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# Scope and focus of foresight exercises

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# Outline

1. **Geographical scope** of the foresight exercise
  2. **Focus** of the foresight exercise
  3. **Themes** of the foresight exercise
  4. **Time horizon** of the foresight exercise
  5. **Methods** of the foresight exercise
  6. Importance of the **preforesight phase !**
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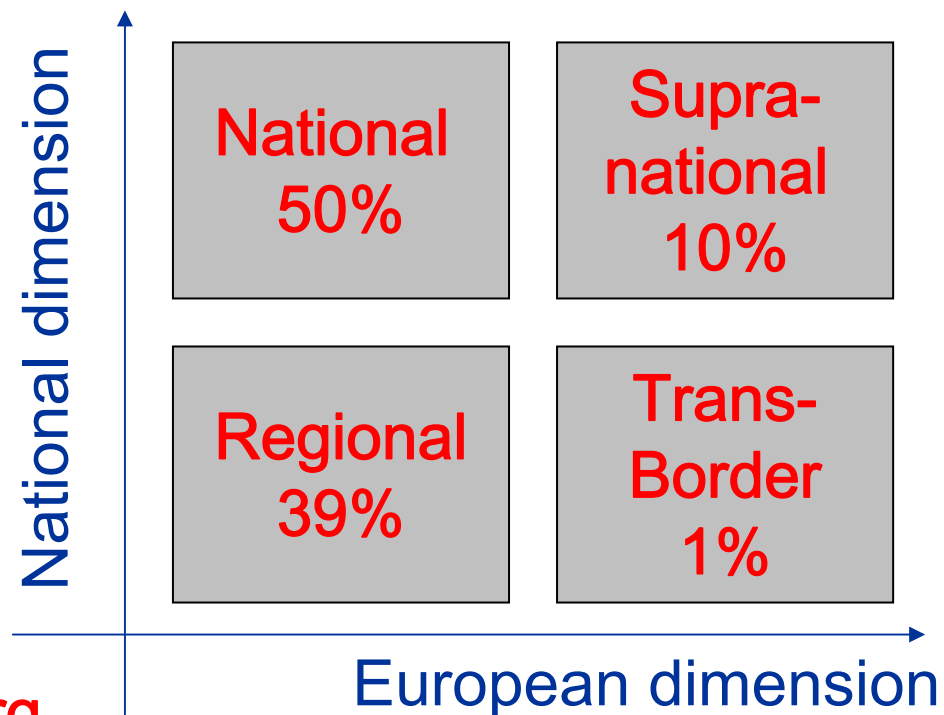


# 1. Geographical scope

- TF at different scales
- International resources at different scales



## Technology foresight at all scales





## TF at national scale

### Year

2001	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
2000	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
1999	XXXXXXXXXXXXXXXXXXXXXXXXXXXX
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1978	X
1977	X
1976	X
1975	X
1974	X
1973	X
1972	X
1971	X
1970	X

The 1990's was the decade  
in that national foresight programmes  
became the norm.

Figure I. *Introduction of national technology foresight programmes, 1970-2001*, Source: Kozlowski, (2001).  
Unido Manual, vol.II, p. 10



## TF at national scale: some overriding trends

1. proliferation of foresight activities **among all sorts of economies** (leading industrial countries but also developing countries and transition economies)
1. foresight activities in **smaller countries**
2. recognition of the possibility of **alternative futures** and tentatives to shaping paths of development
4. foresight **process** regarded at least as important as the outcomes
5. **new function** of mobilizing and “wiring up” national innovation systems
6. increasing attention being paid to **socio-economic embedding** and demand aspects of emerging technologies.
7. **differentiation** and blending of approaches, tailored to different sets of objectives

Source: *Unido TF Manual*, vol.2, p. 14



## TF at national scale: specificities of small countries

### Key features of small economies

- Openess of the national economy
- Production for small segments of the world market
- Adapation pressure
- Stronger dependance on foreign trade
- More limited resources for R&D

### Some common traits of TF in small countries

- More frequently oriented at specific national conditions and identification of niche potentials
- Time horizons less than 15 years
- Value of the process itself
- Bottom-up approaches
- Mobilizing innovation awareness
- Stronger orientation towards implementation of results

### Special emphasis

matching national potentials with economic opportunities and social demand



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## TF at national scale: specificities of transition economies

### Key features of transition economies

- Shrinking of R&D systems
- Need for restructuring of organizational, functional and funding aspects of innovation system

### Some common opportunities of TF for transition countries

- to provide a mechanism to adress structural problems
- to help policy to identify and respond to crucial linkages within the NIS system
- to offer a mechanism to adress trade-offs between several objectives (competitiveness, growth, sustainable development)

### Special emphasis

absorption and transfer rather than generation of technology

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## TF at national scale: specificities of developing countries

### Key features of developing countries

- Lack of conducive integrated policy and institutional framework
- Reactive mode action and short term thinking
- Under-developed technology and innovation promotion planning activities
- Low technology and innovation intensity in industry
- Lack of funding for technology acquisition and diffusion; Brain drain

### Some common opportunities of TF for developing countries

- To identify and realize their national potentials
- To stimulate key actors and institutions to contribute to this and to avoid fragmentation

**Special emphasis** « The problematique of underdevelopment cannot be reduced to one of the listed factors, it reflects the combination of such factors ». (*L. Georghiou*, TF Summit Budapest 2007). Importance of governance

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## TF at local / regional scale

### What do we mean by “region”?

We consider regions to cover subnational areas where the essential criterion is “geographical proximity” and “limited spatial range”. This covers rural communities, town- and city-regions, historical regions, regions marked by specific economic activities or cultural identity, and political regions (autonomies, counties, provinces).

### TF at a regional level?

Key to the concept is the importance of closeness and relatedness.

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## TF at regional scale: different types of European “regions”

- Large regions with high autonomy
- Large regions with limited political autonomy• Large regions with a strong economic identity but transcending political and administrative boundaries
- Large city regions
- Rural/small town regions
- Regions with a strong historical/cultural identity
- Regions with a distinctive geographical dimension

*Source: Keenan, Miles, 2002*

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## TF at regional scale: rationale

### The increasing role of the regions

- Simultaneous phenomena of globalisation and revival of local focus
- Increasing inequalities between territories throughout the world
- Unemployment rates and performances vary considerably from one territory to another.



## TF at regional scale: rationale

The natural propensity of territories in decline is to attribute their problems to external factors, such as oil price, globalisation and fierce competition from the rapidly developing countries to which their businesses are relocating. They often come to expect a solution from the outside.

The true *raison d'être* of regional (or territorial) foresight is to make the inhabitants of a territory the architects of their chosen collective future rather than the passive passengers to an imposed future.

Foresight contributes to improving the quality of governance by activating the stakeholders and citizens of a region.

*Blueprints for Foresight Actions in the Regions –  
policy orientation report, 2004*



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## TF at the supra-national scale: rationale

*‘Regional initiatives’ in the sense of initiatives  
taken by a group of countries which together form a region.*

### Several reasons to justify a supra-national/ trans-border approach?

- To reach the necessary quality and basic sample size of experts’ opinion collection
  - To overcome excessive costs that constrain developing countries to undertake full-scale TF exercises at the national level
  - To extract regional consequences based on the national exercises
  - To serve as a support for national exercises (it is not a substitute!)
  - To structure the technological and industrial communities of the target region
  - To identify large trends of technological evolution which could influence important productive chains within the target region
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## TF at the supranational scale: some recent examples

- **UNIDO foresight study « Avoiding water discharge by industry in the future – Towards a zero discharge in the countries of Central and Eastern Europe »** (march 2007- december 2007)
- **APEC Foresighting Future Fuel Technology (2004-2006):** this project has been a unique cooperative exercise to provide strategic intelligence on future fuel technologies for the APEC region. The technologies selected for study were: hydrogen/fuel cells, conventional and unconventional hydrocarbons and biofuels within the time frame to 2030.
- **Nordic Hydrogen Energy Foresight 2030 :** the Nordic Hydrogen Energy Foresight was concluded by June 2005. The project was launched by 16 partners from academia, industry, energy companies and associations from all five Nordic countries: cooperation involving national research institutes in Finland, Iceland, Norway, Sweden and Denmark.



## International resources for TF at different scales

***Eurofore database*** : The database has been the result of a pilot study to map a selection of foresight exercises and competencies in the enlarged European Union

<http://prest.mbs.ac.uk/eurofore/>

***European Foresight Monitoring Network*** : The EFMN monitors foresight activities and disseminates information to a network of policy researchers, foresight practitioners. By now, the EFMN had already identified and mapped 1750 foresight initiatives in many countries on the 5 continents.

<http://www.efmn.info>

***For-Learn*** contributes to the codification, assessment and dissemination of existing foresight related knowledge and know-how. Also, a online foresight guide.

<http://forlearn.jrc.es/index.htm>

***FORSOCIETY*** : a network of public bodies and agencies in Europe involved in the development of national research and innovation systems. The goal is to promote mutual learning about foresight at national level, and to identify and analyze strategic issues leading to joint activities on a European scale.

<http://www.eranet-forsociety.net/>





## International resources for TF at different scales

### *Practical guides to regional foresight*

<http://cordis.europa.eu/foresight/cgrf.htm>

### *Blueprints for foresight actions in the regions*

[http://cordis.europa.eu/foresight/regional\\_blueprints2004.htm](http://cordis.europa.eu/foresight/regional_blueprints2004.htm)

*The Mutual Learning Platform* : MLP enables European regions to enter the knowledge-based society. Its activities focus on three main areas of interest to policy professionals at regional level: Regional Foresight, Regional Benchmarking, Research and Innovation at regional level.

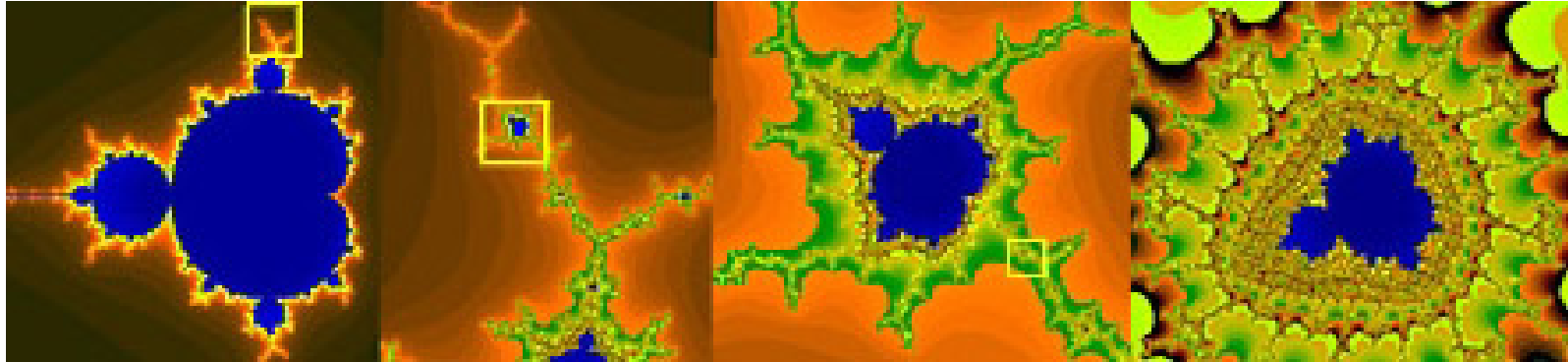
<http://www.innovating-regions.org/>

*FUTURREG* project (European Regional Development Fund - INTERREG IIIC) with its three objectives: the development of a common futures toolkit, the increased use of futures tools in association with other foresight approaches within the regional policy-making system, the application of the futures toolkit to regional development issues.

<http://www.futurreg.net/>

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## Different scales



From 1951 onwards B. Mandelbrot , a mathematician, worked on problems in mathematics but also in real-world fields including information theory, economics and fluid dynamics. He became convinced that **self-similar structure** run through a multitude of these problems.

In 1975, B. Mandelbrot coined the term **fractal** to describe these complex structures (*Les objets fractals, forme, hasard et dimension* / *Fractals: Form, chance and dimension*, 1977).



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## 2. Focus of the foresight exercise

- 5 generations of foresight
  - 3 types of foresight exercises
  - Three important features:
    - Technology foresight v. innovation foresight
    - Content focus v. structural content
    - Growing systemic nature
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## FIRST GENERATION

Technology  
forecasts

## SECOND GENERATION

Technology  
and  
markets

## THIRD GENERATION

Technology  
markets  
and the social  
dimension

## FOURTH GENERATION

Distributed  
Role in  
Innovation Systems

## FIFTH GENERATION






Structural & broad  
policy focus

Five generations  
of foresight

From Georghiou L.,  
*Unido High level experts  
meeting group  
on the future of TF,*  
Vienna, May 2007



## Five generations of innovation process

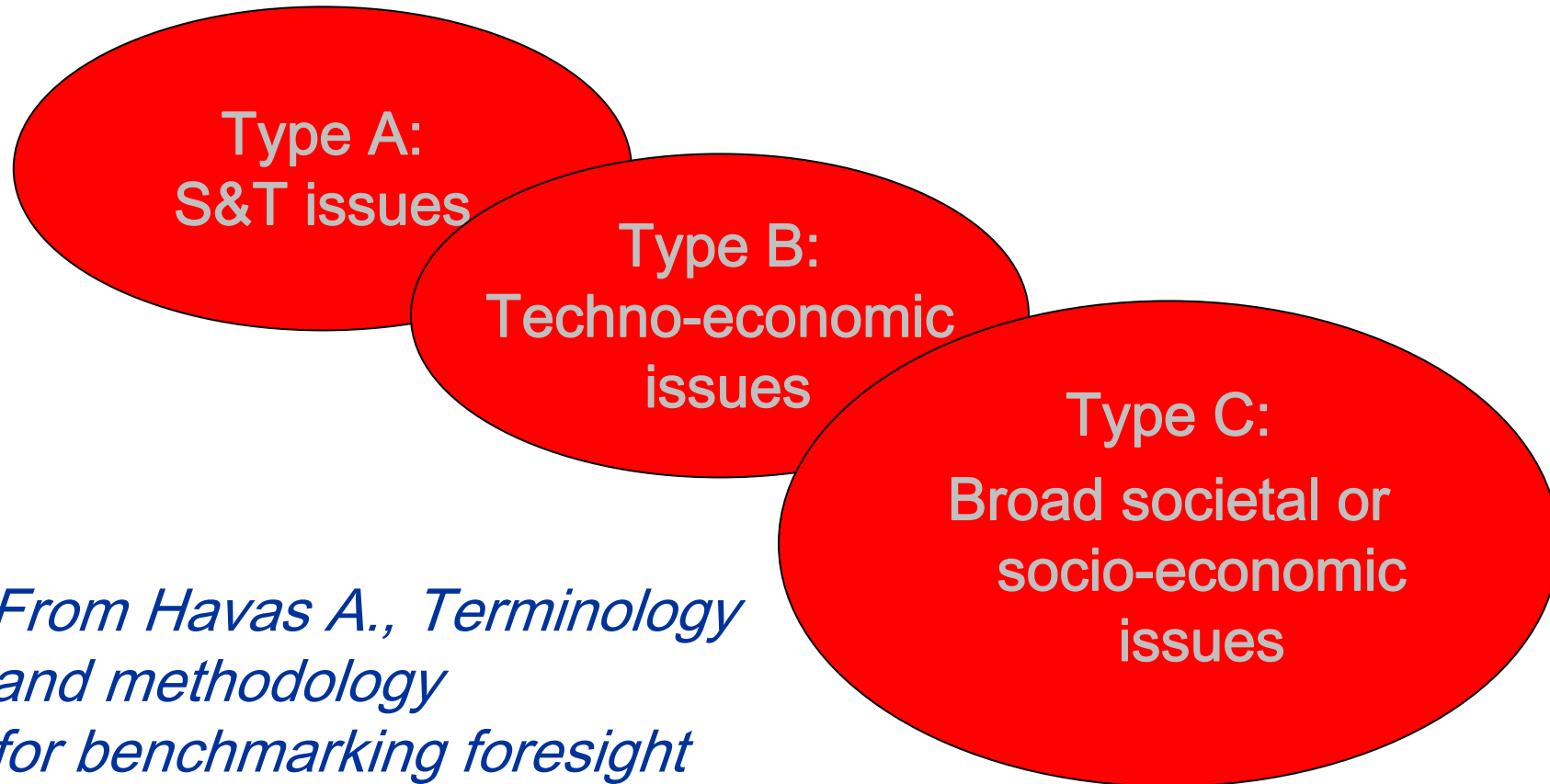
1. the **research-push** model (1950s and 1960s) 
2. the **demand-pull** model (from the early- to mid-1960s) 
3. the **coupling** model (by the 1970s) 
4. the **collaborative model** (in the 1990s) 
5. a more **strategic and technological integration model** (recently) 

## Five generations of foresight

1. Technology Forecasts
2. Technology and Markets
3. Technology, markets and the social dimension
4. Distributed Role in Innovation Systems
5. Structural & broad policy focus



## Three types of foresight



*From Havas A., Terminology  
and methodology  
for benchmarking foresight  
programmes,  
ForSociety, 2005*

Type of foresight	Problematic	Rationale	Involvement of actors
S&T focus (type A)	Technology areas	Research priority agenda	No direct implication of actors
Techno-economic focus (type B)	Socio-economic activity sectors (services, pharmacy, software)	Efficiency of the innovation system at large or in a sector	Ad-hoc limited implication of societal actors and institutional representatives
Societal/ socio-economic focus (type C)	Broad public functions (ex; education, security) Strategic &/or macrosystemic issues	Shared awareness for futures, technologies, opportunities and strategies  <i>Source : ForSociety, D 11 Methodological Aspects in national foresight programmes</i>	Implication of societal actors and institutional representatives

**Links between the types of foresight and their rationale:  
lessons from a benchmarking exercise (ForSociety, task 2.4)**

<b>Key technologies priorities</b>	priority setting oriented ; introducing new perspectives for research and technology
<b>Sectoral thematic R&amp;D priorities</b>	pluri-sectoral oriented, including a large variety of objectives, implementing an efficiency perspective ;
<b>Sectoral innovation dynamics</b>	sectoral or pluri-sectoral; focused on a research priority agenda but also on some broader goals (future research investments, systemic efficiency.
<b>R&amp;D priorities for public &amp; collective functions</b>	Some programs may concern very broad research and technology fields, corresponding to public functions. Strong link with policy
<b>Innovation system efficiency</b>	The main rationale is to produce a national strategy. The question of the efficiency and of the governance of the NIS is addressed in those foresights.
<b>Shared system strategies</b>	strategic oriented and at a large level of societal involvement ; largely beyond the identification of new research fields





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## An important feature: technology foresight v.innovation foresight

- Look at the fourth and the fifth generations of foresight
  - Some tensions raised by the coexistence of several generations
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## Another important feature: content focus v. structural focus?

### Content focus

- Priority setting
- Identifying ways in which future science and technology could address future challenges for society and identifying potential opportunities

### Structural focus (increasing tendency)

- Bringing new actors into the strategic debate
- Building new networks and linkages across fields, sectors & markets or around problems
- Demonstrating vitality of S & I system
- Reorienting Science & Innovation system

*From Georghiou L., Unido Technology Foresight Summit 2007,  
Budapest 27-29 September 2007, UNIDO, documentation, p.6*



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## Another important feature: the growing systemic nature of TF

“There is a clear potential for foresight to function as a systemic policy instrument”

O.Da Costa, Ph.Warnke, C. Cagnin, F. Scapolo ,  
*The Impact of Foresight on Policy-Making: Insights from the  
FORLEARN Mutual Learning Process* , 2007



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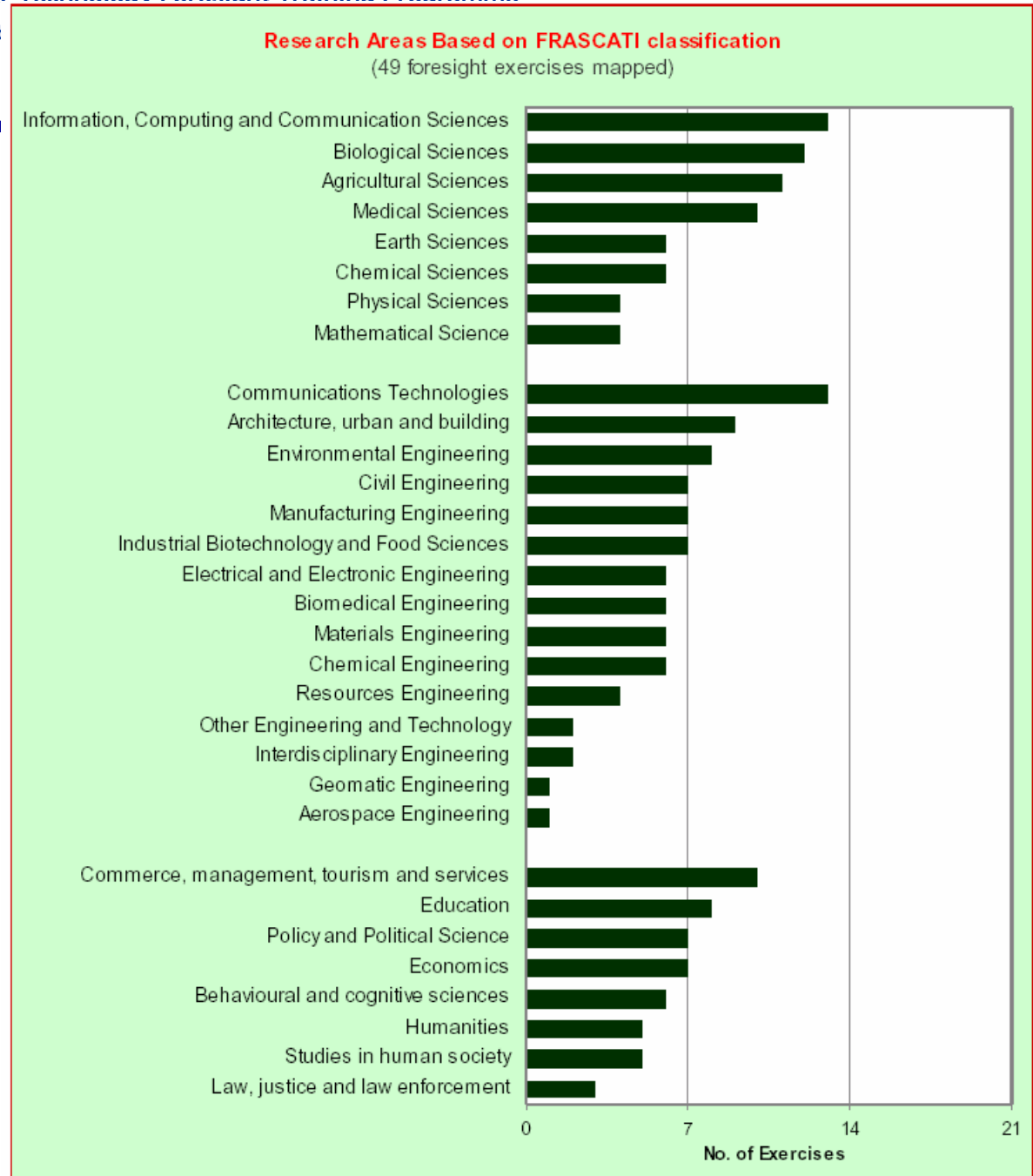
## 3. Themes of the foresight exercises

Although foresight originally grew out of a need to take a long term view on the opportunities offered by science and technology to plan and prioritise national research programmes, **only 21% of foresight exercises now deal explicitly with RTD issues.**



## Research areas?

*Source:*  
*EFMN Mapping 2005*





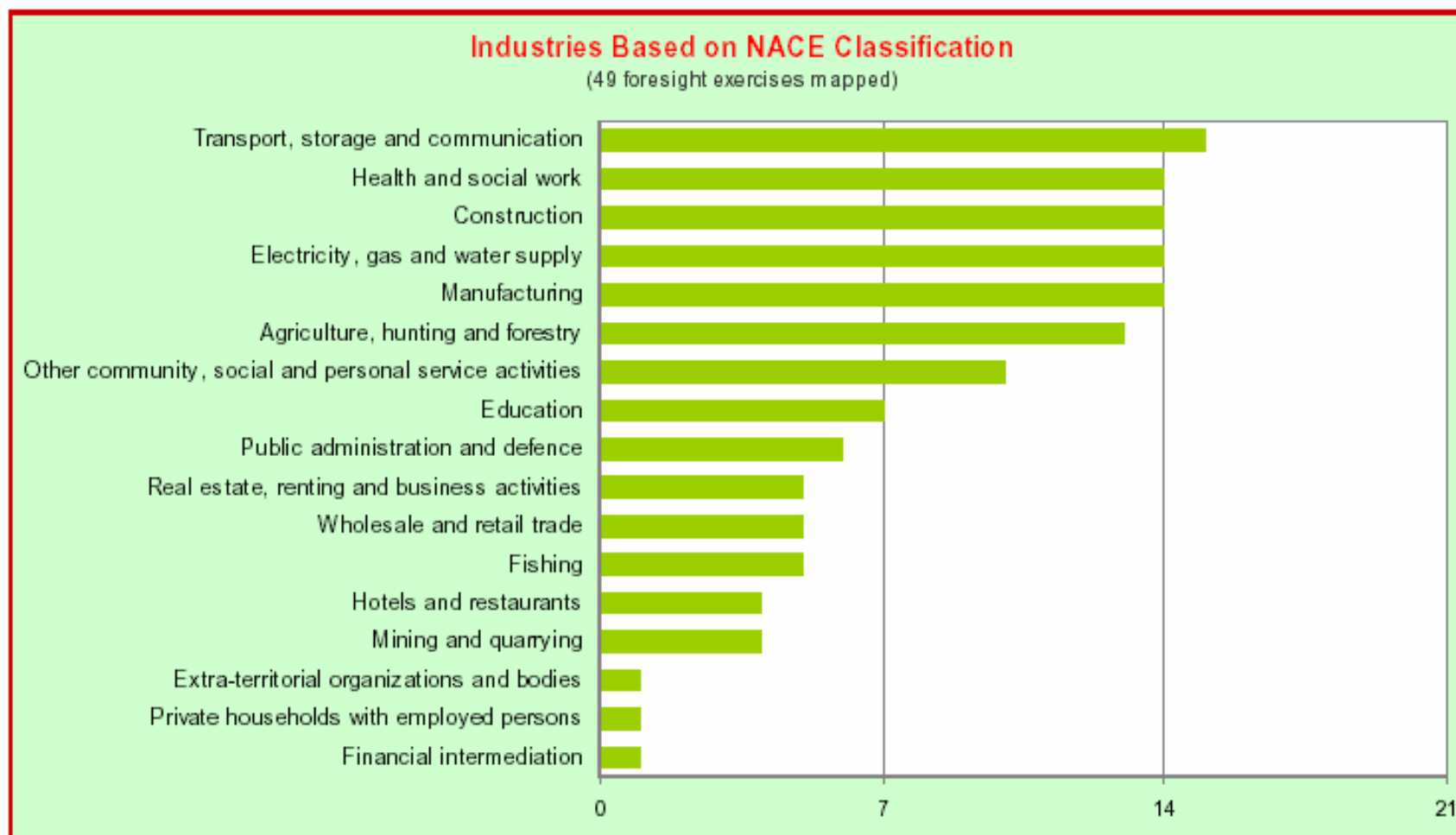
## Research areas?

- Whilst the numbers are very small – the sample of exercises numbers just 49 – the results are nevertheless revealing.
- In the natural sciences category, Information, Computing, and Communication Sciences is the most popular research area covered in the sample of mapped exercises, closely followed by biological sciences and agricultural sciences.
- Turning to Engineering and Technology, again, Communications Technologies are the most popular.
- Whilst in the social sciences and humanities, services come out on top. ( very few cases! )
- The pervasiveness of information and communications science and technology and their applications are well reflected by the subject matter of foresight exercises.

*Source : EFMN Mapping 2005, p15*



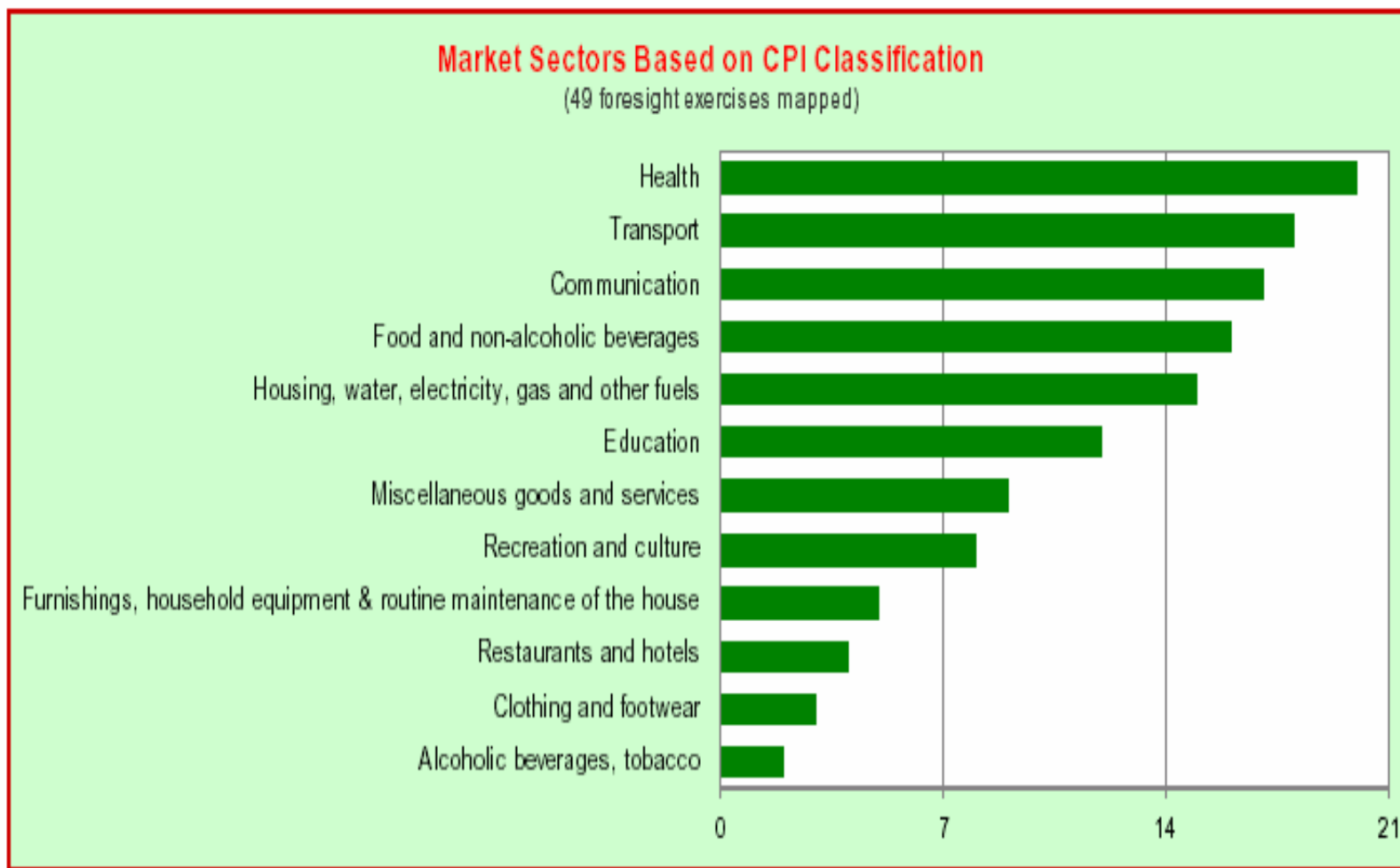
## Industries concerned?



*Source : EFMN Mapping 2005*



## Markets concerned?



*Source:EFMN Mapping 2005*





## 4. Time horizon of the foresight exercise

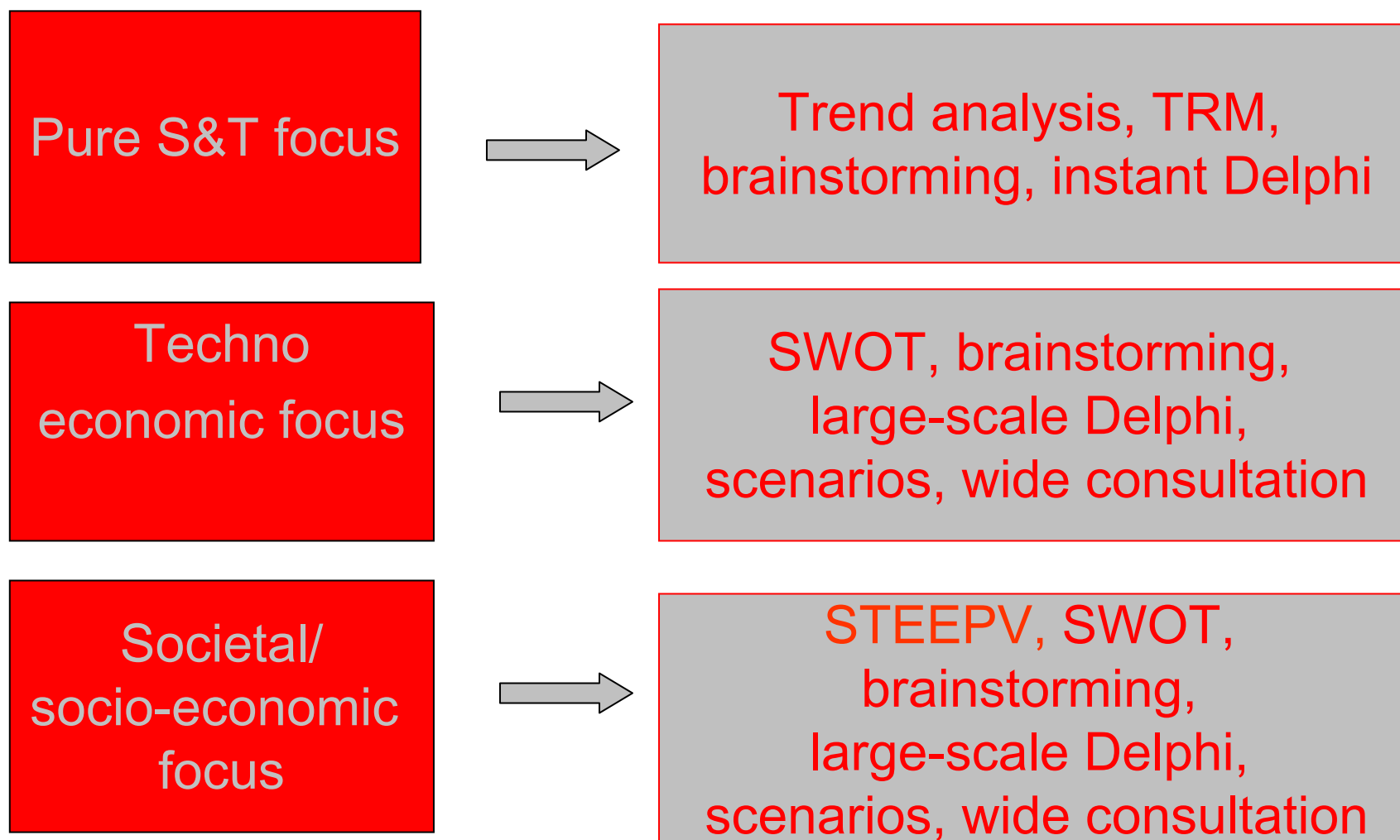
	From Eurofore Search - Step 2 - Select foresight indicators / Time Horizon ( <a href="http://prest.mbs.ac.uk/eurofore/">http://prest.mbs.ac.uk/eurofore/</a> )
3-5 years	6 Foresight Exercises (Activities) match your search criteria (ex. Estonian technology foresight, 2000)
5-10 years	21 Foresight Exercises (Activities) match your search criteria (ex. IPTS Enlargement Futures Project, 2001)
10-15 years	14 Foresight Exercises (Activities) match your search criteria (ex. Visions for the Development of the Czech Republic to 2015)
> 15 years	34 Foresight Exercises (Activities) match your search criteria (ex. Turkish National Technology Foresight Project - Vision 2023)



« The time horizon for most exercises is medium to longer term with over half being orientated towards 10 years or more and only a few on the short term of less than 5 years ».

Ducatel Ken, *Looking back on European Foresight,*  
The second international conference  
on technology foresight, *Tokyo, 27-28 Feb. 2003*

## 5. Methods of the foresight exercise





- popularity of four methods : expert panels, brainstorming, literature review, and scenarios – largely irrespective of the type of outputs being generated.
- average number of methods used per exercise : 5 ( much variation between countries)
- ten methods identified as highly combinable:
  - ✓ Brainstorming
  - ✓ Environmental scanning
  - ✓ Expert panel
  - ✓ Literature review
  - ✓ Futures workshops
  - ✓ Scenarios
  - ✓ SWOT analysis
  - ✓ Delphi
  - ✓ Trend extrapolation

*Source : EFMN Mapping 2005*



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## 6. Importance of the preforesight phase

### Design and preparatory phase for :

Clarification of objectives, perimeter, timescale, desire, etc.

### Results expected from the preparatory phase :

- framework and objectives of the exercise (method, expected outcomes)
  - work programme
  - balanced budget for the exercise
  - steering structures
  - list of the key players to be associated with the enterprise
  - outline of a networking system for the gathering of information
  - communication plan
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Thanks!

Any comment or question welcome.

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