



Kerstin Cuhls, Strasbourg 18-10-2022

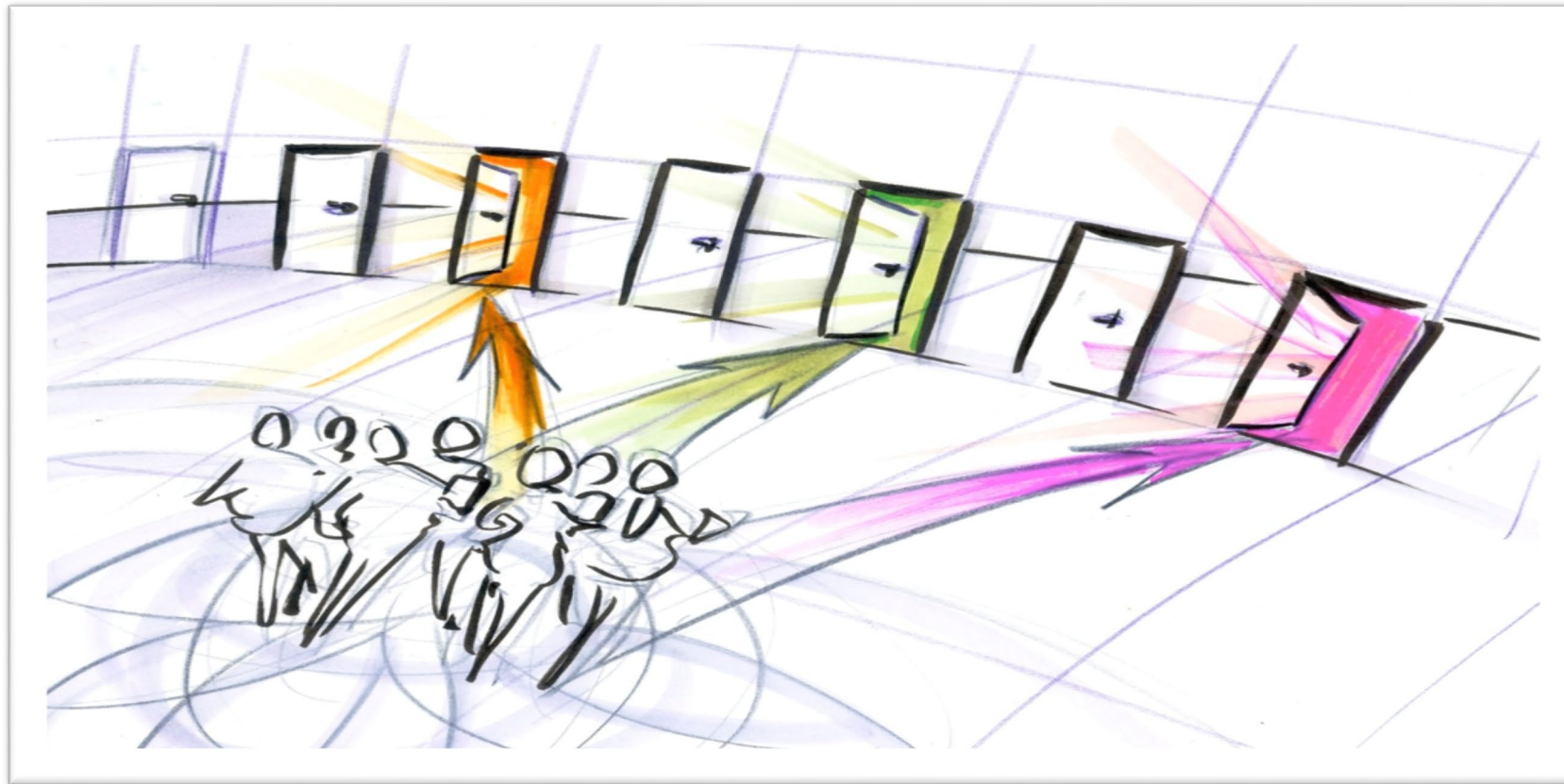
Foresight: Development of the methodology and current importance

Agenda

- What is Foresight?
- My start – Role of collaboration
- Look Back
- Changes over time
- Look Forward
- Congratulation BETA



FORESIGHT



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What is Foresight?

...(technology) foresight is the process involved in systematically attempting to look into the longer-term future of science, technology, the economy and society with the aim of identifying the areas of strategic research and the emerging of generic technologies likely to yield the greatest economic and social benefits ...

For a long time we used Ben Martin's definition:

Martin, B.R. 1995. Foresight in Science and Technology.

Technology Analysis & Strategic Management, 7, no. 2.: 139-168

Our Understanding...

Foresight is the structured debate about complex futures

- **structured:** systematic approach by applying methods of futures research, science-based, based on new theories of futures research
- **structured debate:** interaction of relevant actors, active preparation for the future or different futures, orientation towards shaping the future
- **complex:** consideration of systemic interdependencies, holistic view
- **futures:** open view on different paths into the future, thinking in alternatives
- **long- and medium-term view**
- **no planning**, but a step on the way to planning (strategic foresight)
- **no prediction**

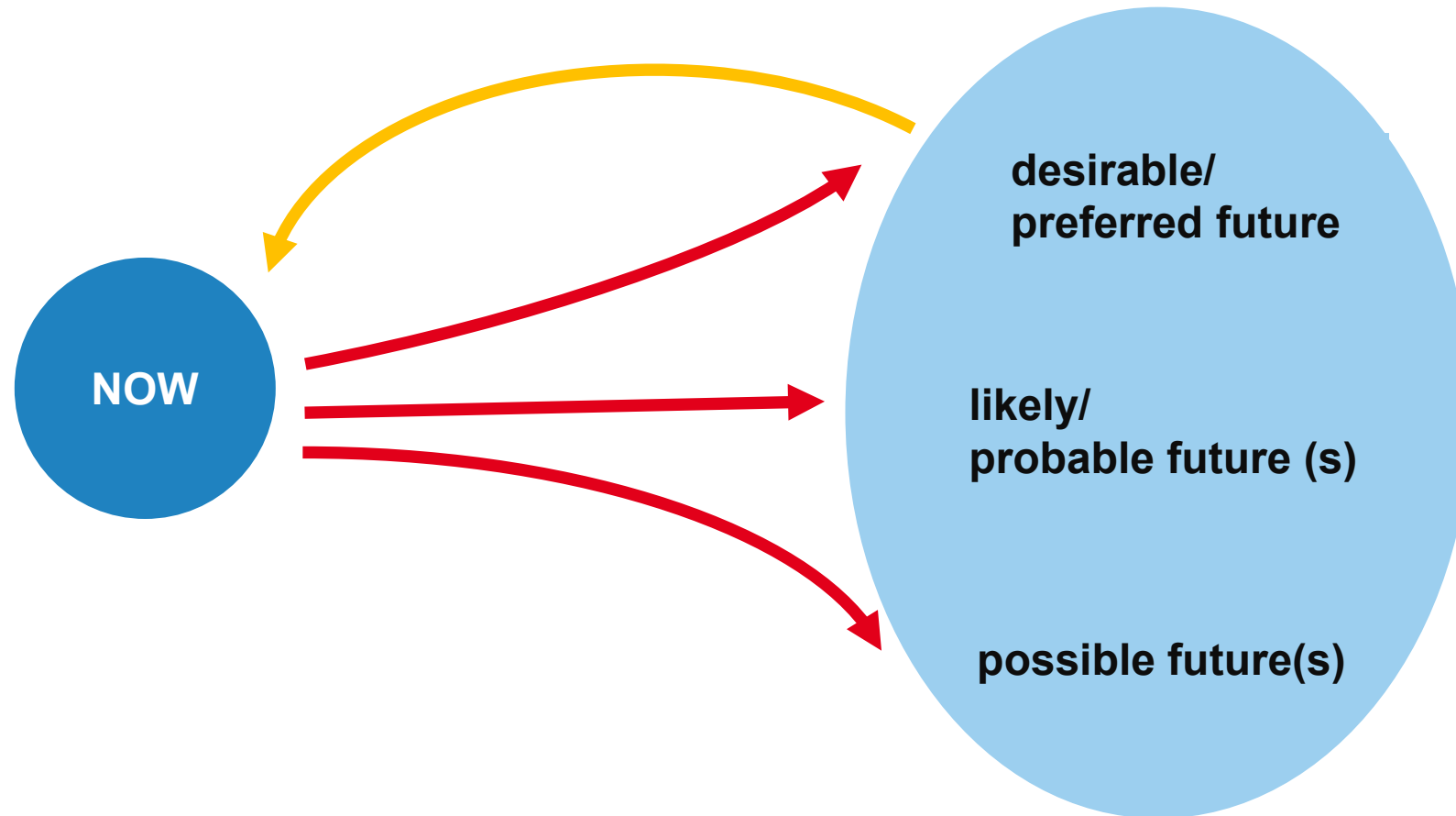
Our Understanding...

**Foresight is the
structured debate
about complex futures**

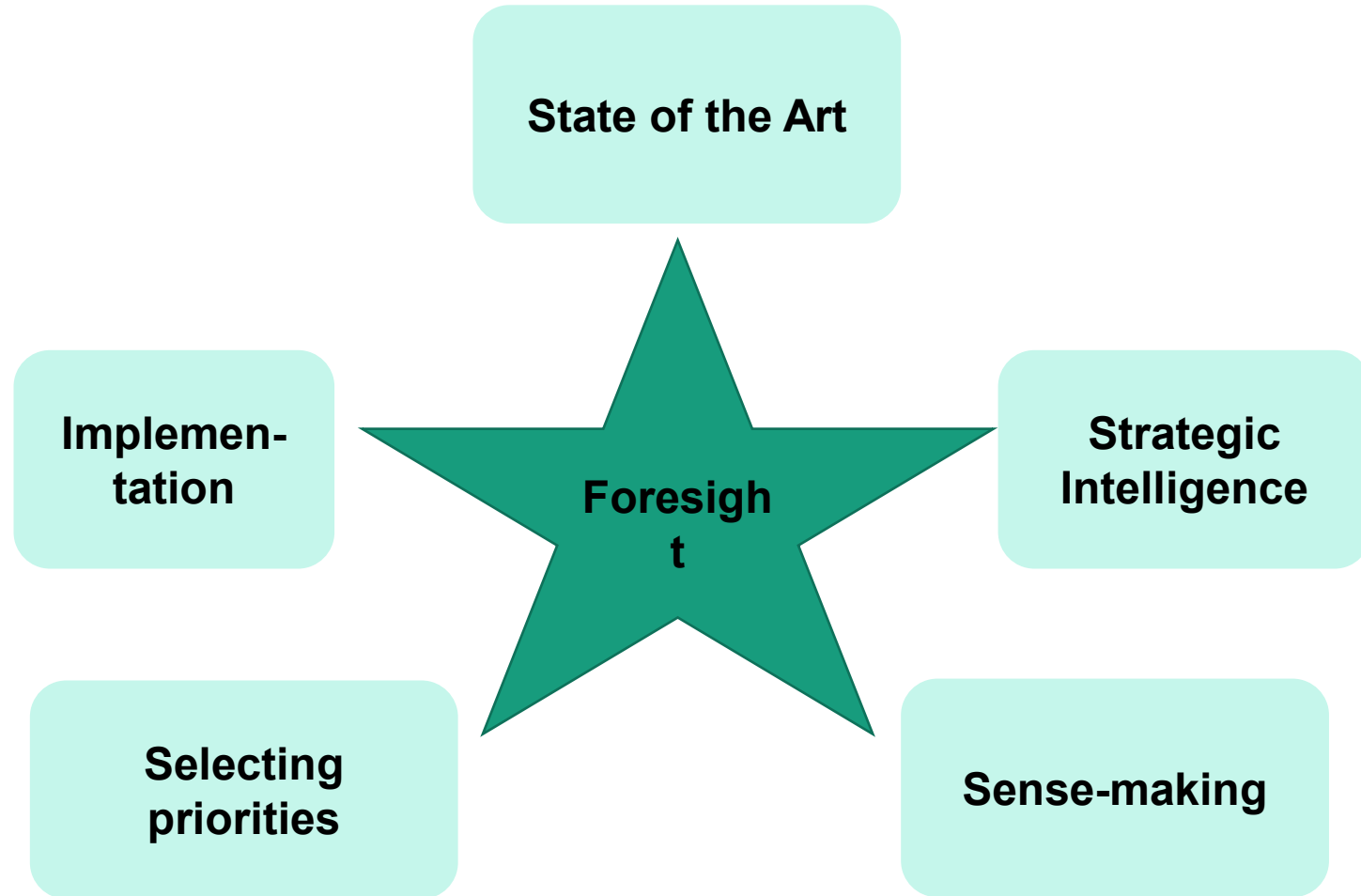
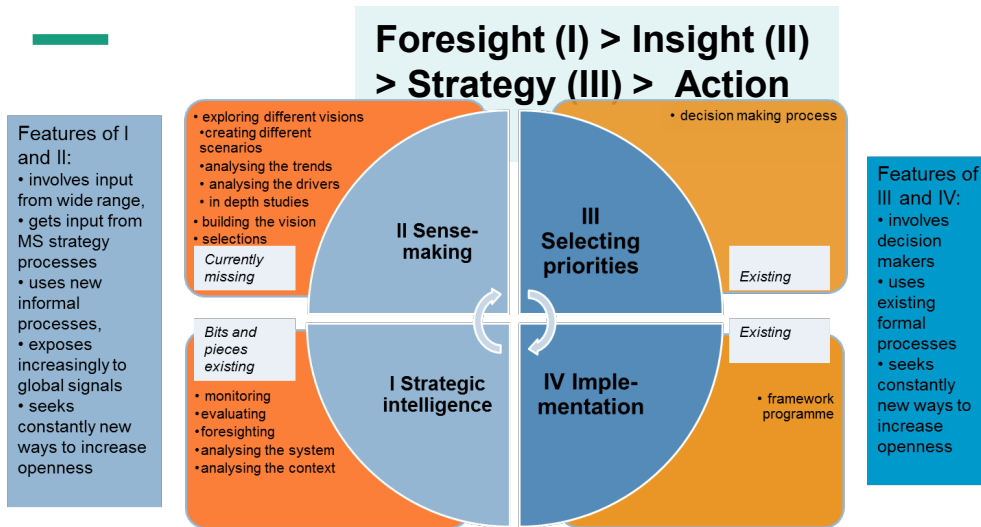
- **La Prospective**
- **Futuribles**
- **Futures Research**
- **(Futures Studies)**

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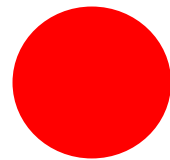
Different Futures – systematic exploration



Full Foresight Cycle

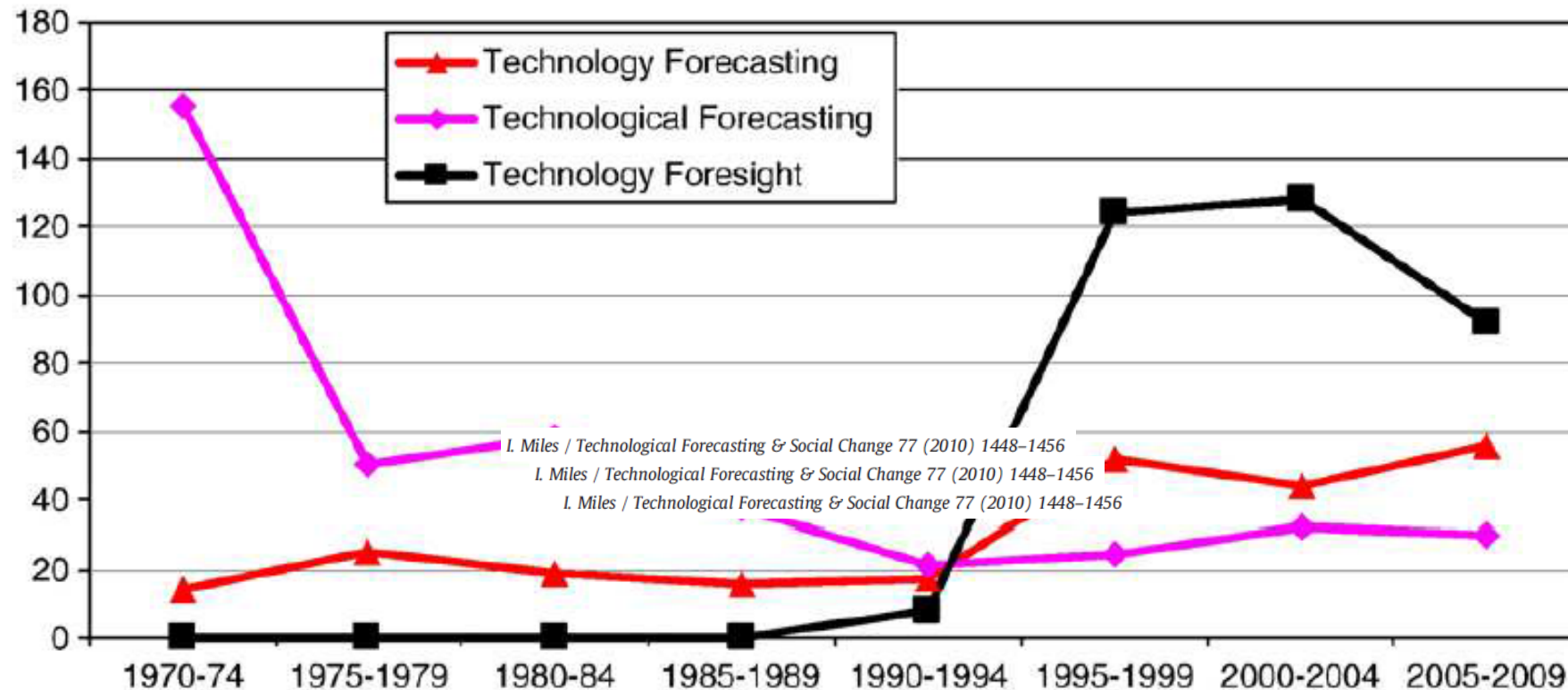


Foresight Activities



2022

Foresight or Forecasting? Terminology is still key...

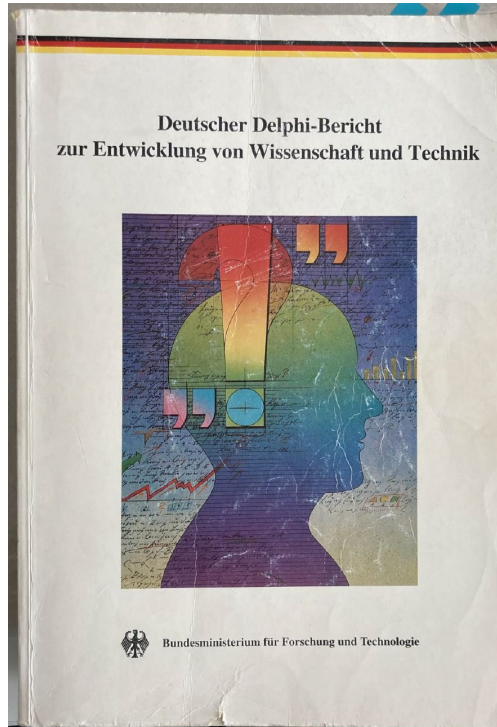


Source: author's processing of data from Harzing's Publish or Perish (accessed 27/03/2010)

Fig. 1. Publications featuring key terms in their titles, 1970–2009.

Miles, Ian (2010): The development of technology foresight: a review. In: *Technological Forecasting and Social Change* 77:1448-1456

My Start



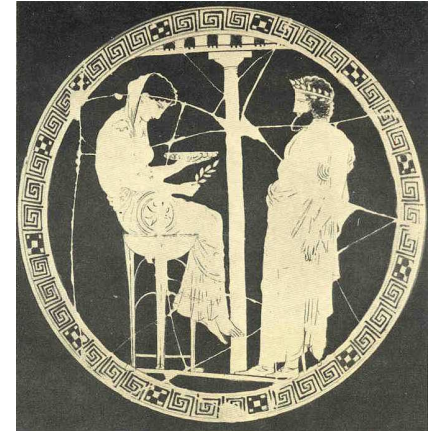
Bundesministerium für Forschung und Technologie (BMFT) (Ed.) (1993):
Deutscher Delphi-Bericht zur Entwicklung
von Wissenschaft und Technik, Bonn

Cuhls, Kerstin; Breiner, Sibylle and Grupp,
Hariolf (1995): Delphi-Bericht 1995 zur
Entwicklung von Wissenschaft und Technik
- Mini-Delphi -, Karlsruhe 1995 (Druck des
BMBF, Bonn 1996)



What is Delphi?

- Delphi is an expert survey in two or more "rounds".
- Starting from the second round, a feedback is given (about the results of previous rounds).
- The same experts assess the same matters once more - influenced by the opinions of the other experts
- important: anonymity
- new forms:
 - Realtime Delphi with immediate feedback + argumentative Delphi

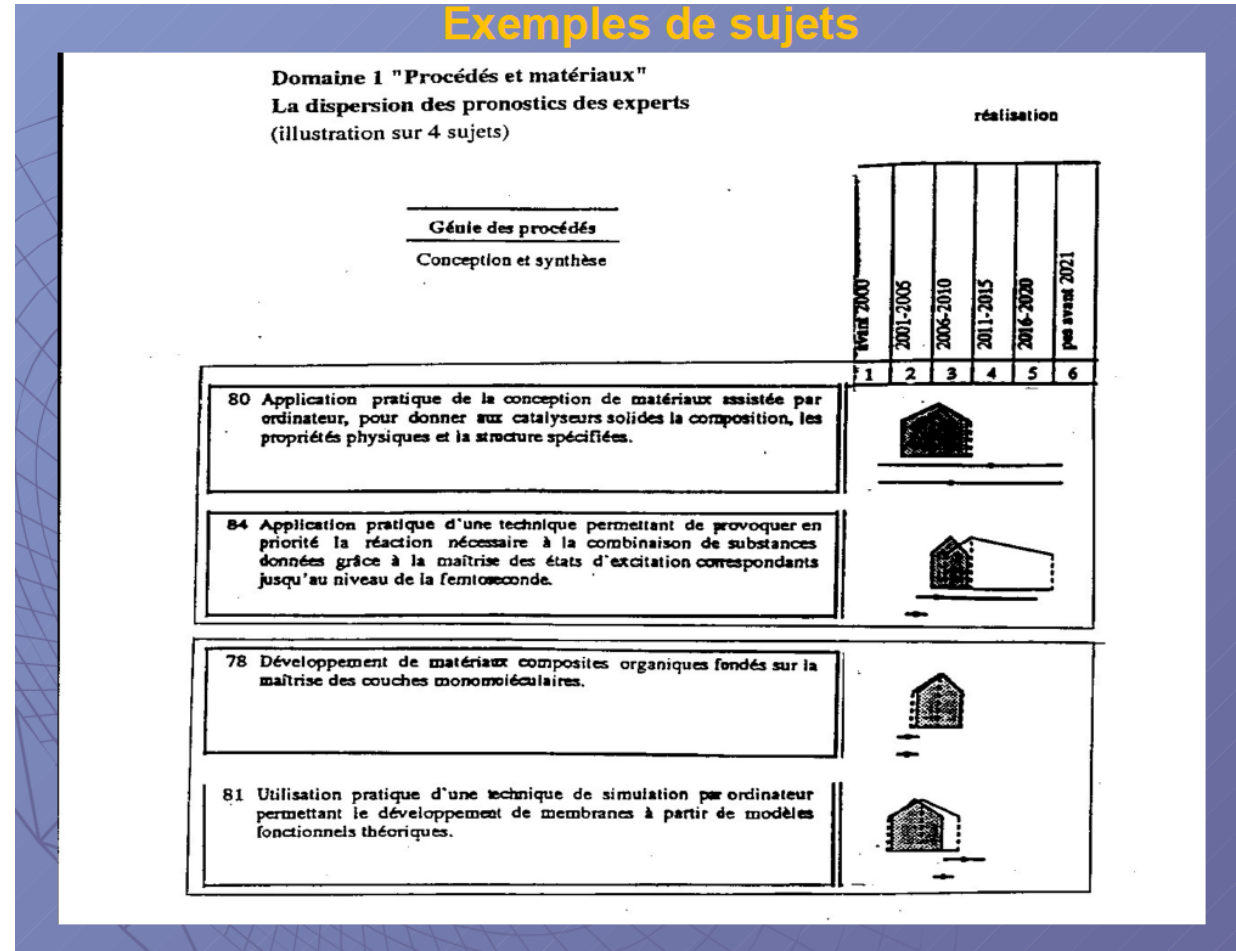


Start with BETA – La Prospective

Our cooperation started in 1992: Jean-Alain Héraud started a national Delphi survey

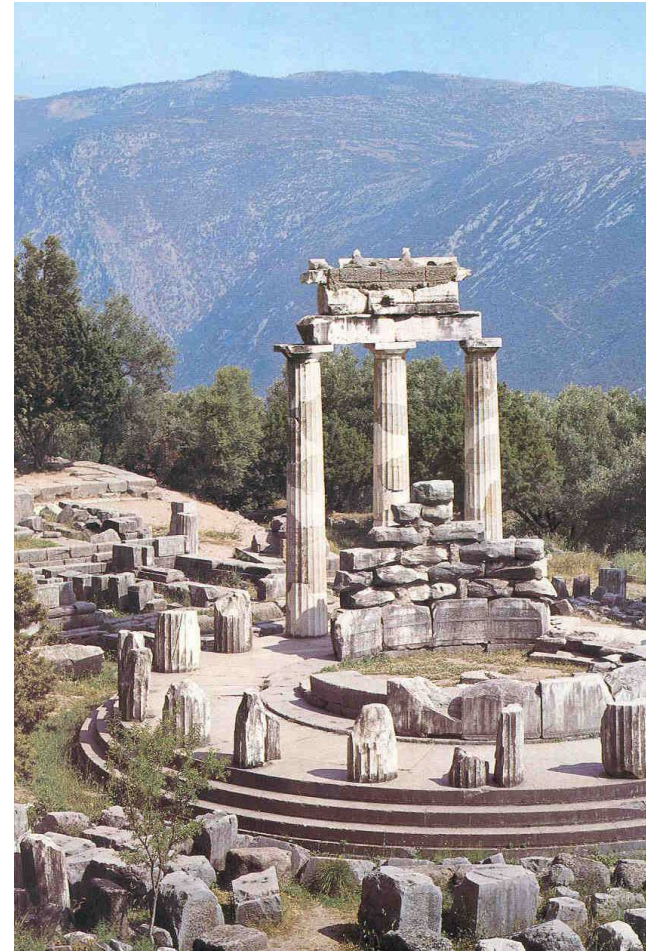
There was already a long history of La Prospective in France:

- Gaston Berger
 - Bertrand de Jouvenel
- later:
- Hugues de Jouvenel
 - Michel Godet



Why Delphi? Seeking for evidence, figures... in collaboration

- we from Fraunhofer ISI copied from Japan (NISTEP/IFTECH)
- BETA (and the UK) copied from us, because it was easier to translate from German language to French or English
- we had 4 data sets that could be compared, later the Korean set was also available



If you say that the French survey was only partly successful, then have a look at one of the comparisons from the 1990s...

Comparaisons internationales:
perceptions concernant l'importance du sujet

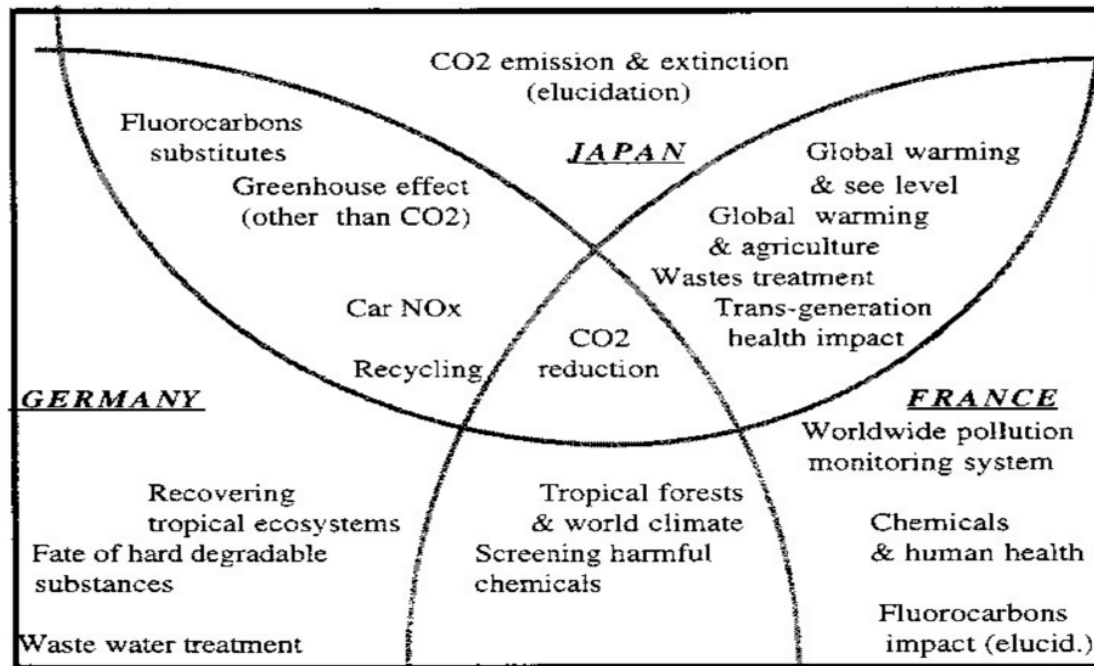
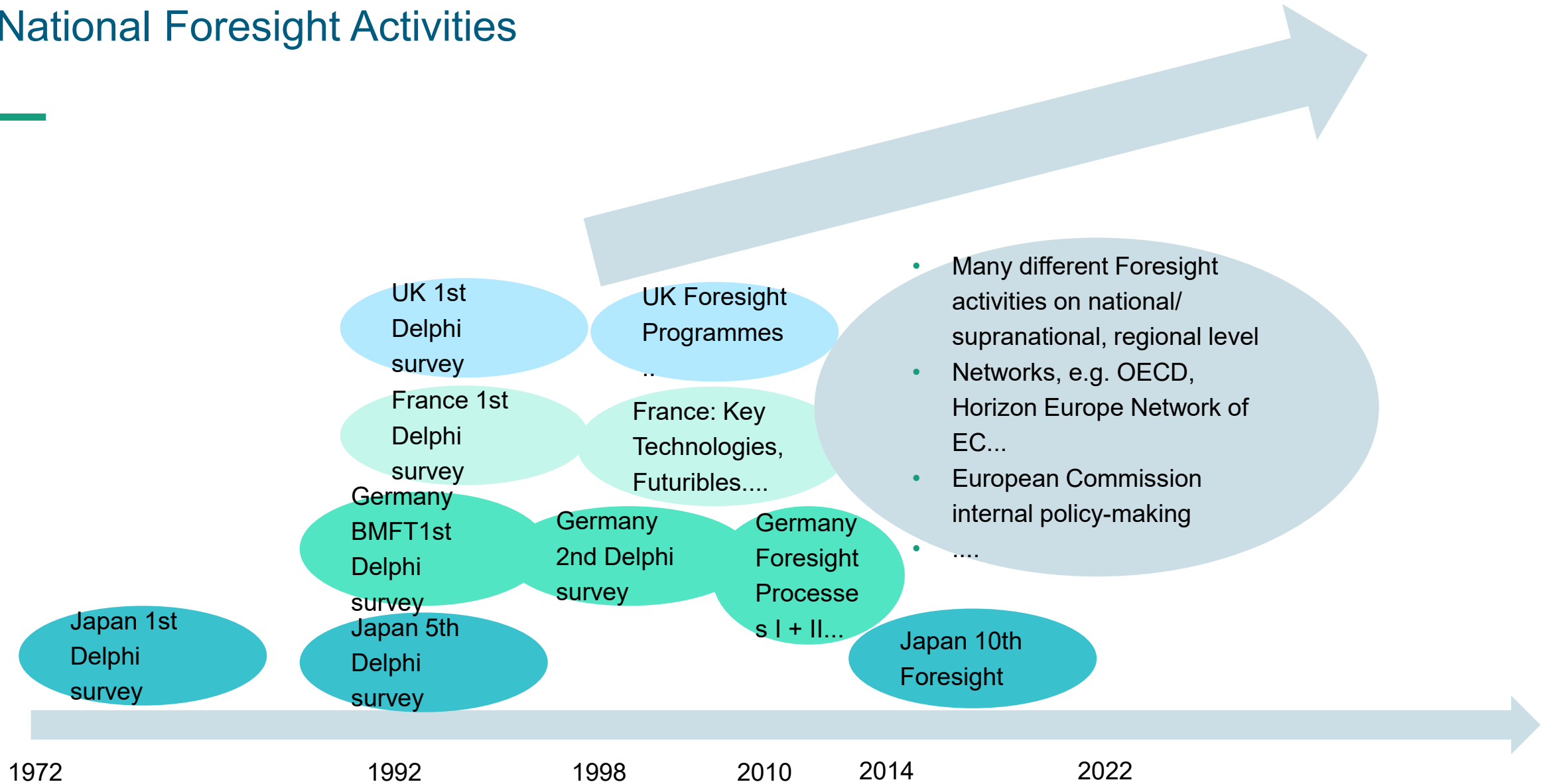


Fig. 3. Consensus and specificities on important topics

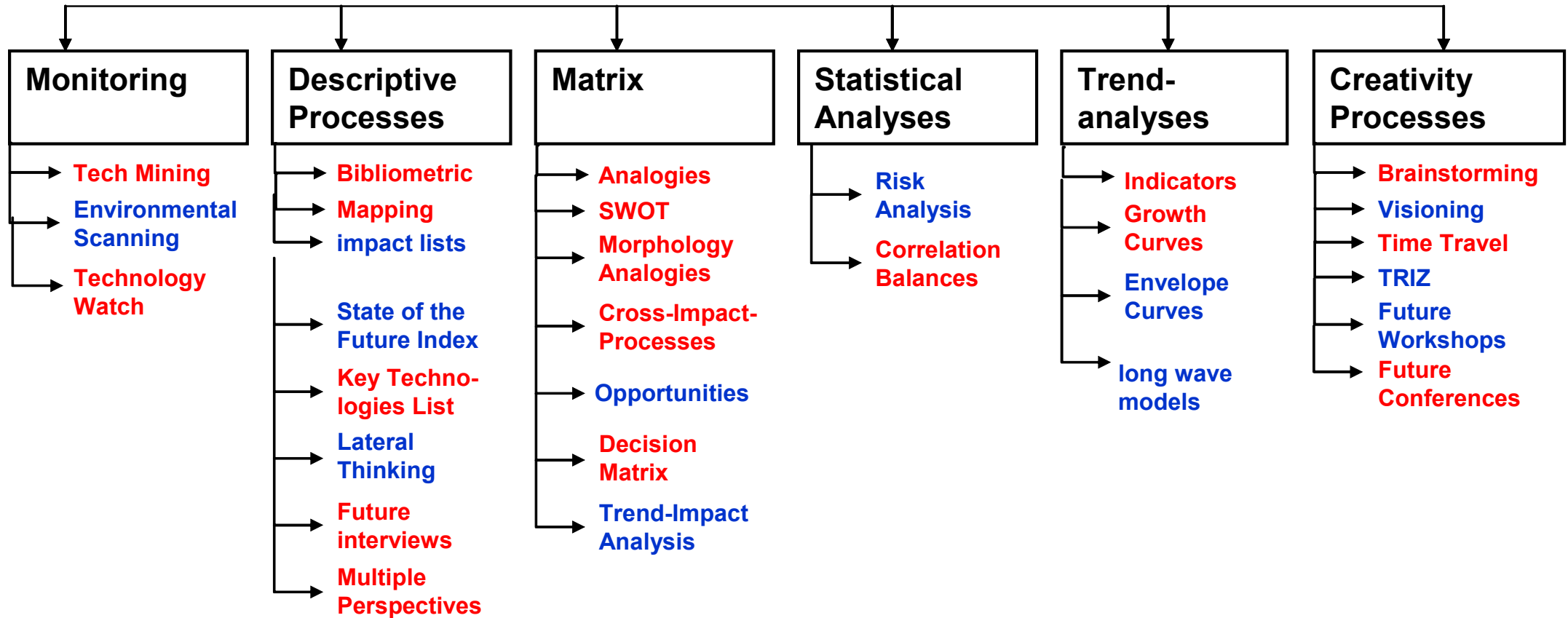
The uptake and implementation is still problematic in 2022

National Foresight Activities



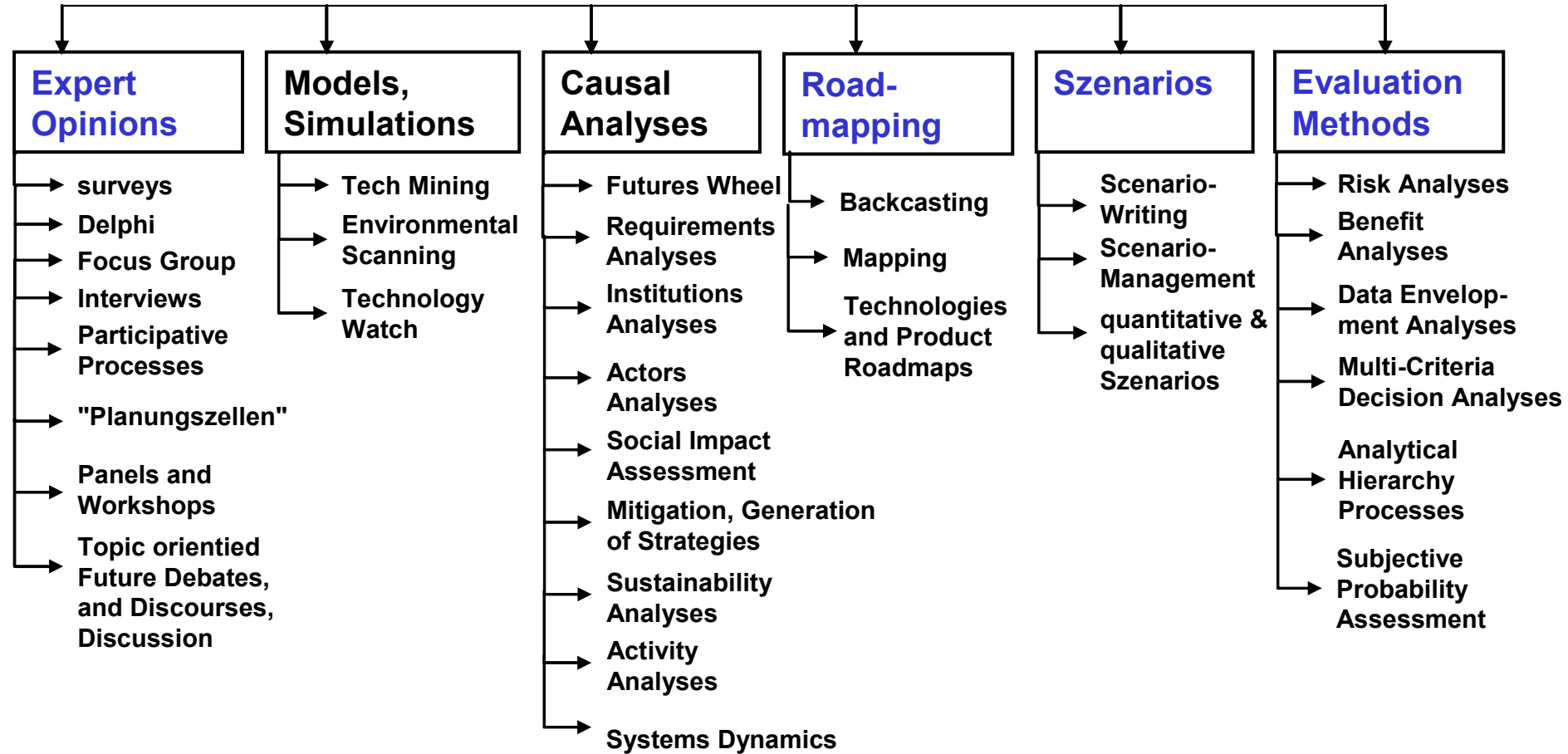
Looking Back to the 1995 Toolbox + enhancements

Diversity of Methods

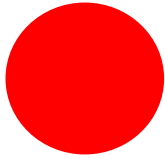


- Importance of the combinations
- for different objectives and
- target audiences

Diversity of Methods



Foresight Activities



2022

Methods and Combinations

- many different workshop formats – from innovation generation to early signal detection
- everything online and offline – workshops and surveys on platforms
- future surveys and Delphi surveys in different variations, argumentative, dynamic argumentative...
- scenarios – with matrix, sprints, narratives only...
- and their analyses and use in roadmapping and strategy building
- often most important: awareness raising to avoid ignoring important issues and questions
- in Futures Research: quality criteria
- more aware of assumptions and biases in Foresight

We all have perception filters when selecting topics and when judging...

1. Surveillance filter

limited capacities for 360 degree observation

2. Mentality filter

experiences of the past are benchmarks for evaluation of signals and their relevance for own actions (pre-disposition)

3. Power filter

Routines and hierarchies have influence on perceptions

4. Desirability bias

Positively perceived developments are expected to have a higher degree of probability (Ecken, Gnatzy et al. 2011)

5. Overprediction bias

We overestimate our ability of prediction and underestimate uncertainties (Schoemaker 2003)

6. End of history illusion

We underestimate dynamics of change and expect the current status to be stable (Quoidbach et al 2013)

Filters cannot be eliminated
but opened up



Delphi surveys for policy-making: examples for different contexts

EXAMPLE PROJECT FROM THE EUROPEAN COMMISSION 2017

- Projekt BOHEMIA – Beyond the Horizon
- Time of Realization in 5 year steps
- What is the time of realization?
(until 2020, 2021-2025, 2026-2030, 2031-2035, 2036-2040, 2041 and later, never, gradual development without specific timing, I do not know)
- Arguments for the Time of Realization

Source: European Commission/ European Union (2017): New Horizons: Data from a Delphi Survey in Support of European Union Future Policies in Research and Innovation; Report KI-06-17-345-EN-N; ISBN 978-92-79-76452-3; doi:10.2777/654172



STATEMENT: Electric Mobility (fuel cells, solar cars etc.) has replaced 20% of combustion engine vehicles on the roads in the EU.

I am not sufficiently knowledgeable to address this statement

Skip >

Please estimate the time of realization for this statement:

Please select an option -

Please support your evaluation by selecting at least 1 and max 3 argument from below. You can also add up to three new arguments, if considerably different from existing ones.

The figures in brackets represent the frequency with which previous respondents selected that argument. The selections are listed in the order of their frequency. This order may change in real time depending on your own choice.

- In Germany, it has been suggested to ban petrol-powered cars in favour of electric vehicles by 2030. (1)
- Norway will ban new sales of fuel cars by 2025. (1)
- New developments in the solar industry will continue to drive down the costs of solar energy. (1)
- The autonomy of electric vehicles is increasing. (1)
- Electric cars are outpacing combustion engine cars in rallycross. (1)

STATEMENT: More than 80% of the CO2 from European industrial production is re-used.

I am not sufficiently knowledgeable to address this statement

Skip



Please estimate the time of realization for this statement:

2035



Please support your evaluation by selecting at least 1 and max 3 arguments from below. You can also add up to 3 new arguments, if considerably different from existing ones.

The figures in brackets represent the frequency with which previous respondents selected that argument. The selections are listed in the order of their frequency. This order may change in real time depending on your own choice.

- As long as there is no CO2 capture on a large scale, this will take a lot of time. (64)
- There need to be significant additional incentives (economic and otherwise) for industry to implement carbon capture measures. (52)
- Circular economy and logistics are the key issues to reduce CO2. (27)
- Identify major sources for CO2 and start reduction from there. (18)
- An industrial plant in India has become the first in the world to generate almost zero emissions by capturing its own carbon dioxide (CO2) to produce valuable chemicals. (11)
- The decrease of CO2 production as industrial byproduct comes in favor of the re-use of the remaining CO2 captured. (10)
- It is impossible to reuse 80% of CO2 in the economy. The viable solution is to replace the CO2 source. (9)
- Many of the European companies operate in an global context. A global playing field is required for large scale implementation of CO2 re-use (=costly). (8)
- We are still missing a way to assess the true volumes of CO2 released in the atmosphere all along its life cycle, because it crosses a lot of industrial sectors and value chains. (5)
- If we only put a CO2 tax on the CO2 pollutor, it will happen. (2)
- There is not large enough demand for CO2 itself and if brought back to carbon the energy expenditure is too large to be economically feasible. (2)
- The change to microbiological processes will support CCS and CCU since microbes will produce a CO2 stream not in need of purification and they can accept CO2 streams of less purity. (2)
- While benefits of CO2 reuse have been identified and some applications exist such as enhanced oil recovery, other than the H2020 prize the EU offers no incentives for R&D. (1)

with a Dynamic
Argumentative
Delphi survey

Far beyond science and technology:



Delphi-Survey

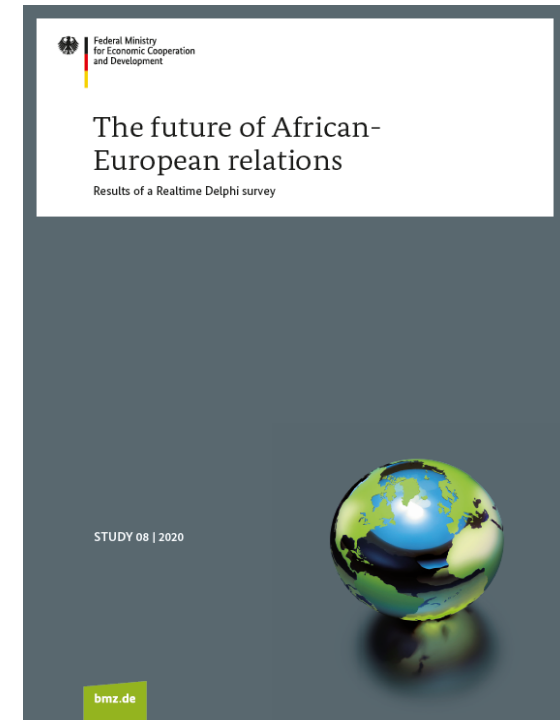
The Future of African-European Relations

<https://www.isi.fraunhofer.de/de/competence-center/foresight/projekte/afrikanisch-europaeische-beziehungen.html>. or
http://www.bmz.de/de/zentrales_downloadarchiv/marshallplan/Delphi-Studie_Zukunft-Afrika-Europa_August-2020.pdf

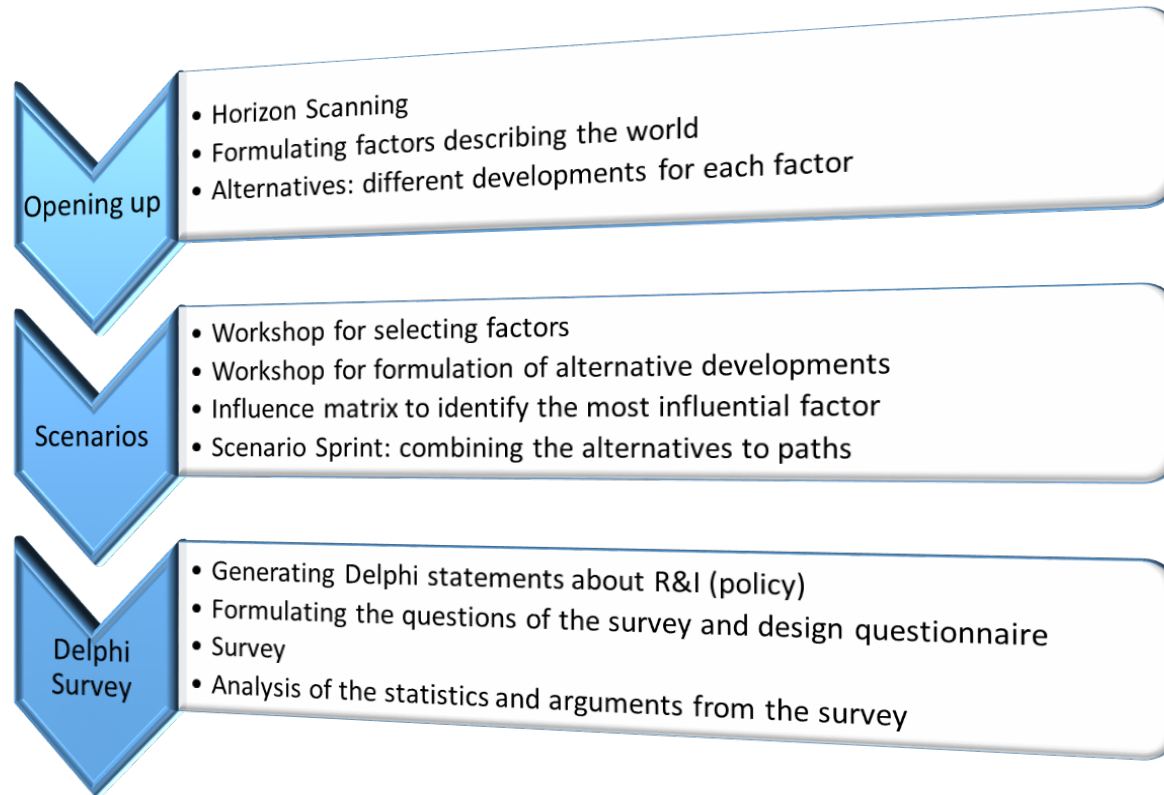
GIZ and

on behalf of the

German Ministry for International Collaboration



EU Foresight on Demand: After the new normal – PostCovid-19 scenarios

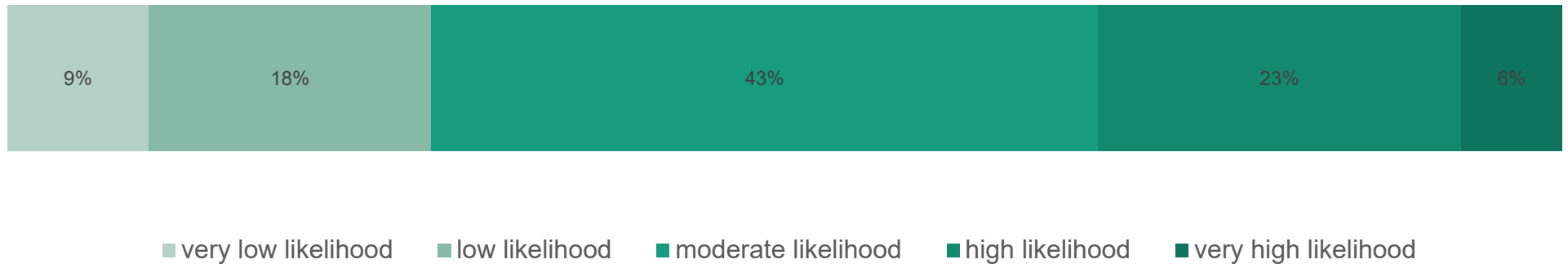


Sense-Making Workshop:
Policy Implications

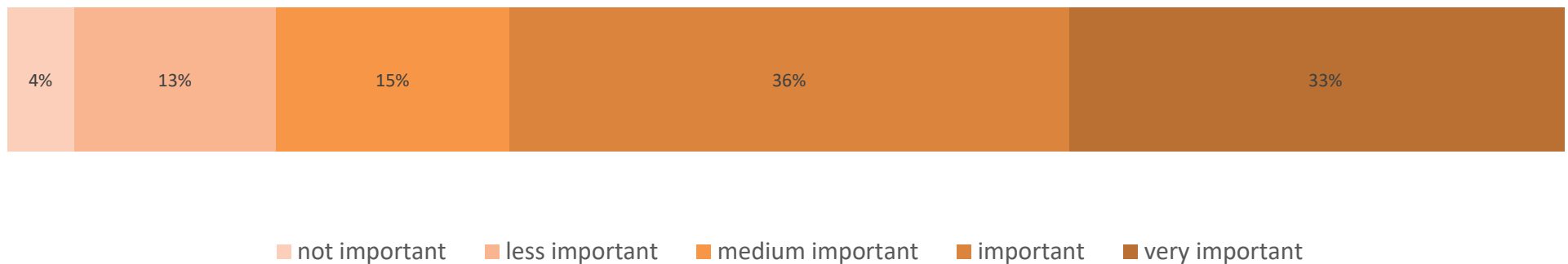
Results S1: Shrinking R&I Budgets

As the result of a long-lasting recession following the Covid-19 pandemic, private and public research and innovation have shrunk considerably (50% compared to 2020) in absolute terms.

Likelihood:
n = 89



Importance:
n = 90



Results S1: Shrinking R&I Budgets

As the result of a long-lasting recession following the Covid-19 pandemic, private and public **research and innovation have shrunk considerably (50% compared to 2020) in absolute terms.**

Reasons (some originals):

a shrinking research and innovation activity seems possible to me, but 50% is not realistic in my view

A significant reduction would have a significant impact in innovation policy (though might be surprises!). Yet, I do not think COVID specifically to have such a deleterious impact. If no new significant (covid like) events happen in the near future, we'll return to previous path (that doesn't mean previous path is great, btw!)

Crises underscores urgency of R&D and respective investment.

in contrary, the shake up by Corona will open opportunities which could be only used if investment in R&I are made

Research and innovation will be a measure of power. In consequence, the political world will not give it up. It is important for democracy

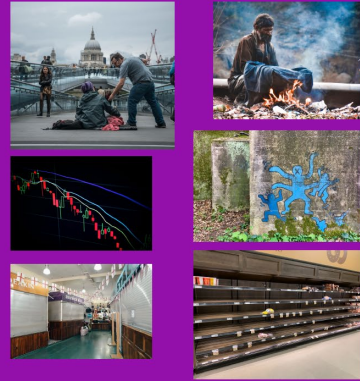
....The recession seems to be less long-standing as the one after the economic and financial crisis of 2008/2009 and stock values have increased enormously after a dip in March/April 2020. There is a lot of capital available looked for a good investment!

The real way out to V recovery from any recession is massive investment in science. However populists are preferring infrastructure investments....

PostCovid-19 scenarios

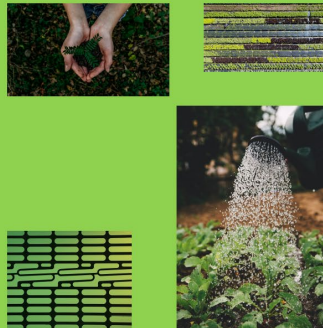
The long recession

- Severe and long-term economic decline
- Regime changes around the world
- "My country first - me first"
- Member States have left or had their membership revoked
- Social disparities emerged, unsettled and disenfranchised population
- Disinformation undermined trust in governing institutions
- There is a lost generation and a stagnant SME ecology
- Paralyzed policy to address climate change



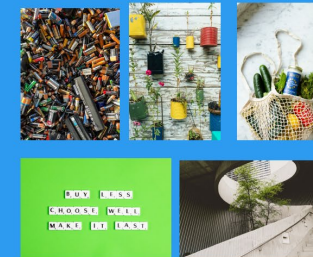
Green Utopia - New Hope

- citizens and companies are supporting green values in a strong societal movement
- Economic growth is no longer the prevailing paradigm
- Sufficiency, while ensuring a decent quality of life, is the guiding principle of what people strive for
- Europe in 2040 has a strong SME landscape
- Food has become an expensive trade good, and healthy diets
- new digital age with digital learning and agile working
- People have taken on more responsibility for their own health
- In Europe, and globally we are better prepared for the next crisis



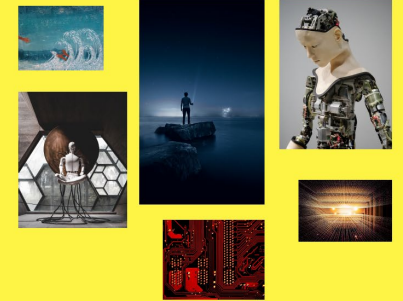
Circular trials and real-life errors

- circular economy
- a further acceleration of the consumption of products and resources
- Europe is on the green path
- "European values" of 2020 are being dismantled
- emphasis on national self-sufficiency
- New and safe modes of interaction at the work place
- critical ecosystems have been lost
- Access to the internet is a means of power and still unequally distributed
- bubbles create communities



Big tech saves Europe

- Large AI companies, science spin-offs, and start-ups rescue the European economy
- European businesses have entered the global market with innovative solutions
- Market-driven forces and libertarian views dominate
- Little attention to planetary boundaries
- New consumption patterns emerged
- Inequalities and widened the social divide
- High-quality vocational services provided by large technology companies compensate for the lack of public education provision

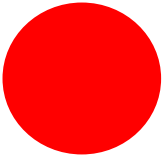


Back to Normal

- Nationalism
- increasing disparities between member states
- consensus a scarcity
- wealth and consumption are highly valued
- increasingly unequal society
- tied economic recovery to industrial production
- worsening 'offshored' emissions
- increase of food insecurity
- resiliency of the continued growth paradigm



Foresight Activities – the coming years



2030

Futures of Foresight

- 1. From detecting “the” future to exploring multiple open futures**
- 2. From narrow to broad participation**
- 3. Foresight and Innovation Systems - From Wiring Up to Re-Wiring**
- 4. Towards conscious integration of machine-learning-based approaches**
- 5. Towards new combinations of quantitative and qualitative methods**

That means

1. Foresight will be increasingly requested to position itself vis-à-vis transformative mission-oriented agendas.
2. “Game changer” for Foresight are machine-based approaches - risk of reversing the focus on reflexive processes and the re-emergence of purely predictive and deterministic approaches
3. Foresight is increasingly embedded into wider policy and strategy processes - new inroads to actual implementation of Foresight insights and strengthening of anticipatory culture in organisations,
 - major opportunities for strengthening outreach and impact of Foresight
 - tendency to draw Foresight back into the deterministic paradigms of the “planning decade”
 - requires Foresight to further extend its co-operations and to continuously develop its epistemological premises

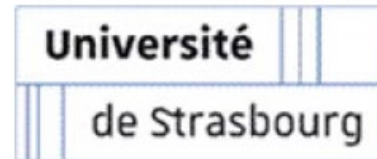
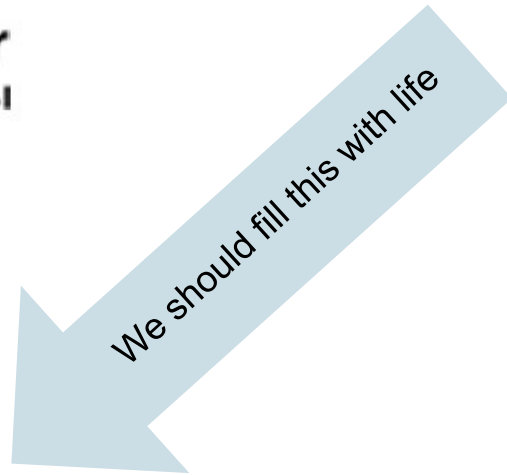


Congratulations BETA!

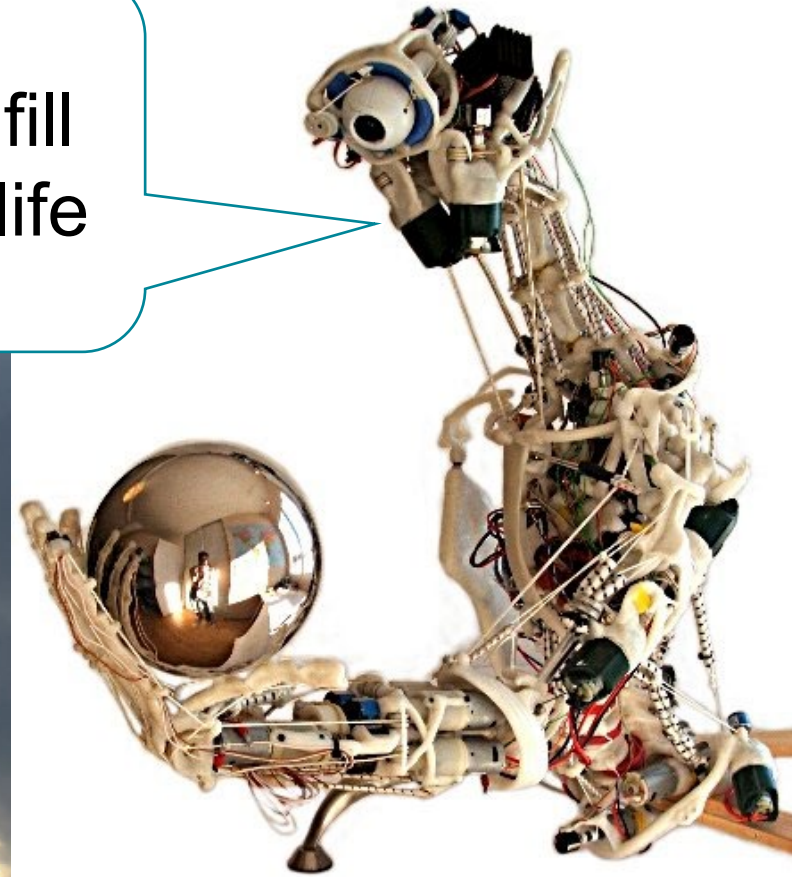


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Jahre

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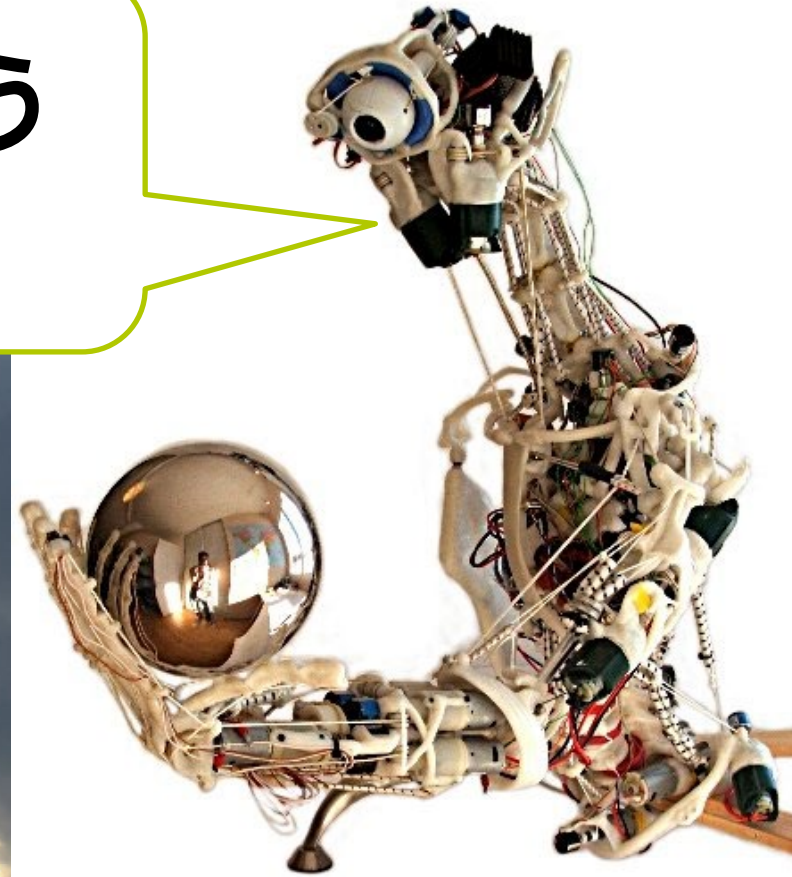


And now, we have to fill
our cooperation with life



Anthropomimetischer Robotertorso - ECCEROBOT

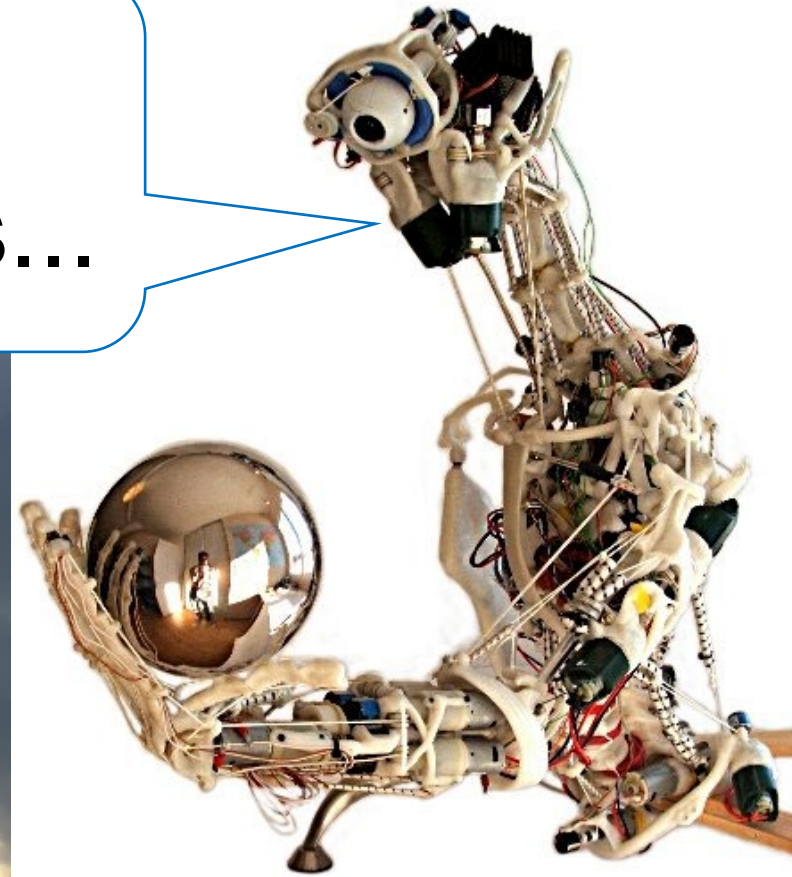
Questions? どうぞ遠慮なく



Anthropomimetischer Robotertorso - ECCEROBOT

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Good luck in
different futures...



Anthropomimetischer Robotertorso - ECCEROBOT

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