

Global Foresight Outlook

GFO

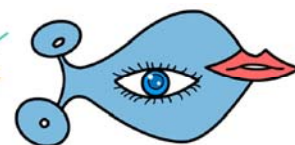
2007



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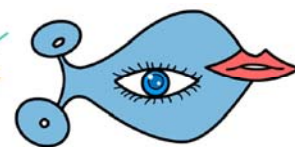




Global Foresight Outlook 2007

Mapping Foresight in Europe and the rest of the World

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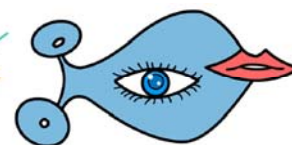
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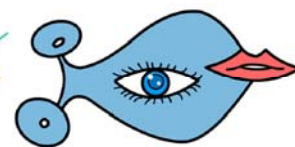
About the Global Foresight Outlook 2007 report

Section 1 of the **GFO 2007** report introduces the EFMN network, and describes various aspects of the mapping process. This is followed by a discussion about the database, and the data themselves. *Section 2* presents an analysis of the general and specific objectives of more than 500 foresight exercises in Europe. The results of the analysis allowed us to create nine families of objectives.

Section 3 benchmarks European foresight against other regions. This includes a general analysis of foresight activities in each of the seven regions, mainly in terms of the key dimensions: sponsors, target audiences, time horizon, participants, territorial scope and outputs. *Section 4* is focused on methodological issues. It addresses five questions: (1) What are the most commonly used methods?; (2) What are the top 10 methods per world region?; (3) What are the main characteristics and key features of Europe's top 10 foresight methods?; (4) What are the most commonly used methods in national, sub-national, transborder, supra-national and trans-European foresight exercises?; and (5) What are the most common combinations of foresight methods?

Section 5 presents an analysis of the research areas, and related industries, that are mainly addressed by the foresight exercises. *Section 6* presents an analysis of 559 recommendations that resulting from a sample of 83 foresight panels and task forces. This assesses the extent to which panels of foresight exercises conducted at different levels (national, sub-national, transnational and European) are suggesting particular types of recommendations. To conduct this analysis, we have created a taxonomy of recommendations; and we are able to identify the 12 most common recommendations. The section includes a discussion about the challenges of making recommendations at the EU level and presents some practical examples.

Section 7 provides a 'snapshot' of the main issues discussed in this report. *Section 8*, finally, introduces the notion of Country Panoramas, providing a 'snapshot' of country profiles for 26 EU Members. This section points to some analyses that the 2008 report will take further.



looking at



Global Foresight

1. Introduction

This report is part of the activities carried out by the European Foresight Monitoring Network (EFMN) – a European Commission funded initiative aimed at exchanging and better understanding foresight related activities all over the world.

The EFMN

In September 2004 the European Commission (EC) supported the creation of an international consortium of foresight organisations to monitor ongoing and emerging foresight activities and disseminate information about these activities to a network of policy researchers, foresight practitioners.

The specific objectives of the initiative are:

1. **Network:** Create a correspondents' network, of foresight practitioners and other interested persons.
2. **Data collection:** To collect foresight exercises and other related activities, as a "library" of information.
3. **Mapping:** To analyse specific characteristics of the collected foresight exercises
4. **Briefs production:** To produce "briefs" on specific foresight studies, in order to inform a wider community.
5. **Issue analysis:** To analyse the collected foresight exercises in terms of emerging issues, and to organise annual workshops addressing specific issues.
6. **Dissemination:** To disseminate the collected information and analysis through the Internet and annual reports.

The Mapping

One major activity of the EFMN is the collection and mapping of foresight exercises. The mapping required the development of a database with indicators capable of capturing the different dimensions of a foresight exercise (e.g. the territorial scope, number of participants, sponsors, target audiences, countries, duration, time horizon, impact, funding, industry, market, methods, outputs, research areas, industries and related markets, among others). This on one hand offers the opportunity to unlock information on what is going on in the world of foresight, and on the other hand provides basic enables different kinds of mapping that can provide foresight practitioners with more detailed insight into methodological and practical issues.

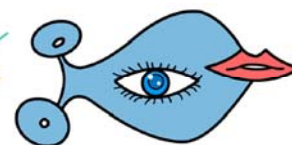
In the three years the EFMN has been operational, some **1650** exercises were collected. Over **800** of them have been characterised in terms of various dimensions, using an expert system to facilitate systematic structuring of information. This report outlines the results of the collection and analysis of this information. The two previous Mapping Reports (2005 and 2006) have been used to explore potential uses and presentation formats of the information collected by the EFMN. But the data was not yet sufficient to draw country-specific conclusions or profiles, and most of the analysis was based on a limited number of entries. This year, the dataset has been broadened significantly and more conclusions can be drawn. In particular, the 2007 Mapping Report benchmarks European foresight practices against other regions (e.g. North America, Latin America, Asia, Africa and Oceania) and includes an overview or panorama of the main features characterising foresight activities in most EU Member States.

We should emphasise that although a limited number of people are involved in the actual writing of this report, we could not have done this without the help of numerous experts who assisted in mapping initiatives. On average, 3 to 4 people per country were actively involved in the mapping process.

The Process

The mapping process is divided into four steps:

1. In the first step, interesting case studies are **identified** by: (a) dedicated EFMN partners who continuously search the internet/reports, etc.; (b) all EFMN partners, who come across possible studies; (c) national correspondents offering; and (d) various experts suggesting studies through the public website.
2. The second step is the **mapping** of the entries according to predefined characteristics by EFMN partners and specific correspondents (in commission).
3. The **quality control** is done by sending a mail with the collected information to a correspondent for evaluation.
4. The **mapping report** (data processing, synthesis and presentation of results) is carried out by a team at the University of Manchester.



The Database

The mapping of foresight exercises is done through a web-based platform called 'Dynamo' (cf. <http://www.dynamo.tno.nl>). This is essentially an online database that is used to manage information on foresight exercises. The system is owned by TNO, while the database content is jointly owned among EFMN partners. The overall structure of the database (i.e. mapping dimensions and indicators) is a significant elaboration of a previous EC funded initiative (see 'Mapping Foresight Competence in Europe: the EUROFORE Pilot Project' report, 2003).

EFMN Correspondents have access to this expert system, enabling them to see the raw information, edit the information and make even more sophisticated analysis. This includes access to the initiatives collected that are not yet up to quality to be public available. Given that mapping is an ongoing activity, the data is collected gradually using **four levels**:

1. Level 0 (when the cases that are only nominated),
2. Level 1 (basic mapping),
3. Level 2 (detailed mapping) and,
4. Level 3 (fully mapped).

Level 0 is only the nomination of the exercise (i.e. providing the name, a short description, a short comment, and the time horizon). **Level 1** includes basic information, such the year in which the exercise was created, the duration, contact person, name of sponsor, amount of funding, executing organisation, website, number of participants, and territorial scope (national, sub-national, transborder, supra-national and European) and objectives. **Level 2** moves into more detailed mapping (e.g. types of audiences, types of sponsors, types of methods, countries and regions involved and types of outputs). Finally, **Level 3** provides mapping against a number of research areas (using the internationally accepted classification system based on the *Frascati Manual*), types of industries (using the *NACE Classification of Economic Activities in the European Community*), and the description of policy impacts, other impacts, as well as results and limitations.

The Data

This report presents the information collected in the period of 2004-2007. In this period, over 1600 exercises were collected from all over the world. Talking to experts, assisted by correspondents, looking at existing reports, browsing the Internet, all led to the collection of data. From a total of **1650** initiatives:

- **804** are nominated (L0) or at basic level (L1), and
- **846** are mapped in depth (L2 and L3).

The original target of 400 cases in Levels 2 and 3 was achieved in 2005; the second target of 800 exercises has now been exceeded. **Table 1.1** (right) shows the number of exercise mapped per country (note that countries are listed by geographical groupings).

Table 1.1: Mapped exercises per country

Country / Region	Level 0 + Level 1	Level 2 + Level 3
Austria	6	10
Belgium	8	17
Bulgaria	1	3
Cyprus	0	1
Czech Republic	0	5
Denmark	15	18
Estonia	2	6
Finland	34	35
France	143	44
Germany	85	40
Greece	1	8
Hungary	1	2
Ireland	5	7
Italy	11	8
Latvia	4	1
Lithuania	1	0
Luxembourg	1	4
Malta	0	3
Netherlands	117	148
Poland	2	4
Portugal	0	5
Romania	1	4
Slovakia	0	2
Slovenia	1	4
Spain	6	37
Sweden	9	9
United Kingdom	87	120
Iceland *	4	1
Norway *	21	10
Switzerland *	4	1
EU NMS	1	2
EU-15	16	24
EU-27	17	14
Europe	38	22
Canada	11	11
North America	0	1
United States	64	97
Brazil	1	9
Chile	2	0
Colombia	1	2
Ecuador	1	0
Peru	2	6
Venezuela	0	7
Armenia	0	1
Asia	8	12
China	11	4
India	4	5
Israel	1	1
Japan	7	28
Middle East	2	0
Saudi Arabia	0	1
Singapore	1	0
South Korea	1	2
Southwest Pacific	3	8
Turkey	1	6
Africa	5	11
Algeria	1	0
Burkina Faso	1	0
Dem. Rep. of Congo	1	0
Egypt	1	0
Guinea	1	0
Rwanda	1	0
South Africa	1	0
Australia	20	14
New Zealand	9	1
Total	804	846

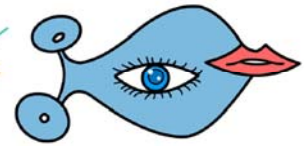


Figure 1.1: Mapped exercises per region

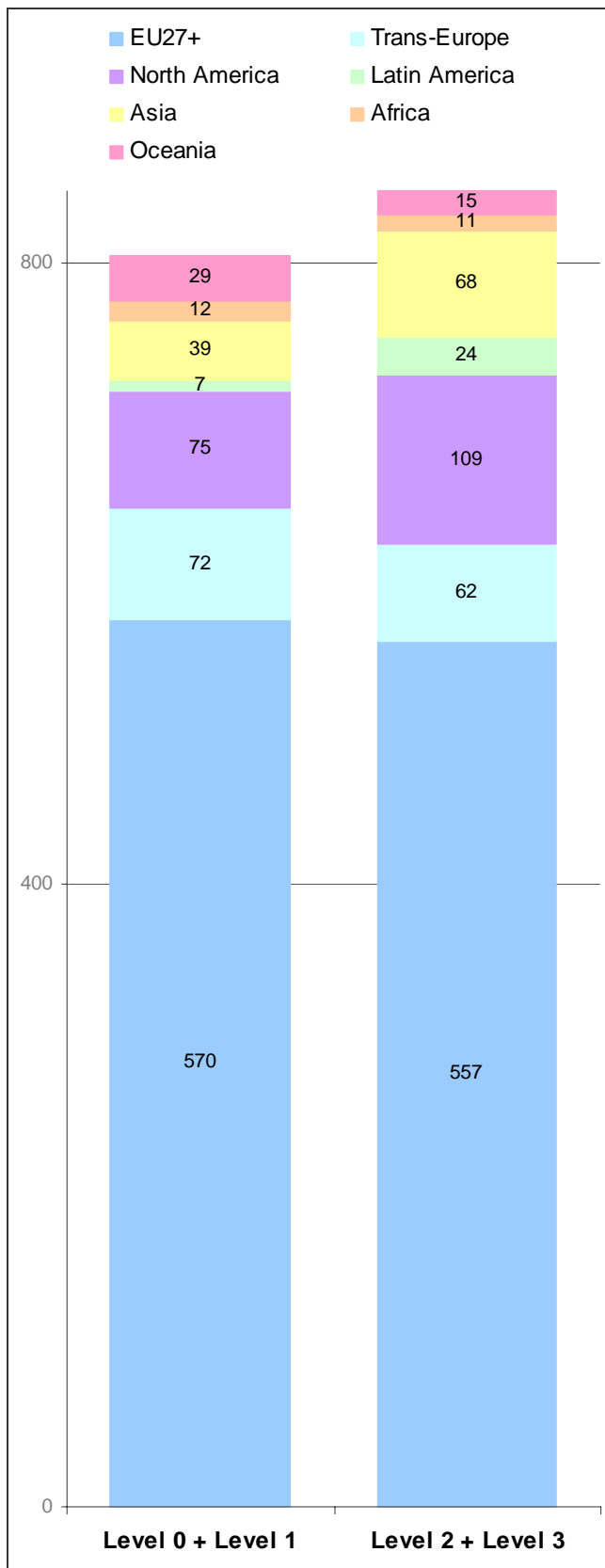


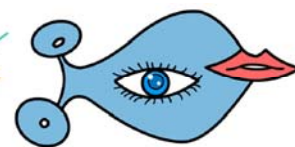
Figure 1.1 (left) shows all mapped exercises per region. For the purposes of this report we have considered seven regions:

1. **EU27+** (this includes Norway, Switzerland and Iceland as well as the 27 EU Member States).
2. **Trans-Europe** (cases with two or more EU countries)
3. **North America** (Canada + USA)
4. **Latin America**
5. **Asia** (Eastern, South-Central, South-Eastern & Western)
6. **Africa**
7. **Oceania** (Australia + New Zealand)

Before discussing the regional distribution of exercises, it is important to make clear that the analyses that will be presented in this report are based on the bar located on the right side of the chart (representing the **846** cases in **L2** and **L3**). The bar on the left side shows **804** other cases, in **L0** and **L1**, that are not analysed here. We plan to continue the mapping process so that more cases from **L0** and **L1** are upgraded to **L2** and **L3** in the 2008 Report

As originally planned, the vast majority of **L2** and **L3** mapped exercises are from the **EU27+** region (**557**). These are followed by **62** Trans-European studies, **109** from North-America, **24** from Latin America, **68** from Asia, **11** from Africa and **15** from Oceania.

The uneven distribution of initiatives over the regions may reflect our data collection methods rather than the actual prevalence of foresight across regions. Given the early focus on European exercises, as well as the fact that the project team is EU-based, it is perhaps unsurprising to see so many exercises mapped for Europe. This 'Eurocentric' view may continue in the short to medium term. However, in the long-term, dedicating more time and resources to map initiatives in other regions (particularly in Asia, North and South America) could bring important benefits, such as more detailed comparative analysis between regions, more methodological learning, etc. We should not assume that European countries have a monopoly on innovative approaches to foresight, for example. The number of entries for North America is also significant, possibly reflecting an English language bias in the database (and the literature and Internet in general). The language barrier was one of the reasons for the creation of a similar mapping platform in Spanish, in which over **100** experiences have been mapped from Latin America. This exercise has been carried out by another EU-funded network on foresight (the Euro-Latin Foresight Network SELF-RULE, see <http://www.self-rule.org>). These and additional cases will eventually be included into the EFMN database. Language barriers may also account for the low numbers of Asian cases captured. Over the coming year, the EFMN will expend more resources in trying to achieve better coverage of these and other regions. For now, it is important for the reader to bear in mind that with so few entries for some regions, the data provided here is indicative at best, and certainly not definitive.



2. Common Objectives of Foresight

This section outlines the most common objectives of foresight. At this point in time we have analysed some **200** specific objectives from mainly national foresight initiatives. These have been into the following nine families of objectives:

- Fostering STI cooperation and networking (29)
- Orienting policy formulation and decisions (33)
- Recognising key barriers and drivers of STI (20)
- Encouraging strategic and futures thinking (15)
- Supporting STI strategy- and priority-setting (30)
- Identifying research/investment opportunities (16)
- Generating visions and images of the future (24)
- Helping to cope with Grand Challenges (12)
- Triggering actions and promoting public debate (21)

We spell out what each of these categories means below.

Typically, the foresight exercises had three to four specific objectives, spread across two or three of the families above. However, the situation was different when we looked at large national foresight initiatives. For example, a recent Finnish 'exercise' (FinnSight2015) featured ten 'studies' - on (1) materials; (2) global economy; (3) well-being and health; (4) environment and energy; (5) infrastructures and security; (6) bio-expertise and bio-society; (7) learning and learning society; (8) services and service innovations; (9) information and communications; and (10) understanding and human interaction - each having 3 or 4 for specific objectives. This means that FinnSight2015 as a whole targeted most, if not all, of the nine families of objectives listed above. The same applies to the UK Foresight Programme and other large initiatives.

Fostering STI cooperation and networking

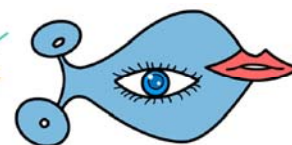
One of the most common general objectives in European foresight is to foster cooperation and networking in science, technology and innovation (STI). This implies (1) the creation of a common space for open thinking, together with (2) the engagement of key STI stakeholders at various levels (International, European, national, sub-national). On the one hand, these activities require the development of, for example, knowledge platforms and research infrastructures. However, sharing platforms and infrastructures often create the need for formal agreements about the use and sharing of intellectual property and particular technologies, and the creation of clear cooperation protocols normally linked to existing regulatory frameworks or policy instruments. On the other hand, the promotion of STI cooperation must take into account the challenges of bringing together multi-sectoral, multi-disciplinary and (sometimes) multi-national expertise to discuss and share views about STI futures in general. This calls for better understanding and continuous monitoring of key drivers of STI cooperation (Some of these are driven by acute and immediate problems, such as global warming, terrorism, poverty, natural disasters, energy needs, etc. Others may be more aspirational, e.g. sustainable development, social cohesion, regional integration, and the like).

Orienting policy formulation and decisions

The analysis demonstrates that the most common objective of foresight activities in Europe is to provide orientation to policy formulation and decisions. 'Orientation' combines the notions of providing methodological support and recommending policy directions. Such orientation often requires the development of specific activities, such as the introduction of new perspectives into existing mechanisms for agenda-setting and prioritisation; the development of new consensus-based frameworks to explore policy options; and the development of guidelines to assist government and other actors in policy design and decision-making processes. This frequently involves the collection, analysis and synthesis of information about the main subject of study (for instance, a territory, an industry, an institution, a particular technology or problem). Such information would generally cover a wide range of dimensions – social, technological, economic, environmental, political and values-related (STEEP) – with the overall intention of increasing the robustness of proposed policies and decisions, thus making recommendations relatively 'future-proof'. In doing so, two common challenges are the development of contextualised recommendations; and the provision of a sound basis to assess whether proposed recommendations are sufficiently coherent and compatible with the long-term objectives of the sponsoring institutions. Sometimes the orientation process goes one step further to include the design of strategic plans and roadmaps based on the proposed policies and decisions.

Recognising key barriers to, and drivers of, STI

The word 'recognising' is used to stress the importance that European exercises give to acknowledging and identifying both current and potential barriers to, and drivers of, science, technology and innovation (STI). **Barriers** are limitations and constraints hindering the development of a sector, territory, research area, etc. These are normally classified into *economic barriers* (e.g. lack of funding), *political barriers* (e.g. inappropriate regulatory framework, lack of political will), *technological barriers* (e.g. limited research infrastructures, including access to databases, databanks, facilities, etc.), *social barriers* (e.g. undeveloped collaborative culture, lack of human capabilities), *ethical barriers* (e.g. inappropriate means of production, unjust business models), and so on. **Drivers** are events, trends, technologies, and other types of issues shaping the development of a society, organisation, industry, research area, technology, etc. Drivers are also classified into categories (often using frameworks such as STEEP). Normally European exercises devote considerable resources (time, money and brain) to explore such barriers and drivers. This information is then used to (1) identify major STI problems that must be addressed in the next 10 to 20 years; (2) set technical requirements and research pathways; (3) detect weak signals to forecast potential problems and provide a sound basis for continuous 'technology watch' and monitoring systems; (4) discuss threats and opportunities that international, national and sub-national communities confront; (5) understand the dynamics that govern the adoption (or lack of adoption) of new technologies; as well as other uses.



Encouraging strategic and futures thinking

A classic objective of foresight is the encouragement of strategic and futures thinking. This can be achieved with (1) the evaluation of existing medium-to-long-term national and regional visions, (2) the assessment of desired, possible and alternative scenarios; (3) the exploration of new approaches for solving and sharing problems; (4) the identification of future applications and implications of new technologies; (5) the exploration of future development trends in sectors (e.g. energy) and sub-sectors (e.g. biofuels); (6) the identification of opportunities, threats and challenges for the future; (7) the connection of research to business and government goals; (8) the identification of new paradigms; (9) the assessment of possible impacts of policy recommendations and decisions derived from foresight; (10) the exploration of promising preconditions (e.g. resources, legal frameworks, capabilities) for sustainable development and economic growth; or (11) the creation of a foresight culture. The most important contribution of strategic and futures thinking to a foresight exercise is the timely identification of issues that should alert and support decision-making, especially when it comes to strategy- and priority-setting activities.

Supporting STI strategy- and priority-setting

The mapping results show that European foresight exercises tend to mobilise key stakeholders to set and/or strengthen strategic science, technology and innovation (STI) areas connected to public and private industries. Such activities normally assess STI developments in specific sectors (e.g. agriculture, environment, health, etc.) as well as the development of framework conditions in industrial production and possibilities for commercialisation of goods and services capable of enhancing competitiveness in key sectors. In doing so, research and technology milestones are defined with the objective of achieving medium-to-long-term industry goals. But the setting of STI strategies and priorities is not an easy objective. It requires the combination of many challenging activities, for example: the definition of public and private research and technology development (RTD) agendas; the evaluation of RTD policies and priorities of innovation and research portfolios of public funding agencies; the identification of future technological needs, risks and opportunities; the identification of desirable and undesirable impacts of modern technologies (e.g. biotechnology); the analysis of both qualitative and quantitative data about past and present STI and socio-economic developments; the promotion of thorough discussions about STI paradigm changes; and, occasionally, the creation of policy frameworks guiding the development of new/critical technologies. One common way of dealing with STI needs is by using available technologies and capabilities. This normally requires: (1) an assessment of the national or regional position in the studied sector, (2) the creation of new networks between industry, academia and government capable of developing a shared strategic vision of the sector and (3) the political insight to propose adequate changes to existing STI strategies and priorities of government agencies, academic institutions or firms. Here we would like to highlight that one of the most significant challenges of priority-setting in foresight is to ask stakeholders to set their priorities on the basis of experts' assumptions about the future instead of their existing views on current conditions and realities.

Identifying research/investment opportunities

A considerable number of European foresight exercises are aimed at identifying research and investment opportunities. This often involves: the mapping of promising technologies, successful research and business models, and infrastructure requirements; the identification of promising markets and business directions; the translation of key STI barriers and driving forces into opportunities for both public and private industries; the adaptation of innovative industrial policies and strategies into the national and regional contexts; the exploration of potential impacts of the growth or reduction of production capacity, consumers demand or market share; the exploration and evaluation of entrepreneurship trends; the benchmarking of future-oriented action plans; and so on. Some exercises focus on SMEs and NGOs are: the identification of potential future demands of new products and services; the identification of medium-to-long-term prospects (5-10 years) for economic growth and competitiveness; the identification of effective ways of attracting bright and highly-skilled people to make careers in a particular industries; the identification of (new) industry products and services capable of creating new ways of reducing societal problems (e.g. crime solving and crime prevention); and the improvement of the capability to anticipate and prepare for new science risks and opportunities.

Generating visions and images of the future

The objective of gathering and generating shared visions and images is implicit in nearly all European foresight exercises. It is closely linked to the previously mentioned objective of encouraging strategic and futures thinking: both require the evaluation of existing visions and the assessment of desired, possible and alternative scenarios. However, the most important aspect of this objective is the actual creation of shared visions and images, enabling the development of new scenarios with their related strategies and recommendations. While many studies develop visions; they are less often successful in the development of 'shared visions'. This is mainly due to, on the one hand, poorly designed participatory processes and, on the other, unsuccessful communication and dissemination strategies. The creation of 'shared visions' requires (1) an open space for discussion; (2) a thorough and careful analysis of opinions and contributions; (3) a dynamic and interactive feedback mechanism; (4) a clear list of convergent and divergent issues; and (5) an open consultation process aimed at building consensus on shared visions.

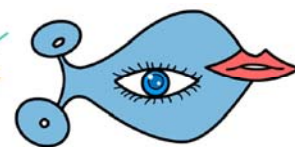
Helping to cope with Grand Challenges

A shared feature across many foresight exercises was the presence of ambitious objectives or 'Grand Challenges'. These Grand Challenges are often politically or socially driven but with a strong economic and technological orientation. Foresight was seen instrumental for achieving engagement of major stakeholders such aspirational objectives. However, one of the biggest challenge of including Grand Challenges in a foresight exercise is the difficulty to invest considerable amount of time and resources in (1) undertaking intensive lobbying of key stakeholders, and (2) securing their political commitment. Examples of EU Grand Challenges include the EU Lisbon Objectives, the European Research Area (ERA)

and, more abstractly, the European Knowledge Society. Exercises focused on such objectives may have also contributed to the creation and consolidation of the European identity in new EU Member States and Candidate Countries. At the trans-national level there are various references to the United Nations Millennium Goals, with a few exercises focused on global problems such as climate change, natural disasters, terrorism, and poverty. As for the national and sub-national levels it is possible to find some exercises targeting 'traditional' Grand Challenges, for example: social equity, sustainable development, regional integration, social cohesion, and sustained economic growth.

Triggering actions & promoting public debate

Of course foresight it meant to inform decisions. But ensuring that foresight actually does trigger action can also be an objective built into exercises. For example, a panel in a foresight project might develop demonstrator proposals, and the panel members engage in recruitment of support for such projects during the life of the foresight exercise. Experience suggests that participants in foresight can often be effective carriers of the message about the results of the activity, and may play roles in implementing (or monitoring the implementation of) the conclusions in their own organisations. A considerable number of cases recognise that foresight outputs have informed decisions but they are cautious at the time of measuring the extent to what the process has lead to actions. The general perception is that on the whole foresight only triggers the actions that need to be taken, and that further steps, such as formalising and implementing the action (e.g. policy recommendations) are almost entirely dependent on the willingness, room for manoeuvre, and power of the sponsoring organisations. The foresight exercise may often seek to influence a wider constituency, for example by disseminating its results and provoking debate on their implications. Sometimes the promotion of public debate on particular foresight results has influenced decisions about RTD investments (e.g. in Malta the Marine exercise claims to have lead to an increase of public RTD investments in the sector, while in the Czech Republic the outcomes of the foresight dialogues reportedly led to a more strategic distribution of public resources for research).



3. Benchmarking European and Global Foresight

The mapping of foresight experiences is not limited to the European region. All over the world experts and national correspondents are contributing to the development of the EFMN database. This facilitates the analysis and comparison of European initiatives against other world regions.

Collecting data at a global level offers the opportunity to look at geographical differences in foresight practices. Questions like who are the main sponsors and target audiences, what are the typical time horizons, how many people are involved, what are the main differences in territorial scope, what are the main outputs, and what are the top methods used in different world regions will provide the reader with valuable information about the global foresight panorama. However, as discussed in the introductory section, the analyses in this report are based on **846** cases. Despite having the national data, it makes sense for analytical purposes to aggregate this to the regional level. As some countries clearly have limited coverage, the data is not sufficient to draw any conclusions. Thus, for the remainder of this section, we analyse the data by regional groups rather than by country. In discussion with the European Commission, seven different groups have been distinguished between:

- **EU27+**
- **Trans-Europe**
- **North America**
- **Latin America**
- **Asia**
- **Africa**
- **Oceania**

The *EU27+* group includes **557** cases. Some **545** from the 27 European Union Member States (Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom) plus **12** cases of Iceland, Norway and Switzerland. The *Trans-Europe* group holds **62** studies. In this category we have included those exercises targeting two or more EU countries. The *North America* group includes **109** exercises from Canada and the USA. The *Latin America* group includes **24** cases from Brazil, Colombia, Peru and Venezuela. The *Asia* group includes **68** exercises from Eastern, South-Central, South-Eastern and Western Asia (i.e. Armenia, China, India, Israel, Japan, Saudi Arabia, South Korea, Southwest Pacific, and Turkey). We believe that in the future additional data may allow us to analyse some of these sub-regions separately. The *Africa* group includes **11** cases focused on Africa as a whole. Finally, the *Oceania* group includes **15** cases from Australia and New Zealand.

These figures are only an indication of the total number of cases available for each region. However, given that the mapping of individual dimensions (e.g. sponsors, audience, time horizon, etc.) was not compulsory, it is often the case that the number of regional cases per dimension varies. For example, while only **450/557** EU27+ cases were mapped against the *sponsors* dimension a total of **5 15/557** cases were mapped against the *target audience* dimension.

Sponsors

Moving on to the nature of sponsors of exercises across the different regions, we can see from **Box 3.1** that **Government** is almost always the main sponsor, irrespective of the region. The main exception here is Latin America, where the proportion of exercises supported by the Government is relatively low. Staying with Latin America, the data also shows that the **research community** plays a more important role as sponsors in this region than in any other. The data for **business** sponsorship is interesting: the relatively high numbers for North America and Oceania perhaps reflect a peculiarly Anglo-Saxon phenomenon. The data for **NGOs** shows that Africa benefits most from their sponsorship as a proportion of total number of sponsors, although Trans-Europe is not far behind. Finally, the data for **IGO** sponsorship pretty much conforms to what we know already about their activities. The Trans-Europe data is unsurprising, since the EC is an important sponsor of foresight exercises with several pilot studies in new Member States and Candidate Countries. But the highest proportion of IGO sponsorship is found in Latin America. This is on account of UNIDO's activities, through which seed funding for some national initiatives has been provided and trans-border exercises established.

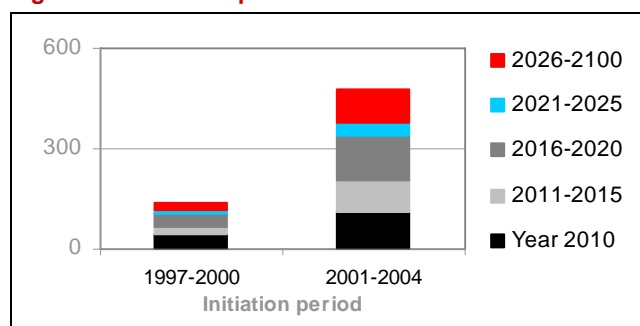
Audiences

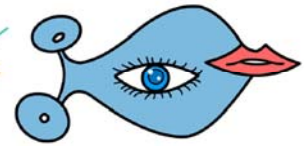
Sponsorship data tells only part of the story and it is also interesting to look at the target audiences of foresight exercises. **Box 3.2** shows the variety of target audiences for each region. Broadly speaking, there is no great variation. **Government agencies and departments** are the main target audiences regardless of the region. The most notable features are the relatively large numbers of **research** and **business** community targets – far more than there are sponsors. This suggests that Governments often sponsor exercises targeted at these other groups. **NGOs** are a significant target group in Africa, whilst **trades unions** are missing from the Anglo-Saxon countries and the Trans-Europe exercises.

Time horizon

Figure 3.1 shows the time horizon of some 600 cases, related to their initiation period. Most foresight exercises are looking 10 to 20 years ahead into the future. With the majority of mapped exercises being initiated in the late 1990s or early 2000s, our analyses are focusing on 21st Century foresight practices.

Figure 3.1: Initiation period vs. time horizon





Box 3.3 presents the time horizon results per region, showing that Europe, North America and Asia have a more strategic attitude towards the far future (e.g. 30, 50, 100 years ahead).

Participation

Looking at the number of participants engaged in foresight exercises, **Box 3.4** shows that there is some regional variety. On the whole, this can be explained by a combination of factors, most notably the target audience of exercises in the different region and the bias in our data collection strategy to date. We will elaborate upon these points as they arise. But to begin, it is perhaps worth noting the similarity in profiles between the EU27+, North America and Oceania data. These three profiles also account for the vast majority of data in the database, and show that more than half the exercises mapped engage **50 persons or less** in their activities. The EU27+ and North America also show less than 20% of exercises involving **more than 200 persons**. Asia has the largest proportion of exercises with **more than 500 participants**, but this is most likely a reflection of the bias in our data collection to date, with the most visible, large-scaled national exercises dominating our small sample size. A similar argument probably holds for Africa. By contrast, Latin America shows a similar profile to Trans-European cases with more than 50% of cases involving **between 51 and 200 persons**, though without any exercise engaging more than 500 persons.

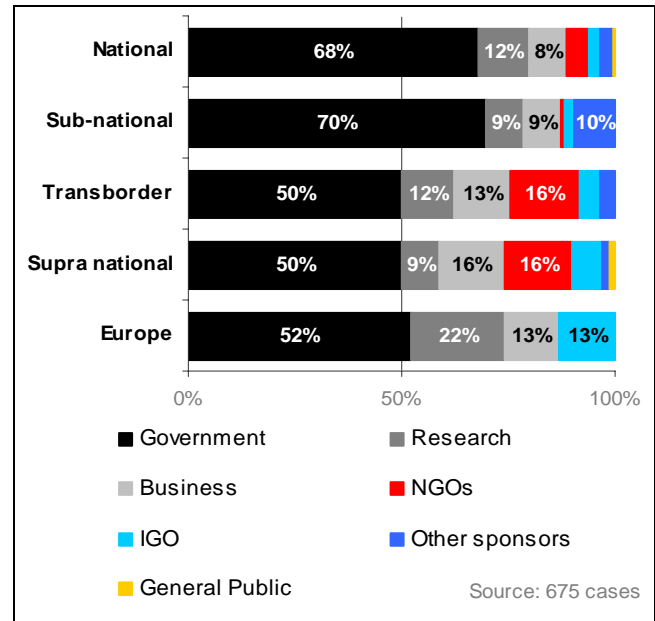
Territorial scope

The aspect of territorial scope can also be further explored in more detail looking at several dimensions. During the collection of information on this aspect, a distinction is made between *sub-national* initiatives (covering regional areas in countries), *national* (covering one country), *supra national* initiatives (covering clusters of countries), and *transborder* initiatives (international of nature and not directly focus on specific countries).

Box 3.5 clearly demonstrates that the majority of the initiatives collected have national scope (approx. 70%). The other remaining initiatives are more or less equally distributed over the other territorial scales (approx. 10%). (Though a regional exercise in a large country may cover a bigger population or economy than a national effort would in a much smaller country.) Looking at some countries that are highly mapped more or less confirms this distribution. The high percentage of initiatives that are national of nature is not strange, because governments are highly represented. But, the conclusion can be drawn that the data suggests that future initiatives are mainly the domain of national governments. The policy on regional foresight seems to have little impact. Looking in detail at the transnational initiatives, UNIDO is of importance, as they organized a significant number of these initiatives. The Supra-national initiatives are often related to supra national country networks, like the Nordic countries and the EC. Another aspect of the analysis of territorial scope is the question: who is sponsoring these types of initiatives? **Figure 3.2** indicates that that the Government is the main sponsor of foresight regardless of the territorial scope. (Note that many business exercises might be commercially confidential or otherwise less visible than activities conducted with public funds.) As expected, Government sponsorship is high for national and sub-national exercises. Business and Research more or less focus on all

scopes like the average distribution with a bit more emphasis on European cases. NGOs, however, are reluctant to sponsor sub-national initiatives; their sponsorship is mainly oriented towards transborder and supra-national studies. Other sponsors support 10% of Sub-national cases.

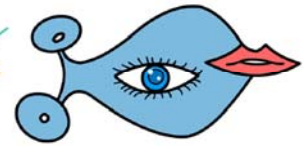
Figure 3.2: Sponsors vs. territorial scope



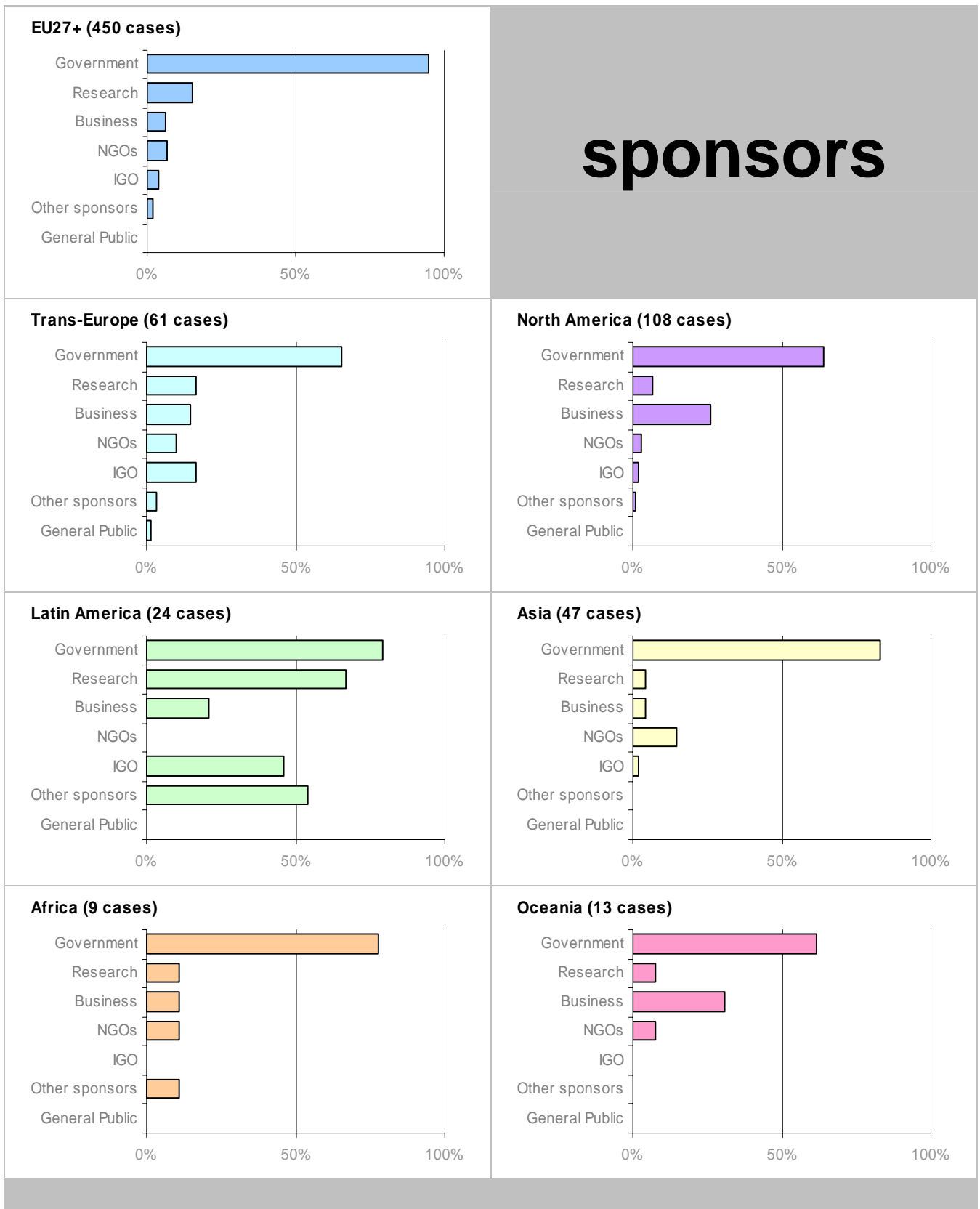
Outputs

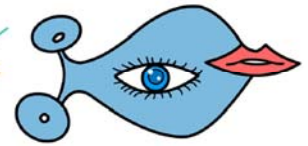
Box 3.6 shows the types of outputs generated by regions.

- **Policy recommendations** are the most common outputs in all regions, particularly in EU27+, Asia, Africa and Oceania. By contrast, policy recommendations account for just over 50% of outputs in North America and Latin America.
- **Analysis of trends and drivers** has been reported as an output most frequently (relatively speaking) in Latin America, followed closely by the EU27+ and Africa.
- **Scenarios** are most common in Oceania and Asia (though note the low number of cases here). They are produced less frequently across the other regions, though with very similar regularity, with the exception of North America, where they are relatively rare in the studies mapped to date.
- **Research and other priorities** are reported as outputs relatively more frequently in Latin America and Oceania; these are followed by North America with 40% of cases providing research priorities.
- **Forecasts** are most popular in Africa, closely followed by Asia. This might reflect the popularity of megatrend analysis in these two regions and the use of modelling and simulation in Africa. On the whole across all regions, forecasts appear to be one of the least reported outputs.
- **Key technologies** are the third most important outputs of Asian cases. It is not very common in other groups.
- **Technology roadmaps** are generated most frequently in North America, while Latin America and Africa show no technology roadmaps in their outputs. In other regions these represents approx. 10% of the outputs.



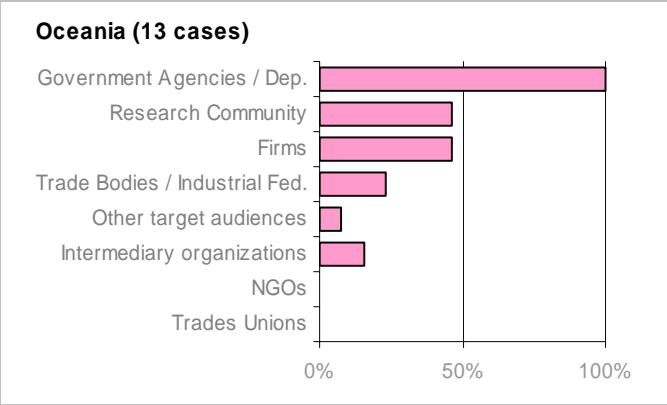
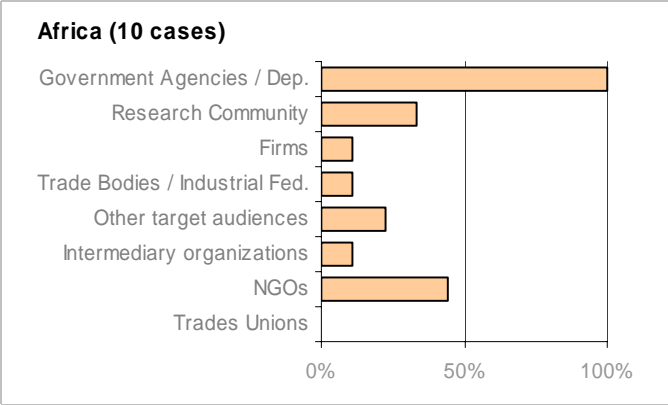
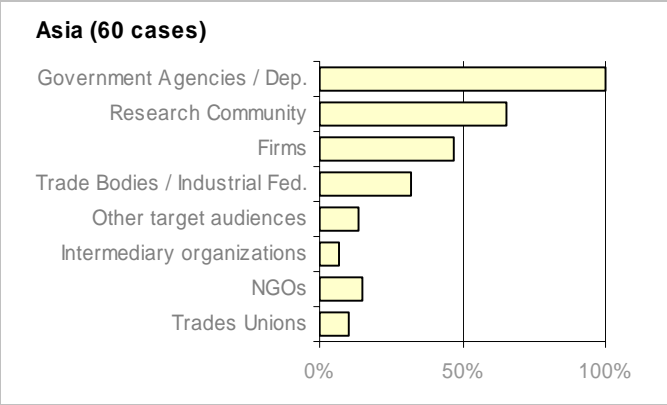
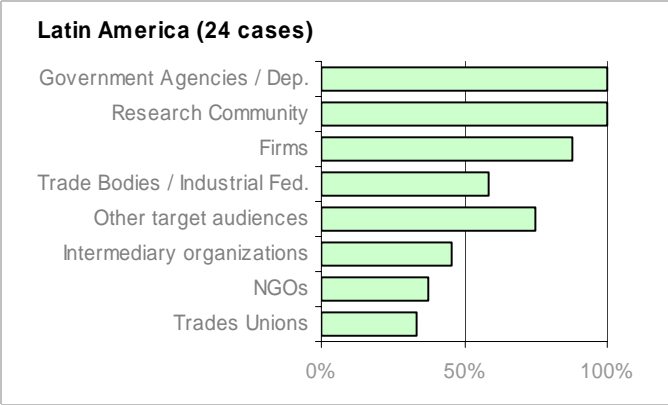
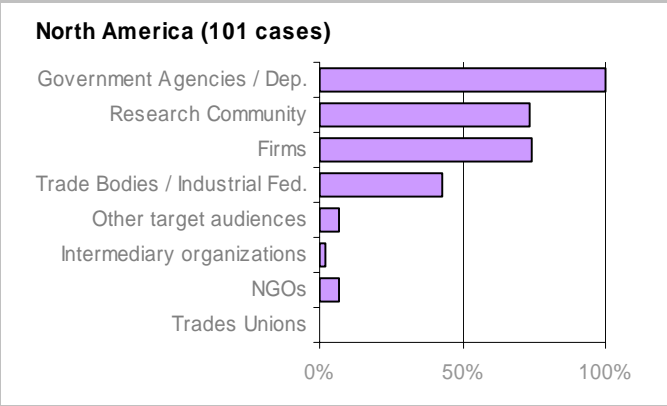
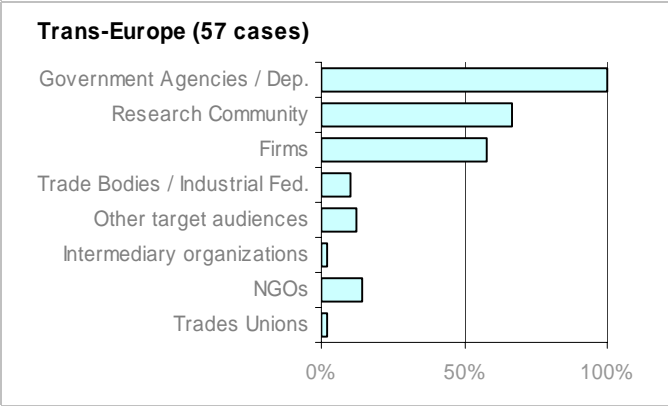
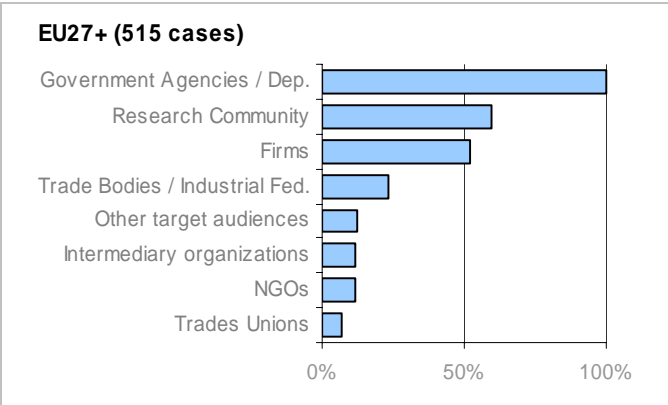
Box 3.1: Sponsors



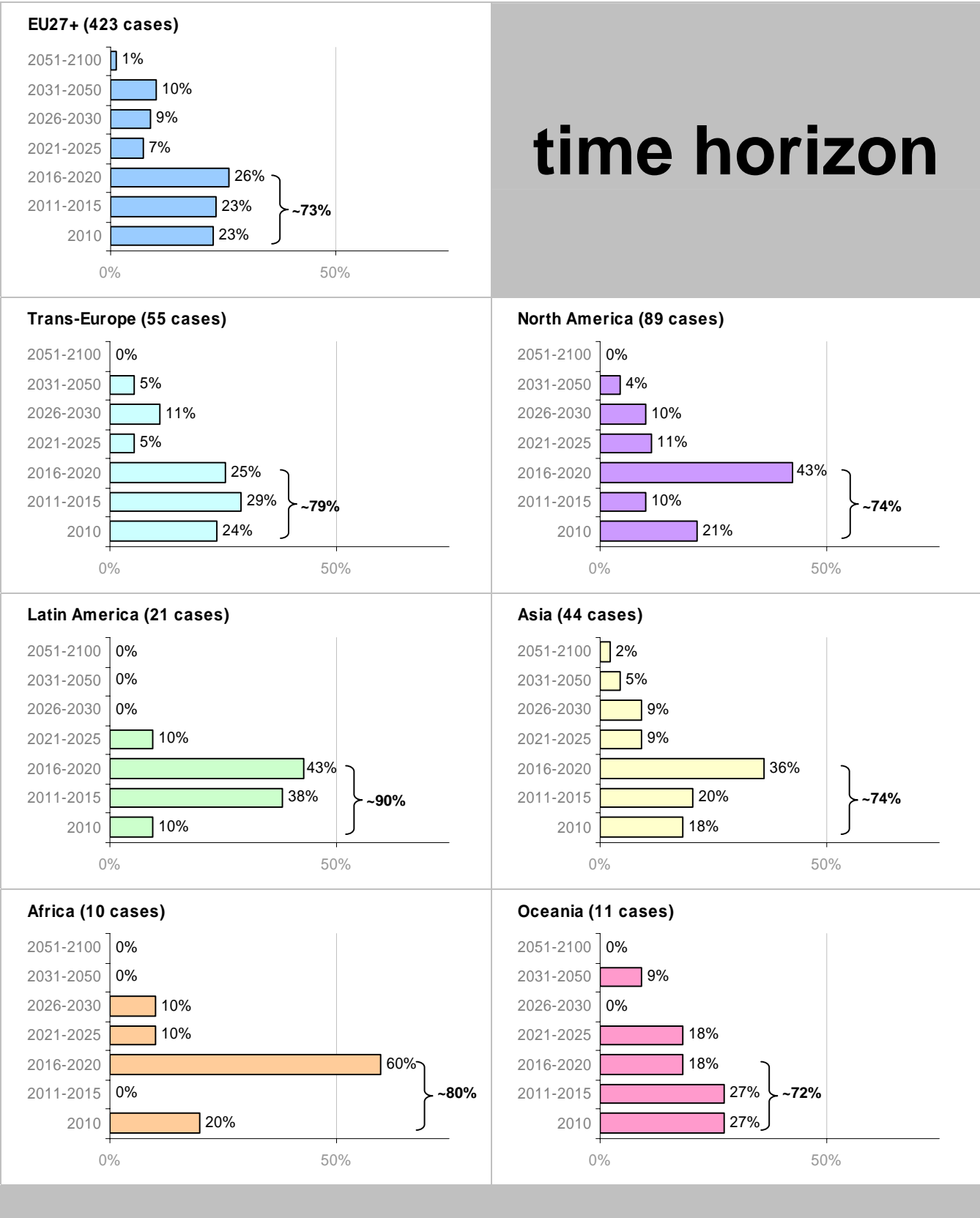


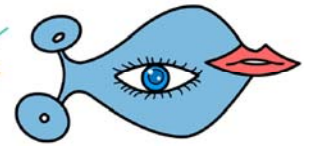
Box 3.2: Audiences

audiences



Box 3.3: Time Horizon

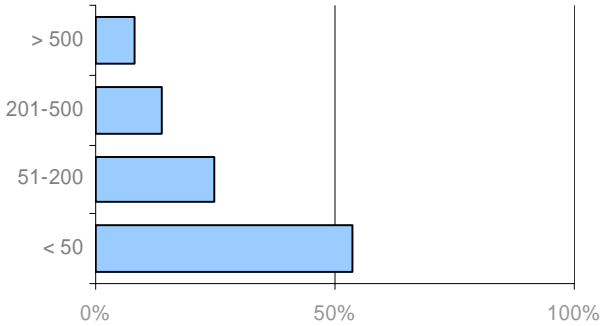




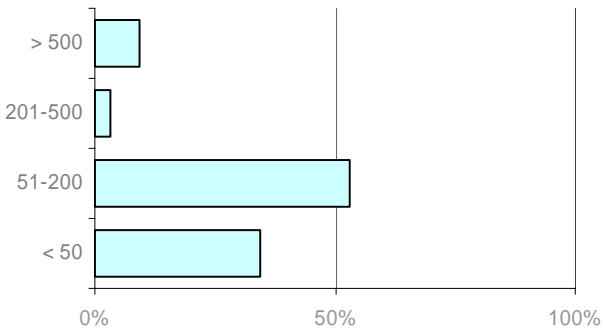
Box 3.4: Participation

participation

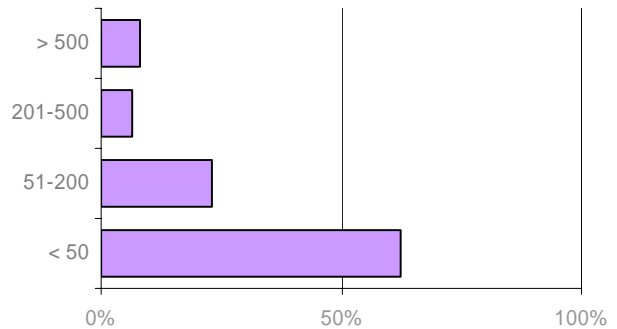
EU27+ (260)



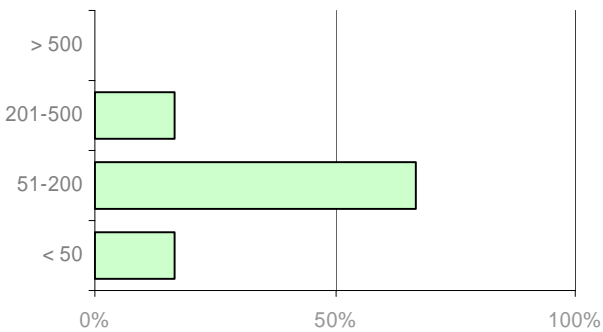
Trans-Europe (32)



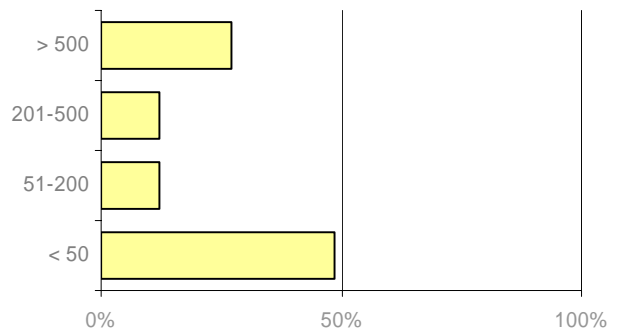
North America (61)



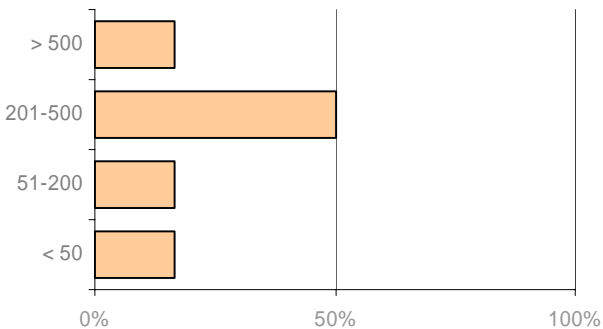
Latin America (24)



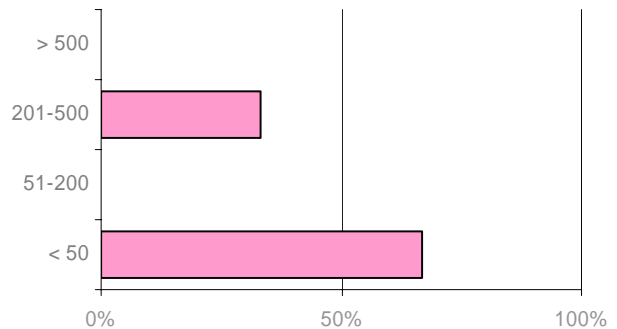
Asia (33)

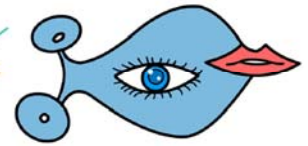


Africa (6)

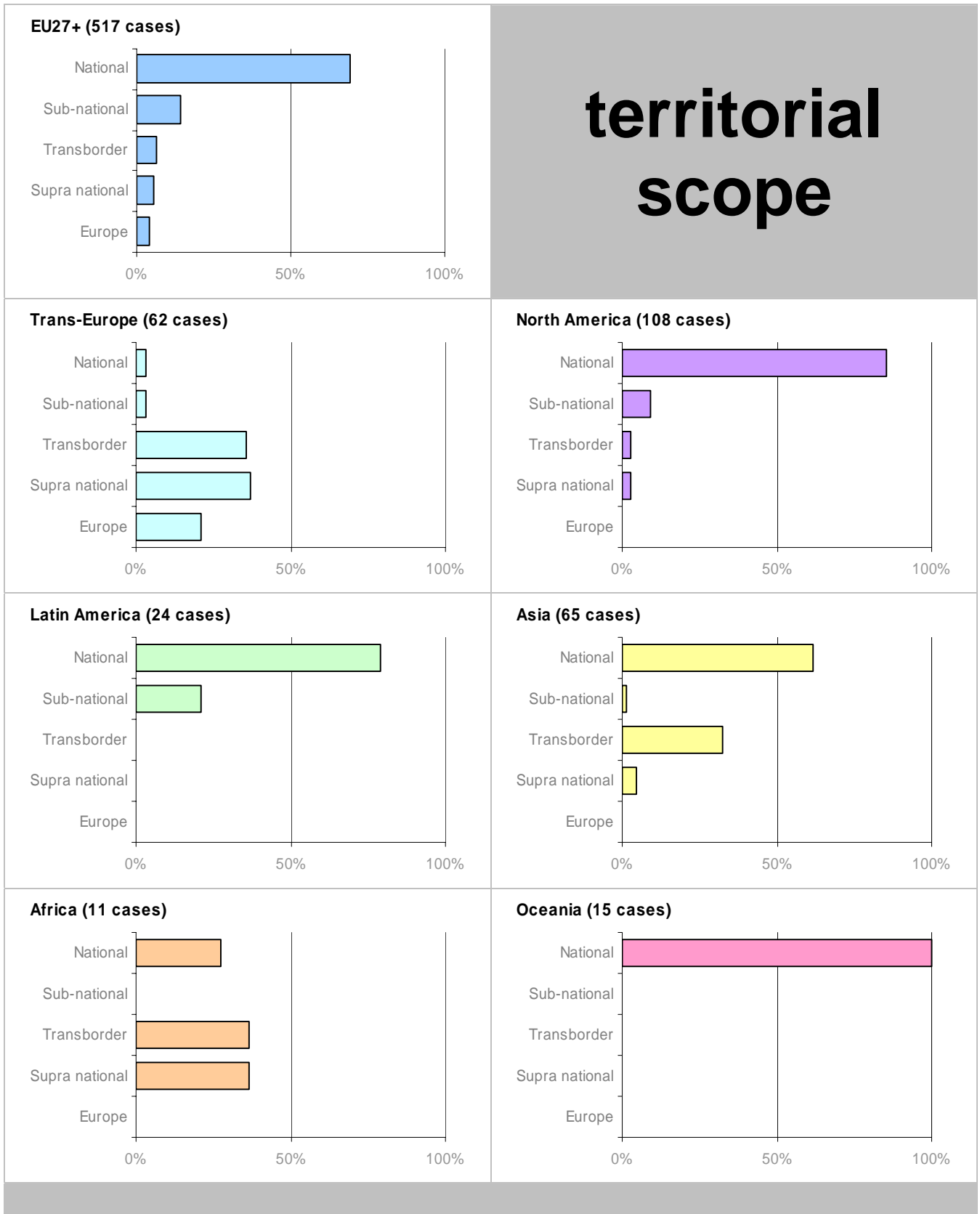


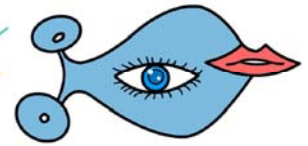
Oceania (3)



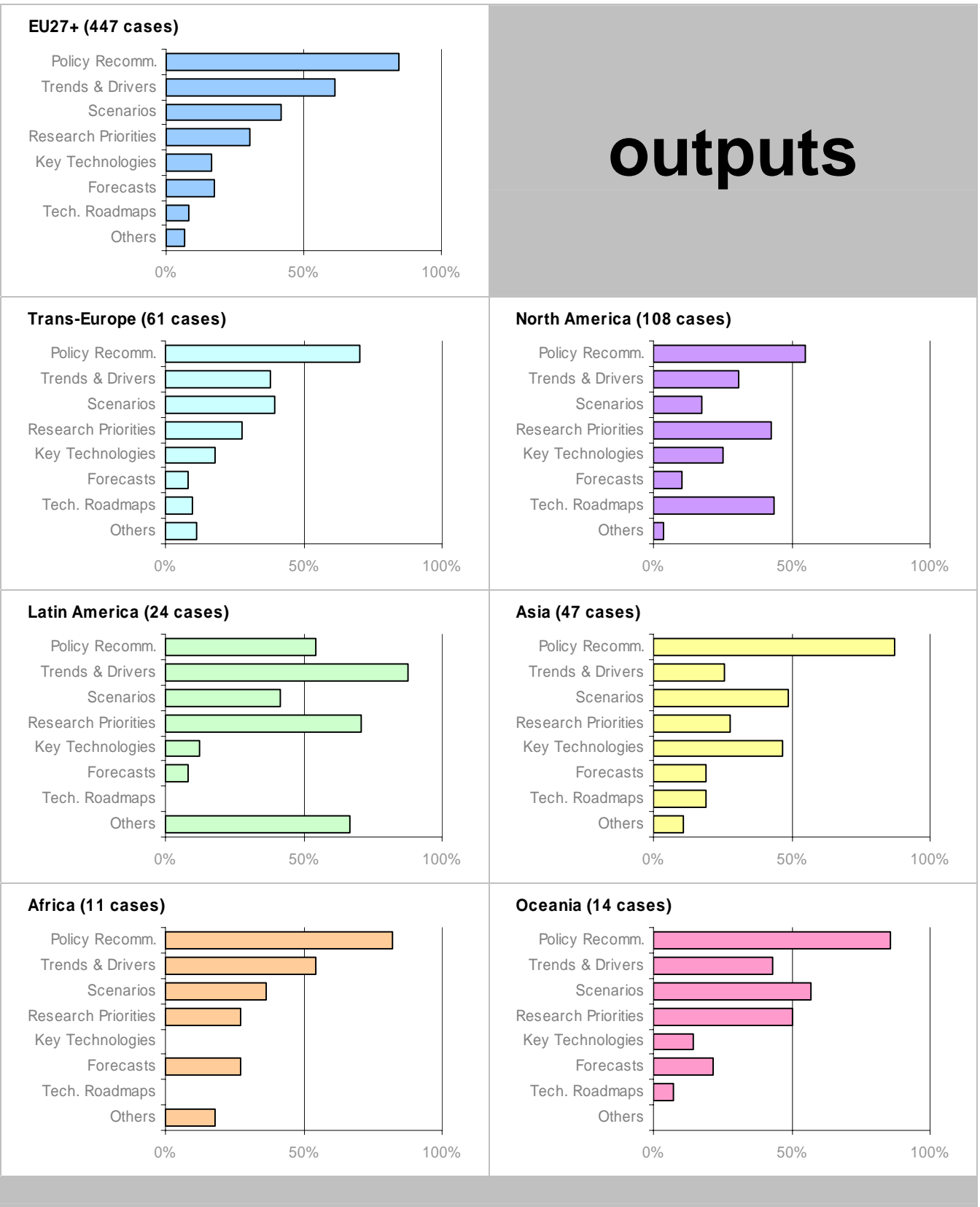


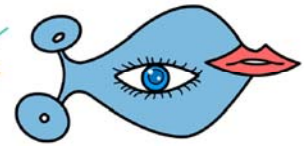
Box 3.5: Territorial Scope





Box 3.6: Outputs





4. Benchmarking Foresight Methods

This section focuses on the methodological side of foresight studies. We address five questions:

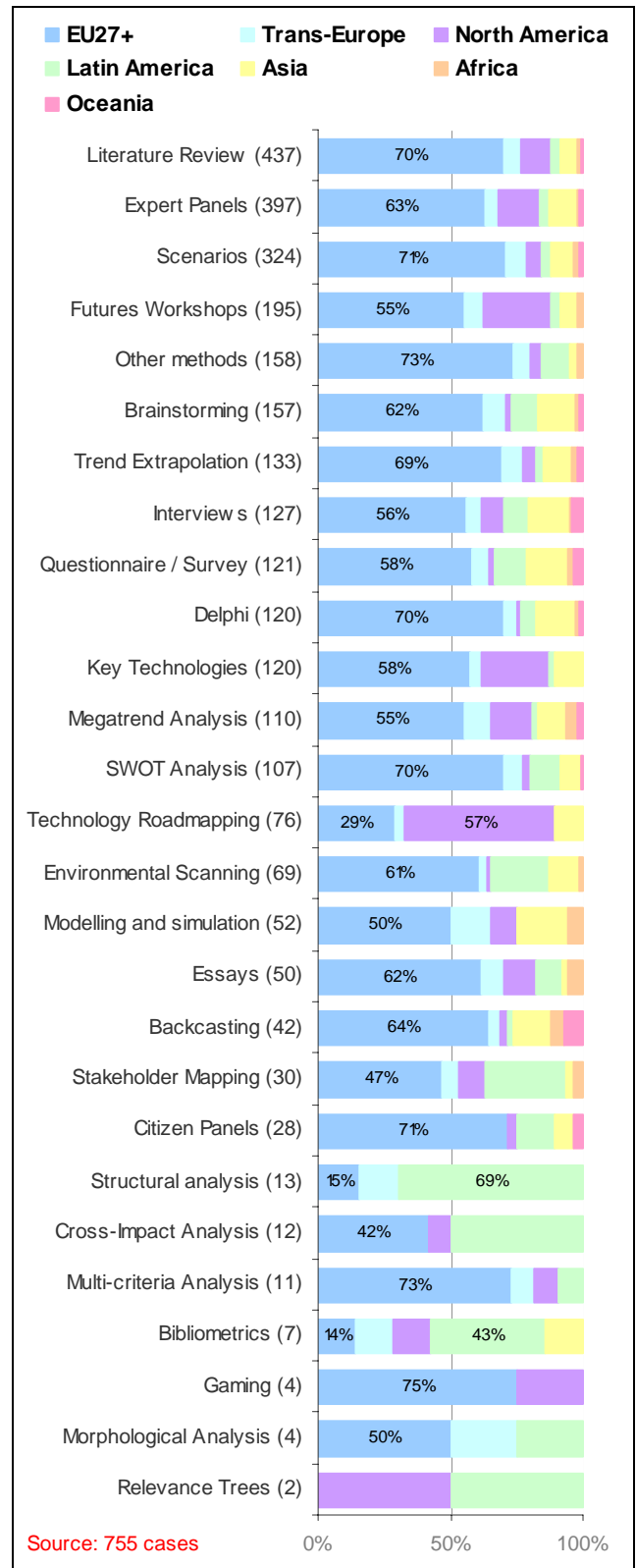
- What are the most commonly used methods?
- What are the Top 10 methods per world region?
- What are the main characteristics and key features of Europe's Top 10 foresight methods?
- What are the most commonly used methods in national, sub-national, transborder, supra-national and trans-European foresight exercises?
- What are the most common combinations of foresight methods?

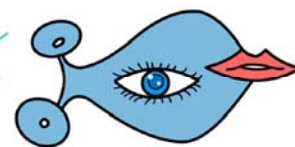
Most common foresight methods

Figure 4.1 (right) presents the basic frequency count data on the extent to which individual methods are used. The number of times each method was used, in a sample of **755** cases, is shown inside the brackets next to the method. For example, **literature review** was employed **437** times. The percentage shown in the blue bar indicates the proportion of applications in national exercises from EU27+ countries. As expected, this number is typically rather high - because the sample is dominated by European cases. For this reason in subsequent analysis we will discriminate amongst regions. Despite the European-bias, the frequencies of use of methods show an interesting result:

1. The **most widely used** methods are without doubt literature review (437), expert panels (397) and scenarios (324). Despite these high numbers, we still believe that literature review and other generic methods are being under-reported in the database; it is hard to imagine a study without some review of relevant literature, in particular.
2. Other **commonly used** methods are futures workshops (195), brainstorming (157), trend extrapolation (133), interviews (127), questionnaires / surveys (121), Delphi (120), key technologies (120), megatrend analysis (110) and SWOT analysis (107).
3. Some **less frequently used** methods are technology roadmapping (76), environmental scanning (69), modelling and simulation (52), essays (50) and backcasting (42). More than half of the cases using technology roadmapping are from North America. We are surprised by the low frequency with which scanning is reported.
4. **Rarely used** methods include stakeholder mapping (30), citizen panels (28), structural analysis (13), cross-impact analysis (12), multi-criteria analysis (11), bibliometrics (7), gaming (4), morphological analysis (4) and relevance trees (2). The numbers here may not do justice to the application of some of these tools in sub-national exercises in France and Spain, where methods such as structural analysis, morphological analysis and relevance trees are known to have been applied. We hope that further mapping efforts will improve the sub-national data and give a more accurate picture here.

Figure 4.1: Mapping frequencies of use of methods





Top 10 methods per region

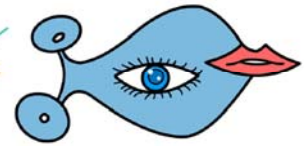
Table 4.1 (below) illustrates the Top 10 foresight methods per region. The first two columns show European cases: **EU27+** (aggregating national exercises in the EU27 plus national cases in Iceland, Norway and Switzerland); and **Trans-Europe** (including studies with more than one EU country involved). To facilitate the comparison across regions, we have used colour shading only for those methods which do not appear in the Top 10 list of EU27. Some remarkable conclusions can be drawn from this analysis:

- Literature review, expert panels, scenarios are in the Top 3 for most regions - except for Oceania where backcasting, interviews and citizen panels are the most common. (These figures might change after improving the number of cases from that region.)
- Megatrend analysis, modelling and simulation, and questionnaires/surveys are more popular in trans-national cases than Delphi, SWOT analysis and interviews.

- Despite being created in North America, Delphi appears to be more popular in EU27+, Asia and Oceania.
- North America seems to be the region with the most emphasis on technology roadmapping and key technologies activities.
- Structural analysis is in the Top 10 for Latin America – probably reflecting the strong influence that French's *strategic prospective* practices had in the late 1980s and early 1990s.
- Both Asia and Africa use modelling and simulation in about 25% of their studies.
- Finally, it is interesting to look at the average number of methods used by region: EU27+ (4), Trans-Europe (3), North America (3), Latin America (8), Asia (6), Africa (5) and Oceania (2). Countries like Colombia and Venezuela in Latin America and Turkey in Asia show very heavy methodological designs.

Table 4.1: Top 10 foresight methods per region

Top 10	EU27+ (485 cases and 1835 methods) Average 4	Trans-Europe (61 cases and 192 methods) Average 3	North America (109 cases and 328 methods) Average 3	Latin America (24 cases and 188 methods) Average 8	Asia (51 cases and 280 methods) Average 6	Africa (10 cases and 47 methods) Average 5	Oceania (15 cases and 35 methods) Average 2
1	Literature Review (63%)	Literature Review (48%)	Expert Panels (57%)	Other methods (71%)	Expert Panels (80%)	Scenarios (60%)	Backcasting (33%)
2	Expert Panels (52%)	Scenarios (41%)	Futures Workshops (46%)	Expert Panels (67%)	Scenarios (57%)	Megatrend Analysis (50%)	Interviews (33%)
3	Scenarios (47%)	Expert Panels (30%)	Literature Review (45%)	Literature Review (67%)	Literature Review (55%)	Literature Review (50%)	Citizen Panels (33%)
4	Other methods (24%)	Futures Workshops (23%)	Technology Roadmapping (39%)	Environmental Scanning (63%)	Interviews (45%)	Futures Workshops (40%)	Questionnaire / Survey (27%)
5	Futures Workshops (22%)	Brainstorming (21%)	Key Technologies (28%)	Brainstorming (63%)	Questionnaire / Survey (39%)	Expert Panels (40%)	Megatrend Analysis (20%)
6	Brainstorming (20%)	Megatrend Analysis (19%)	Scenarios (17%)	Questionnaire / Survey (58%)	Brainstorming (37%)	Essays (30%)	Trend Extrapolation (20%)
7	Trend Extrapolation (19%)	Trend Extrapolation (19%)	Megatrend Analysis (16%)	Interviews (50%)	Delphi (35%)	Questionnaire / Survey (30%)	Delphi (20%)
8	Delphi (17%)	Other methods (19%)	Interviews (10%)	SWOT Analysis (50%)	Trend Extrapolation (27%)	Modelling & simulation (30%)	Scenarios (13%)
9	SWOT Analysis (15%)	Modelling & simulation (13%)	Essays (6%)	Scenarios (42%)	Megatrend Analysis (25%)	Trend Extrapolation (30%)	Brainstorming (13%)
10	Interviews (15%)	Questionnaire / Survey (13%)	Trend Extrapolation (6%)	Structural analysis (38%)	Modelling & simulation (25%)	Other methods (30%)	Expert Panels (13%)



Box 4.1: Europe's Top 10 methods in the Foresight Diamond

The **Foresight Diamond** includes some 33 methods in terms of the main type of knowledge source on which they are mainly based. These sources of knowledge (creativity, evidence, expertise and interaction) are certainly not fully independent from one other; however, it is possible to use them to highlight the most representative features of each method.

Creativity: The mixture of original and imaginative thinking is often provided by technology 'gurus', via genius forecasting, backcasting, or essays. These methods rely heavily on the inventiveness and ingenuity of very skilled individuals, such as science fiction writers or the inspiration that emerges from groups of people involved in brainstorming or wild cards sessions.

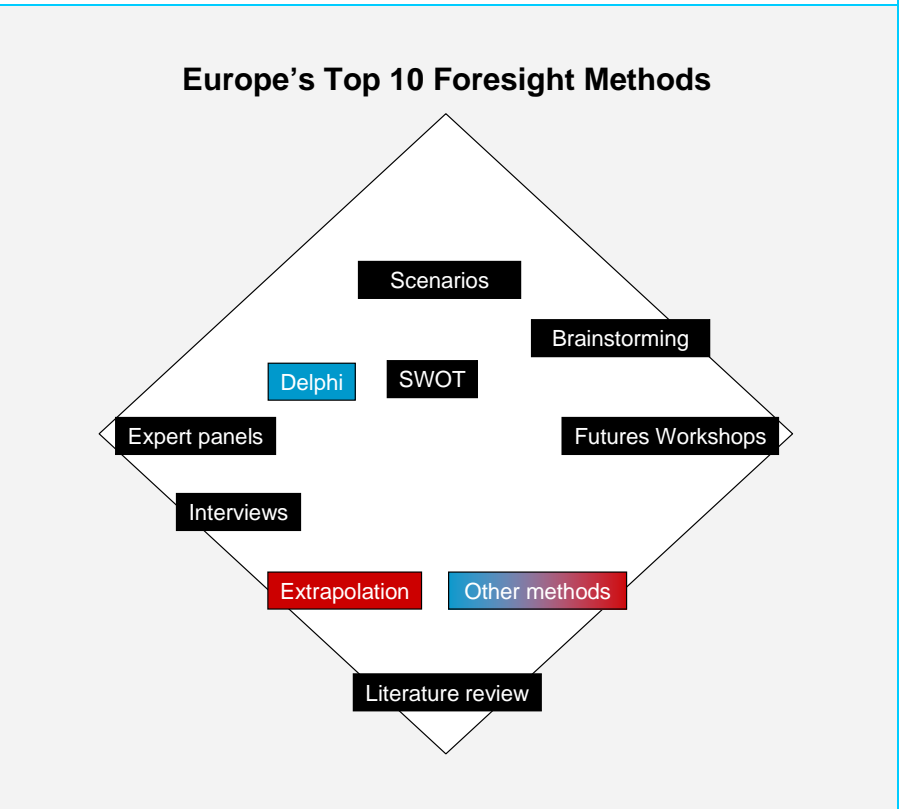
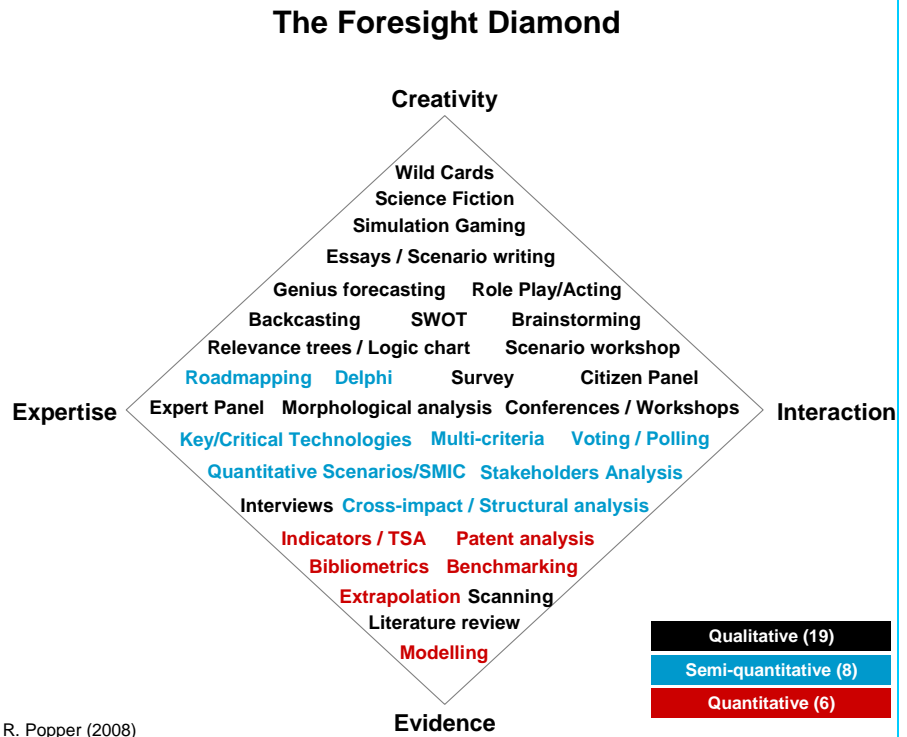
Expertise: The skill and knowledge of individuals in a particular area or subject is frequently used to support top-down decisions, provide advice and make recommendations.

Interaction: Expertise often gains considerably from being brought together and challenged to articulate with other expertise (and indeed with the views of non-expert stakeholders). And given that foresight activities are often taking place in societies where democratic ideals are widespread, and legitimacy is normally gained through 'bottom-up', participatory and inclusive activities, it is important that they are not just reliant on evidence and experts.

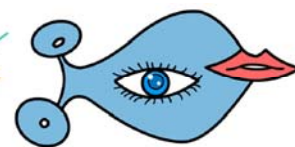
Evidence: It is important to attempt to explain and/or forecast a particular phenomenon with the support of reliable documentation and means of analysis of, for example, statistics and various types of measurement indicators. These activities are particularly helpful for understanding the actual state of development of the research issue.

Similarly, the **Diamond** emphasises the type of technique, using different colours.

- Qualitative methods (**black**)
- Semi-Quantitative (**blue**)
- Quantitative (**red**)



Source: the Foresight Diamond is adapted from Popper (2008)



Box 4.2: Key features of Europe's Top 10 methods

Literature Review (LR) represents a key part of scanning processes (see below). Good reviews generally use a discursive writing style and are structured around themes and related theories. Occasionally the review may seek to explicate the views and future visions of different authors. LR involves the analysis of books, reports, journals or websites, and most often requires an expert in the topic concerned using their existing knowledge of the field to identify crucial contributions and synthesize their implications for the topic at hand (e.g. what they have to say about key drivers, policy instruments, etc.).

Expert Panels are groups of people dedicated to discussion and analysis, combining their knowledge concerning a given area of interest. They can be local, regional, national or international. Panels are typically organised to bring together "legitimate" expertise, but can also attempt to include creative, imaginative and visionary perspectives. In many exercises, panel members are also expected to influence the decision-making environment (e.g. disseminating results).

Scenarios refer to a wide range of approaches involving the construction and use of scenarios – more or less systematic and internally consistent visions of plausible future states of affairs. They may be produced by means of deskwork, workshops, or the use of tools such as computer modelling. Scenario workshops commonly involve working groups dedicated to the preparation of alternative futures. There are numerous ways of articulating and elaborating such scenarios – for example, using a 2*2 matrix cross-cutting key parameters; using "archetypal" scenarios such as "better than expected", "worse than expected", "different to expected", and so on. But one can also find workshops aiming at the creation of an aspirational or success scenario, for example, elaborating a vision of a desirable and feasible aspirational future.

Futures workshops are events lasting from a few hours to a few days, in which there is typically a mix of talks, presentations, and discussions and debates on a particular subject. The events may be more or less highly structured and "scripted": participants may be assigned specific detailed tasks. The feedback of participants is used to improve the scope of the process.

Brainstorming is a creative and interactive method used in face-to-face and online working sessions to generate new ideas around a specific area of interest. Aiming at removing inhibitions and breaking out of narrow and routine discussions, it allows people to think more freely and move into new areas of thought, and to propose new solutions to problems. The first step involves exchanging views from a selected group of people. These views are gathered and made available for inspection as they arise, crucially without being criticised or discussed in depth. Subsequently, all ideas are discussed and clustered (e.g. social, technological, etc.).

Trend extrapolation is among the longest-established tools of forecasting. The method provides a rough idea of how past and present developments may look in the future – assuming, to some extent, that the future is a kind of continuation of the past. There may be large changes, but these are extensions of patterns that have been previously observed. Essentially, it is assumed that certain underlying processes – which may or may not be explicated – will continue to operate, driving the trend forwards. In practice, of course, most, if not all, trends will confront limits and countertrends at some point in their evolution.

Delphi is a well-established technique that involves repeated polling of the same individuals, feeding back (sometimes) anonymised responses from earlier rounds of polling, with the idea that this will allow for better judgements to be made without undue influence from forceful or high-status advocates. Delphi surveys are usually conducted in two, and less commonly three, rounds. They are most often employed to elicit views as to whether and when particular developments may occur, but the technique can be used for any sort of opinion or information – such as the desirability of specific outputs, impacts of policies or technologies, etc.

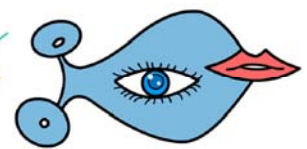
SWOT Analysis is a method which first identifies factors internal to the organisation in question (e.g. particular capabilities, brands, etc.) and classifies them in terms of Strengths and Weaknesses. It similarly examines external factors (broader socioeconomic and environmental changes, for example, or the behaviour of opponents, competitors, markets, etc.) and presents them in terms of Opportunities and Threats. This is then used to explore possible strategies – developing and building on strengths and overcoming or accommodating weaknesses, providing insight as to the resources and capabilities required to deal with changing environments, and so on. It is very widely used for strategy formulation and decision making.

Interviews are often described as "structured conversations" and are a fundamental tool of social research. In foresight they are often used as formal consultation instruments, intended to gather knowledge that is distributed across the range of interviewees. This may be tacit knowledge that has not been put into words, or more documented knowledge that is more easily located by discussions with experts and stakeholders than by literature review. Interviews play an important role in the evaluation of foresight (e.g. assessing how well resources are being or have been used).

Other methods

- **Benchmarking** is commonly used for marketing and business strategy planning and has recently become more popular in governmental and inter-governmental strategic decision-making processes. It focuses on what others are doing in comparison to what you are doing by comparing similar units of analysis in terms of common indicators (e.g. research capabilities of key sectors, market sizes of industries, etc.).
- **Indicators and Time Series Analysis (TSA)** involve the identification of figures to measure changes over time. Indicators are generally built from statistical data with the purpose of describing, monitoring and measuring the evolution and the current state of relevant issues. As for TSA (analysis of a series of data points, measured normally at consecutive times, within often consistent intervals), we can say that the method has become popular for economic forecasting, studying biological data, etc.
- **Patent Analysis** often resembles bibliometrics, but uses patents rather than publications as its starting point. It provides strategic intelligence on technologies, and can be used to indicate "revealed competitive advantage" based on leadership in technological development. It helps to understand who the leading technology providers are. It can be used to compare companies and countries, or different technology areas – such as fields where high levels of activity seem to be underway.

Source: Adapted from Popper (2008)



Territorial use of methods

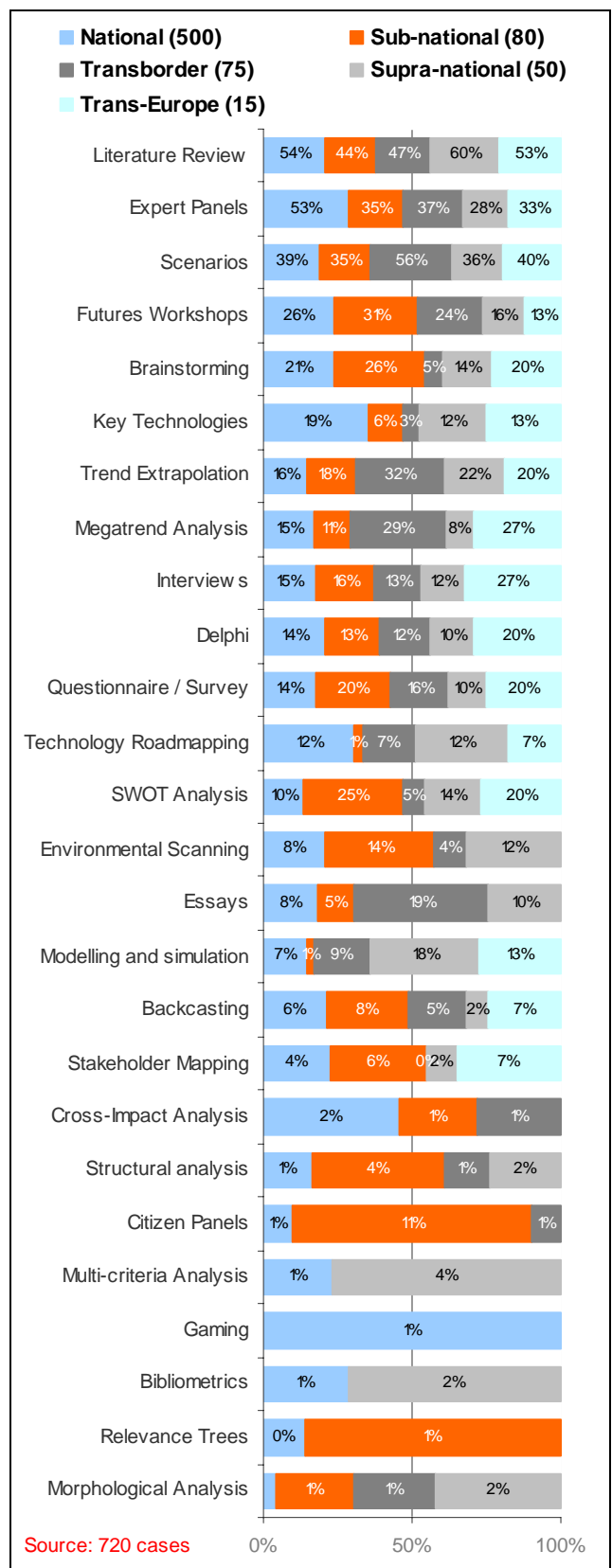
Figure 4.2 (right) shows the territorial use of methods. The percentage figures located in each method bar show the *proportion of cases related to a territory that are reported as using specific methods*. The total number of cases per territory is indicated in brackets next to the territory: national (500), sub-national (80), transborder (75), supra-national (50) and trans-Europe (15). For example, literature review is used in 54% of national cases, in 44% of sub-national cases, in 47% of transborder cases, in 60% of sub-national cases and in 53% of trans-European cases.

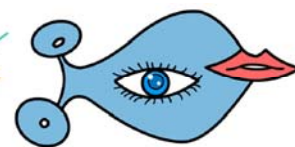
These figures allow us to make some conclusions:

- **Literature review, expert panels** and **scenarios** are the most common methods, regardless of the territorial scope.
- **Scenarios** are, proportionally, twice more likely to be used in transborder exercises than at the national level.
- **SWOT analysis** is very popular at the sub-national level, but less so at the other levels; the same applies to **brainstorming**. Both approaches are relatively inexpensive and easy to organise, which might explain their extensive use at this level.
- **Expert panels** are more common at the national level, but are less popular at the supranational level, no doubt due to the logistical challenges and costs associated with assembling a group of people from several countries.
- **Trend extrapolation** and **megatrends analysis** are more frequently seen in transborder and trans-European studies.
- **Key technologies** are most extensively used at the national level.
- **Technology roadmapping** is most popular at the national and supra-national levels but is virtually absent at the sub-national level.
- **Modelling and simulation** are most popular at the supranational level, but not very practiced at the sub-national level. This is hardly surprising, given the technical resources that are often associated with these methods.
- **Citizen panels** are mostly used at the sub-national level.
- **Environmental scanning** is more commonly used in sub-national and transborder exercises.

Despite the low numbers, it is perhaps worth highlighting that all four uses of **gaming** have been at the national level. Also interesting is the lack of cases using **multi-criteria analysis** at the sub-national level. As we would expect, **bibliometrics** is more commonly used at the national and supra-national levels. Not surprisingly methods like **relevance trees**, **structural analysis** and **stakeholder mapping** are more commonly found at the sub-national levels, this is consistent with the *strategic prospective* practices in France and Latin America.

Figure 4.2: Mapping territorial use of methods





In depth analysis: combinations of methods

To conclude the methodological discussion, this section analyses the most common combinations of foresight methods. In so doing we have looked at how 775 exercises have applied and combined 26 foresight methods. **Table 4.2** shows the results of this analysis. A total 2,584 applications were reported meaning that on average exercises used 3 to 4 methods, in other words the results reflect the analysis of 13,088 combinations.

The table was **designed to be read horizontally**. (The proportion in which most methods have been combined with **expert panels**, **literature review** and **scenarios** (columns **J**, **F** and **O**, respectively) may sometimes divert the attention to explore alternative interpretations of the vertical dimension. But for the purposes of this report, we will only focus the attention on the rows.) Different colour shadings are used to illustrate the extent to what the methods are combined.

- For methods combined in **more than 60%** of their applications we have used **orange** background.
- For methods combined in **between 40% and 60%** of their applications we used **yellow** background.
- For methods combined in **between 25% and 40%** of their applications we used **beige** background.
- For methods which are not very frequently combined we have used **white** background.

The following points should be highlighted:

- As expected, most methods are highly combined with **expert panels**, **literature review** and **scenarios**. However, in order to avoid repetitions we do not refer to these in subsequent highlights but we hope the reader will keep this in mind.
- **Backcasting** is often combined with brainstorming (37%), trend extrapolation (28%) and environmental scanning (26%).
- **Brainstorming** is often combined with futures workshops (43%), SWOT (31%), key technologies (31%), Delphi (30%), environmental scanning (26%) and interviews (26%).
- **Citizen panels** are very often combined with futures workshops (71%), brainstorming (59%), interviews (47%), environmental scanning (41%), SWOT (41%), and questionnaire /survey (35%).
- **Environmental scanning** is often combined with brainstorming (60%), futures workshops (40%), trend extrapolation (35%), SWOT analysis (33%), questionnaires / surveys (28%), stakeholder mapping (27%), interviews (25%) and key technologies (25%).
- **Essays** are often combined with megatrend analysis (33%) and futures workshops (29%).
- **Expert Panels** are often combined with futures workshops (34%) and brainstorming (27%).
- **Futures Workshops** are often combined with brainstorming (32%).

- **Gaming** was only applied in 4 cases of the sample and it was mainly combined with futures workshops, modelling and simulation.
- **Interviews** are often combined with questionnaires / surveys (42%) and brainstorming (32%).
- **Literature Review** is commonly combined with futures workshops (28%).
- **Megatrend Analysis** is commonly combined with futures workshops (33%).
- **Morphological Analysis** was used in 5 cases. It was combined with backcasting, brainstorming, stakeholder mapping and structural analysis.
- **Questionnaires / surveys** are often combined with interviews (42%) and megatrend analysis (25%).
- **Relevance Trees** was used only in 2 cases. In both cases it was combined with cross-impact analysis.
- **Scenarios** are commonly combined with futures workshops (25%).
- **SWOT Analysis** is commonly combined with brainstorming (52%), futures workshops (33%) and questionnaires / surveys (28%).
- **Cross-Impact Analysis** is often combined with brainstorming (62%) and questionnaires / surveys (62%).
- **Delphi** is commonly combined with brainstorming (42%), key technologies (28%) and futures workshops (25%).
- **Key Technologies** is commonly combined with brainstorming (39%), futures workshops (39%), technology roadmapping (35%) and Delphi (25%).
- **Multi-criteria Analysis** has been used in 8 cases only with half of those combining it with interviews and megatrend analysis.
- **Stakeholder Mapping** is often combined with brainstorming (62%), environmental scanning (55%), futures workshops (45%), SWOT (41%) and trend extrapolation (41%).
- **Structural Analysis** is often combined with brainstorming (85%), questionnaires / surveys (69%), SWOT (69%) and environmental scanning (62%) and stakeholder mapping (46%).
- **Technology Roadmapping** is often combined with key technologies (55%) and futures workshops (48%).
- **Bibliometrics** was used in 5 cases and was mainly combined with environmental scanning, stakeholder mapping, and trend extrapolation.
- **Modelling and simulation** is often combined with trend extrapolation (45%) and megatrend analysis (34%).
- **Trend Extrapolation** is mainly combined with the three most common methods (expert panels, literature review and scenarios).

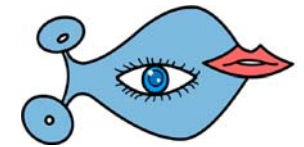
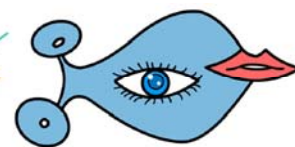


Table 4.2: The A to Z of foresight methods combination

METHODS		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	Backcasting		37%	5%	26%	7%	47%	23%	5%	23%	47%	21%	9%	14%	2%	47%	12%	5%	12%	7%	2%	16%	5%	9%	0%	19%	28%
B	Brainstorming	11%		7%	26%	9%	69%	43%	1%	26%	70%	14%	3%	19%	1%	45%	31%	6%	30%	31%	2%	13%	8%	7%	1%	9%	18%
C	Citizen Panels	12%	59%		41%	18%	76%	71%	0%	47%	47%	6%	6%	35%	6%	59%	41%	6%	18%	0%	0%	24%	24%	0%	0%	0%	18%
D	Environmental Scanning	18%	60%	12%		13%	62%	40%	3%	25%	80%	13%	3%	28%	2%	47%	33%	10%	23%	25%	3%	27%	13%	10%	5%	15%	35%
E	Essays	5%	19%	5%	13%		32%	29%	2%	17%	49%	32%	5%	14%	2%	33%	14%	5%	5%	10%	3%	8%	6%	5%	2%	6%	22%
F	Expert Panels	6%	27%	4%	10%	6%		34%	1%	20%	65%	16%	1%	17%	0%	34%	15%	2%	17%	22%	1%	7%	3%	16%	1%	5%	15%
G	Futures Workshops	5%	32%	6%	13%	9%	64%		2%	13%	61%	21%	2%	13%	1%	41%	14%	2%	13%	23%	1%	7%	3%	18%	0%	5%	14%
H	Gaming	50%	50%	0%	50%	25%	75%	75%		0%	50%	25%	0%	0%	0%	100%	0%	0%	25%	0%	0%	50%	0%	0%	0%	75%	50%
I	Interviews	9%	32%	7%	13%	10%	63%	21%	0%		65%	15%	3%	42%	1%	35%	17%	4%	8%	9%	4%	9%	5%	7%	2%	6%	19%
J	Literature Review	5%	24%	2%	12%	7%	57%	28%	0%	18%		16%	1%	15%	0%	41%	14%	2%	15%	20%	2%	5%	2%	12%	1%	8%	21%
K	Megatrend Analysis	8%	16%	1%	7%	17%	50%	33%	1%	14%	55%		2%	24%	1%	49%	9%	3%	13%	21%	3%	4%	2%	6%	1%	16%	24%
L	Morphological Analysis	80%	80%	20%	40%	60%	60%	80%	0%	60%	80%	40%		40%	20%	100%	40%	40%	20%	20%	0%	60%	60%	20%	0%	40%	40%
M	Questionnaire / Survey	5%	23%	5%	15%	8%	56%	22%	0%	42%	57%	25%	2%		1%	38%	20%	7%	19%	8%	3%	6%	8%	4%	1%	7%	20%
N	Relevance Trees	50%	50%	50%	50%	50%	50%	50%	0%	50%	100%	50%	50%	50%		50%	50%	100%	0%	0%	50%	50%	50%	0%	0%	50%	50%
O	Scenarios	6%	20%	3%	9%	7%	40%	25%	1%	13%	54%	19%	2%	14%	0%		11%	2%	12%	9%	0%	5%	3%	5%	0%	12%	24%
P	SWOT Analysis	6%	52%	8%	24%	11%	66%	33%	0%	23%	70%	13%	2%	28%	1%	42%		8%	20%	23%	2%	14%	11%	6%	2%	2%	14%
Q	Cross-Impact Analysis	15%	62%	8%	46%	23%	62%	23%	0%	38%	54%	31%	15%	62%	15%	46%	54%		15%	23%	15%	15%	38%	8%	0%	23%	15%
R	Delphi	5%	42%	3%	14%	3%	61%	25%	1%	9%	61%	16%	1%	22%	0%	38%	17%	2%		28%	2%	4%	0%	6%	1%	2%	11%
S	Key Technologies	3%	39%	0%	14%	5%	71%	39%	0%	9%	75%	23%	1%	8%	0%	25%	17%	3%	25%		3%	2%	0%	35%	2%	7%	10%
T	Multi-criteria Analysis	13%	38%	0%	25%	25%	38%	25%	0%	50%	88%	50%	0%	38%	13%	13%	25%	25%	25%	38%		25%	0%	13%	13%	38%	38%
U	Stakeholder Mapping	24%	62%	14%	55%	17%	83%	45%	7%	34%	66%	17%	10%	24%	3%	55%	41%	7%	14%	7%	7%		21%	0%	10%	17%	41%
V	Structural Analysis (MICMAC)	15%	85%	31%	62%	31%	77%	46%	0%	46%	62%	15%	23%	69%	8%	62%	69%	38%	0%	0%	0%	46%		0%	0%	8%	15%
W	Technology Roadmapping	6%	14%	0%	8%	4%	80%	48%	0%	11%	70%	10%	1%	6%	0%	23%	7%	1%	8%	55%	1%	0%	0%		0%	7%	11%
X	Bibliometrics	0%	40%	0%	60%	20%	60%	0%	0%	40%	80%	20%	0%	20%	0%	20%	40%	0%	20%	40%	20%	60%	0%	0%		20%	60%
Y	Modelling and simulation	14%	23%	0%	16%	7%	30%	18%	5%	13%	59%	34%	4%	14%	2%	66%	4%	5%	4%	14%	5%	9%	2%	9%	2%		45%
Z	Trend Extrapolation	8%	17%	2%	15%	10%	38%	18%	1%	15%	62%	20%	1%	16%	1%	51%	8%	1%	8%	8%	2%	8%	1%	6%	2%	17%	
13,088 combinations		229	898	132	454	288	1652	961	32	588	1860	573	62	581	25	1289	518	110	504	588	62	237	128	338	38	289	652
2,584 applications		43	140	17	60	63	361	190	4	113	414	119	5	113	2	309	83	13	100	110	8	29	13	71	5	56	143
3 categories		Qualitative															Semi-quantitative						Quantitative				



5. “Hot” Research Areas in European Foresight

This section presents the analysis of more than **500** foresight exercises in terms of the main research areas involved. There are limitations inherent to this analysis in that it deals with established sectors and research fields, which gives limited opportunity to identify new sectors and fields, or convergent industries or technologies. Hopefully future mapping will allow for a more sophisticated investigation of the sorts of knowledge and application of knowledge that are being addressed in foresight studies.

First, let us examine the exercises in terms of the Frascati classification of fields of research.

At least **187** exercises have been classified as dealing with the area of **social sciences** with 586 selections to sub-areas such as: *policy and political science* (162), *studies in human society* (104), *economics* (82), and other aspects of science, technology and innovation policy, public administration, and the like. Some cases examine European society as whole, as well as the social forces shaping socio-economic landscapes at the national and sub-national levels. In so doing, foresight exercises aim at the identification of major directions of, and influences on, social change.

The second major research area includes at least **175** cases linked to **engineering and technology**. The results show 462 selections to sub-areas like *environmental engineering* (68) with topics such as water and air pollution control, hazardous waste management, pollution prevention, bioremediation, landfill and waste repository design and construction, and environmental policy and compliance. Another sub-area of considerable attention is *communication technologies* (55). This includes both the technical and engineering aspects of communications (e.g. telephone, mobile phones, television, computer networks, satellites, etc.) and related technologies such as electronics, opto-electronics, radar and sonar navigation, communications systems, and so on. Other important sub-areas with more than 30 selections are: *material engineering*; *electrical and electronic engineering*; *chemical engineering*; *manufacturing engineering*; and *biomedical engineering*.

The third research area is **natural sciences** with over **120** foresight exercises and 279 selections to *biological sciences* (61) with some studies on the future of biotechnology (e.g. manipulation of living organisms to make products or solve problems through genetic engineering; gene therapy; enzyme technology, etc.) and some others focused on biochemistry (with an emphasis on proteins, carbohydrates, fats, genes, drugs, microbes, as well as higher plants and animals, including humans.). The sub-area of *earth and environmental sciences* was selected 48 times in projects about habitat and natural resource management, floods, environmental impact assessment, air pollution and climate change). This was followed by *chemistry* (34) with projects on synthetic and natural organic compounds, including hydrocarbons research.

The fourth research area is **agricultural sciences** with at least **66** foresight studies and 140 selections distributed between: *crop and pasture production* (33), which includes the production of food, grass, fodder and non-food crops; *animal production* (26), covering breeding, reproduction,

nutrition, husbandry, protection, growth and welfare, as well as veterinary sciences; *fisheries sciences* (21); *Horticulture* (20); and *Forestry Sciences* (18), being the most selected.

In fifth position we can find **medical sciences** with **65** foresight studies and 69 selections distributed across: *public health and health services* (34), dealing mainly with epidemiology, industrial medicine, infection control, and preventive medicine; *general medicine* (13); *pharmacology and pharmaceutical sciences* (11), mostly focused on the discovery and testing of bioactive substances, including animal research, clinical experience, and the like; and *medical biochemistry and clinical chemistry* (11).

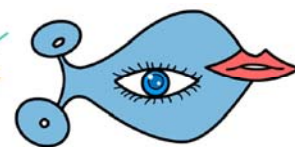
Finally, there are **11** studies in the **humanities** research area; these are mainly about on the future of cultures and media.

Related Industries

We have used the NACE classification of industries in order to identify the top 8 industries related to foresight exercises executed in Europe:

1. Manufacturing
2. Health and social work
3. Electricity, gas and water supply
4. Transport, storage and communication
5. Public administration and defence
6. Education
7. Agriculture, hunting and forestry
8. Community, social & personal service activities

A similar analysis was carried out using cases from other regions, and results show that the top 8 target industries of North American and Asia foresight are the same as the European ones with some very minor changes of rank order. At the time of writing we do not have enough number of cases from Africa, Latin America and Oceania in order to make well-substantiated comparisons. However, it is worth noticing that *agriculture, hunting and forestry* came on top for both Africa and Latin America, while *real estate, renting and business activities* take eighth position in ranking of target industries for Asia and Oceania.



6. Mapping foresight recommendations

This section presents an analysis of **559** recommendations resulting from a sample of **83** foresight panels and task forces. The main purpose of this analysis is to measure the extent to which panels of foresight exercises conducted at different levels (national, sub-national, transnational and European) suggest particular types of recommendations.

But given their action-orientation, foresight panels often (though not always) explicitly make recommendations in light of their analyses and deliberations, most of which are targeted at actors in international, national and regional innovation systems. Even where recommendations are not explicitly stated, often they can be detected implicitly. However, for the purposes of the current analysis, it is important to be clear as to what is meant by 'recommendations' otherwise confusion could result. A few points to bear in mind include:

1. Recommendations are not the same as 'Priorities'. The latter refers to topics and areas that have been identified as important in a foresight exercise. By contrast, recommendations refer to actions that should be taken to address priorities. Care should therefore be taken not to confuse the two of them.
2. Recommendations also tend to be wide-ranging in terms of what they cover and who they target. Policy recommendations are normally directed at the likes of ministries and other funding agencies, but recommendations from foresight panels and task forces often tend to be broader in scope and refer to a wider group of targets, including companies and researchers, for example. So mapping efforts have had to be focused upon a broader set of recommendations than those that simply refer to public policies.

With these points in mind, a taxonomy of recommendations has been developed by the authors (see **Box 6.1** on the right).

The data used for this analysis has been collected from **83** panels and task forces, in most cases, associated to 'flagship' national programmes in **15** countries (see **Figure 6.1** below). Such large-scale programmes are often collections of smaller foresight 'exercises', with 'panels' or task forces focused upon a particular sector or topic area. For the purposes of recommendations mapping, these 'panels' are treated as distinct exercises, which in many cases they are (for example, national foresight programmes carried out in Denmark, Germany, Spain and the UK are 'rolling' exercises, in that they constitute a series of exercises focused upon different topics at different times). Many of the selected panels or exercises are still ongoing or recently completed, although a small number are five years or more old (e.g. the national Hungarian Foresight Programme, completed in 2000). Recommendations from Greece, for instance, are based on the results of 12 panels of the national foresight programme, namely: agricultural development and fishery; biotechnology; culture; defence technologies; energy; environment; governance and e-Government; industrial production and manufacturing; information, technology, communications & e-Business; materials; tourism and transport.

Box 6.1: Taxonomy of recommendations

Policy Shift: Refers to shifts in public policy recommended by a foresight exercise. This could include a very wide range of topics, essentially covering all areas of public policy. Note that we mean 'policy' rather than 'programmatic' shifts, i.e. the recommendation should refer to a shift at a higher strategic level than simply programme planning, e.g. to include regulation and legislation.

Creation of new initiative (e.g. project / programme / strategy / forum): Refers to the establishment of new initiatives in response to the findings of a foresight exercise. This will certainly include things like new (research) projects and programmes, but might also cover things like the establishment of new working groups and committees, new associations and networks, and other similar hybrid fora.

Incorporation of findings into ongoing debates and strategies: Refers to recommendations that specify the use of foresight results in defined policy and decision-making processes that already exist. For example, it might include recommendations for the inclusion of foresight results in ongoing policy reviews or for results to be integrated into strategy documents.

Private sector and NGO action: Refers to actions that should be taken by the private and NGO sectors in light of the priorities identified in a foresight exercise. A wide variety of actions are possible, including new investments in technologies, development of new services to meet emerging needs, and so on.

Further research: Refers to a situation where a foresight exercise makes a general call for further research in a particular area without specifying the need for new projects or centres.

Human resource development: Refers to initiatives to enhance development of human resources, particularly through education and training.

Improved academic-industry links: Refers to the improvement of academic-industry links, for example, through greater R&D collaboration, joint training schemes, and so on.

Increased public spending: Refers to the need for increases in public spending on areas identified in a foresight exercise. Applies in situations where spending increases are proposed without specifying the need for new projects or centres.

Greater cooperation, including international cooperation: Refers to calls for greater cooperation between actors in the innovation system around the priorities and issues highlighted by a foresight exercise. Also refers to calls for greater international cooperation.

Establishment of new centre: Refers to the setting-up of a new group or institute dedicated to addressing priorities identified in a foresight exercise. This can be either a bricks-and-mortar or a virtual centre.

Further foresight: Refers to the need for further foresight exercises, possibly at different locations or levels, but also in the future.

Dissemination of Findings: Refers to concrete proposals for disseminating the findings of a foresight exercise to various groups and communities.

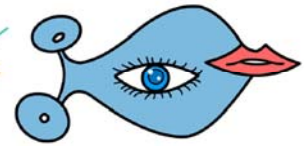
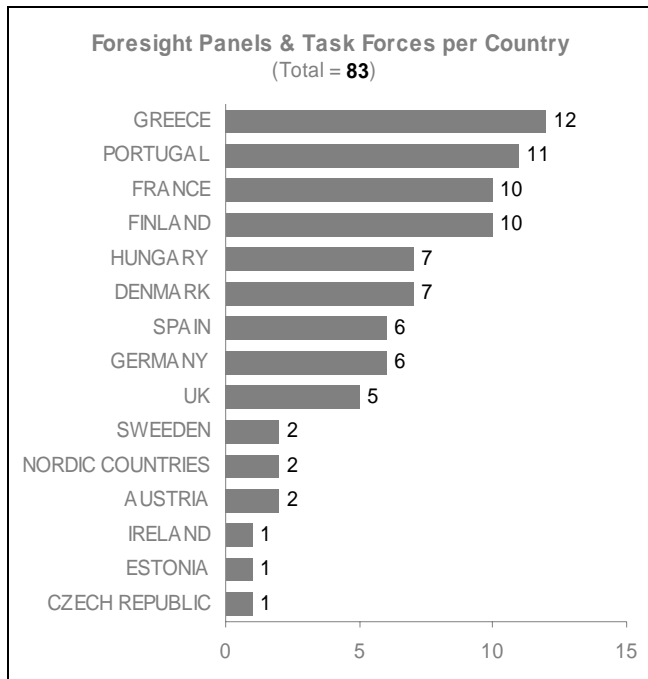
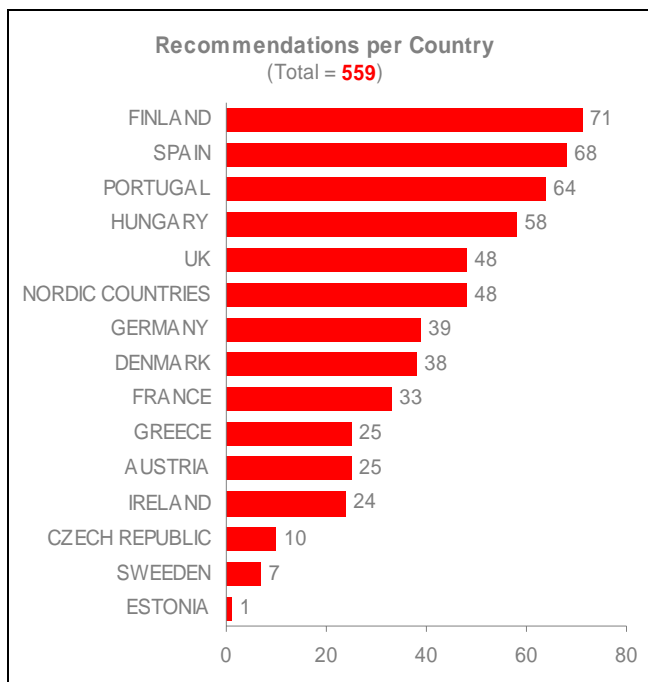


Figure 6.1: Panels and task forces per country



The total number of recommendations per country is shown in **Figure 6.2** (below). More than 50 recommendations have been collected from four countries: Finland, Spain, Portugal, and Hungary. A second group of countries has between 20-50 recommendations mapped, including Denmark, Germany, France, Austria, UK and Ireland. The remainder have less than 20 recommendations mapped.

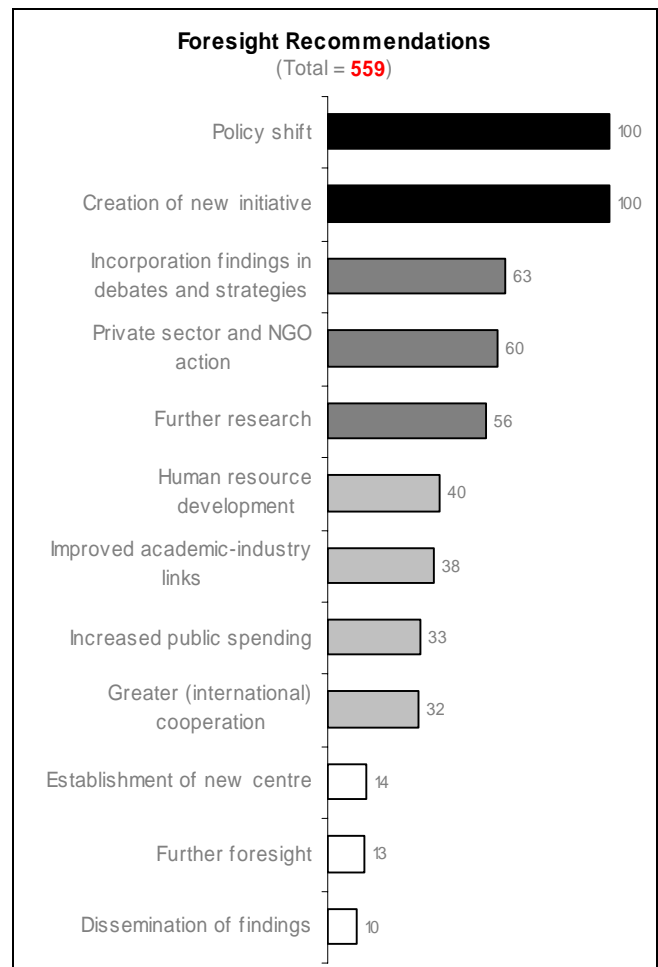
Figure 6.2: Recommendations per country



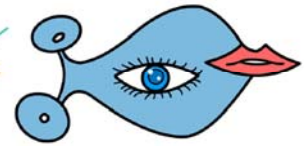
General analysis

Following the proposed taxonomy, the bar-chart below shows that recommendations calling for policy shifts together with those that call for the creation of new projects, programmes, strategies or *fora* are the most common (both consist of 100 suggestions). A second group of recommendations each with 50-70 proposals include the incorporation of foresight findings into ongoing debates and strategies; suggested actions for the private sector and non-governmental organisations to follow, and the need for further research.

Figure 6.3: Top 12 foresight recommendations



A third group (each with 30-40 suggestions) include the development of human resources, improvement in academic-industry links, greater cooperation across the innovation system (including international cooperation), and increases in public spending. A few points are worth highlighting here: first, of the recommendations calling for greater cooperation, very few refer to international cooperation but instead point to the need for greater cooperation between different areas of science, different regions in a country, different industrial sectors, and so on. Secondly, taken together with the figures for improved academic-industry links, calls for improved cooperation between innovation system actors constitute an important concern for foresight exercises.



A final group of recommendations (i.e. establishment of new centres, further foresight, and the dissemination of foresight findings) represent a very small proportion of the total.

Territorial analysis

The consideration of the territorial scope of an exercise is particularly important when drawing conclusions about recommendations. The following analysis supports this argument and at the same time introduces the notion of Recommendation Radars (RR) as a practical framework for comparing the emphasis given to the various types of recommendations at different levels (national, sub-national, supra-national and EU).

Since most of the recommendations in this study come from national exercises, then it is expected that this bias will be reflected in the territorial level distribution. This argument is further supported by considering the sub-national cases, where the majority of recommendations refer to the sub-national level. Given the absence of supra-national and EU level exercises from our sample, it is hardly surprising to see so few recommendations addressing these levels. With these points in mind, the RR diagrams (on the right) show the distribution of recommendations around the twelve typologies. The position of the types of recommendations reflects the overall ranking resulting from the general analysis (above).

- 1st Policy shift
- 2nd Creation of new initiative
- 3rd Incorporation findings in debates and strategies
- 4th Private sector and NGO action
- 5th Further research
- 6th Human resource development
- 7th Improved academic-industry links
- 8th Increased public spending
- 9th Greater (international) cooperation
- 10th Establishment of new centre
- 11th Further foresight
- 12th Dissemination of findings

Not surprisingly, in RR-A (top-right) the distribution of **459 national** recommendations across the 12 typologies indicates a practically identical sequence to the one of general results above (note that national recommendations account for 84% of the sample). Interestingly, RR-A shows that *policy shift* and *creation of new initiatives* are 'equally' important types of recommendations at the national level (85 in each grouping). Another significant type is *further research* which represents the third most important group. In RR-B, **44 sub-national** recommendations show a different distribution pattern with *private sector and NGO action* as the most common type, followed closely by the *creation of new initiatives*, *policy shift* and *human resource development*. While *further research*, *dissemination of findings*, or *increasing public spending* show little or no presence in the selected sub-national exercises. RR-C includes **35 supra-national** recommendations, here the *incorporation findings in debates and strategies* and the *creation of new initiatives* are the two dominating groups followed by *improved academic-industry links*, *policy shift* and increased public spending. Finally, RR-D presents **21 EU** level recommendations with *policy shift* leading the group, followed by *incorporation findings in debates and strategies* and *greater (international) cooperation* (see table below).

Box 6.2: Recommendation Radars (RR)

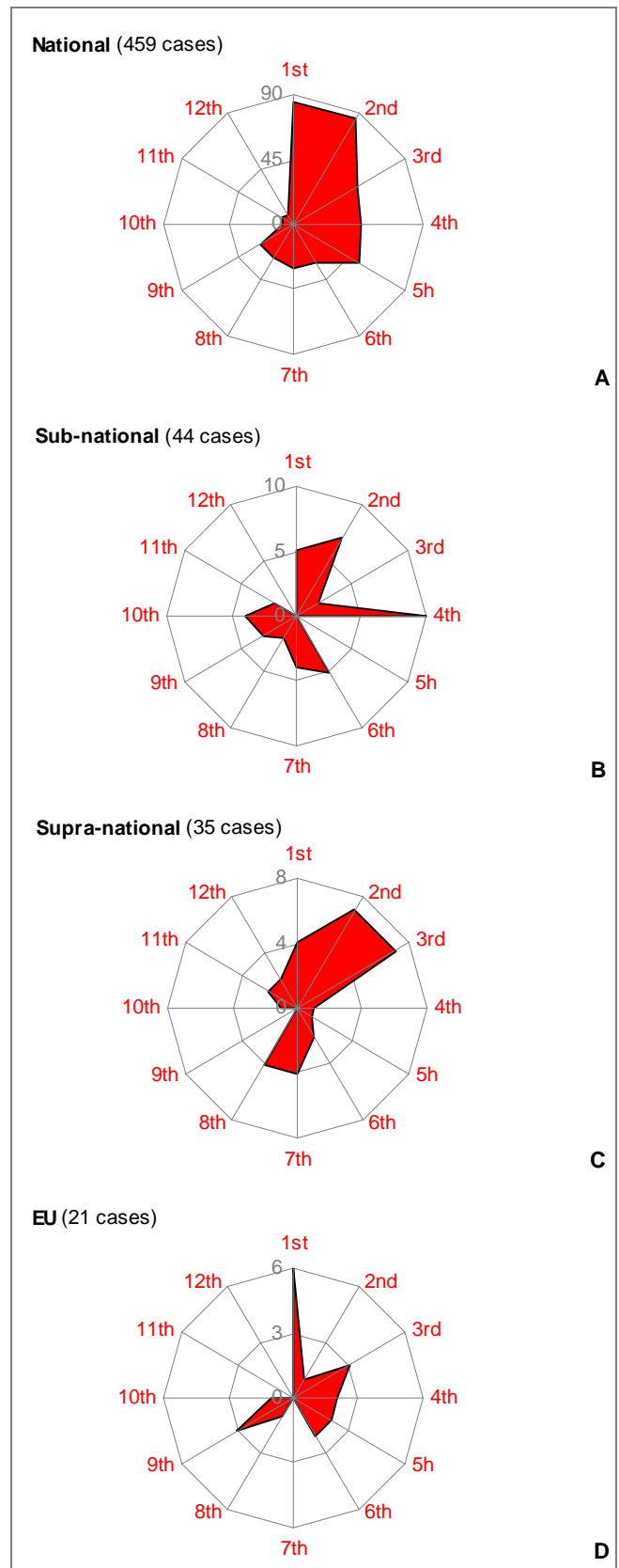
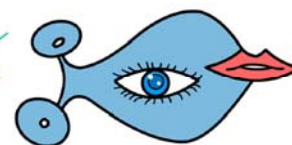


Table 6.1: Mapping EU level recommendations

Type of recommendations	EU level recommendations	Country	Foresight Exercise
Policy shift	Improve the Common Agricultural Policy's conditionality system	FRANCE	DATAR - Agriculture and Territories. Four scenarios for 2015
	Preferential treatment should be given to research topics that have preventative objectives or deal with major health issues and preferred issues in EU Programmes	HUNGARY	Hungarian Technology Foresight Programme - Health
	Implementation of electricity and gas directives at a European level	PORTUGAL	Engineering and Technology 2000 - Liberalisation of the Energy Sector
	Reduction of the present trade barriers including cross border trading rules	PORTUGAL	Engineering and Technology 2000 - Liberalisation of the Energy Sector
	Implementation of the European legislation on genetically modified foods	SPAIN	OPTI - Agro-Food Foresight
	Harmonise the existing legislations on nuclear energy and reduce the complexity of the international normative, in order to improve the public perception.	SPAIN	OPTI - Spanish Nuclear Energy Futures 2030
Incorporation findings in debates/strategies	Harmonization of rules and practices between the different European countries (taxes and environmental regulations, rules for financial trade of commodities and commodity derivatives, or rules for unbundling of the old monopolies)	PORTUGAL	Engineering and Technology 2000 - Liberalisation of the Energy Sector
	Implementation of a discrete international campaign to improve the image of the Portuguese biotechnology research and industry (especially through the encouragement and facilitation of the production of articles in scientific and bio business publications)	PORTUGAL	Engineering and Technology 2000 - Emergence of Biotechnology
	Combine ICTs and telematics (e.g. Trans-European Telematic network) in road transport to improve road safety, to maximize road transport efficiency, and to contribute to environmental problems of congestion, pollution and resource consumption	PORTUGAL	Engineering and Technology 2000 - Trends on Transports
Greater (international) cooperation	Greater cooperation, including international cooperation	CZECH REPUBLIC	Foresight as a basis for National Research Programme II (NRPII)
	Revitalisation of the railway articulating railway systems of several countries to create trans-national networks	PORTUGAL	Engineering and Technology 2000 - Trends on Transports
	To manage the threats posed by new technologies, it is essential to create an environment in which government, industry and citizens can trust each other.	UK	UK National Foresight: Cyber Trust and Crime Prevention
Further research	Fulfil European research policy	FRANCE	INRA 2020
	Intensify research activities at a European level, in particular those activities linked to the Framework Program	SPAIN	Madrid 2015
Private sector and NGO action	The exploitation of S&T through manufacturing is needed to reduce the danger of threats coming from outside Europe	PORTUGAL	Engineering & Technology 2000 - Innovation in Traditional Sectors
	The intense price competition needs to be combined with product differentiation and marketing in a situation where continuous price disputes eroded profit margins.	PORTUGAL	Engineering and Technology 2000 - Innovation in Traditional Sectors
Human resource development	Promote stability in society through the acquisition of new skills for the management of diversity.	FINLAND	FinnSight 2015 - Infrastructures and Security
	Provision of Education and Training Programmes to raise the human resource capabilities of rural businesses, and of rural populations generally	IRELAND	Foresight for Rural Ireland 2025
Creation of new initiative	Initiate European innovation networks and projects based on the exercise's results	FRANCE	Key Technologies 2010
Increased public spending	National and European investment in forestation	IRELAND	Foresight for Rural Ireland 2025
Establishment of new centre	Development of either a UK or EU rapid prototyping silicon foundry is needed, with clear rules on IP sharing/protection	UK	UK National Foresight: Cyber Trust and Crime Prevention



EU level recommendations

Although few in number, it is nevertheless interesting to consider more closely the recommendations that refer to the European level. To begin, the table above shows the countries of origin of European recommendations. The table is dominated by Portugal (8/21). These recommendations come from the various component parts of the Portuguese technology foresight exercise carried out in 2000-01. Somewhat further behind are the figures for Spain, France, and Ireland.

It would be easy to jump to conclusions here: with its relatively under-developed research and innovation system, Portugal has been a major beneficiary of the Framework Programme and other European funding schemes. Thus, it is perhaps of little surprise to see the European dimension featured so prominently in the recommendations of its national technology foresight programme. In this respect, it will be interesting to analyse the data for Greece – which has had similar circumstances – to see whether this hypothesis holds. However, the data is not as startling as it first seems when we consider the proportion (as opposed to the actual numbers) of recommendations from the different countries that refer to the European dimension. Portugal still comes out on top, with **8/64** recommendations referring to the European level. But it is now closely followed by France (**3/33**), Czech Republic (**1/10**), Ireland (**2/24**); Spain (**3/68**) and the UK (**2/48**).

We can also consider the types of recommendations that refer to the European level, though as highlighted above, the small numbers involved should be borne in mind. The table shows the distribution of recommendations across types, with *policy shift* accounting for almost a third of the total. Half as many recommendations refer to each of two needs: that for *greater (international) cooperation* and that for *incorporation of findings into debates and strategies*.

It is often difficult to understand the meaning that lies behind some of the recommendations when they are taken out of context – for example, what is meant by “fulfil European research policy” could imply radically different things in the context, say, of discussions overall R&D expenditure and discussions of convergent technologies. But the broad picture is that five recommendations refer to European level R&D and innovation policies, whilst nine recommendations refer to other aspects of European cooperation and regulation concerning areas like transport, agriculture, trade, and so on. These numbers are very low, particularly for R&D and innovation, even if we accept the argument above regarding the national framing of foresight exercises. It is almost as if the Framework Programme does not exist. How to explain and address this, if at all?

Addressing the European Dimension

The first question to ask is whether the figures above really indicate a problem that needs to be addressed? If it is deemed that there is indeed a problem, then how to go about solving it? We will deal with each of these questions in turn.

As we have seen, of 559 recommendations, only five clearly refer to R&D and innovation actions to be taken at the EU

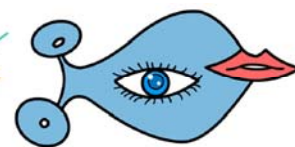
level – about 1 per cent of all recommendations. This number is very low – and well below the proportion of public funding made available for R&D through the Framework Programme. Such figures would seem to suggest that recent efforts to establish a European Research Area (ERA) have had little impact on the conclusions of foresight exercises, and possibly even wider afield.

Foresight exercises should be pointing to areas where future developments will be important and formulating future visions around which agendas are set. Should we be surprised or concerned that so few of their recommendations address the European dimension? At this point, it is perhaps worth considering the significance of foresight exercises in national and regional R&D and innovation landscapes. Whilst more research is undoubtedly needed on the role and impacts of foresight exercises, it is known that they can and do have impacts on spending priorities, on agenda-formation, and on the networking of disparate actors into new working communities. Nevertheless, it is all too easy to over-estimate the effects of these exercises, particularly if one credits the rhetoric surrounding some of them. Closer examination shows that their impact on research and innovation systems is typically rather marginal, and that they tend to lead to incremental, evolutionary changes, often at the edges. This is not to cast doubt on their value. Foresight exercises can and do play an important role in highlighting cross-cutting opportunities that are often missed in the compartmentalised worlds of disciplinary science, economic sectors, and administrative bureaucracy. But to claim that they sit centre-stage in research and innovation systems is, in most instances, wishful thinking.

Furthermore, it could be argued that myopia where the European dimension is concerned is hardly unexpected, given that national and sub-national exercises are typically framed in such a way as to address localised settings. EU exercises are likely to give greater emphasis to the EU level, of course. Since problems and solutions match the territorial levels in which exercises are being carried out, it would be unrealistic to expect another territorial level to feature prominently, unless deliberate efforts were made to cover it. In practice, EU funding is marginal to national sources of funding, particularly in the big-spending science countries. It is therefore natural for recommendations to focus mostly upon the national level where there are more resources to bid for.

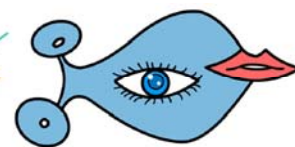
Most recommendations made in national / regional foresight exercises are considered achievable in the short-to-medium term and tend to be within the power of local actors to implement. Actions to be taken at the EU level or in coordination with other countries often fall outside of this definition. Thus, recommendations that are difficult to enact locally are rarely made, unless there is an almost inevitability that another (often higher) policy level must be the source for action and change (i.e. recommendations that address European level policy and regulation);

The bulk of research and innovation system support that might be available at European level is restricted to research funding, with some further support available for networks and mobility. Our data showed that recommendations that call for new research funding account for only 10 per cent of the total mapped. Therefore, if the scope for action at the European



level is largely limited to research funding, it should hardly be surprising to find so few recommendations referring to this level. There is simply much more scope for shaping policies, programmes, and even institutions at national / regional levels than at European levels.

Thus, there are some powerful arguments for why the EU dimension is not very evident in the recommendations of national and regional foresight exercises. While some of these reflect factors that are difficult for the EC to address, some might be tackled. For example, the EC could encourage national governments to incorporate a European dimension into their national exercises – the ForSociety ERA-Net is attempting to do this, to some extent. The EC could also provide useful information resources for national / regional foresight exercises to use – for example, databases of megatrends or wildcards – and these could reflect a European flavour. (Though they would need to retain national relevance!) Another option would be for the EC to carry out its own foresight exercises that address issues at the European level. If done well, these would not only inform EU policy, but could also provide information inputs for national and regional foresight exercises. (Such a phenomenon is already apparent in that sub-national exercises often make use of the tools and results of national exercises). These and other ideas would need to be discussed further with the foresight community in Europe. They would be unlikely to overcome all of the structural factors, highlighted above, that underpin myopia to the European dimension.



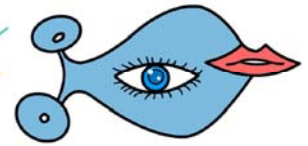
7. Final remarks

This 2007 report continues to display steady progress. The number of initiatives collected and mapped has increased and the quality of the data allows us to undertake more interesting comparisons of main practices and outputs. However, other world regions are not covered sufficiently, and even within Europe the information base should be broadened.

The experience shows that more initiatives can be identified by the mapping team, but also that another strategy of shifting the mapping to external organizations could be valuable. The EMFN can facilitate this if sufficient effort is devoted to quality control.

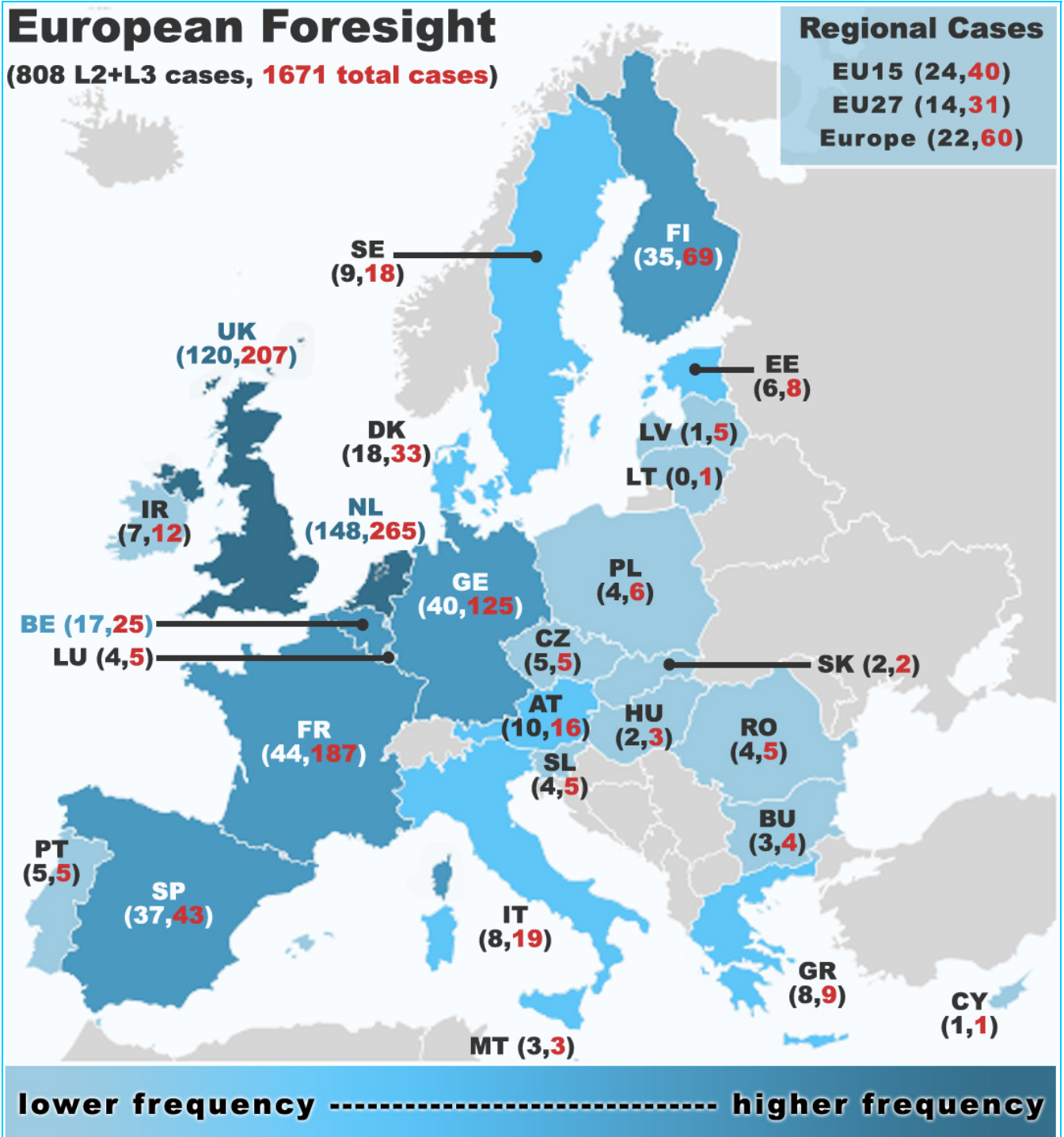
With the improved information, some suggestions and provisional conclusions can be drawn:

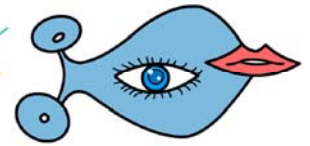
- Foresight is **most commonly used** to: (1) foster STI cooperation and networking; (2) orient policy formulation and decisions; (3) recognise key barriers and drivers of STI; (4) encourage strategic and futures thinking; (5) support STI strategy- and priority-setting; (6) identify research and investment opportunities; (7) generate visions and images of the future; (8) help to cope with Grand Challenges; and (9) trigger actions and promoting public debate.
- **Governments** are the most important sponsors of the foresight studies mapped. Government agencies and departments are the main target audiences regardless of the region. A notable feature is the relatively large numbers of research and business community targets – far more than there are sponsors. Thus, Governments often sponsor exercises targeted at these other groups.
- The results confirm that most foresight exercises look **10 to 20 years ahead into the future**. Note that with the majority of mapped exercises being initiated in the late 1990s or beginning of the 2000s, our analyses focus on 21st Century foresight practices.
- The majority of the cases have **national** scope (approx. 70%). The other remaining initiatives are more or less equally distributed over the other territorial scopes (sub-national, supra-national, transborder, and trans-Europe).
- The three most common outputs of foresight are: (1) **policy recommendations**; (2) **analysis of trends and drivers**; and (3) **scenarios**.
- **Literature review, expert panels, scenarios** are in the Top 3 for most regions. The exception is Oceania where backcasting, interviews and citizen panels are the most common ones.
- The most common research areas in European foresight are: **social sciences** (science, technology and innovation policy, public policy; and administration, social forces shaping socio-economic landscapes); **engineering and technology** (environmental engineering, communication technologies, material engineering; electrical and electronic engineering; chemical engineering; manufacturing engineering; and biomedical engineering); **natural sciences** (biological sciences, environmental sciences, and organic chemistry); **agricultural sciences** (crop and pasture production, animal production and fisheries sciences); and **medical sciences** (public health and health services, general medicine, pharmacology and pharmaceutical sciences, medical biochemistry and clinical chemistry).
- The **top 5 industries** related to European foresight are: (1) Manufacturing; (2) Health and social work; (3) Electricity, gas and water supply; (4) Transport, storage & communication; (5) Public administration and defence; closely followed by Education; Agriculture, hunting and forestry; Community, social & personal service activities; and Construction.
- The **12 most common recommendations** of foresight are: (1) Policy shift; (2) Creation of new initiative; (3) Incorporation findings in debates and strategies; (4) Private sector and NGO action; (5) Further research; (6) Human resource development; (7) Improved academic-industry links; (8) Increased public spending; (9) Greater (international) cooperation; and (10) Establishment of new centre; (11) Further foresight; and (12) Dissemination of findings.



8. Highlights of the 2008 Mapping Report (Country Panoramas)

The frequency of Foresight initiatives vary all over Europe. Some countries, especially where Foresight has *traditionally* been used as an instrument to support government and business decisions, show a higher frequency of case studies than others (e.g. Netherlands, the UK, France, Germany, Finland and Spain). In the 2008 Mapping Report we will introduce in depth analysis of national experiences in the 27 EU Member States. In this section we include 26 country panoramas in order to provide the reader with a flavour of additional analysis of next year's report. The panoramas themselves tell an interesting story about national practices.





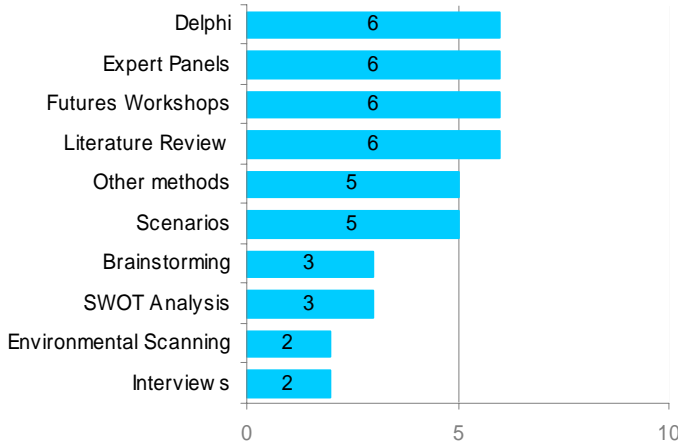
Box 8.01: Foresight Panorama in Austria

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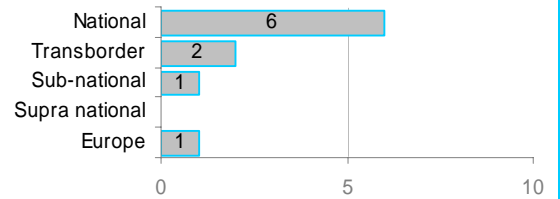
Mapping Foresight in Austria
(10 L2+L3 cases, 16 cases mapped)



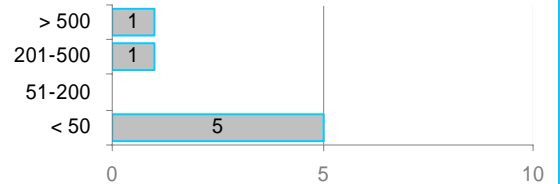
Top 10 Methods



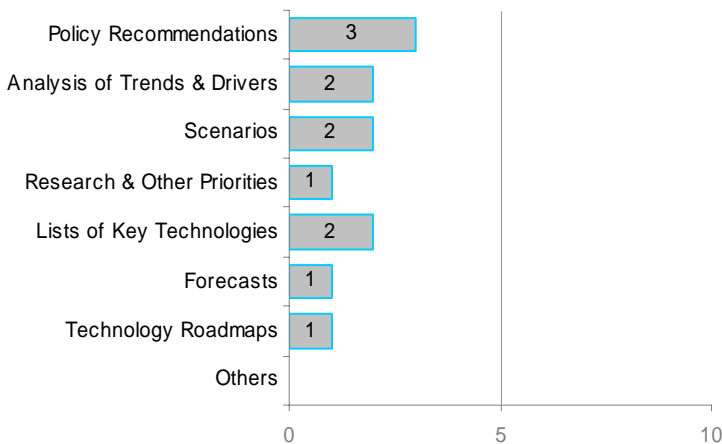
Territorial scope



Number of participants

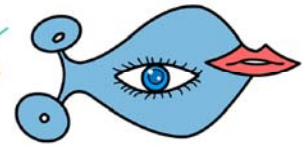


Common outputs

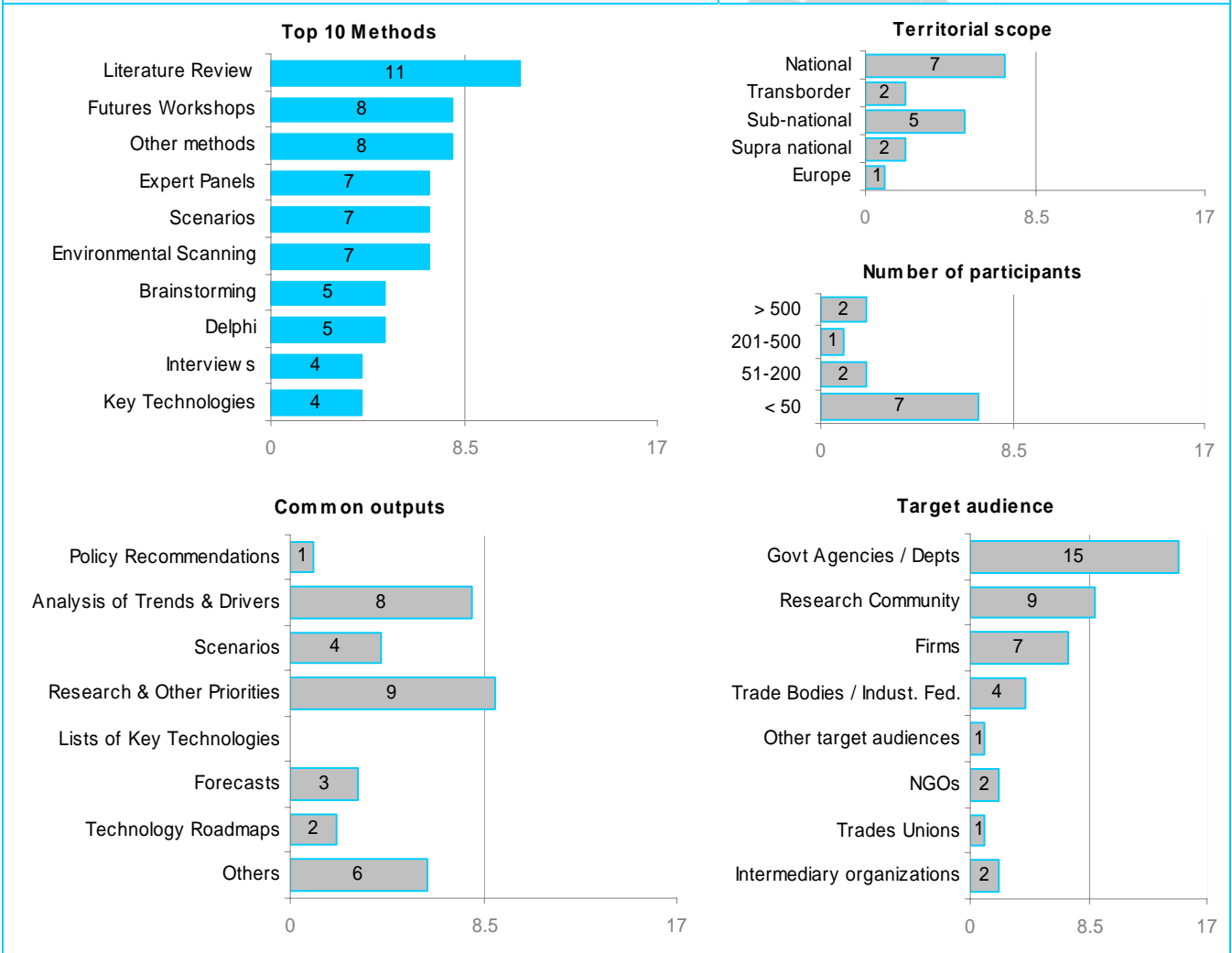


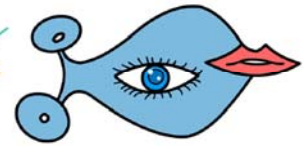
Target audience





Box 8.02: Foresight Panorama in Belgium





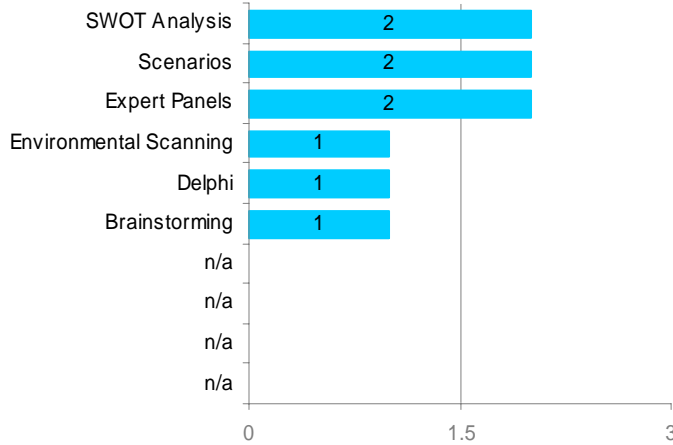
Box 8.03: Foresight Panorama in Bulgaria

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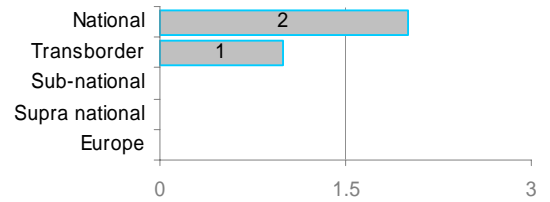
Mapping Foresight in Bulgaria
(3 L2+L3 cases, 4 cases mapped)



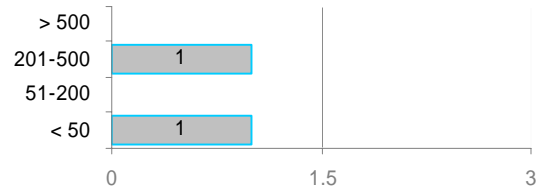
Top 10 Methods



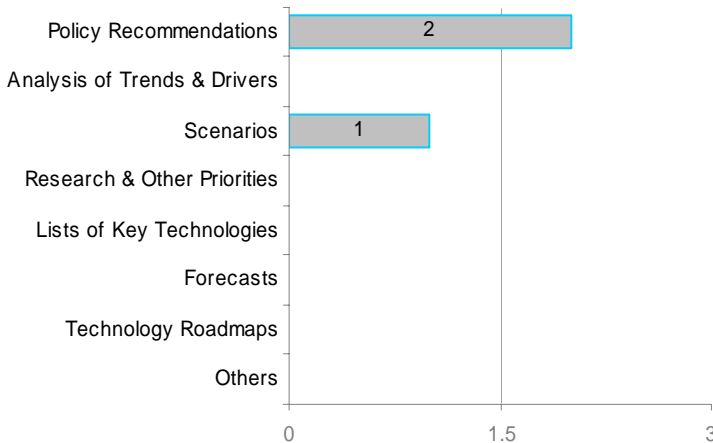
Territorial scope



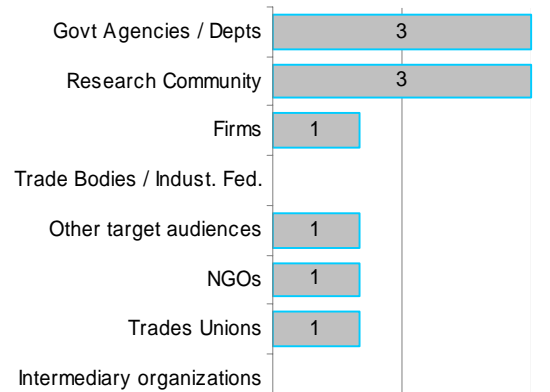
Number of participants

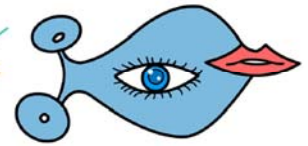


Common outputs

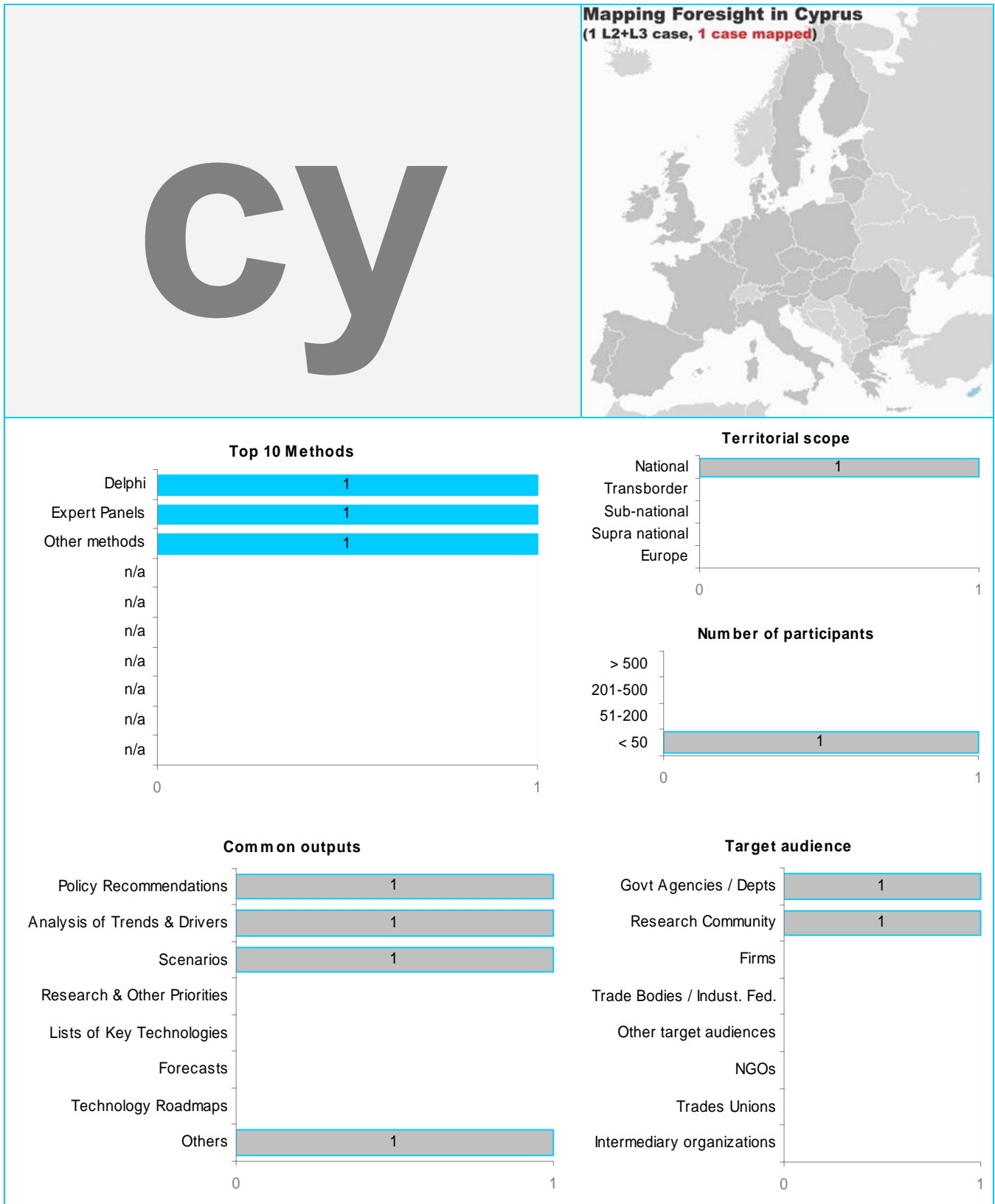


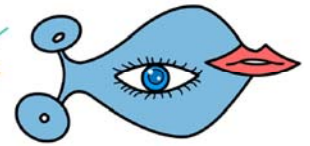
Target audience



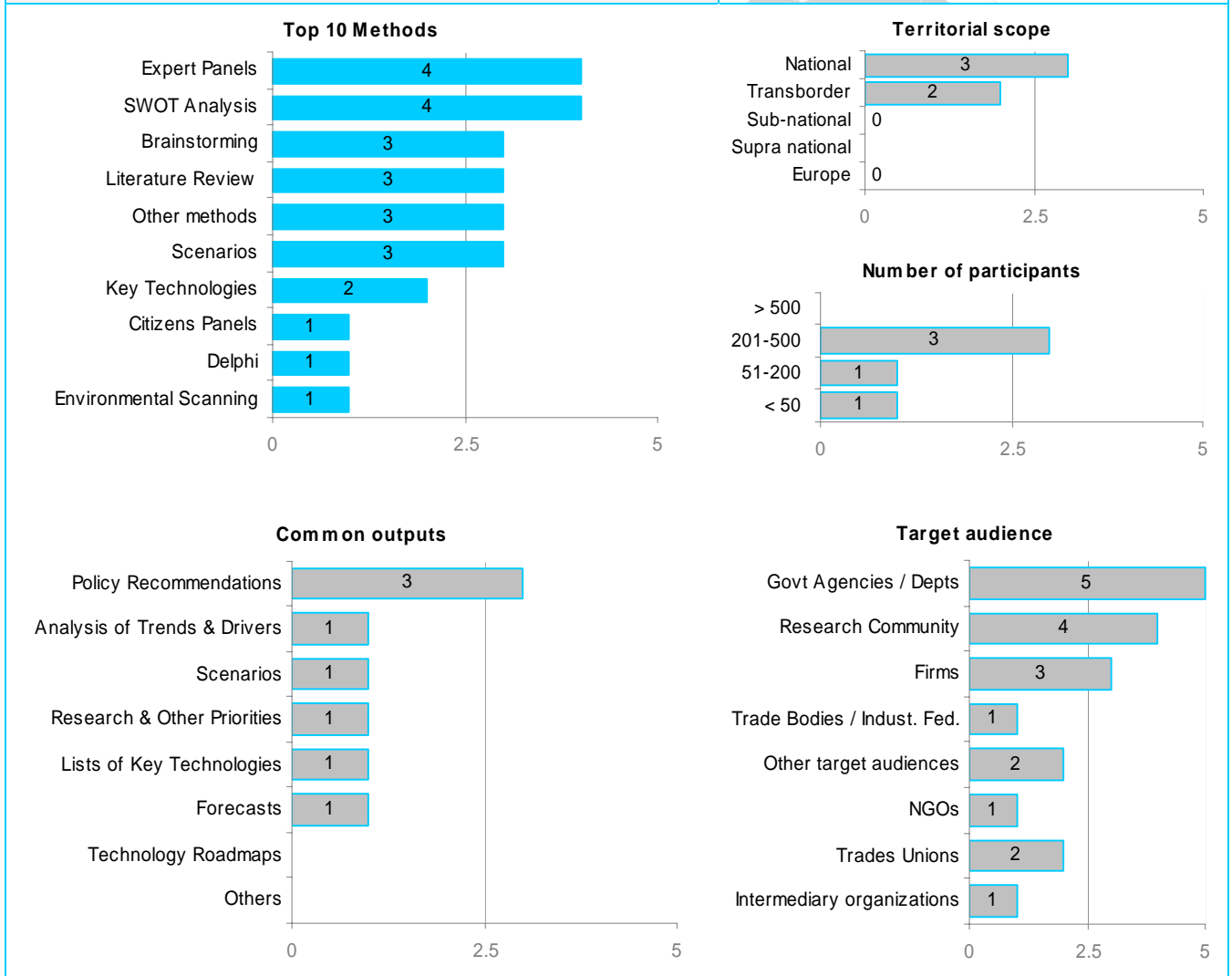
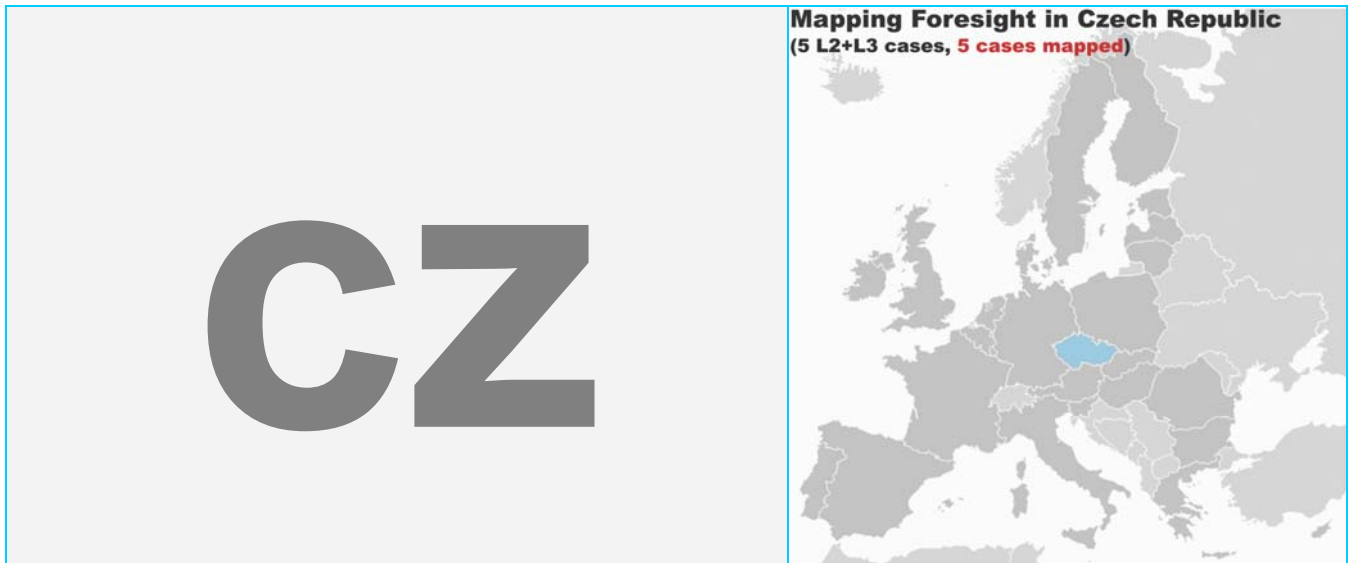


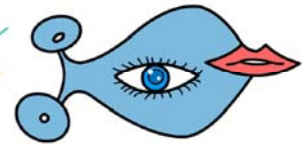
Box 8.04: Foresight Panorama in **Cyprus**



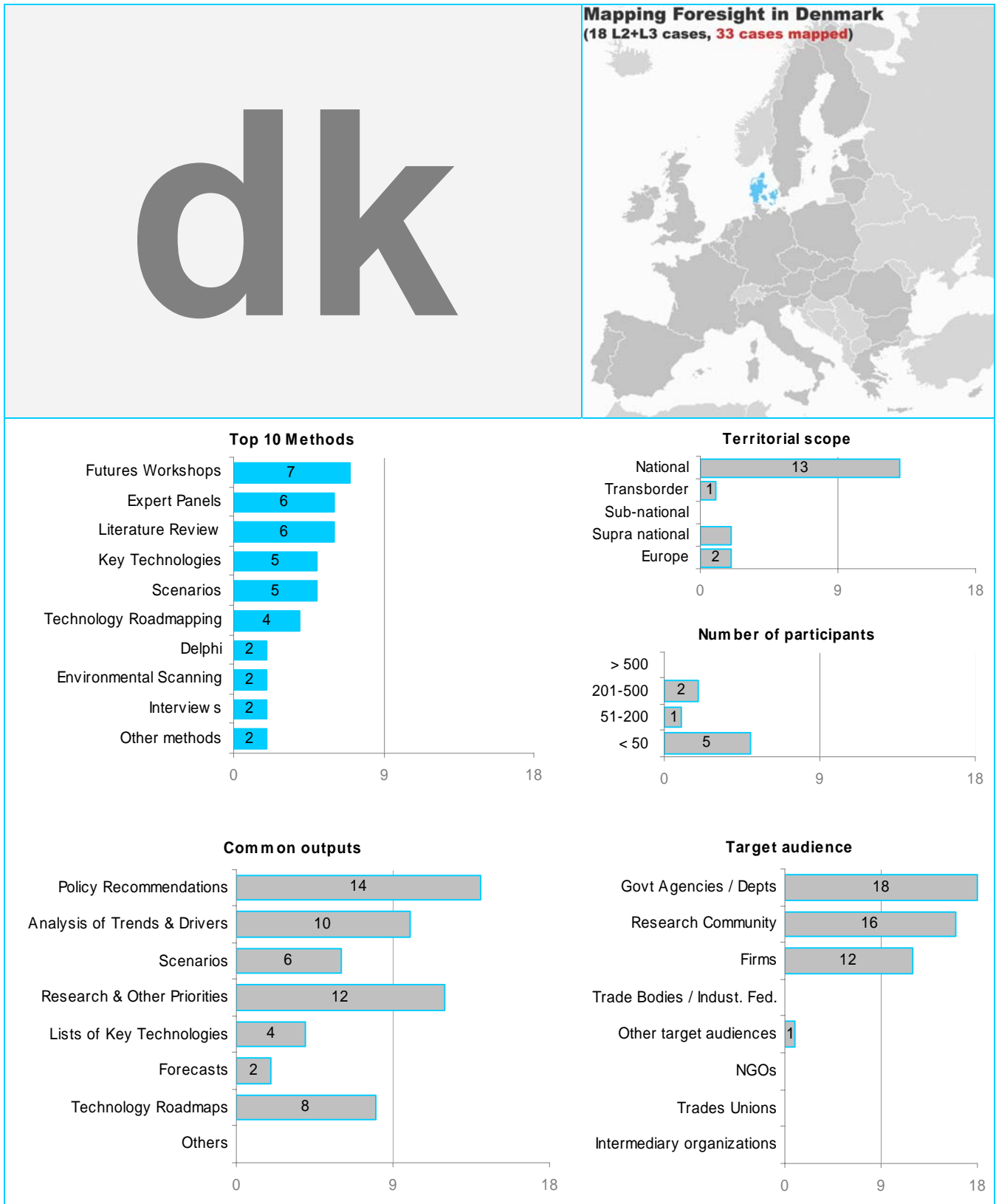


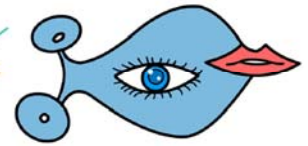
Box 8.05: Foresight Panorama in Czech Republic



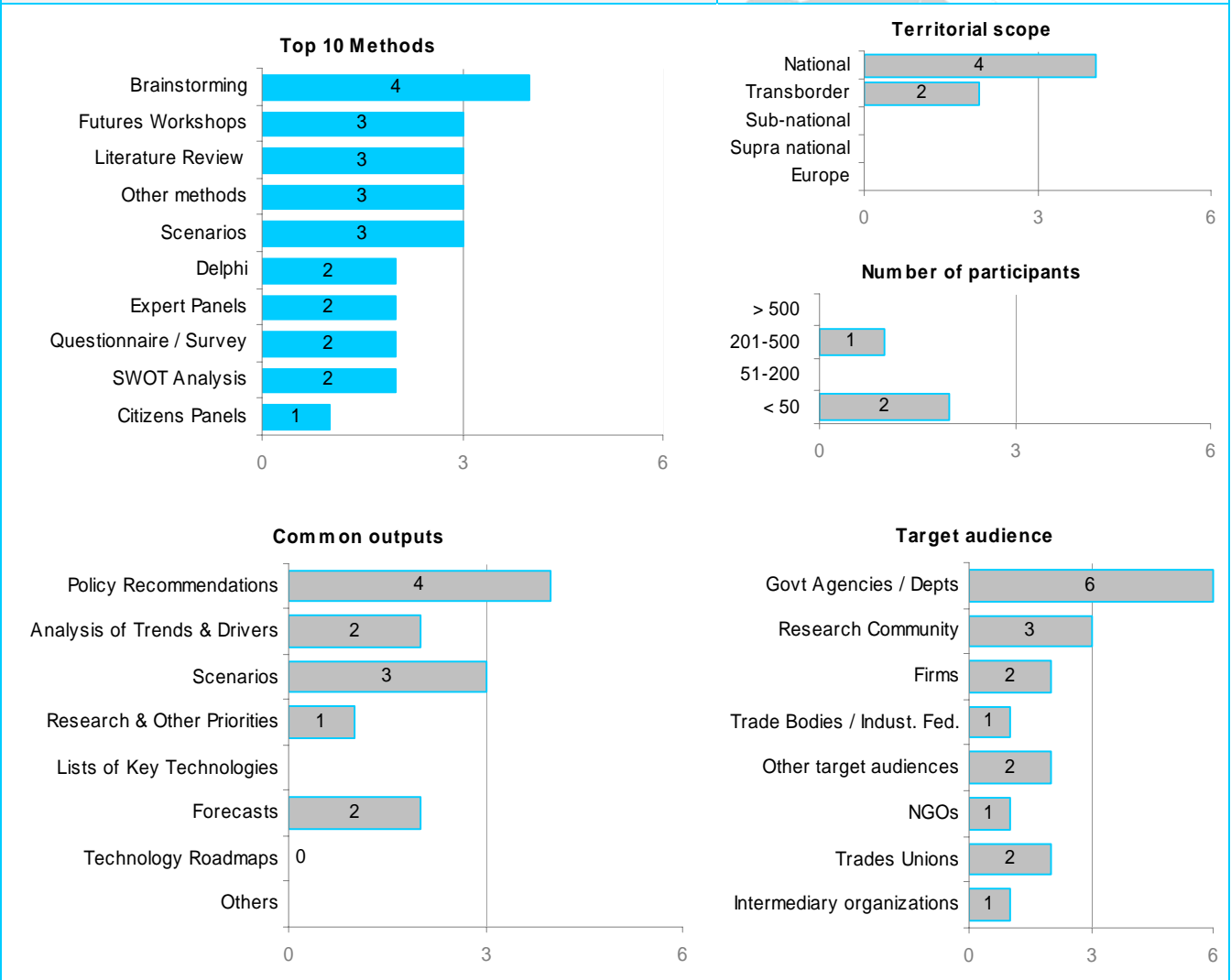


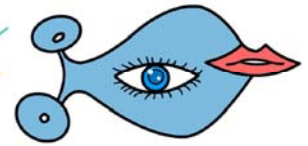
Box 8.06: Foresight Panorama in Denmark



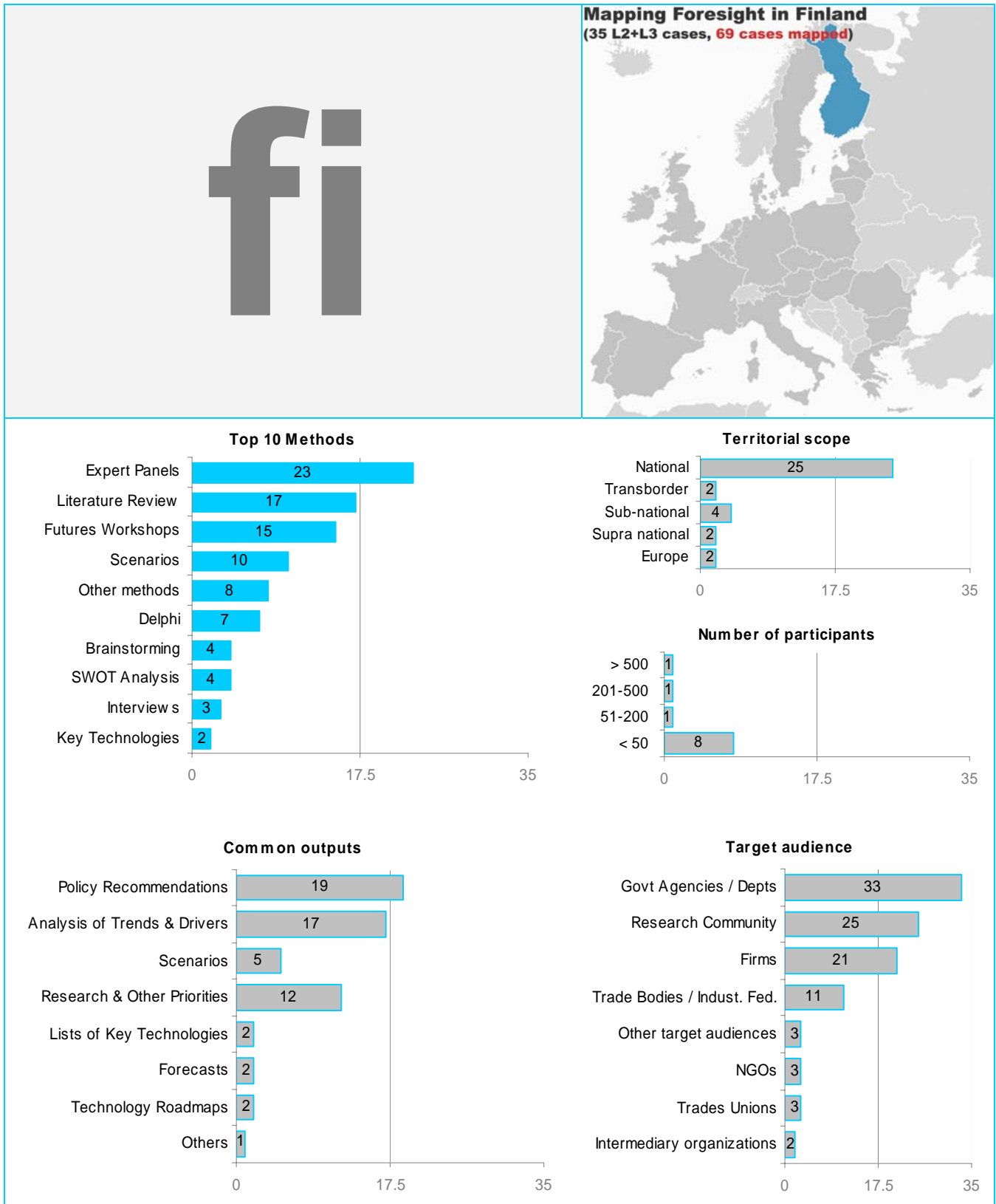


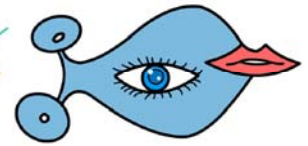
Box 8.07: Foresight Panorama in Estonia



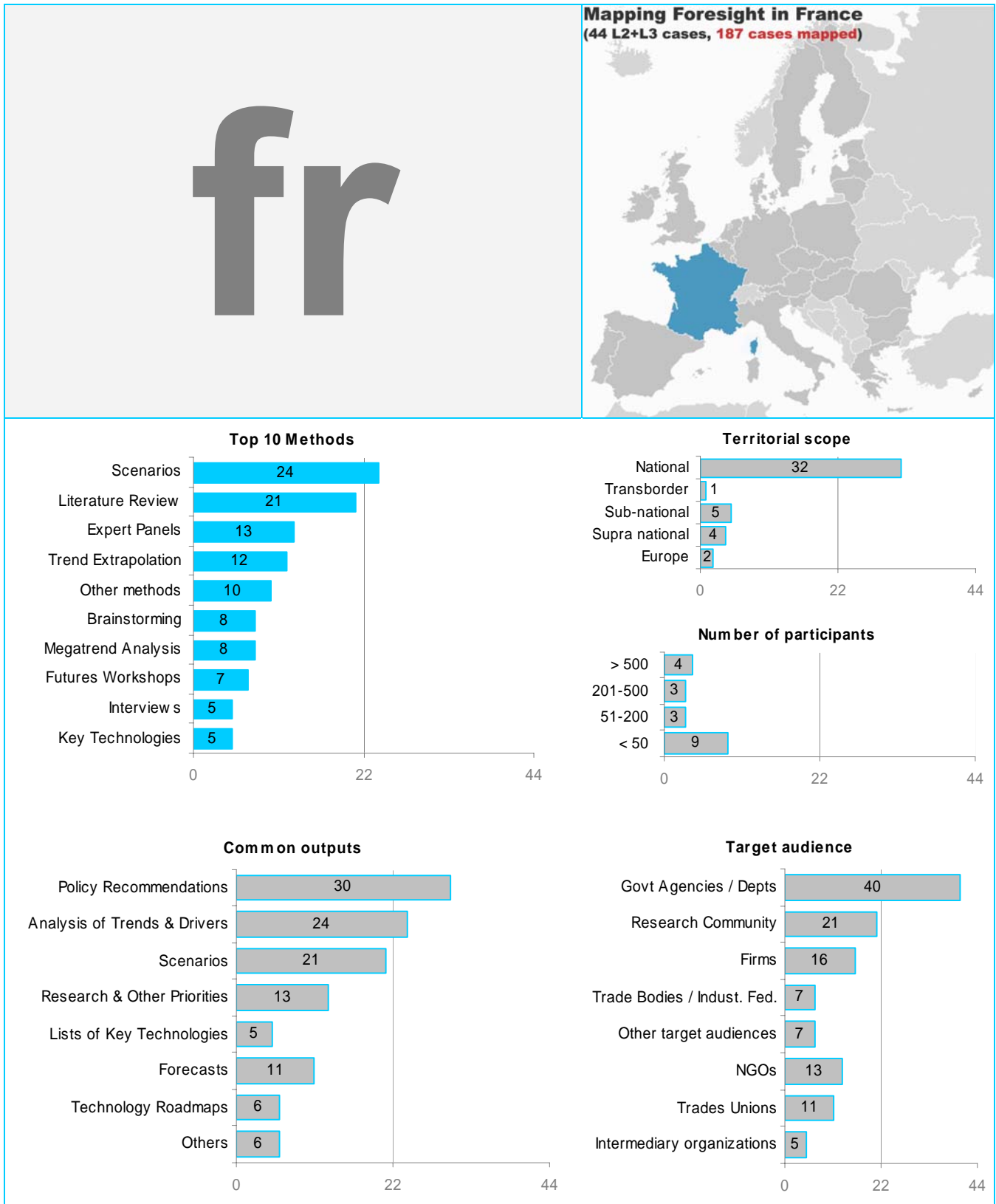


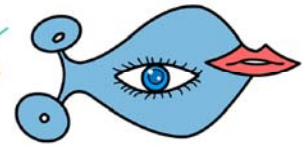
Box 8.08: Foresight Panorama in Finland



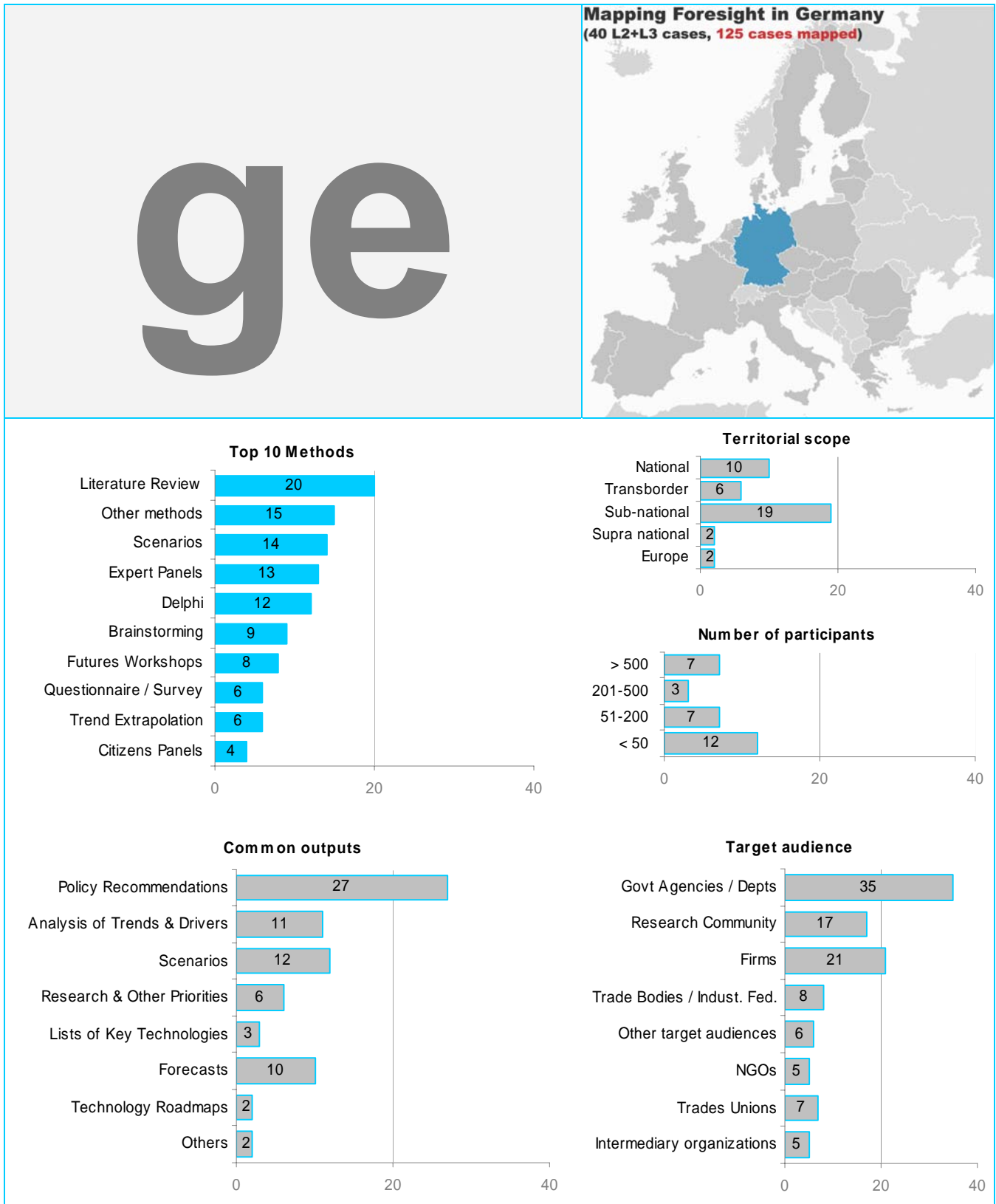


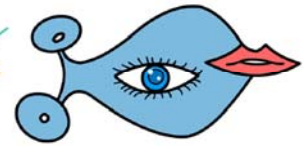
Box 8.09: Foresight Panorama in France



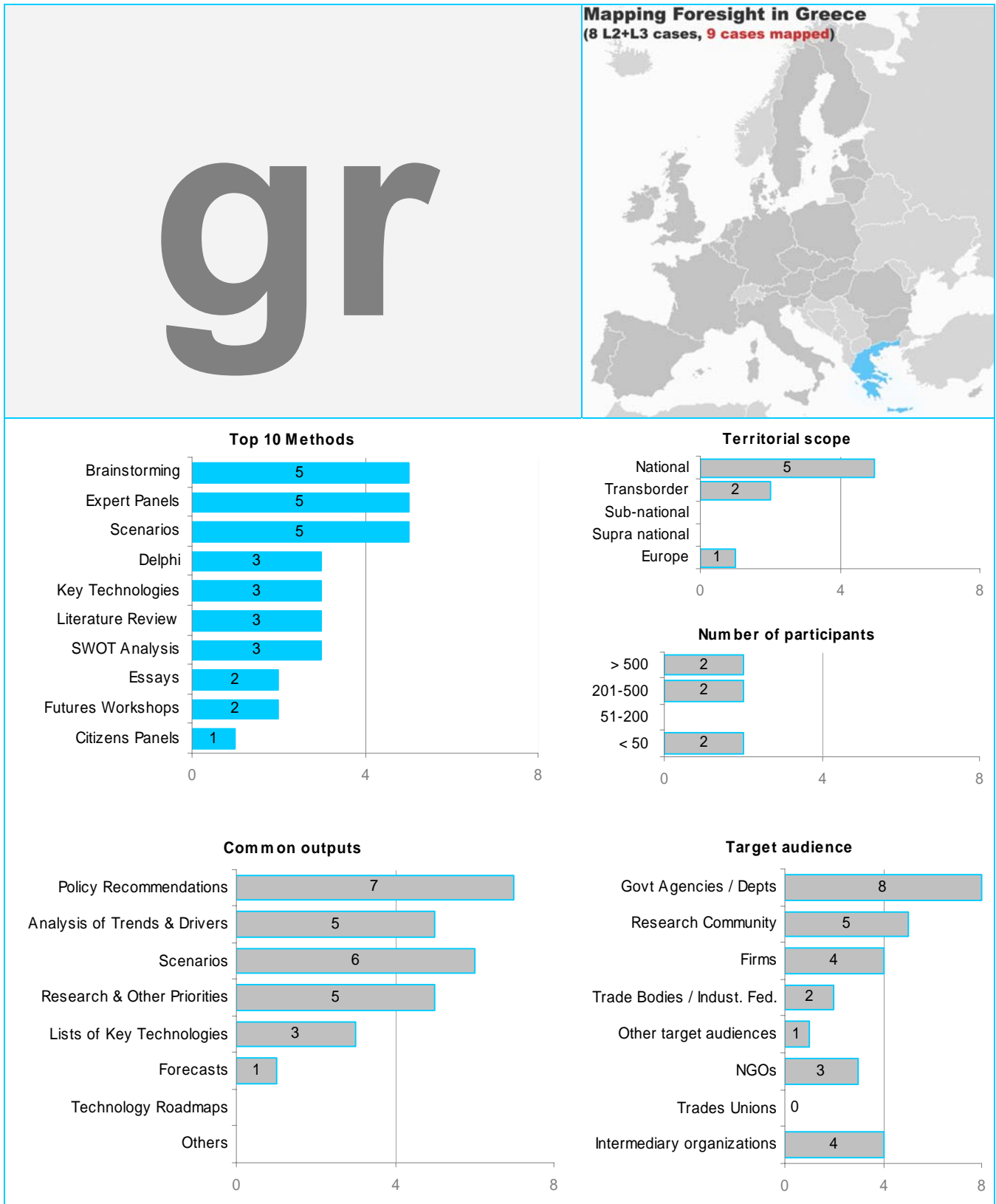


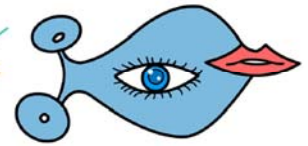
Box 8.10: Foresight Panorama in Germany



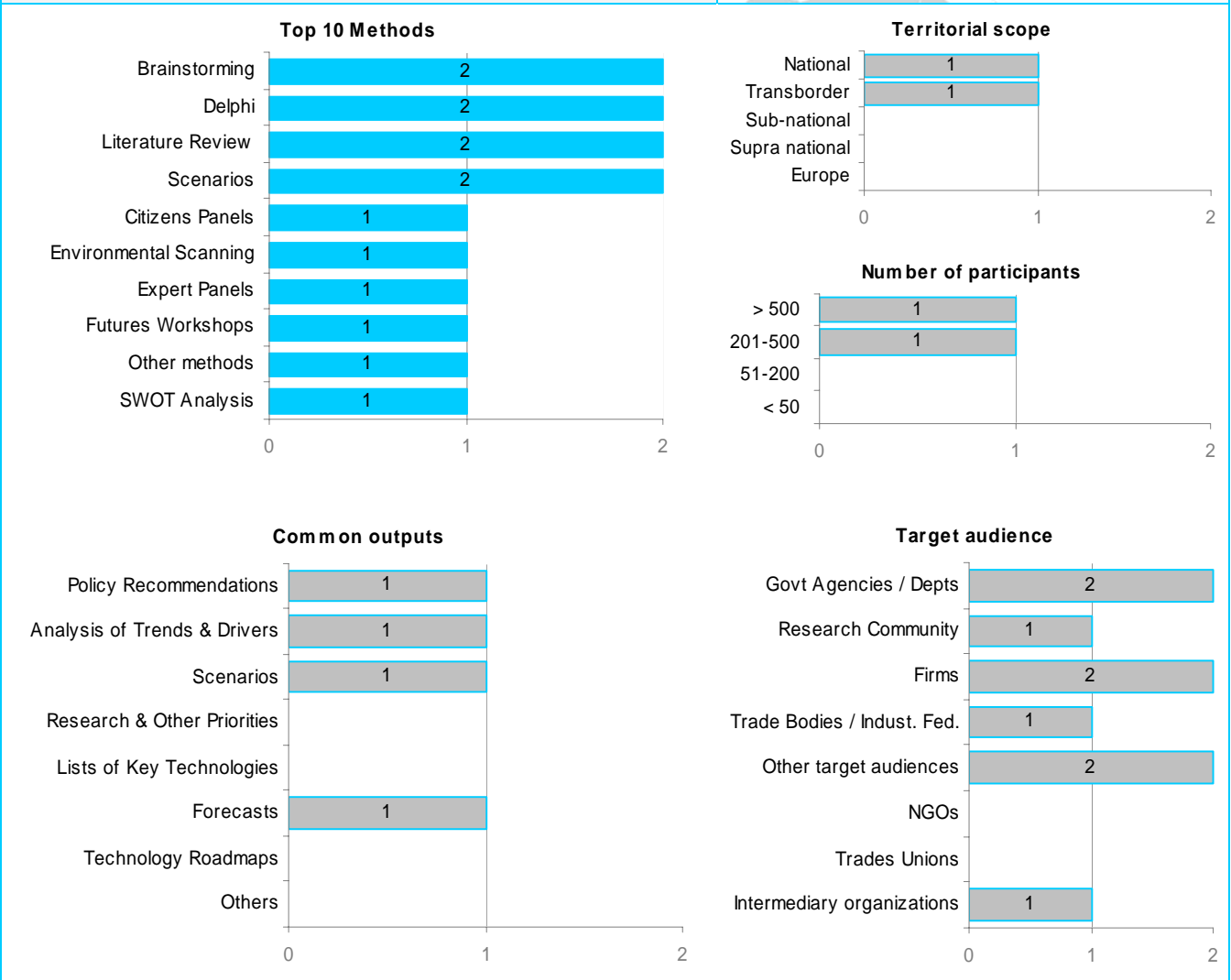


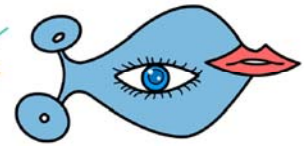
Box 8.11: Foresight Panorama in Greece



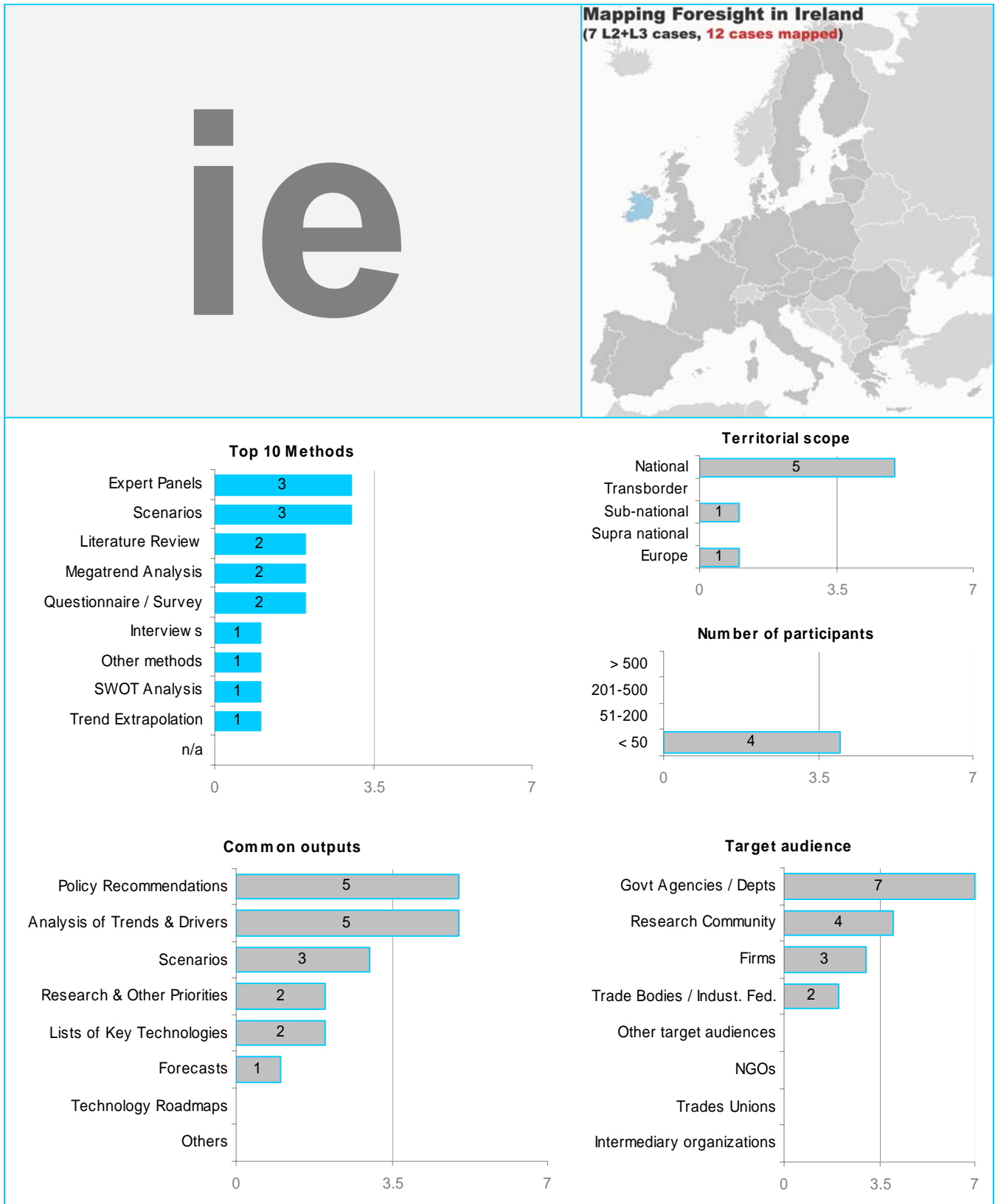


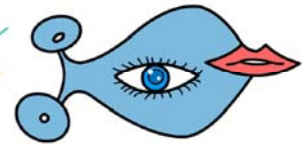
Box 8.12: Foresight Panorama in Hungary



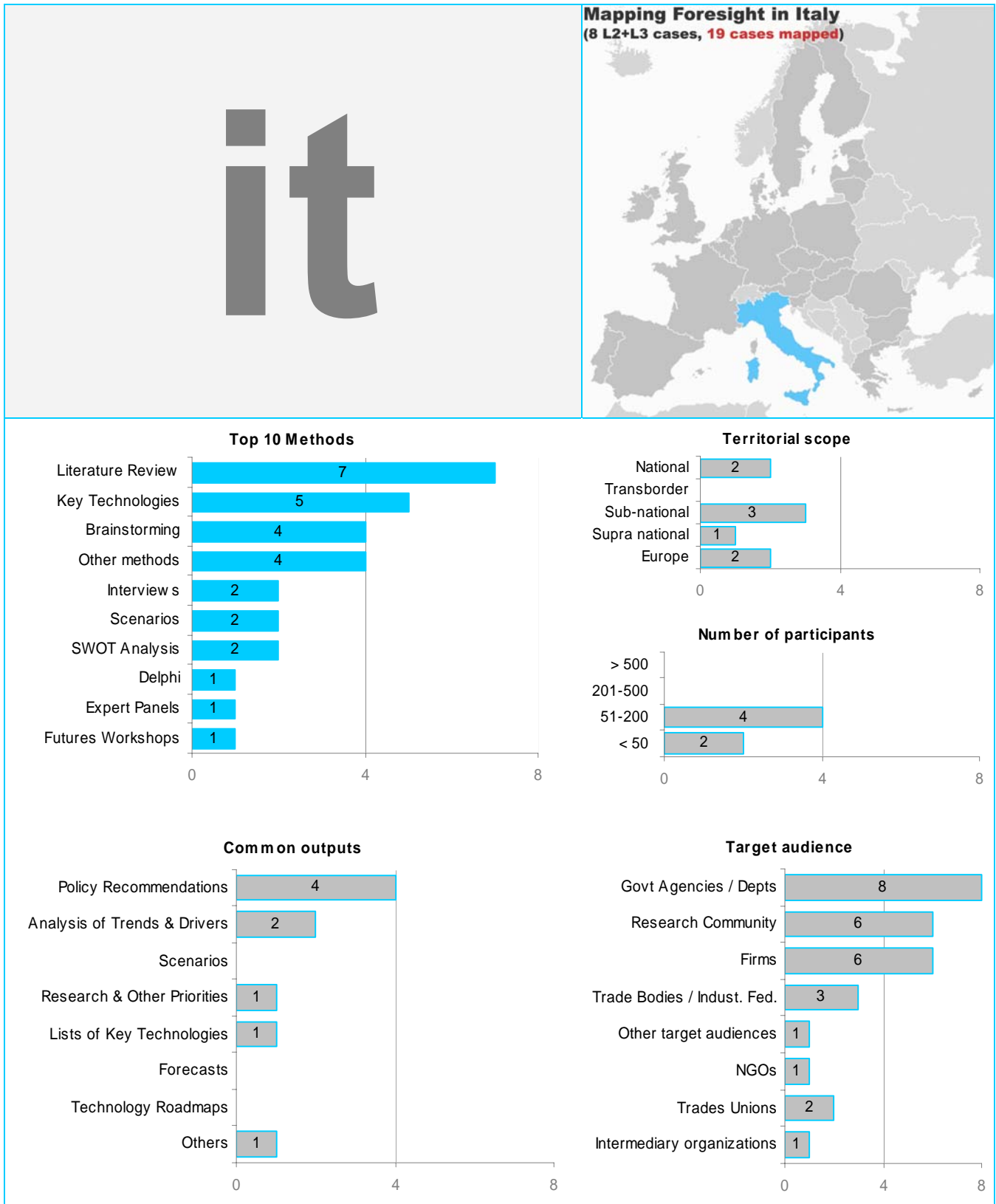


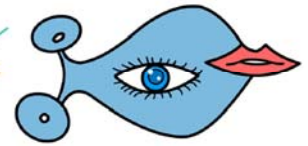
Box 8.13: Foresight Panorama in Ireland





Box 8.14: Foresight Panorama in Italy





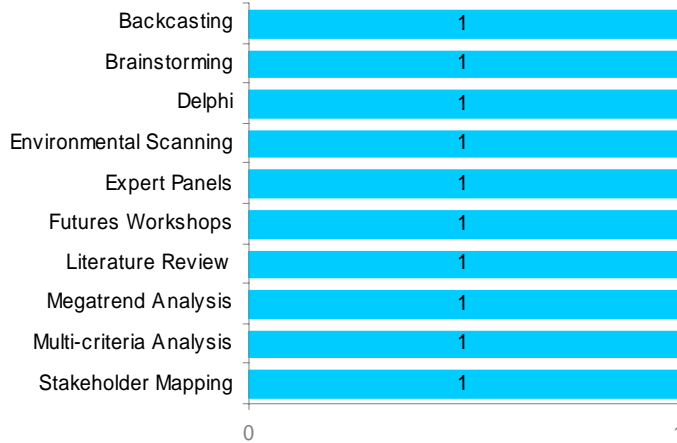
Box 8.15: Foresight Panorama in Latvia

lv

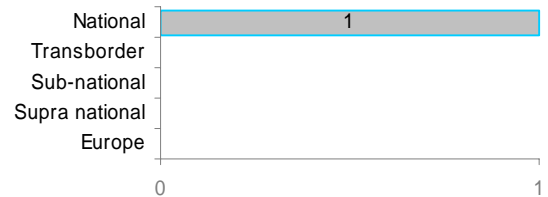
Mapping Foresight in Latvia
(1 L2+L3 case, 5 cases mapped)



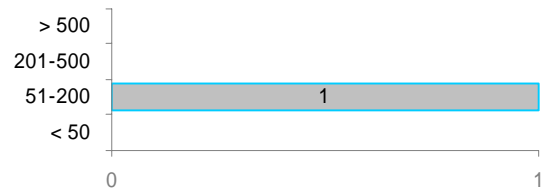
Top 10 Methods



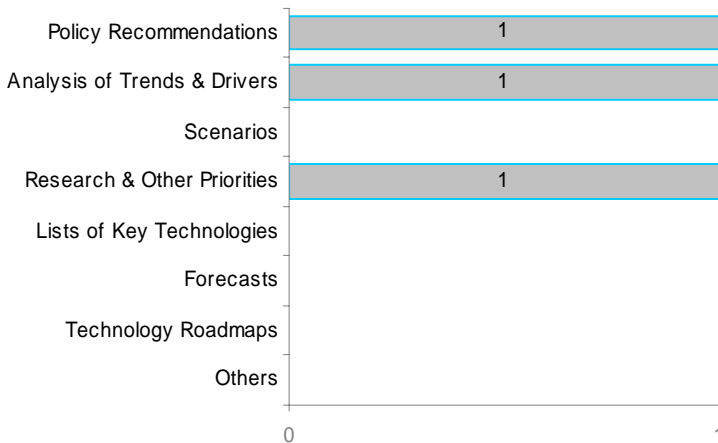
Territorial scope



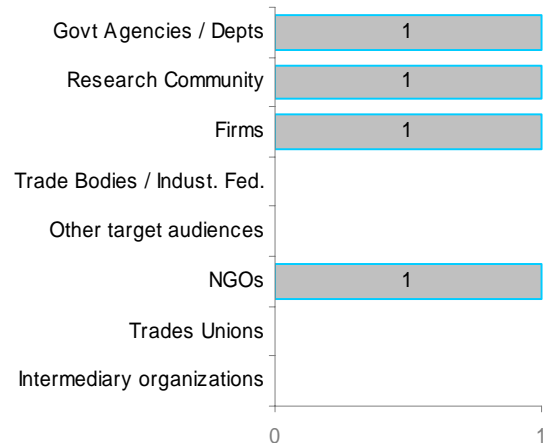
Number of participants

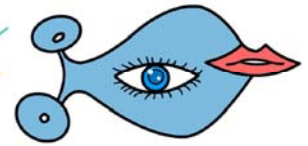


Common outputs

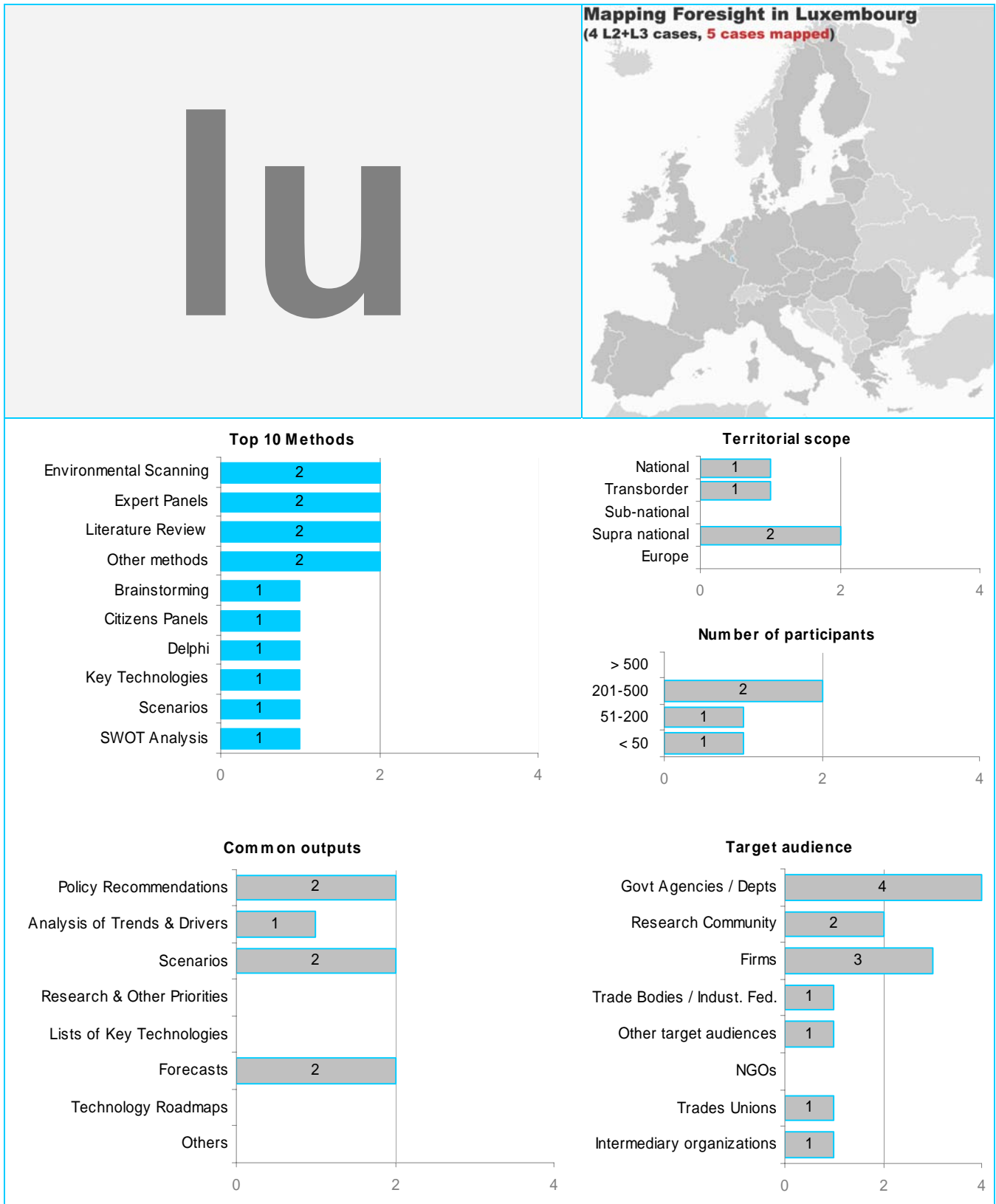


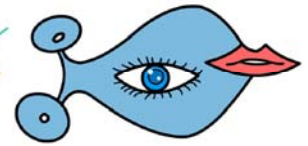
Target audience



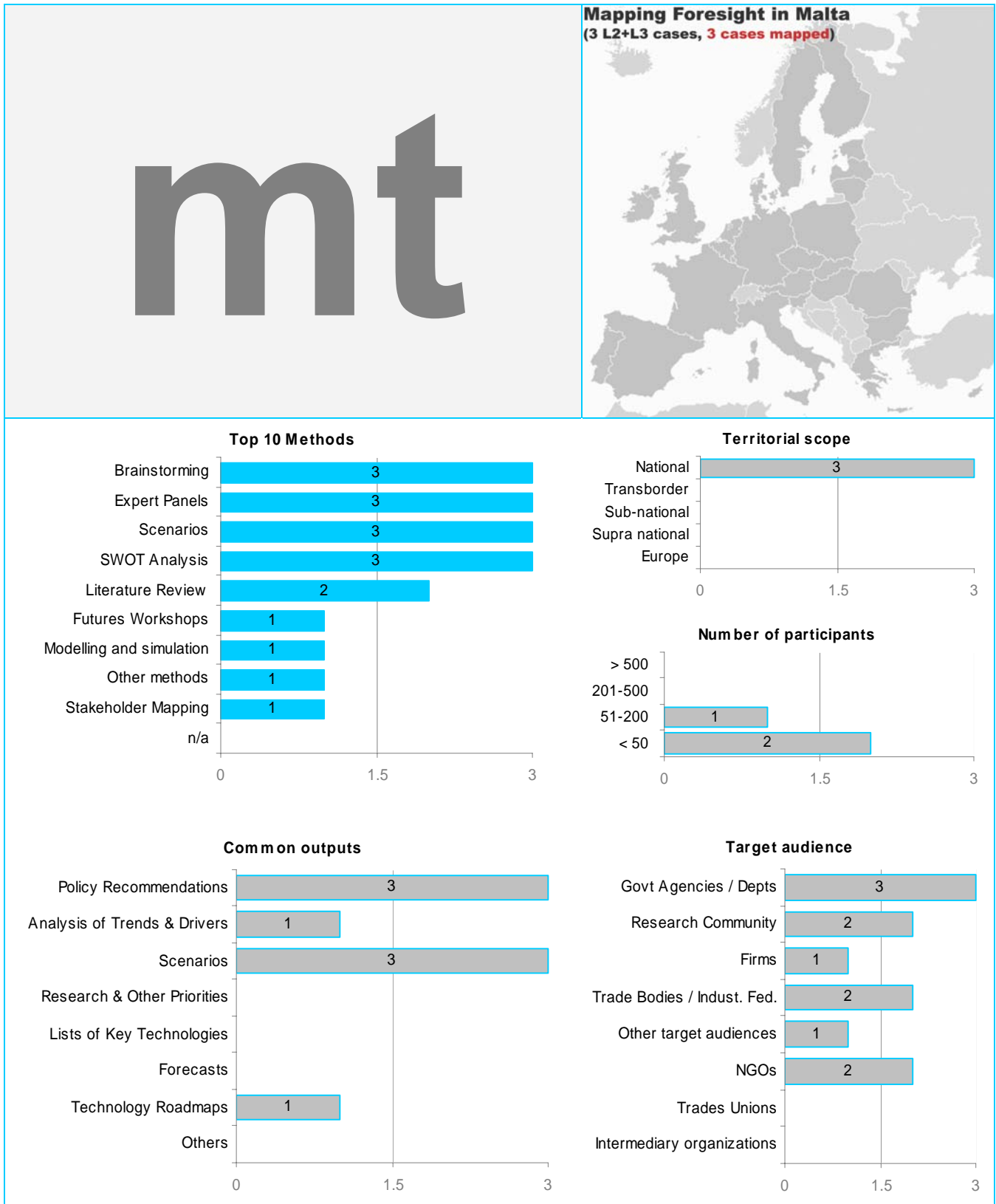


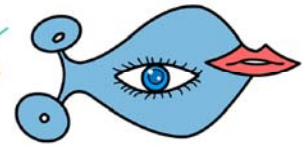
Box 8.16: Foresight Panorama in Luxembourg



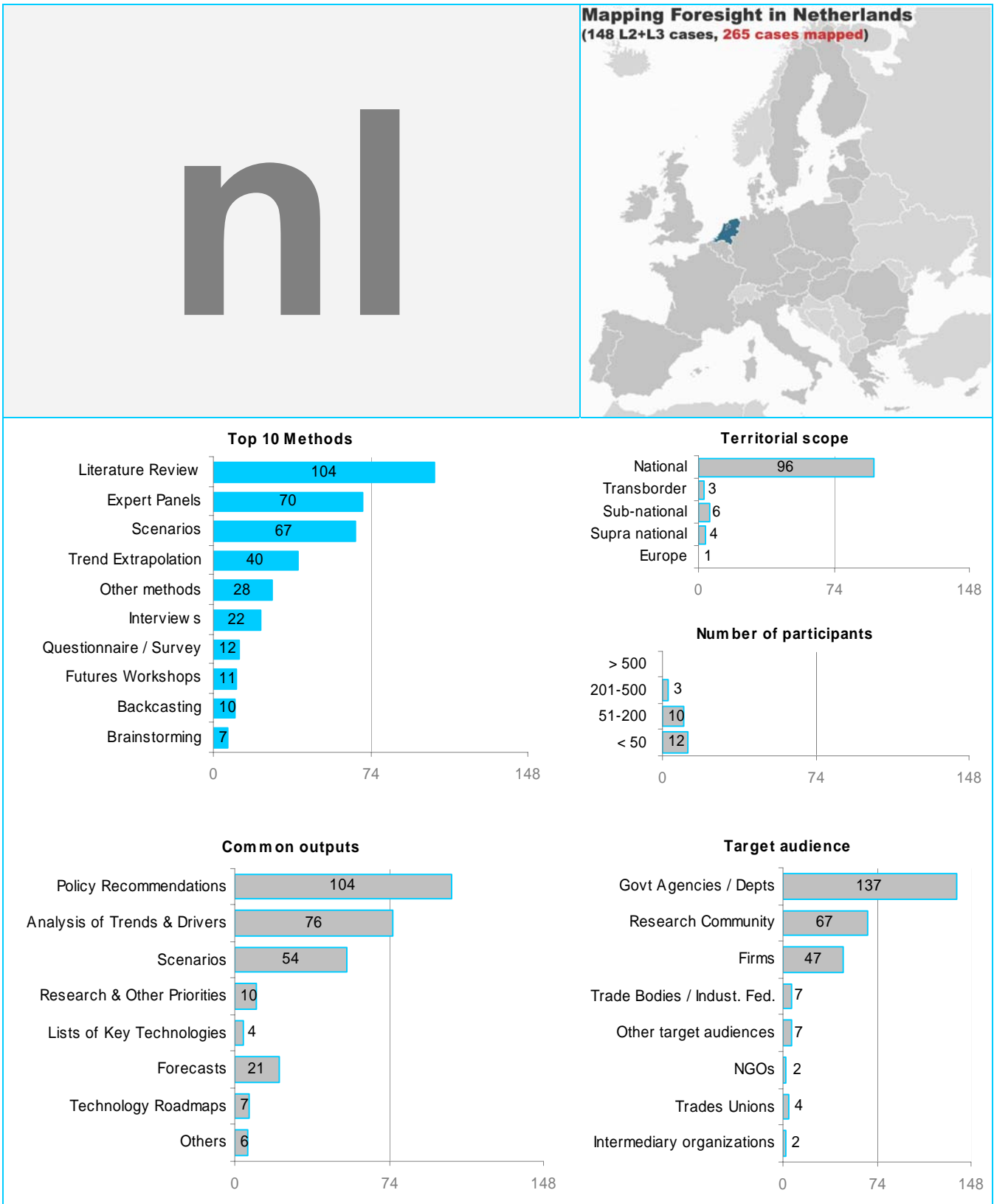


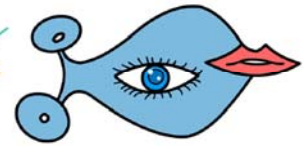
Box 8.17: Foresight Panorama in Malta





Box 8.18: Foresight Panorama in the Netherlands





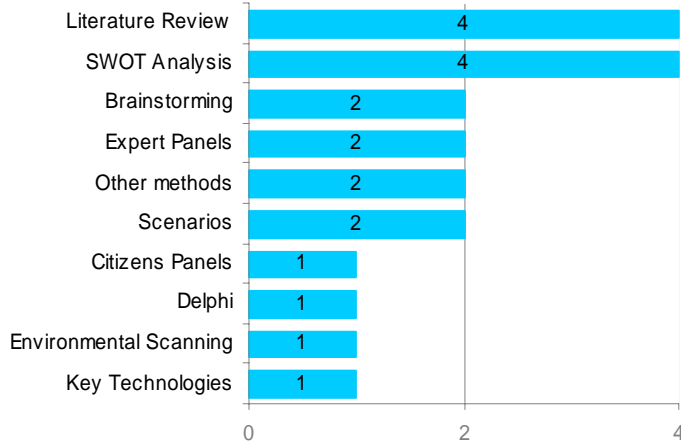
Box 8.19: Foresight Panorama in Poland

pl

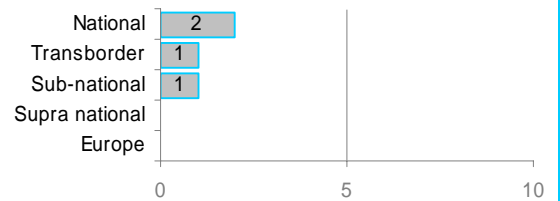
Mapping Foresight in Poland
(4 L2+L3 cases, 6 cases mapped)



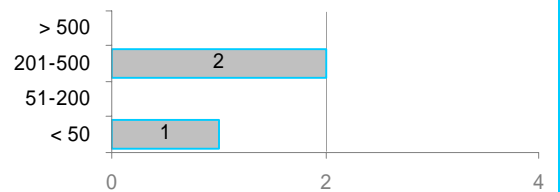
Top 10 Methods



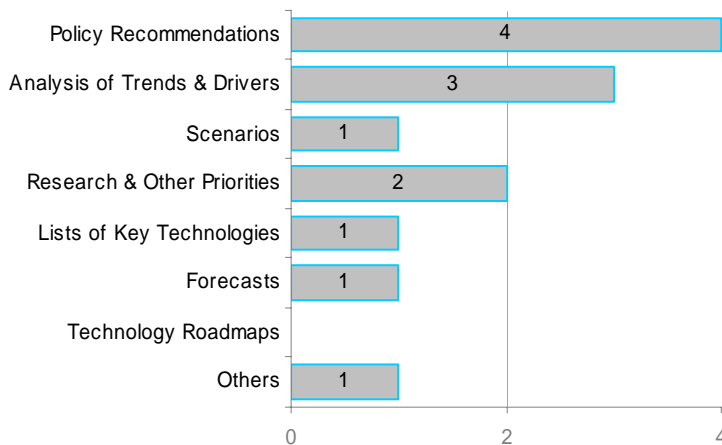
Territorial scope



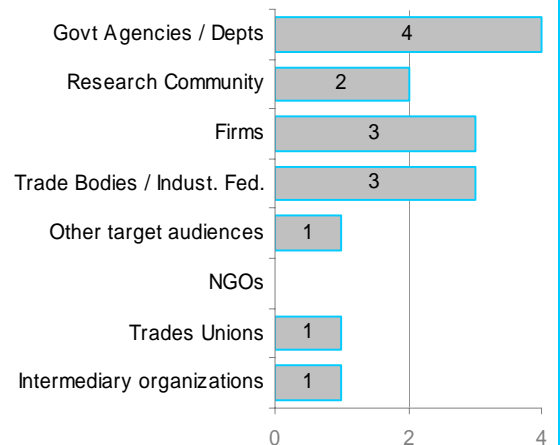
Number of participants

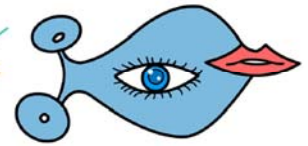


Common outputs

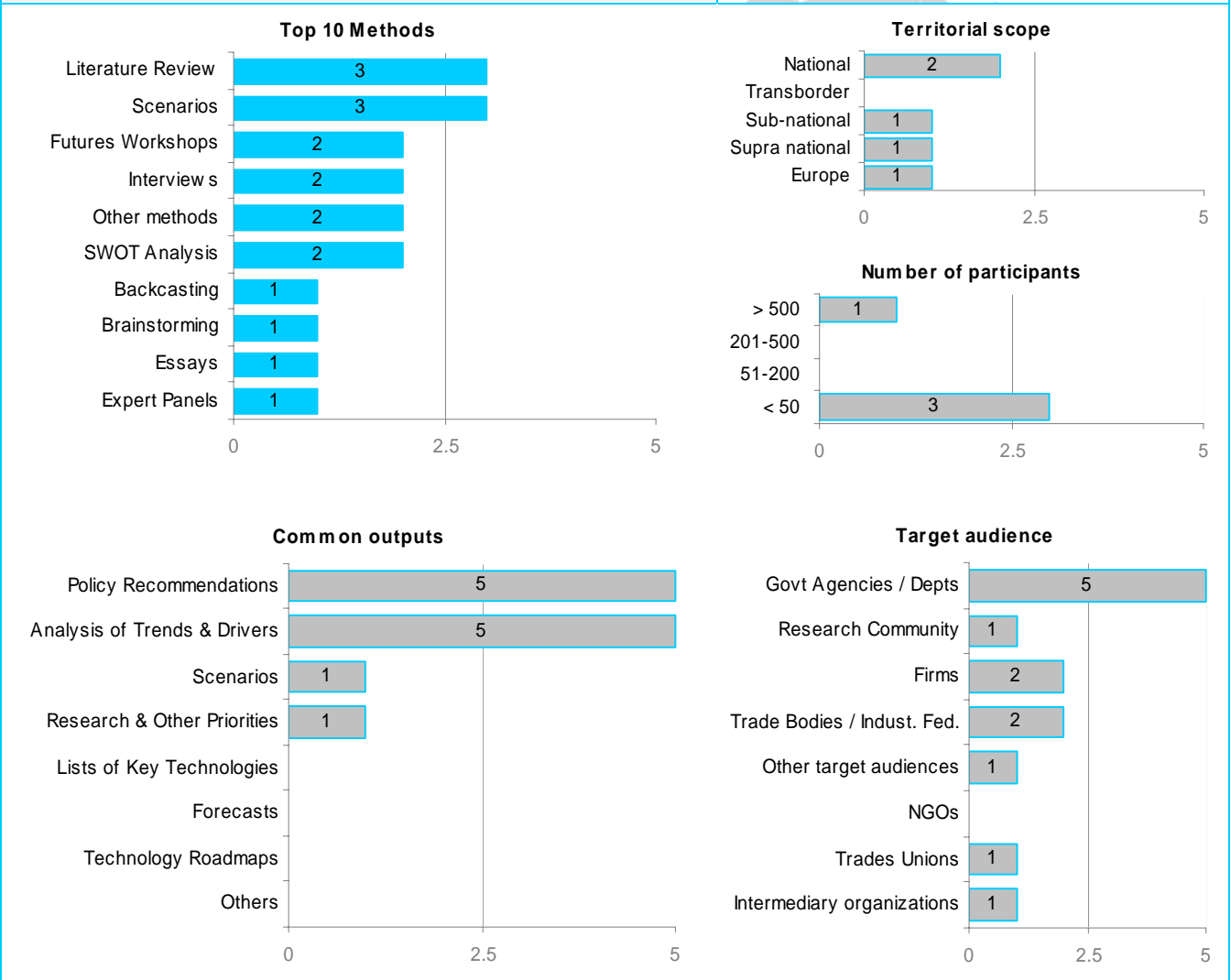
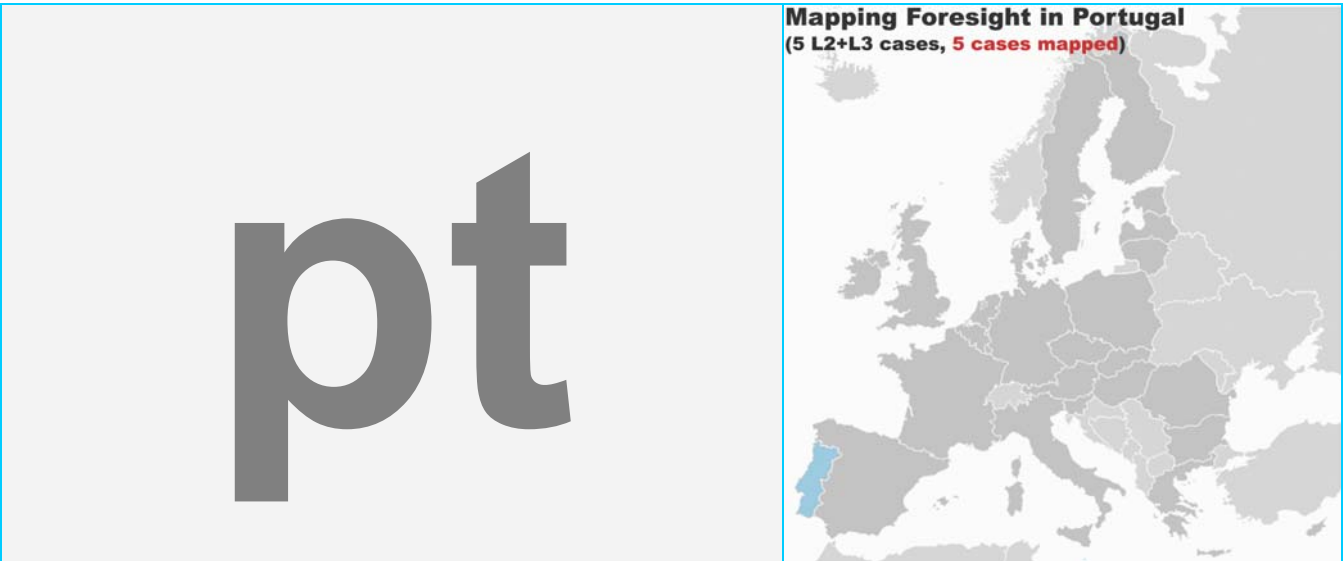


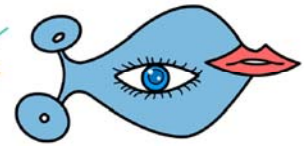
Target audience



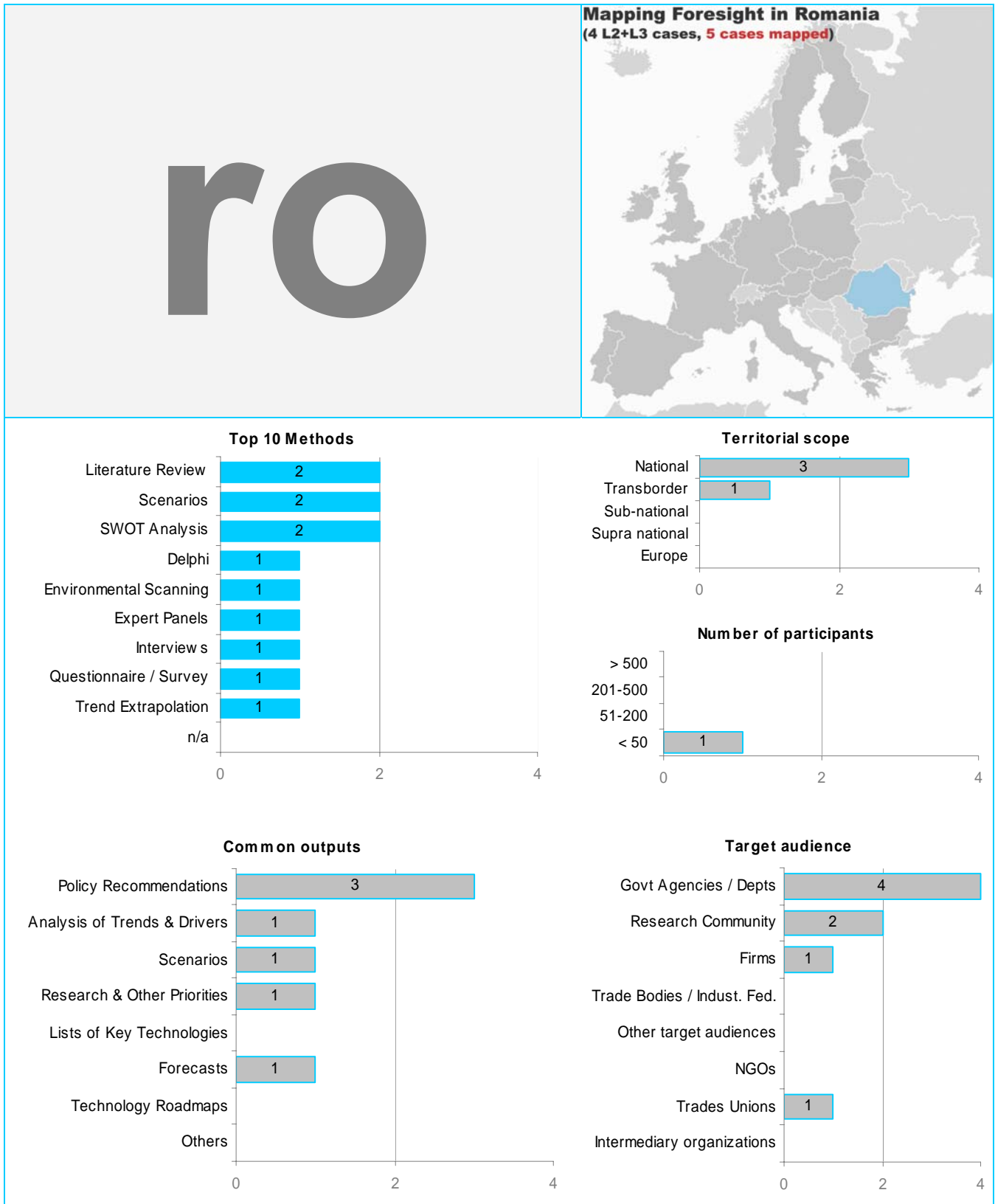


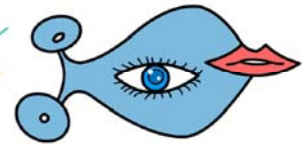
Box 8.20: Foresight Panorama in Portugal



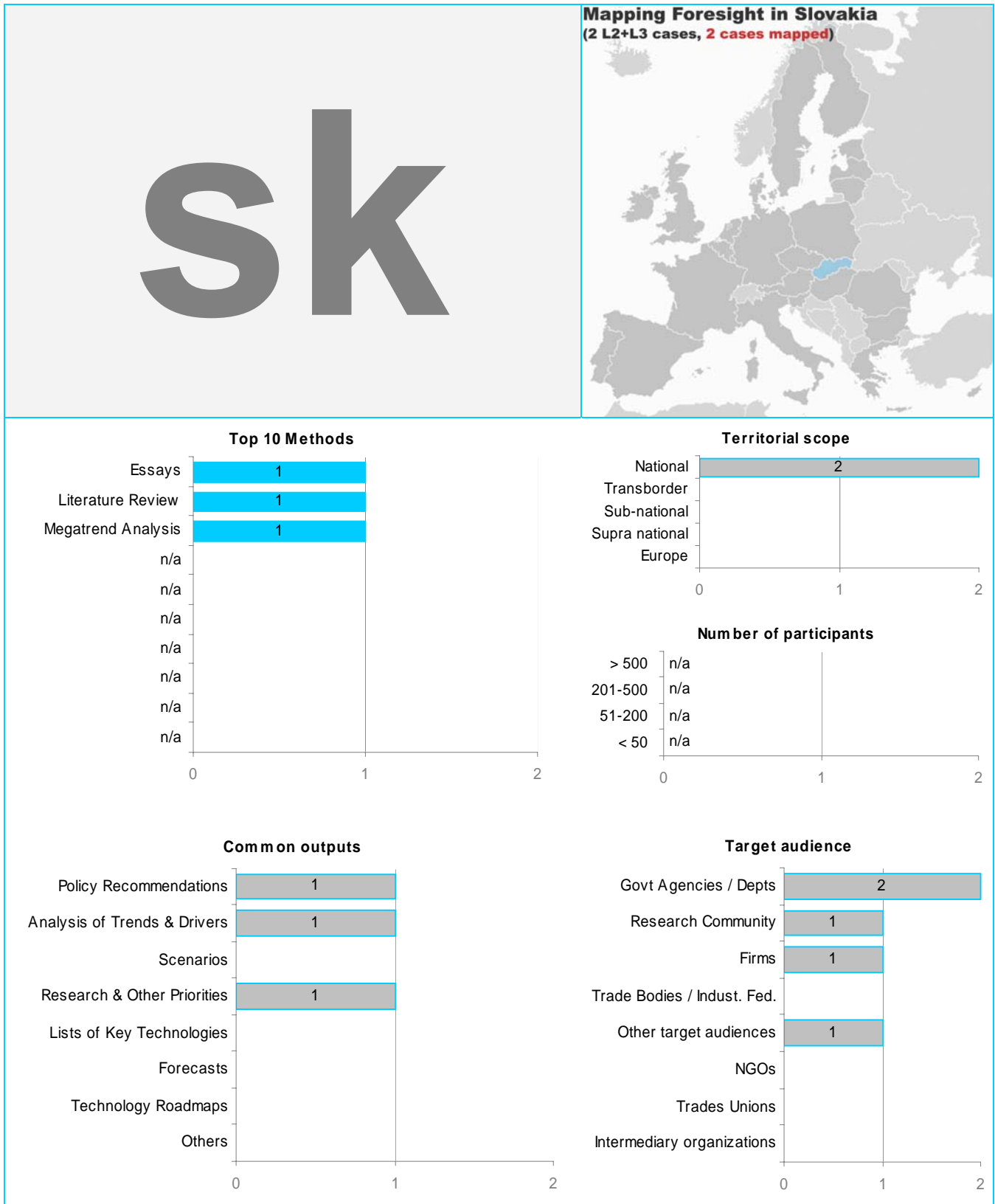


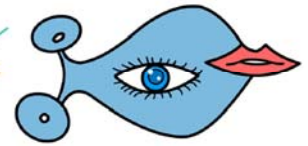
Box 8.21: Foresight Panorama in Romania



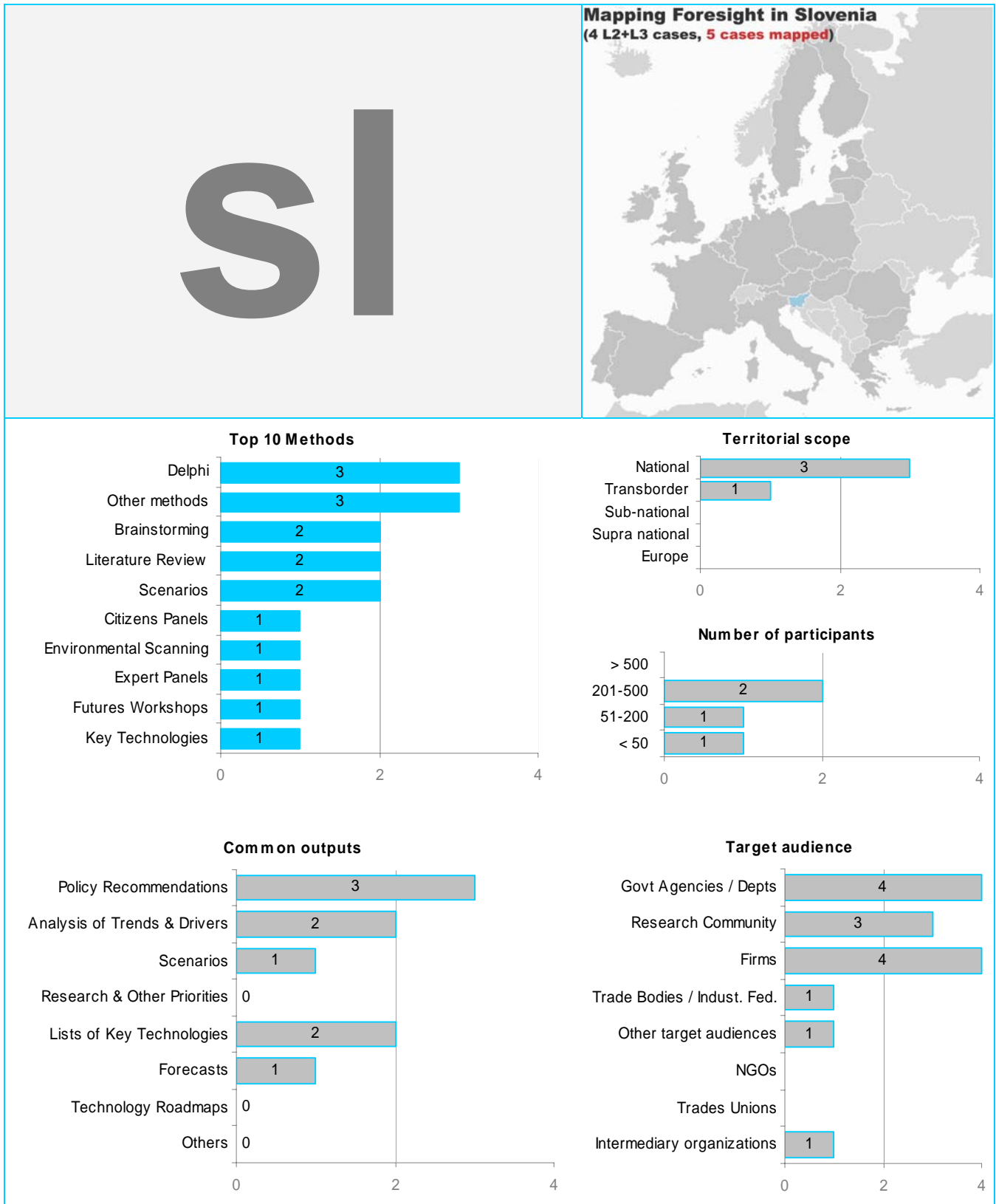


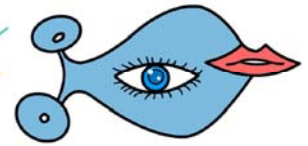
Box 8.22: Foresight Panorama in Slovakia



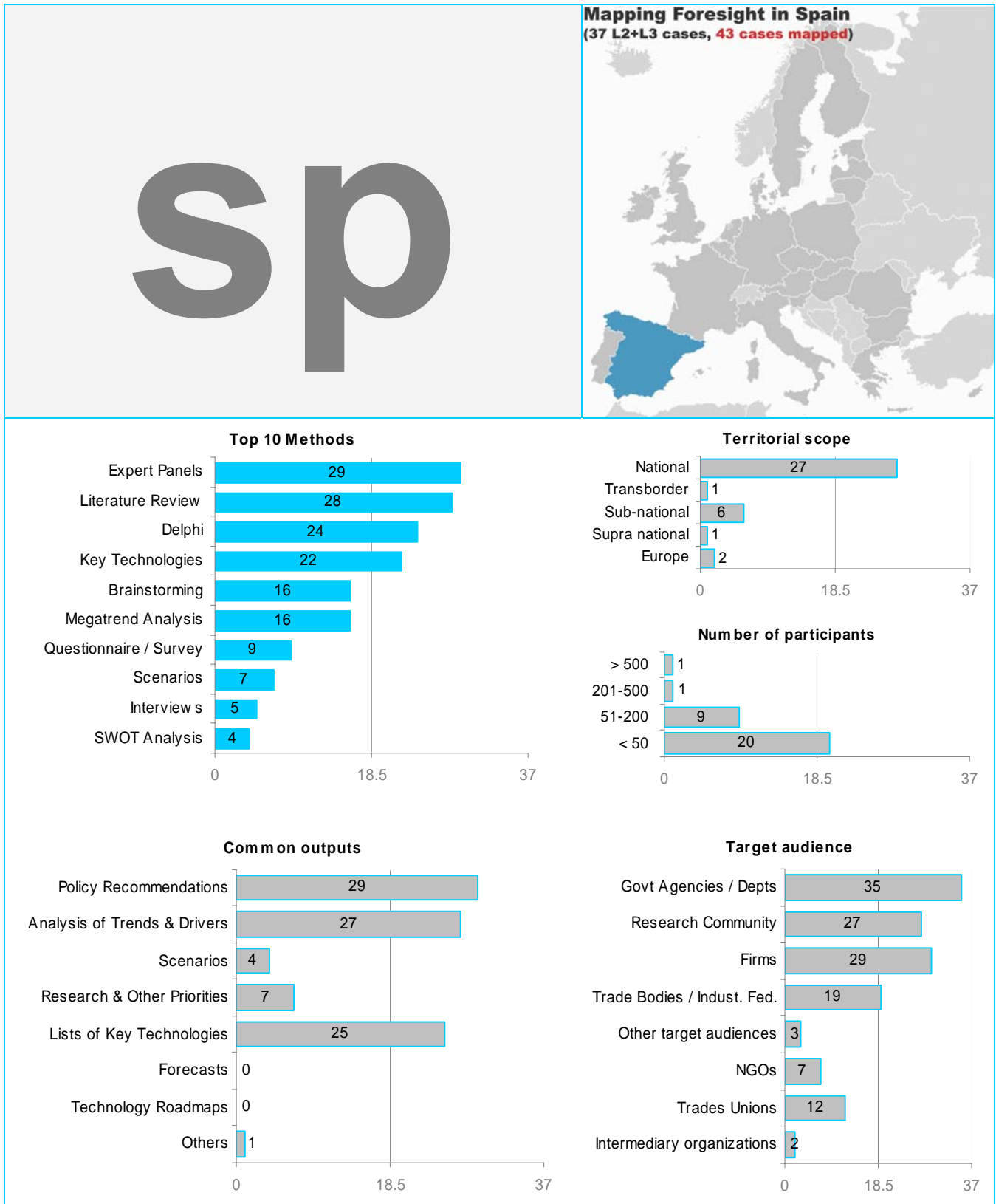


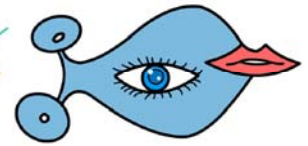
Box 8.23: Foresight Panorama in Slovenia



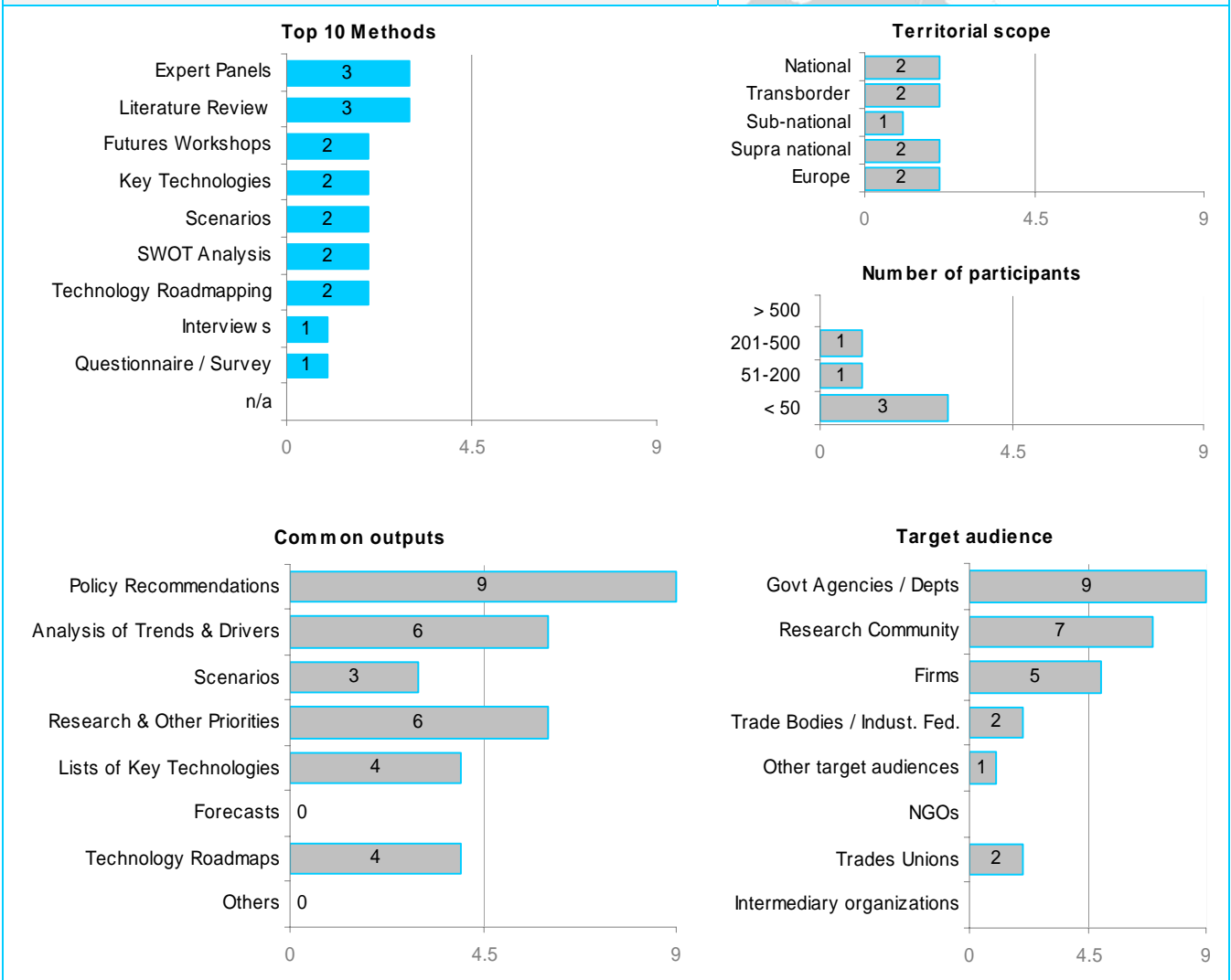


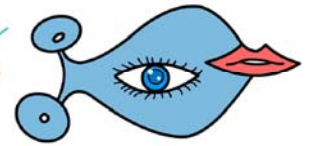
Box 8.24: Foresight Panorama in Spain



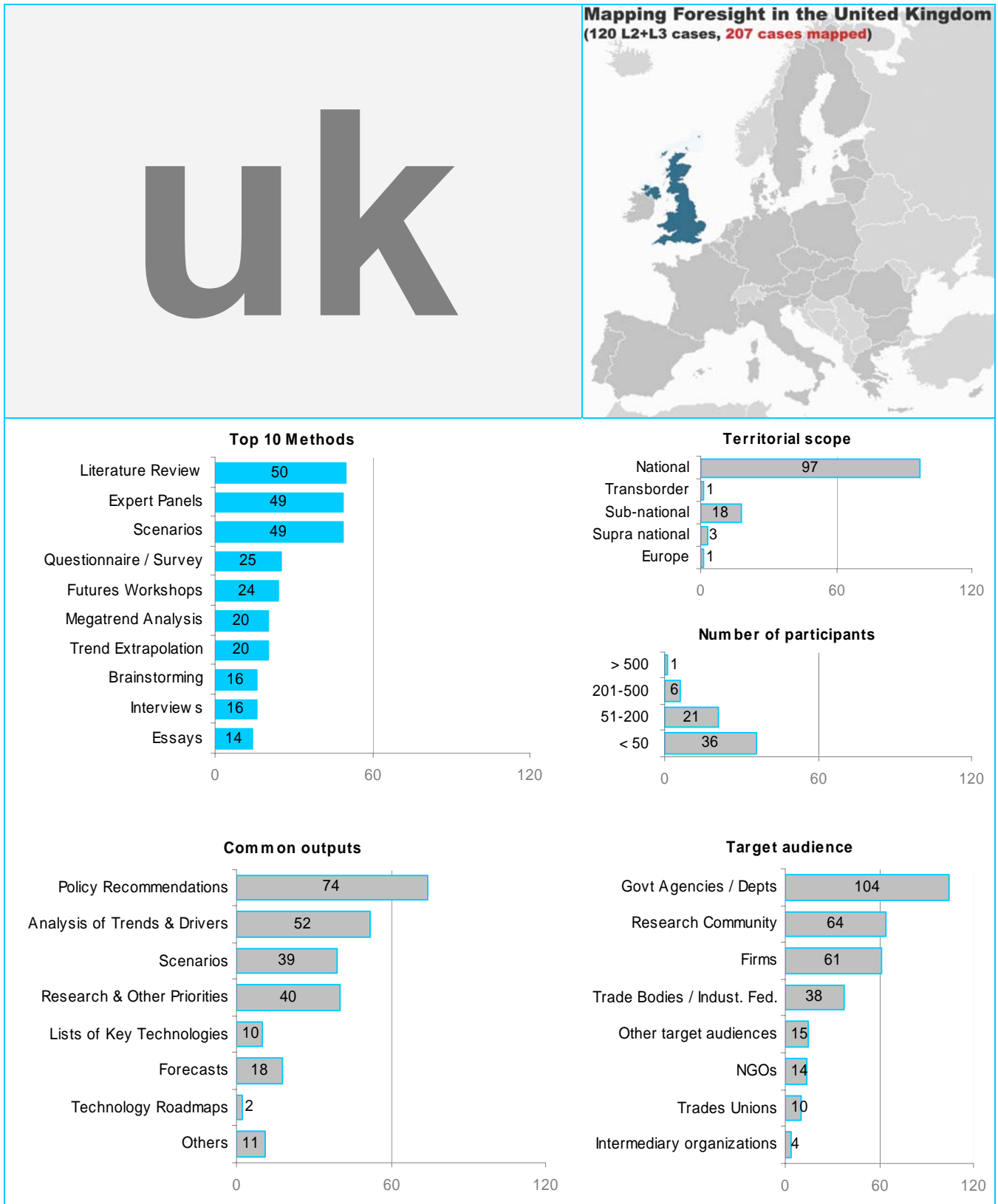


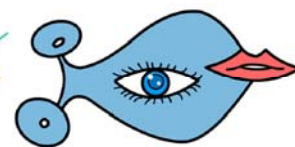
Box 8.25: Foresight Panorama in Sweden





Box 8.26: Foresight Panorama in the United Kingdom





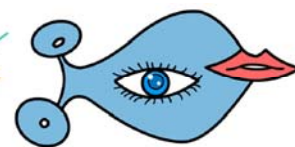
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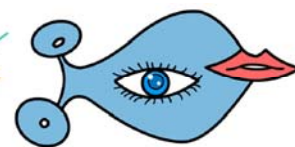
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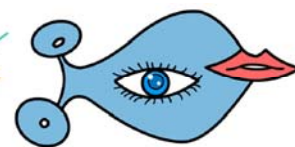
Austria (AAS-ICE - Visions of a wireless information society; BMVIT - Energiesysteme der Zukunft / BMVIT Future Energy Systems; BMVIT - Innovation and development potential biomedical technologies; BMT Austria 2000; BMVIT - Safety and Security Research 2011; BMVIT Technology Delphi; BMVIT/ARC - The Future of Mobility in Austria. Consequences for Technology Policy; Vienna City Council - Urban development strategy Erdberger Mais; IPTS - Future oriented analysis on the main socio-economic challenges that Europe will face: potential impact of research; Cedefop - Scenarios and Strategies for Vocational Education and Training in Europe; European Decentralized Generation (DECENT) Project: Development of EU policy) **Belgium** (Flemish Government - Algemene Omgevingsanalyse Vlaanderen 2004 / Flemish Government - Socio-Economic Foresight Flanders – Algemene Omgevingsanalyse Vlaanderen; Agoria - Roadmap Mechanica & Mechatronica; BACAS - Industrial biotechnology and sustainable chemistry; CLEO-Ulg Etude prospective en appui de la politique scientifique federale; DGTRE: Breakthrough to the Future with the Information Society in the Liège Region; Direction General for Technologies, Research and Energy DGTRE - PROMETHEE Wallonia; Flemish Institute for Science and Technology - Energy Foresight Flanders 2050; King Baudouin Foundation - Grey Matters; Perspectives énergétiques pour la Belgique à l'horizon 2030; SCK/CEN - Sustainability and nuclear development; Socioforesight - Belgian Federal Foresight Study; Strategisch Plan Limburg - SPIN OFF Strategic Plan Innovation: New Opportunities for the Future; IPTS - Future oriented analysis on the main socio-economic challenges that Europe will face: potential impact of research; Cedefop - Scenarios and Strategies for Vocational Education and Training in Europe; European INTERREG Rhine-Meuse Activities (IRMA) - Development of flood management strategies for the Rhine and Meuse Basins in the context of integrated river management; European Interregional Cooperation Area - SaarLorLux 2020 Vision for the Future) **Bulgaria** (ForeTech: Technology and Innovation Foresight; ForeTech: Biotechnology; FP6 SCHOOL Foresight) **Cyprus** (STRATA Programme - eFORESEE Cyprus) **Czech Republic** (National Foresight: a basis for National Research Programme II – NRPII; RASES: Government Council for Social and Economic Strategy - Visions for Development 2015; FP6 SCHOOL Foresight; Cedefop - Scenarios and Strategies for Vocational Education and Training in Europe; Ministry of Education - Foresight as a basis for the National Research Program 2004-2008) **Denmark** (Board of Technology - The future Danish Energy System; Environmental Protection Agency - Green Technology Foresight; Ministry of STI - Technological Foresight on Nanotechnology; Ministry of STI - Teknologisk FremSyn - ICT from Farm to Table; Ministry of STI - Teknologisk FremSyn - Pervasive Computing; Ministry of STI - Teknologisk FremSyn - Ageing Society 2030; Ministry of STI - Teknologisk FremSyn - Bio- and Healthcare; Ministry of STI - Teknologisk FremSyn – Hygiene; Ministry of STI Bio/health technology foresight; Ministry of STI Teknologisk FremSyn - Cognition and Robotics; Nordic Energy Research Programme - Future Wind Turbines; Risø National Laboratory - Sensor Technology Foresight; Society of Engineers (IDA) - Energy Technology Foresight; IPTS - Future oriented analysis on the main socio-economic challenges that Europe will face: potential impact of research; Baltic STRING Region Project; Norden Nordisk Innovations Centre - FOBIS: Nordic Foresight Biomedical Sensors; Nordic Energy Research / Nordic Innovation Centre - H2 Energy Foresight; Nordic Innovation Centre - ICT Foresight) **Estonia** (FP6 SCHOOL Foresight; STRATA Programme - eFORESEE Estonia; eVikings; Research and Development Council - Competitiveness and future outlooks of the Estonian economy; Cedefop - Scenarios and Strategies for Vocational Education and Training in Europe; Scenarios 2010) **Finland** (EU Barents 2010 Project; EUFORIA - European Knowledge Society Foresight; IPTS: Future oriented analysis on the main socio-economic challenges that Europe will face: potential impact of research; FFRC - Foresight analysis of the energy cluster in Pirkanmaa region 2010-2020; FFRC: The Future of the Food Industry - ETU 2030; Committee for the Future - Independent Living of Elderly People: Futures Policy and Gerontechnology; Eennakointi - Regional Foresight Information System of the Northern Ostrobothnia; 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TEKES - FinnSight 2015: Understanding and Human Interaction; TEKES - FinnSight 2015: Well-Being and Health; TEKES - FinnSight 2015: Food Technology Foresight in Finland; Turku School of Economics - NAVIfuture: Survey on future of personal navigation; VATT - Globalisation: the End of Work? The Economy and Employment in Finland to 2030; VTT - Energy Vision 2030 for Finland; Nordic Energy Research / Nordic Innovation Centre - H2 Energy Foresight; Nordic Innovation Centre - ICT Foresight) **France** (Europe - Strategic capacities in Europe in 10 years in relation with budgetary perspectives; European Interregional Cooperation Area - SaarLorLux 2020 Vision for the Future; IPTS - Future oriented analysis on the main socio-economic challenges that Europe will face: potential impact of research; Fondazione Rosselli - FoMoFo : Four Motor Foresight –Lombardy; Nancy 2020; INRA 2020; ADEME - Le secteur des transports à l'horizon 2030; AGORA 2020 - Transport, Housing, Urbanism and Risk; Atomic Energy Authority - Energy 2010-2020 – The paths for a sober growth / Energie 2010-2020; Atomic Energy Authority OMNT – Observatory of Micro and NanoTechnologies; CGP - L'évolution future des conflits d'usage envisagée à partir des 4 scénarios sur les campagnes françaises à l'horizon 2020; CNAM - L'ANAH à l'horizon 2010 / Public Administrations in 2010; CNAM - The Future of Geographical Information in France; CNAM - The future of Pays Basque;



CNAM / LIPSOR - La filière agricole et l'environnement. Scénarios 2010 par la méthode Delphi- Abaque de Régnier; CNAM L'avenir du maïs en France vers l'An 2010 / The Future of Corn 2010; Commissariat Général du Plan - CGP - Energy 2010-2020: the challenges of the long term; Conseil économique et social de la région Centre - Region Centre: which scenarios towards 2020?; Conseil économique et social de Île-de-France - Living in Île-de-France in 2025; Conseil Régional du Limousin - Limousin 2017; DATAR - Agriculture and Territories. 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Rheinland-Pfalz county association (Landtag) - Zukunftsradar 2030: ZIRP Zukunftsinitiative Rheinland-Pfalz; Senator for Economy and Harbour - Innovation 2010 Bremener Innovationsoffensive; SPD-Landesvorstand - Perspectives on Sachsen-Anhalt 2020; Staatsministerium Baden-Württemberg / Abteilung Grundsatz und Planung - Future Commission Society 2000; Siemens Horizons 2020; Forecasting of the development on the market for agricultural machines) **Greece** (EC DG Research - INTRACK Regional Foresight in Crete; IPTS - Future oriented analysis on the main socio-economic challenges that Europe will face: potential impact of research; EUFORIA - European Knowledge Society Foresight; Cedefop - Scenarios and Strategies for Vocational Education and Training in Europe; General Secretariat for Research and Technology - 2021 Scenarios for Greece; National Technological Foresight; National Technological Foresight Exercise - Biotechnologies; Regional Foresight Exercise in Central Macedonia) **Hungary** (Cedefop - Scenarios and Strategies for Vocational, Education and Training in Europe; Technology Foresight Programme) **Ireland** (Marine Foresight; Rural Foresight for 2025; University College Dublin - Archaeology in Ireland; BMW Region Foresight Project; IPTS - Future oriented analysis on the main socio-economic challenges that Europe will face: potential impact of research; Environmental Protection Agency - Energy Scenarios Ireland; FORFÁS - National Technology Foresight 1999) **Italy** (EC DG Research - TRACK Regional Foresight in Sicilia; IPTS - Future oriented analysis on the main socio-economic challenges that Europe will face: potential impact of research; Strategic capacities in Europe in 10 years in relation with budgetary perspectives; Fondazione Rosselli - FoMoFo: Four Motor Foresight - Lombardy; Fondazione Rosselli - National priorities for industrial research; National priorities for industrial R&D; IRES Piemonte - Scenario Analysis 2010; RISE - Research, Innovation, Economic Development) **Latvia** (Towards Knowledge Societies of Europe) **Luxembourg** (Dutch STT - Nanotechnology, towards a molecular construction kit; Cedefop - Scenarios and Strategies for Vocational Education and Training in Europe; Interregional Cooperation Area - SaarLorLux 2020 Vision for the Future; Esch : Esch-sur-Alzette - Workshop Esch 2006 Urban Vision) **Malta** (STRATA Programme - eFORESEE Malta - Biotech Pilot; STRATA Programme - eFORESEE Malta - ICT & Education Pilot; STRATA Programme - eFORESEE Malta - Marine Sector Pilot) **Netherlands** (No future without informatics, a look at the future; The economical and physical environment; Time for healthy behaviour; stimulation of healthy behaviour for specific groups; Demand for child care 2003-2007; Development of an integration map; European INTERREG Rhine-Meuse Activities IRMA - Development of flood management strategies for the Rhine and Meuse Basins in the context of integrated river management; IVLOS / Futureconsult - (On)voorstelbaar (On)voorspelbaar / Incredible unpredictable; Limburg 2030 excellent in Europe; a future study for the regional province Limburg; Ministerie OC&W en EZ - Energy and society in 2050; Study on the political attitude of citizens; National identity of the Netherlands; National security; National strategy for sustainable development; National Foresight Studies to Energy; Financial crime in 2010 - Scenarios and strategic policy questions; NVVP policy options investigated on transport of goods; Opportunities and strengths of the Dutch Defence related industry; Pilot wireless health care; Population trends; Production, labour and sector-structure in four scenario's for 2040; Developments for Dutch farmers; a foresight of policy, the market, technology and actors; Representative and participative; double democracy; Royal Netherlands Meteorological Institute - KNMI Climate Scenarios for Impact studies in the Netherlands; Ruimtelijk Planbureau Den Haag - Four spatial scenario's for the Netherlands; Scenario's for household developments in the Netherlands; Social and cultural developments; Social and cultural rapport 2004; State without a country: a foresight of the consequences of ICT; Summarization of foresights about Delta in the future; SURF: Visions for the future; Foresight study for the occupation/job structure in care and welfare; Foresight of the cable landscape; Scenario's mapped: Future use of space/spatial planning; Forecast in relation to occupation structures in health sector; Foresight study on mediation and law; AER - Energie-infrastructuur van de toekomst; AWT - With an eye on the future 2010; AWT Flows and floods - knowledge and innovation challenges for a watery Netherlands; Berenschot / Images of management: Berenschot trend analysis; Citizens and the public government in an ICT society; Centre for higher education policy studies Academia in the 21st century, an analysis of trends and perspectives in higher education and research; CPB - Labour productivity on long term in historical and international perspective; CPB - Dutch Central economic planning and a macro economical exploration; CPB - Four



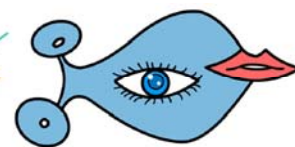
long-term scenarios for the Dutch government and health-care sector; CPB - Labour supply scenario's for the Netherlands; COS - The ether without boundaries; CPB - Housing and space in 2020; ECN - Energy technology; ECN - Energy infrastructure of the future; Futureconsult - Four scenarios for the Dutch knowledge economy in 2010; Gemeente Amsterdam - Vision of the city of Amsterdam; Gemeente Amsterdam: future scenario; Gemeente Eindhoven - Vision of the city of Eindhoven 2010; Gemeente Oosterhout - Vision of the city Oosterhout 2000-2015; Gemeente Venlo - Vision Venlo 2030; Gemeente Zwolle - The future of the city of Zwolle; HBA Vak kundig naar 2010 / The future vision of the HBA; KNAW Bio-exact - Global trends and national position in biochemistry and biophysics; KNAW - Between earth and life: A strategic foresight of biogeology in the Netherlands; KNMG / DMW-VSNU / VAZ / NVZ/ LCW - The medical doctor of the future; Food supply in the 21st century; Libraries 2040; Limburg 2030; Longing for the endless sea; Marine Parks: sustainability at sea; Milieuverkenning 5 - 2000-2030; Min V&W en Min OC&W - The problems of tomorrow 1/2; Minister van Grote Steden- The future of the policy for big cities; Ministerie EZ - The economy of the 21st century; Ministerie OC&W / Ministerie van EZ - Vision of the future of scientific research; Ministerie van Binnenlandse Zaken en Koninkrijksrelaties - Policy for big city's 2005-2009; Ministerie van Economische Zaken - Dutch Vision on the role of bio mass in the Dutch energy supply in 2040; Ministerie van Economische - The future of electronic communication; Ministerie van EZ - Innovation in Energy Policy; Ministerie van Justitie en Ministerie van Binnenlandse Zaken en Koninkrijksrelaties - Towards a safer society; Ministry of Economic Affairs - Dynamo 2004; Ministry of Economic Affairs - Visie op biomassa, De rol van biomassa in de Nederlandse energievoorziening 2040 / Vision on biomass; Ministry of Economic Affairs ECN - The next 50 years: Four European energy futures; Ministry of Education, Culture and Science - The future of math research in the Netherlands; Ministry of Education, Culture and Science / Dutch Ministry of Economic Affairs - Vision on the future of scientific research; Ministry of VROM - Quality and the future; Ministry of VROM - Housing and living in multicultural cities; Ministry VROM - Trend analysis biotechnology 2004; National Environmental outlook 2000-2030; NIZW - Future scenarios for the health sector; NRLO - Functional Foods - Position and future perspectives; NRLO - Rural Areas put on the map, knowledge and innovation priorities, aspirations for the 21st century; NRLO - Science and Technology, Opportunities for agribusiness, rural areas and the fishing industry; NRLO - Agricultural sciences in Wageningen in 2010; NRLO Agribusiness: knowledge and innovation priorities, aspirations for the 21st century; NRLO Agricultural policy and internationalisation; developments and dilemmas in agricultural policy towards 2015; NRLO Agriculture and Environment, future initiatives for knowledge and innovation; NRLO Agriculture in society: a new perspective, future initiatives for knowledge and innovation; NRLO Bioproduction and ecosystem development in saline conditions; NWO - Technology Roadmap Catalysis; Ocean Farming - Duurzaam zeegebruik; PBOO - The future of the civil society of Limburg at the beginning of the 21st century: an exploration of the future; Province of North-Brabant: Brabant 2050; Quality and the future, foresight to sustainability; Rabobank groep nederland - WBZ: four scenarios for 2012; RIVM - exploration of the future on the health of society 2002; RIVM - Milieukosten energiemaatregelen - Costs and energy interventions 1990-2010; RIVM - The elderly now and in the future; RIVM / NIVEL Health care in big cities; RIVM Macro-economic effects in 2020 of the Kyoto climate policy; RMO - Integration in perspective; RPB - The unknown space explored - Scenarios for household trends in the Netherlands; SCP - Trends in education; SCP - The future of the labour market and social security; SER - Health care in the context of the aging of society; SER - Vision on the future of the debate economy on national and sectoral level; Stichting Weten - exploration of the future on scientific and technical communication; STOOM - Health care; to a organized first line; Strategic foresight on biogeology in the Netherlands; STT - Nanotechnology, towards a molecular construction kit; Dutch STT & RNMO - Beweton Better building and living; a practical foresight; Technology Radar; TNO Automotive - De people mover roadmap; Future perspective of the Netherlands as a guidance country in the year 20XY; TU Delft - ICT at home: trends in ICT in the home environment at 2010; Secondary houses; Universiteit van Nyenrode & Stichting Bevordering Wetenschappelijk Toekomstonderzoek & Stichting Toekomstbeeld der Techniek - The new human being in a future world society; From a logistic turntable to a sustainable service network - the Dutch horticulture cluster in Europe 2020; Vrom en De Rijksgebouwendienst - The future as an inspiration. Scenario's for Public Buildings Affairs; WI - Dutch exploration of energy choices; WI - Choices for sustainability; Wiardi Beckman Stichting - Wiardi Beckman Stichting - Energy in the 21th Century; WRR - Wetenschappelijke Raad voor het Regeringsbeleid - The future of the national state of law; WRR / The state of democracy - Democracy beyond the state; WRR - Challenges for a future media policy; WRR - The Islam in the Netherlands, from a European perspective; WRR - Trends in the media landscape: 4 foresights; IPTS - Future oriented analysis on the main socio-economic challenges that Europe will face: potential impact of research; European Decentralized Generation - DECENT Project: Development of EU policy; Long term scenarios for the Dutch human population; Mobility; NRP - Dutch Climate Options for the Long term - COOL project: Stakeholders' views on 80 percent emission reduction; Population and scenarios: worlds to win?; Potential risks of bio-technology for humanity and the environment; Rabobank Groep Nederland: Build houses with future forecasts in mind; Foresight study about home rights; physical integrity and new methods of investigation; Scenarios for a private medicine market; Shell Scenarios 2025; Vision on the city of Maastricht 2030; Future scenarios for housing and health; US Department of Energy Roadmap for developing accelerator transmutation of waste technology **Poland** (BALTIC+ Project; Cedefop - Scenarios and Strategies for Vocational Education and Training in Europe; FISTERA - Future Prospects in Poland - Scenarios for the Development of the Knowledge Society in Poland; Ministry of Science and Information Society Technologies - Foresight Project in the field Health and life **Portugal** (EC DG Research - TRACK Regional Foresight in Madeira; IPTS - Future oriented analysis on the main socio-economic challenges that Europe will face: potential impact of research; Place's Strategic Foresight: A Look at the Future of the Lisbon Metropolitan Area - LMA; V Technology Foresight for 2000-2020: Engineering and Technology 2000) **Romania** (ForeTech - Technology and Innovation Foresight for Bulgaria and Romania; FP6 SCHOOL Foresight; FISTERA - Future Prospects in Romania - Scenarios for the Development of the Knowledge Society in Romania; INFORSE - Romania Vision 2050 for Sustainable Energy Development) **Slovakia** (INFORSE - Vision 2050. Fossil-Free Slovakia; National Technology Foresight 2015) **Slovenia** (Cedefop - Scenarios and Strategies for Vocational Education and Training in Europe; Ministry of Education, Science and Sport / Chemical Society, Chemical Engineering Section / Chamber of commerce / Ministry of Labour, Family and Social Affairs - Vision and development strategy of chemical & process industries in Slovenia; Ministry of Higher Education, Science and Technology - Technology Foresight in Slovenia; Slovenian National Technological Foresight) **Spain** (TRACK Regional Foresight in Canary Islands; IPTS - Future oriented analysis on the main socio-economic challenges that Europe will face: potential impact of research; Europe - Strategic capacities in Europe in 10 years in relation with budgetary perspectives; Fondazione Rosselli - FoMoFo: Four Motor Foresight - Lombardy; French CNAM - The future of Pays Basque; Catalonia 2010: Mediterranean Foresight; Galicia Government / OPTI - Marine Technologies: Observation and Control / The future of Fishing Technologies / Transformation Industry for Sea Products / Aquaculture; Guipuzkoa Government - Scenarios 2020: Four Possible Futures for Gipuzkoa; Regional Government of Madrid - Madrid 2015; Regional Government of Murcia / OPTI (Ministry of Industry) - TICarm: ICT in the region of Murcia ; Ministry of Industry - The Spanish Renewable Energy Plan 2005-2010; OPTI (Ministry of Industry): Chemistry Foresight / Agro-Food Foresight / Biotechnology Foresight for the Region of Murcia / The Impact of Biotechnology on Health / The Impact of Biotechnology on Agriculture, Farming and Forestry / Energy Foresight and Technology Trends / Tourism Scenarios / First Technology Foresight Program / Environment Foresight / Civil Construction Technology Foresight / Programme of Industrial Technological Foresight / Foresight on Formulation Chemistry / Second Technology Foresight Program / Spanish Nuclear Energy Futures 2030 / Technologies for Design and Production / ICT Foresight / The Impact of New Technologies on Communication Media / Third Technology Foresight Program / Transport Foresight / Biomaterials Foresight / FENIN - Minimal Invasive Surgery Foresight / ASCAMM - Micro technologies and Microsystems / INASMET - Materials for Transport and Energy) **Sweden** (FP6 SCHOOL Foresight; IPTS - Future oriented analysis on the main socio-economic challenges that Europe will face: potential impact of research; Baltic STRING Region Project; BALTIC+ Project; Norden Nordisk Innovations Centre - FOBIS: Nordic Foresight



Biomedica Sensors; Nordic Energy Research / Nordic Innovation Centre - H2 Energy Foresight; Nordic Innovation Centre - ICT Foresight; Academy of Engineering Sciences IVA - Energy Foresight Sweden in Europe; Swedish Technology Foresight) **UK** (Europe - Strategic capacities in Europe in 10 years in relation with budgetary perspectives; Cedefop - Scenarios and Strategies for Vocational Education and Training in Europe; International - Greenpeace Environmental Trust - Future technologies, today's choices; International Ernst and Young - Winners and losers, the future of online betting; IPTS - Future oriented analysis on the main socio-economic challenges that Europe will face: potential impact of research; Manchester City-Region 2020; Nanoscience and nanotechnologies: opportunities and uncertainties; Northern Ireland Foresight eBusiness Report; Riding the rapids: Urban life in an age of complexity; South-West Scenarios 2026; Sustainability literacy - knowledge and skills for the future; Edinburgh 2020; Glasgow 2020; National Foresight: Manufacturing: We can make it better. Final Report Manufacturing 2020 Panel; BBSRC Bioscience for Society: a ten year vision; British Cement Association - A Carbon Strategy for the Cement Industry; Building Futures: Housing Futures 2024 / The professionals' choice; the future of the built environment professions / The urban futures game / 2020 Vision - Our Future Healthcare Environments / 21st century libraries. Changing forms, changing futures / 21st century schools; Learning environments of the future; Countryside Agency - The State of the Countryside 2020; UK DEFRA: Climate Change Scenarios for the UK / Community Action 2020 / Current and Future Deer Management Options / Consultation on policy for the long term management of solid low level radioactive waste / Energy: Biomass Task Force / Feral wild boar in England: Implications of future management options / First Report of Sustainable Farming and Food Research Priorities Group / Fresh Start: Changing Times. Farmer's Options for the Future / Future Strategies for the English Farmed Trout Industry / Global Warming - Looking Beyond Kyoto / Horizon Scanning Programme / Industrial Sector Carbon Dioxide / Science Forward look 2004 -2013 / The Future of the UK Food Chain / The Future of UK Dairy Farming / Climate Change and Demand for Water; Department of Transport: Future Vehicle Emission Standards - 2010 and Beyond / The Future of Air Transport; DTI: Financing the Enterprise Society: Financial Services for Small and Mid-sized Enterprises in 2010 / Industrial Biotechnology: Delivering Sustainability and Competitiveness / Information Relationships Report / Our Energy Challenge / Strategy 2010 - Report by the Economic Development Strategy Review Steering Group; Forum for the Future: Financing the Future: The role of the UK financial services in sustainable development / Vision for the sustainable production and use of chemicals; London Connects: Future Strategy 2006; HABIA - Skills Foresight Report 2002; Health and Safety Executive's Horizon Scanning; Health Protection Agency 2004-2009; Henley Centre - Benchmarking UK Strategic Futures Work; Institute of Innovation Research - IoR - Contribution of Universities to the knowledge capital: A scenario of success for 2008; Institute of Materials, Minerals and Mining - Foresight document on adhesives; Local Government Association - NHS - Sainsbury Centre for Mental Health - Association of Directors of Social Services: The Future of Mental Health - A Vision for 2015; Local Strategic partnerships - Shaping their future; Making a world of difference - Cultural Relations in 2010; Ministry for Skills and Vocational Education Construction Skills Foresight Report; Nanotechnology in Northern Ireland An Imperative for Action; National Technology Foresight: Ageing Population Panel - The Impact of Demographic Change / @ Your Home. New Markets for Customer Service and Delivery / A Chemicals Renaissance / A survey of spin-out and start-up companies in the materials sector / Aerospace Manufacturing 2020 / Agriculture in the UK - its Role and Challenge / Brain Science, Addiction and Drugs / Cognitive Systems / Constructing the Future - Built Environment and Transport Panel Construction Associate Programme / Crime Prevention Panel - Just Around the Corner, A consultation document / Cyber Trust and Crime Prevention / Detection and Identification of Infectious Diseases / Energy for Tomorrow - Powering the 21st Century / Energy Futures Task Force Fuelling the Future A consultation document / Exploiting the Electromagnetic Spectrum / Flood and Coastal Defence / Foresight Futures 2020 Revised Scenarios and Guidance / Functional materials - Future directions / Future of learning - Consultation Document / Health Care 2020 / Intelligent Infrastructure Systems / ITEC Group Report - Information, Communications and Media Panel / Let's Get Digital / Mapping out the future for the road ahead - Materials Foresight / Materials: Shaping our Society / New materials that will shape our future / Obesity / Priority Topics for Future Biomaterials Development / Smart materials for the 21st Century / The (R)etail (R)evolution: From a nation of shopkeepers to a world of opportunities / The Age Shift -Priorities for action / The Future of Financial Services / Towards more sustainable decisions; Northern Ireland Ageing Population Panel Report 2001; Northern Ireland Economic Development Forum - Working Together for a Stronger Economy; Northern Ireland response to Technology Foresight progress through partnership - Software Panel; Nuclear Energy - The Future Climate; ODP/Defra sustainability impact study of additional housing scenarios in England; OST: North East England regional foresight / Research Councils: Large Facilities Roadmap / Intelligent Infrastructure Futures Scenarios Toward 2055; Proudman Oceanographic Laboratory - Coastal Defence Vulnerability 2075; Regional Futures: England's regions in 2030; Forward look at 2020 Housing - Issue Group Report; Royal Academy of Engineering - Transport 2050: The route to sustainable wealth creation; Scotland Science Strategy; Scottish Executive Health Department Cancer Scenarios; Shell Scenarios 2025; Society of British Aerospace Companies: Air Travel - Greener by Design - The Challenge; Strategy for radioactive discharges; Tyndall Centre for Climate Change: Electricity Scenarios for 2050 / UK Hydrogen Futures 2050; University of Cambridge - Cambridge Futures; Wellcome Trust - Genetics and Health: Visions for the Future; Wessex Water - The Sustainable Vision; Young Foresight; Manchester Airport Development Strategy to 2015; Northern Ireland Industrial Research and Technology Unit - IRTU - The Foresight eBusiness Report; Scotland's Renewable Energy Potential - Beyond 2010).

Foresight programmes and exercises in the rest of the World

Africa (A View of the EU, FAO & African Development Bank to 2020; Long-Term Prospects for Africa's Agricultural Development and Food Security; IFPRI - Full Food Basket for Africa by 2020; IFPRI - Assuring Food and Nutrition Security in Africa 2020; Nigeria - Vision 2010; US NIC 2020 Project - Africa in 2020; IFPRI - Alternative Scenarios for Ugandan Coffee to 2020; UNAIDS - AIDS in Africa: Three scenarios to 2025; The French foreign affair department on the African foresight initiatives; UNDP - Development Planning and HIV-AIDS in sub-Saharan Africa) **Armenia** (Armenia 2020 Scenarios Book) **Asia** (IFPRI - The Future of Fish - Issues and Trends to 2020; APEC: DNA Analysis for Human Health in the Post Genomics Era / Nanotechnology: The Technology for the 21st Century / Healthy Futures for APEC / Sustainable Transport for APEC / Technology for learning and culture in 2010 / The Future of APEC / Water Supply and Management in the APEC region / Alternative Development Scenarios for Electricity and Transport; Japan Science Council - The Future Society; Japan's Goals in the 21st Century) **Australia** (Australian Business Foundation Alternative Futures - Scenarios for Business in Australia to the year 2015; Review of Wind Energy opportunities in Australia and regional markets; Australia Business Council - Aspire Australia 2025; New Zealand MoRST Blueprint for Change; Australia's National Strategy for Vocational Education and Training; Murray-Darling Basin Ministerial Council (Australia) - Basin Salinity Management Strategy 2001-2015; Australian Wine Foundation - Australia Wine 2025; Australian Department of Immigration and Multicultural and Indigenous Affairs - Future Dilemmas: Options for 2050 for Australia's population, technology, resources and environment; Long-term housing futures for Australia: Using foresight to explore alternative visions and choices; Medium and long-term projections of housing needs in Australia; Sustainability and housing, more than a roof over head; Australian Science and Technology Council (ASTEC) - Matching science and technology to future needs 2010; Smart Internet 2010; Australian Cooperative Research Centre for Construction Innovation - Construction 2020: A Vision for Australia's Property and Construction Industry) **Brazil** (MIDIC: Foresight on Productive Chains: Civil construction; MIDIC: Foresight on Productive Chains: Wood and Furniture; MIDIC: Foresight on Productive Chains: Plastics Transformation; MIDIC: Foresight on Productive Chains: Textile and Garment; FINEP-CGEE Foresight on Climate Change; CGEE: Foresight on Energy; CGEE: Foresight on Biotechnology; CGEE: Foresight on Nanotechnology; CGEE: Foresight on Bio-fuel) **Canada** (Looking Forward: S&T for the 21st Century; Canadian Government - The Future of



Healthcare in Canada; Canadian National Energy Board: Canada's Energy Future; The College of Family Physicians in Canada - Family Medicine in Canada: Vision for the Future; Toward 2025 - Assessing Ontario's Long-Term Outlook; Canada Government - Future needs for medical images in health care in Canada; Canada Image analysis and visualization; Canada Image generation and capture Roadmap; Science and Technology Foresight Pilot Project; Technology Foresight Pilot Project: BioSystemics; The Big Down: from genomes to atoms) **China** (China's Technology Foresight Report 2003; China's Technology Foresight Report 2005; Ministry of Science and Technology China's Hydrogen Vision; International Food Policy Research Institute IFPRI - The Future of Fish - Issues and Trends to 2020) **Colombia** (World Bank and Colombian Governmental Planning authority for Mines and Energy (UPME) - Energy Scenarios for Colombia; COLCIENCIAS: Colombian Biotechnology Foresight 2015) **India** (India Centre for Policy Research - Indian Demographic Scenario 2025; Indian Government - India Vision 2020; Indian Government - Vision for Biotechnology; Deutsche Bank Research: India Rising - A medium-term perspective; Indian TERI / IPCC - Renewable Energy Sources: Future Prospects for Developing Countries) **Japan** (Microsystems research in Japan; 8th Japanese Foresight; US / NSF - The Future of Data Storage Technologies; US National Science Foundation - International Assessment of Research and Development in Robotics; Japan Climate Change earth simulations; Japan Human Resources and Recruiting 2015; Japan's Energy Future; 7th Japanese Foresight; CEFP - Japan's 21st Century Vision; CEFP - Japan's 21st Century: Toward the Realization of a Dynamic, Stable Society; CEFP - Japan's 21st Century: Competing over the long run. Fostering cultural creativity, transfer of skills and individual abilities; CEFP - Japan's 21st Century: Creating Policies Aimed at Diverse Regional Communities and a Mature National Life; CEFP - Japan's 21st Century: Creating an Influential Nation Without Walls; Japanese Tokyo Institute of Engineering and Innovation - Go Japan 2002; Japan Business Federation - The Keidanren Vision 2007; Japanese Ministry of Economy Trade and Industry - Energy Technology Vision 2100; Japan Atomic Industrial Forum - Atomic energy in 2050: vision and roadmap; Japan after 50 years; Japanese Optoelectronic Industry and Technology Development Association - Optical technology Roadmap; Japanese Ministry of Internal Affairs and Communications - Towards Ubiquitous Networking; Japanese Ministry of Internal Affairs and Communications - U-Japan; Japan Health Science Foundation - Future trends in health and medical care over the next two decades; Japanese Ministry of Land Infrastructure and Transport - Scenarios on the shape of Japan in 2030; Japan NEDO - Strategic Technology Roadmap; Japan Science Council - The Future Society; Japan's Goals in the 21st Century; Japan Science and Technology Agency; JST - Virtual Science Center) **New Zealand** (New Zealand Ministry of Housing - Building the Future: Towards a New Zealand Housing Strategy) **Peru** (Pilot Foresight on Biotechnology; Pilot Foresight on Energy; Pilot Foresight on Hydro-biological Products; Pilot Foresight on Key Areas for 2020; Pilot Foresight on Materials; Pilot Foresight on Textiles) **Saudi Arabia** (Saudi Arabia to 2020) **South Korea** (Korean STEPI Technology Foresight 2004; US National Science Foundation - International Assessment of Research and Development in Robotics) **Southwest Pacific** (APEC - DNA Analysis for Human Health in the Post Genomics Era; APEC - Nanotechnology: The Technology for the 21st Century; APEC - Healthy Futures for APEC Megacities; APEC - Sustainable Transport for APEC Megacities; APEC - Technology for learning and culture in 2010; APEC - The Future of APEC Megacities; APEC - Water Supply and Management in the APEC region; APEC - Alternative Development Scenarios for Electricity and Transport) **Turkey** (Turkish Science Policy, 1983-2003; Research Foresight for Life Sciences and Technologies; Turkish National Information Infrastructure Master Plan (TUENA); TUBITAK - Vision 2023 Turkish National Foresight - Construction and Infrastructure Panel; TUBITAK - Vision 2023 - Turkish National Technology Foresight Project; Turkish Gebze High Technology Institute & Kocaeli Chamber of Industry - Technology Foresight for Industry in Kocaeli, Turkey) **USA** (MIT - The Future of Nuclear Power; Sandia Report - 2020 Vision Project; US Pew Internet & American Life Project - The Future of the Internet; US - International Bridge, Tunnel and Turnpike Association IBTTA - Forum on the Future of Highway Transportation in America; ORNL Bioenergy Feedstock Development Program: Biofuels from Switchgrass; US Naval Studies Board - Autonomous Vehicles in Support of Naval; US - Daily Life in 2050 New York - Vignettes from the Future; US Census Bureau - Population Projections 2025; US City of Bend - 2030: Community Trends Report; US Department of Defense - UAS Roadmap 2005; US Metro Atlanta / Chamber of Commerce- Future for Metro Atlanta; US Government in 2020: Taking the Long View; Microsoft Vision for Lifelong Learning - Year 2020; US Mack Center for Technological Innovation - The Future of Bioscience; US Energy Scenarios for the 21st Century; US Ford Foundation - California Water 2020; US Bureau of Health Professions (BHP): Changing Demographics - Implications for Physicians Nurses and Other Health Workers; US Prior City Council - 2030 Vision and Strategic Plan; OECD - Energy Scenarios to 2050; World Business Council for Sustainable Development - Biotechnology Scenarios 2000-2050; World Resources Institute WRI - Diverging Paths: What future for export credit agencies in development finance?; New York City 2005 - 2030 Regional Transportation Plan; US Federal Highway Administration - Destination 2030; US Department of Energy DOE - Vision for Bioenergy & Biobased Products in the United States; Sarasota 2025; US / Microsystems research in Japan; US Ceramics Association Advanced Ceramics Roadmap; US Aluminum Association: Industry Technology Roadmap / Industry Roadmap for the Automotive Market, enabling technologies and challenges for body structures and closures / Industry Vision, sustainable solutions for a dynamic world / Metal Matrix Composites Consortium Technology Roadmap; Institute of the Future - Health Horizons Program: Boomers in transition: The Future of Aging and Health; Institute for the Future - Changing Communication Strategies, new roles for e-mail; Institute of the Future - Diffusion of Innovation in health care; US Office of Energy Efficiency and Renewable Energy - E-Vision 2000, key issues that will shape our energy future; US National Mining Association - Education Roadmap for mining professionals; US Electricity Technology Roadmap; Meeting the Critical Challenges of the 21st Century; Institute for the Future - Engaged Consumers in health and health care; US National Mining Association - Exploration and Mining Technology Roadmap; US Department of Energy and Glass Industry - Glass: a clear vision for a bright future; Institute For The Future - Health and Health Care, the forecast, the challenge; US Aluminum Association - Inert Anode Roadmap; Map of the Decade; Mineral Processing Technology Roadmap; Mining Industry Roadmap for Crosscutting Technologies; Naval Transformation Roadmap 2003, Assured Access & Power Projection... From The Sea; New biocatalysts, essential tools for a sustainable 21st century chemical industry; New Consumer, New Genetics, Seven Scenarios; US Potomac Institute - Out of the box and into the future: a dialogue between war fighters and scientists on far-future warfare; US Concrete Industry - Roadmap 2030; Roadmap for biomass technologies in the United States; Robotics and intelligent machines: a DOE critical technology roadmap; Solar Electric Power - The US Photovoltaic Industry Roadmap; Steel Industry Technology Roadmap: barriers and pathways for yield improvements; Technology in Daily Life: A spotlight on entertainment; Technology Roadmap for Bauxite Residue Treatment and Utilization; Technology Roadmap for computational Chemistry; Technology Roadmap for Computational Fluid Dynamics; US National Mining Association - The Future begins with mining, a vision of the mining industry of the future; Global Business Network - The Future of Independent Media; US National Intelligence Council - The Global Technology Revolution, bio/nano/materials trends and their synergies with information technology by 2015; US White House OSTP - The Roadmap for the revitalization of High-End Computing; US Department of Energy and US Department of Agriculture - The Technology Roadmap for plant/crop-based renewable resources 2020; US Secretary of Defense - US Air Force Transformation Flight Plan; US Department of Defence - Army Transformation Roadmap; US White House OSTP Policy - Vision 2020: Technology Roadmap for Materials; US Government / Chemical Companies - Vision 2020: New Process Technology Roadmap; US Department for Energy DOE - Vision 2020: Process Measurement and Control: Industry Needs; US Department of Energy DOE - Vision 2020: Reaction Engineering Roadmap; Roadmap for Process Equipment materials Technology - Vision 2020; US Department of Energy DOE - Vision 2020: Separations Roadmap; US Department of Energy DOE - Vision 2020: Technology Roadmap for Materials of Construction, Operation and Maintenance in the Chemical Process Industries; US National Science and Technology Council - Vision for Nanotechnology R&D in the Next Decade; US Fannie Mae Foundation - Fair growth 2020: A tale of four futures, Housing facts and findings; US Department of Energy National Vision of America's Transition to a Hydrogen Economy - To 2030 and

global foresight outlook 2007

Beyond; Propane Vision Technology Roadmap; National Hydrogen Energy Roadmap; National Electric Delivery Technologies Roadmap; US DOE - GRID 2030 A National Vision for Electricity's Second 100 Years; US Department of Energy Coated Conductor Technology Development Roadmap; National Combined Heat and Power Roadmap; California Energy Commission - Energy Efficiency Roadmap for petroleum refineries in California; Oil heat Industry technology Roadmap; Plant-Crop based renewable resources 2020; US Department of Energy DOE - The Micro CHP (micro-combined heat and power systems) Technologies Roadmap; Technology Roadmap for Productive Nanosystems; US National Renewable Energy Laboratory - Industrial Material for the Future. R&D Priorities; Institute of the Future - Genetics and Genomics: Transforming Health and Health Care; US Department of Energy DOE - Industrial Wireless Technology for the 21st Century; US National Intelligence Council - The global course of the information revolution: Technological Trends; US / Japan National Science Foundation NSF - The Future of Data Storage Technologies; Pathways for enhanced integrity, reliability and deliverability; US Department of Energy Roadmap for developing accelerator transmutation of waste technology; US National Ocean Service - Coastal Futures 2025; US National Science Foundation - International Assessment of Research and Development in Robotics; US Department of Energy - Chemical Industry R&D Roadmap for Nanomaterials By Design - Chemical Industry Vision 2020; Europeans Future Observatory - America 2025) **Venezuela** (UNEFM: Foresight on the Academic Sector - UNEFM 2020; UCV: Foresight for the Vargas State; MCT: Foresight on Agriculture – Yucca in Gondola; UC: Foresight on Carabobo Region; MCT: Foresight on Housing & Habitat; Foresight on UNARE Region; ICS-UNIDO-UCV: Piloting GIS on Delphi).

10. Epilogue

The EFMN now collected initiatives for two years. We trust that in the coming years more initiatives will be collected and the data presented will tell us more about future studies in Europe and the rest of the world. In 2008, more emphasis will be given to quality control and initiatives of countries that at this moment are barely addressed. All readers are invited to provide information about missing foresight studies.

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More information is provided at <http://www.efmn.eu>