erawatch

Strategic Governance of R&D Related Policies

Katy Whitelegg, Matthias Weber

Austrian Research Centers - systems research

Reinhold Hofer, Wolfgang Polt

Joanneum Research - Institute for Technology and Regional Policy

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1 -   Executive summary

Background
The project "Strategic governance of R&D related policies in the EU" aims to form a better understanding of strategic governance in R&D related policies. The project is divided into two parts, a first part that develops a typology for assessing strategic governance in the EU Member States and a second part that looks in more detail into three case studies on strategic governance. This report is the final project report. The report first of all summarises the conceptual design of the project and the definitions used for strategic governance and strategic governance in R&D policy. It then describes the process and the results of developing a typology for strategic governance and classifying the Member States. It subsequently integrates the findings from the case studies in order to assess the usefulness of the concept and to draw conclusions on strategic governance in EU Member States.

Definition of strategic governance
Strategic governance is a normative concept that is based on a belief that making sure a governance system functions in a particular way (long-term, responsive and integrative) and will improve policy making. Strategic governance can be described as a governance system that is able to respond effectively to changes in circumstances by the development of long-term visions and the formulation and implementation of higher-order policy goals. This definition can be broken down into the following four attributes: strategic scope of objectives, ability of governance structures to design and implement strategic and holistic policies, responsiveness, inclusiveness and quality assurance.

Model of strategic governance in R&D policy
The model of strategic governance in R&D policy developed during the project allows us to map the four elements of strategic governance onto a stylised model of a research and innovation system. The model allows us to turn the somewhat abstract elements of strategic governance into concrete mechanisms and relationships in R&D policy.

Framework for a typology of strategic governance
The classification of EU Member States first needs a framework. The framework aims to match the definition of strategic governance and the model of strategic governance in R&D policy with concrete indicators for strategic governance in R&D related policies. The indicators were developed through a mixture of top-down criteria from the definition and bottom-up criteria from the ERAWATCH Research Inventory.

Typology Approaches
The completed typology framework encompasses a large amount of information on individual aspects of strategic governance across the EU Member States. We followed two ways of reducing the complexity. The first we have called a top-down approach and involves condensing the information in the framework to a series of yes and no answers to see if any patterns emerge. The second approach we have called a bottom-up approach and involves making short summaries of the strategic governance systems in each of the Member States based on the information in the framework.

Summaries of strategic governance in the EU Member States

The summaries have been written using the four elements (strategic scope, the ability of R&D system to design and implement strategic policies, responsiveness and quality assurance within the R&D system of strategic governance) as a basis. They present on a few pages the way in which these issues are dealt with in the different EU Member States. We have used the statements in them as the basis for the typology.

Parameters for the typology

To design the parameters for the classification we went back to the four dimensions of strategic governance in the framework (strategic scope, the ability of R&D system to design and implement strategic policies, responsiveness and quality assurance within the R&D system of strategic governance) and for each dimension defined one characteristic that would allow us to capture that particular element in a Member State.

- Ability = Types of co-ordination mechanisms
- Responsiveness = the involvement of stakeholders in the R&D governance system
- Quality = the level of Evaluation in the R&D governance system

Scope could not be included as there was no single characteristic for defining it.

We subsequently drew three grids or pictures each using two of the parameters and plotted the Member States according to the parameters. We ended up with three pictures.

Pictures of strategic governance

The pictures show the state of play in the EU Member States according to the parameters. Of course they also show the strength of the parameters in the Member States. A weak evaluation culture is immediately obvious as is a strong evaluation culture. The stronger a given parameter is the further to the top and to the left a Member State will be positioned. However, this does not mean to say that this Member State is necessarily better than another one, just because it can be found in the top left hand corner in every picture. The question what is better can only be answered by looking at the outcomes and the implementation of policy making in the Member States. Having said this, the classification proposed here does work on the assumption that having certain mechanisms and practises in place should form the basis of a strategic governance system.

Assessing the pictures

The pictures tell a story about elements of strategic governance in the EU Member States. It is a diverse picture with few obvious patterns. There are, however, several groups of countries that have similar trends. FI and IE would appear to have a high level of strategic governance across all parameters. EE and SI also appear to have a high level on all parameters apart form evaluation. There are another set of interesting countries (DE, FR and DK) that appear to have very similar levels of strategic governance. Apart from these three groups, the rest of the countries are widely spread and no clear pattern emerges. However, it is possible from the pictures to get a good overview of where each individual country is positioned.

Classification

The classification therefore is a positioning of the countries according to high, medium and low levels of strategic governance. More detailed information can be found in the description of the pictures.

The results of the typology

The first half of the project Strategic governance of R&D related policies aimed to develop a framework and a typology of the EU Member States. This was successfully achieved, however not with the result that all countries can be divided into a set number of types of strategic governance. The picture is more diverse. However, the results of the typology have lead to a fascinating overview of the elements of strategic governance in the EU Member States.

The case studies

The second half of the project focused on an in depth look at strategic governance in three individual Member States. The case studies allowed us to look behind the scenes at the implementation and design of R&D related policies in the Member States.

Methodology for the case studies

The selection of the cases was based on the following criteria: 'highest category' in the developed typology or countries with implemented changes showing before and after effects; one country should be from new Member States; and lastly something unconventional in dealing with strategic governance in R&D related policies was undertaken.

As there are currently many different projects dealing with forms of governance in R&D related policies (e.g. ERAWATCH intelligence reports, Policy mix project, CREST 3% OMC policy mix peer reviews, INNO-Policy TrendChart reporting and OECD STI Outlook activities), we wanted to avoid repetition of these experiences. Consequently a two-step procedure was followed, firstly scanning and analysing the results and documents from the mentioned attempts from our perspective of the four dimensions, and secondly developing a questionnaire in order to carry out interviews with experts and policy makers in the three countries.

Results from the cases

There were three case studies performed – Denmark, Estonia and United Kingdom – to cover the criteria mentioned above. These cases showed the following patterns:

Denmark: Having implemented the Globalisation Strategy a comprehensive framework was established that included STI policy and created a strategically oriented policy making.

Estonia: Trying to learn from foreign expertise and orienting its policies strongly on the EU's activities (especially implementing the Lisbon goal and taking into account the Structural funds and Framework Programmes for designing STI) gives the overall system a strategic orientation in policy making.

UK: The UK governance system can be considered strategic as it has all the relevant elements (strategic scope, ability, responsiveness and quality) and in addition has a more experimental approach, setting objectives and seeing if they work and if not trying something else.

Conclusions

The conclusions from the project are manifold and interesting:

- All case studies seem to prove that the dimensions of strategic governance that were developed are useful in characterizing the individual Member States;
- Main changes in governance – towards a new 'strategic orientation' – are designed to simplify, coordinate, involve and measure. Even though the focus is different in the countries the objectives are quite similar;
- Even when there are improvements towards more "strategic governance", it is very difficult to measure performance and the impacts on efficiency and effectiveness;
- The role of the EU is different. One can especially acknowledge the EU's influence on new Member States, whilst fewer direct effects on national R&D policy in older Member States can be seen.

2 - Introduction

Trying to improve the formulation and implementation of R&D related policies and trying to find the right kind of structures to carry this out is something that has always concerned the public sector. One of the current focuses of policy makers to try and improve the governance system is on strategic governance as a way of making policy making more long-term and more effective as well as increasing its responsiveness. However, as yet there is no one definition for strategic governance and its meaning seems to change according to the policy context, sector and country. Some countries have been very explicit about the need for strategy at a high level. The UK set up its UK strategy unit to advise government in 2002. Other countries have less visible forms of strategic governance that never-the-less may function in a similar way.

The project "Strategic governance of R&D related policies in the EU" aims to form a better understanding of strategic governance in R&D related policies. The project is divided into two parts, a first part that aims to develop a typology for assessing strategic governance in the EU Member States and a second part that looks in more detail into three case studies. This report contains the results from the project. The report first of all summarises the conceptual design of the project and the definitions used for strategic governance and strategic governance in R&D related policies. It then describes the process and the results of developing a typology for strategic governance and classifying the Member States, followed by an in-depth look at strategic governance case studies. Finally the conclusions include an analysis of the developed typology and the usefulness of the concept, the implications for ERAWATCH web site, the impacts of strategic governance on policy design and the role of EU as driver of strategic governance and consequences for ERA.

3 - Defining strategic governance

The project "strategic governance in R&D related policies" had three main challenges during the first part on the development of a typology. These are:

- Finding a workable definition of strategic governance for our conceptual framework;
- Further developing the conceptual framework from the technical specifications based on our definition of strategic governance and on the categories in the ERAWATCH research inventory;
- Classifying the countries according to the framework

Finding a workable definition of strategic governance was paramount to the success of the project. In order to further develop the typology and define concrete indicators the project needed a firm basis. Although there is not a large amount of literature on strategic governance, some public bodies have already begun to implement strategic governance. We have been able to draw on these for our own definition.

Following the general definition of strategic governance, the next step was to define how this relates to strategic governance of R&D policy. For this purpose we constructed a model and mapped the four elements of strategic governance onto a stylised model of a research and innovation system.

The model of strategic governance in R&D policy allowed us to develop a framework for the typology. The four dimensions of strategic governance were broken down into concrete mechanisms and indicators found in the ERAWATCH research inventory. The operational framework is thus an attempt to combine a top down methodological approach whilst taking the structure and the categories of the ERAWATCH inventory into account. The framework was then filled out with data from the Research Inventory.

The next step was to get from the filled in framework to a typology. Therefore we firstly followed two approaches, while the final approach was a combination of the two.

The following section gives an overview of the different parts of the project to date. It details the conceptual approach towards strategic governance and strategic governance in R&D policy. It also describes the framework for the typology used and the typology.

3.1 Literature on strategic governance

Everybody talks about strategic governance, yet few define in any concrete form what is meant by the concept once it has left the realm of the private sector. Here, concepts such as strategic planning and strategic management have been around for a long time. However, the public sectors use of such concepts is relatively recent. Many people use it without defining its meaning at all and for others it contains different concepts that never get explained in more detail. Having said this there have been several recent attempts by public sector bodies in different countries to try and define and also implement strategic governance. The IPTS (Institute for Prospective Technological Studies), for example, has recently drafted a paper on strategic governance (Kyriakou, 2008). The IPTS working paper on strategic governance briefly defines the term strategic governance and then gives examples of the way in which strategic

governance is implemented in a few European countries. The country descriptions presented in the paper are nicely described and it is clear why the individual countries are classified as having more or less strategic governance. However, that working paper has a different role than this study and does not attempt to break down the concept into smaller components, as we do in this paper, in order to pursue complete typologies.

3.1.1 Strategic governance in the public sector

Other recently attempts from the public sector to define and implement strategic governance can be found in the U.S. and in Australia. One very structured example comes from the Queensland government[1] which developed a two stage processes combined with principles for the implementation of strategic governance. In a first stage they differentiate between strategic governance and agency governance:

Strategic Governance is considered to encompass the processes by which the public sector is managed at a strategic level. Central to strategic governance are the concepts of leadership, authority, accountability, transparency and stewardship. Additional to this is the concept that some agency outputs serve as a "delivery arm" to ensure the efficient, effective and equitable allocation of state funding.

Agency Governance refers to the services internal to agencies which support the particular outputs of the agencies. The requirements for financial, risk management, human resources, systems development and internal review and performance review processes within agencies as outlined within the Financial Management Standard 1997.

Within this framework they have developed the following key principles:

- Strategic Direction;
- Workforce Capability;
- Fiscal, Regulatory and Administrative Framework;
- Accountability; and
- Ethics.
- Parliamentary Process and Protocol

Another example of strategic governance is the RAND Corporation's National Defence Research Institute report for the Office of the Secretary of Defence titled "A Strategic Governance Review for Multi-organizational Systems of Education, Training, and Professional Development" (RAND 2003) aims to provide the U.S. Department of Defence with concepts for clarifying and approaches for evaluating the external governance of education, training, and professional development (ET&D) providers serving DoD uses the following concept for its governance review. The RAND report splits the governance review into two parts: a structural analysis and an implementation audit. The structural analysis describes existing governance arrangements. It maps the providers and stakeholders, their functions and goals, and the relationships among them are identified. It aims to link system-level goals with governance arrangements and to search for gaps and overlaps. The implementation audit aims to assess governance. It involves checking actual governance practices and evaluating them against effectiveness criteria.

The governance review is carried out in three steps: 1) a conceptual framework defining the types of actors and relationships that will be looked at. 2) A taxonomy and methods for classification and 3) a strategy and methods for evaluating realities.

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[1] http://www.treasury.qld.gov.au/office/knowledge/docs/manage-for-outcomes/mfo-governance.pdf

The criteria for evaluating realities are the following:

- Criterion 1. There Is Evidence that System Outcomes Are Being Defined, Measured, and Evaluated Relative to Goals;

- Criterion 2. There Is Evidence that Providers, Intermediaries, and Key Stakeholders Are Communicating Frequently and Transparently;

- Criterion 3. There Is Evidence that Providers and Intermediaries Are Responsive to Key Stakeholder Guidance; and

- Criterion 4. There Is Evidence that Key Stakeholders are Being Satisfied.

There are other examples of public sector organisations trying to define strategic learning such as Randstad, Holland. The following definition of what the term strategic means comes from the area of spatial planning (Salet 2007):

- Permanent exploration of wider horizon;
- Crossing borders of scales, time paths and sectors;
- Integrating regional systems; and
- Integrating policy sectors.

In this definition strategic refers not to the policy areas itself, but to the ability of a policy area to look and act beyond its own borders.

3.1.2 Academic studies on strategic governance

The academic world has so far occupied itself little with the concept of strategic governance in the public sector. That is apart from a few isolated individuals including Geoff Gallop (former Premier of Western Australia) from the Graduate school of governance at the University of Sydney. He is also one of the few people who has looked at why strategic governance is becoming more popular. According to him (Gallop 2006), two separate developments have increased the necessity for some kind of joined-up thinking not just within one country but also between countries. The first development is the increase in issues such as terrorism and global warming. Such issues require a response across policy areas and countries. The other development is the return of a stronger approach to the role of the public sector. During the last two years of the 20th century new public management heavily influenced the role of the public sector and in many ways reduced the role of the state. Gallop suggests that issues such as terrorism and global warming have led to the need for a strong and more strategic form of governance as a reply to the weaker role it played under the new public management paradigm.

Another academic Martin Potůček (Centre for Social and Economic Strategies, Charles University in Prague) has looked at the emergence of strategic governance in Central and Eastern Europe (Potůček 2006). He defines strategic governance as:

- The capacity to foresee the long-term potential future developments and thus be able to react to them in an anticipatory way;

- The capacity to induce important changes compared with the way society has been functioning in the past; and

- The negotiated outcome of many interacting policy actors and processes, and called the 'emergent strategies'.

3.1.3 Strategic governance in R&D related policies

There are many documents that occupy themselves with governance in R&D related policies and several recent ones that focus on achieving greater coherence within R&D policy. However, there are few documents that specifically concentrate on strategic governance in R&D related policies. The majority of the documents on governance in R&D related policies focus on defining specific functions of R&D policy and then analysing whether or not these functions are met in a given country. Many of these functions are by definition of a strategic nature even if the term strategic is not explicitly used.

The main difference between the following two examples and the examples given above (on strategic governance) is that the above examples contain strategic elements on all levels whereas the examples below simply define the functions of governance.

One recent attempt to define governance in Austria (Ohler et al 2005) defined the role of governance in R&D related policies as the ability to…….

- Recognise system characteristics (policy intelligence);
- Define the focus and topic of political action (agenda setting);
- To make divers players co-ordinate their activities beyond their policy field (horizontalization);
- To implement policies;
- To learn from past experience or good practice elsewhere; and
- To make adjustments of the whole policy cycle.

The report comes to the conclusion that the aim of governance is policy coherence. Another recent Austrian innovation policy strategy document of the Ministry for Transport, Innovation and Technology "Research and innovation policy for prosperity through social responsibility" (BMVIT 2006) named three functions that innovation policy should fulfil. Firstly is should stimulate innovative activities, secondly it should develop a focused use or direction for research potential and thirdly it should guarantee adaptability within innovation policy. These three functions are narrowly defined according to the responsibilities of an individual ministry. They cannot be applied to an innovation system in its entirety.

3.2 Our approach to defining strategic governance

Strategic governance is a normative concept that is based on a belief that making sure a governance system functions in a particular way (long-term, responsive and integrative) and will improve policy making.

Based on the literature review strategic governance can be described as a governance system that is able to respond effectively to changes in circumstances by the development of long-term visions and the formulation and implementation of higher-order policy goals. This definition can be further broken down into the following four attributes:

- Strategic scope of objectives: this attribute contains several different elements:

  o The first is, being able to set long-term and high-level goals and objectives. However, part of strategic objectives needs also to be not

just the content part but the process of setting and implementing them and therefore this attribute also contains:

- o Setting clear tasks and responsibilities and making them explicit (responsibility and accountability)

- Ability of governance structures to design and implement strategic and holistic policies (co-ordination)

- Responsiveness: this means being able to respond to the needs of different stakeholders but also being able to respond to external changes and to change policies mid-way through if necessary. This can mainly be achieved through:

    - o Inclusiveness as this way the needs of different stakeholders are automatically included in designing and in implementing policies

- Quality assurance: this means the ability to evaluate and to learn from experiences

Strategic governance therefore aims to improve policy making not just by defining strategic goals but by improving the process through which such goals are designed and implemented.

3.3 A model for strategic governance in R&D related policies

Having surveyed the literature on strategic governance and found a definition of four elements that could determine whether a governance system is more or less strategically orientated, the next step is to map these four elements onto a stylised model of a research and innovation system. For this we will need to develop a model of a research and innovation system that allows us to analyse its key strategic elements. The model found below (Figure 1) does just this.

The main rectangle of the model contains in its upper half the R&D policy actors and in its lower half the R&D actors. The circles refer to individual actors in both halves. R&D related policies and programmes are portrayed as the main way in which the two halves interact with each other. Other relevant policy levels and areas are represented outside the rectangle. The only other element, apart from the policies and programmes, which can be found inside the rectangle, is the R&D strategy. This is due to the visioning and co-ordinating function that this type of strategy could play.

The blue oval shapes are elements of strategic governance that can exist in R&D policy. They have been formulated based on the definition of strategic governance described in the part above. Each of the oblongs is numbered. The numbers refer to the following elements of strategic governance:

Strategic scope of policy making

1) Overarching government policy formulation – are there links between R&D policy and an overarching government policy?

2) R&D strategy: does an R&D strategy exist, what does it contain, how is it formulated and how is it evaluated?

Ability of governance structures to design and implement strategic policies

   3a) Is there a formal co-ordination mechanism within R&D policy?

   3b) Do foresight mechanisms or other formal co-ordination mechanisms exist that support the policy making process?

   4a) Does policy co-ordination with EU policy (R&D or structural fund policy) exist?

   4b) Does policy co-ordination with the regional level exist?

   4c) Are there co-ordination mechanisms with other policy areas? (horizontal policy co-ordination) and levels?

Responsiveness of R&D policy

   5) Are stakeholders involved in the design and implementation of policy?

   6) Are mechanisms for anticipating change in place?

Quality assurance of R&D policy

   7) Do evaluations take place which influence the policy process?

The term strategic intelligence does not appear in our definition of strategic governance or in our model of strategic elements of R&D policy. This is because we have broken down strategic intelligence into individual and identifiable elements that are distributed (not always equally) throughout the system. Our approach builds on the concept of distributed intelligence (see Kuhlmann 2001).

Figure 1: Model of elements of strategic governance in R&D policy
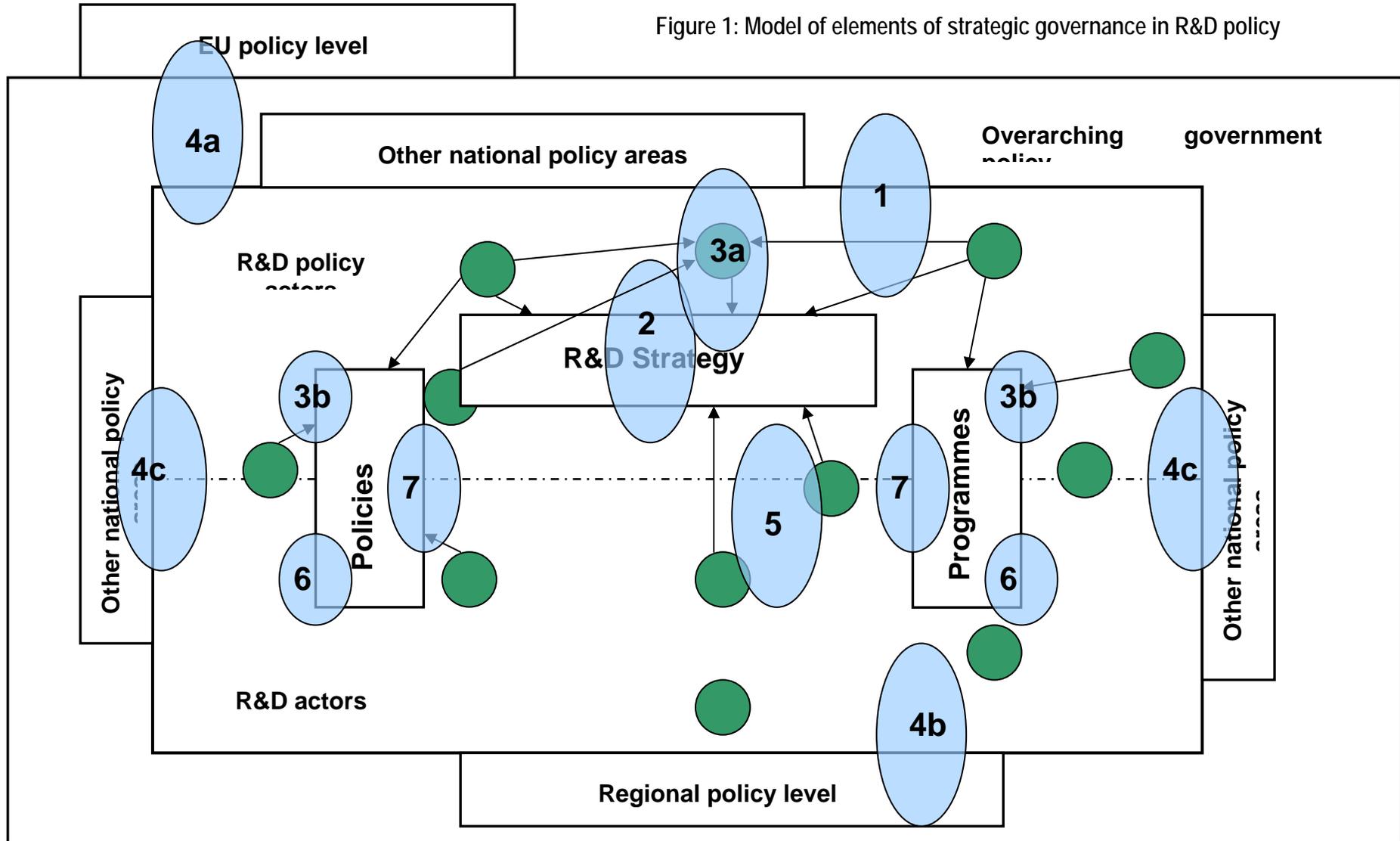
4 - Developing a framework for a typology

So far we have developed a definition of strategic governance and applied it to R&D policy. This has allowed us to develop a top-down and systematic approach to the development of a framework. The next step was to operationalise the model of strategic governance in R&D policy and to create a list of concrete mechanisms and indicators by which to assess the Member States. Before doing this however, it was seen as useful to have a look at the ERAWATCH Research Inventory in order to assess the availability and quality of the information to be used for the typology.

4.1 Screening ERAWATCH Research Inventory for strategic elements

The ERAWATCH inventory was not specifically designed to assess elements of strategic governance. Using the inventory for this purpose requires sifting through the individual elements in the inventory in order to see which ones can be used for the purpose of assessing strategic governance. However, it doesn't just depend on defining the right indicators, there also has to be sufficient information in the database to be able to put into the typology. This is of course very country specific. Some countries provide very careful and detailed accounts of their research and innovation systems whilst other countries fulfil the bare minimum. There are however, some questions that have been categorically not filled in. For instance, and unfortunately for this project, the question concerning the influence of the structural funds has only be filled with weak information in a few cases. The influence of the structural funds was one of the issues that IPTS was specifically interested in.

A first analysis of the ERAWATCH Research Inventory showed that the following categories could be useful for assessing strategic governance in R&D related policies. All of the categories mentioned are those which reveal some form of strategic orientation, co-ordination, reflexiveness or evaluation in the different countries. These include the existence of a specific R&D strategy, the existence of co-ordination bodies with R&D policy, different forms of providing advice and intelligence and the use of evaluation.

There would appear to be a sufficient amount of data in the inventory to be able to complete a typology – at least on the main issues. At the moment though, we have too little information as to the quality of the data.

Elements of the ERAWATCH Research Inventory that could be useful for assessing strategic governance in EU Member States are the following:

Research policy
- Research related policies in other domains

Impact of EU developments
- Lisbon-strategy related activities
- Impact of Structural Funds on Research Funding

- Impact of EU framework programmes

Regional research policies

Policy documents
- Organisations involved

Policy making bodies and mechanisms
- Government policy making and coordination
- Science Policy Advice (institutions and foresight mechanisms)
- Stakeholders in the policy process
- Role of Evaluation

There appeared therefore to be enough information in the ERAWATCH Research Inventory to be able to create a typology.

The final input for the framework for the typology was the table in the IPTS technical specifications outlining a first attempt at defining dimensions for strategic governance in R&D related policies. The technical specifications specified the following two key elements that a framework for the typology should comprise:

- Processes and associated rule sets in policy-making that allow the achievement of long-term goals; and
- Qualitative indicators constructed from the ERAWATCH Research Inventory information.

The table included in the technical specifications operationalises these aims and our approach builds on that outlined in the table.

Our approach, outlined in the following section, builds on the previous elements and attempt to combine the top-down conceptual approach with a more pragmatic look at what the ERAWATCH Research Inventory has to offer.

4.2   Dimensions of the framework

The framework (Table 1) aims to match the definition of strategic governance with concrete indicators for strategic governance in R&D related policies. Having said this, the framework will have to contain aspects that cannot be covered by the ERAWATCH Research Inventory as not all aspects of strategic governance can be covered by the research inventory.

The framework has four columns: Policy dimension, Policy level, Mechanisms and Indicators. Policy Dimension refers to the four dimensions of strategic governance Scope of R&D policy, Coordination of R&D policy, Responsiveness of R&D policy and Quality Assurance of R&D policy. Moving from left to right the dimensions of strategic governance are broken down firstly onto concrete policy levels, then on to individual policy mechanism and finally on to individual indicators that are to a large extent covered by categories found in the ERAWATCH Research Inventory.

The four dimensions of strategic governance have been broken down in a way that can be implemented in terms of R&D related policies.

The first dimension Scope of R&D policy covers the formulation and content of R&D policy. It focuses on explicit and formulated strategies, their content and their formulation. It has three different policy levels: links between R&D related policies and an overarching government policy, explicit R&D strategy formulation and formal coordination mechanisms within R&D related policies. These three categories are then further broken down into concrete mechanisms and indicators that can be found on the right hand side of the table. One of the main focuses of this dimension is on the formulation and the implementation of an explicit R&D strategy. In this way we hope to keep policy separate from governance.

The next dimension is the ability of the governance system to design and implement strategic policies. This dimension focuses on internal and external co-ordination of R&D policy and in particular the influence of other policy areas on the formulation of R&D related policies. The third dimension concerns the responsiveness of R&D policy firstly to respond to the needs of different stakeholders and secondly to react quickly and efficiently to changes in the system. The fourth and final dimension is quality assurance of R&D policy and refers to the ability of the system to reviewing the impact of its policies and learning from them. The first two dimensions can be broken down in to mechanisms and indicators quite easily. The final two dimensions are much more difficult to define as concrete mechanisms and much less easy to find appropriate indicators for in the ERAWATCH Research Inventory.

The framework needs to consist of categories that are concrete. Several projects have proven that in the area of policy coordination and policy coherence there are often few structures that can be formally identified, but that firstly each policy area has different mechanisms and secondly that many of these are of an informal nature.

Table 1: Framework for a typology of strategic governance in R&D policy

Dimension	Elements of policy and governance	Mechanisms	Indicators	Corresponding ERAWATCH label
Strategic scope of policy	Overarching government policy formulation **(1)**	R&D policy is part of general government policy	National 'Lisbon' strategy equivalent	Impact of EU developments - Lisbon-strategy related activities
			Integration of R&D policy into other national policy documents	
	R&D strategy formulation **(2)**	Shared orientation by a specific R&D strategy	National R&D strategy	Important policy documents
		Focus on long-term goals in R&D strategy	Long-term elements in the R&D strategy	Important policy documents
		Comprehensive coverage of the whole policy cycle	Strategy addresses full policy cycle from design to implementation and evaluation	
	R&D strategy formulation–processes **(2)**	Use of foresight processes to formulate strategy	Existence of foresight measures to support formulation of R&D strategy	Main research policy setting mechanism - science policy advice
			Existence of other strategy processes	Main research policy setting mechanism - science policy advice

		Integration of actors in formulating strategy	Types and number of different actors involved in formulating strategy	
	R&D strategy formulation – evaluation **(2)**	Evaluation of strategy	Types and practises of evaluation of strategy	Main research policy setting mechanism - role of evaluation

Dimension	Elements of policy and governance	Mechanisms	Indicators	Corresponding ERAWATCH label
Ability of governance structures to design and implement strategic policies	R&D policy internal co-ordination mechanisms	Advisory bodies and coordination bodies	Permanent R&D advisory body on national level **(3a)**	Main research policy setting mechanism - government policy making and coordination
			Other forms of formal co-ordination mechanisms in the R&D system (bilateral)	Main research policy setting mechanism - government policy making and coordination
			Foresight mechanisms for supporting co-ordination in R&D policy **(3b)**	Main research policy setting mechanism - science policy advice
			Other formal co-ordination mechanisms **(3b)**	Main research policy setting mechanism - science policy advice
	R&D policy external co-	Influence of other policy areas on	Influences of EU framework policy on national R&D policy	Impact of EU developments - Impact of EU framework

			(4a)	programmes
ordination of policy	formulating R&D policy		Influence of structural funds on national R&D Policy **(4a)**	Impact of EU developments - Impact of structural funds on research funding
			Coherence with regional policies **(4b)**	Regional research policy
	Horizontalisation of policy areas with R&D policy	Mechanisms for horizontal co-ordination **(4c)**		Research policy - research related policies in other domains

Dimension	Elements of policy and governance	Mechanisms	Indicators	Corresponding ERAWATCH label
Responsiveness of governance system	Involvement of stakeholders in the policy process	Formal involvement of stakeholders **(5)**	Advisory Councils and co-ordination bodies with stakeholder participation	Main research policy setting mechanisms - stakeholders in the policy process
			Other forms of stakeholder participation	Main research policy setting mechanisms - stakeholders in the policy process
			Public consultations for design and evaluation of R&D related policies	

			Existence of monitoring or intelligence systems (including "horizon scanning" or technology assessment)	
	Responsivenes s to change in system	Mechanisms for anticipating change **(6)**		
Quality Assurance within governance system	Reviewing impact and appropriatenes s of R&D policy	Monitoring and regular evaluation mechanisms **(7)**	Regular evaluation mechanisms, including system evaluations	Main research policy setting mechanism - role of evaluation
			Provision of resources for assessing the applied policy mix	

4.3 Implementing the framework

The framework described above was completed with the relevant data from the ERAWATCH Research Inventory. The individual categories in the framework were filled out for each individual Member State. The following section details the process of analysing the framework.

The data input revealed that there is a large amount of data on elements of strategic governance in the ERAWATCH Research Inventory. Overall, the Inventory is well researched and useful; however, there are several problems we experienced with data. These can be categorised into two groups, general problems experienced with using the ERAWATCH Research Inventory and specific problems related to using the EARWATCH Research Inventory for this project.

General ERAWATCH Problems:

- Comparison of information difficult due to the fact that the information on some countries is just on research policy and in others it includes research and innovation policy. This occurs especially where there is no formal split between research and innovation policy (UK).
- Often the categories require analysis and not fact. In such cases the experience of the country correspondent plays an important role. Less experienced correspondents are unable to give an adequate answer. For example, the category impact of EU policy required an in depth knowledge of the relationship between EU and national policy.
- Some of the categories were only filled in by very few country correspondents – for example, the category influence of the structural funds was filled in for very few country states even if it would have been relevant for that country.
- The ERAWATCH categories were understood differently by different country correspondents and the information is not comparable – for example the category stakeholder is often understood differently
- Some of the initial categories on research policy and current trends are so similar to each other that each country correspondent allocated the information in their own way. To find a specific piece of information it was necessary to click around.

Problems related to this specific project:

- In some cases the data in the Inventory was not in sufficient detail for our purpose. For example the category on stakeholders asked about the type of stakeholders involved in the policy making process. Often the answers were quite unspecific about exactly which groups (industry, academia etc.) were involved.
- The data base focuses on facts and not on processes. This project's focus is on both structures and processes. The ERAWATCH Research Inventory does not provide information on processes. For example: it would have been interesting to know about the links between different documents, or parts of the system. For instance in most of the older Member States it is hard to find anything out about the relationship between the national Lisbon strategies and national policy setting.

- Looking at processes also requires looking at how things change. Although some elements of the Inventory included some time of temporal analysis, it was often difficult for us to know how things fitted together.

5 - Testing different approaches for the typology

The completed typology framework encompasses an enormous amount of information on individual aspects of strategic governance across the EU Member States. The next step was to reduce the complexity of the framework in order to be able to develop a classification system. There are two obvious ways of reducing the complexity. The first we have called a top-down approach and involves condensing the information in the framework to a series of yes and no answers to see if any patterns emerge. The second approach we have called a bottom-up approach and involves making short summaries of the strategic governance systems in each of the Member States based on the information in the framework. Both the approaches have their strengths and weaknesses and this section of the report will elaborate on which of the two provides the better basis for answering the questions set in this project.

5.1 Assessing different approaches: The top down approach

The top down approach for developing a typology for strategic governance involved reducing the amount of information in the framework to a shorter number of categories with yes and no answers. The shorter number of answers was easily arrived at due to the fact that not all the categories were completed in the framework (see Table 2: Indicators for the top-down approach below). For the top-down approach we took the twelve most complete categories, placed them into a table with space for a yes/no or in some cases several answer. The result can be seen in Table 3: Top-down typology - first results below. They are displayed with the Member States in alphabetical order.

Table 3: Top-down typology - first results gives an overview of whether or not specific elements of strategic governance can be found in certain countries. Looking at the overview table there are no immediate patterns or surprises that jump out. The only category that is obviously redundant is the impact of EU policy as every Member State claims that it has an influence. This category refers to the existence of a Lisbon strategy which there is in every country as it was obligatory to develop one. Through further analysis, including looking at combinations pf different categories and different countries we tried to find patterns or groupings of countries. However, apart from saying that certain elements existed in certain countries and not others this form of assessment did not deliver the type of analysis necessary to develop a useful typology.

Table 2: Indicators for the top-down approach

Indicator	ERAWATCH label	interests	scales/content
National 'Lisbon' strategy equivalent	Impact of EU developments - Lisbon-strategy related activities	Impact EU	yes/no
Integration of R&D policy into other national policy documents			
Existence of a national R&D strategy	Important policy documents - select!	policy documents/national R&D strategy und long-term elements	yes/no - timeframe (process)
Long-term elements in the R&D strategy	Important policy documents - select!		
Strategy addresses full policy cycle from design to implementation and evaluation			
Existence of foresight measures to support formulation of R&D strategy	Main research policy setting mechanism - science policy advice	Science policy advice/Foresight	yes/no
Existence of other strategy processes	Main research policy setting mechanism - science policy advice		
Types and number of different actors involved in formulating strategy			
Types and practices of strategy evaluation	Main research policy setting mechanism - role of evaluation		
Permanent R&D advisory body on national level	Main research policy setting mechanism - government policy making and coordination	advisory bodies	yes/no/several - advising, coordination, decision-making power
Other forms of formal co-ordination mechanisms in the R&D sytem (bilateral)	Main research policy setting mechanism - government policy making and coordination	coordination mechanism - other	yes/no/several - advising, coordination, decision-making power
Foresight mechanisms for supporting co-ordination in R&D policy	Main research policy setting mechanism - science policy advice	foresight	yes/no
Influences of EU framework policy on national R&D policy	Impact of EU developments - Impact of EU framework programmes	EU programs impact	yes/no - how?
Influence of structural funds on national R&D policy	Impact of EU developments - Impact of structural funds on research funding	structural funds impact	yes/no - how?
Coherence with regional policies		regional policy	importance/coordination
	Research policy - research related policies in other domains	horizontal coordination	special measures
Advisory Councils and co-ordination bodies with stakeholder participation	Main research policy setting mechanisms - stakeholders in the policy process	stakeholder participation in advisory councils	who
Other forms of stakeholder participation	Main research policy setting mechanisms - stakeholders in the policy process	stakeholder participation - other mechanism	which
Public consultations for design and evaluation of R&D policies			
Existence of monitoring systems (including 'horzon scanning')			
Regular evaluation mechanisms, including system evaluations	Main research policy setting mechanism - role of evaluation	evaluation	yes/no - level - systematic?

Table 3: Top-down typology - first results

	Impact EU	policy documents/national R&D strategy und long-term elements (time limits)	Science policy advice/Foresight	advisory bodies	coordination mechanism - other	foresight	EU programs impact	structural funds impact	regional policy	stakeholder participation in advisory councils	stakeholder participation - other mechanism	evaluation
Austria	yes	no	no	several	no	no	yes	no	yes	yes		yes
Belgium	yes	partly	yes	several	several	yes	yes	no	yes	yes	yes	yes
Bulgaria	yes	yes	no	several	no	no	yes	??	no	yes		no
Cyprus	yes	yes	no	yes	??	no	yes	??	no	no	yes	no
Czech Republic	yes	yes	yes	yes	no	yes	??	??	no	yes		yes
Denmark	yes	no	yes	several	yes	yes	yes	no	yes	yes	yes	yes
Estonia	yes	yes	no	yes	??	no	??	yes	no	yes	no	yes
Finland	yes	no	no	yes	no	yes	yes	??	no	yes	yes	yes
France	yes	no	no	several	several	no	yes	no	yes	no	yes	yes
Germany	yes	partly	no	yes	several	yes	no	no	yes	yes	yes	yes
Greece	yes	yes	no	yes	no	yes			no	no		yes
Hungary	yes	yes	yes	several	??	yes	??	yes	no	yes	yes	yes
Ireland	yes	yes	no	yes	yes	yes	yes		no		yes	yes
Italy	yes	yes	no	no	yes	yes	??		yes	no	yes	no
Latvia	yes	yes	no	several	no	no	yes	??	no	yes	no	no
Lithuania	yes	yes	no	yes	yes	no	yes	??	no	yes	no	no
Luxembourg	yes	yes	yes	??	yes	yes	??	??	no	??	yes	no
Malta	yes	yes	yes	yes	no	yes	??	??	no	yes	no	no
Portugal	yes	no	no	yes	yes	yes	yes	yes	no	yes	no	yes
Rumania	yes	yes	yes	yes	no	no	yes	??	no	no	yes	yes
Slovak Republic	yes	yes	no	yes	no	no	?		no		no	yes
Slovenia	yes	yes	no	yes	no	no	??	??	no	yes		yes
Spain	yes	yes	no	yes	yes	yes	??	yes	yes	no	yes	yes
Sweden	yes	no	no	yes	yes	yes	no	no	no	no	yes	yes
UK	yes	no	no	yes	several	yes	no	??	yes	yes	yes	yes

Despite the fact that the top-down approach did not lead to the development of a typology the results were useful for helping define the criteria for the bottom-up approach. It was possible to see which of criteria were not useful to differentiate between the Member States as all the Member States said yes to a particular question. It also allowed us to see where the difference could be and in which directions we could pursue the analysis further.

5.2 Assessing different approaches: The bottom up approach

Having realised that reducing the information in the framework to the existence of certain elements of strategic governance in terms of yes and no answers did not lead to the development of a typology, we decided to apply a different approach to developing a typology. This we call the bottom-up approach. It is based on a more qualitative assessment of the data in the framework in order to develop a typology. This approach consists of several steps:

1. Creating summaries of each Member State to gain an overview of the strategic governance situation in each country
2. Taking the dimensions of the framework and deciding on a single indicator to represent that dimension
3. Creating a series of grids each consisting of two of the dimensions on which to map the Member States
4. Mapping the Member States on to the grids not just according to the existence of elements of strategic governance, but according to the level or amount
5. Analysing the outcomes of the pictures that emerge

This approach has several advantages. It leaves room for a qualitative assessment of the strategic governance in the Member States whilst at the same time defining concrete parameters and indicators by which to compare the countries. The following section describes the bottom-up approach.

6 - Developing the combined approach

The following section elaborates the bottom-up approach and creates a typology for classifying the EU Member States.

6.1 Summaries of strategic governance in EU Member States

The first stage of the bottom-up approach was to write summaries of strategic governance in each of the Member States. The summaries of strategic governance are based on information taken from the ERAWATCH Research Inventory and the selection and the order of the information are based on a framework developed in the course of the project.

The summaries have been written using the four elements (strategic scope, the ability of R&D system to design and implement strategic policies, responsiveness and quality assurance within the R&D system of strategic governance) as a basis. Two further elements have been introduced to improve the summaries that have not been included in the original framework. These are an element on strategic change at the beginning of the summaries and a conclusive element at the end. The conclusions are the only part of the summaries that have been formulated by the project team.

The 27 individual summaries give to a large extent an interesting picture of different ways in which the EU Member States organise their R&D governance systems. They give an overview of the extent to which individual countries co-ordinate the different bits of their systems, the role of stakeholders and the use of foresight and evaluation.

However, as the data was not specifically collected for this purpose of looking at strategic governance there are gaps in the data. The summaries should, therefore, be seen as sources of useful information to build up a picture of strategic governance in a country but not as a complete and ultimate overview. Nevertheless, the pictures that emerge are sufficient to give an accurate impression of strategic governance in that country.

The countries have been grouped into four different groups; the first three groups according to the size of population in each country, the final group containing all the more recent EU Member States (Member States that have joined since 2004). The summaries can be found in Annex II of this report.

The summaries provide a nice overview of strategic governance elements in the EU Member States; they are however, still too detailed to be used as a classification system for the Member States. Therefore the next step was to define parameters for the classification.

6.2 Defining Parameters for the typology

To design the parameters for the classification we went back to the four dimensions of strategic governance in the framework (strategic scope, the ability of R&D system to design and implement strategic policies, responsiveness and quality assurance within the R&D system of strategic governance) and for each dimension defined one characteristic that would allow us to capture that particular element in a Member State.

Strategic Scope

For the first dimension (strategic scope) we quickly realised that as nearly every country has a R&D strategy there would be no easy parameter to use for a differentiated classification. There are definitely differences in the way in which R&D strategies are designed and the importance and role they have in each different Member State. However, this is information that is not easily accessible in the ERAWATCH Research Inventory and would require an assessment of the whole of each individual R&D strategy, which is outside the scope of this project. This dimension was therefore not taken into further consideration for the classification. It was looked at again during the case studies.

Ability

The second dimension, the ability of R&D system to design and implement strategic policies, we decided to define as the types of co-ordination mechanisms there are within the national R&D governance systems. Every Member State has some sort of co-ordination and/or advisory body to facilitate policy making. This indicator focuses on the type of co-ordination mechanisms between the different parts of the R&D governance system. At one end of the scale are co-ordination mechanisms that are purely advisory and which do not play a role in formal decision making processes. At the other end of the scale are co-ordination mechanisms that actually participate in the decision making process.

Responsiveness

The third dimension, responsiveness, we defined as the involvement of stakeholders in the policy making process. Stakeholders are involved in many different parts of the processes as commentators. However, we were interested in how stakeholders from academia, industry, other ministries, social partners and others are formally involved in the policy making process. Most often this occurs through their involvement in co-ordination and/or advisory bodies. This indicator therefore maps the level of stakeholder involvement in the R&D policy making process. On one end of the scale are Member States with no, or hardly any, formal involvement of stakeholders. At the other end are Member States that formally involve a considerable amount of different types of stakeholders in the policy making process.

Quality assurance within the R&D system

The fourth dimension, quality, we defined as being the level of evaluation that is implemented within a country. At the one end of the scale are the Member States that have a low level of evaluation and at the other end of the scale are the states that implement evaluation systematically.

There are therefore three parameters for the development of the typology

- Ability = Types of co-ordination mechanisms
- Responsiveness = the involvement of stakeholders in the R&D governance system
- Quality = the level of Evaluation in the R&D governance system

Although the parameters have been defined in a way that will allow useful and comparable pictures to be drawn, they definitely reduce the breadth of information collected in the strategic governance summaries of the Member States. Certain very interesting elements and mechanisms have been deliberately left out especially if they only applied to a small number of countries (such as the relationship between regional and national levels) or it was not immediately clear how the mechanisms was linked to the policy making process such as with foresight.

The next step was to create three grids using the parameters. Rather than have three single grids each containing a single parameter, we decided to use a combination of two parameters per grid. This still allows us to view the status of a single parameter. However, it also allows us to view the positioning of the Member States according to two parameters at the same time.
The three grids combine the following parameters:

- Grid 1 combines ability with responsiveness
- Grid 2 combines ability and quality and
- Grid 3 combines responsiveness and quality

6.3 Classifying the countries

Having developed parameters and defined indicators for them the final step was to map the Member States onto the grid based on the information in the strategic governance summaries of the Member States. The following three pictures (Figures 2, 3 and 4 below) show the results of the mapping.

In almost all cases the positioning of a Member State is an estimation based on our assessment of the information in the ERAWATCH inventory. We have not quantified the parameters as this is not possible partly due to the information in the Inventory and partly due to the fact that they are per se difficult to quantify. For this reason it is important to bear in mind that someone else doing the same assessment might come up with different pictures. Therefore the exercise should be seen more as an attempt to think of the ways in which strategic governance can be conceptualised and not as a definitive guide to one country's position compared to another's.

Belgium has not been included in the pictures below as it is not possible to consider Belgium on the national level. R&D policy is to a large extent the responsibility of the regional level. The national level only has responsibility for issues that are obviously national such as space research. Trying to find one value for each parameter across the regions is too difficult due to the differences between them.

Figure 2: Grouping Member States according to the parameters ability and responsiveness
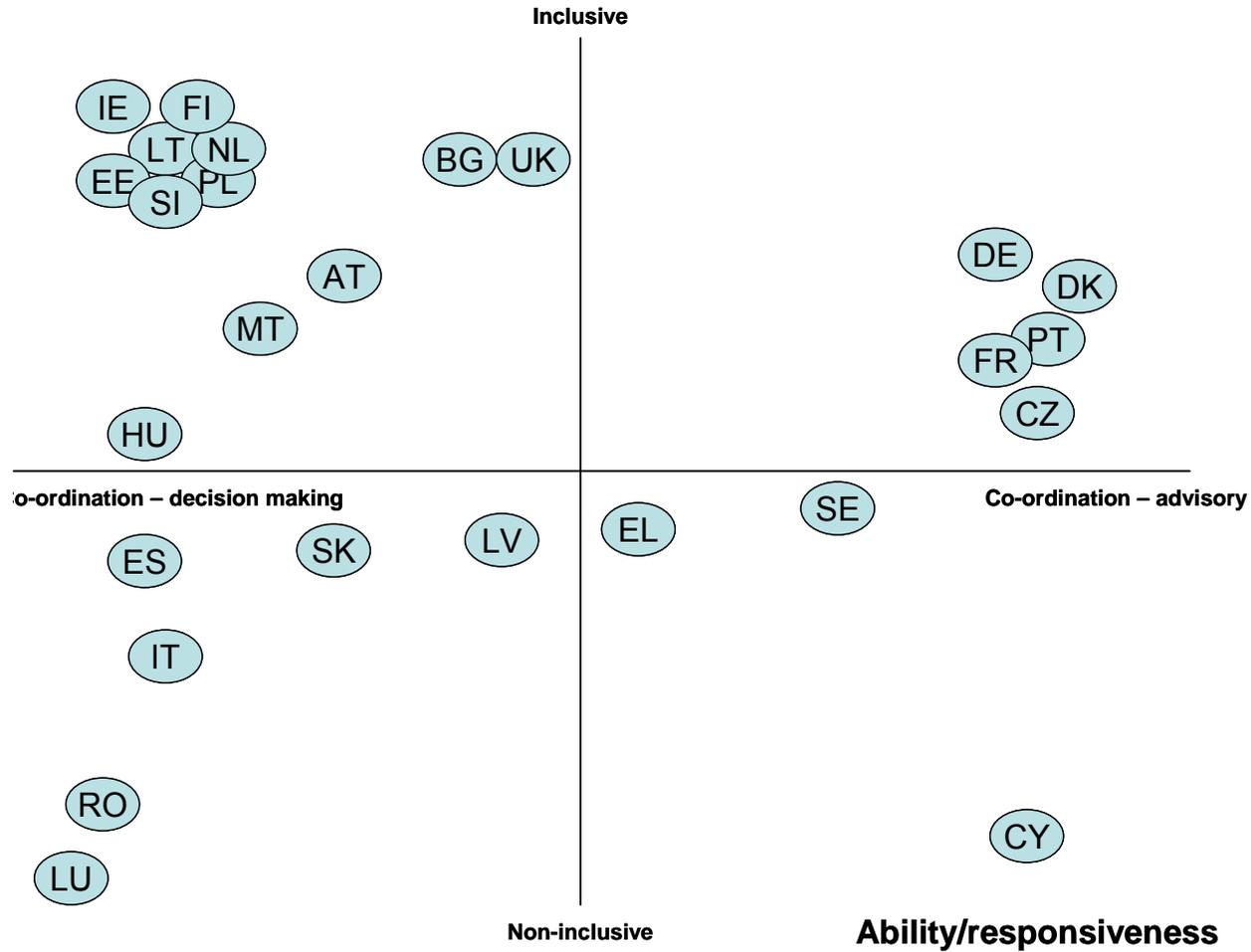
Figure 3: Grouping Member States according to the criteria ability and quality
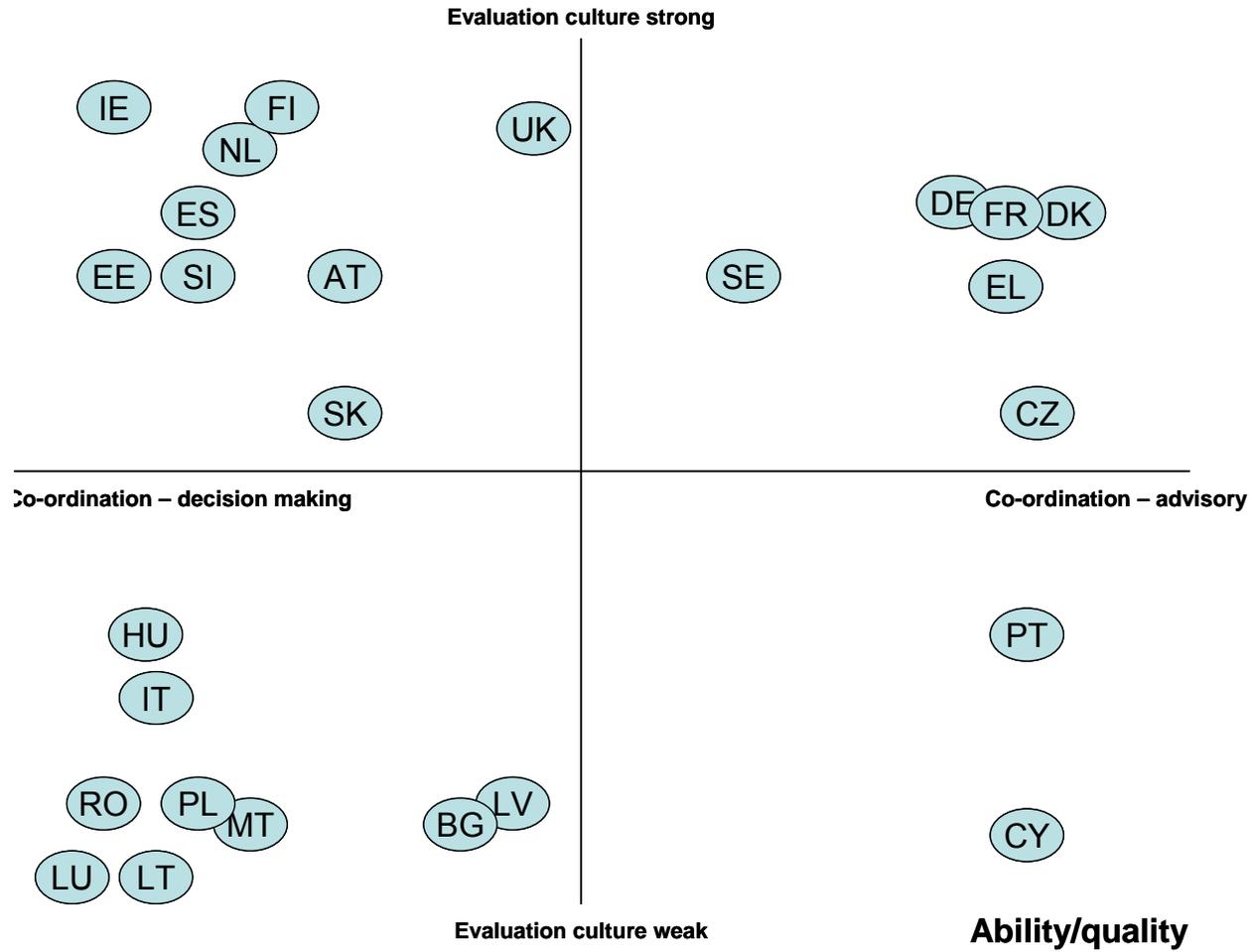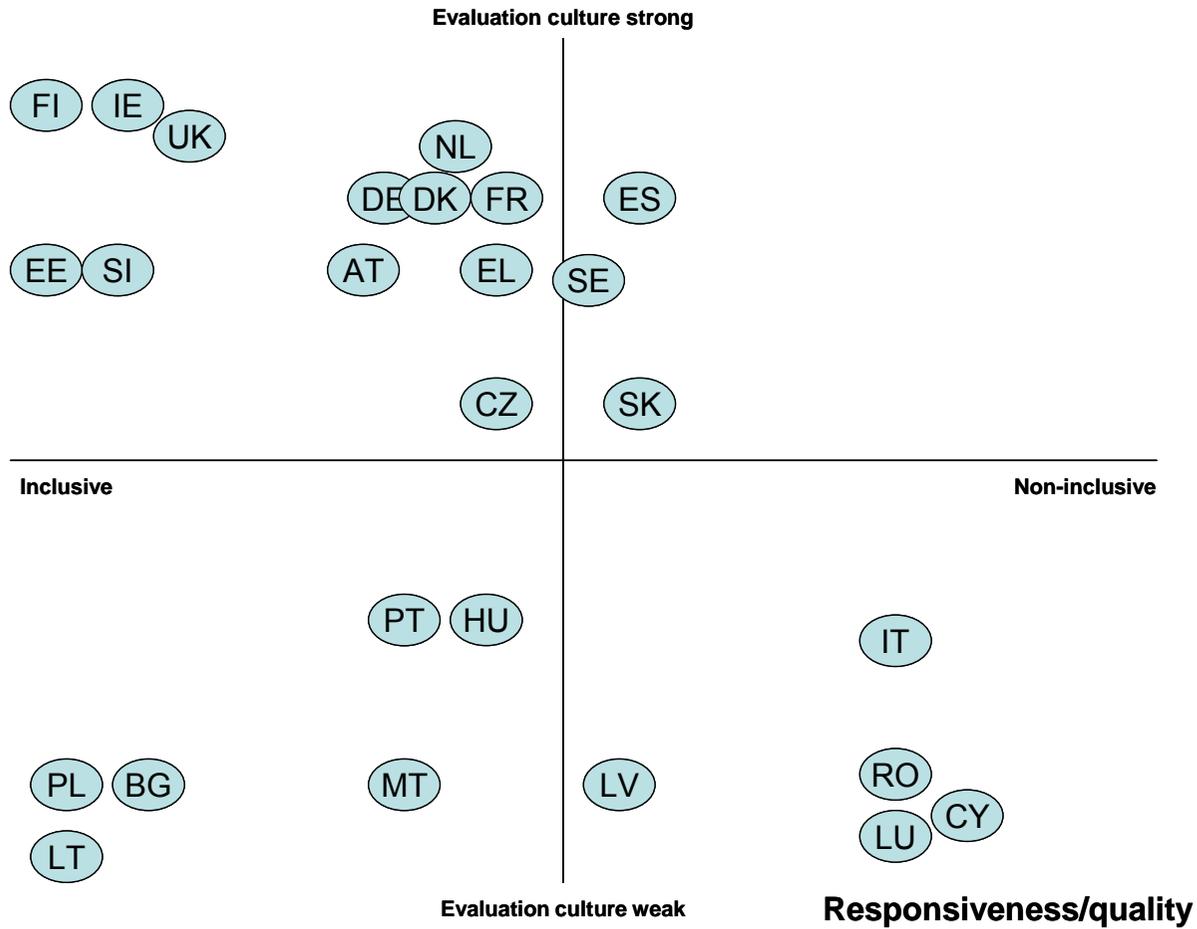
Figure 4: Grouping Member States according to the criteria responsiveness and quality

The above pictures show the Member States classified according to three parameters: ability, responsiveness and quality. Each of the pictures has a story to tell about strategic governance across the Member States. The following section looks at each picture individually.

The pictures show the state of play in the EU Member States according to the parameters. Of course they also show the strength of the parameters in the Member States. A weak evaluation culture is immediately obvious as is a strong evaluation culture. The stronger a given parameter is the further to the top and to the left a Member State will be positioned. However, this does not mean to say that this Member State is necessarily better than another one. Just because it can be found in the top left hand corner in every picture. The question what is better can only be answered by looking at the outcomes and the implementation of policy making in the Member States. Having said this, the classification proposed here does work on the assumption that having certain mechanisms and practises in place should form the basis of a strategic governance system.

Picture 1: Ability/ responsiveness (Figure 2)

The picture ability/responsiveness tells us some things that we already know, but also has some surprises. There are some Member States with a very low level of formal stakeholder involvement (RO, LU and CY), there are a group of countries with a medium level of involvement and there are a group of countries with a high level of formal stakeholder involvement (see the group in the top left hand corner; IE, FI, LT, NL, EE, SI, PL, BG and UK). This group has some countries that one would expect to find there but also some of the newer Member States such as EE, SI, LT, PL and BG.

Looking at responsiveness, there are a few of the older Member States and the Czech Republic that have only advisory co-ordination mechanisms (these can be seen on the right hand side of the page; DE, DK, PT, FR, CZ). However, many Member States (the ones on the left hand side) have implemented some form of co-ordination mechanisms that is directly linked to the decision making process. This means that the co-ordination body consists of different ministers and other parts of the policy making system. In some cases (those that can be found in the top left hand corner) the policy co-ordination mechanism is jointly a way of getting external expertise. In such cases an inter-ministerial group is often joined by external stakeholders.

Picture 1 shows the two specific groups described above quite clearly. One group of Member States are less inclusive and have co-ordination bodies that are more advisory. The other group of Member States are more inclusive and at the same time have co-ordination mechanisms that are closer to the decision makers.

Picture 2: Ability/quality (Figure 3)

The second picture looks at the parameters ability and quality. That means it takes one of the parameters from Picture 1 (ability) and combines it with the parameter quality. In actual terms, this means looking at the co-ordination mechanisms combined with the level of evaluation in a country. A first interpretation of the picture shows the immediate difference between those Member States that have systematically implemented evaluation and those that have not. The Member States with a low level of evaluation can be found at the bottom of the picture and those with a high level towards the top. The further towards the top of the picture the Member State is placed the more emphasis on implementing evaluation there is in a given country. The countries at the top of the page have therefore all implemented some form of evaluation that goes beyond programme evaluation. Either they have carried out policy reviews of entire policy areas of they have implemented systems evaluations or another form of broader evaluation.

There are, of course, a number of newer Member States that have yet to implement evaluation systems where the general evaluation culture is low.

The combination of the parameters ability/quality is less interesting than the parameters ability/responsiveness. The Member States are more spread out across the picture and fewer patterns emerge. One interesting aspect, however, is that certain groups of countries can be found in the same page quarter together with the same countries as in the previous picture. For example DE, FR and DK are all in the top right hand quarter and on the other side IE, FI, NL, EE and SI are all together again in the top left hand quarter. Similarly CZ is the only new East European Member State that can be found consistently in the top right hand quarter of the picture. There would appear to be similar patterns going across the parameters in certain countries.

Picture 3: Responsiveness/quality (Figure 4)

The third picture looks at the combination of parameters responsiveness and quality. This means it looks at the involvement of stakeholders combined with the level of evaluation. As in picture 2 the Member States with a low level of evaluation can be found at the bottom of the page and the member States with a high level of evaluation at the top.

The interesting aspects about this picture are the fact that the two groups from pictures 1 and 2 can still be found together (almost in the same configuration). DE, FR and DK and all still together and the combination FI, IE, EE and SI can still be found together occupying the top left hand corner.

Another interesting aspect of this picture is the absence of any Member State in the top right hand corner. There are no Member States that have a strong evaluation culture, but little formal inclusion of stakeholders.

The pictures provide us with an overview of elements of strategic governance in the EU Member States. We can see the relative positions of the Member States according to the dimensions ability, responsiveness and quality. The pictures can be used to see which Member States are where, based on a series of concrete indicators

7 - The classification of the Member States

The question set in the technical specifications was to design a typology so as to classify the Member States. This section further develops the work so far into a set of concrete statements along which the Member States can be assessed. It puts the Member States into categories according to their level of strategic governance.

Member States with a high level of strategic governance

- A level of strategic governance that is high across all three parameters inclusiveness, co-ordination and evaluation

  Member States in this category are: IE, FI, EE, SI

- A level of strategic governance that is high across any combination of two of the parameters inclusiveness, co-ordination and evaluation

  Member States in this category are: LT, PL, UK, NL, ES

Member States with a medium level of strategic governance

- A level of strategic governance that is of a medium level across all three parameters inclusiveness, co-ordination and evaluation

  Member States in this category are: AT, SE, SK,

- A level of strategic governance that is of a medium level across any combination of two of the parameters inclusiveness, co-ordination and evaluation

  Member States in this category are: CZ, MT, LV

- A level of strategic governance where one parameter is high, one is medium and one is low(an uneven but medium spread)

  Member States in this category are: DE, DK, FR,

Member States with a low level of strategic governance

- A level of strategic governance where either all parameters are low or most are low

  Member States in this category are: PT, CY

Member States with an uneven but mostly low level of strategic governance

- A level of strategic governance where one parameter is high and the others are low

  Member States in this category are: BG, LU, RO, HU, IT

8 - Trends in the strategic governance of R&D related policies

The pictures described and analysed in the previous section show the Member States positioned according to specific parameters. There are several trends that can be identified analysing the pictures. This section presents these trends. In addition, this section goes back to the strategic governance summaries themselves and picks up on the issues that were not followed up on in the pictures, but that are still relevant for an assessment of strategic governance in R&D related policies.

8.1 Trends in R&D related policies according to the parameters

Strategic governance in the new Member States

Many of the former East European Countries appear to have well developed R&D governance systems as they have had the chance to completely restructure their systems in the recent past. Many of the new systems are inclusive, have a formal co-ordination body involved in decision making and have put evaluation high on the agenda (ES, SI and LT). The exception is CZ that is less inclusive and has put less emphasis on evaluation than some of the other East European Member States.

Trends in evaluation

Evaluation would appear to be one of the key elements in assessing a Member States overall level of strategic governance. The pictures above show that all countries with a strong evaluation culture are to a certain extent inclusive. This is due to the fact that once a Member State has implemented a certain level of evaluation then other elements of strategic governance such as inclusiveness, co-ordination and strategies automatically increase in importance.

Some countries have put evaluation high on the agenda such as IE, FI, UK and NL. These Member States have all performed evaluations that go beyond the simple evaluation of individual instruments.

Joining the EU has increased the pressure to carry out evaluations in many Member States. This is especially true for the structural funds that have

Co-ordination mechanisms in R&D policy

Many Member States use formal bodies either to co-ordinate and advise the policy process. In some cases these bodies are only advisory (DE, FR, DK, EL and PT). In other cases these bodies are only co-ordination (HU, ES, IT) as is the case with some of the inter-ministerial committees. In some cases, however, these bodies are a mixture of advisory and co-ordination and combine the use of experts (IE, FI, LT, EE, SI and PL) with the co-ordination of different ministries and/or parts of the policy system.

The three types of co-ordination and advice mechanisms represent three different ways of co-ordinating the policy process. Each different way is based on a different assumption of the need for co-ordination. Whether there are formal inter-ministerial committees, whether there are experts involved in the process and how there two are linked depends on how the question of co-ordination is perceived. In two of the older Member States (DE and FR) the emphasis would seem to be more on making sure that different parts of the system talk to each other, but not that every one comes together at once.

8.2 Further trends in strategic governance in R&D policy

The pictures deliberately reduced the number of indicators and parameters to a few key ones in order to keep the typology simple and effective. There are, however, trends that we can see in the strategic governance summaries that are not in the pictures. These include the role of R&D strategies in R&D policy governance, the use of foresight in R&D policy,

R&D strategies and their role in strategic governance

There is an increase in the number of R&D strategies. Whereas some countries have been designing and implementing strategies for a number of years, some countries such as Germany have only just begun to formulate overarching R&D strategies on a national level. All the new Member States have R&D strategies in place (due to the fact that this is a Lisbon goal). An interesting further line of enquiry would be into the formulation and the implementation of such strategies; however this is outside the scope of this project.

The role of foresight in the governance of R&D policy

Foresight is used in many Member States (DE, UK, FI, EL, IE, IT, BE, DK, HU, HU, LU, MT, PT, ES, SE). In some cases it is not linked to the policy process directly, but is used to generate ideas in a more general sense. In other cases foresight is directly linked to the policy process and the results are fed into a strategy or other policy document. Many of the country correspondents were unclear as to the direct effect that foresight has had on policy content and policy processes. Only in a very few cases in the older EU Member States were there clear outcomes of foresight process. Denmark is such a case in point where the establishment of the Technology Foundation is directly linked to a foresight process. There are also other older Member States where the foresight process is linked to a strategy process (BE-Flanders, LU). However, it is mainly in some of the newer and East European Member States where foresight is used to directly support the strategy process and is often used to support the formulation of the national strategy itself (CZ, HU and RO). A further and more detailed assessment of the links between foresight and the formulation of national R&D policy would be an interesting avenue to follow.

Multi-level governance

The relationship between different parts of the system is an important part of strategic governance. This includes the relationship between the national and the EU level and the

national and the regional level. The relationship between the national and the regional levels is not as relevant for all Member States. In some Member States the regional level plays an important role (BE and DE for example) and in other Member States the regional level is not relevant at all either because of the size of the country or because the structures are not yet in place as is the case in some of the newer Member States (BG). For the Member States where the regional level is important, the mechanisms that link the levels play an important role in R&D policy governance. Many Member States have mechanisms that link the two levels to ensure that each knows what the other is doing and that this is not the same.

EU influence on national R&D strategy formulation

The influence of EU policy on the national level is of relevance to each Member State but to varying degrees. The EU's influence can be seen on a number of different levels: the influence of the Lisbon Strategy, the influence of the Framework Programme and the influence of the structural funds. These can have an influence on national strategy formulation or on the implementation or on more structural elements of the governance system such as evaluation

Some of the newer EU Member States are orientating their national R&D strategies heavily towards EU policy. This can be seen either through the focus on the Lisbon strategy in their national policy documents or their orientation towards the EU Framework Programme. The role of the Lisbon Strategy on national policy making would also be a further avenue of research to follow especially in the older Member States where the influences are not as clear cut as in the newer Member States.

The trends are observations made on the basis of the summaries of strategic governance in the Member States. They are assumptions made on the basis of information from the ERAWATCH Research Inventory and have not been substantiated in reality. For instance, the new Member States might look good on paper; however, whether this bears any resemblance to policy implementation has still yet to be seen.

9 - From typology to case studies

This project aimed at defining strategic governance in R&D policy to the extent to which it could be used to classify the Member States. Using categories and information from the ERAWATCH Research Inventory this took place. The result is a classification of the Member States according to a set of strategic governance parameters. The project proved that it is possible to define strategic governance as a set of concrete parameters and indicators and to classify the countries. It has shown that the Member States can be classified despite the fact that strategic governance in R&D policy exists in many shapes and forms throughout the EU Member States and that each country has had to find its own way to proceed based on the structures, institutions and processes it has.

The typology classifies the countries according to their levels of strategic governance based on structures and formal process. It does and cannot say anything about whether such systems are better governance systems or not as so far there has been no analysis of the impact these elements have on the functioning of the R&D policy governance system or on the impact on the performance of the R&D actors themselves. This was to be the task of the second half of the project.

10 - An in depth look at strategic governance – the case studies

This part of the report looks at the extent to which the level of strategic governance in an R&D system contributes to the overall functioning and performance of the R&D policy system. Although the first half of the project allowed us to gain an overview of strategic governance across all Member States, it was more difficult to understand whether there was any impact on policy making through being more or less strategic. The aim of the case studies was to take a closer look at three individual countries in order to better understand what effect strategic governance was having on policy making in R&D related policies. The three countries selected were Denmark, Estonia and United Kingdom which were chosen due to their interesting yet very different approaches to strategic governance in R&D related policies.

Several questions that were outlined in the projects terms of references were used as a framework for carrying out the case studies (see below). However, another important role of the case studies was to verify the information we already had on the three countries from the ERAWATCH Research Inventory.

Questions to be addressed by the case studies:

- What are the main internal (national) and external drivers for introducing elements of strategic governance in R&D policy making?
- What objectives were to be achieved by introducing strategic governance of R&D policy?
- What instruments and institutional mechanisms are applied that can be attributed to strategic governance?
- How is the efficiency and effectiveness of theses instruments and mechanisms monitored and assessed, especially with regard to intra-governmental coordination and participation of stakeholders?
- How c an the role and relevance of EU community instruments such as the EU Framework programme, the Lisbon strategy or the Structural Funds as driver of the development of strategic governance be described and assessed?
- What can be identified as the impact of strategic governance on the performance of the R&D system?

Before presenting the comparisons of the strategic governance systems in the three countries, a brief description of the methodology and its implementation is given.

10.1 Case study methodology and implementation

The first task was the selection of the case studies, followed by the development of a methodology for their implementation. Following the discussions regarding the classification of the EU Member States, countries were selected for case studies which fulfilled following criteria:

- Countries that have well developed systems and are in the highest categories in the developed typology, or are in the uneven category and are unusual.
- Countries where something has changed and therefore there will be a before and after effect to discuss.
- One country should be from the new Member States as they have been restructuring their systems.
- There should also be something different, or unusual in the way that the country deals with strategic governance in R&D policy.

Applying these criteria, it was decided to focus the case studies on Denmark, Estonia and United Kingdom.

There are currently many different projects that analyse the governance settings and the types of policies pursued in the field of R&D policy in the EU Member States. Amongst these attempts are the work undertaken with ERAWATCH intelligence reports, the analysis undertaken in the Vision ERA-NET, the project "Monitoring and analysis of policies and public financing instruments conducive to higher levels of R&D investments" (Policy Mix), the CREST 3% OMC policy mix peer reviews, the INNO-Policy TrendChart reporting and the OECD STI Outlook activities. Given that all these projects and initiatives focus on governance and STI policy it was important for this project not to be seen as duplicating material. For this reason, this project focused very specifically on the question of what is strategic about R&D related policies and not at what R&D related policies do.

A two-step procedure was followed, firstly scanning and analysing the results and documents from the above mentioned attempts based on our concept of strategic governance, and secondly developing a questionnaire for carrying out interviews in the countries selected. The questionnaire was based on our previous work on the typology of strategic governance and addressed the four characteristics of strategic governance. We added two additional parts to the case studies that focused on the general framework conditions and on recent and especially strategic changes to the R&D governance systems in the three countries. The three parts of the case studies were therefore:

- General characterization of the governance system of the STI policy system
- Changes in governance in R&D policy
- Dimensions of strategic governance containing sections for scope, ability, responsiveness, quality, use of policy intelligence mechanisms and impact

The case studies were divided between the project partners. ARC carried out two cases – Denmark and United Kingdom and Joanneum Research examined Estonia.

The case studies were undertaken through interviews with experts and policy makers in the three countries. The interviewees were firstly asked a relatively open question as to what they understood by strategic governance in their country and were then asked to what they thought about the governance system according to the four characteristics outlined in this project. The interviews were successful as there was a high response rate and interest to requests for meetings and interesting discussions with the interviewees.

Once the interviews had been completed, individual case studies were written following the format of the interview guidelines (see Annex III) in order to facilitate a comparison of the results. The case studies can be found in Annex IV.

10.2 Case study comparisons

The case studies present an interesting overview of three Member States and the level of strategic governance in their R&D governance systems. As a basis for comparing the three case studies, here are short summaries of the main changes in strategic governance found in the three Member States. Longer versions can be found in Annex IV.

The Danish system can be considered highly strategic:

> Since 2001 the Danish Government has put into place many far reaching reforms that are certainly of a strategic nature. Some of the reforms have been aimed at restructuring and simplifying the Danish STI system whereas the Globalisation Strategy was developed to produce a strategic future direction for Denmark with wide reaching consequences for many policy actors.

> The Danish STI governance system is probably unique in Europe at the moment. The Globalisation Strategy forms a comprehensive framework that embeds STI policy in the bigger picture. From this point of view policy making is certainly strategically orientated, although not focused purely on STI policy

The case of Estonian STI Policy can be seen as a country with a rather well articulated STI policy but not too strong links to other policy areas. Consequently strategic governance seems to be in a more infant state:

> The Estonian STI governance system consists of several attempts to integrate examples of more advanced R&D intensive small open economies (predominantly Finland and Sweden, partly the Netherlands and Austria).

> Nevertheless, the major impetus for policies comes from the EU via the OMC and the Structural funds and almost all dimensions of 'strategic governance' are strongly influenced by the EU's STI policy.

The UK case study also reveals a high level of strategic governance:

> Firstly, it has a strategic framework in place that provides a long-term and comprehensive direction for all STI actors. The Framework is developed with substantial inputs from many sides including academia, charities, business and other Governmental departments. It is both accepted and implemented. The UK governance system also has many mechanisms in place that facilitate co-ordination between different parts of the system. The Government's Chief Scientific Advisor plays a significant role in co-ordinating policy on the highest level. However, there are many other mechanisms that ensure that each part of the system knows what the other is doing. Policy reviews are an important part of the UK governance system and they are one of the main ways in which policy actors involve other stakeholders in policy design. There were around 200 responses to the Government's draft version of the Framework after it was put on the Government's web site for comments. This dialogue with stakeholders ensures that there is an open discussion about future policies. There is a transparent approach to the way in which policies are developed.

Last, but not least, the UK has a strong evaluation culture. The Framework is reviewed annually; there are policy reviews of specific policy areas as well as the evaluation of individual initiatives. The Framework also introduced a series of initiatives to try and measure the performance of the UK research community.

The UK has a governance system that attempts to define long-term goals through a strategy simplify the actor's landscape and have a clear division of competencies between the policy actors whilst at the same time allowing a large amount of freedom for individual research performers to define their own goals. The overall approach to policy making is one of setting objectives and seeing if they work and if not trying something else.

Looking across the three case studies it is possible to see patterns emerging even if the individual implementation in each country looks at first glance to be quite different. There is an overall trend to simplify, co-ordinate, involve and measure the R&D governance system. This holds true for UK and Denmark as for Estonia. Even though the focus is different the objectives are similar. The overall trend can be broken down into several concrete characteristics that could be called elements of a strategic orientation:

- The usefulness of a top-down strategy or an overarching framework that provides a common ground for all actors involved in STI even if their individual focus is in each case slightly different, e.g. the Globalisation Strategy in Denmark that embeds STI policy in to a broader framework, the adapting of guidelines from EU Structural Funds as leading elements for STI policy in Estonia and the high level and long term reflexive framework for S&T policy in UK.

- Simplification of the system – all three countries aim to try and have clear structures and responsibilities between the actors. There is also a trend not simply to add new actors, but also to remove those that don't work or have finished their job, e.g. in Estonia to redesign the Science and Technology Council as a co-ordinating mechanism.

- High level of participation within the system – both high level strategies in Denmark and UK have gone through a wide and lengthy consultation process that was considered by many to be one of the main reasons that they are being implemented. Estonia could still improve participation in this respect, but has gradually improves awareness of stakeholders in order to increase opportunities for participation.

- An increasing acknowledgement that innovation has a broad definition and takes place in many different contexts. This holds for all cases, but to some extent less in Estonia, when there is still a STI policy in place which does not have too strong links to other policy areas.

- A growing recognition of the necessity to define societal needs for research and to promote mechanisms to bring different actors together to find solutions to problems. This argument is represented by very different solutions, being e.g. first attempts to build capacities for foresight experiences in Estonia or a Government Office for Science, headed by a Chief Scientific Adviser and the Horizon Scanning Centre in UK. But also

the Globalisation Council in Denmark points can be seen as such an element.

- All have a focus on performance and on defining what needs to be measured for that purpose. This includes efforts to measure also those things for which there are no ready-made indicators available. For all cases a high attitude towards usage of evaluation can be observed.

- STI policy should be developed in a way by which other ministries get involved. This point to the fact that 'strategic' has to be interpreted as a broad concept, representing interplay of several policy fields. Especially the case of Denmark the Globalisation Strategy stresses this fact, but also the necessity of coordination between ministries for Action Plans due to EU guidelines in the case of Estonia supports this point.

It can therefore be seen that Denmark and UK are both very different examples of innovative and strategic R&D governance systems that do, however, share certain objectives. Estonia, on the other hand differs in a number of aspects from the other two:

- The most important difference is the fact that the EU through its instruments (Framework Programme, Structural fund, OMC) has a much greater influence on strategic governance of the Estonian system than in the other two countries. In this respect, Estonia is similar to several other the new member countries and the southern European countries in focusing national policy objectives on EU policy.

- Another difference can be seen in the actor involvement in STI policy formulation that sometimes faces the problems of actors not being aware of the importance of the policy field (e.g. the business associations) or not having been developed at all.

General trends can be seen in the way in which the three Member States are approaching governance in STI policy. All three have attempted to bring a more strategic element in to R&D policy making. However, the individual implementation is very depending on the different institutional and cultural nature of the governance systems in the countries.

10.3 Case study conclusions

For the case study conclusions we need to go back to the list of questions set at the beginning and try to answer them.

- What are the main internal (national) and external drivers for introducing elements of strategic governance in R&D policy making?

The main drivers were similar in all of the countries. They all introduced elements of strategic governance so as to improve the efficiency of the governance system. Behind this drive are larger goals such as improving economic competitiveness, ensuring top-quality research and linking research to societal goals. The main thinking behind linking

the goals with the strategic elements is that if you design a governance system that is interactive, reflexive and co-ordinated then the overarching goals will automatically be achieved.

- What objectives were to be achieved by introducing strategic governance of R&D policy?

The main objectives that will be achieved are a more efficient and integrated governance system where each different part takes responsibility for one area and is, at the same time, aware of what other parts are doing. However, it is on the other hand difficult to answer the question as in some countries the impulses came from outside R&D policy and strategic governance of R&D policy was not the main aim behind the changes. Having said this, the changes did affect the governance of R&D policy in a strategic way.

- What instruments and institutional mechanisms are applied that can be attributed to strategic governance?

The typology and the case studies reveal many different types of mechanisms on different levels that can be attributed to contributing to a more strategic form of governance. As has been discussed earlier, these range from overarching strategies, to co-ordination mechanisms, to stakeholder participation and evaluation initiatives. However, the case studies revealed that in two countries (DK and UK) at least these were all part of a general seen change in thinking and should not be taken as individual mechanisms. What effect they would have as independent mechanisms is hard to say. One such example is the way in which strategy is formulated in DK and UK. The process is highly participatory and by the time the strategy is in place considerable momentum and commitment has been achieved. The participation is such an important part of the strategy process that these two elements cannot be considered individually.

- How is the efficiency and effectiveness of these instruments and mechanisms monitored and assessed, especially with regard to intra-governmental coordination and participation of stakeholders?

There are two ways of looking at this question. The first way is to say that there has been a change in trying to attempt to predict what exactly the whole system should look like and a move towards trial and error on the basis of individual policies. Especially in the UK and DK there has been a trend to make large and significant changes to the R&D landscape to change a specific issue but not to try and fix all the problems at the same time. On the other hand, there has also been a drive to better monitor the performance of individual parts of the system. Especially universities and research councils now have strategies and development plans.

- How can the role and relevance of EU community instruments such as the EU Framework programme, the Lisbon strategy or the Structural Funds as driver of the development of strategic governance be described and assessed?

This question very much depends on the individual Member State's perspective. In many of the new Member States all three mentioned EU mechanisms play a large role in the development of national R&D strategy. In the older EU Member States the picture is more complicated. The influence of EU policies is not as clear as in the newer member States.

National policy making has national priorities that reflect national challenges and objectives. EU policies and mechanisms are taken into consideration if there is an advantage to doing so. For instance, the recent changes in the Framework Programme aimed at bringing together larger players have had an effect on the way in which policies towards universities in DK have been formulated. The policies aimed to increase Danish participation in the Framework Programme.

- What can be identified as the impact of strategic governance on the performance of the R&D system?

This is the most difficult question to answer as it is difficult to find direct cause and effect between changes to the governance system, changes in policy formulation and design and changes in the R&D system. However, most policy makers agree that more participation in design of long-term strategies helps to create a system that moves in the same direction.

11 - Assessing the typology based on the case studies

Having addressed the questions set for the case studies, the next stage of the project was to go back to the original typology and to reassess both the framework and the typology on the basis of the case study analysis. This has two purposes, first to see whether the positioning of the countries is still correct following the further analysis and secondly to see if we can further develop the characteristic "scope" than was the case in the typology where it had to be left out.

11.1 Repositioning the case studies in the typology

The typology developed during this project positioned the three cases according to the assessment of the three dimensions (ability, responsiveness, quality) that were measured by selected indications from the ERAWATCH Research Inventory.

This meant for Denmark a position with a medium level of strategic governance with one parameter high, one medium and one lower. Estonia was related to Member States with high level of strategic governance due to high parameters in all parameters. Lastly United Kingdom was also seen as part of states with high level of strategic governance (see the following figures 5 to 7).

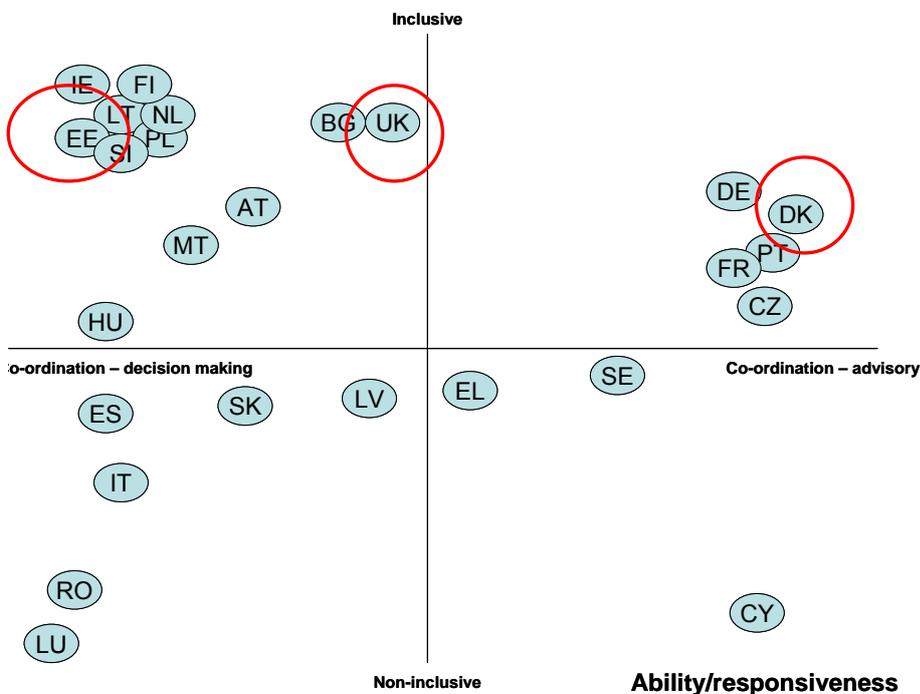**Figure 5: Grouping Member States according to the parameters ability and responsiveness**

51

Figure 6: Grouping Member States according to the criteria ability and quality
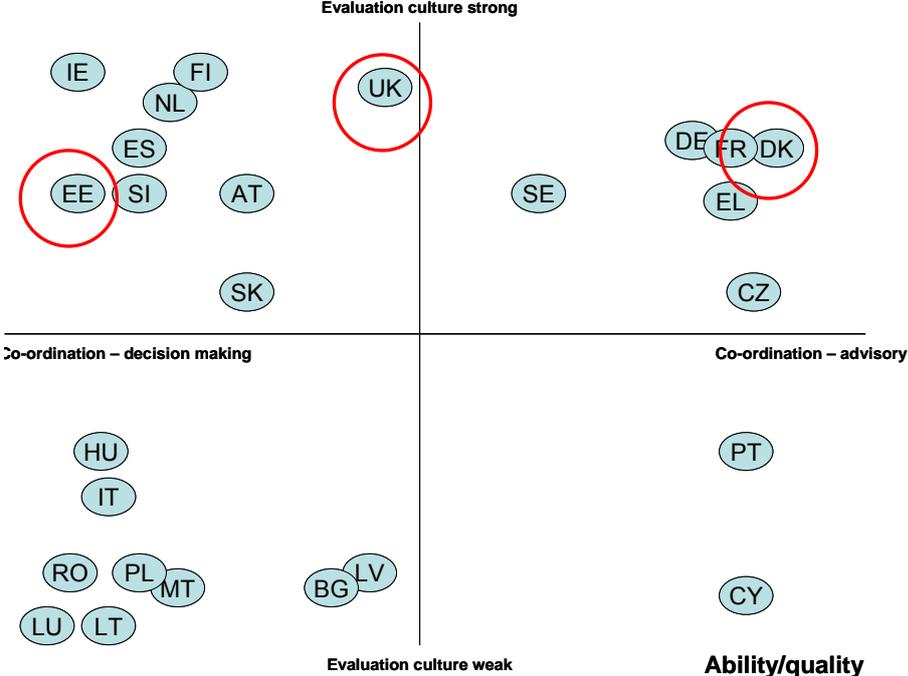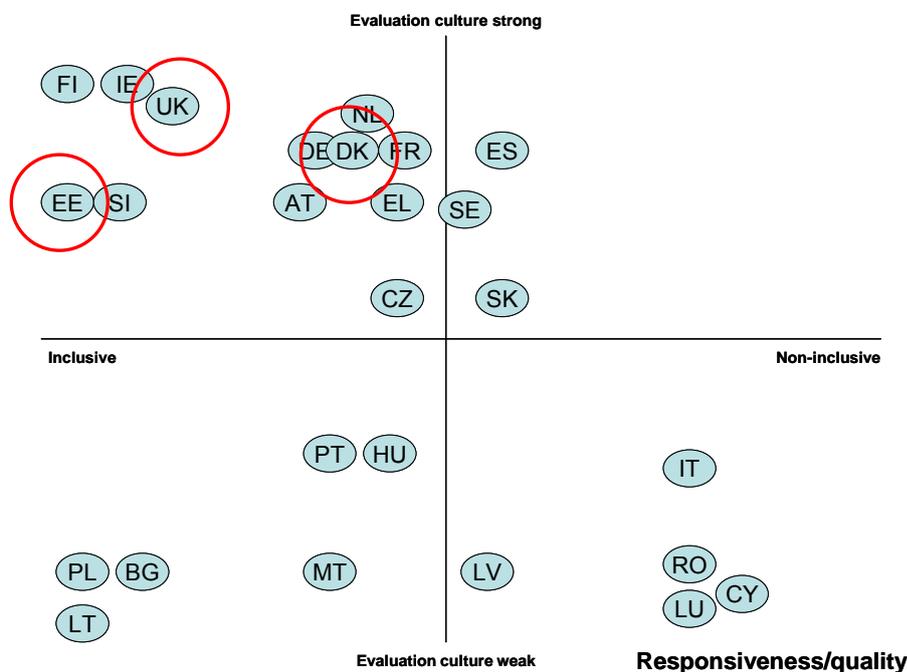
Figure 7: Grouping Member States according to the criteria responsiveness and quality

The approach of using information from the ERAWATCH Research Inventory that was collected in a highly standardized way can result in some 'misleading' insights when the specific questions about strategic governance come to be answered. The experiences from the case studies quite clearly indicated that the 'reality' in the countries deviates to some extent from the standardised analysis. While certain structures are represented quite well in the ERAWATCH inventory, processes and their 'living conditions' are not so well documented. Consequently an understanding of the system – especially in the case of strategic governance – and its impacts is limited. Little information was available on issues such as the 'real' influence an institution has as opposed to its formal status or the rationales for changes (splitting up the DTI in the UK or the functioning of the Science and Technology Council in Estonia). This is even more relevant when STI policy is embedded in a 'meta strategy' (meaning that there is a general overarching strategy such as Denmark's Globalisation Strategy), and this larger setting is not captured by the inventory.

Based on the assessment of the case studies we would move Estonia slightly lower on the characteristics inclusiveness and co-ordination and move Denmark to the higher end of the co-ordination scale. Also the level of co-ordination in the UK turned out to be higher than the estimated level from the ERAWATCH Research Inventory (see Figures 8 to 10).

Figure 8: Grouping Member States according to the parameters ability and responsiveness – changes due to case study results
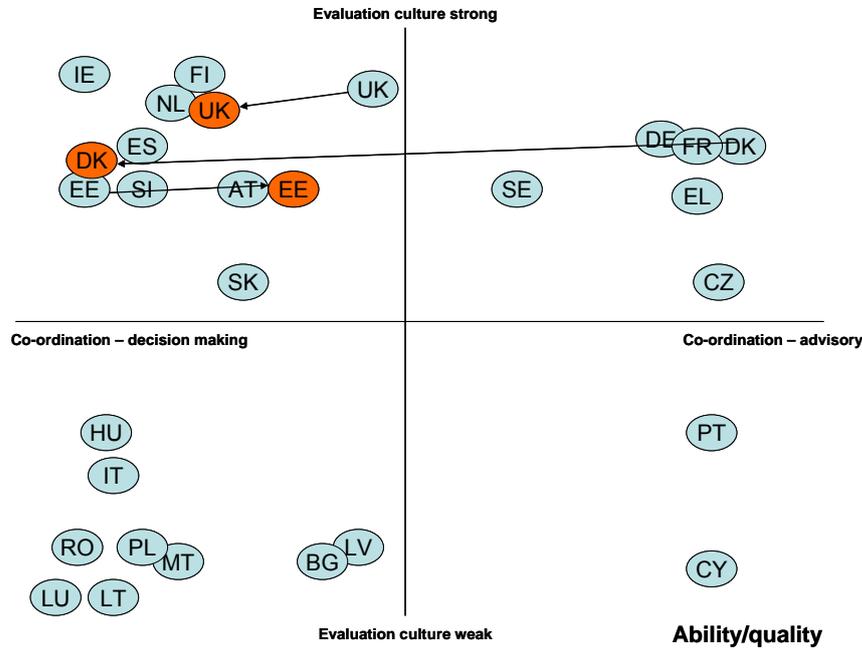

Figure 9: Grouping Member States according to the parameters ability and quality – changes due to case study results
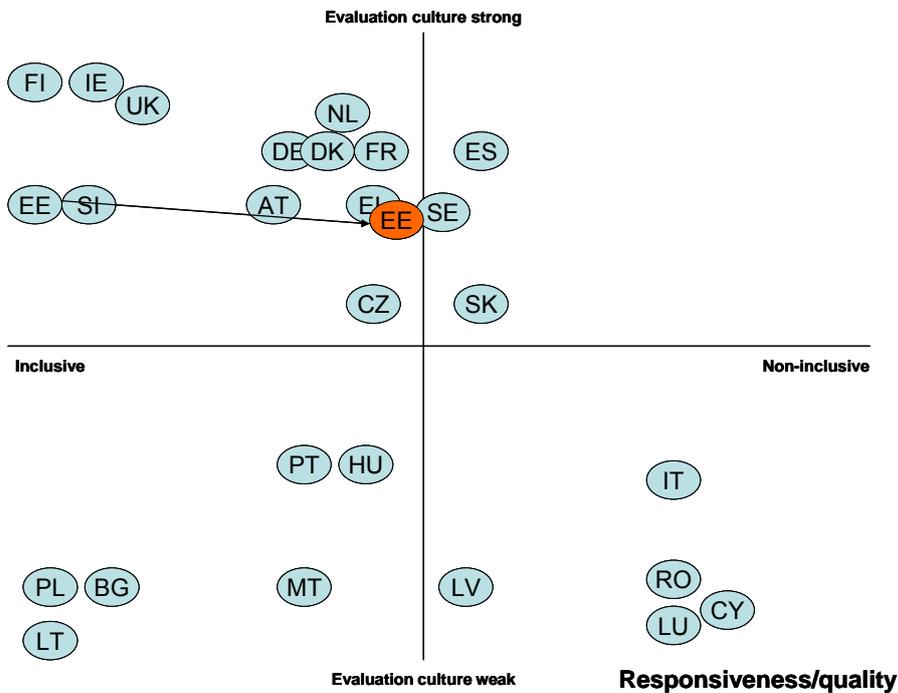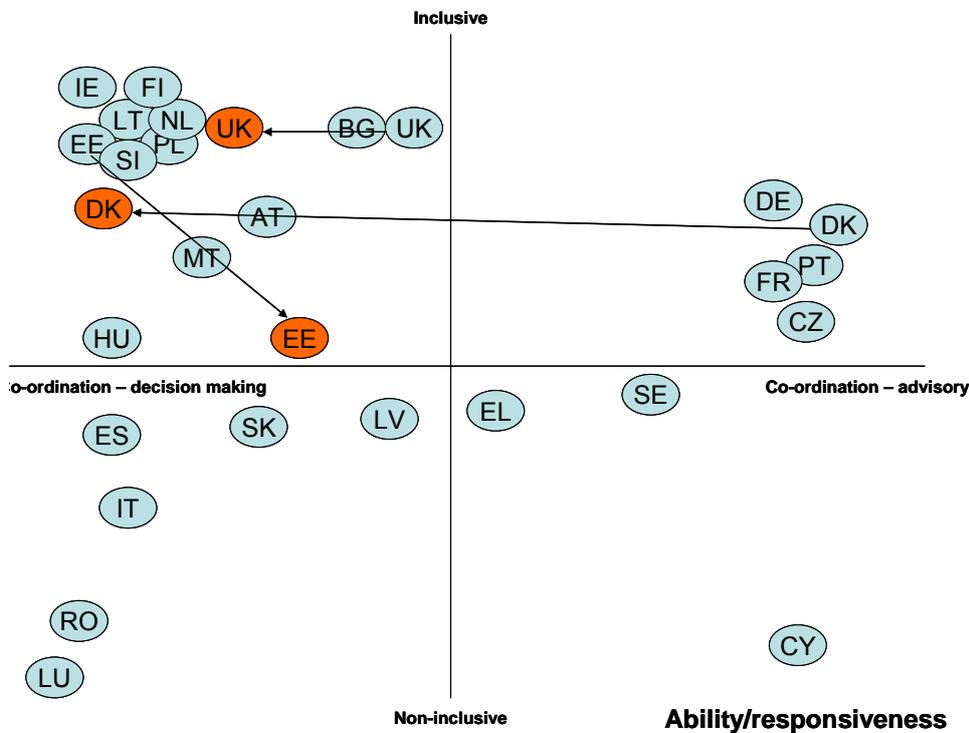
Figure 10: Grouping Member States according to the parameters responsiveness and quality – changes due to case study results

11.2 Further developing the characteristic "scope" for the typology

The dimension scope was left out of the grids because strategy papers (which were used as indicators of this dimension) exist in all countries, thus offering little opportunity for a differentiated analysis. A more differentiated picture could only have been drawn from an analysis of the actual content of these strategy papers for all EU 27 countries, a task that was well beyond the scope of this project. However, the results from the three case studies suggest opening up an indication of the position in scope dimension by having a continuum from 'overarching' to 'focussed' strategies. In this case "overarching" refers to cases where R&D policy is part of a broader overarching policy and "focused" refers to R&D related policies that are more stand-alone. Denmark could be positioned on the 'overarching' side, Estonia more on the 'focussed' side and UK in between. Another opportunity for differentiating in scope dimension may be given by building a continuum from 'only national' to 'EU/global' oriented.

Overall we can conclude that the framework, the typology and the dimensions proved to be meaningful. They allowed us to analyse strategic governance in the Member States and proved to be a useful structure on which to base the case studies. However, the case studies proved that although the framework for the typology was robust, basing the typology on information form the ERAWATCH research inventory does not provide the whole picture. There is a need for intelligence and analysis to get complete picture and to see exactly what the story looks like on the ground. This is mainly, as has been discussed

before, due to the focus of the ERAWATCH research inventory on organisations, policies and initiatives and less on interactions and processes and on the way in which things work in practice and not just on paper.

12 - Conclusions

The project "Strategic governance in R&D related policies" looked at how to define strategic governance and at how it is implemented in the EU Member States. Previous sections of this report have discussed the usefulness of the typology for assessing strategic governance, the conclusions that can be drawn from the case studies and lastly, how to further develop the typology on the basis of the analysis from the case studies. The conclusions so far have been directly related to the development of the typology and the case studies. In this final section we try and put the conclusions developed during the project into a broader context. These we have grouped into four different issues:

- The first issue concerns the concept of strategic governance. Was it a useful concept to capture changes in R&D policy making? What were our experiences using the concept and are there any changes we would make to improve the analysis?
- The second issue concerns implications for the ERAWATCH Network and especially for the Research inventory. Having used the Research inventory extensively for the typology we were able to draw some conclusions for the further development of the website.
- The third issue concerns our conclusion regarding good governance in R&D policy in national settings. What conclusions can we draw on for understanding and encouraging the development of good governance in national settings?
- The fourth issue concerns consequences for the ERA. Are there lessons we can draw from the project for the development of good governance in the ERA?

12.1 'Strategic governance' – a useful concept?

The starting point of this project was to gain a better understanding of "strategic governance" in R&D related policies. The project began by defining strategic governance and developing concrete categories by which to assess it through. Our concept of strategic governance consists of four dimensions (strategic scope, ability, responsiveness and quality). It was used to guide and structure the process of screening the ERAWATCH Research Inventory and it allowed us to condense the information on certain indicators of strategic governance in order to provide summaries of 'strategic governance' in the Member States.

In general the four dimensions of strategic governance we used proved to be very useful for analysing the policy governance systems and we found a high level of acceptance with the interviewees. Our experiences with the concept of strategic governance applied and its four dimensions were on the one hand very positive, resulting in a classification of the Member States even when diverse forms and shapes of appearances of elements of strategic governance exist throughout the Member States, being more or less verified by the selected case studies.

Do our dimensions capture "strategic governance" fully?

On the other hand it is worth asking whether our concept of strategic governance captures the complete situation of strategic governance in the EU Member States or whether there are additional ways of capturing the changes. One such obvious dimension that was important in the case studies, but that we hadn't used in the typology was that of rationalisation and simplification. Many countries are attempting to make their governance systems easier to understand. However, although rationalisation or simplification was not specifically addressed in the typology, we think it should not be considered a dimension in their own right. They could be considered a part of the scope dimension or the ability dimension which deals with coordination mechanisms and decision making.

Ranking the dimensions of strategic governance

Taking these suggested extensions of dimensions into account and relating and integrating them into our concept with the four dimensions, one could get the impression that the 'strategic scope' and 'ability' dimension should be given a more prominent role than the 'responsiveness' and 'quality' dimension when characterising a strategic governance system. But this could be a too strong constraint, confining the concept itself too much on setting-up of strategic rules and institutions and reducing the realisation and implementation part of it, represented by functions of stakeholder involvement and quality assurance. Nevertheless, this discussion points to the question how we can observe the impact of strategic governance and what are the most important dimensions and their subsequent indicators in this respect. We may come back on that issue in the next sub-chapter, but state here that a ranking of the dimensions is not very fruitful, we need to rather see them all as necessary characteristics of a system.

Does the concept "strategic" best cover the changes taking place?

The most common understanding of the concept strategic is as a form of hierarchy in decision making. The concept of "strategic governance of R&D related policies" therefore sounds as if a single point or actor is responsible for designing and implementing STI policy – this is rarely the case. In fact, the opposite is often the case. During the project though, we came to the conclusion that that "strategic governance" was taking place in the Member States if taken to mean long-term, interactive, inclusive and reflexive but not if taken to mean top-down.

The notion of 'strategic' therefore needs to stand for a broader concept, representing an overall orientation and alignment in governance processes, which is not controllable from a single point, but represents collective behaviour. Strategic can also often imply a single direction rather than what is taking place. This can be more captured by a framework for many different actors to do their own thing and that have some landmarks as a common orientation. 'Strategic' is not about individual tools/instruments, but about their interplay, and the way the interplay, the setting up and the closing down of instruments is achieved. These arguments are supported, when we look at the case studies. In none of the performed cases a single entity performs and controls the R&D policy, but there are common rules/orientations behind the scene which guide the actors in the R&D policy field and form a 'strategic' governance system. In UK, we can find many mechanisms facilitating co-ordination between parts of the system, like the Government's Chief Scientific Advisor and a strategic framework as much as policy reviews. The Danish case on the other hand is an exceptional example of a comprehensive strategic framework (Globalisation Strategy) embedding the STI policy. Lastly the case of Estonia finds its

'strategic orientation' through the influence of EU's instruments, both from policy learning as well as from the funding instruments (mostly the Structural funds).

Can we find a better concept than "strategic"?

We tried therefore to find an alternative concept that provides a better fit for the general idea of some overarching objectives and framework that does not have such a hierarchical tone to it. Notions like 'concerted' and/or 'consultative' governance were discussed in this respect. However, in the end it was very difficult to come up with a concept that exactly defines the type of broader "strategic governance" which we observed. In addition, it was not only the nuances of strategic governance that we had problems with, but also the focus of this project on "R&D related" policies. As we took R&D related policies to mean anything that directly has an influence on R&D related policies the focus was too narrow. As R&D related policies are currently being integrated into larger and more far-reaching government concepts the focus on R&D was too narrow. Often the focal point of 'strategy' is outside R&D policy itself (Denmark) or frameworks are provided from outside (like in UK - comprehensive spending review – or in Estonia - structural funds).

12.2 Experiences and implications for the ERAWATCH web site

Another set of conclusions can be drawn regarding the ERAWATCH web site. During the project we used the ERAWATCH website and were able to draw some conclusions on its usefulness and limitations in providing information concerning specified topics.

Experiences in using the ERAWATCH web site

The first part of this project used the ERAWATCH website extensively in order to provide the typology and the classification of the EU Member States. Although we were able to find substantial information on the R&D systems of the individual Member States, there was not sufficient information in the ERAWATCH Research Inventory in order to be able to provide an accurate picture of strategic governance in the EU Member States. However, we should keep in mind that the ERAWATCH Research Inventory was not intended to answer such detailed questions as those addressed in this study. The ERAWATCH research inventory therefore could only be used as a starting point for making the analytical work easier and a bit faster as we did not have to collect each individual piece of information on our own but could find a comprehensive overview of an individual country's R&D system in the inventory. Having said this, there were several limitations to the ERAWATCH research inventory we think are worth pointing out:

- Few processes covered in ERAWATCH: First is the general problem that the ERAWATCH research inventory does not capture processes. There is little information about processes provided by the ERAWATCH research inventory. This puts some constraints on understanding policy implementation and realisation, especially in our case of trying to understand the strategic dimension.

Portraying governance on the web site: Collecting information from the ERAWATCH Research Inventory for the four dimensions of the concept of 'strategic governance' also

showed limitations in availability and quality of data on this subject. Whilst to some extent browsing/clicking through the entire inventory allowed us to fill the initial gaps, there would be an easier way of getting the most relevant information concerning this topic, if the ERAWATCH structure followed the developed dimensions. This would involve taking into consideration the option of further developing the category „governance" in the inventory along the lines of the four dimensions of the strategic governance concept. Alternatively it may be a better solution to have this topic covered by some form of intelligence service – which would be able to present a more in-depth analysis.

- Using the ERAWATCH database for a different purpose: Based on the typology developed for strategic governance, we assigned Estonia and UK a high level of strategic governance and a medium level of strategic governance for Denmark. When we carried out the three case studies, we did not find a high degree of correlation with these results. For example, following the in-depth assessment we would assign a higher level of strategic governance for Denmark of strategic governance. The ERAWATCH Research Inventory gives only information about the STI policy and does not include much information about other policies areas would have been important in this case. To conclude, although the web site can provide a useful overview, any analysis taken should be based on separate research work. Trying to use the data for a different purpose in this case was not possible.

12.3 The effects of "strategic governance" policies on policy making

One of the main aims of the project was to better understand what strategic governance is and how it affects R&D policy making in the EU Member States. Here we try and summarise the main conclusions on the development of strategic governance in the EU Member States. The following statements go above and beyond an assessment of the four dimensions and try to capture the essence of what going beyond the concept of "strategic governance" might mean:

- Good policy making/governance addresses the four characteristics in a "holistic way"; the specific mechanisms and instruments identified as being strategic elements are part of a general approach not just add-on extras

- You don't need to think about what strategic is, if your general view is an integrated one. It drops out of the bottom anyway.

- The efficiency and effectiveness of instruments and mechanisms in themselves is not the focus. The focus is on the whole system.

- There is also a shared understanding that there is no such thing as an optimum. It is not possible to get everything right all of the time especially as many objectives are conflicting. There is very much a trial and error approach to policy making. Make big changes, make them clear and see what happens.

Denmark and the UK are two Member States that are putting these dimensions into practise. It is however, difficult to look at the impact that such policies are having. One can

see that the co-ordination and participation is leading to more concerted policies. However, whether co-ordinated policies are delivering the goods is difficult to say. The way in which most countries are dealing with this is not to measure the whole but to designate clear responsibilities and to measure the performance of these mechanisms.

12.4 Role of the EU as a driver of strategic governance and consequences for ERA

In the previous section, the impacts on the national level were discussed. In this section the role of EU and especially the consequences for the ERA are focused on. The main question here is: are there lessons we can draw from our experiences for the further development of the ERA?

During the project we saw in several cases the implementation of some innovative strategic elements into national R&D policy making. We could see that several EU Member States are moving towards a more "holistic approach" to designing and implementing R&D policy. This is definitely an interesting phenomenon on the national level. A more interesting question is what is going on on the European level. Is there such a thing as "strategic governance" on the European level and what is the interplay between national level strategic governance and strategic governance on a European level? To take this question a step further and ask what can be done to improve strategic governance on the European level.

Before looking at the conclusions concerning the ERA, it will be helpful to examine the results from the case studies regarding the role of EU in national policy making. An assessment of the case studies shows the following patterns:

- In Denmark and UK national policy objectives are paramount and EU policies do not have a large influence.

- Denmark would like to have a few larger players to be able to participate in the Framework Programmes more effectively, but EU policies as such do not have a real large influence.

- In Estonia the focus of STI policy is much more EU oriented, as a lot of funding is from the Structural funds.

Looking at the role of the EU, there are differences between the case studies. While in general for the old Member States – here Denmark and United Kingdom – a more differentiated and sometimes sceptical attitude towards EU can be seen, a more consistent and less sceptical approach is true for Estonia. The old Member States are interested in procuring money from EU Framework Programmes and other funds, but would not agree in getting directives or even accepting high influences on their national STI policy. The opposite may be true for Estonia, which heavily takes the EU into account in designing its STI policy. This result is not very surprising due to the fact that the new Member States had to implement new organisational structures of their R&D governance system only quite recently (Estonia only implemented its starting in 1999). Here especially the Structural Funds have played a big role for the new Member States.

In addition, Denmark and the UK both didn't necessarily think it terms of the ERA when formulating R&D strategies. Their aim is to co-operate with the best researchers, irrelevant of where these people are based. Both countries have therefore internationalisation strategies that are not geographically specific.

We can see from the above analysis that some EU Member States are nationally and globally focused and not necessarily EU focused in terms of R&D policy. On the other hand we can also see at the moment that the ERA needs a new direction. The current studies and web sites comparing and contrasting policies and instruments will soon have reached a plateau and it is not clear what the next step in developing the ERA could be after the mapping stage has finished. This is a difficult question and this project only touched on such issue. If anything, the analysis here would conclude that it is not possible to pursue all goals all the time and more important to decide what is important and what is less important. There are many conflicting issues within R&D policy and it is not possible to satisfy everyone and everything. As we saw in Denmark and the UK they try to get the framework right by talking and involving people but the direction is less important. Trying to make people do things they don't want to do is not an effective way of making long-term policy work. The national level has, in some cases, not yet fully seen the right incentives to move towards the ERA.

13 - Final comments

This was a far-reaching and interesting project that looked at strategic trends in R&D policy. It attempted to develop a concrete definition for a somewhat fuzzy concept and to assess first of all all EU Member States according to this definition for strategic governance and then three Member States in more detail. Even though the classification system for all the Member States would probably have to be reassessed on the basis of the study's findings (due to insufficient material in the ERAWATCH research inventory) the classification system still proved to be a way of gaining an overview of the state of play in each EU Member State.

The case studies allowed us to gain a deeper insight into how three countries worked and what they are doing to make their R&D system "more strategic". The conclusions were manifold and touched on many issues including the use of the concept "strategic governance", the use of the ERAWATCH research inventory and wider issues such as good governance on the Member State and the EU level.

Below are our final list of five dimensions that summarise a strategic system:

- Clearly specified scope of the overall system – working for all actors as a "lighthouse" in navigation for executing the daily routines.
- Simplification of the overall system – represented by well-defined organisation with clearly assigned tasks and goals.
- Participation – as expression of highly responsive structures integrating decentrally given experiences and focussing efforts by committed goals.
- Coordination and adapting with other policy areas – when they are getting more important.
- Policy evaluation and reviews for learning processes to develop the system.

Of course, it depends on how and in what way these are implemented and whether they only exist on paper or not.

The project ended, as only the most interesting projects do, with more questions than answers. In terms of "strategic governance" on the Member State level the main issue surrounds the question can you plan too much? Both Denmark and the UK are heavily interested in performance indicators. Do performance indicators influence the research done and if so how. Although this argument is often rejected by research policy analysts as mere defensive action from basic scientists, we still think it is a line of investigation worth pursuing. Regarding the EU level the focus of further research should be on the further development of the ERA and what happens when the mapping and analysing phase is over.

14 - Questions for further research

During the course of the project we constantly came upon questions and issues that it would have been interesting to follow, but that were not within the scope of this project.

National strategies: What role do national R&D strategies play in co-ordinating R&D policy in networked systems?

Are national R&D strategies becoming more important in the EU Member States and if so why?

What influence have national Lisbon strategies had on the formulation of national R&D policy? Or are Lisbon strategies, especially the older EU Member States, only worth the paper they are written on?

What is the influence of the Framework Programme on national policy setting?

What role does and can foresight play in formulating R&D policy? Should it be a separate process or can it be concretely linked to the strategy formulation process?

What impact do national overarching strategies have on R&D policy?

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Annex I: List of Member State and corresponding country codes

Source language	English short version	Country code
Belgique/België	Belgium	BE
Bulgaria	Bulgaria	BG
Czeská republika	Czech	CZ
Danmark	Denmark	DK
Deutschland	Germany	DE
Eesti	Estonia	EE
Éire/Ireland	Ireland	IE
Greece	Greece	EL
España	Spain	ES
France	France	FR
Italia	Italy	IT
Kıbrıs	Cyprus	CY
Latvija	Latvia	LV
Lietuva	Lithuania	LT
Luxembourg	Luxembourg	LU
Magyarország	Hungary	HU
Malta	Malta	MT
Nederland	Netherlands	NL
Österreich	Austria	AT
Polska	Poland	PL
Portugal	Portugal	PT
România	Romania	RO
Slovenija	Slovenia	SI
Slovensko	Slovakia	SK
Suomi/Finland	Finland	FI
Sverige	Sweden	SE
United Kingdom	United Kingdom	UK

ANNEX II: Strategic Governance Member States summaries

Attached as a separate document

Annex III: Questionnaire Guidelines

Questionnaire guidelines: Strategic governance

This questionnaire addresses the question of how 'strategic governance' is used and implemented in the context of R&D policy. It is part of a series of pilot studies conducted in the context of the ERAWATCH project: "Strategic governance in R&D related policies".

By strategic governance, we understand "Strategic governance is a normative concept that is based on a belief that making sure a governance system functions in a particular way (long-term, responsive and integrative) and will improve policy making. Strategic governance can be described as a governance system that is able to respond effectively to changes in circumstances by the development of long-term visions and the formulation and implementation of higher-order policy goals. This definition can be broken down into the following four attributes: strategic scope of objectives, ability of governance structures to design and implement strategic and holistic policies, responsiveness, inclusiveness and quality assurance."

General characterization

- What are the main features and characteristics of governance in your STI policy system?

- Is, in your assessment, this system capable of 'strategic governance' in the sense defined above?

- If it does not completely fulfil the definition, does it have elements of strategic governance, and if so, in which respects?

- What was the historical development of this system (or important parts of it)?

- What were the main drivers (developments, actors etc.) that led to the system as it is today?

Changes in governance in R&D policy

- Have there been any significant changes in the governance of R&D policy in country?

- If so what were the main objectives of the change

- Who initiated them, where did they originate from? (national, EU etc.)

Dimensions of strategic governance

Scope

- What role does R&D strategy play for general government policy?

- Is the R&D strategy useful for operational decision making? Could you describe by what means the R&D strategy is taken into account?

- Could you describe the R&D strategy formulation process?

Ability

- Is the R&D governance system perceived as being coherent? Are there functioning co-ordination mechanisms? If so, how do they work?

- What are the processes to respond strategically to changes in environment for policy?

Responsiveness

- Are stakeholders involved in the policy process? Are they sufficiently integrated? What kind of impact do they have? What value added does their involvement bring for improving policy making?

Quality

- What role does evaluation play? How is it fed back into policy decision making? Does it improve policy making?

- Could you give an example for a learning process in strategic governance?

Use of policy intelligence mechanisms

- What role does foresight play in policy formulation?

- Are there any other special mechanisms implemented for intelligence?

Impact

- What impact does a more or less "strategic" system have on the whole R&D system?

- What are the experiences you can draw on?

Annex IV: Case studies

This annex contains the case studies on strategic governance

- Denmark

- Estonia

- United Kingdom

Case Study on Strategic Governance in Denmark

Brussels
September 19, 2008

Introduction and aims

This paper is part of the project "Strategic Governance in R&D related policies". It is one of three case studies looking at the extent to which the R&D policy can be termed strategic and if so whether this has an impact on the policy process and the policies. This paper focuses on Denmark. The other case studies are the UK and Estonia.

There are currently many different projects around that analyse the governance settings and the types of policies pursued in STI policy in EU Member States.

Very detailed and good descriptions of the Denmark STI governance system can be found on web sites such as the ERAWATCH research inventory *http://cordis.europa.eu/erawatch/index.cfm* and the web portal Denmark in the global economy *http://www.globalisation.dk/page.dsp?area=52* . An analysis of the Denmark STI governance system can be found in the case study on the Denmark in the project "Monitoring and analysis of policies and public financing instruments conducive to higher levels of R&D investments" or "policy mix" project *http://rid.intrasoft-intl.com/PolicyMix/UserFiles/File/UploadedDocs/Country%20review%20DK-published.doc*, in the INNO-Policy TrendChart - Policy Trends and Appraisal Report 2007 *http://www.proinno-europe.eu/docs/reports/documents/Country_Report_Denmark_2007.pdf*. In addition, ERAWATCH is now producing their own analytical country reports. Although each of these web sites and reports has a slightly different focus, each of them has a section on governance structures and in many cases an assessment of the governance structure's ability to function.

The analysis here does not attempt to repeat what can be found on these web sites and in these projects, but to analyse the STI governance systems in terms of the four characteristics of strategic governance that were determined in the first phase of this project. The analysis draws on much of material mentioned above as well as a number of face-to-face interviews in Denmark. In particular it draws on a recent case study on STI governance in Denmark that is part of the "policy mix" project. This is a very comprehensive description and analysis of the STI governance system in Denmark.

Summary

The Danish system can be considered highly strategic. Since 2001 the Danish Government has put into place many far reaching reforms that are certainly of a strategic nature. Some of the reforms have been aimed at restructuring and simplifying the Danish STI system whereas the Globalisation Strategy was developed to produce a strategic future direction for Denmark with wide reaching consequences for many policy actors.

Recent changes to the Danish STI system can be termed strategic. However, as was the case with the UK case study, it is doubtful as to whether the term strategic is a useful concept to capture the changes taking place. The changes in Denmark go far beyond ensuring that STI policy is strategic. They concentrate instead on including that STI policy is embedded in a far broader agenda. However, there are some who would argue that this approach is detrimental to

STI policy goals as it requires STI policy to focus on specific economic and societal aims and this harms the freedom that science and research policy have needed and enjoyed.

Recent changes to the governance system

The Danish approach to the organisation of STI policy has changed considerably over the past 10 years. It has changed from a system in which STI policy was a side-line policy area heavily influenced by decisions taken in other policy areas to an important policy area in its own right with an agenda of its won. The change in thinking began in the mid nineties when first steps towards strategic thinking in R&D policy were taken and the first national R&D strategy was developed. However, the start of the extensive reforms of the public sector R&D institutions began in 2001. The new Danish Government established a Danish Research Commission to review legislation in order to enhance the efficiency of the entire research system. Based on the Commission's report, a series of wide reaching reforms were introduced.

The Ministry of Science, Technology and Innovation was created in November 2001.The former Ministry of Information Technology and Research gained several new areas including universities, industrial research and Denmark's policy on technology and innovation. The large ministry, covering all areas of STI was expected to deliver on STI across the board. However, having acquired several new tasks it was deemed necessary to simplify the ministry again and in May 2006 the ministry was reorganised. It was split into a smaller ministry with three large agencies working under it.

Issues surrounding information and communication technologies became the responsibility of the IT and Telecom Agency. The areas of innovation and research moved to the Danish Agency for Science, Technology and Innovation (DASTI), and a new agency, the University and Building Agency.

Important characteristics of the new organisation are according to ERAWATCH country profile:
- a slim Ministry with a central policy unit and a stronger connection to the international activities of the Ministry.
- a concentration and strengthening of the ICT area of the Ministry
- a strengthened integration of innovation and research
- a stronger and larger administrative platform in the area of the Danish universities

Since then there have been several other major reforms that have affected STI policy and that have aimed at simplifying and streamline the STI system. In 2002 the way in which universities were governed was reformed in order to create a management system that could think strategically about each individual university. The long term effect on research at universities is still being discussed.

In 2006 the government made the decision to integrate 25 government research organisations into the universities. Only a hand full was left outside. There were several reasons for the merger. These included the fact that the research organisations were previously not linked to education and secondly, the government aimed at creating greater critical mass so as to generate research centres that would be able to compete for research funding from the European Union. The most important policy development in recent years is the Danish Globalisation Strategy – progress, innovation and cohesion – Strategy for Denmark in the Global Economy.

Globalisation strategy

After the elections in 2005 the Government decided to set up a Globalization Council to prepare a comprehensive strategy for Denmark in the global economy. The Council is chaired by the Prime Minister and has 26 members: 21 high level representatives and 5 key ministers. The representatives come from trade unions, industrial organisations, companies, and the education and the research community. Over a period of one year the Council met 14 times and discussed the strategy and in spring 2006 presented the final result. They were also helped by a large number of international and Danish experts.

The strategy contains 350 specific initiatives, which detail extensive reforms of education and research programs and substantial improvements in the framework conditions for growth and innovation in all areas of society, including entrepreneurship and innovation policy. Many of the initiatives focus on the governance and efficiency of education and research activities.

At the same time as the Globalisation strategy was being developed, the Government was also working on a series of welfare reform proposals. These focused on issues such as getting young people to complete their studies faster, on postponing the average retirement age, and on improving the integration of immigrants. The savings from the welfare reform package contributes to financing the globalization strategy (e.g. investments in education and research).

The Council for Technology and Innovation was another recent addition to the STI policy scene. The council advises the Minister of Technology, Science and Innovation and is authorised to make decisions on a number of specific appropriation affairs. The council members are appointed by the minister and represent wide range of views. Its main role is the co-ordination of innovation policy.

Analysis of strategic governance in the Denmark

Having looked at the recent changes in the STI governance system, this section analyses the Danish system according to the four characteristics of strategic governance defined and described in the first half of the project. The analysis focuses mainly on the Globalisation Strategy as this has been one of the major changes to policy making in recent years.

1) Scope

The globalisation strategy provides a high level policy framework that sets the general direction for policy Denmark. This strategy has not only managed to co-ordinate a common direction for diverse policy areas. It has also successfully managed to draw up a collection of 350 separate initiatives that will be implemented by the individual ministries as part of the strategy's implementation. The breadth and depth of the strategy is currently quite unique in Europe.

2) Ability

The Globalisation strategy provides a high-level framework within which different actors and policy areas can work together. The Strategy is not just a high level document that has no impact on levels further down, but a framework for each individual's own work. There were many ministries involved in the formulation of the strategy that were able to include and discuss their own agendas in the process.

3) Responsiveness

Danish STI policy has been previously criticised for not involving many different STI actors in the development of policies. Recently however, there has been a change in the way that external actors are integrated and policy actors have increasingly begun to seek a dialogue with more STI actors. The change was motivated by the belief that more interaction will lead to better policies and most importantly to more commitment to the policies.

The development of the Globalisation Strategy was an interactive process. All material for Council meetings was made available beforehand for the press and the general public on a special website. Over 100 representatives of organisations and other individuals were invited to participate in the meetings.

Horizon scanning
Another recent way in which different actors have come together to define an agenda has been the development of a document on the focus of strategic research up until 2015. Parliament had asked for a catalogue of strategic research themes. The ministry asked the OECD as an independent actor to assess the situation in Denmark and to write a report on the problems and the challenges facing the country. The OECD report was put on the web site for and people were asked to define strategic research themes based on the report. There were 500 suggestions to the request. The 500 suggestions were given to a group of 30 experts to make a catalogue of themes which was again sent out to the main actors in the field for review. Based on an intensive dialogue the final list was reduced to 21 themes for

strategic research. The results of this exercise will be used in conjunction with the Globalisation Strategy in order to focus the research agenda of the Council for Strategic Research.

4) Quality

The Globalisation Strategy has had a large effect on issues such as evaluation and performance. The Globalisation Council worked with indicators and benchmarks and would like to have more performance indicators to measure the Danish system. A new unit has been established to focus on evaluation of the globalisation strategy.

In addition, an evaluation of the whole of the research council system is planned in order to assess their current structure and functioning.

Conclusions – is Danish STI policy strategic?

The Danish STI governance system is probably unique in Europe at the moment. The Globalisation Strategy forms a comprehensive framework that embeds STI policy in the bigger picture. From this point of view policy making is certainly strategically orientated, although not focused purely on STI policy.

What is the impact of strategic governance on the Danish system?

The Danish "policy mix" case study on governance in Denmark is very critical of the current changes taking place in Denmark. The Authors suggest that changes to STI policy taking place as a result of the globalisation strategy are leading to an increase in strategic and applied research at the expense of basic research. He also asks whether recent calls for an increase in "accountability, control and societal relevance" for research funds "encourages innovative research or just leads to reproduction of already accepted results".

Case Study on Strategic Governance in Estonia

Brussels
September 19, 2008

Introduction and aims

This paper is part of the project "Strategic Governance in R&D related policies". It is one of three case studies looking at the extent to which the R&D policy can be termed strategic and if so whether this has an impact on the policy process and the policies. This paper focuses on the Estonia. The other case studies are Denmark and United Kingdom.

There are currently many different projects around that analyse the governance settings and the types of policies pursued in STI policy in EU Member States.

Very detailed and good descriptions of the Estonian STI governance system can be found on web sites such as the ERAWATCH research inventory *http://cordis.europa.eu/erawatch/index.cfm* and the Estonian Research Portal *https://www.etis.ee/index.aspx?lang=en* . An analysis of the Estonian STI governance system can be found in the case study on Estonia in the project "Monitoring and analysis of policies and public financing instruments conducive to higher levels of R&D investments" or "policy mix" project *http://rid.intrasoft-intl.com/PolicyMix/UserFiles/File/UploadedDocs/070408_Policy-Mix_Country%20Review_Estonia.doc* , in the CREST 3% OMC Third Cycle Policy Mix Peer Review report for the UK *http://ec.europa.eu/invest-in-research/pdf/download_en/omc_ee_review_report.pdf*, in the INNO-Policy TrendChart - Policy Trends and Appraisal Report 2007 *http://www.proinno-europe.eu/docs/reports/documents/Country_Report_Estonia_2007.pdf* and the United Kingdom Response to the STI Outlook 2006 Policy Questionnaire for the OECD *http://www.oecd.org/dataoecd/5/56/38893436.pdf*. In addition, ERAWATCH is now producing their own analytical country reports. Although each of these web sites and reports has a slightly different focus, each of them has a section on governance structures and in many cases an assessment of the governance structure's ability to function.

The analysis here does not attempt to repeat what can be found on these web sites and in these projects, but to analyse the STI governance systems in terms of the four characteristics of strategic governance that were determined in the first phase of this project. The analysis draws on much of material mentioned above as well as a few telephone interviews with informed people about Estonian STI policy.

Summary

The Estonian STI Policy can be seen as a country with a well developed STI policy but not too strong links to other policy areas. Consequently strategic governance seems to be in a more infant state.

The Estonian STI governance system consists of several attempts to integrate examples of more advanced R&D intensive small open economies (predominantly Finland and Sweden, partly the Netherlands and Austria). Nevertheless, the major impetus for policies is coming from the Structural funds of EU and almost all dimensions of 'strategic governance' are heavily influenced if not to a large extent determined by the EU's instruments.

Recent changes to the governance system

The institutional setting for and most policy measures of RTDI policy that has developed in Estonia over the last decade has been modelled using the examples of more advanced and more R&D intensive small open economies (predominantly SF and SWE, partly NL and AUT) (see Figure). Attention to policy developments in other countries was very high, role models and lessons from other countries were actively sought. People responsible for S&T policy have been trained abroad; the inclusion of foreign expertise in policy design and evaluation is frequent. Estonian S&T policy can be characterized as being very pro-active in policy learning.

Figure 1 Estonian Research Policy Organisation in 2005
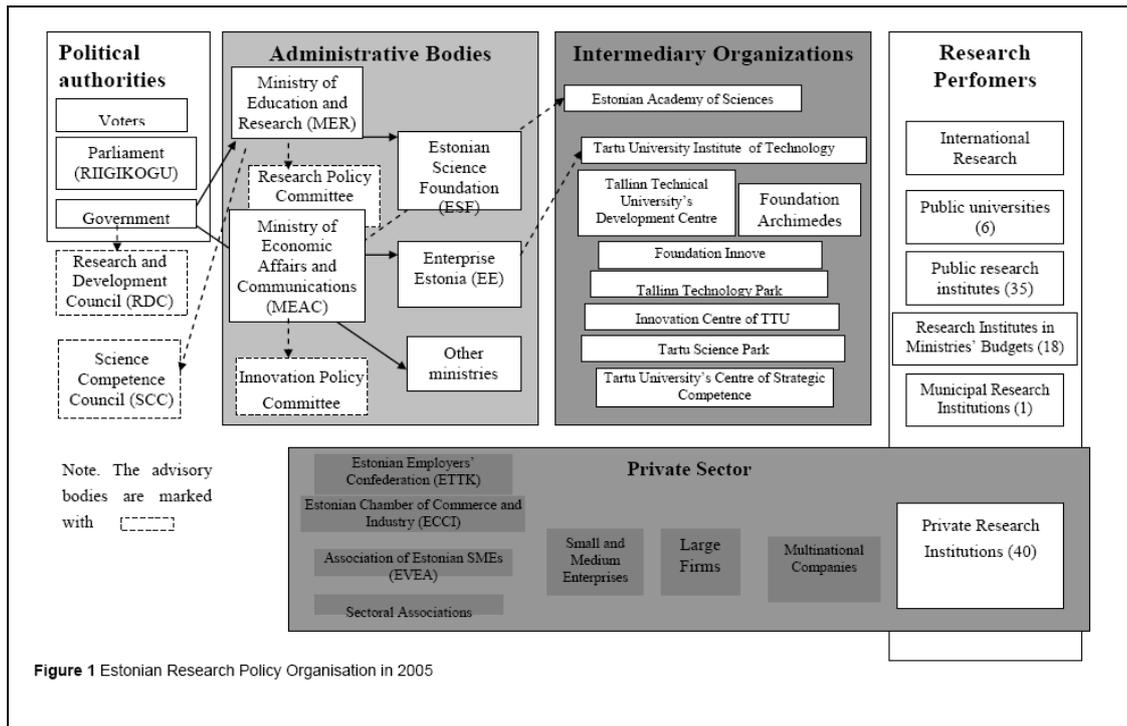
There are several strategic policy documents (e.g. the two successive S&T strategies and the SF planning documents) which act as a framework for the governance of the Estonian S&T policy. These documents, in their most recent versions adopt a 'systemic approach', that is, they emphasize links and coordination in the system, instead of the 'science push' model that dominated earlier versions. As such they indeed seem to provide some strategic orientation for the system – mostly through the SF documents, as they are the frame for a large part of R&D spending in the country. Alas, policy making in reality does always live up to the systemic concepts prevalent in the strategy documents:

The country is small, has a low R&D intensity and a very limited number of research performers (universities, enterprises, public research organisations). This would suggest that policy coordination and strategic orientation of actors should be easier than in larger, more developed and more diversified innovation systems. Nevertheless, also in Estonia there are complaints that proper coordination between policy making bodies and between areas (scientific research, enterprises) is lacking and one of the main weaknesses of the system (see recent reports from Männik 2007 and Polt 2007). This may also be due to the fact that some actors have not yet developed capacities for policy formulation in STI policy (which can be said for all employers associations). In terms of difficulties to achieve coherent and coordinated STI policy, Estonia seems to face the same challenges of policy coordination as other innovation systems.

The following description of the Estonian S&T system follows Männik 2007:

- S&T council which was established trying to emulate the Finnish model had been operated in practice (i) as two councils (one sub council for technology/innovation; one for science respectively) which did not interact, (ii) did not meet very regularly, (iii) did not achieve the attention from high-level policy which was hoped for. The CREST review therefore asked for an attempt to re-invigorate the council. Also, a merger of the two sub-committees could strengthen the capabilities for 'Strategic governance' of the whole of the council. Such a re-launch of the council is being debated in Estonia.
- Attempts to achieve 'Strategic Governance' of S&T policies are not eased by the fact that this policy area is not figuring very high on the overall policy agenda. Thus, there seems to be an awareness and policy attention problem with regard to S&T policy. The above mentioned review of CREST suggests that raising this issue higher on the policy awareness ladder.
- Within S&T policy in the more narrow sense, there was an attempt to increase the capabilities of the system for 'Strategic Governance' by establishing capacities to carry out technology foresight at the Estonian Development Fund. Previous national S&T strategies had named the definition of technological priority areas a task for strategic governance, but this task was only insufficiently carried out in previous years.

A major impetus for 'Strategic Governance' not only with respect to S&T policy but also for linkages to other policy areas comes from the Structural funds. Experiences from the preparation of the planning documents for the current (2007-2013) SF period suggest that this has driven ministries to interact much more closely. Apart from the main ministries for S&T, the Ministry of Finance had a major role as it coordinated the preparation of the national development plans (in 2003, 2006).

From what we know of other transition or catching-up countries (e.g. the new Easter European member states, but also southern European ones), this is probably an observation which can be generalized: in this group of countries all dimensions of 'Strategic Governance' are heavily influenced if not to a large extent determined by the EU's instruments (FPs, SFs, OMC, etc.): in terms of goal setting, Estonia has adopted the 3% target (even if doubts can be raised whether this goal is realistic). In terms of the quality and reflectivity of the policy process, Estonia has adopted European practices in S&T policy formulation and evaluation not least through the active participation in the OMC (the country was reviewed by a team of peers from CREST in 2007).

Dimensions of strategic governance in Estonia

1) Scope

In the form of the white papers for S&T there does exist an overarching strategy. The production of the white papers is a regular process. The strategy contains spending targets as well as qualitative descriptions of goals. Main addressees are S&T institutions; coordination with other policy areas is weak. The need to produce coordinated plans for the Structural Funds induces some policy coordination between ministries otherwise not talking to each other on STI matters. Again, this is a regular process determined by the cycles of the SF. It can be said that

Estonia has a well developed S&T strategy policy process with some but not too strong links to other policy areas.

2) Ability

Apart from the white papers mentioned above, there are formal coordination mechanisms, most of all the S&T council. Its functioning (or rather the limits to it) has been described above. The reform of the council has been singled out as one of the main challenges for the improvement of the SG capabilities of the Estonian S&T policy system.

In terms of formal mechanisms for prioritisations, no systematic foresight activities have been carried out. Following the challenges set by the S&T strategy, a unit responsible for carrying out or initiating foresight on a regular basis was established at the Estonian Development funds.

There are regional innovation policy initiatives, which seem to make reference to the national S&T strategy, but there was no discernable formal link.

The EU plays a large role in terms of demands or impetus for creating capabilities for SG, both through the SF as well as through the OMC, which finds much more responsiveness in Estonia than in other countries.

3) Responsiveness

Stakeholder involvement evolved gradually from the first phase of S&T policy formulation (science push, science stakeholders dominating) to include business enterprises and others. As said above, the involvement is not an easy task, partly because of the lack of awareness on the side of business and their associations. Involvement is higher in special areas (e.g. the Estonian e-Government initiatives).

In terms of anticipation of change and adoption of strategy, the cycles of EU policy are most important determinants (FP and SF periods) of timing of adaptation and reformulation of strategy.

4) Quality

Evaluation is quite common in Estonian S&T policy, but most policy instruments and institutions are too young to be assessed for their impact. An assessment of the whole policy mix was carried out recently by a CREST peer group. It seems that evaluations have an impact on policy action, although there are little formal procedures to translate evaluation results into policy prescriptions. Evaluations are frequently carried out with international participation. Also in terms of research on the innovation system, Estonia seem to have some capacities which provide groundwork for evidence based policy making in the form of a considerable number of studies on several characteristics of the innovation system.

Conclusions – is Estonian STI policy strategic?

The Estonian STI Policy can be seen as a country with a well developed STI policy but not too strong links to other policy areas. Consequently strategic governance seems to be in a more

infant state. There are several limitations given, which support this status, amongst them are problems in coordination, participation and an implementation gap.

What is the impact of strategic governance on the Estonian system?

As stated before, the system is just developing and still suffers from some limitations in the system (e.g. an implementation gap), but clearly show the importance of the EU's instruments.

Case Study on Strategic Governance in the UK

Introduction and aims

This paper is part of the project "Strategic Governance in R&D related policies". It is one of three case studies looking at the extent to which the R&D policy can be termed strategic and if so whether this has an impact on the policy process and the policies. This paper focuses on the UK. The other case studies are Denmark and Estonia.

There are currently many different projects around that analyse the governance settings and the types of policies pursued in STI policy in EU Member States.

Very detailed and good descriptions of the UK STI governance system can be found on web sites such as the ERAWATCH research inventory *http://cordis.europa.eu/erawatch/index.cfm* and the British Council websites http://www.britishcouncil.org/gost/ . An analysis of the UK STI governance system can be found in the case study on the UK in the project "Monitoring and analysis of policies and public financing instruments conducive to higher levels of R&D investments" or "policy mix" project *http://rid.intrasoft-intl.com/PolicyMix/UserFiles/File/UploadedDocs/Policy-Mix-Country%20Review-UK%20-%20published.doc* , in the CREST 3% OMC Third Cycle Policy Mix Peer Review report for the UK *http://ec.europa.eu/invest-in-research/pdf/download_en/omc_uk_review_report.pdf*, in the INNO-Policy TrendChart - Policy Trends and Appraisal Report 2007 *http://www.proinno-europe.eu/docs/reports/documents/Country_Report_United_Kingdom_2007.pdf* and the United Kingdom Response to the STI Outlook 2006 Policy Questionnaire for the OECD *http://www.oecd.org/dataoecd/5/56/38893436.pdf*. In addition, ERAWATCH is now producing their own analytical country reports. Although each of these web sites and reports has a slightly different focus, each of them has a section on governance structures and in many cases an assessment of the governance structure's ability to function.

The analysis here does not attempt to repeat what can be found on these web sites and in these projects, but to analyse the STI governance systems in terms of the four characteristics of strategic governance that were determined in the first phase of this project. The analysis draws on much of material mentioned above as well as a number of face-to-face interviews in the UK.

Recent changes to the governance system

There have recently been significant changes to the governance structures in the UK. The central focus of S&T policy in the UK is the Department for Innovation, Universities and Skills (DIUS). This department was created in June 2007 after the Department for Trade and Industry and the Department for Education and Skills was replaced by three new departments: The Department for Business, Enterprise, The Department for Innovation, Universities and Skills (DIUS) and the Department for Children Schools and Families (DCSF)

DIUS has brought together functions from two former departments: science and innovation responsibilities from the Department of Trade and Industry and Skills, further and higher education from the Department for Education and Skills. The main aim of DIUS is the delivery of the Government's long-term vision to make Britain one of the best places in the world for science, research and innovation and to raise the level of education and skills at every level in our economy to give the UK the competitive edge.

The reasons behind the new division of labour between the ministries are manifold. Firstly, there was a belief held by many that the DTI was not working properly any longer and that something had to change. Over the last 5-6 years the DTI had been losing some of its competencies to the

regions. Secondly, Gordon Brown as Chancellor was always unhappy with the DTI and took the first opportunity to remove it.

The implications for the changes are also viewed differently by different parts of the policy system. Some observers believe that the role of science has increased in importance by being taken out from under industry and joined up with universities. Others think that on the ground not much has changed and that the emphasis has stayed the same. Science has, after all, been left out of the title.

On a more practical level although the relationship between science and universities has been strengthened, science and industry will be less closely allied and the linkages with schools will not be as strong.

Office for Science
The Office of Science and Technology (OST) was established in 1992 in the Cabinet Office. Since 1995 the OST has been part of the Department of Trade and Industry where it provides the central focus for the development of Government policy on science and technology, nationally across the broad spectrum of government, and internationally. In April 2006 the Office for Science and Technology (OST) and the DTI's Innovation Group became the Office of Science and Innovation (OSI). This was to integrate the OST more into what the DTI was doing.

The OSI was divided into two parts:

- a Transdepartmental Science and Technology Group that supported the head of the OSI in advising the Prime Minister, the Cabinet, the Secretary of State for Trade and Industry and the Minister for Science and Innovation.
- The Science and Innovation Group which supports the Director General of Science and Innovation (DGSI) in allocating the Science Budget, assuring the successful operation of the eight Research Councils and assisting innovation

Since the new split of ministries, the name of the Office has changed yet again being now referred to as the Government Office for Science. The new office has taken over some of the responsibilities of the OSI and resources of the Transdepartmental Science and Technology Group of the Office of Science and Technology, former DTI. Other, former tasks of the Office for Science and Innovation have become part of the Science and Innovation group at the DIUS.

The Government Office for Science, headed by the Government Chief Scientific Adviser (GCSA) Professor John Beddington is located within DIUS. The GCSA is responsible to the Prime Minister and Cabinet for the quality of scientific advice to them on scientific and science policy issues.

Provides scientific advice to the Prime Minister and the members of the Cabinet, provides the Prime Minister and Cabinet on aspects of Government policy on science and technology and ensures quality of evidence and advice in Government. In addition, the Office will also be responsible for:

- oversees the Government's Foresight programme and Horizon Scanning Centre;
- Chairs the Global Science and Innovation Forum which co-ordinates the UK's international science and innovation strategy and delivery;
- co-chairs the Prime Minister's Council for Science and Technology;
- Heads the Science and Engineering profession in Government.

The Science and Innovation Group at the DIUS is responsible for:

- The science budget including funding the seven Research Councils, three National Academies, the Higher Innovation Fund, Capital Funding for research Infrastructure, and science and society programmes
- Policy on innovation including funding for the Technology Strategy Board, the National Measurement System, the National Physical Laboratory, British Standards Institute, the Design Council and government links with NESTA (National Endowment for Science, Technology and the Arts)
- British Space Centre
- UK-Intellectual Property Office (UK-IPO)
- National Weights and Measures Laboratory (NWML)

Agencies

The TSB

The TSB is one of the most interesting changes to the UK S&T governance system in recent years. Established in 2004 as an advisory body, in 2007 it became an executive body at arm's length from Government in July 2007. Its mission is "to promote and support research into, and development and exploitation of, science and technology and new ideas for the benefit of business, in order to increase sustainable economic growth and improve the quality of life. The organisation is sponsored by the Department for Innovation, Universities and Skills (DIUS). It has in many ways become the main technology funding agency in the UK. Its total budget for the TSB for the next three years is £1bn. £120 mill of this budget is money that the Research Councils are required to align with the TSB's objectives and a further £180 mill is from the Regional Development Agencies.

Although the TSB has to have its strategies ratified by DIUS and deliver quarterly and annual reports, it designs and implements its own strategy. The strategy is developed through its governing body which is made up mostly of people with a background in business. They are supported by the TSB executive.

Creating an agency to run the technology programmes outside of Government is a new step for the UK. However, many observers believe that the distance to BBERV will allow the TSB to have closer contact with other ministries that would previously not been possible. In addition to closer contact to other ministries, the establishment of the TSB in this form was a deliberate step to involve more people from business in working for the agency and in this way to take it closer to business itself. The TSB is still very new and their first strategy is expected in April. There are a lot of expectations on the TSB.

The TSB has a number of different programmes and initiatives. One of these is the innovation platforms that have been initiated to address societal problems. There aim is to link innovation and the business sector with regulation and procurement. There are several innovation platforms running. These focus on issues such as climate change and the building sector, low carbon vehicles, intelligent transport, assisted living and network security.

When the Government was thinking about establishing the agency, several people went to Tekes in Finland to find out what they were doing. The impressions were positive and the trip certainly influenced the design of the new agency.

Analysis of strategic governance in the UK

Having looked at the recent changes in the STI governance system, this section analyses the UK system according to the four characteristics of strategic governance defined and described in the first half of the project.

1) Scope

There is a high level framework for S&T policy in place in the UK. This is the Science and innovation investment framework. However to understand the way in which STI policy and its formulation works in the UK, one needs to understand a little bit about the way in which Government policies are formed. The UK has several distinct features that belong to the context of general policy making that have a large impact on the ways in which S&T policy is designed and implemented.

The first of these is the role of the UK Treasury in overseeing and co-ordinating policy making. It has several instruments at its disposal one of these being the Comprehensive Spending Review which is a long-term and fundamental examination of Government expenditure. In the 1998 Comprehensive Spending Review Public Service Agreements were introduced in order to improve public service delivery. The PSAs set out the key priority outcomes the Government wants to achieve in the next spending period (current period 2008-2011). Each of the PSAs has a single Delivery Unit shared across all contributing departments that has been developed with delivery departments and frontline workers. Each PSA has a set of performance indicators. The UK "policy mix" report has a detailed description of PSAs in STI policy[2]. This report describes the specific performance indicators for STI policy.

The centre of S&T policy in the UK is the S&T Investment Framework. The framework sets out the long-term vision for UK science and innovation. The SIIF was published in 2004 after a substantial consultation process involving many different actors from research, business, charities and many other Government departments. It is a ten-year strategy that aims to make the UK second only to the US on research excellence. It outlines the long-term vision and the funding arrangements. The SIIF is reviewed annually and regular concrete targets are set. It is not an abstract framework, but a working document. However, within this framework many observers think that the picture is less clear as each individual actor still pursues their own goals and develops their own strategies. They do have a clear idea about what the other is doing, but it can happen that one ministry publishes two white papers in one week as recently happened.

S&T policy in the UK is not heavily influenced by European S&T policy or by the content of the framework programmes. Many observers question the benefits of continued participation in the Framework Programmes saying that they do not wish to participate in cohesion policy dressed up as research policy.

2) Ability

The UK governance system is highly co-ordinated. A main role in co-ordination is played by the SIIF that provides a framework for the various actors in which to manoeuvre. A key figure in co-ordination is the Government Chief Scientific Advisor. His role is described above. There are many other individual mechanisms that aim to support the co-ordination of policy making. The UK system is able to create new mechanisms to co-ordinate parts of a policy if deemed necessary. One such mechanism is the Funders Forum, a body to co-ordinate funding in S&T in the UK and

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[2] See p. 10

the Global Science and Innovation Forum, a body that focuses on the internationalisation of UK S&T.

The Funders Forum
The SIIF also introduced another co-ordination body to the governance system, the funders forum. This is a forum that was established "to consider the collective impact of their strategies on the sustainability, health and outputs on the Research Base". It includes representatives from charities, industry, Research Councils, Funding Councils, Regional Development Agencies, the Higher Education sector and Government departments. They meet on a quarterly basis.

The Global Science and Innovation Forum
The Global Science and Innovation Investment Framework is a vehicle that aims to coordinate the UK effort in international science and innovation collaboration. The Science and Innovation Investment Framework 2004-1014 (HMT, 2004) charged GSIF with the design and implementation of the UK's Global Science and Innovation Strategy for international engagement in science and technology. This is a key element of the current activity of GSIF. Its membership organisations are:

- Department for Innovation, Universities & Skills (including trans-departmental, research base and innovation areas)
- UK Trade & Investment
- Foreign & Commonwealth Office
- Department for Environment, Food & Rural Affairs
- Department for International Development
- British Council
- Royal Society
- Research Councils UK
- Department for Education and Skills
- HM Treasury
- Department of Health
- Home Office

One of the more recent additions to UK S&T policy advice is the Horizon Scanning Centre. The centre also plays a large role in facilitating cross-Government co-ordination. The centre was established as a result of the SIIF to do two things. Firstly, it should inform strategic prioritisation and secondly to raise capability across government in doing horizon scanning. The centre works through doing targeted projects for individual parts of Government, through training and through organising a network of practitioners. The main aim of the projects is to help look beyond a "single expected future" to a "range of possible futures" by looking beyond the usual time scales and usual sources. Although the initial objectives of the Centre were more technologically focused, its current focus is much broader and its work includes a wide range of projects with a more societal focus.

There is no requirement for the individual departments to use or implement the recommendations that come out of a scanning exercise. However, the selection criteria for choosing projects reflect the requirement for a concrete use for the project. For client lad projects the criteria include: clear demand for a project and clear commitment of resources, significant consequent action by client, cross-departmental involvement, stakeholder engagement and no duplication of current work. Even for more explanatory projects the criteria include potential impact on public policy, cross-departmental involvement and stakeholder engagement.

Recent projects carried out by the Centre have included a project on international futures and included the participation of a wide range of different parts of Government and one on the future

of trade with Asia for the UK. The Centre is currently working on a series of scenarios for DIUS to set priorities and scenarios for the ministry over a time period of 15 years.

Co-ordination with the regional level is not as well developed. Recently regional influence on STI policy has been growing as the regions now all develop strategies. Currently, these strategies are quite new and all look quite similar to each other with each region wanting to focus on the same high-tech fields. Both the regions would need to develop better strategies and strengthen their relationship to the national level.

3) Responsiveness

The UK STI governance system can be considered very inclusive. Wide use is made of consultation mechanisms and there is a high level of debate that goes on between Government and the different stakeholders. The review of the SIIF is such an example. In fact, many Government papers are put on ministry web sites for comment before they are finalised. Of course, there is no obligation for the Government to take the comments into account, however, many organisations that submit responses also make these public on their websites and through doing so increasing the debate on STI policy. This also makes the UK approach to policy formulation very transparent. Everything from policy reviews to responses to Government papers can be found on the web. Even the reports from the parliamentary committee and the Government responses are available to the general public.

In a way the TSB is also a good example of a mechanism that is aimed at increasing the co-ordination between different agents. The board of the TSB is made up of people from industry and has been designed to increase industry involvement in the agency.

The Council for Science and technology (CST) is an advisory body that facilitates the interaction between Government and the academic community. CST's remit is to advise the Prime Minister and the First Ministers of Scotland and Wales on strategic issues that cut across the responsibilities of individual government departments. CST organises its work around five broad themes (research, science and society, education, science and government, and technology innovation) and takes a medium to longer term approach. The Council for Science and Technology was re-launched in 2004, following a review, with new terms of reference, a new membership, and a new way of working. CST terms of reference were amended at the September 2007 meeting. Although many observers see the CST as an important body for discussing certain topical issues, they thought that their influence on or importance to policy making was small.

4) Quality

The UK reviews and evaluates STI policy frequently and in different ways. Firstly, there are the policy reviews that aim to take stock of policy in a given field. Secondly, the main SIIF is reviewed annually and concrete objectives set. In addition, the UK has a strong evaluation culture that is constantly being developed. In addition, the UK has a series of checks and balances from the parliamentary side whose role it is to assess Government policy.

Policy is constantly being reviewed in the UK. There are numerous reviews of policy areas. These are highly valued not just as a way of reflecting on developments in a certain policy area, but as a method for involving different actors in the development of future strategies. Such an example is the Sainsbury Review of Science and Innovation (Oct 2007). The review examines the role of science and innovation in ensuring the UK remains competitive in our increasingly globalised economy and took a year to complete. The Author interviewed and talked to many different people in the course of writing the document and the end result is held by most to be a good picture of the problems and challenges faced by STI policy. Although the review was overtaken by events and the Ministries were re-shuffled before the review was published it was still important

for writing down current thinking on STI policy in the UK. In fact many of the recommendations have already been taken up.

There is also an increased emphasis on the UK in setting objectives and measuring them. This is also the case for individual actors within the system. One example is the research councils who now have strategic five year plans with annual updates. However, this system has not been in place very long and is still being worked through.

The UK parliament has two committees that focus on science and technology. The House of Commons Science and technology Committee was established in 1992 to examine "the expenditure, policy and administration if the Office of Science and technology". The Committee was recently renamed as a result of the changes on the ministerial level. The Committee is now called the Innovation, Universities and Skills Committee. The Committee would have liked to have added science to its name to reemphasize the focus on science. This suggestion was, however, rejected by Government.

POST – Parliamentary Office of Science and Technology
POST is "the UK Parliaments in-house source of independent, balanced and accessible analysis of public policy issues related to science and technology". The office provides a number of different services:

- publishes its own short briefings on subjects (POSTnotes) and longer reports
- supports the Select Committees with informal advice, data analysis and follow-up advice
- informs both Houses on public dialogue activities in science and technology
- organises discussions to stimulate debate on a wide range of topical issues, from small working groups to large lectures
- horizon scanning to anticipate issues of science and technology

Conclusions – is UK S&T policy strategic?

The UK would appear to have a strategic approach to governance of R&D policy. There is a broad and long-term framework within which S&T policy takes place. There is a climate in which policies are reflected upon and changed if there is thought to be a better way of doing it. There are many formal mechanisms that try and link up the various bits of the system and provide for the inclusion of stakeholders. Policy reviews and evaluations take place at regular intervals and the UK appears to be a system that is not frightened of trying things out and learning from them. As one observer said "we try things out. There is no completely right way to answer every question simultaneously. Once one question has been answered we go and look at another one".

What is the impact of strategic governance on the UK system?

The UK has according to the criteria used in this project a strategic approach to R&D governance. The question this project was asked to answer was does it make a difference whether there is a strategic approach to governance in R&D policy or not? In the UK it is difficult to separate the STI governance system from the strategic elements as the project suggests. The Government's approach to the UK STI policy is to govern in the most effect and efficient way possible often referred to in the UK setting as evidence based policy making.