Foresight: Processes and Methods

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Foresight Methodology (Popper, 2008) in The Handbook of Technology Foresight

How are foresight methods selected? (Popper, 2008) in Foresight

Mapping Foresight (Popper, 2009) European Commission
Evolution of Foresight Mapping & Evaluation

- Our *Mapping Foresight* work has produced a vast amount of futures-related information *unprecedented in the world*

- Our *Mapping Foresight* activities have been useful to *understand foresight practices* in Europe and other world regions

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases Mapped</th>
<th>Identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>100</td>
<td>&gt; 800</td>
</tr>
<tr>
<td>2005</td>
<td>437</td>
<td>&gt; 1400</td>
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<tr>
<td>2006</td>
<td>767</td>
<td>&gt; 1600</td>
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<td>2007</td>
<td>846</td>
<td>&gt; 1600</td>
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<td>2008</td>
<td>&gt; 1000</td>
<td>&gt; 2000</td>
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<tr>
<td>2009</td>
<td>&gt; 1000</td>
<td>&gt; 2000</td>
</tr>
<tr>
<td>2010-2017</td>
<td>&gt; 1000</td>
<td>&gt; 2000</td>
</tr>
</tbody>
</table>

**Mapping Foresight**

**Key Lessons + Findings**

- Introducing networking (SNA) and systemic analyses into Foresight
- Introducing Wild Cards & Weak Signals (WI-WE) systems
- Web 2.0 scanning + Bottom-up Evaluation

**Mapping Foresight & Forecasting**

+ *Self-Rule: The Euro-Latin Foresight Network*
Foresight is a systematic, participatory, prospective and policy-oriented process which, with the support of environmental/horizon scanning approaches, is aimed to actively engage key stakeholders into a wide range of activities anticipating, recommending and transforming (ART) technological, economic, environmental, political, social and ethical (TEEPSE) futures.

- Key/Emerging/Frontier Issues
  - Environmental Scanning
  - Horizon Scanning

- ART
  - Anticipating
  - Recommending
  - Transforming

- TEEPSE futures
  - Technological
  - Economic
  - Environmental
  - Political
  - Social
  - Ethical

Source: R. Popper (2011)
**Scoping** is the starting point of the process, where practitioners, together with the sponsor: define the general and specific objectives; assemble the project team; and design the methodology.
Phase 1: Scoping

**aims and objectives**

**Common aims**
- shaping capacities and skills
- shaping strategies and priorities
- shaping paradigms and current visions
- shaping socio-economic and STI systems
- shaping behaviour, attitudes and lifestyles
- shaping knowledge-based products & services

**Common features of objectives**
- specific (clear)
- measurable (quantifiable outputs)
- achievable (attainable by the study)
- relevant (related to the aim)
- time-bounded (related to a deadline)
Phase 1: Scoping

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- relevant (related to the aim)
- time-bounded (related to a deadline)

The aims and objectives are amongst the most important elements of foresight practices, simply because they determine the overall scope of the activity and the type of players and outcomes that are required.
Phase 1: Scoping

rationales and background
Phase 1: Scoping

**rationalas and background**

<table>
<thead>
<tr>
<th>Common Rationales</th>
<th>Foresight</th>
<th>Forecasting</th>
<th>Horizon Scanning</th>
<th>Impact Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forecasting TEEPSE events/developments</td>
<td>★★★</td>
<td>★★★★</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Orienting policy and strategy development</td>
<td>★★★★★</td>
<td>★★★</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Recognising drivers/impacts of TEEPSE changes</td>
<td>★★★★★</td>
<td>★★★</td>
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<td>★★★★</td>
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<tr>
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<td>★★★</td>
<td>★★★★</td>
<td>★★★★</td>
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<tr>
<td>Supporting STI priority-setting and governance</td>
<td>★★★★★☆☆☆</td>
<td>★★★</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Identifying key/emerging TEEPSE issues</td>
<td>★★★★★☆☆☆</td>
<td>★★★★</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Generating (shared) visions and scenarios</td>
<td>★★★★★☆☆☆</td>
<td>★★★★</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Harmonising (STI) supply and demand needs</td>
<td>★★★★★☆☆☆</td>
<td>★★★</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Transforming/absorbing capacities and methodology</td>
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<td>★★★</td>
<td>★★★★</td>
<td>★★★★</td>
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<tr>
<td>Identifying risks, grand challenges and opportunities</td>
<td>★★★★★☆☆☆</td>
<td>★★★</td>
<td>★★★★</td>
<td>★★★★</td>
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<tr>
<td>Networking and international cooperation</td>
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<td>★★★</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Generating bridges between science and policy</td>
<td>★★★★★☆☆☆</td>
<td>★★★</td>
<td>★★★★</td>
<td>★★★★</td>
</tr>
</tbody>
</table>

**Notes**

TEEPE = technological, economic, environmental, political, social, ethical.

STI = science, technology and innovation.

★ = None/very low  
★★ = Low  
★★★ = Moderate  
★★★★ = High  
★★★★★ = Very high
Understanding the background requires:

(a) **recognising key events**, i.e. technological, economic, environmental, political, social, ethical issues; and

(b) **mapping ‘state-of-the-art’ knowledge** from academic/grey literature, databases, etc.) and relevant initiatives (e.g. research programmes, agendas, networks, expert groups, etc.)

### Common Rationales

<table>
<thead>
<tr>
<th>Rationale</th>
<th>Foresight</th>
<th>Forecasting</th>
<th>Horizon Scanning</th>
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<tr>
<td>Forecasting TEEPSE events/developments</td>
<td>⭐⭐⭐⭐⭐</td>
<td>⭐⭐⭐⭐⭐</td>
<td>⭐⭐⭐⭐⭐</td>
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<tr>
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<td>Engaging key stakeholders and decision-shapers</td>
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<tr>
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</table>
Phase 1: Scoping

context and domain coverage

Common context of foresight projects
- International foresight
- National foresight attached to a programme
- National foresight detached from a programme
- Sub-national foresight
- Corporate foresight
- Structural foresight

SMART Futures Jigsaw
Scoping Futures
Mobilising Futures
Anticipating Futures
Recommending Futures
Transforming Futures

Popper (2011)
Phase 1: Scoping

context and domain coverage

Common context of foresight projects
- International foresight
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- Corporate foresight
- Structural foresight

Analysis of the domain coverage of 841 foresight cases

<table>
<thead>
<tr>
<th>Research Areas</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
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<td>79%</td>
<td>26%</td>
<td>27%</td>
<td>34%</td>
<td>6%</td>
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<tr>
<td>Engineering &amp; Technology</td>
<td>59%</td>
<td>335</td>
<td>21%</td>
<td>20%</td>
<td>32%</td>
<td>5%</td>
</tr>
<tr>
<td>Medical Sciences</td>
<td>50%</td>
<td>56%</td>
<td>270</td>
<td>27%</td>
<td>54%</td>
<td>8%</td>
</tr>
<tr>
<td>Agricultural Sciences</td>
<td>55%</td>
<td>56%</td>
<td>29%</td>
<td>140</td>
<td>47%</td>
<td>10%</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>27%</td>
<td>35%</td>
<td>22%</td>
<td>19%</td>
<td>132</td>
<td>7%</td>
</tr>
<tr>
<td>Humanities</td>
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<td>65%</td>
<td>42%</td>
<td>50%</td>
<td>96%</td>
<td>26</td>
</tr>
</tbody>
</table>
Phase 1: Scoping

**methodology and work plan**
Phase 1: Scoping

**methodology and work plan**

Key methodology features
- Creativity – Exploratory methods
- Interaction – Participatory methods
- Evidence – Explanatory methods
- Expertise – Advisory methods
## Top 10 Methods per World Region

*(Popper et al, 2007)*

### EU27+ (485 cases and 1835 methods)
- **Average 4**
  - **1.** Literature Review (63%)
  - **2.** Expert Panels (52%)
  - **3.** Scenarios (47%)
  - **4.** Other methods (24%)
  - **5.** Futures Workshops (22%)
  - **6.** Brainstorming (20%)
  - **7.** Trend Extrapolation (19%)
  - **8.** Delphi (17%)
  - **9.** SWOT Analysis (15%)
  - **10.** Interviews (15%)

### Trans-Europe (61 cases and 192 methods)
- **Average 3**
  - **1.** Literature Review (48%)
  - **2.** Scenarios (41%)
  - **3.** Expert Panels (30%)
  - **4.** Technology Roadmapping (23%)
  - **5.** Key Technologies (28%)
  - **6.** Megatrend Analysis (19%)
  - **7.** Trend Extrapolation (19%)
  - **8.** Other methods (19%)
  - **9.** Interviews (16%)
  - **10.** Modelling & simulation (13%)

### North America (109 cases and 328 methods)
- **Average 3**
  - **1.** Expert Panels (57%)
  - **2.** Scenarios (46%)
  - **3.** Literature Review (45%)
  - **4.** Technology Roadmapping (39%)
  - **5.** Environmental Scanning (39%)
  - **6.** Questionnaire / Survey (58%)
  - **7.** Brainstorming (37%)
  - **8.** Essays (30%)
  - **9.** Trend Extrapolation (30%)
  - **10.** Structural analysis (38%)

### Latin America (24 cases and 188 methods)
- **Average 8**
  - **1.** Other methods (71%)
  - **2.** Expert Panels (80%)
  - **3.** Scenarios (57%)
  - **4.** Futures Workshops (67%)
  - **5.** Megatrend Analysis (56%)
  - **6.** Literature Review (55%)
  - **7.** Literature Review (50%)
  - **8.** Literature Review (50%)
  - **9.** Expert Panels (40%)
  - **10.** Other methods (40%)

### Asia (51 cases and 280 methods)
- **Average 6**
  - **1.** Expert Panels (80%)
  - **2.** Scenarios (57%)
  - **3.** Literature Review (55%)
  - **4.** Literature Review (67%)
  - **5.** Literature Review (55%)
  - **6.** Literature Review (67%)
  - **7.** Literature Review (67%)
  - **8.** Literature Review (55%)
  - **9.** Megatrend Analysis (56%)
  - **10.** Expert Panels (40%)

### Africa (10 cases and 47 methods)
- **Average 5**
  - **1.** Interviews (33%)
  - **2.** Other methods (19%)
  - **3.** Expert Panels (67%)
  - **4.** Scenarios (57%)
  - **5.** Modelling & simulation (39%)
  - **6.** Expert Panels (67%)
  - **7.** Expert Panels (40%)
  - **8.** Megatrend Analysis (20%)
  - **9.** Megatrend Analysis (20%)
  - **10.** Megatrend Analysis (20%)

### Oceania (15 cases and 35 methods)
- **Average 2**
  - **1.** Interviews (33%)
  - **2.** Other methods (19%)
  - **3.** Interviews (33%)
  - **4.** Megatrend Analysis (20%)
  - **5.** Megatrend Analysis (20%)
  - **6.** Megatrend Analysis (20%)
  - **7.** Megatrend Analysis (20%)
  - **8.** Megatrend Analysis (20%)
  - **9.** Megatrend Analysis (20%)
  - **10.** Megatrend Analysis (20%)
Classifying methods by their capabilities

FUTURES DIAMOND
R. Popper (2011)

CREATIVITY
EXEMPLARY METHODS

SF
WILD CARD
SCENARIO VIGNETTE
GENIUS/EXPERT FORECAST
BACKCASTING ROLE PLAY/GAMING
TEEPSE ANALYSIS SWOT BRAINSTORMING
ROADMAPPING DELPHI SCENARIO WORKSHOP
PREDICTION MARKET WEB-BASED CROWDSOURCING
RULE-BASED FORECAST RELEVANCE TREES CITIZEN PANEL
MULTI-CRITERIA ANALYSIS MULTIPLE PERSPECTIVE ANALYSIS SURVEY
EXPERT PANEL SYSTEM DYNAMICS/SIMULATION CONFERENCE/WORKSHOP
KEY TECHNOLOGIES MORPHOLOGICAL ANALYSIS POLLING/VOTING
IMPACT ANALYSIS DATA/TEXT MINING STAKEHOLDER ANALYSIS
CROSS-IMPACT/STRUCTURAL ANALYSIS BENCHMARKING
SMIC INTERVIEW LOGIC CHART SEGMENTATION
INDICATOR/INDEX REGRESSION ANALYSIS
EXTRAPOLATION PATENT ANALYSIS
BIBLIOGRAPHY SCANNING
LITERATURE REVIEW
WEAK SIGNAL
SNA

EXPERTISE
ADVISORY METHODS

INTERACTION
PARTICIPATORY METHODS

EVIDENCE
EXPLANATORY METHODS

LEGEND
QUALITATIVE
QUANTITATIVE
SEMI-QUANTITATIVE
Classifying methods by their nature

<table>
<thead>
<tr>
<th>Qualitative</th>
<th>Quantitative</th>
<th>Semi-quantitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods providing meaning to events and perceptions. Such interpretations tend to be based on subjectivity or creativity often difficult to corroborate (e.g. brainstorming, interviews)</td>
<td>Methods measuring variables and apply statistical analyses, using or generating (hopefully) reliable and valid data (e.g. economic indicators)</td>
<td>Methods which apply mathematical principles to quantify subjectivity, rational judgements and viewpoints of experts and commentators (i.e. weighting opinions)</td>
</tr>
<tr>
<td>7. Genius forecasting</td>
<td></td>
<td>32. Roadmapping</td>
</tr>
<tr>
<td>8. Interviews</td>
<td></td>
<td>33. Stakeholder analysis</td>
</tr>
<tr>
<td>9. Literature review</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Morphological analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Relevance trees / logic charts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Role play / Acting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Scanning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Scenario / Scenario workshops</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Science fictioning (SF)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Simulation gaming</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Surveys</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. SWOT analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Weak signals / Wildcards</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Popper (2008)
Foresight methods are **NOT** different from those used in other disciplines.

*Foresight practitioners* borrow and adapt methods from *management, planning* and *social sciences*. However, what makes Foresight methods particularly unique is their application to *futures research* and the willingness to undertake serious analysis by combining:

- **Prospective approaches**;
- **Participatory/networking approaches**; and
- **Policy-making approaches**.

There are plenty of methods that can be used in Foresight Processes…
Towards the European Foresight ‘*Periodic Table’*?
Towards the European Foresight ‘Periodic Table’?
## Work Plan

### iKnow Project Work Plan

<table>
<thead>
<tr>
<th>Task</th>
<th>Time Frame</th>
<th>Duration</th>
</tr>
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<tbody>
<tr>
<td>WP1: Management / Coordination</td>
<td>2008-2011</td>
<td>4 years</td>
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<td>WP2: Literature Review</td>
<td>2009-2010</td>
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<tr>
<td>WP3: WI-WE Characterisation</td>
<td>2009-2011</td>
<td>3 years</td>
</tr>
<tr>
<td>WP4: Delphi &amp; Interviews</td>
<td>2009-2010</td>
<td>2 years</td>
</tr>
<tr>
<td>WP5: Impact Surveys</td>
<td>2009-2011</td>
<td>3 years</td>
</tr>
<tr>
<td>WP6: Workshops</td>
<td>2009-2011</td>
<td>3 years</td>
</tr>
<tr>
<td>WP7: Case Studies</td>
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<td>4 years</td>
</tr>
<tr>
<td>WP8: IT Applications</td>
<td>2009-2011</td>
<td>3 years</td>
</tr>
<tr>
<td>WP9: Dissemination and Policy</td>
<td>2009-2011</td>
<td>3 years</td>
</tr>
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</table>
Phase 1: Scoping

**territorial scope**

Most common territorial scopes
- National
- Supra-national
- Sub-national
Phase 1: Scoping

**territorial scope**

Most common territorial scopes
- National
- Supra-national
- Sub-national

Analysis of the territorial scope of 1639 foresight cases

<table>
<thead>
<tr>
<th>Region</th>
<th>Supra-national</th>
<th>National</th>
<th>Sub-national</th>
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<tbody>
<tr>
<td>Europe</td>
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<td>658</td>
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</tr>
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<td>Latin...</td>
<td>16</td>
<td>94</td>
<td>16</td>
</tr>
<tr>
<td>North...</td>
<td>9</td>
<td>148</td>
<td>23</td>
</tr>
<tr>
<td>Asia</td>
<td>30</td>
<td>53</td>
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<tr>
<td>Oceania</td>
<td></td>
<td>43</td>
<td>2</td>
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</table>
Phase 1: Scoping

*time horizon(s)*

Common time horizon(s)

- Up to 10 years
- 11-15 years
- 16-20 years
- 21-30 years
- 31-50 years
- 51-100 years
Phase 1: Scoping

time horizon(s)

Common time horizon(s)
- Up to 10 years
- 11-15 years
- 16-20 years
- 21-30 years
- 31-50 years
- 51-100 years

Analysis of the time horizon(s) of 1236 foresight cases

Europe
- Up to 10 years: 273
- 11-15 years: 203
- 16-20 years: 209
- 21-30 years: 155
- 31-50 years: 66
- 51-100 years: 7

Latin America
- Up to 10 years: 16
- 11-15 years: 28
- 16-20 years: 43
- 21-30 years: 9

North America
- Up to 10 years: 26
- 11-15 years: 12
- 16-20 years: 42
- 21-30 years: 24

Asia
- Up to 10 years: 18
- 11-15 years: 22
- 16-20 years: 24
- 21-30 years: 23

Oceania
- Up to 10 years: 7
- 11-15 years: 3
- 16-20 years: 5
- 21-30 years: 2

Phase 1: Scoping

**funding & duration**

Common funding level of projects
- < 50,000 Euros
- 50,000 - 200,000 Euros
- 200,000 - 500,000 Euros
- > 500,000 Euros

Common duration of projects
- < 6 months
- 6 - 12 months
- 1 - 2 years
- > 2 years
Phase 1: Scoping

**funding & duration**

### Funding

- **< 50k**
  - Northwest Europe: 4%
  - Southern Europe: 14%
  - Eastern Europe: 13%
  - South America: 10%
  - Total: 33%
- **50-200k**
  - Northwest Europe: 33%
  - Southern Europe: 57%
  - Eastern Europe: 25%
  - South America: 10%
  - Total: 63%
- **200-500k**
  - Northwest Europe: 50%
  - Southern Europe: 50%
  - Eastern Europe: 52%
  - South America: 50%
  - Total: 50%
- **> 500k**
  - Northwest Europe: 0%
  - Southern Europe: 50%
  - Eastern Europe: 50%
  - South America: 0%
  - Total: 10%

### Duration

- **< 6 months**
  - Northwest Europe: 10%
  - Southern Europe: 50%
  - Eastern Europe: 50%
  - South America: 50%
  - Total: 50%
- **6-12 months**
  - Northwest Europe: 52%
  - Southern Europe: 50%
  - Eastern Europe: 50%
  - South America: 50%
  - Total: 50%
- **1-2 years**
  - Northwest Europe: 29%
  - Southern Europe: 50%
  - Eastern Europe: 50%
  - South America: 50%
  - Total: 50%
- **> 2 years**
  - Northwest Europe: 10%
  - Southern Europe: 50%
  - Eastern Europe: 50%
  - South America: 50%
  - Total: 50%
Mobilising is represented as the second phase of Foresight. However, some activities are simultaneously initiated with the scoping phase, such as contract negotiations with the sponsor or definition of the project team; while others run throughout the life of the project (e.g. engaging target groups).
Phase 2: Mobilising

sponsors & champions

Common sponsors
- Government
- Research
- Business
- Non-state (e.g. IGOs such as the EU)
**Phase 2: Mobilising sponsors & champions**

**Common sponsors**
- Government
- Research
- Business
- Non-state (e.g. IGOs such as the EU)

---

### Analysis of the sponsors of 1000+ foresight cases

<table>
<thead>
<tr>
<th>Region</th>
<th>Government Actors</th>
<th>Research Actors</th>
<th>Business Actors</th>
<th>Non-State Actors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>91%</td>
<td>16%</td>
<td>8%</td>
<td>7%</td>
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<tr>
<td>Latin America</td>
<td>94%</td>
<td>25%</td>
<td>13%</td>
<td>44%</td>
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<tr>
<td>North America</td>
<td>72%</td>
<td>8%</td>
<td>30%</td>
<td>5%</td>
</tr>
<tr>
<td>Asia</td>
<td>64%</td>
<td>29%</td>
<td>9%</td>
<td>30%</td>
</tr>
<tr>
<td>Oceania</td>
<td>57%</td>
<td>7%</td>
<td>29%</td>
<td>7%</td>
</tr>
</tbody>
</table>

Multiple sponsorship means totals exceed 100% in most regions.
Phase 2: Mobilising

**research & support teams**

**Common activities of the team**
- Research
- Technology development
- Management and other support
Phase 2: Mobilising

**research & support teams**

Common activities of the team
- Research
- Technology development
- Management and other support

### Capacities
iKnow Project Capacities (distribution of 40 people by type of activity)

- Research
- Technology Development
- Management / Other support

### Efforts
iKnow Project Efforts (distribution of 126 person/months by type of activity)

- Research
- Technology Development
- Management / Other support
Phase 2: Mobilising

**methodology & domain experts**

Key roles of methodology experts
- training
- designing
- implementing
- supervising

Common domain experts
A. Natural sciences
B. Engineering and technology
C. Medical sciences
D. Agricultural sciences
E. Social sciences
F. Humanities
Phase 2: Mobilising

**methodology & domain experts**

Knowledge domains
A. Natural sciences
B. Engineering and technology
C. Medical sciences
D. Agricultural sciences
E. Social sciences
F. Humanities

Analysis of knowledge domain linkages in 841 cases
Phase 2: Mobilising

cooperation & networking

Common types of cooperation & networking
- between regions
- between countries
- between organisations
Phase 2: Mobilising

**cooperation & networking**

Common types of cooperation & networking
- between regions
- between countries
- between organisations

Analysis of foresight cooperation and networking between **regions** in 643 European and Latin American cases

<table>
<thead>
<tr>
<th>Foresight Cooperation</th>
<th>With NWE</th>
<th>With SE</th>
<th>With EE</th>
<th>With SA</th>
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</thead>
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<tr>
<td>North-West Europe (NWE)</td>
<td>63%</td>
<td>14%</td>
<td>18%</td>
<td>6%</td>
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<tr>
<td>Southern Europe (SE)</td>
<td>52%</td>
<td>30%</td>
<td>9%</td>
<td>9%</td>
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<td>Eastern Europe (EE)</td>
<td>41%</td>
<td>10%</td>
<td>45%</td>
<td>4%</td>
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<tr>
<td>South America (SA)</td>
<td>30%</td>
<td>13%</td>
<td>10%</td>
<td>47%</td>
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</table>

Source: Adapted from *Evaluating Foresight* (Popper et al., 2010) – 643 Cases: 467 NWE, 62 SE, 35 EE, 79 SA.
Phase 2: Mobilising

coopération & networking

Common types of cooperation & networking
- between regions
- between countries
- between organisations

Analysis of foresight cooperation and networking between countries in 1000+ cases
Phase 2: Mobilising

**participation scale**

**Common activities of the team**
- Research
- Technology development
- Management and other support

**Phase 2: Mobilising Participation Scale**

- Key and emerging technologies
- Visions, scenarios & forecasts
- Wild cards & weak signals
- Investment & training
- Appropriation & dissemination
- Models & frameworks
- SWOT & grand challenges
- Drivers, trends, & megatrends
- Priorities & strategies
- Paradigms & current visions
- Knowledge-based products & services
- Socio-economic & STI systems
- Capacities & skills
- Alliances
- Initiatives
- Cooperation & networking
- Research & support teams
- Methodology & domain experts
- Sponsors & champions
- Players
- Target groups
- Methodology & work plan
- Behaviour, attitudes & lifestyles
- Time horizon(s)
- Pathways & roadmaps
- Context & domain coverage
- Practices
- Rationales & background
- Funding & duration
- (FHS) research
- Alliances
- Players
participation by methods

- Literature Review (10)
- Scanning (30)
- Workshops (200)
- Web-based crowdsourcing (300)
- TEEPSE Analysis (10)
- Wild Cards Analysis (30)
- Weak Signals Analysis (30)
- Surveys (50)
- Interviews (60)
- Brainstorming (80)
- Science Fictining (10)
- Delphi survey (600)
- Expert Panels (20)
- Conferences (100)
Phase 2: Mobilising

target groups

Common target groups
- Public organisations
- Research and education organisations
- Private organisations
- Non-State Actors, e.g. EU, UNIDO, UNESCO
- Non-governmental organisations (NGO)
- Media
- Civil society
Phase 2: Mobilising

**target groups**

Common target groups
- Public organisations
- Research and education organisations
- Private organisations
- Non-State Actors, e.g. EU, UNIDO, UNESCO
- Non-governmental organisations (NGO)
- Media
- Civil society

### Analysis of target groups in 700+ European and Latin American cases

<table>
<thead>
<tr>
<th>Target Group</th>
<th>Northwest Europe</th>
<th>Southern Europe</th>
<th>Eastern Europe</th>
<th>South America</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Agencies / Departments</td>
<td>91%</td>
<td>97%</td>
<td>100%</td>
<td>91%</td>
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<tr>
<td>Research organisations</td>
<td>54%</td>
<td>68%</td>
<td>69%</td>
<td>90%</td>
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<tr>
<td>Business organisations</td>
<td>45%</td>
<td>68%</td>
<td>63%</td>
<td>62%</td>
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<tr>
<td>Trade Bodies / Industrial Federations</td>
<td>45%</td>
<td>31%</td>
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<tr>
<td>Intermediary organisations</td>
<td>31%</td>
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<tr>
<td>Other target groups</td>
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<td>NGOs</td>
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<tr>
<td>Trades Unions</td>
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</tbody>
</table>
Phase 2: Mobilising

public relations (engagement) & marketing

Communication & dissemination tools
- online
  - websites / blogs / web-discussions
  - emails / electronic newsletters
  - web-videos / podcasts
  - tutorials / apps
- offline
  - policy / research briefs
  - television / radio / press promotion
  - conferences / seminars / symposia
  - newsletters / flyers / leaflets / brochures
Phase 2: Mobilising

*public relations (engagement) & marketing*

Example of the CfWI horizon scanning hubs in web and app formats

Developed by

[Logos and text]
Anticipating involves generating the ‘formal outputs’ of the process. The anticipatory intelligence developed in this phase often reflects different elements of the present situation and future contingencies by combining Outward-looking, Inward-looking and Forward-looking approaches.
Phase 3: Anticipating

visions, scenarios & forecasts

Key features visions and scenarios
- exploratory
- normative

Key features of forecasts
- Qualitative
- Quantitative
- Semi-quantitative
Phase 3: Anticipating

visions, scenarios & forecasts

Key features visions and scenarios
- exploratory
- normative

Key features of forecasts
- Qualitative
- Quantitative
- Semi-quantitative

Examples of common scenario approaches

2 x 2
Archetype
Success
Phase 3: Anticipating

key & emerging technologies

Features of key / emerging technologies
- regional / national / sectoral relevance
- key / emerging due to contribution to:
  - quality of life
  - competitiveness
  - wealth creation
  - influence on other technologies
Phase 3: Anticipating

**key & emerging technologies**

Features of key / emerging technologies
- regional / national / sectoral relevance
- key / emerging due to contribution to:
  - quality of life
  - competitiveness
  - wealth creation
  - influence on other technologies

Example of key technologies process based on secondary research
Phase 3: Anticipating

key & emerging technologies

Features of key / emerging technologies
- regional / national / sectoral relevance
- key / emerging due to contribution to:
  - quality of life
  - competitiveness
  - wealth creation
  - influence on other technologies

Example of key technologies with sectoral (health) relevance

- **Therapeutic technology**
  - Regenerative medicine
  - Minimally invasive procedures
- **Diagnostic technology**
  - Nanotechnology
  - Point-of-care (POC) diagnostics
- **Enabling technology**
  - Mobile technology
  - Wearable health monitors
  - Assistive technologies
- **Preventive technology**
  - Genomics
  - Gaming and education
- **Organisational technology**
  - Integrated big data
Phase 3: Anticipating

**SWOT & Grand Challenges**

Key features SWOT analysis
- Inward-looking
- Outward-looking
- Forward-looking

Key features of grand challenges
- Top-down
- Bottom-up
Phase 3: Anticipating

**SWOT & Grand Challenges**

Key features SWOT analysis
- Inward-looking
- Outward-looking
- Forward-looking

Key features of grand challenges
- Top-down
- Bottom-up

Examples of SWOT and Grand Challenges approaches

- S: strengths
- O: opportunities
- W: weakness
- T: threats

Big picture challenges
The CfWI’s big picture challenges are complex high-level challenges facing policymakers in health, social care and public health.
Phase 3: Anticipating

**TEEPSE drivers, trends & megatrends**

Key dimensions of TEEPSE analysis
- Technological
- Economic
- Environmental
- Political
- Social
- Ethical
Phase 3: Anticipating

**TEEPSE drivers, trends & megatrends**

Key dimensions of TEEPSE analysis
- Technological
- Economic
- Environmental
- Political
- Social
- Ethical

Example of TEEPSE drivers analysis

- 381 emerging issues
- 42 emerging issues
- 11 key issues
- 16 strategic implications
Phase 3: Anticipating

**wild cards & weak signals**

**Key features of wild cards**
- Nature-related
- Unplanned
- Planned

**Key features of weak signals**
- Interpretation uncertainty
- Importance uncertainty
- Implication uncertainty
Phase 3: Anticipating

**wild cards & weak signals**

Key features of wild cards
- Nature-related
- Unplanned
- Planned

Key features of weak signals
- Interpretation uncertainty
- Importance uncertainty
- Implication uncertainty

Ubiquity of **Wild Cards** and **Weak Signals** (WI-WE) analysis
Phase 3: Anticipating

**models & frameworks**

Common types of models / frameworks
- Qualitative
- Quantitative

Key features of models / frameworks
- conceptual
- methodological
- analytical
Phase 3: Anticipating

**models & frameworks**

Common types of models / frameworks
- qualitative
- quantitative

Key features of models / frameworks
- conceptual
- methodological
- analytical

---

Example of qualitative model

Example of methodological framework
Phase 3: Anticipating

**pathways & roadmaps**

Common types of pathways / roadmaps
- single-layer
- multi-layer

Key features of pathways / roadmaps
- linear
- non-linear
Phase 3: Anticipating

Pathways & Roadmaps

Common types of pathways / roadmaps
- single-layer
- multi-layer

Key features of pathways / roadmaps
- linear
- non-linear

Example of pathways from signposts to megatrends to megathemes
Phase 3: Anticipating

pathways & roadmaps

Common types of pathways / roadmaps
- single-layer
- multi-layer

Key features of pathways / roadmaps
- linear
- non-linear

For further information, contact:
Dr. Alexander Chulok
achulok@hse.ru

Developed by
Higher School of Economics
Institute for Statistical Studies and Economics of Knowledge
Foresight Centre
**Recommendation** should be considered a critical phase of the process. Even where recommendations are not explicitly stated in ‘formal outputs’ (e.g. reports), often they can be detected implicitly in the form of, for example, success or normative scenarios.
Phase 4: Recommending

Common types of recommendations
- policies and actions
- initiatives and actors
- appropriation and dissemination
- investments and training
- alliances and synergies
- (Foresight & Horizon Scanning) research
Phase 4: Recommending

Common types of recommendations
- policies and actions
- initiatives and actors
- appropriation and dissemination
- investments and training
- alliances and synergies
- (Foresight & Horizon Scanning) research

Analysis of the typology of recommendations from 500+ foresight cases

- Policies and actions: 80%
- Initiatives and actors: 57%
- Appropriation and dissemination: 37%
- Investments and training: 37%
- Alliances and synergies: 35%
- (FHS) Research: 35%
Phase 4: Recommending

Key features of recommendations
• Feasible
• Necessary
• Evidence-based
• Relevant to the objectives
• Informed by anticipatory phase
• Etc.

Example of recommending process based on opportunities and threats
Phase 4: Recommending

Key features of recommendations
- Feasible
- Necessary
- Evidence-based
- Relevant to the objectives
- Informed by anticipatory phase
- Etc.

Example of recommending process based on opportunities and threats
Transforming involves constant monitoring and evaluation in order to assess whether the foresight process has helped to achieve its original objectives and how far results are being acted on. One main challenge here is the development of success indicators to assess foresight impacts.
Phase 5: Transforming

Key areas of transformations
- capacities and skills
- priorities and strategies
- paradigms and current visions
- socio-economic and STI systems
- behaviour, attitudes and lifestyles
- knowledge-based products and services
Phase 5: Transforming

Key areas of transformations
- capacities and skills
- priorities and strategies
- paradigms and current visions
- socio-economic and STI systems
- behaviour, attitudes and lifestyles
- knowledge-based products and services

Example of evaluation process aimed to map key transformations

Key transformations are often linked to:
1. General objectives
2. Specific objectives
3. Activities
4. STI-related impacts
5. Other key impacts
Phase 5: Transforming

Key areas of transformations
- capacities and skills
- priorities and strategies
- paradigms and current visions
- socio-economic and STI systems
- behaviour, attitudes and lifestyles
- knowledge-based products and services

Example of methods used for the evaluation of key transformations
Phase 5: Transforming

Key areas of transformations
• capacities and skills
• priorities and strategies
• paradigms and current visions
• socio-economic and STI systems
• behaviour, attitudes and lifestyles
• knowledge-based products and services

Example of evaluation of new capacities and knowledge-based products

Transforming...
• Foresight
• Horizon scanning
• Productive chain

... capacities and skills:
1. Process design
2. Methods and methodology
3. Process management

Transforming...
... knowledge-based products:
1. Findings and outputs
2. Immediate impact
3. Future impact
Foresight Methods: How to select them?
How is selection influenced by the intrinsic nature of methods?

very high influence

Note: 886 cases
Sources: EFMN and SELF-RULE (2008)
Is this the case in your region/country?

Draw your own conclusions

<table>
<thead>
<tr>
<th>Foresight Methods</th>
<th>Brazil</th>
<th>Peru</th>
<th>Latin America</th>
<th>Canada</th>
<th>United States</th>
<th>North America</th>
<th>Japan</th>
<th>South Korea</th>
<th>Asia</th>
<th>Czech Republic</th>
<th>Denmark</th>
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Let us visualise the “Methods Mix”

Frequency of combinations

- L (or blank) = below 19%
- M = 20-39%
- H = 40-59%
- VH = above 60%
Mapping methods used with Roadmapping

Frequency of combinations:

- L (or blank) = below 19%
- M = 20-39%
- H = 40-59%
- VH = above 60%
Now, what if you want to use scenarios...

What other methods would you use?
What do we know from **886 case studies**?
How to design a foresight methodology?
Let us explore 2 demo cases with 6 methods
Methodology X (Forward)

Evidence
+ Broad Expertise
+ Wild Creativity
+ Interaction
+ Local Expertise
+ Strategic Creativity

Internal activity (possibly desk-work) aimed at synthesising outcomes in terms of current strengths and weaknesses as well as future opportunities and threats.

Detailed analysis of main issues around a particular sector/theme of study (sub-contracted).

Scanning

Delphi

Wild Cards

Citizen Panel

Expert Panel

SWOT

Wild cards
Methodology X (Backward)

SWOT
- Expert panels
- Citizen panels
- Wild Cards
- Delphi

Wild cards

Expert Panels

Delphi

Citizen Panels

Scanning

Strategic Creativity +
Local Expertise +
Interaction +
Wild Creativity +
Broad Expertise +
Evidence

Large-scale activity (e.g. workshop) aimed at identifying strengths, weaknesses, opportunities and threats related to a sector / theme / technology / etc.

Internal activity aimed at identifying disruptive events and situations.

Large-scale normative study aimed at formulating policy recommendations.

Regional task forces contextualising main issues and evaluating public acceptance.

Expert panels looking at future implications of SWOT findings and clustering main issues into broader dimensions, such as social, technological, economic, etc.
There are many methodology options, indeed!

9 methods
- Scenario writing
- Backcasting
- Roadmapping
- SWOT
- Extrapolation
- Scanning
- Literature review
- Scenario workshops
- Workshops

8 methods
- Scenario writing
- Roadmapping
- Expert panels
- SWOT
- Workshops
- Extrapolation
- Benchmarking
- Brainstorming

7 methods
- Scenario writing
- Expert panel
- Delphi
- Interviews
- Workshops
- Extrapolation
- Benchmarking

8 methods
- Scenario writing
- Backcasting
- Delphi
- Survey
- Brainstorming
- Expert panels
- Scenario workshops
- Workshops
- Scanning
- Literature review

6 methods
- Wild cards
- Expert Panels
- Delphi
- Citizen Panels
- Scanning
• **Principle of future-orientation**: foresight is a future-oriented activity, though not in a predictive sense. In fact, foresight assumes that the future is not pre-determined, but can evolve in different directions, depending upon the actions of various players and the decisions taken today. In other words, the future can be actively shaped, at least to some extent, and there is a certain degree of freedom to choose among alternative, plausible futures, and hence to increase the likelihood of arriving at a preferred (selected) future state.

• **Principle of participation**: foresight values the multiplicity of perspectives, interests, and knowledge held across a dispersed landscape of actors, and seeks to bring these together in processes of deliberation, analysis, and synthesis. Thus, foresight is not the preserve of a small group of experts or academics but involves a wider number of different groups of actors concerned with the issues at stake. Moreover, the results of foresight often have implications for a wide variety of actors, so it is important to involve these as far as possible throughout the process.

• **Principle of evidence**: foresight relies upon informed opinion and interpretation, as well as creative approaches in formulating conjectures on the future. However, these are seldom sufficient on their own and are complemented with various sorts of data from trend analyses and forecasting, bibliometrics, and official statistics, among other sources. Clearly, the future cannot be known with certainty and it is impossible to test conjectures on the future in the same way as one might test scientific knowledge claims. However, the plausibility of conjectures – as well as the original insights that they bring – are essentially ‘markettested’ by the decision-makers who rely upon such information. If they are to be convinced of foresight’s worth, then results should be based upon a sound knowledge base.

• **Principle of multidisciplinarity**: foresight recognises that many of the problems we face today cannot be understood from a single perspective nor the solutions found within a single discipline. Accordingly, foresight intentionally seeks to transcend traditional epistemic boundaries, bringing together different disciplines in processes of deliberation that result in improved understanding and new working relationships.

• **Principle of coordination**: foresight enrols multiple actors to participate in decision arenas where conjectures on the future are contested and debated. Supported by various data and opinion, the foresight process aligns participant actors around emergent agendas, resulting in a coordinated mobilisation of people and resources.

• **Principle of action orientation**: foresight is not only about analysing or contemplating future developments but supporting actors to actively shape the future. Therefore, foresight activities should only be undertaken when it is possible to use act on the results.

1. **Contextualised**: Foresight needs to be rooted in the context within which it is to be implemented be it national, regional, local, corporate, organisational;

2. **Credible**: The robustness of the evidence and the reputation of those presenting and validating it should be such that results are treated as credible;

3. **Diversed**: Foresight must keep an ear open to unpopular views and not rush to a consensus; relevant (and seemingly less relevant) stakeholders should be engaged wherever possible, either in the exercise itself or in pre- and post-foresight activities;

4. **Systematic**: A foresight exercise should develop and follow a systematic approach which can easily be replicated. Methods should as far as possible allow comparisons/benchmarking and yield reproducible results;

5. **Far-sighted**: There is little point to foresight which does not include a creative element that is explicitly future-oriented and moves beyond mere zeitgeist;

6. **Transparent**: The objectives of an exercise should be clear to all; the design of the process, the sources of information and the means used to analyse data should all be available to those expected to participate and make use of the results;

7. **Embedded**: Foresight’s impact endures where a culture for foresight is able to spread;

8. **Engaged**: The commitment of those capable of acting upon the results should be secured in advance;

9. **Efficient**: In its use of public (or private funds) foresight should be carried out with due economy and efficiency but be adequately resourced to be effective;

10. **Adaptive**: Foresight should be adaptive, drawing upon lessons from previous and current activity to meet evolving demands.

Thank you!
rafael.popper@manchester.ac.uk