
FRAUNHOFER ISI

FORESIGHT AND HORIZON SCANNING FOR SCIENCE AND TECHNOLOGY IN THE EU CONTEXT

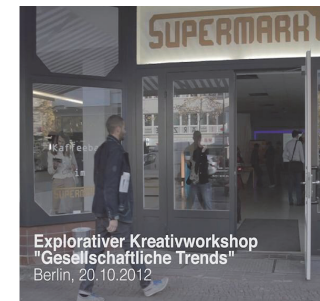
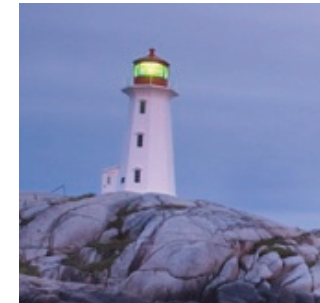
Dr. Kerstin Cuhls

NISTEP, Tokyo, November 1, 2018



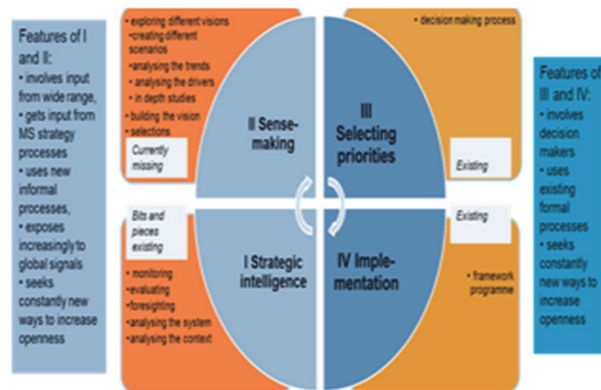
Fraunhofer ISI

- **Strategic advice** on economic and political decisions in Germany, Europe, and other world regions
- **Foresight** on technologies, markets and societal change
- **Developing future concepts** to strengthen the sustainability of our clients
- **Analysis and evaluation** of technical and non-technical innovations, their economic, social, ecological, and political requirements and potentials and the obstacles to them
- Pioneering **innovation research for more than 40 years**



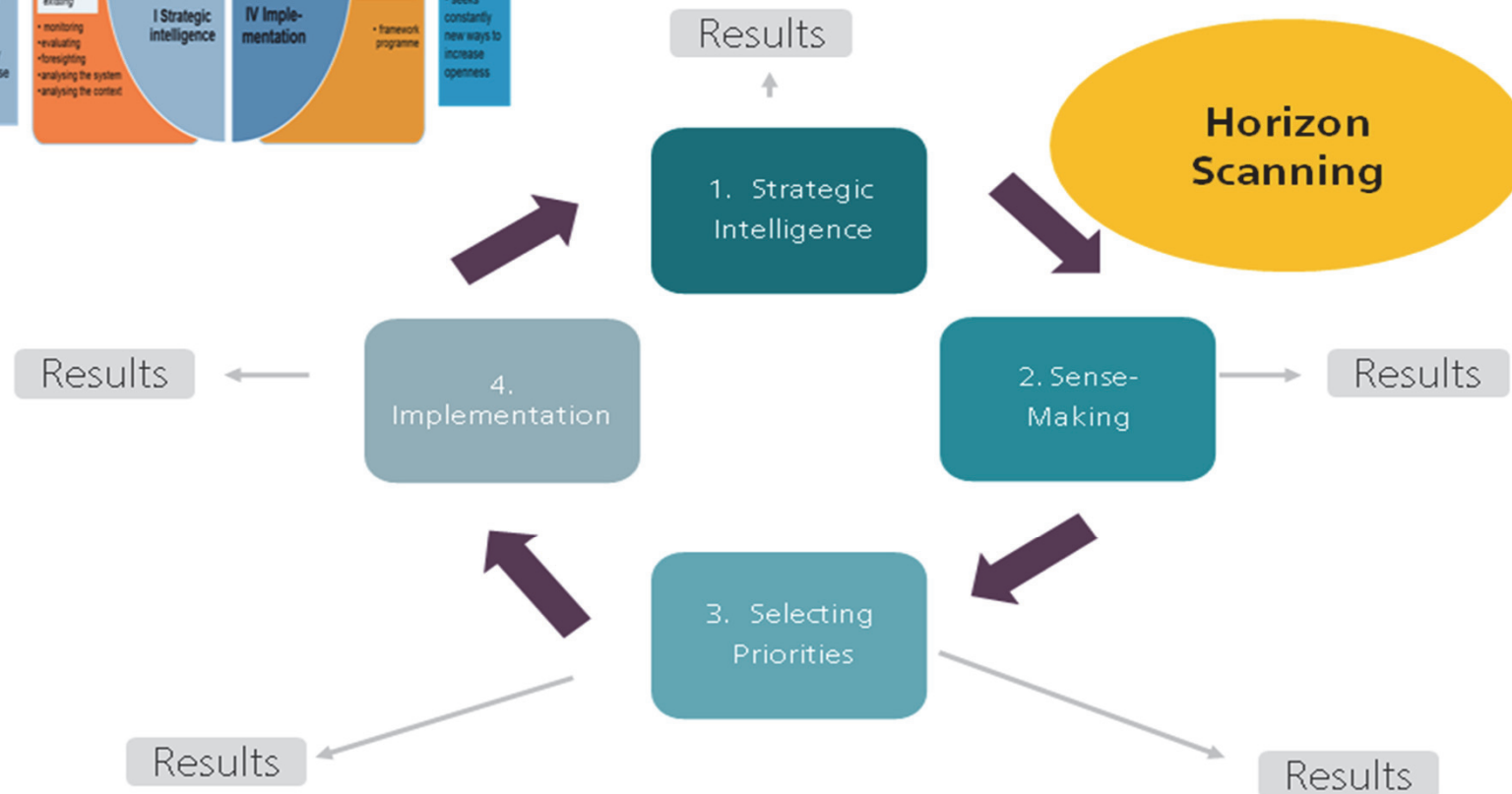
NEW FRAMES FOR FORESIGHT – FORESIGHT FOR NEW FRAMES?

- Foresight Cycle
- Some projects
- Horizon Europe
- Horizon Scanning
- Recommendations



original model for Foresight from
EFFLA (European Forum for
Forward Looking Activities)

Foresight Cycle



MISSION-ORIENTED RTDI POLICY – MISSION DEFINITION BY FORESIGHT

- starting from the demand side:
 - What is needed? What can be a solution for a problem?
 - more participative approaches
- societal challenges in the forefront
- „Grand Challenges“ as driver for innovation
- new role for Foresight: defining the vision, finding the mission, long-term mission-oriented issues
- but also: finding technology hot spots or „Radical Innovation Breakthroughs“ and „Radical Societal Breakthroughs“



starting from demand side, meeting supply or
starting from supply side, meeting demand

SOME PROJECTS IN THE EUROPEAN CONTEXT

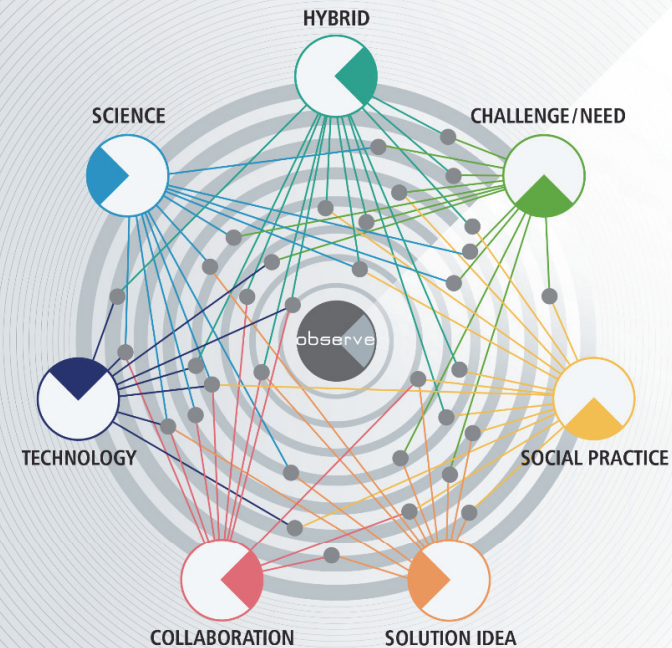
- OBSERVE
- CIMULACT
- BOHEMIA
- RIBRI

OBSERVE

Project for the European Commission – FET

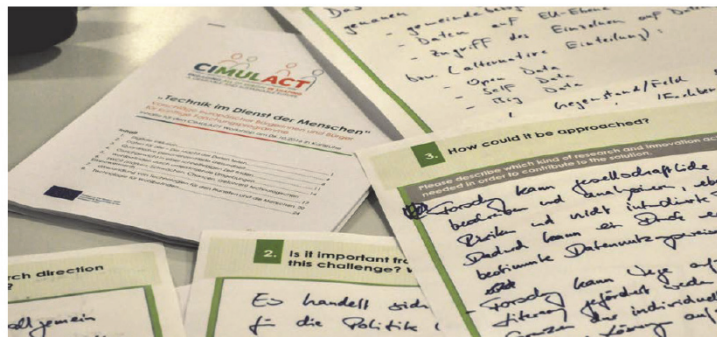
- Horizon Scanning: Novelty emerges from an interplay of developments in different societal domains
- -> No mere technology screening but
- -> multi domain approach to capture emerging aspects of different types
- Sources: Innovation + Futures studies
- 171 Seeds of Change
- 34 Hotspots

OBSERVE 360° RADAR



- 1 HPC System Disruptions
- 2 Game Change Enabling Materials
- 3 Bacteria Management Strategies
- 4 Biomimicry New Frontiers
- 5 Beyond, Within and Into the Brain
- 6 Zero Waste Technologies
- 7 Civilisational Transformation
- 8 Breathtaking Air Research
- 9 Infrastructures for Communicating in New Dimensions
- 10 Revolutionary Healthcare Diagnostics
- 11 Global Enabling Infrastructures for New Economic Patterns
- 12 Dormant Effects of Climate Change
- 13 Emergency Preparedness
- 14 Groundbreaking Food Supply Systems
- 15 Low Footprint Chemical Processes
- 16 Understanding Beneficial Human Machine Symbiosis
- 17 Socio-Technical Internet Futures
- 18 New Ways of Exploiting Functions of Living Organisms
- 19 Mixed Realities for Extended Human Sensation
- 20 Next Generation Energy Storage (Beyond Lithium)
- 21 Novel/unconventional Therapeutic Approaches
- 22 Privacy Providing Systems
- 23 Quantum Research
- 24 Unlocking Opportunities by Embracing Complexity
- 25 Re-Engineering Life
- 26 Shifts in Research Practices
- 27 Robotic Frontiers
- 28 Multi-Signal Sensing Systems
- 29 Shifting Understanding of Life and its Boundaries
- 30 Solar Age
- 31 Future Living Spaces
- 32 Diverse Unconventional Energy Supply Solutions
- 33 Underwater Operations
- 34 Water Challenge

www.horizon-observatory.eu



- European project to identify the ideas of European citizens into the next Framework Programme
- Workshops in every country
- with a standard format
- reports for every country
- highly aggregated, low use

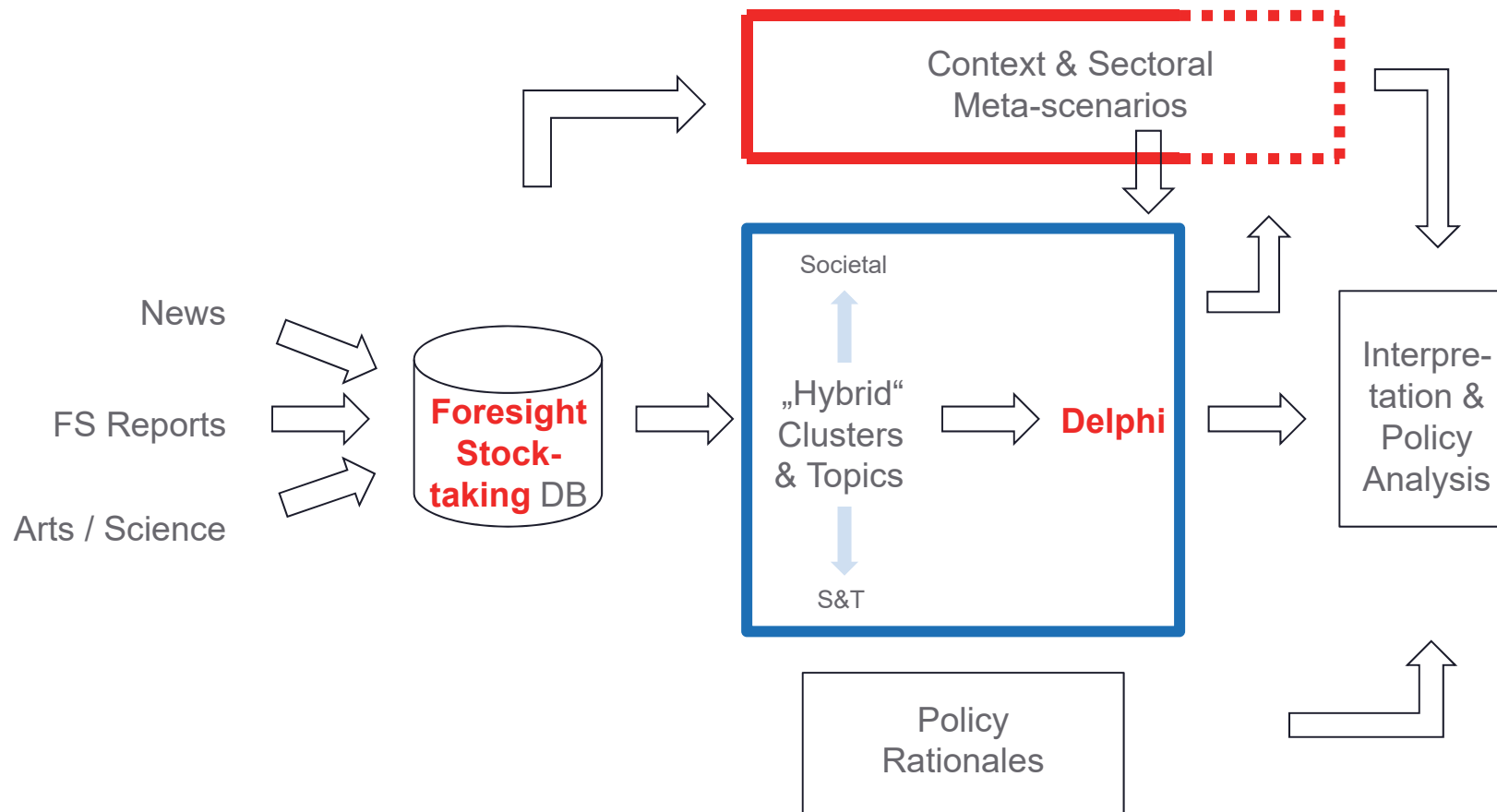
BOHEMIA

Beyond the Horizon: Foresight in Support of the Preparation of the European Union's Future Policy in Research and Innovation

- Meta scenarios
- Interviews
- Argumentative Delphi survey for S&T developments and for policy topics
- Mini-scenarios from the Delphi survey statements
- Consultation
- Recommendations with targeted scenarios

The Delphi survey: an essential element of BOHEMIA

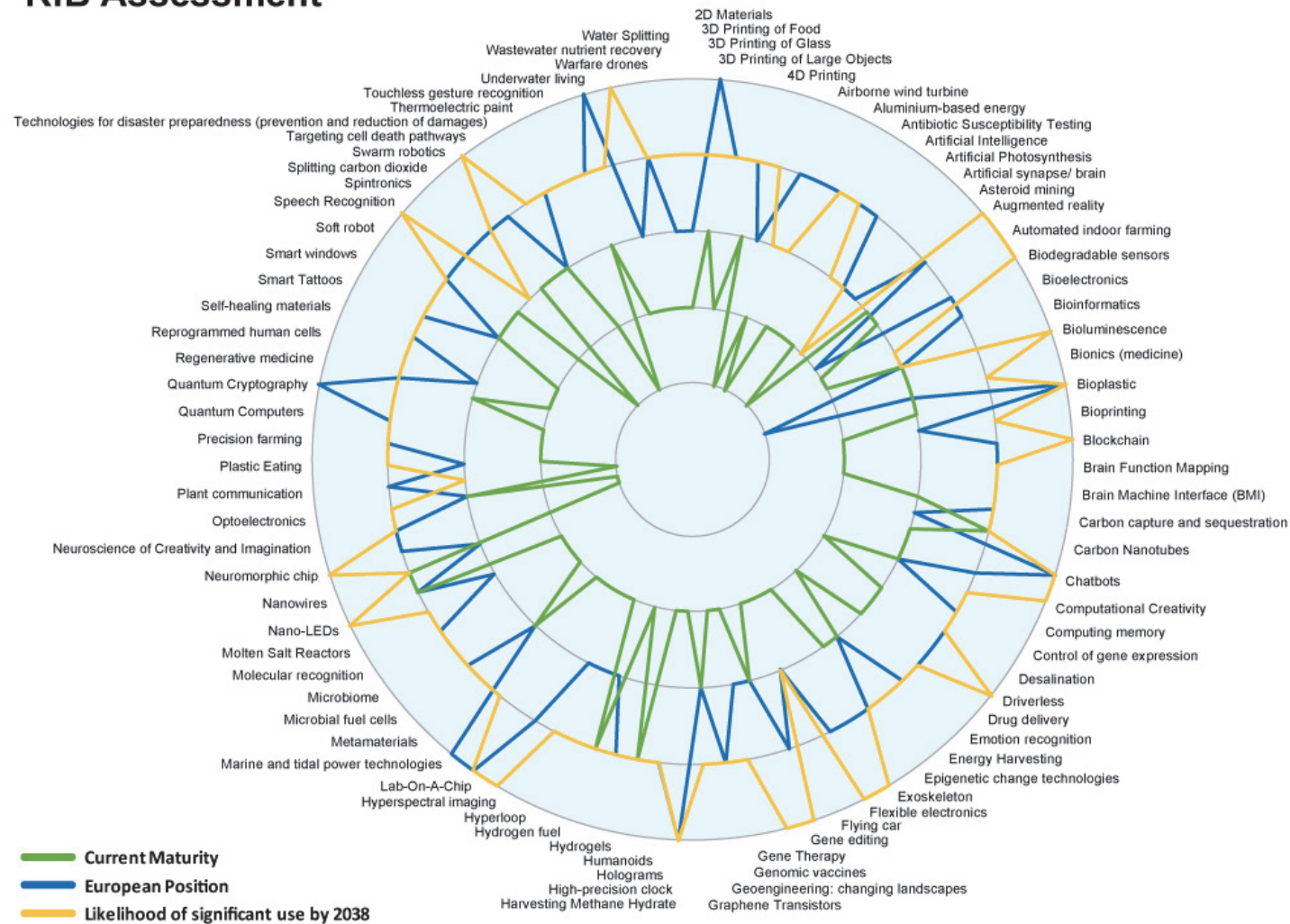
- Dynamic Argumentative Delphi (realtime)
- 147 statements with 2 sets of arguments
- 2 „questions“/ assessments



RIBRI – RADICAL INNOVATION BREAKTHROUGH INQUIRER

- 100 technologies and
- social innovations as breakthroughs in Europe and for Europe
- consultation for evaluating impact and position of Europe
- Global Value Networks
- similar to the Finnish Radical Innovation Inquirer
- test for combination of automatic and human Horizon Scanning approaches

RIB Assessment



POLICY: FROM THREE OPENS TO NEW HORIZON EUROPE

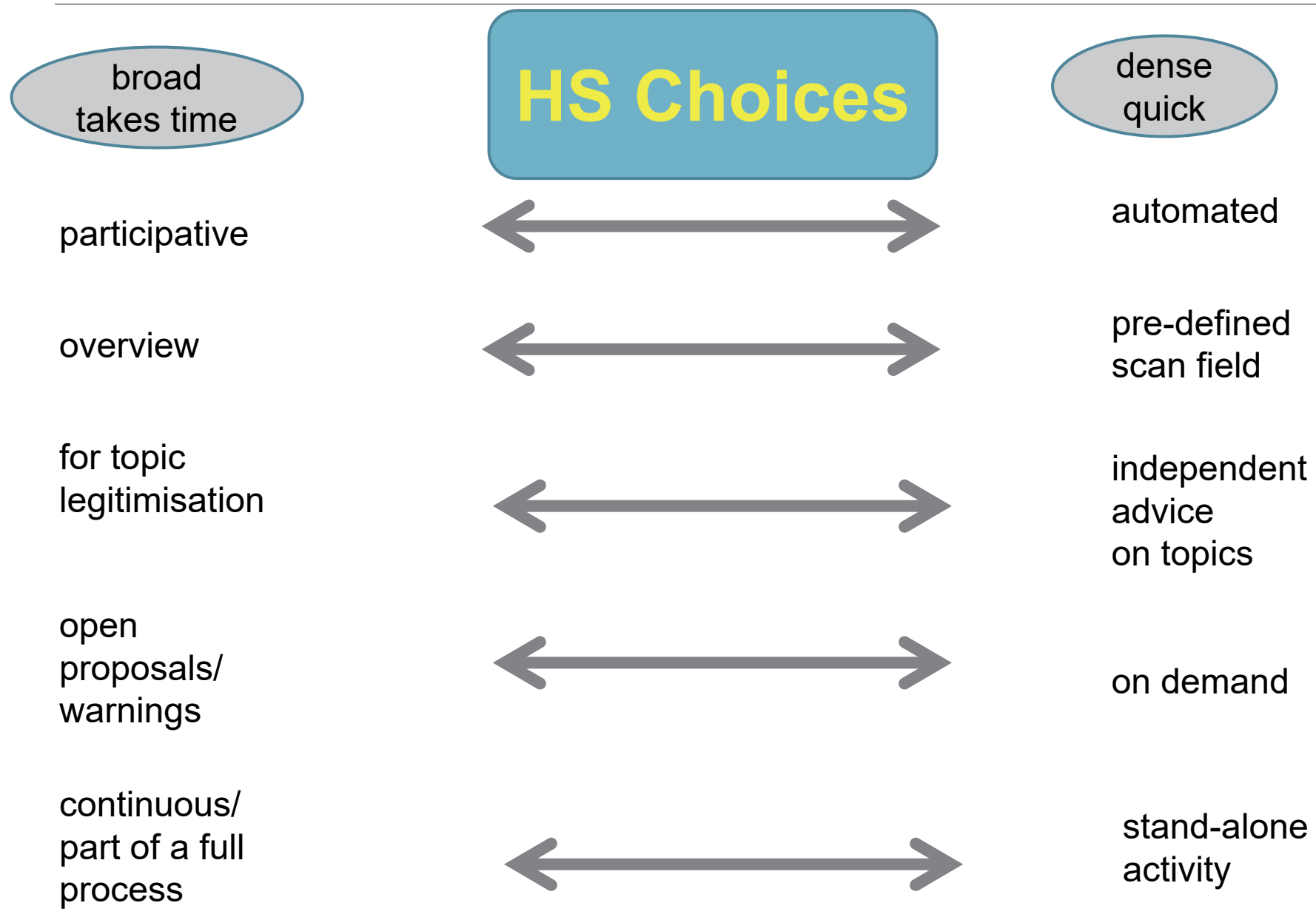
- Open Innovation
- Open Science
- Open to the World

Horizon Europe

- Mission-oriented approach: an approach to policy-making which means setting defined goals, with specific targets and working to achieve them in a set time;
 - mission: specific package of measures and activities that can deliver a verifiable result, which successfully exploits, resolves, mitigates or makes defined progress against the challenge
 - Innovation policy driven by challenges;
 - challenge: wider problem, aim or benefit that is faced
 - Open Innovation, Open Science
 - policy papers: RISE, ESIR, „Lamy Report“, „Mazzucato Report“
-

Horizon Scanning and Foresight as an input – not for missions directly

- have to be adapted to the objectives
- needs-oriented
- open and explorative even if on request or in a single field
- skills to perform HS as important as capacities
- continuous HS needs continuous motivation
- ad hoc HS needs (infra-) structure or frame to make use of the results
- transfer of result needs to be considered from the beginning (way and form)



Foresight and Horizon Scanning can be bridges



Strategic Intelligence

→ Material

- sources
- first analysis
- overview
- questions

outside +
inside EC

WHO?

HOW?

Sense-Making

- distribution into EC + member states
 - institutions
 - departments
 - single persons
- adaptation of the right questions
- detailing with respect to the client EC

inside
EC

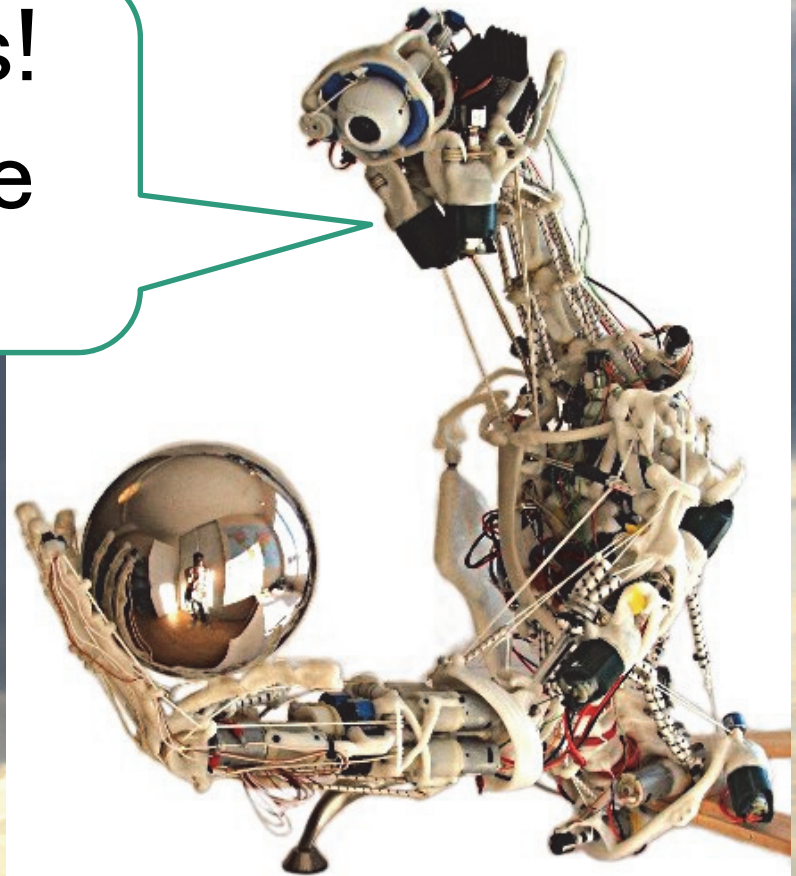
priority setting

Recommendations from Horizon Scanning and Foresight Studies

1. Expert (human being) involvement is important to transform information into actionable knowledge.
2. The implementation of HS results has to be thought through from the beginning **or** the HS needs to be integrated into a full Foresight (with foresight use).
3. The transfer of HS to the users must be clarified from the beginning. (Can a broker function be helpful?)
4. Continuous Horizon Scanning and stand-alone projects – both should be performed. They can be complementary and benefit from each other.
5. Networks help – multipliers in the system

Bridge the gaps!
And have a nice
future!

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Anthropomimetischer Robotertorso – ECCEROBOT