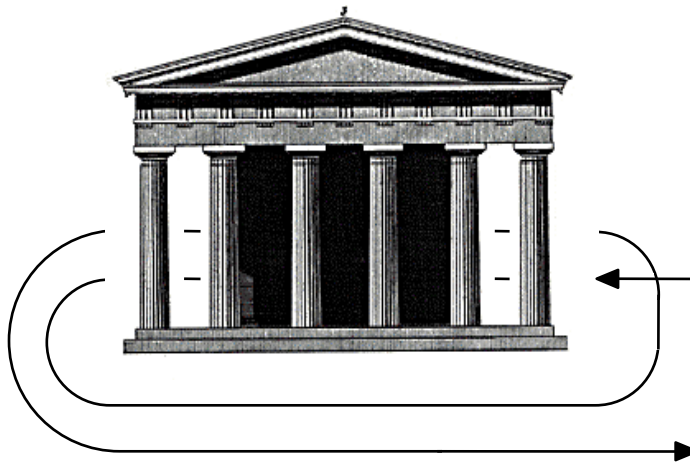


The oracle has (once) spoken.

Nanotechnology and the Delphi method - A TA-SWISS case study



Emiliano Feresin, TA-SWISS

PACITA Workshop "Methods"

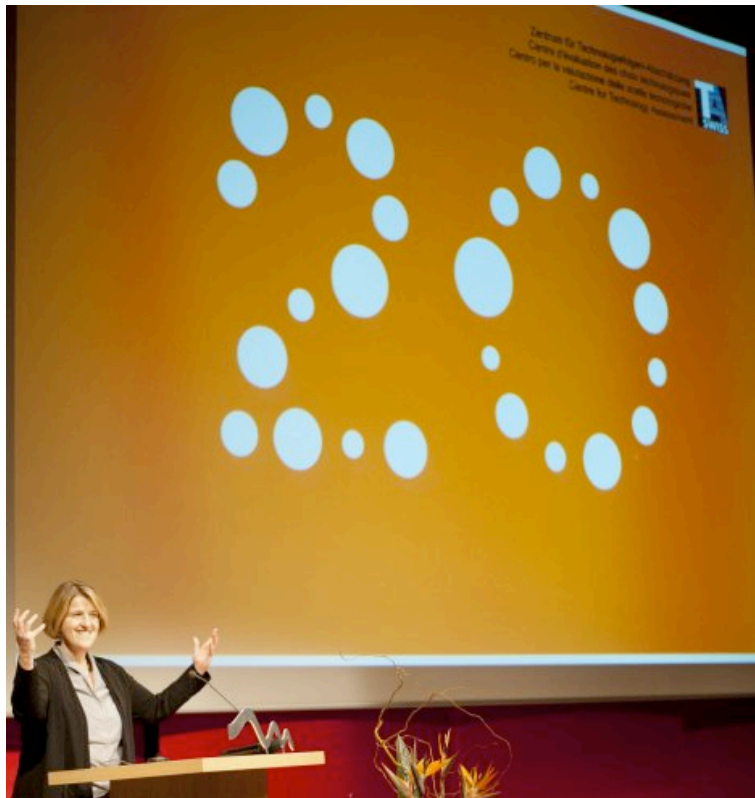
17th – 19th April 2013

Sofia, Bulgaria

Outline

- The institution TA-SWISS
- Theme, political/social context
- Method choice and application
- Project management, difficulties
- Goals/results achieved
- Discussion and conclusions

The Swiss Centre of technology assessment TA-SWISS



- Officially established in 1992 (20 years of practice!)
- Institutionalised in 2000
- Since 2008 affiliated to the Swiss Academies of Arts and Sciences
- Office team of 7 persons (full-time equivalent)
- Total budget of ca. 1.1 Mil. €
- **To support political decision-making on new technologies by providing reliable, prospective and independent TA activities**

How TA-SWISS works

Scientific Studies

(external contracting, 100-120k€):

- Scientifically reliable
- Interdisciplinary
- Independent

New
knowledge



Options and
recommenda-
tions

Participatory methods

(in-house, 40-200k€):

- Social fairness
- Procedural fairness
- Quality of the argumentations

Dialogue



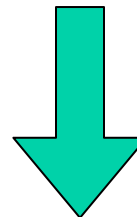
Options and
recommenda-
tions

Nanotechnology in 2003

- A technology still largely at the beginning of its development, but great expectations (“key tech of the 21st century”) and huge investments
- Nanotech applications in medicine highly praised and publicized
- Impacts expected on medicine, society and the individual. Implications for politics and regulators

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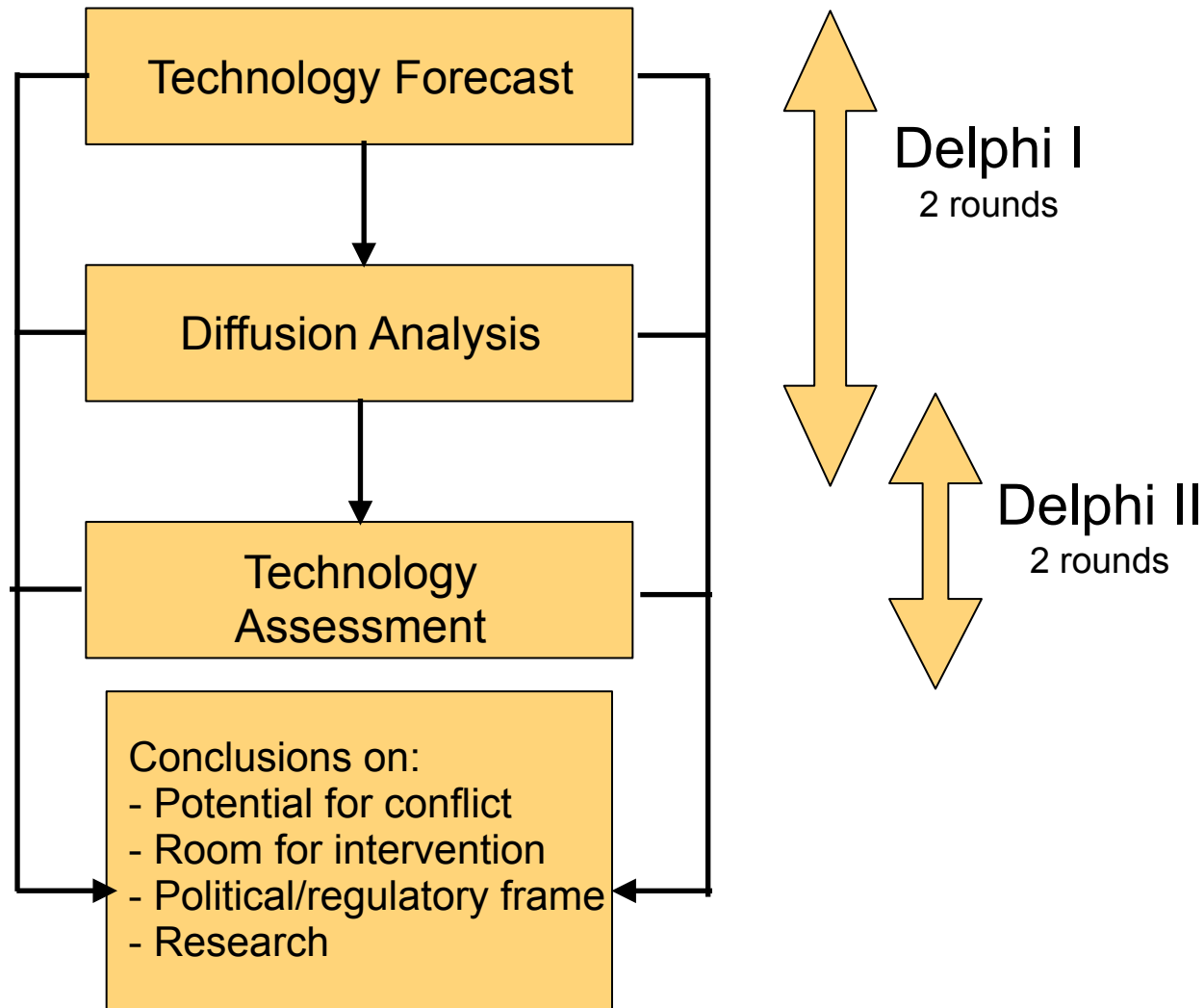
Call for tenders

9 offers, a very good one proposed Delphi

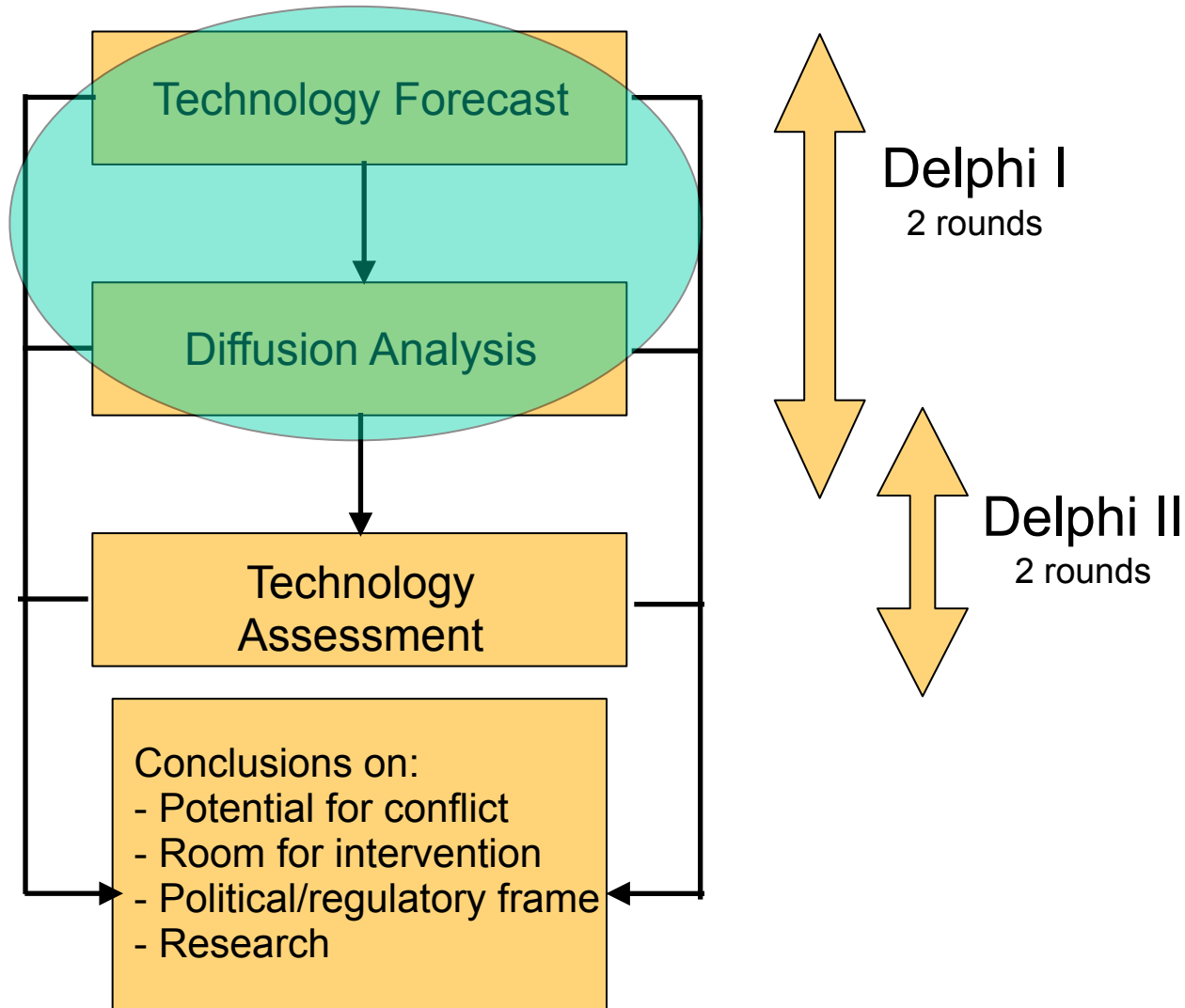
Nanotechnology in 2003 - Why Delphi?

- Essential aim and possible (practical) applications for a given time horizon are both just speculation. "Future uncertainty is indeed part of any technology assessment, but here it is particularly big."
- Not a definite branch of science, rather a new cross-sectional approach among the most diverse scientific disciplines. "Even the experts were not well known."
- "Investigating the effects of nanotechnology in medicine (eg in relation to the health care system) will also have large uncertainties and should only be interpreted in the sense of plausible trend statements. We cannot expect more than that by the experts of the technology assessments."
- "Classical desktop research would probably fail: Issues are too complex and too much anchored in individual disciplines."

Delphi method - the scheme

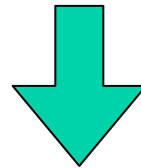


Delphi method - the scheme



Delphi method - Delphi I

Target of the first 2 survey rounds: researchers actively involved in nanoscience



TF questionnaire: nanotechnology and its applications in the next 20 years

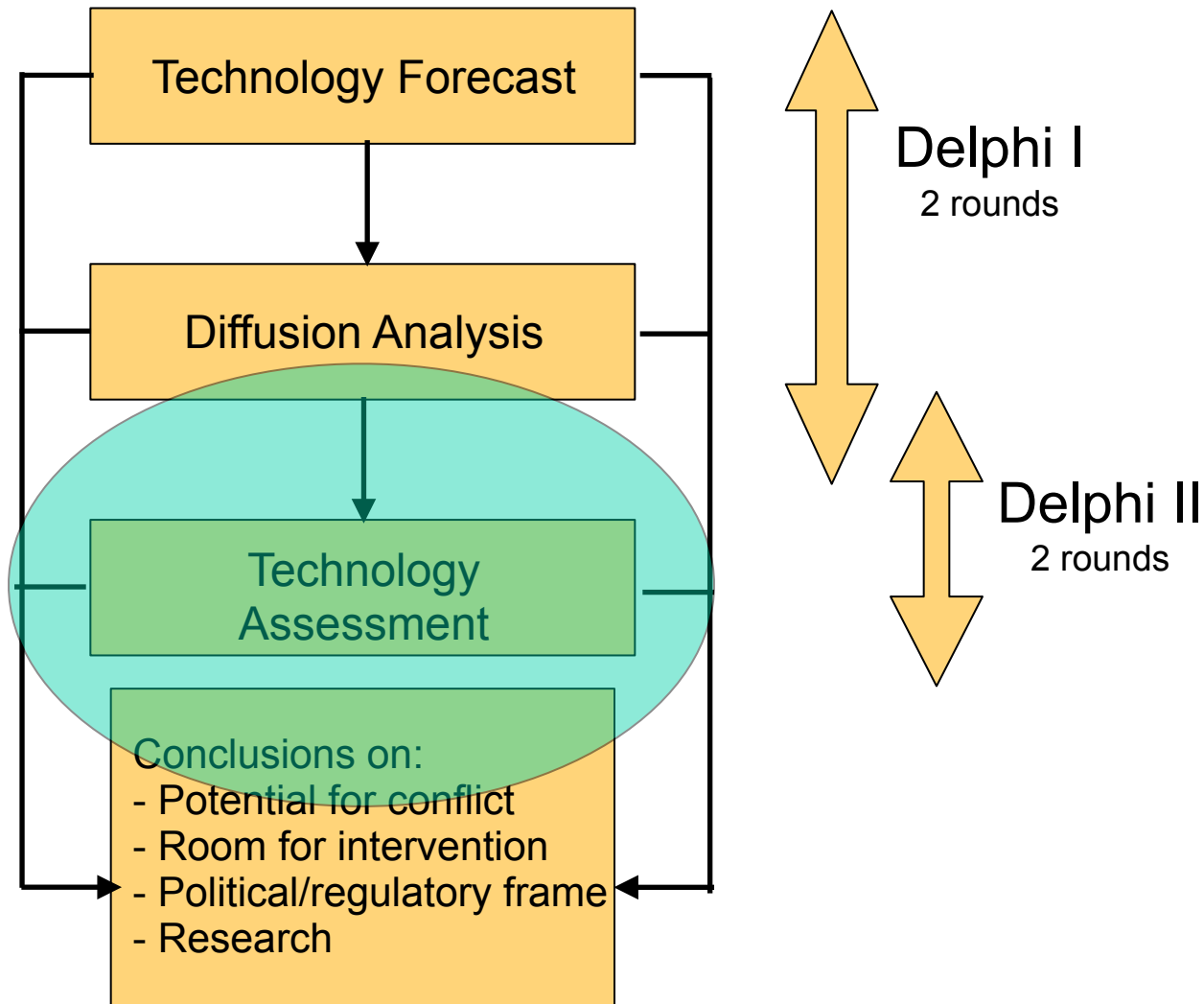
- where are the earliest break-throughs likely to be?
- how long is it likely to be before they arrive?
- what are the technical hurdles that will have to be overcome?

Diffusion analysis questionnaire: results of first round analysed and commented

focus on which applications will be used

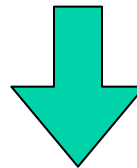
Note: Mini-Delphis standardized questionnaires were prepared together with experts

Delphi method - the scheme



Delphi method - Delphi II

Target of third round: experts from the fields of law, ethics and economics



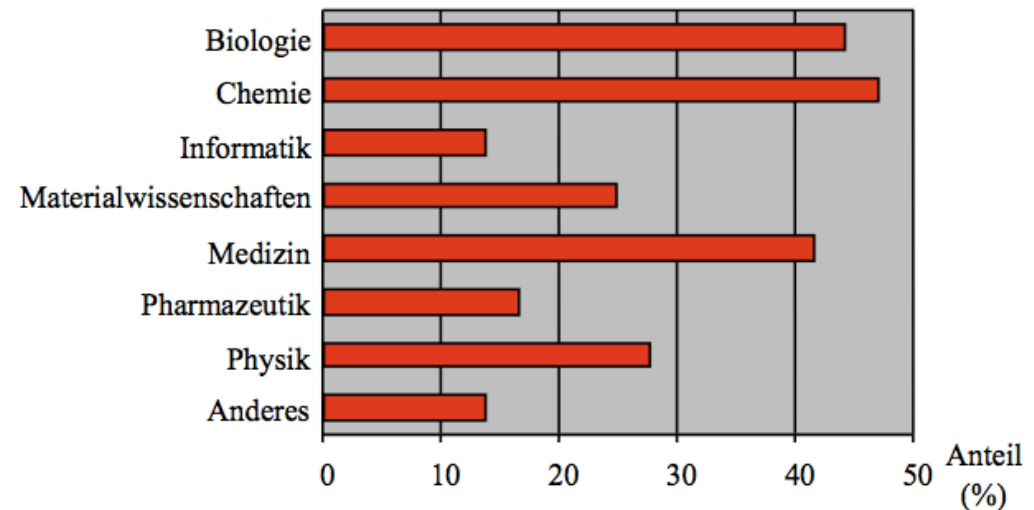
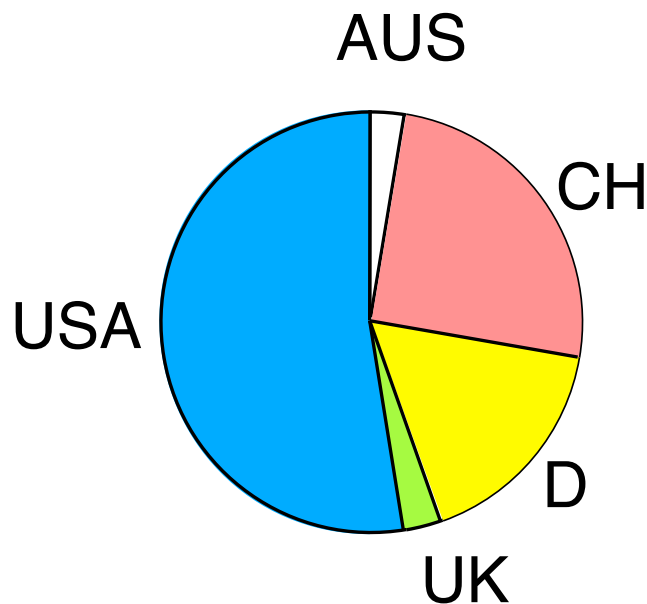
TA1 questionnaire: focus on the legal, social and ethical consequences of the new technology

TA2 questionnaire: results of first round analysed and commented

Note: Mini-Delphis standardized questionnaires were prepared together with experts

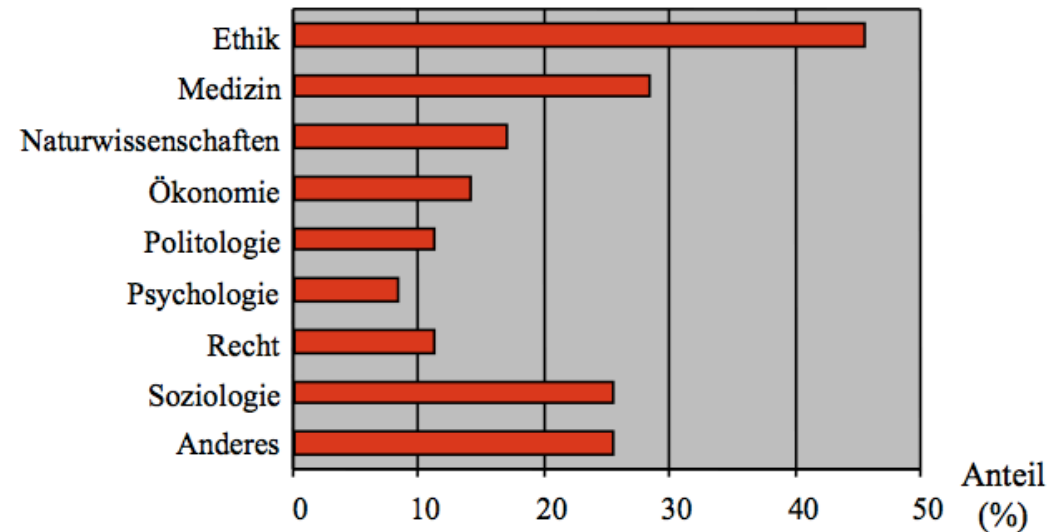
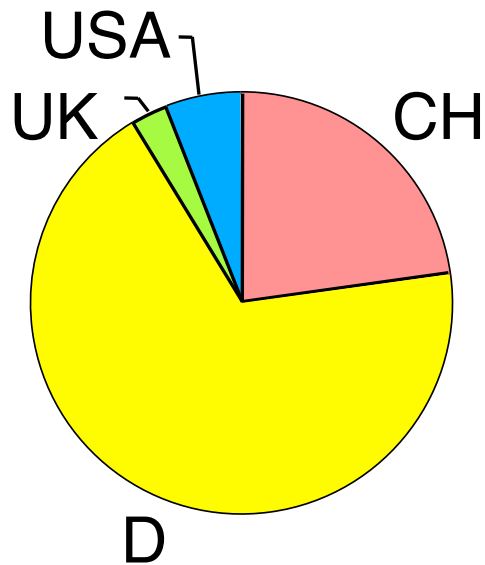
Delphi I - More than 70 experts questioned

Technology Forecast

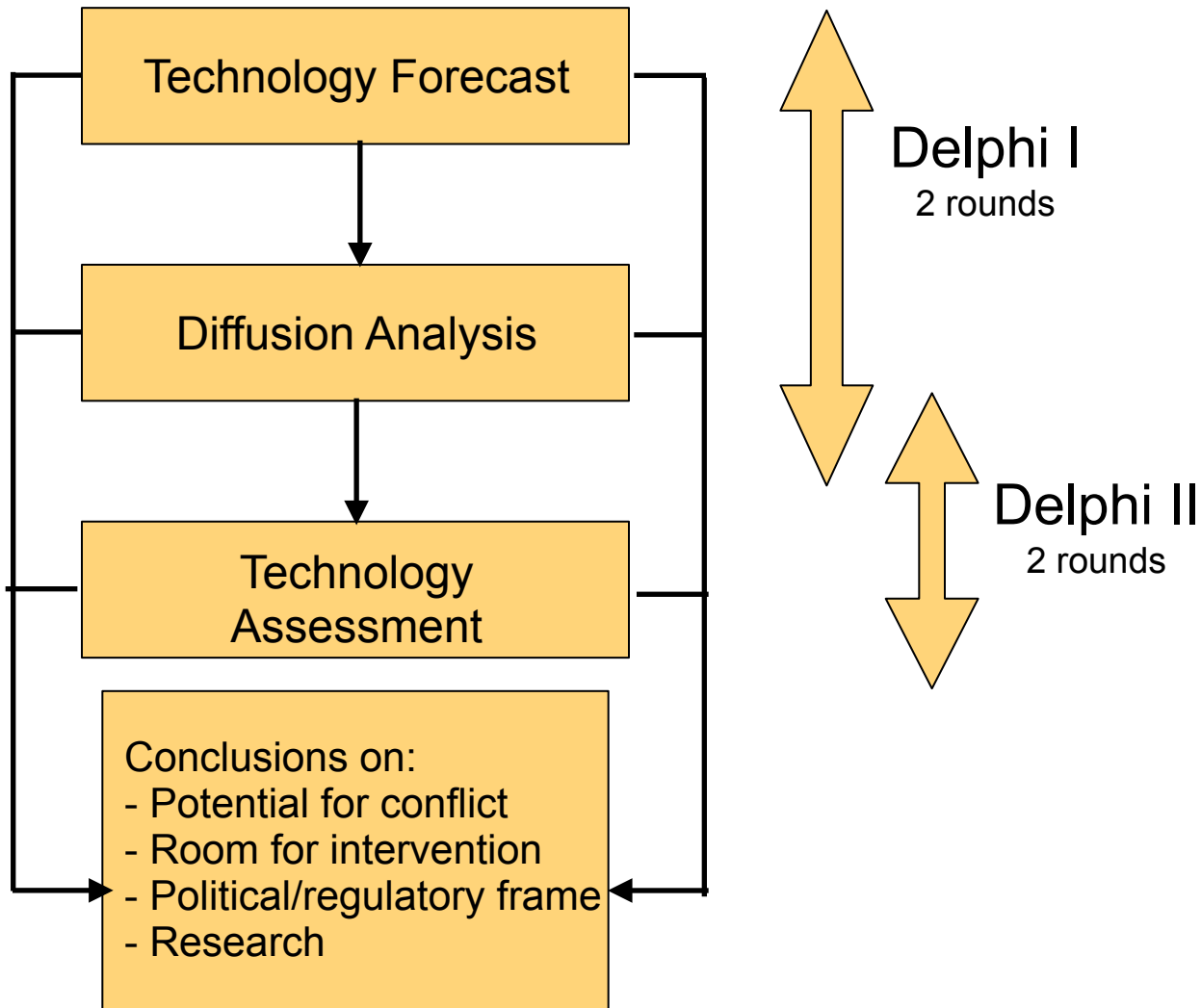


Delphi II - 30 experts questioned

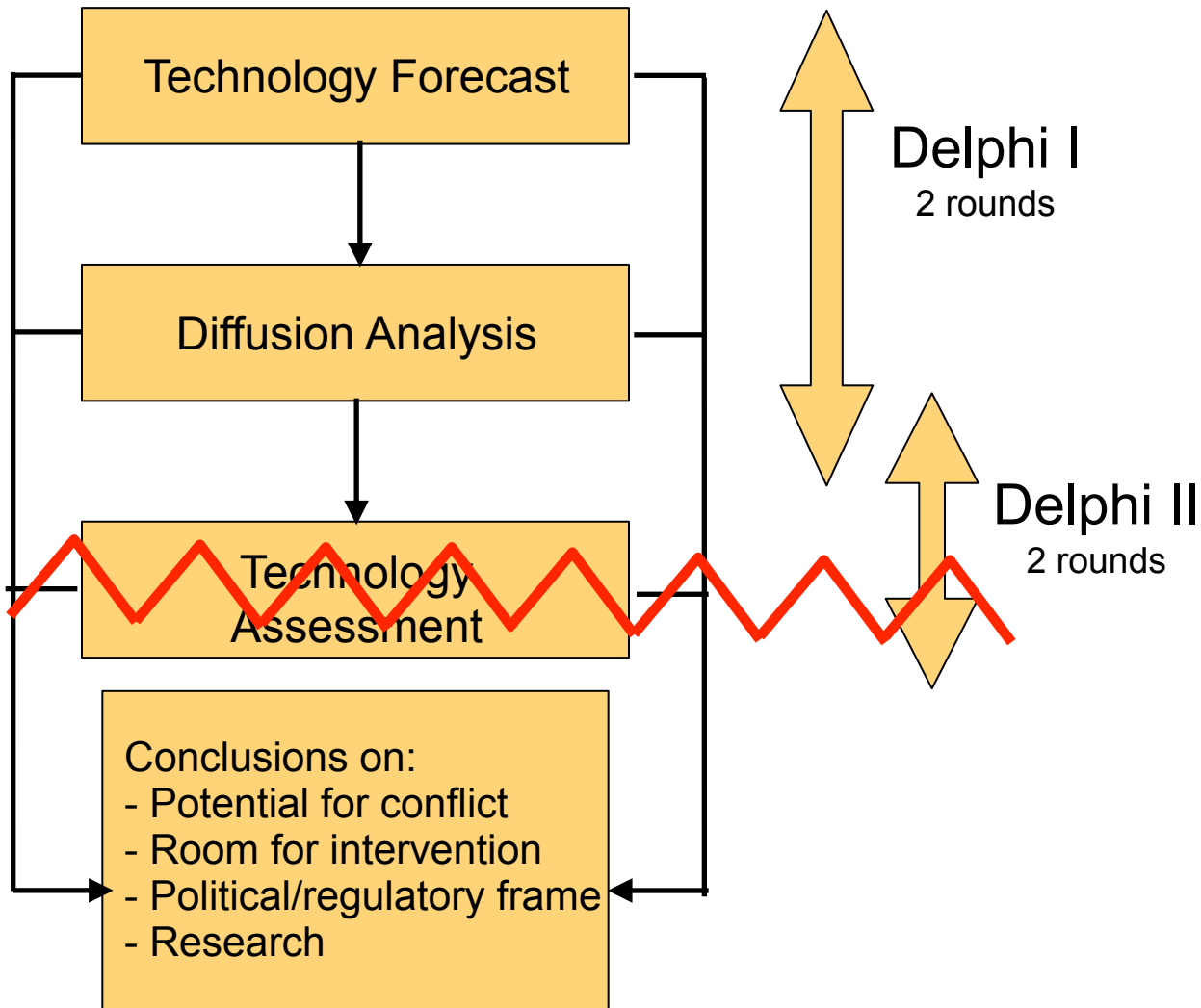
Technology Assessment



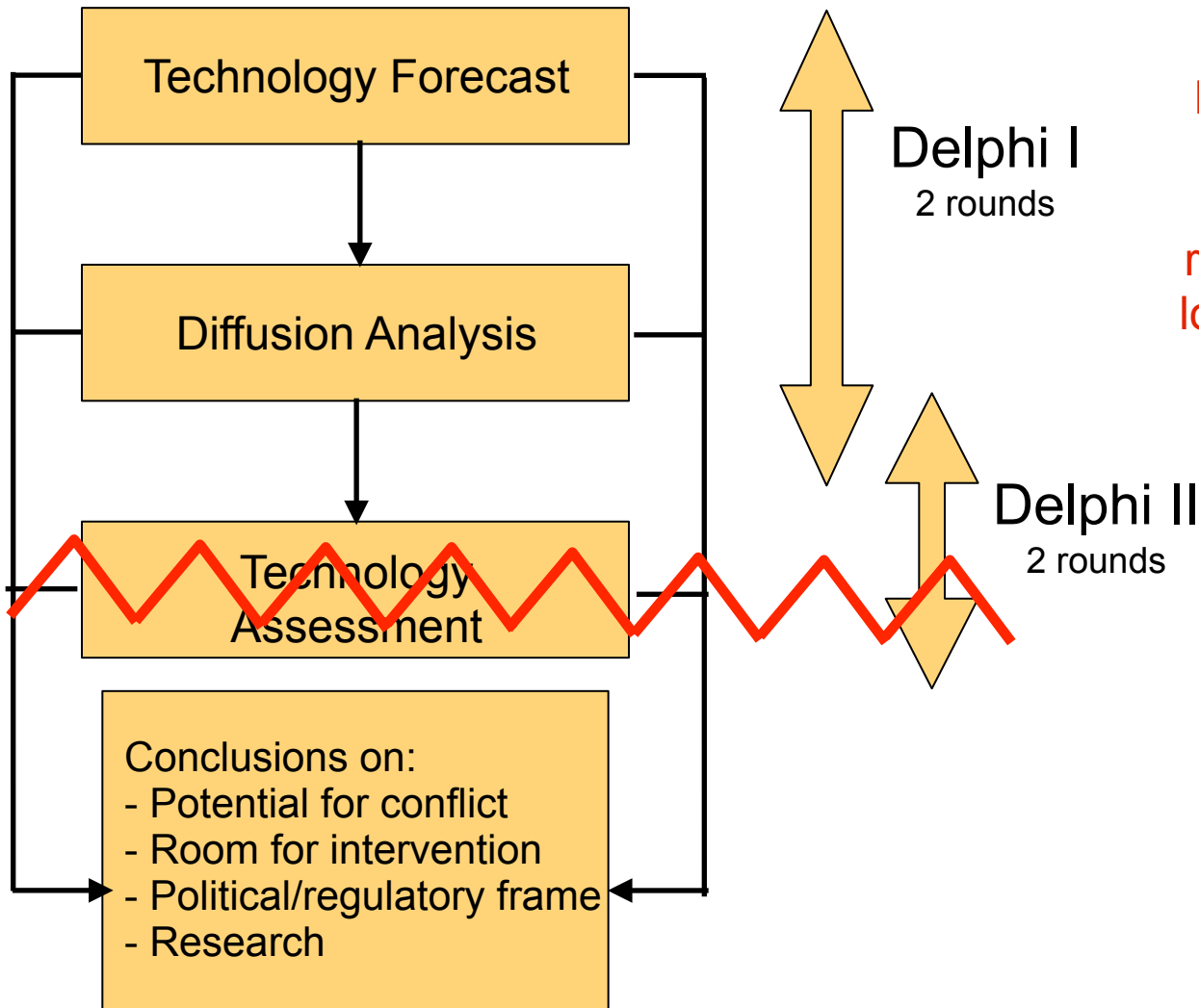
Delphi - Not everything went smooth...



Delphi - Not everything went smooth...

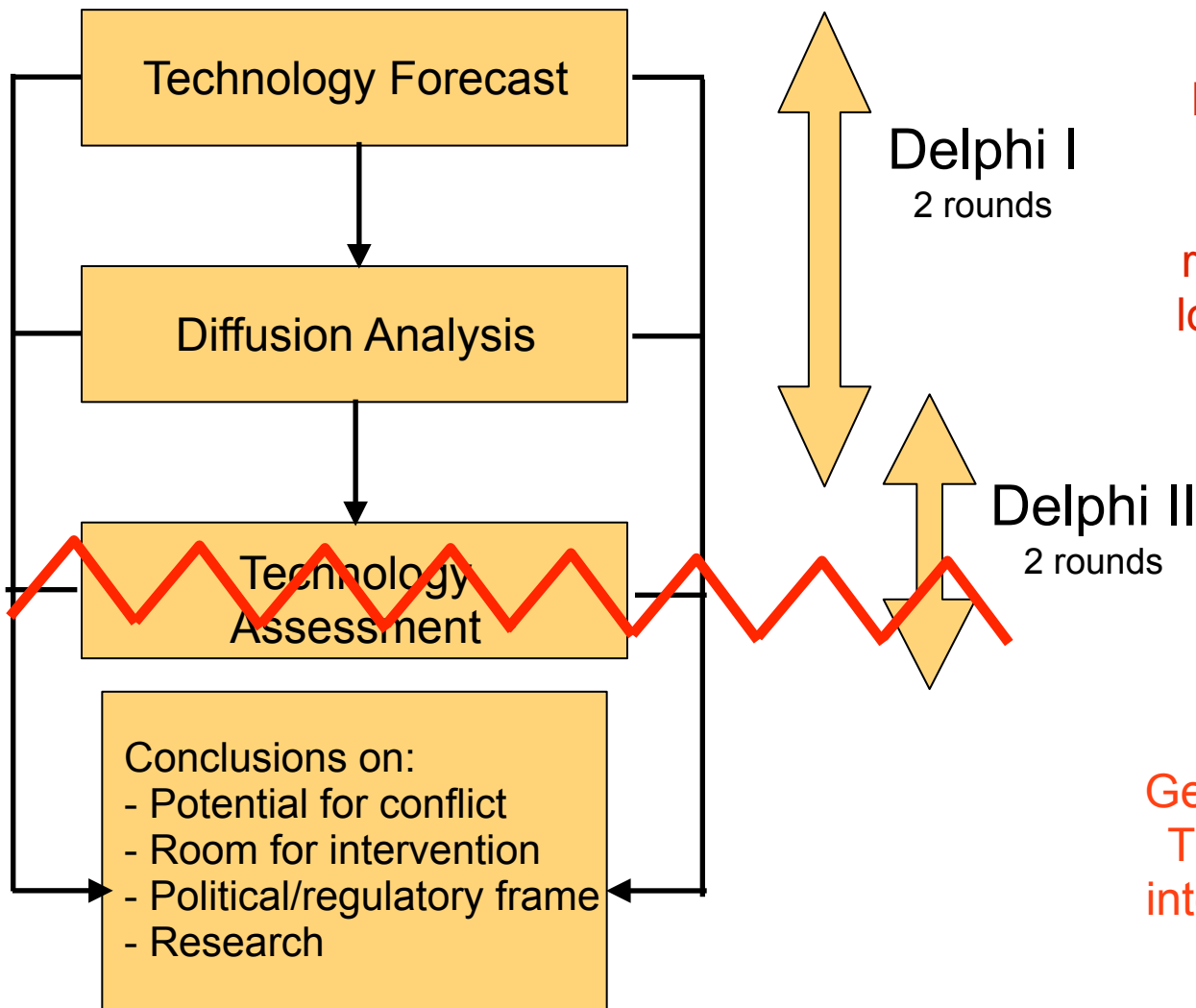


Delphi - Not everything went smooth...



Delphi II was changed!
Difficult to reach people
and motivate them to
answer; someone
responded only partially;
low interest from non-CH
experts; some target
experts were changed.

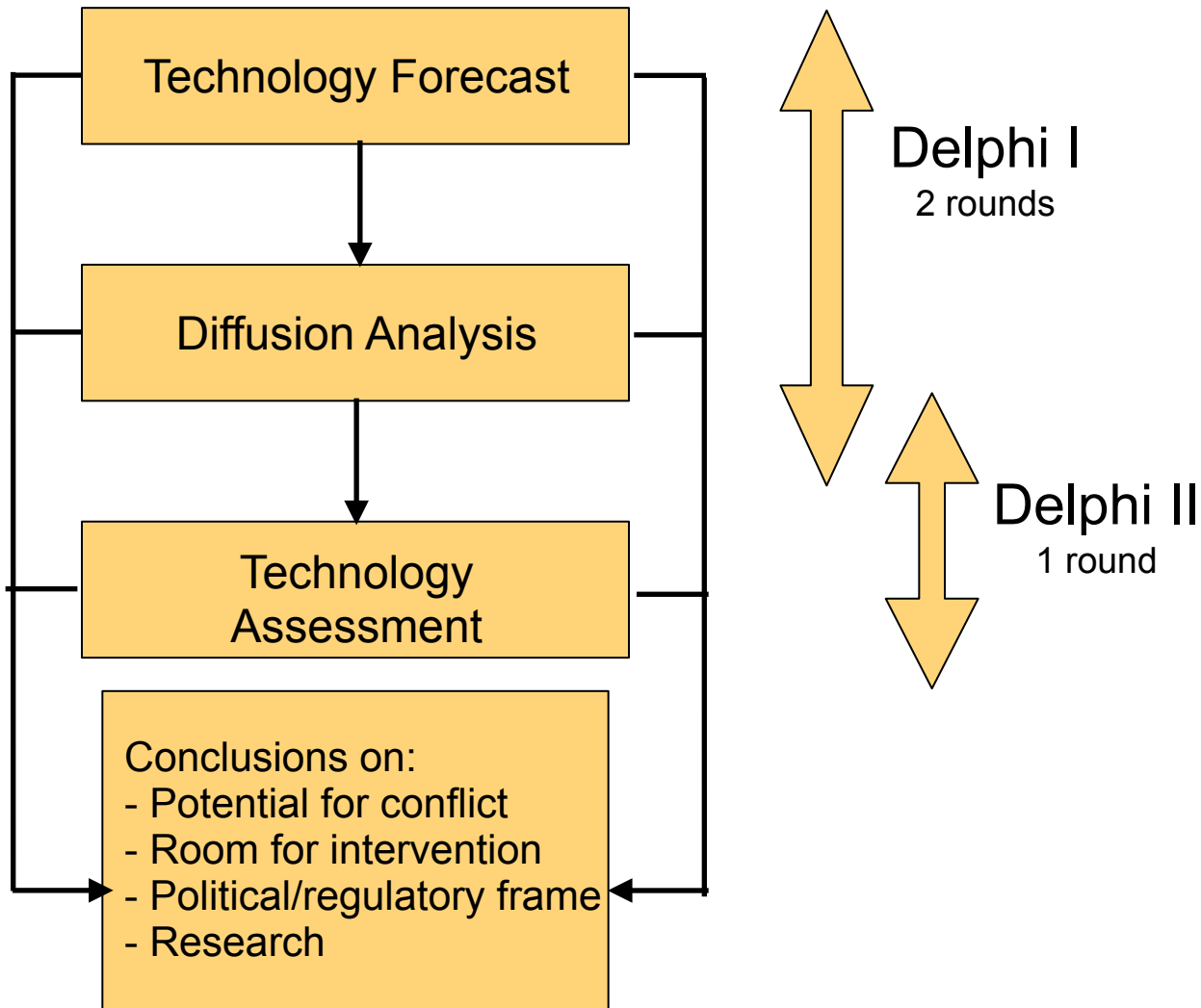
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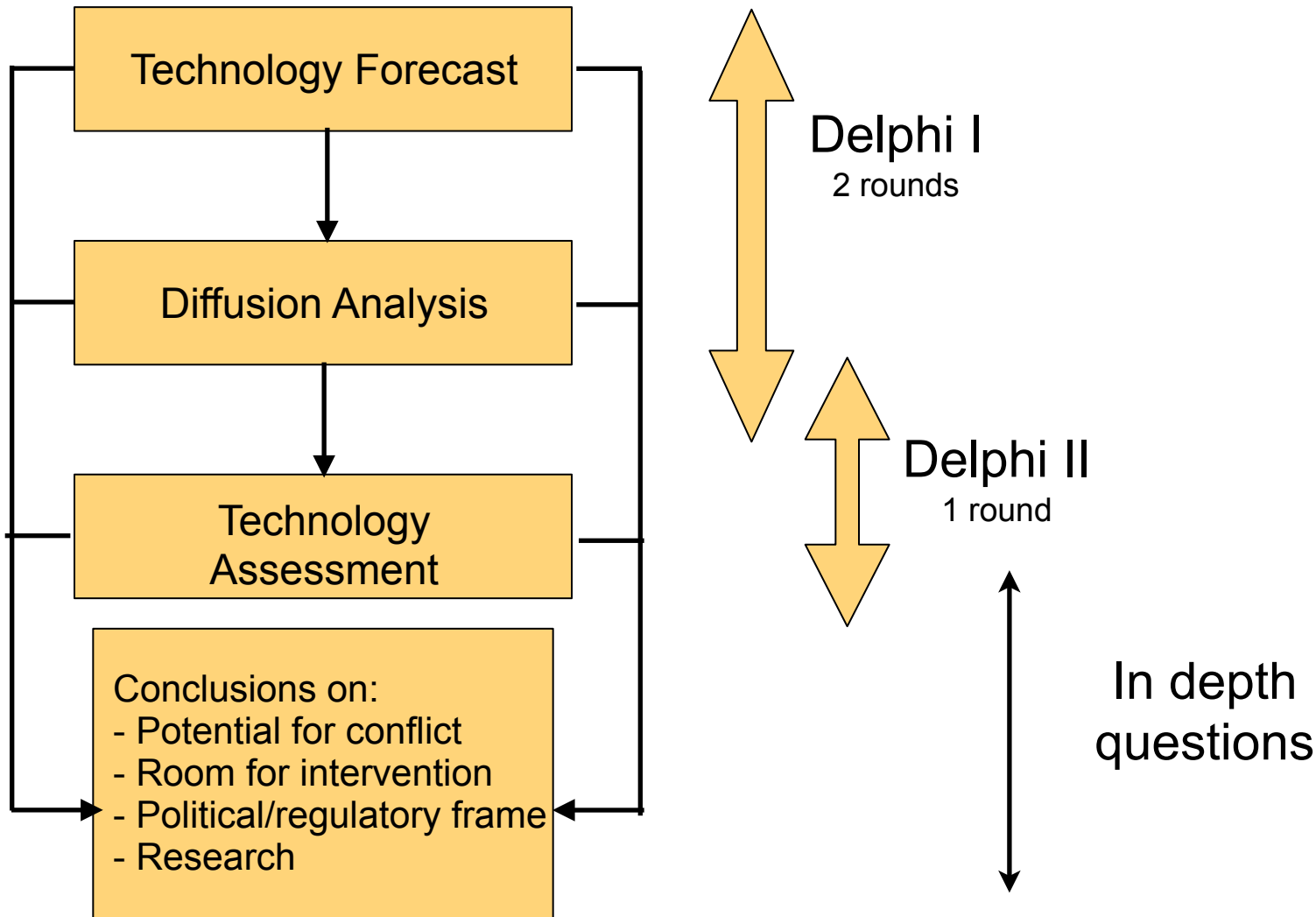
Delphi II was changed!
Difficult to reach people
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Only one round with 30
experts mostly from
German speaking countries.
Then individual qualitative
interviews to deepen certain
questions.

Delphi - Not everything went smooth...

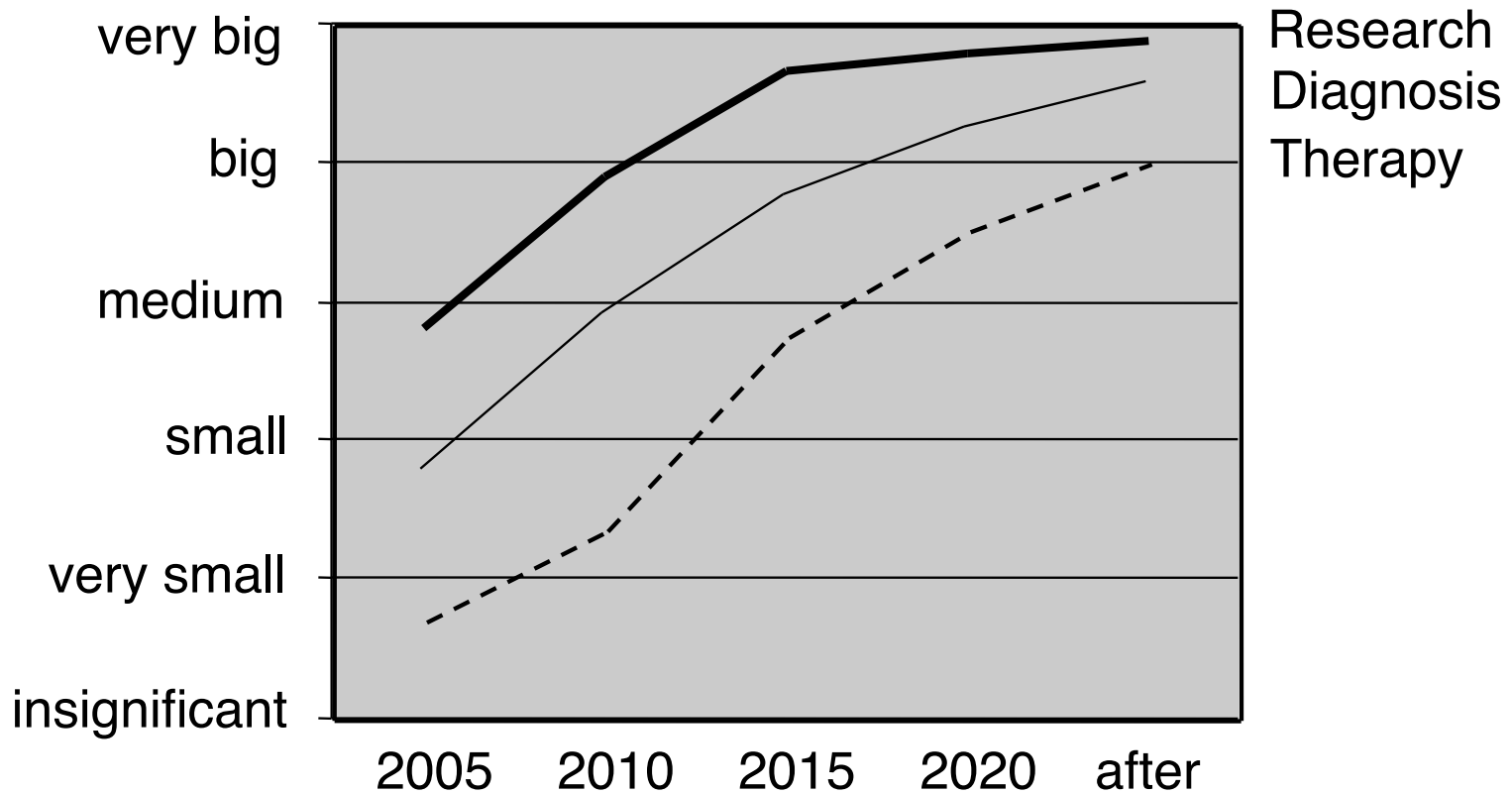


Delphi - Not everything went smooth...



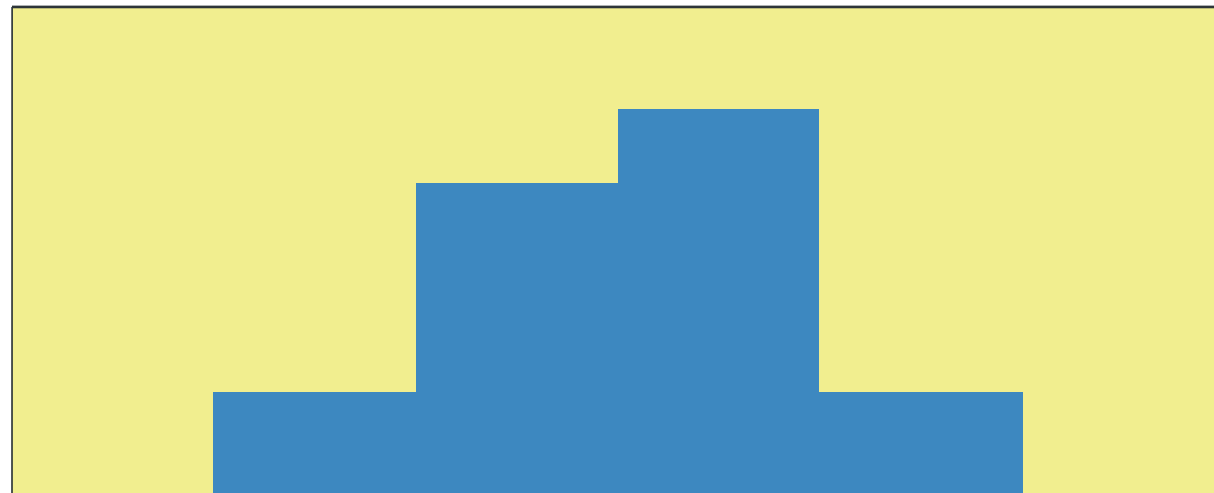
Results - chances

Significance of nanotechnology in medicine...



Results - risks

Probability that nanomaterials used in medicine are toxic:



negligible

very big

Delphi method - experienced pros and cons

Pros:

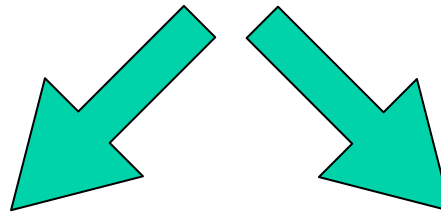
- chance to reach and define a community of experts on an issue
- less bias due to statistics: results are scientifically sound and meaningful
- no “popes”: anonymity allows for straight answers and tough debate
- the method fits when the knowledge on the topic is blur and future uncertainty very big

Cons or challenges:

- quality of the questionnaire defines the quality of the method
- elaborate to prepare, difficult and time-consuming to get all the experts involved (personal and intensive contact needed)
- answers are sometimes too technical
- formulation of concrete recommendations was a difficult process

TA-SWISS, Nanotechnology and TA in 2013

Current research and technology context more clear, more concrete applications in sight



Desktop research and
targeted qualitative interviews
(Nano 2009 & 2013)

Scenario analysis
(Electromobility 2013, Biofuels 2010)

The decline of the oracle?

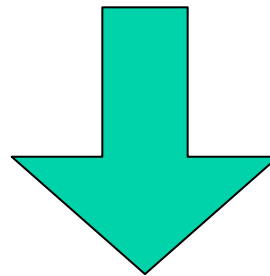
Sergio Bellucci: “I don’t know if we would use it again. It’s very demanding and I would rather continue using desktop research and targeted qualitative interviews. Nonetheless it depends on the offer we get.”

Adrian Rügsegger: “Every situation and every topic is different, so it could be that’s suitable again, if we have similar conditions as back then.”

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What if similar conditions are nowadays difficult to reproduce? If information is so easy to retrieve via the www and research branches define themselves much faster than before, could it be that Delphi-method is no longer so appealing? Has my computer become my digital Delphi?

Thanks!

