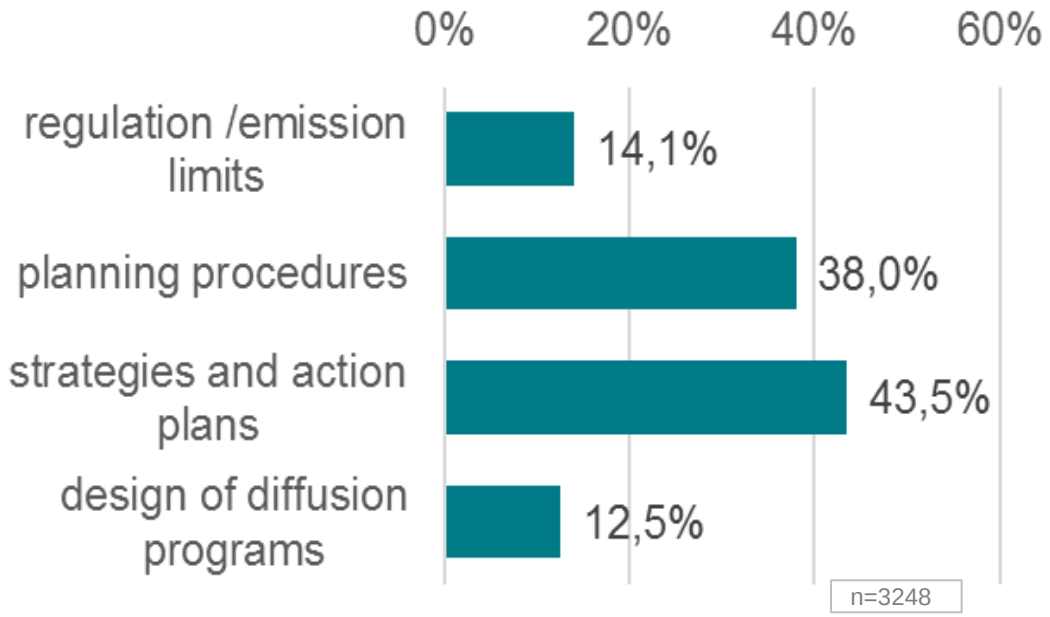
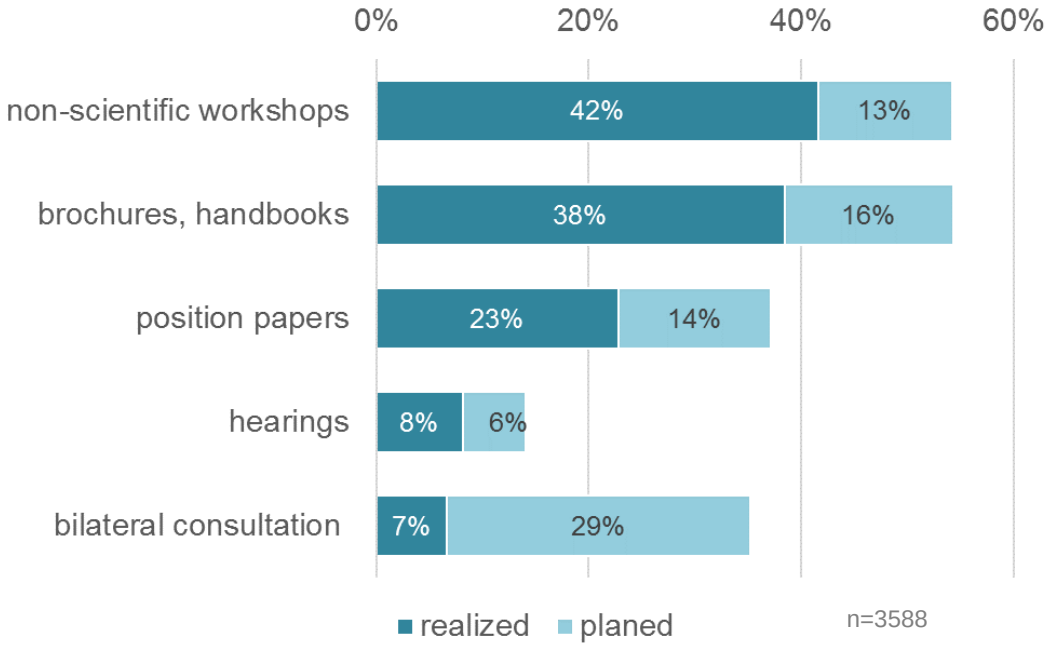
Impact on politics and society

- Input for policy making
- Transfer of results towards non-scientific community is taking place

use of results in politics



communication channels to decision makers



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Impact on Sustainability

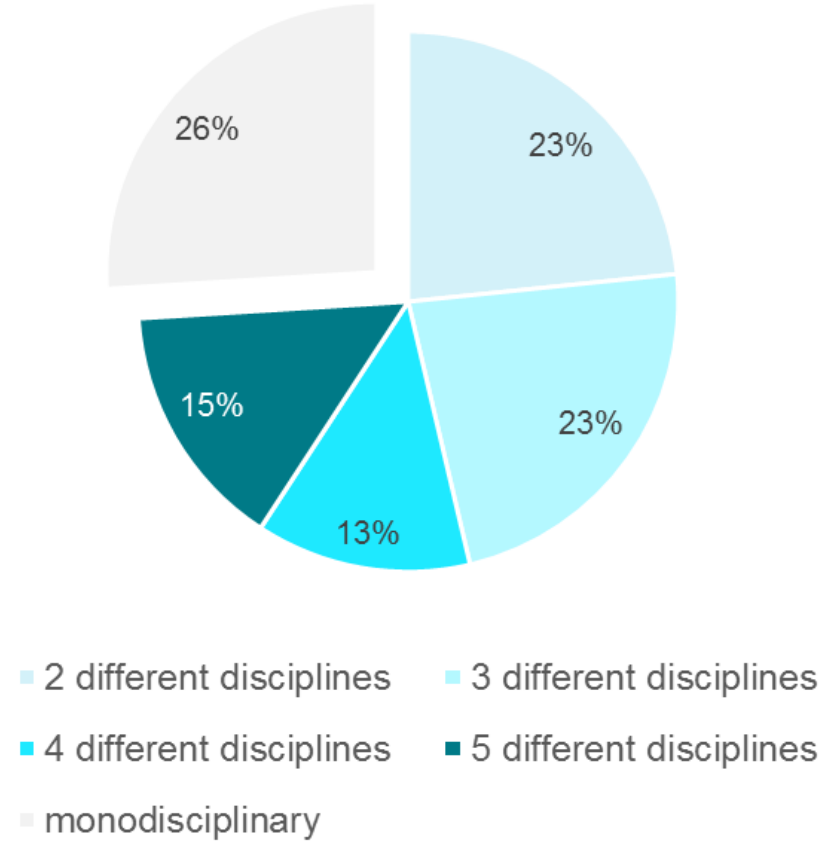
- sustainability influenced by many factors
  => only possible to look at contribution
  => input into decision making
- difficulties to assess direct contribution of projects, because no systemic monitoring after project ends; survey indicates high involvement
- example from case study for indirect contribution: funding of secretariat of IPCC, WG III
  - „without IPCC Report WG III, there would be no Paris Agreement“
  - but many other factors also contributed

Evaluation of FONA characteristics: Can FONA transform the research system?

Interdisciplinarity

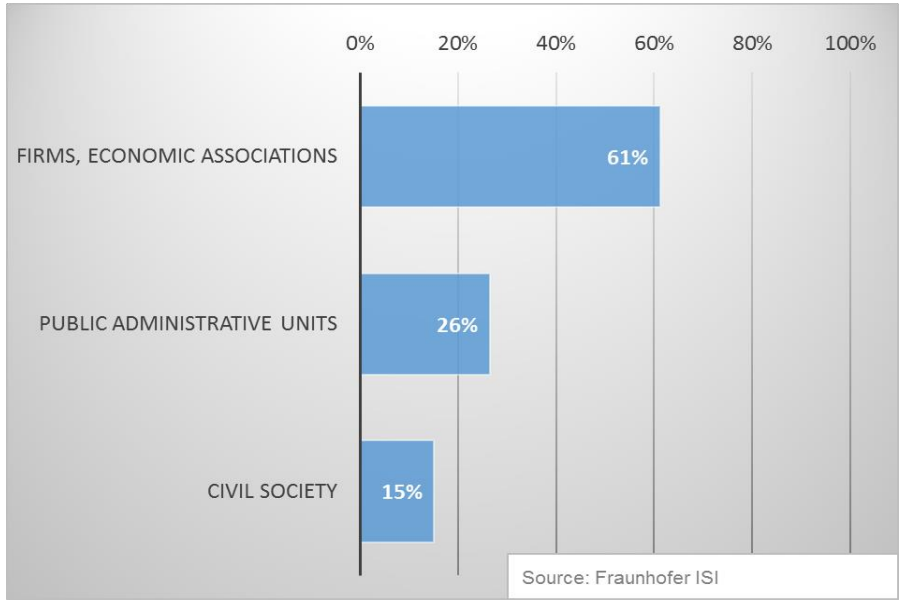
- **achievements**
  - increase in interdisciplinarity of research teams
  - one quarter of projects with strong interdisciplinarity between natural/engineering science and social science/humanities
- **room for improvement**
  - improve interaction between disciplines
  - publications mostly still in a disciplinary fashion => explanation for publication paradox?
  - enlarging system perspective requires even stronger interdisciplinarity
  - incentive system of universities often not compatible with FONA characteristics

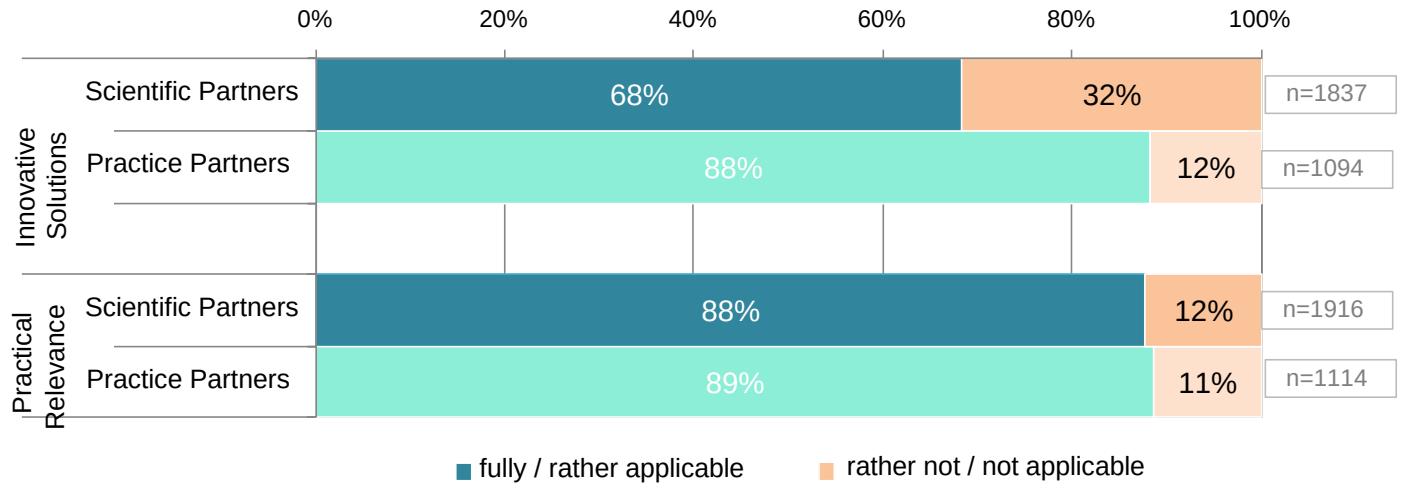
composition of projects



Transdisciplinarity

- **achievements**
  - strong involvement of practice partners in projects
  - survey results indicate innovativeness also from practical perspective
- **room for improvement:** involve practice partners more strongly in definition of research question and research process in order to adapt to real world system perspective





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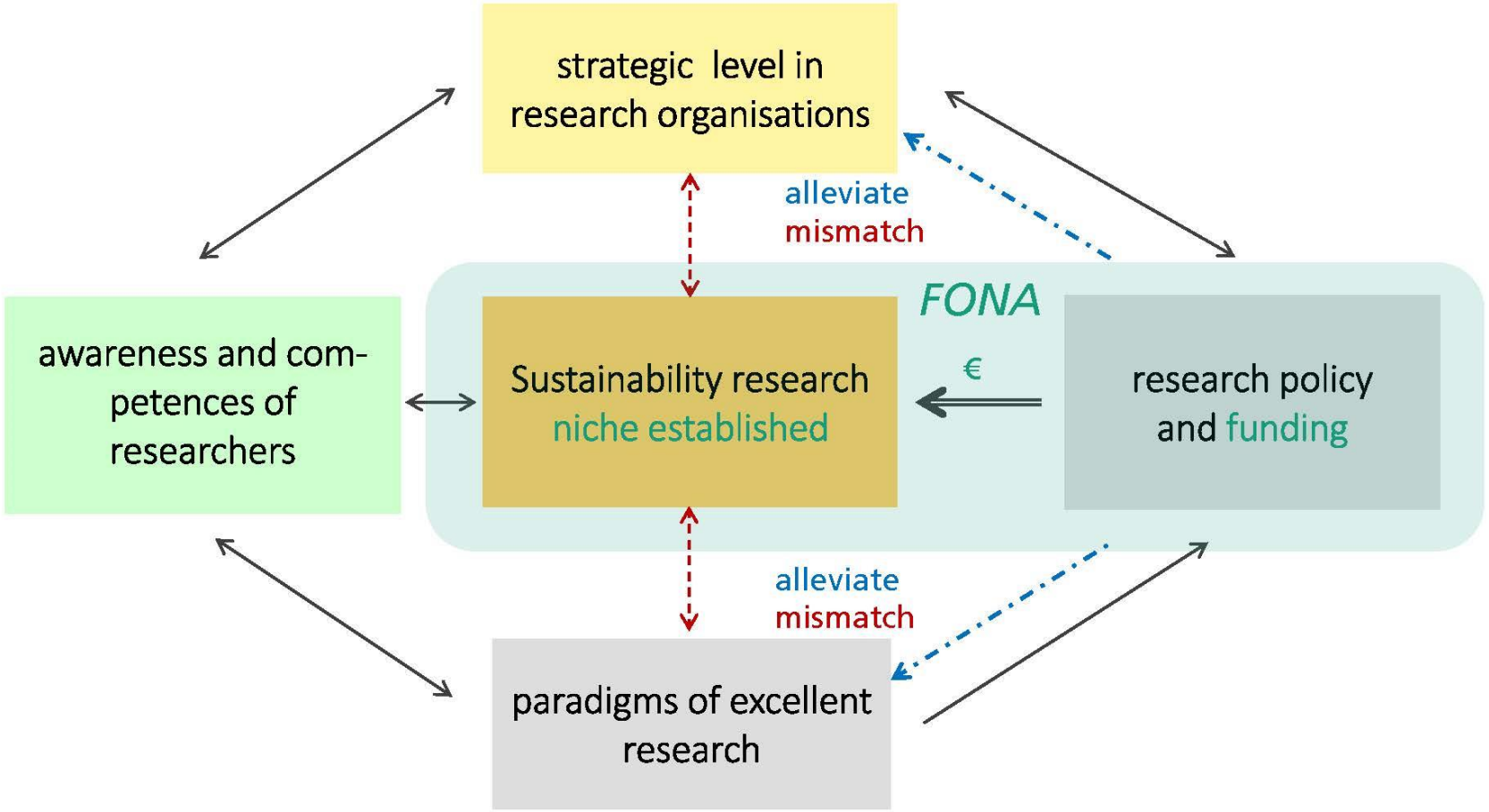
Conclusions

- significant impulses on sustainability research
- specific charac-teristics of a niche (inter- and trans-disciplinarity, syste-mic approach), partial mismatches with regime
- Money is not enough: stronger impact requires policies to adapt research system



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Strategic challenges

- FONA as role model for mission oriented innovation policy
  - Upcoming FONA 4 moves towards actions with specific innovation goals
- strengthening the value chain of research
  - mixture of specific transfer projects and demand side policies
- Although huge, FONA is only a program. How to adapt the research system?
  - What about other programs, which touch upon sustainability?
  - There are still disincentives to interdisciplinary and transdisciplinary work in the academic world.
  - How do we implement incentives into the research institutions to establish reflection processes about the impact of science?
  - How to move towards a new Leitbild for excellent research, which accounts for the need to direct research towards global challenges without compromising academic rigor?

„There ain‘t nothing good, unless you do it“

(Erich Kästner, German writer)

contact for further information:

Prof. Rainer Walz

Fraunhofer ISI

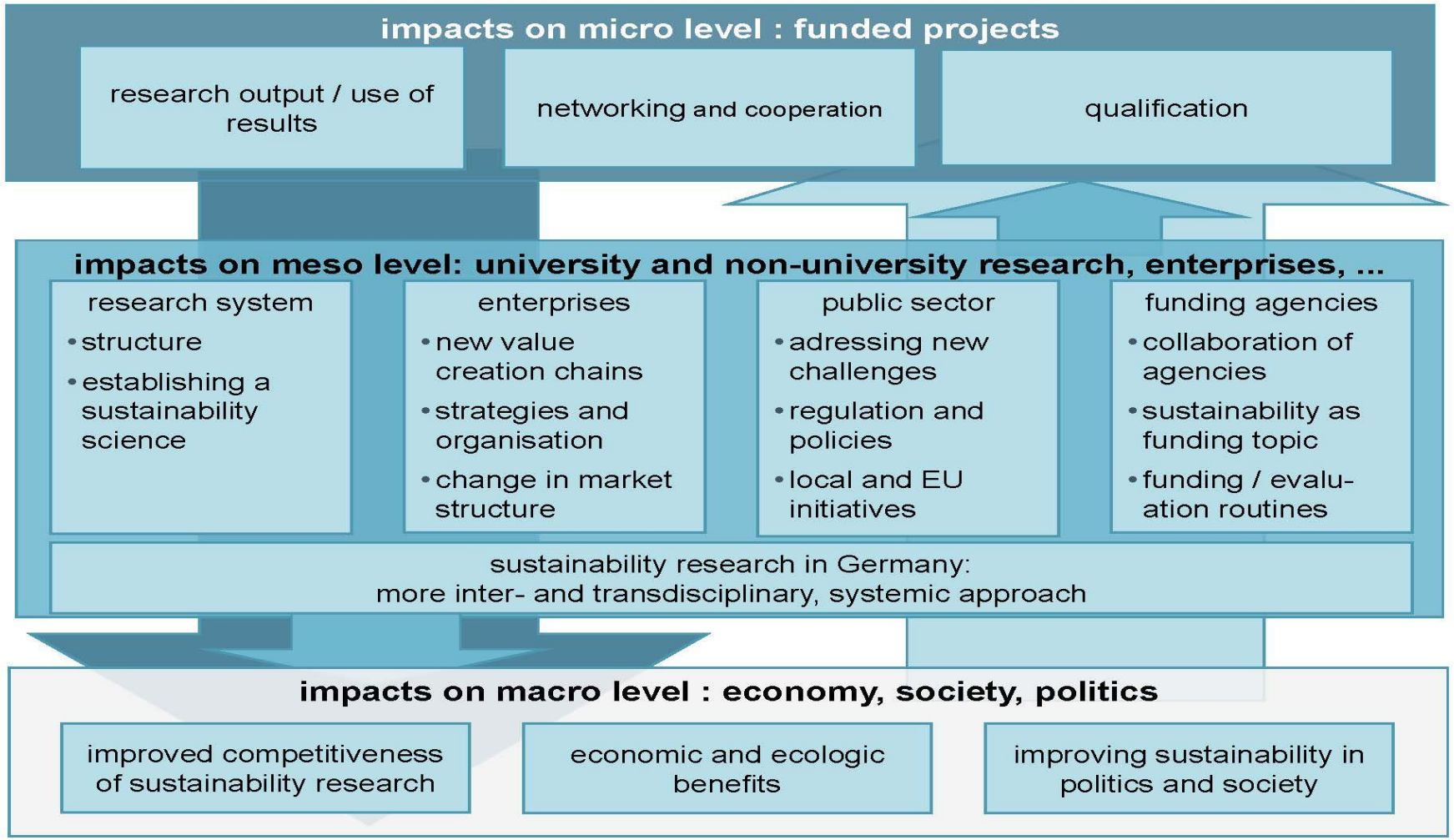
mail: rainer.walz@isi.fraunhofer.de

Literature:

Bührer, S.; Walz, R.; Seus, S.; Astor, M.; Stehnken, T.; Malik, F. (2020): Evaluation der BMBF-Rahmenprogramme Forschung für die Nachhaltigkeit. Karlsruhe: Fraunhofer ISI. Online available at: http://publica.fraunhofer.de/eprints/urn_nbn_de_0011-n-5751014.pdf

Back-up slides

levels of impact of FONA



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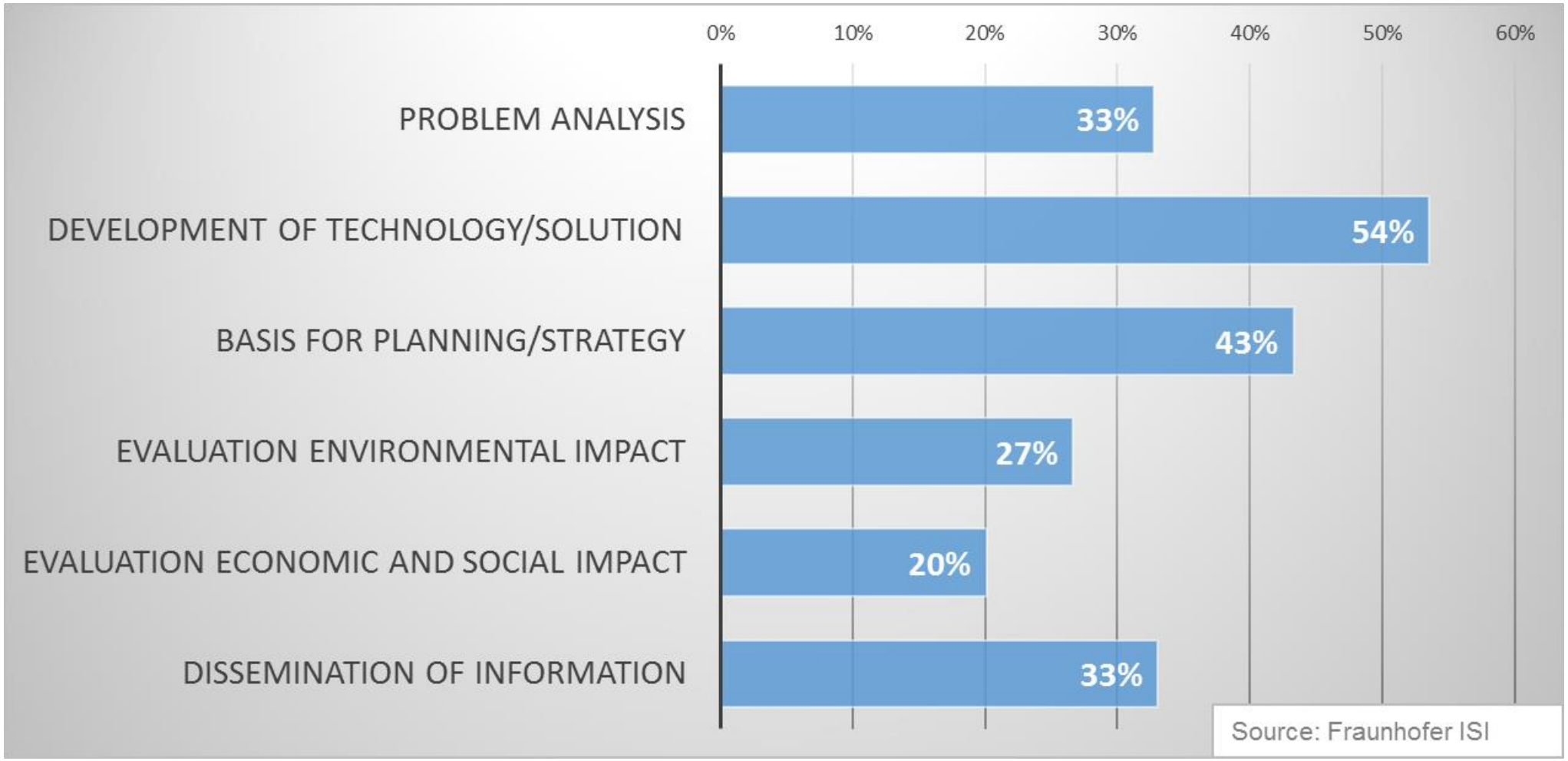
goals of FONA projects



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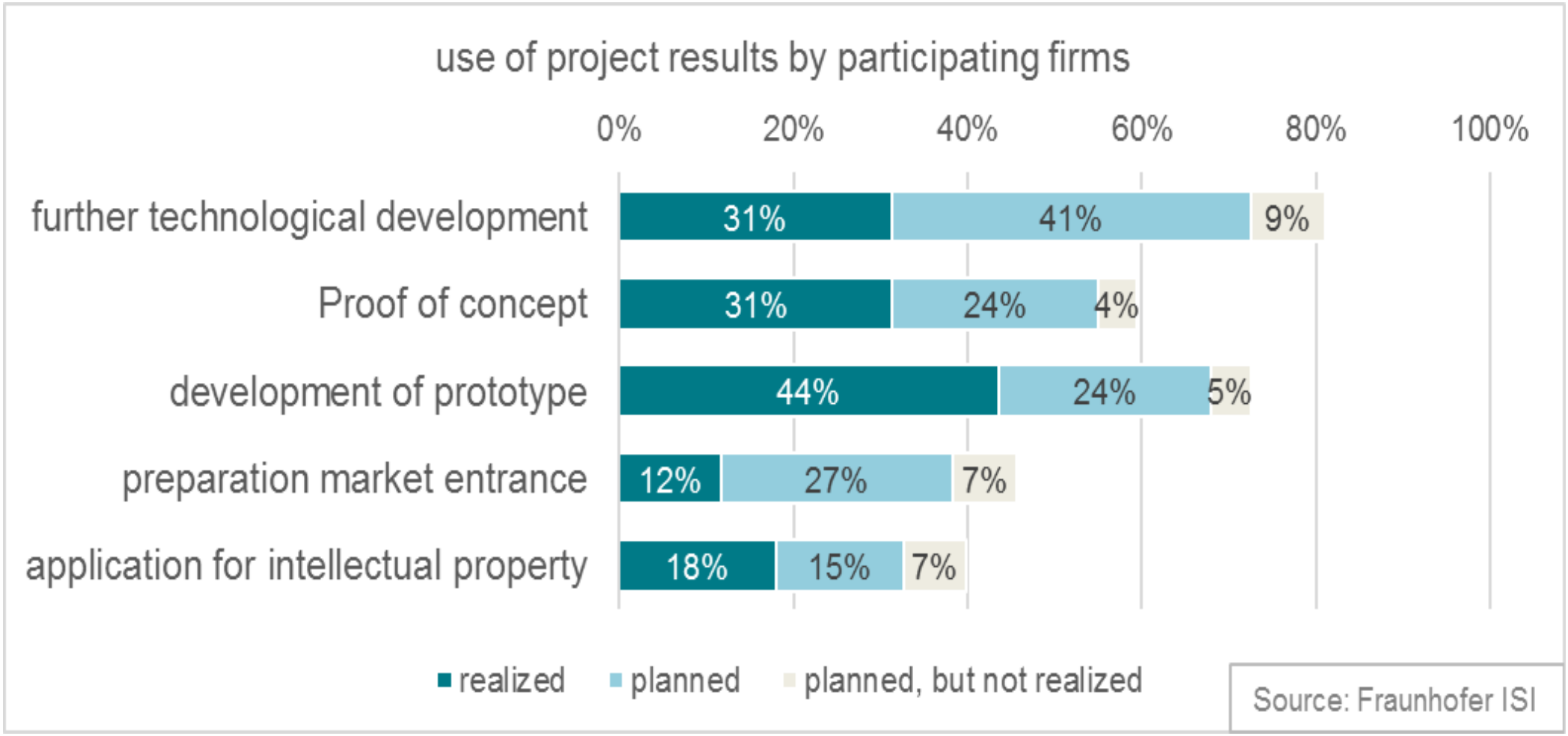
SDG need new solutions – achievements of FONA



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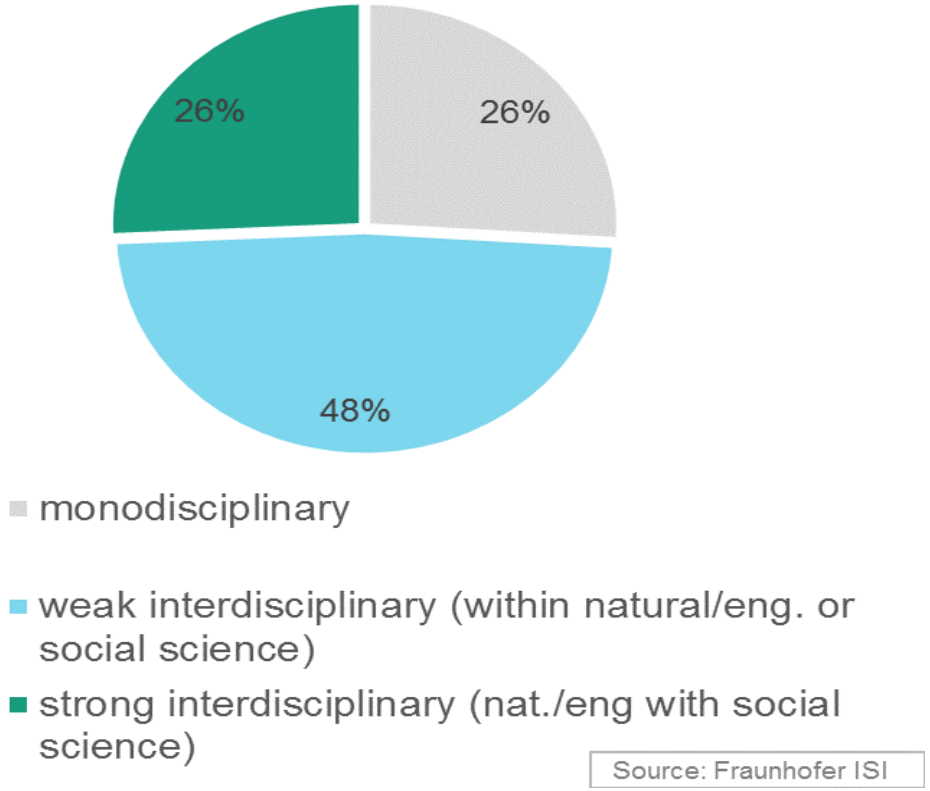
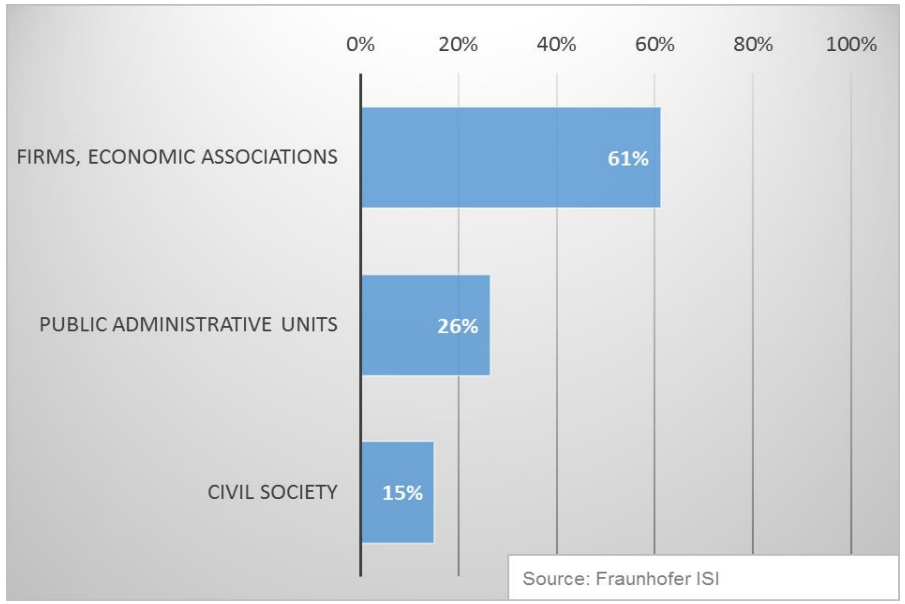
FONA project structure

Interdisciplinarity



Transdisciplinarity: non-academic partners in projects



Fraunhofer ISI

STI for SDGs need a mission oriented approach

- FONA addresses directionality of innovation....
  ....but mission oriented is more than directionality

- mission oriented innovation policy is process in the making....
  ....but the following prerequisites emerge
  - spelling out mission on intermediate granularity
  - policy integration across ministries
  - stakeholder involvement
  - (measurable) targets and indicators for mission fulfilment
  - defining bottlenecks to be addressed
  - targeting research and demand side of innovations
  - measuring of impacts of STI
  - adjustment of STI towards mission fulfilment

STI for SDG need adaptation of science system on all levels

- reflection processes of researchers
- commitment of institutions
- selection criteria for research projects
- implementation in STI programs
- inter- and transdisciplinarity as criteria of excellent science

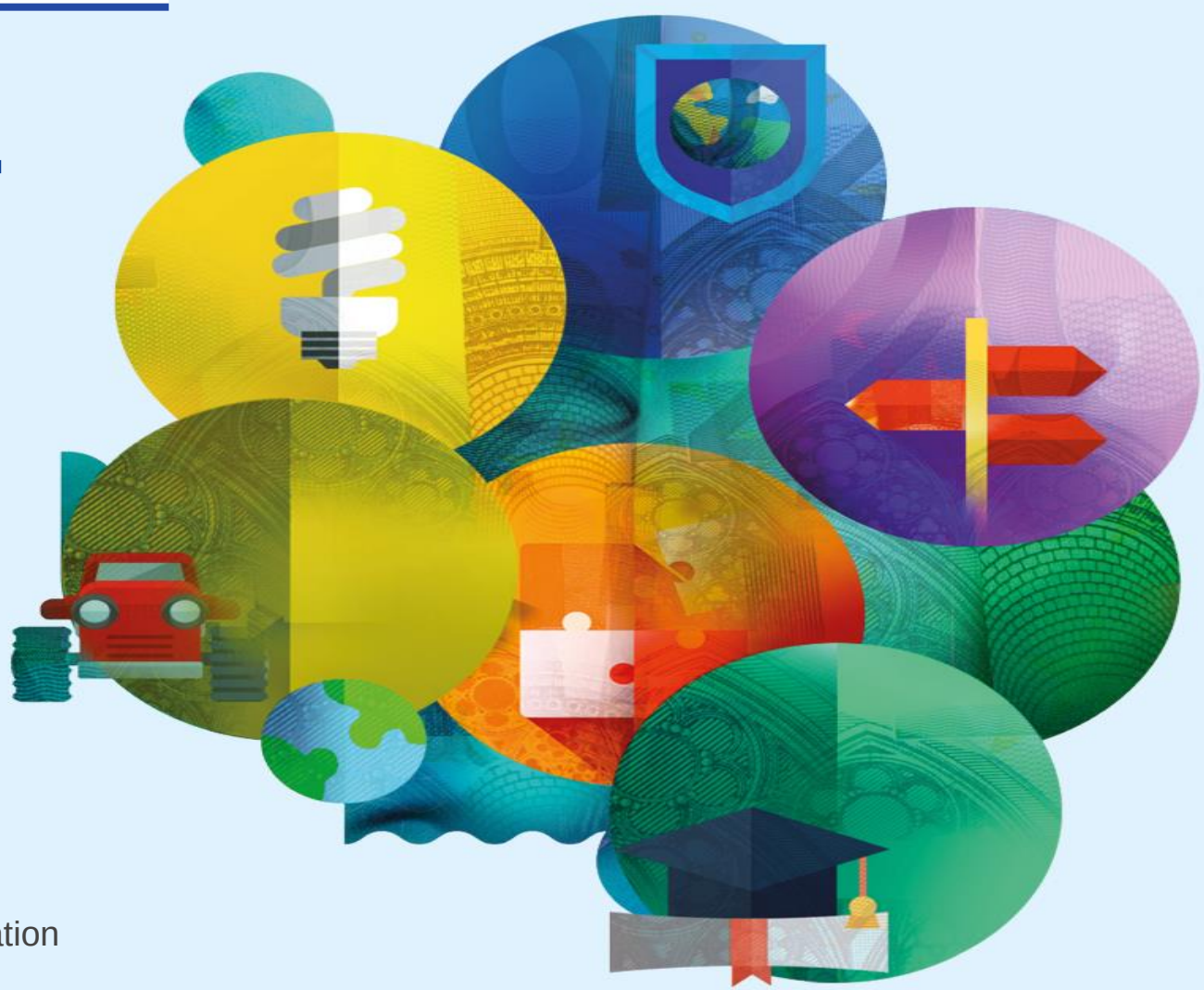
Challenges for program design

- What happens after project is finished?
- Does increasing the focus on promising impact in the research proposal lead to crowding-out of risky radical solutions?
- How to establish monitoring process of impacts after projects are finished?
- How to get better match of research and practice partners
- Where do we get evaluators for project proposals from, who are experienced in inter- und transdisciplinary research?
- How to improve proficiency of PIs in transdisciplinary project management?
- Involving more and new actors to research leads to increased costs for project management

European Commission

PAVING THE PATHWAYS TO IMPACT

IN HORIZON EUROPE



Martina Kadunc
Team leader - Impact monitoring
European Commission, DG Research & Innovation

Expectations of research & innovation impact on science, economy and society are increasing …

(Societal) impact is now at the heart of the next EU R&I Framework Programme Horizon Europe …

HORIZON EUROPE CYCLE

Impact focused Framework Programme

European Commission

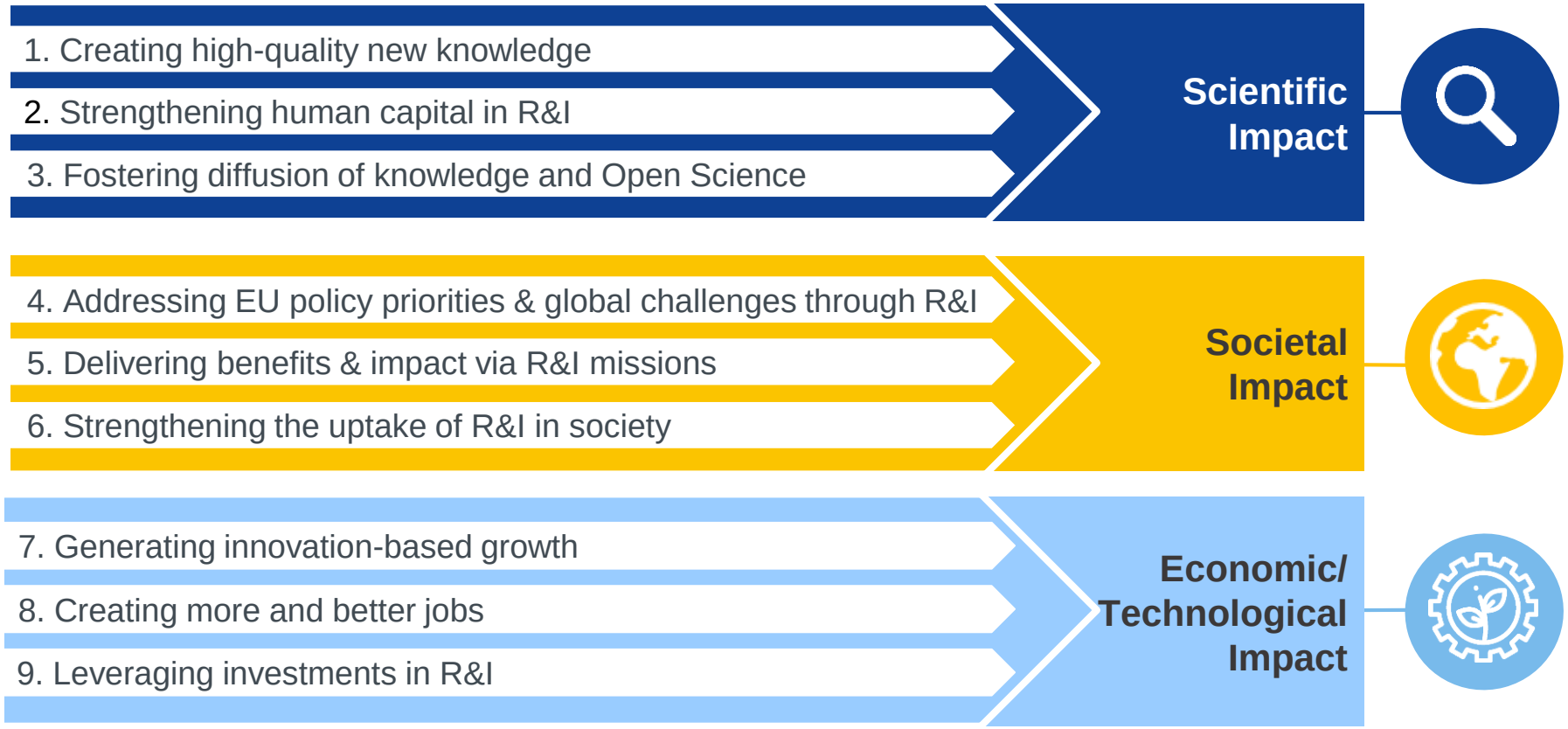
HORIZON EUROPE impact implementation

EC POLICY PRIORITIES	**Political Guidelines for the European Commission 2019-2024 (and other key strategic documents - e.g. Green Deal)**
KEY STRATEGIC ORIENTATIONS FOR R&I	Set of strategic objectives within the EC policy priorities where R&I investments are expected to make a difference
IMPACT AREAS	Group of expected impacts highlighting the most important transformation to be fostered through R&I
EXPECTED IMPACTS ⇒ *DESTINATIONS* *= General objectives*	Wider effects on society (incl. the environment), the economy and science enabled by the outcomes of R&I investments (long term) EXAMPLE *Strategic Plan & Work Programme: R&I contribution to seamless, smart, inclusive and sustainable mobility services* *Project : Increase maximum passenger capacity by 15% and passenger average throughput by 10%, leading to a 28% reduction in infrastructure expansion costs*
EXPECTED OUTCOMES *=>TOPICS* *= Specific objectives*	Effects of Horizon Europe projects such as uptake, diffusion, use and deployment of the projects' results by direct target groups (medium term) EXAMPLE *Work Programme : Innovative accessibility and logistics solutions applied by the European Transport sector* *Project : At least 9 European airports adopt the advanced forecasting system that was demonstrated during the project*
EXPECTED OUTPUTS *=>PROJECT RESULTS* *= Operational objectives*	What is produced during the project implementation, such as innovative solutions, algorithms, new business models, guidelines, policy recommendations, methodologies, publications, database, prototypes, trained researchers, new infrastructures, proof of feasibility, networks, etc. (short term) EXAMPLE *Project (by the end of its implementation): Successful large-scale demonstration trial with 3 airports of an advanced forecasting system for proactive airport passenger flow management*

European Commission

And at the heart of the Horizon Europe monitoring framework …

Horizon Europe legislation defines three types of impact, tracked with Key Impact Pathways



Article 45 & Annex V

Creating high quality new knowledge

STORY LINE: The FP creates and diffuses high quality new knowledge, as shown by the high-quality publications that become influential in their field and worldwide.

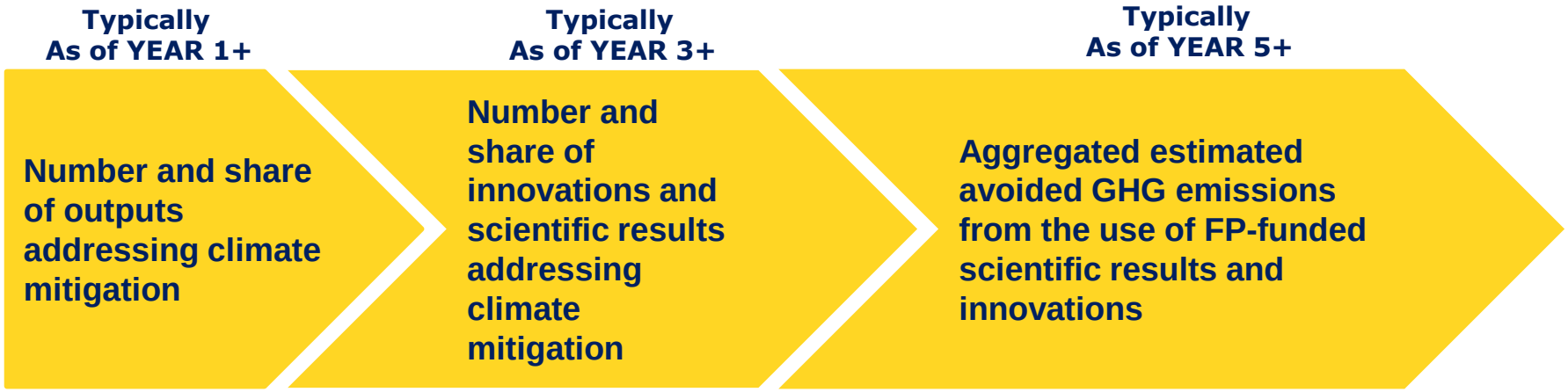
- **Indicator (short, medium, long-term)**

Data needs: Identification of publications co-funded by the FP through the insertion of a specific funding source ID when publishing, allowing follow-up tracking of the perceived quality and influence through publication databases and topic mapping.

Contributing to the European Green Deal

STORY LINE: The FP is helping to make Europe the first climate-neutral continent in the world as shown by portfolios of projects generating innovations and scientific results with estimated xx avoided GHG emission potential.

- **Indicator (short, medium, long-term)**



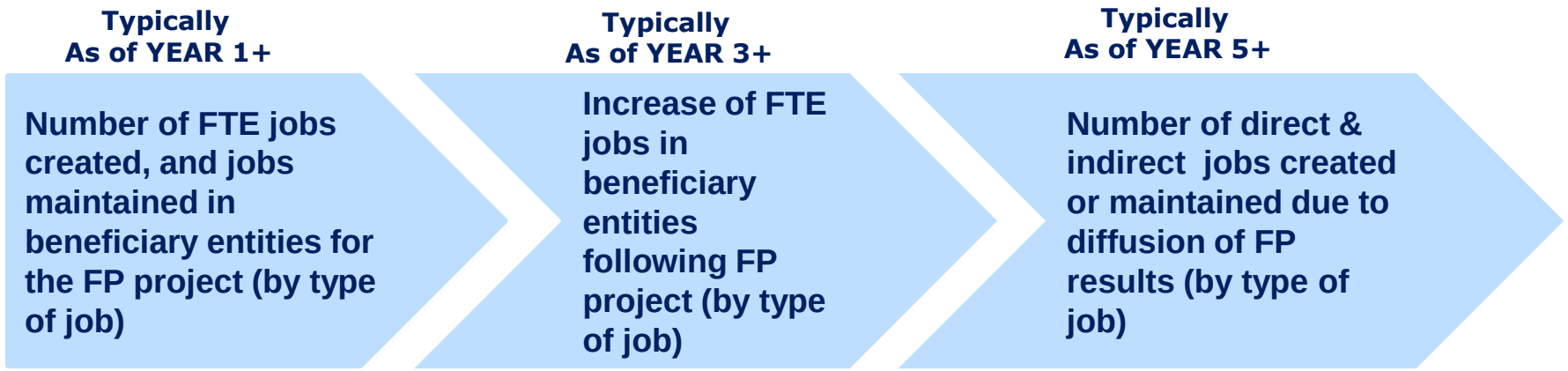
Data needs: Projects classified according to climate priorities (climate tracking RIO marker), project estimated results & impacts and follow-up tracking (targeted Green Deal Call survey), macroeconomic modelling on excepted effects from scientific results & innovations, expert assessment of project portfolios

European Commission
Research and innovation

Pathway 7. Creating more & better jobs

STORY LINE: The FP generates more and better jobs, initially in the projects, and then through the exploitation of the results and their diffusion in the economy.

- **Indicator (short, medium, long-term)**



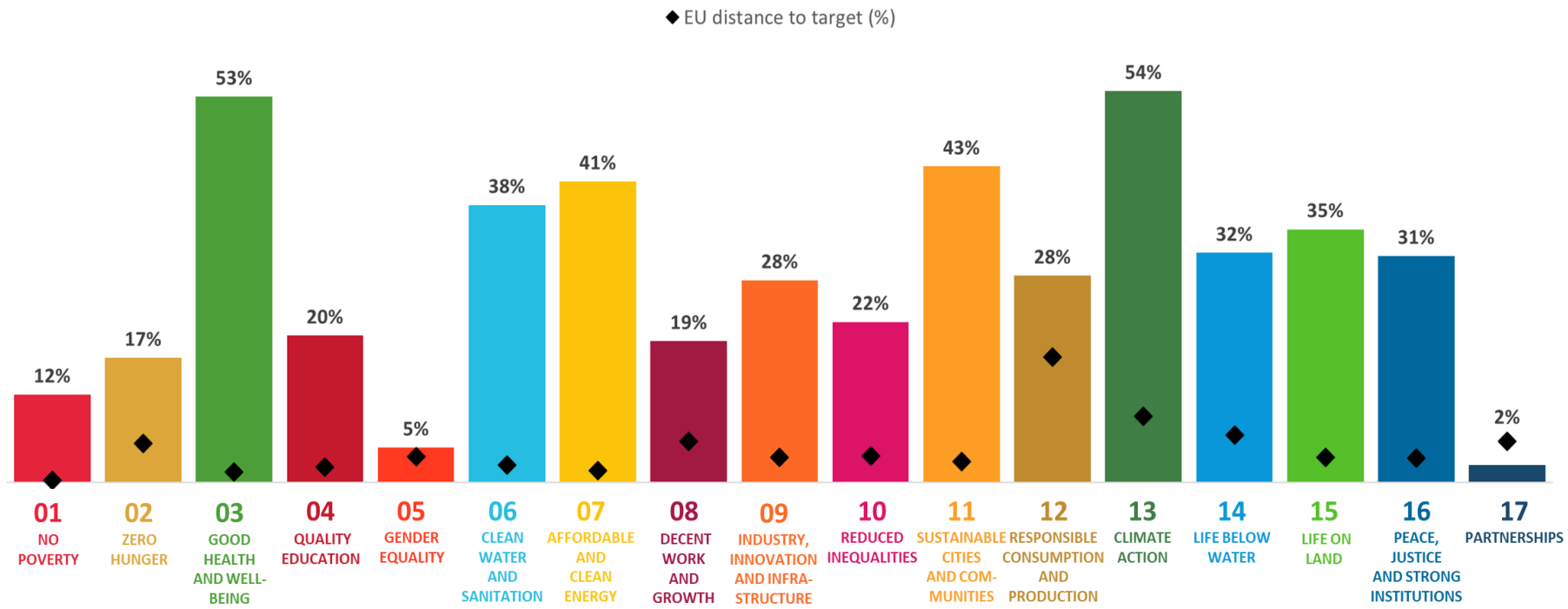
Data needs: Collection of information on individuals involved in FP projects, including their workload (Full Time Equivalent) and job profile allowing follow-up tracking of employment in beneficiary organisations. Longer-term indicator to be estimated based on dedicated study.

European Commission
Research and innovation

But developing and experimenting with new methods is needed to assess societal impact

MONITORING FLASH #5
SUSTAINABLE DEVELOPMENT GOALS

- Majority of Horizon 2020 investment expected to foster Sustainable Development Agenda - potentially 84% of the Horizon 2020 investment relates to at least one of the SDGs

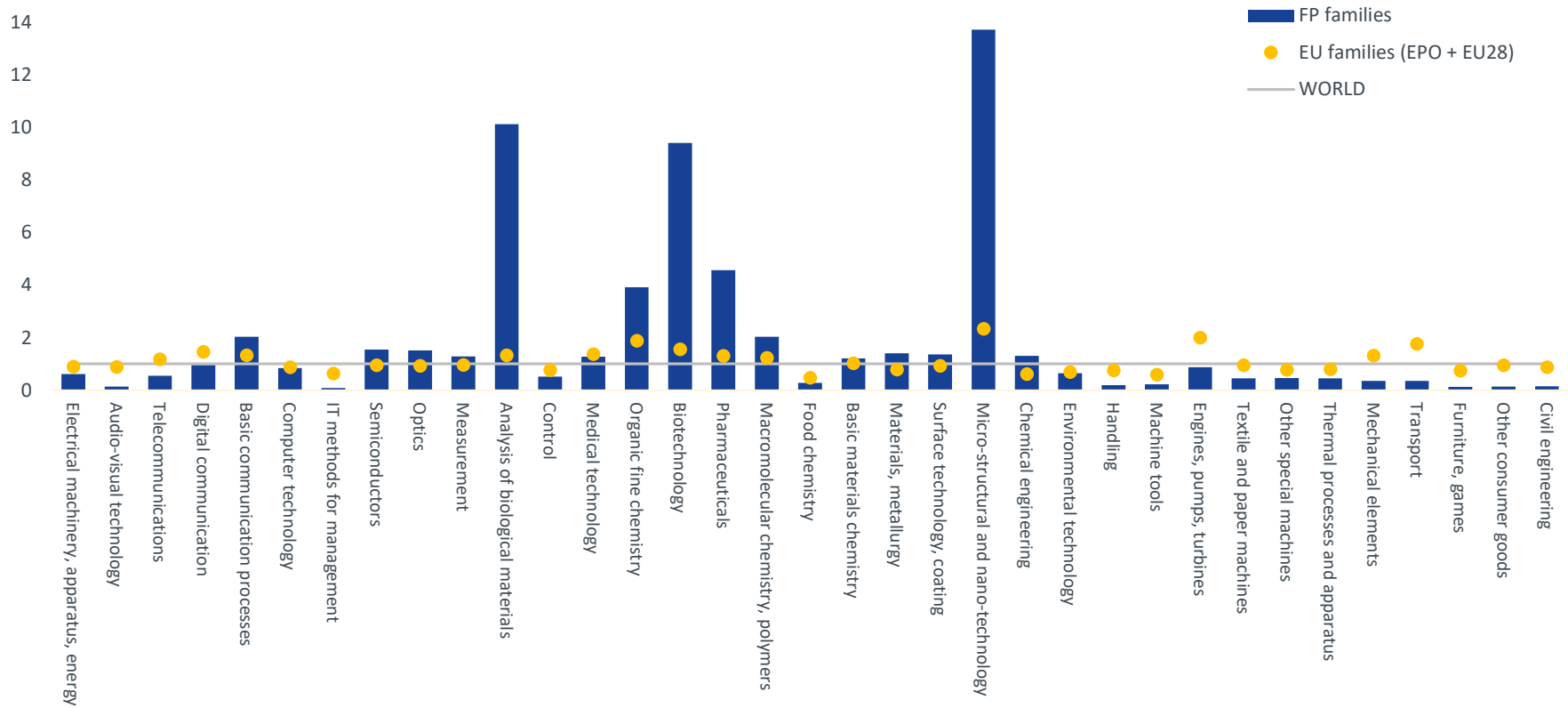


Source: Keeping our eyes on the Horizon, Monitoring Flash Series: a Horizon 2020 monitoring report

European Commission

MONITORING FLASH #4
PATENTS IN FP

- Majority of inventions related to health, few to environmental technologies (so far). More interdisciplinary than average, with above-average estimated market value
- Inventions intended to be largely exploited in Europe & the USA. On average, each invention is protected in 3.7 different markets. 75% of patents owned in EU



European Commission

What is next?
CLIMATE IMPACT & COVID-19

- **Climate Impact Pilot:**

- 35% climate related investment target
- Horizon 2020 Green Deal Call, targeted survey for climate mitigation assessment
- Climate impact modeling for R&I? (so far good at showing the value through growth and jobs: Horizon Europe impact assessment estimated that each euro invested could generate a return of up to 11 euros of GDP over 25 years)

- **COVID-19 pilot:**

- COVID-19 Newsflash : €458.9 million invested from Horizon 2020 / 103 projects, mainly for clinical management and treatment (27%) and vaccines (25%) , additional 547 R&I projects reoriented to fight COVID-19
- Define key impact pathways for the portfolio of COVID-19 related projects, indicators and data sources

Thank you!

#HorizonEU

martina.kadunc@ec.europa.eu

Up Next

12.30-13.00	Break
13.00-15.00	Closing Panel: "Recommendations for the Polish science system, and beyond"