Dr. Thibaut Lery
Senior Science Officer

Introduction to ESF Forward Looks

Prediction is very difficult,
especially about the future.
- Neils Bohr

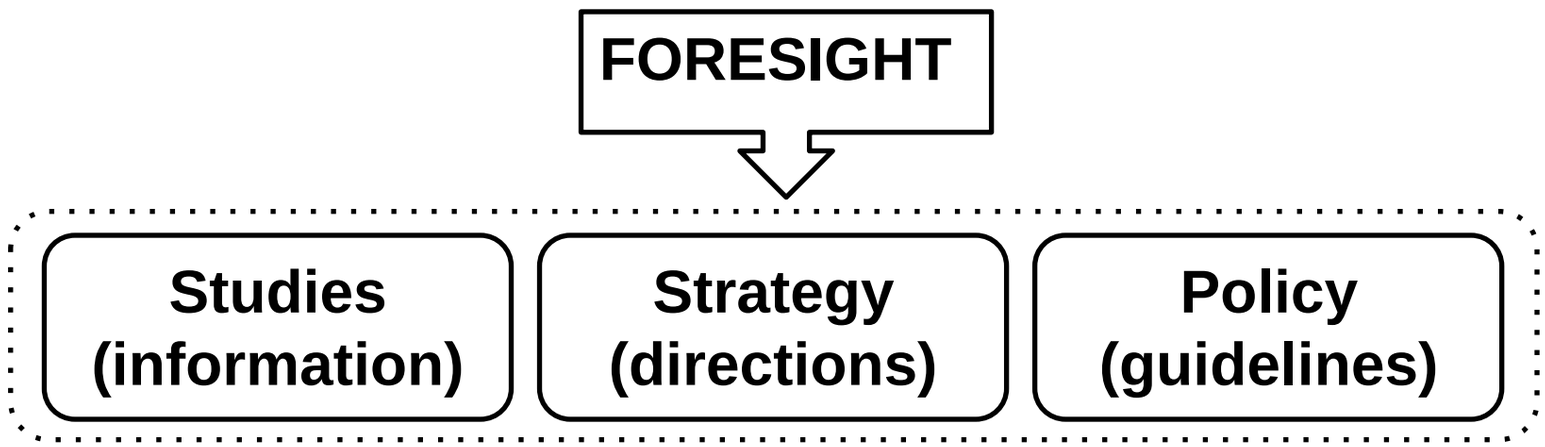
The European Commission science trends

- HORIZON 2020 would be structured with three pillars:
  - **“Strengthening the Science Base”**
    - Discovery driven
    - Long term and bottom up approach
  - **“Societal Challenges”**
    - Politically driven and top down approach
    - Problem driven (Health, Demography, Security, Smart transport, Climate, Ageing…)
    - High impact
  - **“Competitiveness and Innovation”**
    - Economically driven
    - Purpose driven
    - High risks

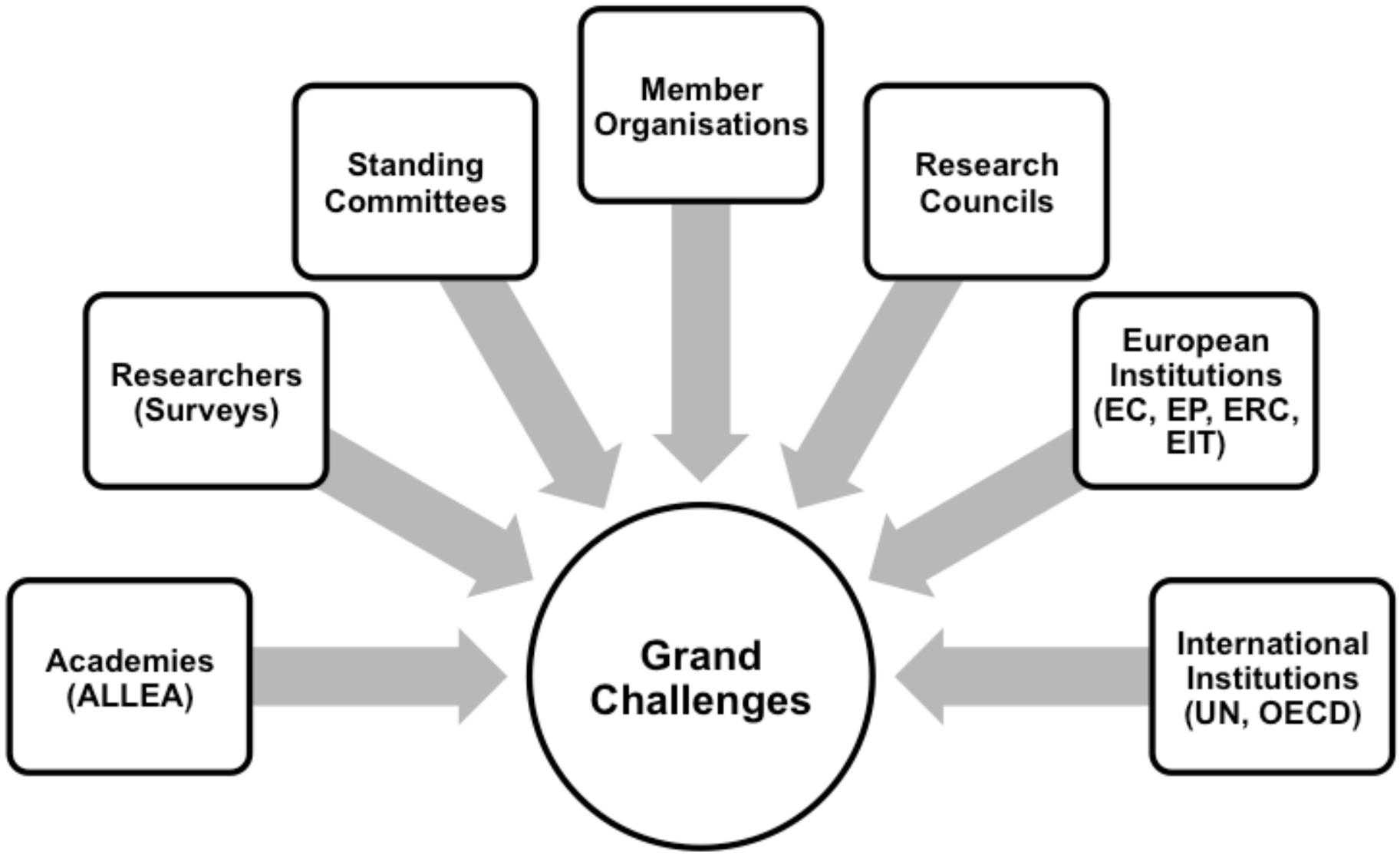
ESF Forward Look Goals

- Forward Looks enable Europe's scientific community, in interaction with policy makers, to develop **medium to long-term views and analyses of future research developments** with the aim of defining research agendas at national and European level.

- Forward Look reports and other outputs such as ESF Policy Briefings assist **policy makers and researchers** in defining **optimal research agendas and in setting priorities**.



Source of Topics for Forward Looks



Forward Look Process

Selection & Design

250 k€

Proposal

Selection of Topics → **Champion Selection** → **Scoping & Design** → **Acceptance by the Governing Council**

30 k€

Implementation

12 months

Forward Look Activities

170 k€

Dissemination

6 months

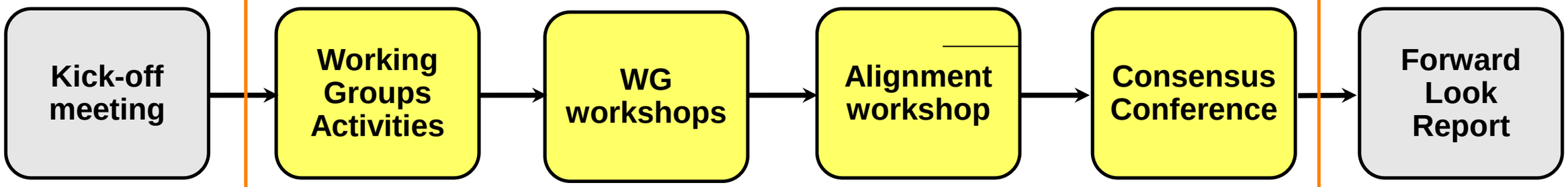
Forward Look Report → **Implementation and Dissemination Plan**

50 k€

- Green and White Papers
- Conference
- Frontiers of Science
- Press and Media

Forward Looks activities

Methodology



Working Groups Activities	WG workshops	Alignment workshop	Consensus Conference
• Depends on the tools and methodology • Analysis of the state of the art	• To present and discuss results from the activities	• Scientific Organising Committee to review and align outcomes of workshops	• To review outcomes • To generate consensual agreement

Tools and Methodology

Roadmapping	Interviews	Modelling
Surveys	Bibliometrics	Extrapolation
Brainstorming	Horizon scanning	Structural Analysis
Delphi	Indicators	Stakeholders Mapping
SWOT Analysis	Scenario Workshop	Essays

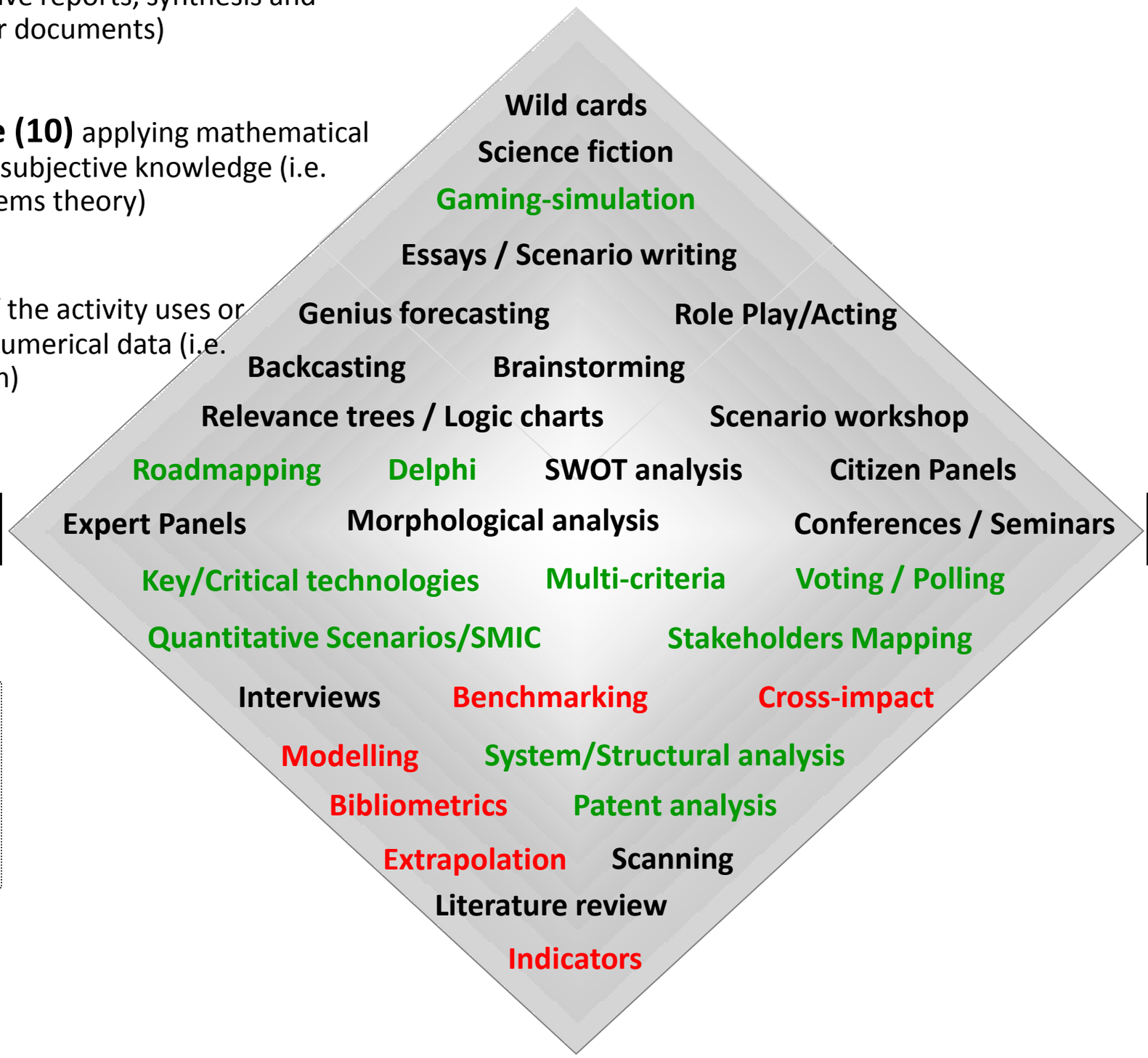
The Foresight Diamond

Qualitative (17) relying less on numbers and statistics (i.e. subjective reports, synthesis and evaluation of ideas or documents)

Semi-quantitative (10) applying mathematical principles to process subjective knowledge (i.e. weighting ideas, systems theory)

Quantitative (6) if the activity uses or is based on reliable numerical data (i.e. statistical information)

Creativity ← Strongly influenced by imagination



Expertise

Strongly influenced by experiences and knowledge sharing

Interaction

Strongly influenced by discussions and knowledge exchange

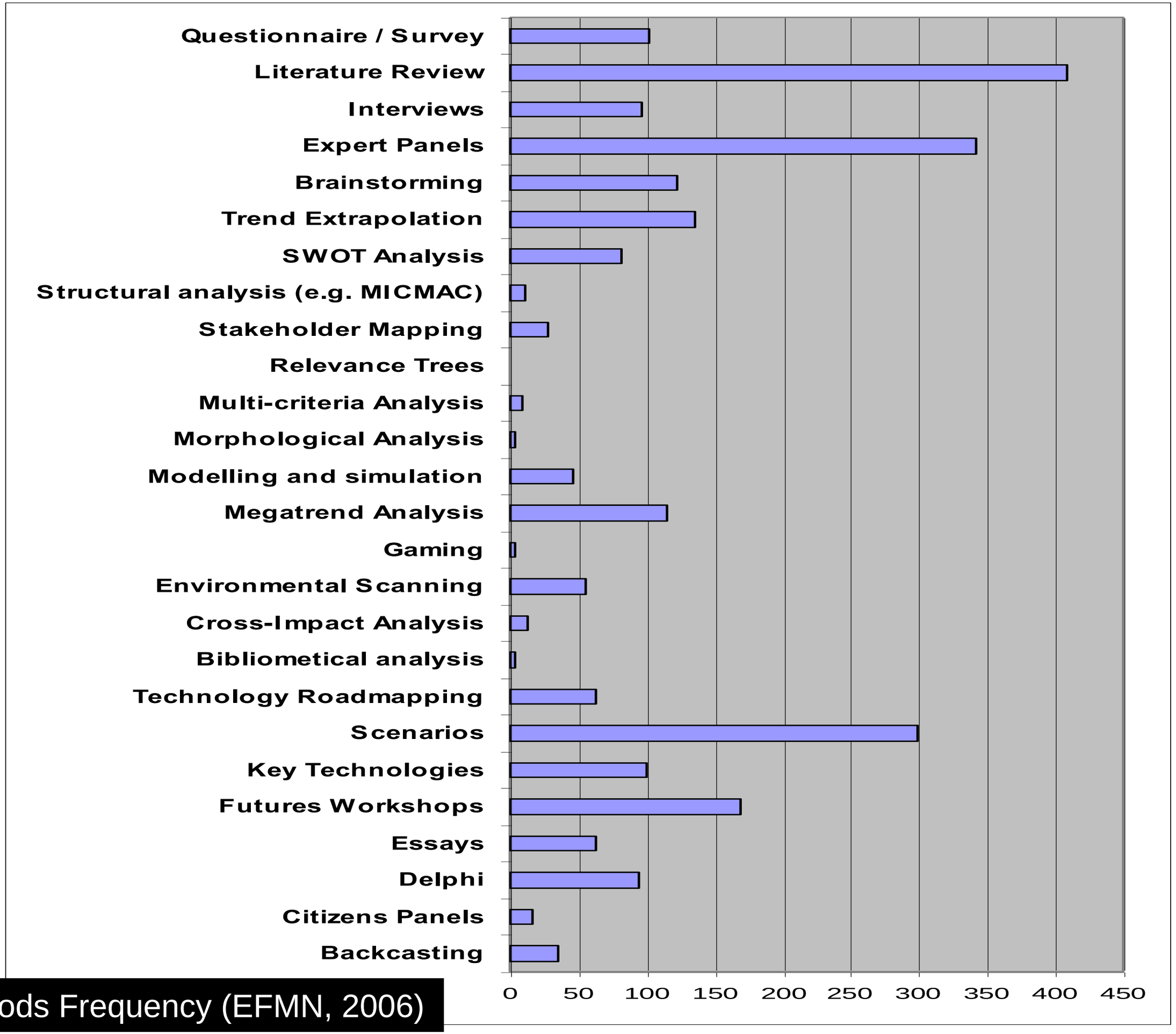
Evidence ← Strongly influenced by facts & data

Source: R. Popper (2006-2008)

EUROPEAN SCIENCE FOUNDATION

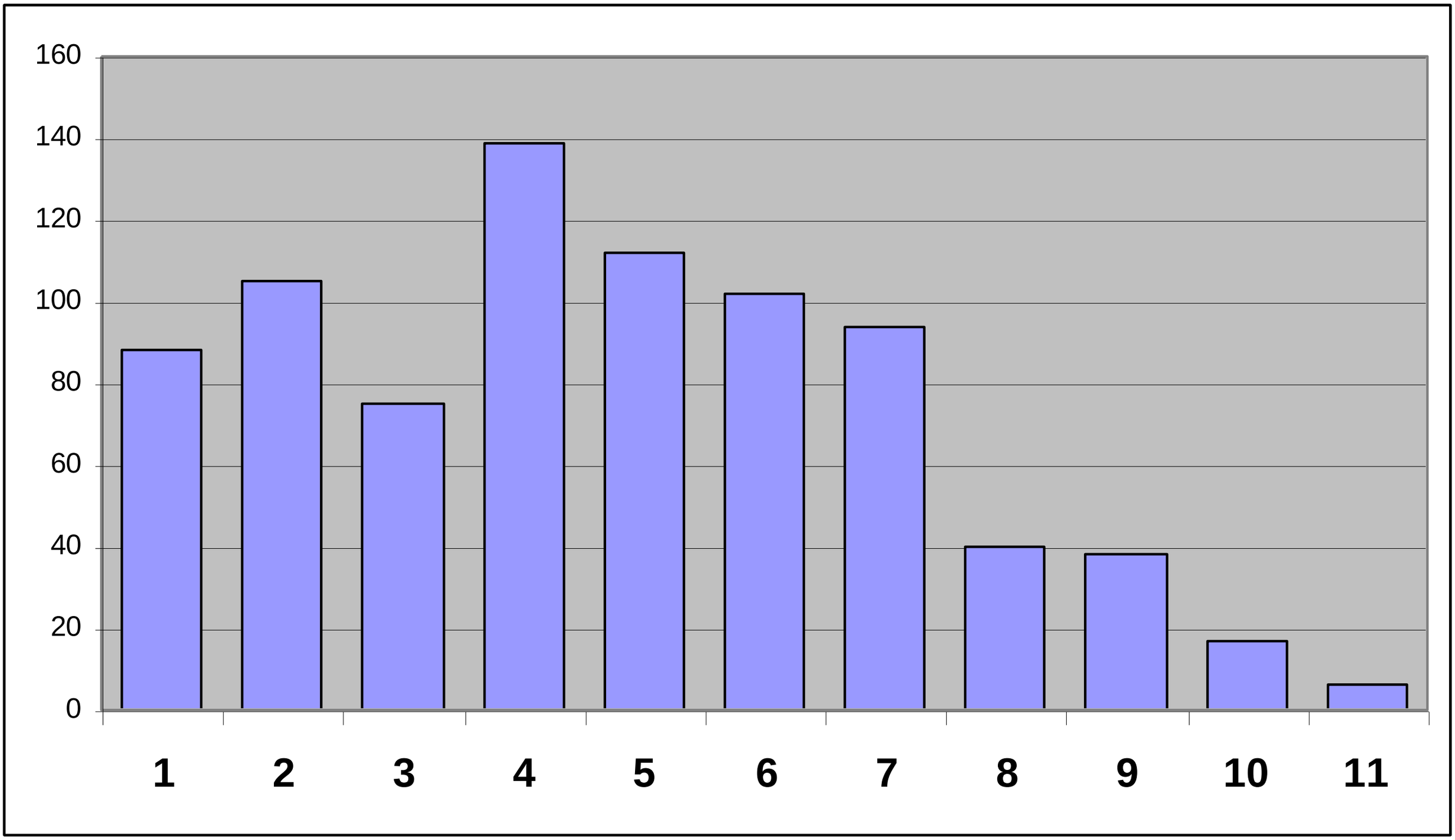
Which are the most popular methods?

Results of an analysis of the European Foresight Monitoring Network (EFMN) database



Methods Frequency (EFMN, 2006)

No. of Methods reportedly used in Foresight exercises (EFMN, 2006)



Corporate Foresight
Dominant Logics / Paradigms

Assumption:
The future can be foreseen by collecting and comparing the opinions of (numerous) experts.

Assumption:
The future can be calculated by appropriate computer models based on huge amounts of data and mathematical finesse.

Assumption:
Businesses can understand the future by anticipating the impact of trends on customers and markets.

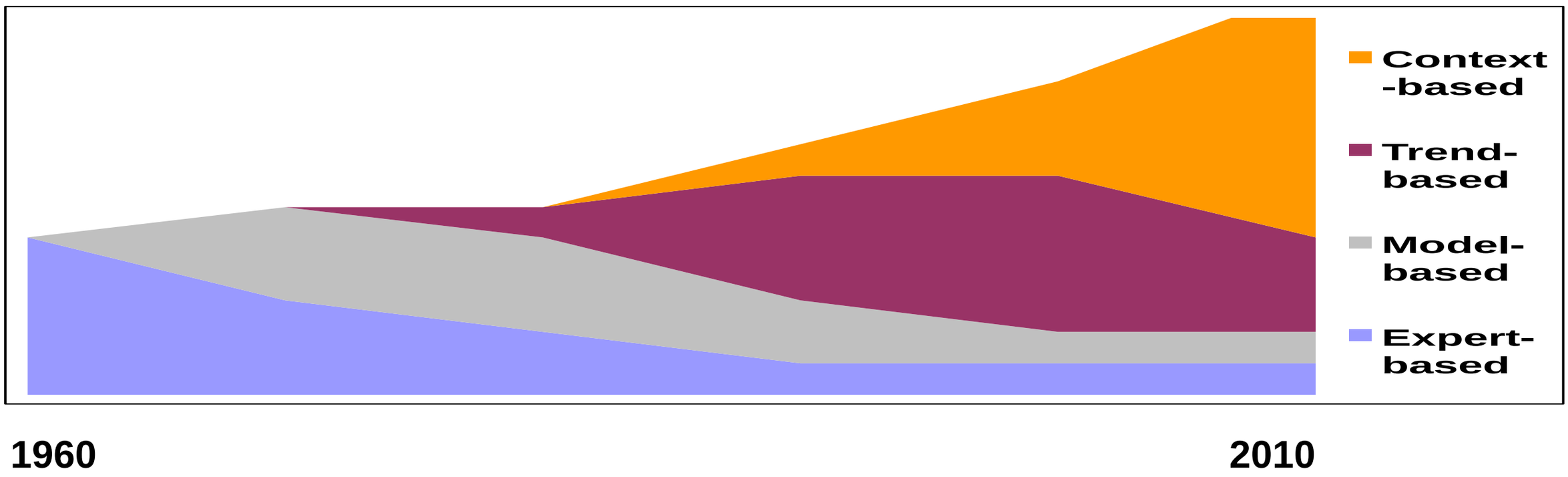
Assumption:
Businesses can shape future contexts and markets by anticipating the dynamic interaction between social, techn. & economic forces.

Expert-based Foresight

Model-based Foresight

Trend-based Foresight

Context-based („Open“) Foresight



Source: Daheim, 2007

Scoping Design Questions

- What are the characteristics and dynamics of the field that is foresighted? Who are the key players and stakeholders?
- What are the main questions or problems that make a Forward Look needed or appropriate?
- Can any sort of implementation of the results be expected and, if so, who should take care of the implementation? (Tailored end product)
- What expertise is needed to discuss the developments in the field and to what extent are external perspectives needed? Dedicated and motivated participants?
- What kind of specific interests or obstacles may be expected in the conduct of the foresight or in implementing the results? Hidden agendas?

Forward Look Checklist

- The present checklist should be used during the implementation and final phases of a Forward Look. It contains items to ensure that your program includes all necessary activities and meets ESF expectations.
- If you were to need any clarification or help with this checklist, please feel free to contact our office.

- **State of the Art**
- Have you made a clear overview of the current state of research in the area?
- Have you identified recent advances in the field?
- Have you identified potential advances in the near future?

- **Scientific Challenges**
- Have you started a SWOT analysis (Strength, Weaknesses, Opportunities, Threats) in your field?
- Can you estimate the potential impact of future advances in the field?
- Did the project identify the evolving topics in the field?
- Have you identified the strengths and weaknesses at National and European levels in this field?

Forward Look Checklist

- **Vision**
- Have you identified the medium and long term goals in the area?
- Have you identified the key players in the field and the key factors required to achieve the vision (in terms of infrastructure, human and financial resources, governance, means, etc.)?
- Have you started a draft research agenda for the Scientific Community in the field and the means of implementation?
- Have you taken into account all the various schools of thought in your area?

- **Scientific Challenges**
- Do you know who the major stakeholders are, and who the most influential institutions or groups in the field are?
- Do you have targeted recommendations for actions required to achieve the above vision?
- Do you plan to actively follow up the results of the Forward Look after the completion of the present initiative and how?
- Do you have a clear plan (for a 9-12 month schedule)?

Forward Look Report Design

- **State-of-the-Art review**
  - Current state of research in the area and highlights of the major advances in the last years
- **Scientific challenges**
  - Impact of those advances on the research agenda
  - Indication of major knowledge gaps and potential ‘hot topics’
  - Identification of European strength and weakness
- **Vision**
  - Presentation of a vision with major goals that could provide directions for research in the medium and long term time frame
  - Implementation plan (in terms of infrastructure, institutional innovation, human resources, governance)
- **Impact and Follow-up**
  - Key stakeholders likely to play a key role in the implementation
  - Targeted recommendations
  - Follow-up mechanism to ensure delivery and avoid risks

A recent example: NuPECC LRP2010

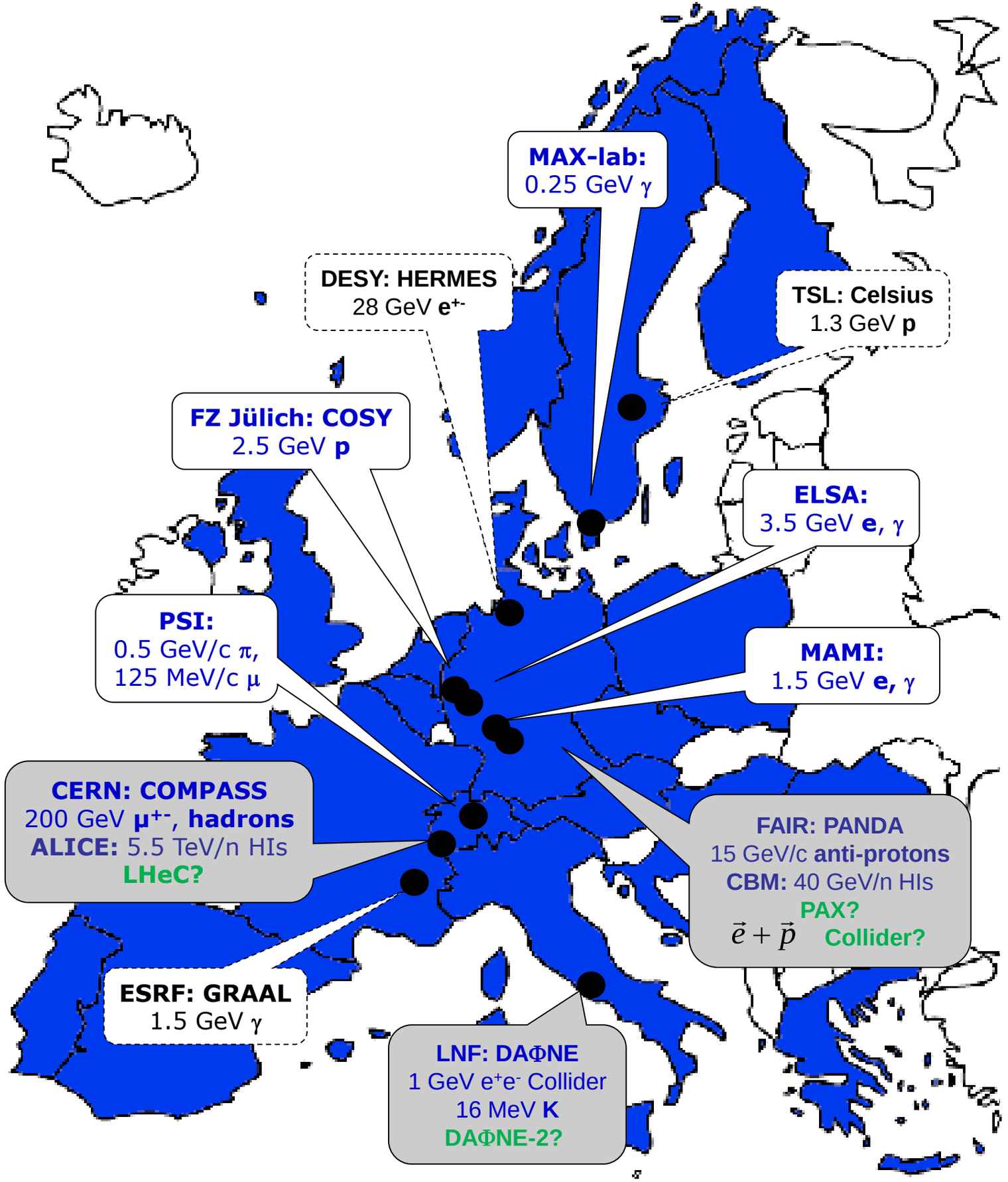
- Nuclear Physics projects involve setting up large-scale Research Infrastructures
  - Needs
    - Strong science case
    - Strong support of scientific community
    - Strong support of policy makers
    - Coherent action of funding agencies
  - Because they are expensive! Billions!
- NP projects have very long lead times
  - Needs (4000 researchers involved)
    - Considered planning ahead (Forward Looks)

Objectives

- Review status of the field
- Put European Nuclear Physics into the worldwide context
- Issue recommendations to advance
  - The science &
  - Its applications in Europe
- Develop action plan
  - Roadmap for
    - Upgrading existing NP facilities
    - Building new large-scale Research Infrastructures
- Collaborate with
  - IAs: HadronPhysics2 and ENSAR
  - Funding agencies: NuPNET

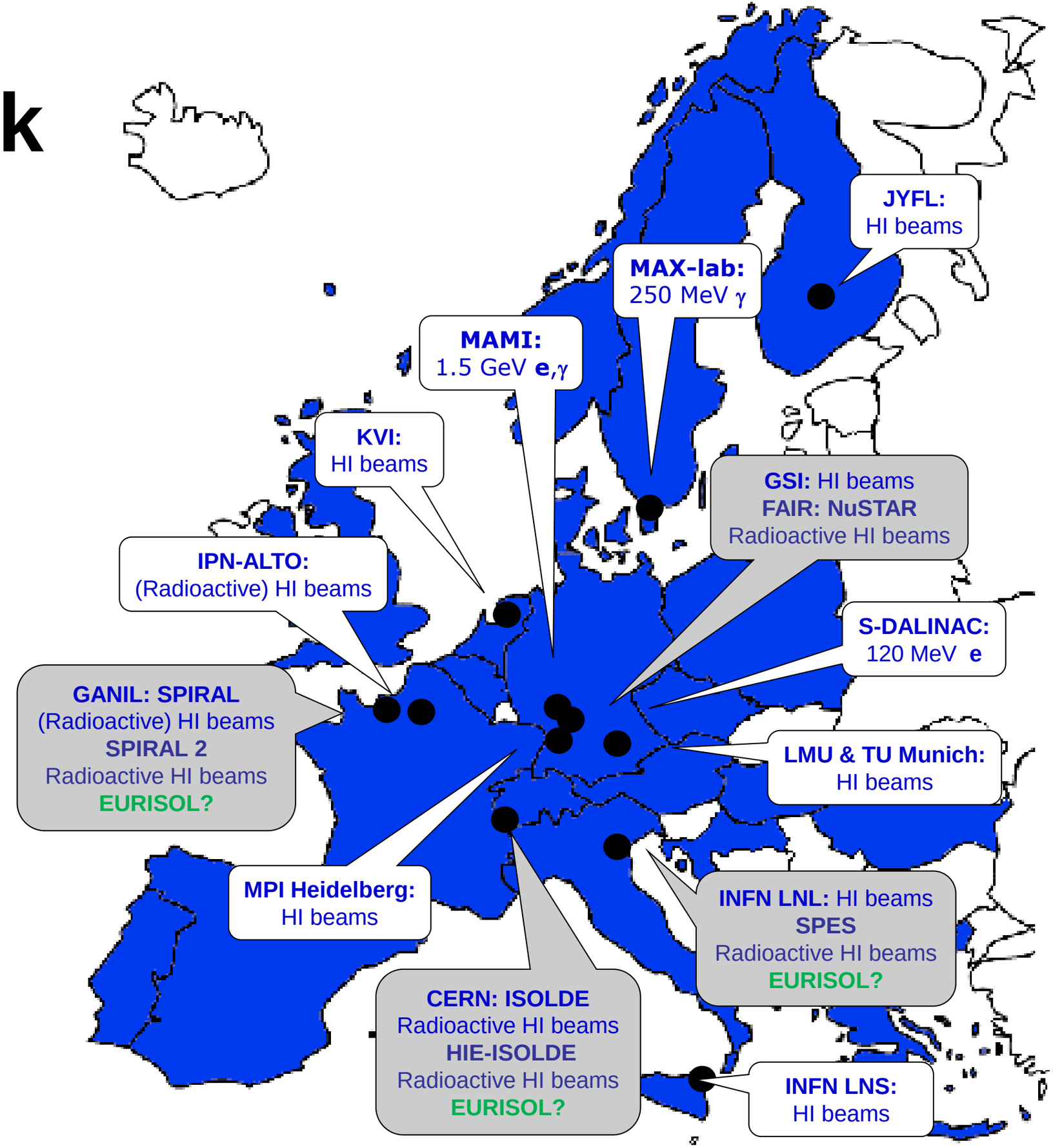
Taking stock

Hadron Physics Facilities



Taking stock

Nuclear Structure Facilities



Schedule

Dates	Actions	Deliverables
12-13/10/09	**Scoping Workshop** @ FIAS, Frankfurt	WGs' final lists of Big Questions, Key Issues & Activities
Oct. '09-Jan. '10	WGs draft Themes' contribution to LRP2010. SC + Liaison + Lab. Directors + FP7 Coordinators draft RIs chapter including networking and provide early feedback to WG-Conveners.	Draft, to SC **15/1/10**
Jan./Feb. '10	SC + Liaison + WG-Conveners draft Exec. Summary. SC drafts Recommendations: Priorities & Roadmap	Draft, to NuPECC **1/3/10**
12-13/3/10	NuPECC evaluates LRP2010 draft.	List of requested changes
March/Apr. '10	SC + Liaison + WGs revise draft.	Draft, to NuPECC **1/5/10**
May '10	NuPECC evaluates revised draft. SC + Liaison + WG-Conveners prepare Town Meeting.	Draft, to European NP community **15/5/10**
31/5-2/6/10	**Town Meeting** @ CISC, Madrid	List of requested changes
June-Oct. '10	SC + Liaison + WGs revise Draft LRP2010.	Draft, to NuPECC **25/9/10**
8-9/10/10	NuPECC evaluates revised draft.	List of requested changes
Oct.-Dec. '10	SC + Liaison + WGs finalise LRP2010.	**LRP2010**, published **Dec. 2010**.

2011: NuPECC Roadmap → ESF → ESFRI
→ Horizon 2020 to establish the European Research Area, ERA

Forward Look Process

Selection & Design

Proposal

Selection of Topics → **Champion Selection** → **Scoping & Design** → **Acceptance by the Governing Council**

Implementation

12 months

Forward Look Activities

Dissemination

6 months

Forward Look Report → **Implementation and Dissemination Plan**

- Green and White Papers
- Conference
- Frontiers of Science
- Press and Media