Enabling better RTDI policy-making in Europe's Regions

STRATEGIC POLICY INTELLIGENCE TOOLS – A GUIDE

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The RegStrat Guide to

Strategic Policy Intelligence Tools

REGSTRAT

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Foreword

The regions have a vital role to play in the EU's drive to develop a common European Research Area (ERA). EU goals include achieving the 3% target for investment in Research, Technological Development and Innovation (RTDI) set down by the European Council at its Barcelona meeting in 2002, and contributing to the optimisation of research programmes and priorities envisaged in the 2007 Commission Green Paper on New Perspectives for the ERA.

Empowering the strategic development of Europe's regions is, therefore, a critical requirement for transforming the EU into a competitive knowledge-based economy. This necessitates supporting regional authorities to continuously review and develop the institutional features, strategic capabilities, and the organisational skills and expertise to design and implement research and innovation policies that can increase their regions' competitiveness. This is important not only for their own future economic well-being but also because of the cohesion 'risk' it could pose for the Community if some regions remain marginal in terms of knowledge-based activities. An additional contribution to a competitive EU is achieved when the strategies in the different regions are developed in a way that leads to an overall optimisation of programmes and priorities in the EU, at and across governance levels.

While Europe's regions are very heterogeneous in terms of their RTDI profiles, they all share the need for guidance on how to formulate policies to support their development into knowledge-based regional economies in today's globalised markets. Long-term competitiveness and growth is linked to a region's ability to improve the coherence and, where necessary, the co-ordination between different policies for achieving long-term objectives.

The RegStrat project promoted by Steinbeis-Europa-Zentrum (SEZ, Germany) in co-operation with the partner organisations, Forfás (Ireland), IReR (Italy), Fundecyt (Spain), WUT (Poland) and IBS (Estonia), aims to enhance regional policy-making, especially in relation to RTDI, by synthesising the knowledge and experiences of policy research experts and of advanced policy practitioners, and by making this available to policy-makers throughout Europe via the development and publication of a practical, user-friendly Guide and Compendium.

RegStrat, one of the projects co-funded by the Sixth Research Framework Programme (FP6) under the Regions of Knowledge 2 initiative, draws on the accumulated knowledge of national and regional practitioners in the use of Strategic Policy Intelligence (SPI) tools such as innovation audits, benchmarking, foresight, technology assessment and evaluation. Moreover, RegStrat not only seeks to promote the systematic use of individual SPI tools but, more importantly, their integrated use in support of the whole policy cycle.

One objective of the project is to leverage the large knowledge stocks accumulated during decades of Structural Funds evaluations, monitoring and benchmarking, and to develop guiding models for forward-looking, region-shaping exercises. The hope is that these guides will help other convergence regions to take full advantage of EU RTDI interventions, e.g. the 2007–2013 Structural Funds' (ERDF/ESF) focus on RTDI, and thereby increase the contributions of their regional RTDI activities to the Lisbon goals.

We hope that this Guide, along with its companion publication, the RegStrat Compendium, will be a valuable asset to you, the regional policy-maker, in your quest to transform your region into an innovative and knowledge-based economy.

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Preface

The purpose of this Guide — together with its companion publication, the RegStrat Compendium — is to assist regional decision-makers, especially those concerned with the area of Research, Technological Development and Innovation (RTDI), to develop competence in the use of Strategic Policy Intelligence (SPI) tools such as innovation audit, benchmarking, foresight, technology assessment and evaluation.

More importantly, the Guide seeks to provide regional decision-makers with the motivation and insights to use SPI tools, systematically and in an integrated manner throughout the policy cycle.

The goals of the Guide and Compendium include, *inter alia*, to support decision-makers in both the public and the private domain to design and implement better RTDI investment strategies in Europe's regions. They can thus contribute to the EU's Lisbon Strategy to become a competitive knowledge-based economy, and to the Barcelona target of investing 3% of GDP in RTDI. In developing their networks and gaining the strategic knowledge from their individual SPI-based exercises, decision-makers can fashion their preferred strategies in a way that also contributes to the achievement of overall EU programmes and priorities.

The Guide is divided into five chapters. The first chapter describes the overall policy-making environment which informs our policy considerations, and focuses especially on the regional dimension. Also, it provides an overview of the integrated use of SPI tools and highlights the importance of embedding an SPI culture within the regional policy-making networks.

The second chapter outlines the EU support available for regional applications of SPI tools.

The third chapter presents a case study illustrating how one region used SPI tools in an integrated manner to address regional development and competitiveness issues. Even though the case study is fictional, it is based on real-life experiences gained from the application of SPI tools in regions throughout Europe. The further use of SPI to improve direct innovation support measures is also discussed in this chapter.

Chapter four presents a description of the individual SPI tools and discusses the specifics of their application. It begins with a brief overview of the techniques applied in SPI exercises and presents a summary of the elements common to all SPI exercises. A more detailed description of the individual SPI tools and their application, together with illustrative case studies from different countries, can be found in the Compendium.

The final chapter presents the key lessons and conclusions distilled from interviews with practitioners in the use and application of SPI tools.

The Guide concludes with a list of further resources and links which readers can explore to pursue their SPI learning. Links to the relevant sections of the RegStrat Compendium are also offered throughout this Guide so that further information can be obtained.

Chapter 1

The use of SPI Tools

1.1 Introduction: Strategic Policy Intelligence for decision-making

Strategic Intelligence can be defined as "*the set of actions to search, process, diffuse and protect information in order to make it available to the right person at the right time in order to make the right decision.*"[1]

Strategic Policy Intelligence (SPI) tools are thus methodologies used to provide decision-makers with comprehensive, objective, politically unbiased and, most importantly, forward-looking information.

> In the case of RTDI policies these SPI tools include innovation audits, benchmarking, technology or regional foresight, technology assessment and evaluation.

The implementation of SPI tools takes the form of an exercise featuring techniques such as data analysis (bibliometric, patent, etc.), SWOT and STEEPV analyses, expert panels, scenario workshops, etc.

The effective use of SPI tools yields more **realistic, efficient, relevant and democratic** strategies for a range of policy fields. The strength of the application of SPI tools derives from:

- **Participation**: the SPI methodology invites the participation of all stakeholders involved in the decision-making;

- **Evidence-base**: SPI makes policy-making more objective through the integration of empirical data and rigorous analyses;

- **Mediation and alignment**: the SPI methodology generates mutual learning and understanding among the stakeholders and facilitates consensus-building;

- **Decision support**: SPI tools not only facilitate decision-making but, very importantly, also facilitate implementation of decisions taken.

SPI tools support the crafting and implementation of policy in two ways. They provide:

- Strategic knowledge based on a synthesis of expert and stakeholder input;

- Support to consensus building, mobilising the commitment of stakeholders and decision-makers around the policy decisions in question.

Often, SPI-based exercises are instigated by identifiable "*trigger events*" such as a landmark policy support framework, a change of government, or the stimulus of a pivotal seminar or consequential report. Current best practice suggests that those exercises can gain in efficacy and efficiency if carried out on a more continuous and integrated basis and synchronised with major policy cycles.

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1   Strategic Policy Intelligence: Current Trends, the State of Play and Perspectives. IPTS Technical Report Series, Seville, December 2001, EUR 20137 EN

1.2 The policy-making environment

Since the publication of the *Green Paper on Innovation* in 1995, policy-makers have become more and more aware of the growing social and economic problems caused by stagnating and/or falling competitiveness of many regions in the EU compared with other parts of the world especially in America and Asia. The need to jointly address the resulting challenges has been stressed up to the highest levels, e.g. in 2000 the Lisbon European Council called for the EU to become, by 2010, "*the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion.*" As research and innovation were considered key activities to increase long-term competitiveness, the concept of the European Research Area (ERA) was developed; subsequently, the European Council in Barcelona set the target to raise investments in RTDI to 3% of GDP by 2010.

The Lisbon Strategy was given a new impetus in 2005 with the call for a 'Partnership for Growth and Jobs' between the European Community and the Member States, fostering broad-based innovation strategies for the EU, its member states and regions. Again, in 2007, the Green Paper *ERA: New Perspectives* — and especially the parts dealing with **optimising programmes and priorities** — focused on the importance of co-operative and coherent policy-making and implementation, at and between the different governance levels (local, regional, national, EU).

It is evident that decision-makers in the EU need to explore novel strategies and approaches if they are to deliver a more competitive Europe and overcome the challenges posed by a complex and rapidly changing socio-economic political environment. This environment can be characterised by the following factors:

- **Globalisation**, bringing both opportunities and challenges for nations, regions, companies and individual citizens;

- The **acceleration of technological change**, both a precondition and a result of globalisation;

- **Changing innovation processes** towards more 'open' routes to innovation, integrating own knowledge and skills with those of external public or private innovation partners via strategic alliances and innovation networks;

- **Market liberalisation**, a precondition for globalisation and sustained competitiveness, but also a challenge to governments reducing and/or adapting their role in shaping regional or national policies;

- Global **social and environmental challenges**, the latter mainly related to air, soil, water, energy and climate-change issues;

- **Demographic challenges**, both with respect to an ageing society and attendant pressures on public expenditures, and to increasing migration pressures towards Europe;

- Increasing **individualisation**, diversification of values and sometimes polarisation of society.

To cope with this growing complexity and uncertainty policy-makers need to be able to command improved decision-making processes.

At all governance levels policy-making needs to focus on the acquisition of adequate knowledge for decision-making and on the involvement of all relevant stakeholders. In respect of RTDI they need to develop the building blocks for a **21st century governance of innovation**, viz appropriate institutional set-ups, procedures and practices for agenda setting, prioritisation, implementation and policy learning.

This implies a broader understanding of, and a new approach to, research and innovation policies:

- considering the systemic nature of research and innovation and their complex interactions with other policy fields and societal issues;

- developing flexible decision-making tools and mechanisms which facilitate horizontal coordination and support cross-sectoral linkages and networks.

This broader understanding of innovation systems, research and innovation policies and innovation processes implies the need to institute multi-actor policy-making in all policy fields. In this respect, one important condition for success is efficient knowledge generation and management at the macro level. This proves a very acute challenge when the increased public pressure for more transparency and accountability in policy-making is weighed against the often restricted financial resources made available to public bodies. Against this background, the design and implementation of sound policies can best be supported by a more systematic and increased application of strategic policy intelligence (SPI) tools.

1.3 The regional dimension

Since 2001 various EU communications have highlighted the importance of the regions' contribution to achieving the **Lisbon Goal and the Barcelona 3% target**. The regional dimension is of key importance in innovation policy because learning and innovation processes are often spatially bounded, and strengthened and improved by physical closeness. Thus, regional research and innovation activities can have a significant influence on strengthening the overall European RTDI capacity. By adapting the European RTDI policy approach to specific territorial conditions (top-down) and, at the same time, communicating the needs of the regions to the national and EU policy levels (bottom-up), regions perform an effective intermediary role in developing, tailoring and implementing RTDI policies and enhancing RTDI investments. They thus strengthen the European Research and Innovation Area (ERA/ERIA) and contribute to the optimisation of EU programmes and priorities.

In this context, SPI tools can be used as strategic instruments for boosting regional development and can form the basis for successful regional policy-making. In general, the application of SPI tools has to be adapted to the specific regional framework conditions, challenges and needs, and can contribute to successful regional policy-making under diverse regional circumstances and for different purposes, e.g. upgrading rural areas, transforming old industrialised regions, fostering cross-border co-operation, facilitating trans-regional technology transfer, improving regional strategies, etc.

Prominent examples of regional innovation policy interventions which can be enhanced considerably by the application of SPI tools are the development of regional innovation strategies and regional clusters. Clusters — geographical concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries and associated institutions (e.g. universities, agencies, trade associations and standards) in a particular field — are important settings to stimulate the productivity and innovativeness of companies and the formation of new businesses, thereby contributing to regional economic growth. Successful clusters are thus important motors of competitiveness for regional and national economies.

To conclude, regional policy-makers can increase both the effectiveness and the efficiency of research and innovation policies by using SPI-based approaches more systematically. Yet, these approaches need to be truly embedded in the decision-making processes of the regions. One-off exercises have their

value in giving impetus to regional innovation activities and can contribute to vision creation. Much more can be gained, however, when visions and long-term strategies are updated regularly, when networks and implementation processes are kept alive, and, in general, when an SPI culture and strategic capability is constantly nurtured.

1.4 Embedding an SPI culture to improve policy design and results

Building on what was said above, an objective of this Guide is to help embed the uptake and application of SPI tools in the policy culture of Europe's regions; this is also called for in the RTDI policy literature. The mounting pressures on RTDI policy-makers include actions to:

- Acknowledge, comprehend and master the increasing complexity of innovation systems (more actors, more interactions, more levels, etc.);

- Integrate 'classical' innovation policy initiatives with broader socio-economic targets, such as reducing unemployment and fostering social inclusion;

- Increase efficiency and effectiveness in the governance of science and technology, thus optimising, inter alia, the difficult decisions in the allocation of scarce resources for RTDI investments;

- Help preside over the establishment of an international division of labour in science and technology acceptable to all actors involved.

Considerable advances have been made in these areas by the application of SPI tools. This has encouraged policy-makers in some territories to use the tools more systematically to produce customised intelligence and know-how, thereby facilitating innovation and learning processes in their economic systems and societies. In so doing they benefited from:

- The **timely identification of new S&T developments** and possible areas of their application in ALL policy fields, in order to better anticipate their potential benefits for the economy and society;

- The elaboration of an adequate **information base for RTDI policy-making**, taking into account the general context and good practice, both from within the territory and with regard to other territories;

- The **formulation of policies** explicitly aimed at stimulating science and technology and its application both at the level of the individual instruments and integrated in the innovation systems;

- The effective **introduction of a user perspective** into discussions on the deployment and use of science and technology for economic growth and social enhancement.

The strength of an SPI-based approach to RTDI policy-making stems from the bringing together of specialised technical expertise (both technology expertise and SPI process know-how), diverse, distributed local know-how, and broad participation of stakeholders. The complexity of the policy challenges requires technological expertise; the local knowledge serves both to feed and anchor the expert deliberation and ensures its relevance to the outcomes; the process know-how ensures that successful strategies are formed as a result of the comprehensive collaboration of all these different resources.

Another challenge facing decision-makers is the increasing maturity and discernment of the citizens informed by their enhanced education levels. The public is becoming more and more knowledgeable about the possibilities and risks associated with new technologies and will not

hesitate to voice its preferences and make policy-makers truly answerable for their decisions. The trend towards mobile coalitions of special interest groups intensifies this public scrutiny.

The policy-maker's response must be to move from the traditional top-down, reactive approach to one which is proactive, participative, evidence-based, and uses transparent methods in finding solutions to the modern policy challenges. The new approach embraces SPI tools not only to gain access to **difficult-to-acquire strategic information** for decision-making but also as **socio-economic mobilisation tools to raise awareness and create consensus** around promising solutions.

1.5 Integrating the use of SPI tools in policy design and implementation

SPI tools should support all **stages of the decision-making process**. Often the main obstacle to effective and efficient policy-making is the distributed nature of the knowledge needed for decision-making. SPI tools can help identify, select, structure and 'translate' this knowledge, thereby enabling the development of **better policy options — more broadly based and consensual, more credible and implementable and, on average, less risky and more optimum**.

In the following, we use a simplified policy cycle framework to illustrate the point (cf the figure below).

1. A decision-making process aims **to shape the future state of society** by addressing the challenges it faces. It starts by developing ideas and **defining visions** of how the future should — and could — look, making recommendations on how best to realise them, and **pointing to priorities** that could be set. This is the stage where foresight, as an SPI tool to look into the longer-term future, can bring stakeholders together, detect and develop possible options for action, agree on general priorities, and thus generate the commitment to act.

2. Once the preferred vision is defined, discussed and agreed upon, **lines of actions have to be prioritised**, the **implications of adopting particular options** have to be **assessed**, and an **agenda** detailing the steps to be taken to move towards the vision needs to be **worked out**. Agenda setting means defining the policy objectives and setting the strategy for national, regional and sectoral levels. This is strongly influenced by different interest groups, but should be firmly based on results from the previous (i.e. the Foresight) phase to deliver implementable outcomes. This process can be supported by technology assessment and ex-ante evaluation.

    Technology assessment can be used to assess:

    ◗   which options (identified during the previous stage) are feasible;

    ◗   which impacts are to be expected for the different actors involved and affected, and how positive impacts can be increased and negative ones decreased to ensure that the implementation benefits all.

    Ex-ante evaluation can prove an important tool at this stage to provide comprehensive information and assess the success and utility of the options available.

3. **Detailing an agenda, e.g. a regional one**, covers the part of the policy cycle where the issues that have got onto the policy agenda are formulated into concrete regional initiatives, programmes or policies to be implemented. A road-mapping exercise can be useful in this respect to develop an agreed perception of the technological options — available at present and which could be exploited in the future — together with concrete steps to best realise them, e.g. in the form of optimised programs.

4. The **implementation and monitoring** part of the policy cycle refers to the application of the policy measures developed in the previous phase. It is often a different challenge to that of the design of the initiatives, due to political and practical trade-offs and changing context. Implementation should be accompanied by ongoing monitoring activities to ensure that the process is followed-up adequately, that appropriate actions are taken, and that the expected outcomes are achieved. This means continuous feedback and a willingness to modify the implementation process to optimise its outcomes.

5. Finally, the results of the process should be examined by means of **strategic evaluation and benchmarking**. Evaluation often refers to ex-post but may be conducted at an interim stage or in tandem with the implementation. Benchmarking refers to comparison of outcomes with those of other relevant exercises/fields/territories. These evaluation and benchmarking exercises provide recommendations for improvements in the process or for further actions.

   This phase should also include **policy learning**. This refers to all processes by which knowledge and understanding arise within decision-making processes through feed-back generated on:

   ◗ the underlying causes and preconditions for policies and initiatives;

   ◗ their effects.

6. To close the circle, outcomes of this phase are used to provide new inputs for the future formulation of visions and the optimisation of priorities.

Figure 1: From Vision to Action to new Futures
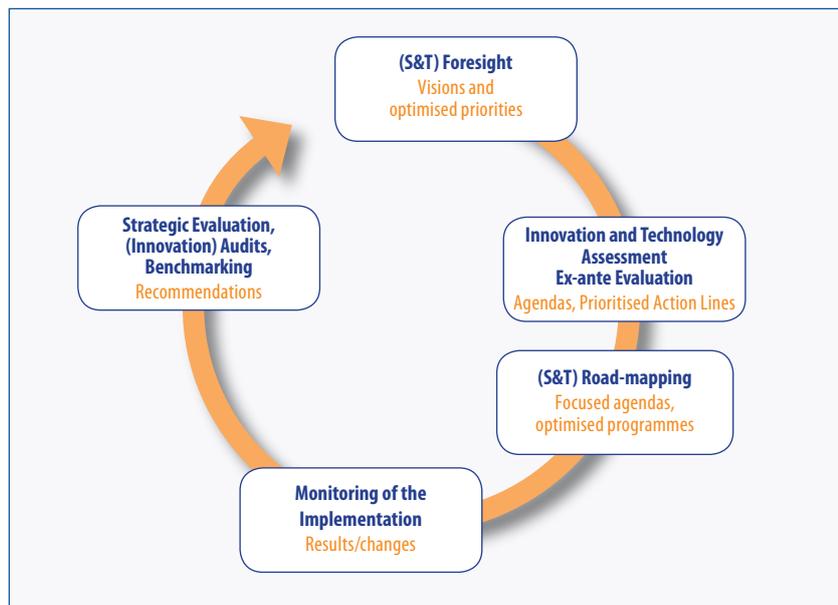
Source: Clar G. et al. (2007).

Regarding the policy learning mentioned above, this is not only an imperative for the different stakeholders and decision-makers in the individual territories. To be successful in Europe's multi-level and multi-actor innovation area, an assessment of the situations in other territories and at other governance levels is crucial. Therefore, mutually **optimising priorities and programmes in Europe** is more and more seen as an important part of the policy cycles at all governance levels.

Trans-regional co-operation in the application of SPI tools can provide important contributions both to territorial and EU competitiveness.[2] The possibilities and chances of success, and achieving

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2   Regarding SPI tools, the European Commission's 2007 Green Paper "*ERA — New Perspectives*" mentions specifically: common principles for evaluations and quality assurance; joint identification of major societal challenges; optimised (individual) priority setting based on shared foresight and technology assessment exercises and their results.

appropriate balances between competition and co-operation, are much higher **before** individual national and regional programmes are legally and administratively finalised.

Policy development and learning can be reinforced by **combining SPI tools**. There is no one generally applicable model. Optimally combined use depends on the objectives and the scope of the decisions in question, on the quantity and quality of information on the topic, and on the composition and relevance of the group of stakeholders involved.

The **Case Study** in section 3.2 describes the integrated use of SPI tools in an idealised sequence. In reality, SPI tools may be used in parallel and in an intermittent fashion, but, for the purposes of illustration, the Guide adopts a sequential story-line with the results of one SPI exercise feeding into the subsequent one. The key point to note is that there is substantial synergy to be gained by an integrated approach to the use of SPI tools, and, also, a stronger likelihood of embedding an SPI culture. To a large extent, the application of the different SPI tools involves the same regional stakeholders and similar methodologies — section 4.2 discusses this common core of methodological elements in all SPI exercises.

Chapter 2

EU support for funding SPI exercises

Following the announcement of the EU 2007–2013 programmes — the 7th Community Research Framework Programmes (FP7), the Competitiveness and Innovation Programme (CIP) and the Structural Funds (SF) — it was broadly acknowledged that the opportunities for RTDI investment offered by the different funding sources could only be optimised by exploiting their synergies. This, in turn, strongly reinforces the need to apply SPI tools for better programme design and management.

In light of scarce resources and pressing demands on national and regional budgets, stakeholders in Europe who are involved in applying SPI tools often regard EU-programmes as an important financing source for their activities. As the table below shows, the choice of the right funding programme depends on a number of factors. Broadly speaking, Structural Funds could be used to build up RTDI capacities for research and innovation; this would then enable regional actors to participate in European level research and development (FP7) and innovation activities (CIP).

All three Community programmes offer extensive opportunities for conducting projects involving the use of SPI tools. The following tips on how to access these programmes may be useful:

- Regularly check the respective work programmes and study their calls for proposals or tenders (available on EU web sites) to find out whether and how your project idea would fit into their priorities;

- Contact the institution responsible for the implementation of/counselling on the respective programme (European Commission, Regional/National Contact Points, Joint Technical Secretariats) to learn more about the procedure of submitting project proposals, the main requirements and the financial resources available;

- Develop a project proposal, taking into account the economic and innovation profile of the region, the relevant regional actors, the capacities and agendas of policy-making and implementation structures as well as aspects that could be of interest to other European actors;

- First-time SPI exercises should not be over-ambitious — keep it simple, don't try to be too sophisticated and don't tie yourself solely to 'fashionable' SPI techniques;

- Secure the commitment of the relevant political actors to conduct this kind of activity (this is especially important if the provision of co-financing for EU-funded projects is necessary).

More information on the possibilities for funding SPI activities and on the ways in which the use of SPI tools relate to the three EU programmes mentioned can be found in **greater details in the RegStrat Compendium**.

Table 1: Comparative overview of FP7, Structural Funds and CIP, from the perspective of increasing RTDI investments as a contribution to the Lisbon goal

	FP7	CIP	Structural Funds
Duration	7 years: 2007–2013		
Budget (Euro)	€50.521 billion	€3.6 billion	€307.6 billion
Commission aim	Progress in building the ERA & achieving the Lisbon strategy objectives: "***the EU becoming the most competitive and dynamic knowledge-based economy capable of sustainable economic growth with more and better jobs and greater social cohesion***"[3]		
Objectives	Underpin EU industrial competitiveness by supporting excellence in research	Enhance European competitiveness and innovation capacity	Support balanced development of the whole EU territory
Thematic programmes/ objectives at EU level	Specific programmes: • People • Ideas • Capacities • Co-operation	Three (sub-) programmes: • Entrepreneurship & Innovation • ICT policy support • Intelligent Energy	Three objectives: • Convergence • Competitiveness & Employment • European territorial co-operation
Rationale for participation	• International co-operation • Research excellence • R&D funding	• International co-operation • Innovation development	• Cross-border/transnational/interregional co-operation • Funding infrastructure development • Supporting regional initiatives (e.g. clusters & business networks) • Implementing RIS
Main target groups	• R&D institutes • Higher education institutes • Individual researchers • Industry (including knowledge intensive SMEs) • Public bodies	• SMEs • Large enterprises • Business support organisations (intermediaries)	• Regional & local authorities • SMEs • Higher education institutes • R&D institutes • Business support organisations (intermediaries)
Regional aspects of support for RTDI	• Helps optimise the use and development of Research Infrastructures • Encourages development of research-driven clusters ("Regions of Knowledge") • Seeks to unlock and develop Research Potential of convergence & outermost regions	Regions are invited to participate in exchanges & networking activities in the framework of CIP in order to take into account specific regional situations while identifying good practices.	• Help lagging regions catch up with innovation, entrepreneurship & technology transfer • Help better-off regions further increase competitiveness • Support priority areas of EU RTDI policies • Support participation in FP7 and CIP
Programme design at EU level	Work-programmes for specific subprogrammes/themes (updated annually)	Work-programme for each sub-programme (updated annually)	Priorisation in Community Strategic Guidelines and "Regions for Economic Change" initiative
National level priorities	Not applicable	Not applicable	National Strategic Reference Frameworks and Sectoral Operational Programmes (OPs)
Regional level implementation	Not applicable	Not applicable	Regional Operational Programmes (one for each region)
Project application and selection	• Procedure: calls for proposals & calls for tenders • Project proposal submitted directly to the European Commission	• Procedure: calls for proposals & calls for tenders • Project proposal submitted directly to the European Commission	Project proposal submitted to: • Regional/national agencies via calls for proposals or developmental procedure (Regional/Sectoral OPs) • Joint Technical Secretariats (territorial co-operation)
Main selection criteria	Scientific excellence	Contribution to innovation, energy efficiency & better use of ICT	• Contribution to the realisation of the goals established by national/regional strategies (Regional/Sectoral OPs) • Added value of territorial co-operation

3 COM (2005) 488

Source: Own compilation, based on Reid et al (2007).

Chapter 3

Applying SPI Tools along the policy cycle — a Case Study

3.1 Introduction

The purpose of the following section of the Guide is to present a case study (fictional) to illustrate how a regional policy planner might use all of the SPI tools in an integrated way in dealing with Research and Technological Development and Innovation (RTDI) policy issues.

While real-life cases are presented in the **Compendium**, the Ruritania case is fictional and not based on any actual region or organisation. This approach was adopted to enhance the expositional power of the narrative by merging together a number of actual situations and events from different regional experiences. Readers should note that, while the SPI tools are used in a linear fashion in the case study, this may not always reflect the situation in real life; for example, a number of the tools (e.g. Innovation Audits and Benchmarking) could be used concurrently.

3.2 Ruritania case study

Ruritania is a region in the south-west of Polyponia, one of Europe's peripheral countries. The region's economy is still heavily based on agriculture and natural resources but there has been solid achievement in fostering industrial development centred on the capital, Villamagna, where the foundations of an indigenous agrifood and textile sector have been laid. These industries have induced a dynamic light engineering services sector which, in turn, has spurred the provision of mechanical engineering training and applied research in the regional Institute of Technology.

A recent change of government in Polyponia followed a keenly-contested election campaign centred on the issue of opening up the economy to free trade. The successful new liberal government has promised to dismantle all remaining protectionist tariffs within three years of taking office.

Polyponia's Economic Development Ministry came under immense pressure to prepare the indigenous industry for the global competition. One strategy option was to adopt a low-cost approach based on wage control, but the Ministry set its sights at a higher level. For them the way to promote sustainable indigenous industry was to enhance its innovative capacity by encouraging it to improve business organisation methods, introduce new products and processes and thereby win new markets.

The Ministry requested its regional development agencies to introduce progressive RTDI measures in support of this strategy. The following account is a summary of the Ruritanian Development Agency's approach and the SPI tools it used.

Regional Innovation Audit

The Ruritanian Development Agency invited Inga Eriksson, its senior RTDI policy planner, to make a presentation. Inga demonstrated how the innovation performance of industry is nurtured by the overall regional innovation system. With the support of her agency, she first commissioned an Innovation Audit of the region to determine the strengths and weaknesses of its innovation system.

Inga paid close attention to the formulation of the terms of reference for the commission and was careful to include both quantitative and qualitative measures so that the Audit produced a rounded picture of Ruritania's innovation system.

> **Inga's Terms of Reference for the Regional Innovation Audit specified the following requirements:**
>
> ✔ Develop a broad profile of the region's demographics, employment and industrial structure, providing insights to the performance of the various sectors;
>
> ✔ Assess the general culture and attitude towards entrepreneurship and innovation in the region;
>
> ✔ Assess the extent of innovation in new products, processes and organisational structures by firms, and identify the internal and external conditions and factors encouraging innovation, paying particular attention to technology-based firms;
>
> ✔ Identify and evaluate the role and contribution of public and private institutional supports offering financial, consultancy, research, training and other supports;
>
> ✔ Identify the current and potential impact of the Higher Education institutions and other public and private sector research institutions on the region's innovative capacity;
>
> ✔ Identify the existence of formal and informal inter-firm networks.

Inga met with the successful consultants to critique their proposed audit methodology to make sure that their theoretical model of a dynamic innovation system would capture what she considered to be the key drivers of innovation.

The subsequent Audit report discussed the region's strengths and weaknesses with respect to:

- Entrepreneurial performance;

- Innovation performance;

- Public and private support systems for economic development;

- Higher education infrastructure and linkages to industry;

- Public research infrastructure and linkages to industry;

- Other public infrastructure.

The amount of innovation in industry was shown to be very modest and the drivers poorly understood. Ruritania had developed some strengths in applied research in its Institute of Technology, but, due to the low level of business R&D, there were virtually no linkages between industry and the research institution.

Benchmarking

The Agency now had a picture of Ruritania's innovation system, but how did it compare with that of other similar regions? Inga pointed out that innovation policy literature (including the European Commission Trend Chart outputs) contains copious information in terms of reports and performance scoreboards showing which regions were forging ahead in terms of innovation-driven economic

growth. The Agency agreed that Ruritania could learn from the innovation systems of successful regions with similar characteristics to those of Ruritania while accepting Inga's caveat that best practice lessons are subject to 'transferability conditions.' The Agency was particularly anxious to learn how these leading regions used RTDI policy interventions to drive innovation.

The question was which regions to pick as benchmarks. The main criteria indicated in the literature (e.g. EC Mutual Learning Platform study) include the following:

- The region should have consciously implemented a relevant process of outstanding effectiveness and efficiency (that it makes sense to learn from them);

- The region should have succeeded under similar circumstances (in order to make the lessons learned relevant for implementation);

- The region should be motivated to fully share its insights and act as a willing partner in the transfer of know-how — even sensitive but crucial information such as what did not work;

- The region should be 'close' to the policy-maker's own region in terms of geographical distance, language, etc., in order to limit transaction costs.

The Agency was aware that there is no one perfect exemplar, each successful region usually excels in perhaps one or two important economic activities. Therefore, it recommended a Benchmarking exercise to look at three best-practice regions which had surmounted similar geographical and institutional constraints to that of Ruritania and realised significant economic achievement.

The Benchmarking brief was drawn up and requests for tenders issued. The successful consultants were tasked to measure Ruritania against the three benchmark regions using an agreed framework of metrics; some comparisons were readily accessible from EU and OECD scoreboards, but the important work would comprise interviews with industry experts to identify the industry activities and capabilities underpinning the economic success. In particular, the consultants would observe which key supports, both public (policy interventions, educational and research institutions) and private (chambers of commerce, trade associations, sectoral research and technology institutions, etc.) were responsible for the industrial success in these regions.

The overriding finding from the Benchmarking exercises was that strong enterprise R&D performance was the major driver of innovation in all benchmark regions. The common feature of enterprise policy in these regions was a determination to move industry to higher added-value sectors and thereby escape the competition 'squeeze' between the advanced high technology economies and the low-cost economies.

Foresight

As a small regional economy with limited resources Ruritania had to be selective in its industrial effort. Having kept itself well informed of the use of foresight initiatives at both national and regional levels in EU and OECD countries the Agency recognised that a foresight exercise was now the appropriate tool to help Ruritania's stakeholders agree on the industrial sectors to promote and on which technology fields its indigenous industry should focus.

The Agency's first move was to set up a Foresight project team. They appointed Inga and three of her colleagues from the RTDI Planning Office. The Agency also engaged the services of an international expert in foresight processes and facilitation who would advise the team and be on hand to help prepare materials and facilitate the various deliberative sessions.

The project team then set about identifying and recruiting the members of a Steering Committee to oversee the Foresight project. It was agreed with the Agency that the Committee chairperson should be a prominent Ruritanian industrialist who would command the respect of his or her peers and be in a position to operate largely independent of political pressures. The team encountered considerable difficulty locating a candidate who was prepared to devote the necessary time and commitment. Equally challenging was the task of recruiting other senior actors from the business, education and policy-making communities to make up the Committee membership and provide appropriate expert knowledge and unbiased advice.

With the Committee finally in place the project team proceeded to scope out and design the Foresight project with input from the Committee. It was decided to set up four working panels based on the four prominent industry sectors in Ruritania, agrifood, textiles, light engineering and tourism. Each panel would conduct a Foresight exercise for its sector and was also asked to identify cross-cutting technologies and issues that should be considered in the new round of industrial promotion.

Panel participants were proposed and canvassed to join the project. Participants were chosen carefully with a judicious balance of public, private and higher education; it was important to select people who would work together yet engage in stimulating and challenging deliberation. The Foresight facilitator advised that all four panels use the same futures methodology so that their findings would be easier to synthesise.

A two-year budget had been promised for the Foresight exercise, but, ten months into the project, the liberal government was narrowly defeated on a vote of no confidence in their industrial strategy and new elections were called. The successful new labour government had promised to postpone the dismantling of protectionism for a further two years. It signalled to the Agency that it wanted the regional Foresight exercises to be wrapped up pretty much immediately and that it expected the publication of optimistic findings and well founded recommendations.

The Agency knew that it needed six more months to complete its Foresight deliberations properly, but the public servants were powerless in the face of the political pressure. However, when the chairperson of the Steering Committee threatened to resign, a compromise was worked out with the Ministry and the project was granted three months to finish off its work.

The Foresight exercise identified two sectors offering the most promise for Ruritania's industrial future, namely food and tool-making. All panels also identified Information and Communications Technologies (ICT), Biotechnology and Nanotechnology as key cross-cutting technologies with very wide application potential. It was recommended that a technology watch be instigated to see what, if any, opportunities might arise for Ruritanian industry to become more involved at a manufacturing and research level with these enabling technologies.

The results of the foresight activity were received very positively by the Agency and the RTDI Planning Office was assured that results would be implemented. Nevertheless, the Agency felt that further investigation was necessary to detail the results and to assess the impacts of the technologies in question.

Technology Assessment

Following on from the findings of the Foresight exercise, the Agency knew that a Technology Assessment (TA) exercise was needed to consider in detail which subsectors of the two target sectors — food and tool-making — would best fit in with Ruritania's industrial and socio-economic ambitions, which

investments would be needed (in RTDI activities as well as in education, infrastructure etc.), and how the various impacts of the transition phase could best be addressed.

The Agency was anxious to move forward quickly so that they could use the networks and exploit the motivation and energy already generated by the Foresight exercise. However, they suffered a setback when one of the members of the Foresight project team resigned from the RTDI Planning Office to take up a position in a consultancy firm specialising in foresight; this meant another colleague would have to be trained up in SPI methodologies. This experience convinced the Agency it should establish a dedicated SPI Unit with an ongoing work programme so that internal SPI capability would not continue to haemorrhage after every ad hoc SPI project.

The results of the Technology Assessment indicated that investment in nutritional and functional foods fitted in with Ruritania's existing research expertise in the food sector and matched its ambition to move to higher added-value sectors. Likewise for tool-making, the healthcare sector was identified as the most promising, as it demanded research-based, precision technologies not easily accessible to low-cost economies.

After the final meeting of the Technology Assessment project the Agency was in a position to report back to the Ministry identifying the sub-sectors that should be prioritised, based on the future prospects for their underlying technologies and the fit with the Ruritanian RTDI infrastructure.

As part of its recommendations the Agency proposed a suite of RTDI policy measures to foster the sub-sectors. These interventions included increased direct funding for industrial research and for basic research associated with the identified sub-sectors, and measures to strengthen linkages between the public research centres and industry. In addition, there were recommendations for national policies including education, the regulatory framework and the physical infrastructure.

Evaluation

During the design of the new suite of regional RTDI policy measures, the Agency's new SPI Unit implemented rigorous ex ante evaluations on each intervention proposed. This evaluation constituted a prospective assessment to check that the rationales for the interventions were robust; that the objectives could be expressed logically, clearly and accompanied by appropriate input, output and impact indicators to facilitate relevant data collection and monitoring; and that the instruments used seemed cost-effective.

The ex-ante evaluation found that the measures were not wholly aligned and that some could have negative effects on others; one example was that a sizeable increase in funding for public research could result in companies finding it difficult to recruit new graduates to work on their industrial research. Another helpful recommendation of the ex ante evaluation was that a portion of the industrial research fund should be reserved for research consortia of SMEs and start-ups from the two chosen sub-sectors. It also suggested that industrial researchers should be given a say in the approval of university research projects attracting public grants but the Education and Science Ministry blocked this suggestion.

An interim evaluation of the suite of intervention measures was conducted by the SPI Unit in association with external consultants after a period of three years. The purpose was to determine if the schemes remained on target with respect to inputs, outputs and impacts. It found that, in the case of the industrial research grant scheme, inputs were behind schedule due both to inadequate promotion of the scheme and to excessive bureaucracy in the approval procedure; it recommended better marketing and a two-tiered application procedure featuring a fast-track initial submission procedure and positive feedback. In the case of the schemes to promote research collaboration between industry and higher education (HE) the evaluation found that the submitted projects were predominantly driven by the HE partners and tended to gravitate towards high technology areas not yet appropriate to Rurita-

nia's current industrial capabilities; the evaluation recommended that a higher rating should be given to projects originating in companies and transparently close to market.

In terms of inputs, the evaluation was also concerned that the additionality of the interventions was not always transparent. One of its recommendations was a tiered grant rate to favour first-time research performers.

An inevitable difficulty for the interim evaluation was assessing output performance because of the indeterminate time lag from research to innovation. This was particularly problematic for the better research projects that had a significant technological risk attached.

It was acknowledged that only the ex-post evaluation exercise, scheduled to take place after the fifth year, would provide a conclusive assessment of output performance of the industry supports. This period of elapsed time would also afford a meaningful assessment of the economic impacts of the interventions in terms of growth in company sales and employment. Nevertheless, an ongoing monitoring of the progress of the activities in question was implemented to facilitate the upcoming evaluation and to provide constant feedback during the coming years.

The Agency was confident that, in addition to the summative contribution of the ex post evaluation to cost-benefit analysis, the final evaluation would have a formative role in refining the subsequent round of enterprise support mechanisms. It would also be expected to form a substantive basis for discussions with the EU in the context of the co-investment support programme for Ruritania.

In reviewing its performance the SPI work of the RTDI Planning Office was assessed very positively by the Agency as well as by other stakeholders in the region. There was substantial agreement that the outcomes had contributed to well-founded and –informed decision-making, and that SPI tools should be further applied in the region to follow up on progress since the initiation of the original Innovation Audit.

3.3 SPI to improve direct innovation support measures

The Ruritania case study illustrates how the application of SPI tools can enhance key activities along a typified policy cycle. Of course, there are numerous other policy design and support activities that can **improve the quality of life, competitiveness and the innovation capabilities** in a territory. In this section, therefore, we mention some examples of innovation support measures underpinning the policy cycle, and outline how the strategic knowledge generated by SPI-based exercises can increase the overall positive impacts of these measures.

Measures directly related to boosting RTDI in public and private sectors such as funding R&D activities, improving the research and technology transfer infrastructure and mechanisms providing venture or seed capital for start-ups, traditionally play an important role in RTDI policy-making. 'Translating' and using strategic knowledge more systematically can give guidance to the areas, niches and directions where existing measures are best applied, thus reducing duplication and failures, and increasing the number of likely successful cases. **The returns on investment in RTDI are expected to be higher at the overall region level**.

In addition to the above typical innovation support measures, **the design and implementation of regional innovation strategies and the development of regional clusters** have become increasingly important instruments of regional development during the last decade. The success of these measures depends substantially on the concerted actions of many different actors — multiple levels of government and public agencies, companies, educational and research organisations, etc.

Here, SPI tools such as Foresight and Technology Assessment can contribute to the elaboration of a common vision and strategy by enabling the stakeholders to jointly develop strategic knowledge based on strong personal linkages and mutual trust. SPI-based activities support **consensus building by mobilising the commitment of the different innovation actors and cluster members**, and by bringing together the competences and decision-making power within the region or cluster. **Joint agendas** agreed on the basis of SPI-based activities tend to be optimised to stakeholders' needs thus ensuring the effective implementation of the planned actions and, at the same time, reflect the strategic needs of modern regional innovation systems.

SPI-based activities employed to facilitate the implementation of innovation support measures prove valuable for different region-specific framework conditions, challenges and needs — e.g. the varying conditions, challenges and needs during the evolution of cluster 'life cycles'. As in the Ruritania case study, SPI can help upgrade predominantly rural areas towards a knowledge-based economy and society, e.g. by formulating strategies addressing the complex challenges of the globalising markets and by identifying and developing concrete options for policy interventions.

In the initial stages of regional, technology or cluster development SPI-based activities can serve to **aggregate the competence and power of the stakeholders and provide a common platform** for knowledge exchange from their heterogeneous experiences. On the other hand, towards the 'end of a technology cycle', SPI tools can help to update the knowledge pool within the region or cluster e.g. by introducing new ideas and potential partners from outside. Hence, SPI activities are crucial in transforming and advancing regions by creating a climate conducive to visionary, out-of-the-box thinking which **resolves regional 'lock-ins'**, and provides the basis for new gateways to regional development.

The long-term orientation of SPI activities and their relative distance from highly competitive business activities **facilitate horizontal cross-border co-operation and cross-regional policy learning**. For example, the Ruritanian Development Agency used a benchmarking exercise to identify international good practices in regional innovation policy. **Cross-border SPI activities** constitute a promising way of improving knowledge transfer by creating consensus, addressing critical issues across regional and national borders, and supporting territorial co-operation projects e.g. funded under the EU's Interreg initiative (Structural Funds).

SPI activities also assist the formation of **trans-regional strategic business linkages that leverage technology transfer** and exploit the complementary assets and capabilities of different regions. By taking stock of the strategic knowledge accumulated by private partners concerning technology trends, future markets and needs etc. (e.g. the intelligence gathered in multinational companies from corporate Foresight or Road-mapping activities) regional SPI exercises (e.g. Regional/Cluster Foresight or Sectoral Road-mapping exercises) could generate considerable added value for regional development and play an important role in '(re)wiring' the regional innovation system.

To conclude, the application of **SPI tools can improve the impact and economic return of direct innovation support measures** by:

● providing a common strategic knowledge base for better decisions;

● ensuring more synergies and effectiveness at the territorial level by supporting consensus building, and mobilising the commitment of stakeholders and decision-makers.

Thus, SPI tools augment traditional regional RTDI policy instruments by generating a creative atmosphere and a seedbed for ongoing learning processes; they contribute to sustainable regional development through the successful re-orientation of regions, sectors and businesses.

More detailed information on the regional SPI applications is provided in chapters 2 and 7 of the **RegStrat Compendium**.

Chapter 4
How to implement an SPI exercise

This chapter deals with the concrete implementation of SPI exercises, and thus begins with a synthesis of the key process issues to be addressed. Then, Section 4.1 outlines the general techniques available and Section 4.2 presents elements common to all SPI exercises. In the subsequent sections each of the five SPI tools is described in turn, and the steps involved in applying each tool are discussed.

In accordance with the overall aim of the Guide to develop tailored advice and to lend credibility to the outputs, consideration should be given to:

- **Appropriate Content/Issue/Technological Expertise**: this is THE necessary, but not sufficient, condition for a meaningful SPI exercise; ensure that all expert knowledge related to the essential goals of the exercise is generated or made available, and incorporated into the deliberations in an appropriate form and at the appropriate time;

- **Appropriate Process Expertise**: the know-how to select appropriate techniques and to guide and facilitate the process brings confidence and credibility to the exercise and ensures the robustness of its outcomes;

- **Appropriate Selection of Techniques**: different techniques generate different types of knowledge. They should be selected and combined with regard to context, the issues, aims and objectives. This facilitates the transformation of the recommendations into implementable decisions bringing long-term benefits to the territories and actors concerned;

- **Appropriate Resources**: allow for enough personnel and financial resources to adequately implement the techniques chosen; only then can the techniques generate the necessary knowledge, the desired outcomes and meet the expectations;

- **Transparency**: make the process of choosing the techniques easy to understand and as transparent as possible, thereby keeping expectations of outcomes realistic and making the subsequent decision-making process more objective;

- **Participation**: choose techniques which will incorporate all relevant perspectives into the process;

- **Mediation**: apply techniques to optimally support mutual learning and understanding by the stakeholders involved, which in turn will facilitate consensus-building;

- **Stakeholders' 'know-how'**: when implementing the chosen techniques, take account of stakeholders' backgrounds and levels of expertise, and facilitate the exercise accordingly;

- **Information**: Finally, keep the decision-makers and the stakeholders informed during the whole exercise to raise their understanding of and commitment to the process.

4.1 Techniques available for the implementation of SPI exercises

A variety of policy-supporting techniques, both of general applicability and, more specifically, to generate SPI, have been developed over the decades.

In general, one should aim to combine the techniques in a way that best accomplishes the desired policy impact, and such that the outcomes are tailored to the needs of the decision-makers. Foresight

exercises, for example, usually aim at providing a more general exploration of elements, issues and/or technologies which might be relevant for strategic decision-making; benchmarking exercises, in contrast, provide very concrete, detailed and technical outcomes in terms of analyses, RTDI priorities or other policy actions to be taken.

The techniques can be **classified** as follows:

- Quantitative techniques, using empirical data;

- Qualitative techniques, based on judgements, using tacit knowledge and experiences;

- Exploratory techniques, developing possible scenarios based on the present state of knowledge and the experiences of the participants;

- Normative techniques, developing preferred future scenarios and then 'backcasting' the routes to get there from the present situation.

The most frequently used techniques are listed in Figure 2. They are grouped along the time-line of a typical exercise:

1) gathering and collection of the information available;

2) structuring the relevant information;

3) assessing and evaluating this information, either in a more participation-oriented manner (3a)) or using quantitative elements (3b)), or combining these in a way which is conducive to the success of the process;

Figure 2: SPI techniques
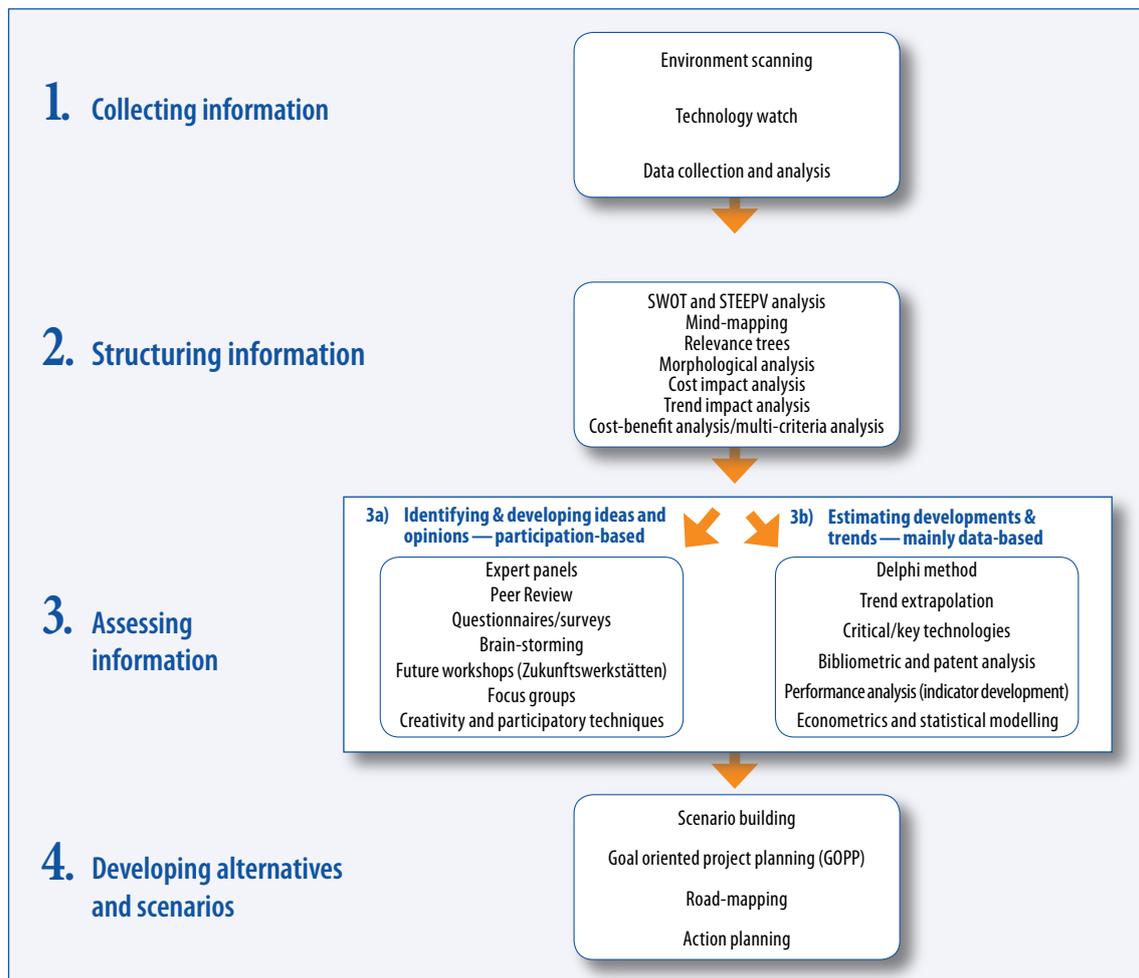
4) making sense of what has been developed and discussed by elaborating solutions, recommendations and options for action.

A description of the techniques can be found in the **RegStrat Compendium**.

4.2 Elements common to all SPI exercises

All SPI exercises share a common structure:

- Exercise design phase;

- Exercise execution phase;

- Preparing the implementation of the recommendations, based e.g. on a strategic plan and multi-annual action plans.

Within each of these three phases, there are elements common to most SPI exercises and these are discussed in the following three sub-sections.

4.2.1 Exercise Design Phase

This first phase consists of the following elements:

- Relating SPI exercises to funding cycles;

- Defining/agreeing objectives;

- Setting out focus, scope and methodology;

- Organising financial and human resources;

- Setting up steering and working structures;

- Setting up and managing the Working Panels;

- Setting out work programme (timetable with task allocations, deliverables and deadlines);

- Agreeing communication plan (for internal collaboration and external dissemination).

Each of these elements is here discussed in turn.

- **Relating SPI exercises to funding cycles**   It is important that an SPI exercise ties in with funding cycles — e.g. EU Structural Funds or National Funds programmes — so that there is funding available to proceed with the implementation of recommendations emerging from the exercise. For example, the foresight project carried out in the Border, Midlands and Western Region of Ireland during 2003–2004 had been planned to synchronise with the investment decisions in the National Development Plan 2007–2013.

- **Agreeing/defining objectives**   It is the responsibility of the project management team to define, within the given framework and in conjunction with the commissioning body, the objectives of the SPI exercise, and to ensure that all participants and stakeholders share a common interpretation of these objectives.

- **Setting out focus, scope and methodology**   The focus of an SPI exercise refers to the 'topic' or 'issue' to be addressed. Usually, there will be a prime motive for starting the exercise, and the various stakeholders, including the client (decision makers) and exercise participants, will have their ideas about what the exercise should primarily address. Defining the focus in consultation

with the principal stakeholders generates a clear mission statement or 'guiding question' for the exercise and helps to co-ordinate efforts and to avoid misplaced expectations.

The scope of the exercise refers to its breadth and depth. The breadth defines geographic or jurisdictional, sectoral and institutional boundaries. The depth refers to the dimensions addressed and typically considers economic, technological and social drivers of change. Scoping the exercise thus means defining the field of study and its dimensions.
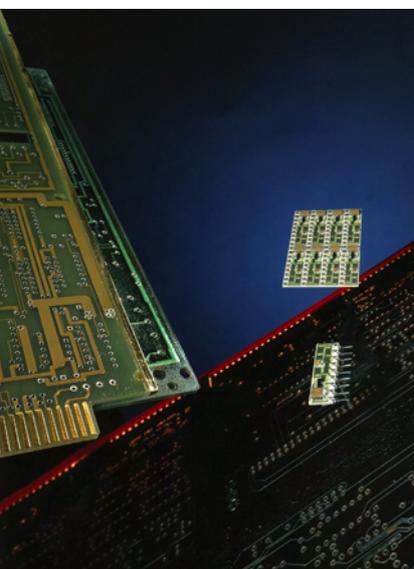
At the strategic level, methodology refers to the approach adopted in the exercise. For example, one exercise may stress technology and prioritise the top-down inputs of external technology experts while another exercise may emphasise democratic legitimacy and adopt a bottom-up, participative methodology. Another aspect where methodologies differ is where one exercise puts the emphasis on the product (output reports) while another places more value on the process and stakeholder networking and learning.

At the operational, level the term methodology is used to denote the framework of methods specified to perform specific functions in each of the phases of the SPI exercise. Each of the SPI tools has its own suite of standard methods.

Given that there is considerable overlap in the functions involved in the application of the five SPI tools — in particular, all involve data collection and analysis, and all strive for effective stakeholder participation — there is, likewise, considerable overlap in their methodologies.

● **Organising financial and human resources** The quality and effectiveness of an SPI exercise is patently dependent on the available resources.

In calculating the cost the following items should be considered:

▶ Remuneration and other operating costs of the project team;

▶ Organisation of Steering Committee and Working Panels meetings (e.g. travel and accommodation costs, rental of meeting rooms, meals and honoraria);

▶ Remuneration of process facilitators and content experts;

▶ Data collection and interpretation costs

▶ Communication, promotion and dissemination costs (e.g. reports, promotional materials, events and media coverage).

● **Setting up the Project Team and Steering Committee** A **Project Team** is formed to look after the daily management of the project. The role of this team is to provide a technical secretariat function; it should be made clear to all that they are not 'the holders of the knowledge', that creation and ownership of the knowledge is the collective responsibility of all the participants. A **Steering Committee** comprised of an appropriate mix of 'people with expertise' and 'people with influence' is assembled to oversee the exercise; these will normally be drawn from the three spheres of society — private, public and civil society. The formation of this Steering Committee should receive careful attention and take cognisance of the governance of innovation. If policy is steered at national government level, e.g. then it is imperative that national agencies are invited to take co-ownership of a regional exercise from the outset.

● **Chairperson** All SPI exercises need an able and competent chairperson. Experience, for example, from successful foresight exercises suggests that a chairperson coming from the private sector is more likely to keep the exercise aligned to market-place pressures and from a political perspective enhance the credibility of the exercise.

- **Setting up and managing Working Panels**   For most SPI exercises, a panel-based approach is chosen. A consistent methodology needs to be adopted when selecting panel members. It is vital that the panel members are given autonomy within the panels (prioritisation and selection of issues to be developed, etc.). Each panel should have a designated manager chosen from the project team. A designated professional process facilitator is also recommended.

  Panel members should include representatives from the key organisations and institutions driving development in the region. Their selection will involve a judicious balance of actors from the public sector including the education and training sector, and the private sector. Where the emphasis is very firmly on representative legitimacy the project design may compensate for the inevitable 'limitations' of the panels by including 'outreach' consultation events.

- **Frequency of panel meetings**   Here the challenge lies in striking a balance between too often and not often enough. There needs to be enough interim time to allow panel members assimilate the outputs from the preceding meeting and carry out their action tasks; however, the intervals should not be so long as to risk losing project momentum. A suggested interval is between 6 and 8 weeks.

- **Panel information requests**   Panel members can request further research to ascertain facts that bear on their deliberations if this is shown to be necessary for the progress of the exercise.

- **Setting out the work programme**   The complete programme should be designed and presented to the participants from the outset — even if it has to be adjusted subsequently as a result of the outputs of the various stages. A complete SPI exercise from data collection to recommendations may take from one to two years to complete; follow-on actions may extend into subsequent years. The SPI exercise itself may lie within a larger policy programme involving other initiatives with their respective tools.

  At operational level project management techniques such as GANTT charts and critical path analysis can be used to control the work schedule. The schedule should be closely monitored to prevent slippage and the contraction of time available for later modules. In particular the time allocated for the important final communication module must be vigorously defended.

- **Agreeing a communication plan**   It is important to specify a communication plan at the outset of the project as it is a crucial element for the success of the process. Communication has multiple audiences and several purposes: it is a means to raise project awareness among potential participants; it is a medium for communication between the participants as the exercise proceeds; it is a tool to inform the region's citizens about the vision, launch, progress and final achievements of the exercise; another important role is to 'promote' the project outputs to the potential sponsors of the follow-on actions.

  Full use should be made of the latest e-capabilities including web sites, discussion fora and other communication tools to enhance process performance and outputs, and to facilitate transparency and good governance. The important objective is that all of the key audiences are reached appropriately.

4.2.2 Project Execution Phase

In this phase, the elements are, by and large, specific to the particular SPI tool being applied. However there are a few common themes:

- **The challenge to win commitment**   The key to winning participant and stakeholder commitment is to ensure that genuine consultation is practised — that feedback is sought and acted upon, not just a top-down, one-way flow of information or the token soliciting of opinions on decisions already taken.

- **Achieving the right level and breadth of input**   The execution phase may involve external consultants and/or working panels consisting of key regional actors and external experts. The involvement of regional actors provides an opportunity to enhance the democratic legitimacy and regional ownership of the exercise. In addition, further outreach consultation events may be mounted to expand local involvement and ownership.

- **Clarify the reasons behind opinions**   For example, a participant representing a high tech sector of industry may commend the actions of the local higher education institution. People may assume the industrialist is referring to the calibre of its research whereas in fact he is commending it as a source of qualified personnel for their workforce. It is thus very important to probe the precise reasons behind opinions.

- **Ongoing dissemination**   A proper communication strategy will include ongoing dissemination of the progress of the SPI exercise. This serves internal and external functions. First, communication between the project team, steering committee and working groups is essential to the success of the project. It can be facilitated by the use of internet resources. Second, a wider stakeholder audience must be kept informed, e.g. through specific briefings to key decision-makers. Releases to the press and other media (radio and television) at significant stages of the SPI exercise will serve to keep the range of societal actors informed and supportive throughout the process. These releases should be multi-lingual if there are cross-border stakeholders.

- **Strategic capability building, continuous exercises**   It is both more efficient and effective to build a permanent in-house SPI capability, or to operate several smaller SPI exercises in short intervals, than to undertake an occasional heroic effort conducted at great expense. Lessons will be learned from one exercise to the next and continuous improvements made; data gathering and integration of expert input becomes easier and less expensive; spill-over effects into the territory can further improve macro-economic impacts. For example, the Irish national foresight exercise had a number of unintended benefits, including the adoption of the foresight tool by a number of regional policy makers in pursuance of their own strategic planning.

4.2.3 Preparing for the implementation of the recommendations

Here, the overriding challenge is that the 'products' or outputs are communicated intelligibly and effectively to the appropriate audiences so that they prompt the desired actions — i.e. the recommended policy interventions and activities to be undertaken by the public and private actors.

- **Dissemination of SPI results**   The 'products' — intermediate, final and summary reports — will be produced by a smaller core group which should be representative of the stakeholders but also include communication experts. The output of their labours will determine the ultimate success of the exercise in so far as the reports manage to persuade the relevant decision-makers to follow through on the recommendations of the exercise.

- **The societal learning process**   Keeping the public informed of the progress of SPI exercises in an appropriate way will inevitably have the result of embedding an SPI culture not just in the policy-making community but also in the wider community. In this way, the public understanding of and the input to policy-making will become better, more structured and more constructive, and the public expectations vis-à-vis policy-making become more realistic.

Each of the five SPI tools is now discussed with reference to their applications

4.3 Innovation Audit

4.3.1 Introduction

Successful innovative regions tend to possess a combination of excellence in entrepreneurship, in research, and have framework conditions highly supportive of existing innovative companies and high tech start-ups. Successful regions particularly manifest a culture of very active networking of local 'champions'; excellence in science alone is not a sufficient factor for success, the research base has to be linked with locally based value-chains that can convert this potential into commercial success.

4.3.2 Definitions

At the micro-level, an Innovation Audit is a method of investigation which aims at evaluating the technological capacity and technology needs of a firm or an organisation, and also at assessing related non-technological innovation in organisation processes. At the regional level, an Innovation Audit profiles the strengths and weaknesses of the regional innovation system and helps policy-makers to identify and deal with the issues of competitiveness pertinent to their region — technological capacity, research and development, innovation and organisational change. The Audit is action-oriented and forms the basis for a strategic development plan.

4.3.3 Benefits of an Innovation Audit

The traditional approach to RTDI policy-making tended to focus on the needs of single components of the innovation system and, consequently, often failed to achieve the proper balance and co-ordination of the co-operating elements of the system. An Innovation Audit helps to avoid this pitfall by taking a holistic perspective as its starting point, allowing policy-makers, in consultation with the key actors in the local economic, industrial and social communities, to define broad strategic objectives and allocate resources in a more systemic fashion.

Another beneficial outcome of an Innovation Audit is the development of networking among the principal actors in the innovation system and the evolution of robust partnerships. The Audit process, with its deployment of expert committees, workshops, seminars and panels, inevitably produces extensive formal and informal economic, entrepreneurial and social networking amongst the participants.

Public policy-makers benefit from:

● Identification of the strengths and weaknesses of the regional innovation system — a quantification of the performance of the enterprise, HE and public policy sectors and an insight into the drivers of technological and economic development;

● Assessment of the effectiveness of existing RTDI policies, and empirical evidence to guide the formulation of new RTDI policies and goals; the identification of Innovation System weaknesses highlights the nature of supports needed (financial, educational and training, and regulatory);

Firms benefit from:

● Identification of sources of knowledge and support, and of potential partners and markets: this includes the capabilities of research centres, and the work programmes of leading enterprises in key technology fields in the region;

Research centres benefit from:

- Greater visibility of their expertise and capabilities;

- Identification of opportunities for co-operation with firms and other research centres; and

- Information about best practice in incubation strategies to support the successful development of new products/processes and technology transfer to enterprise.

4.3.4 Applications

An Innovation Audit constitutes an effective mechanism to mobilise a critical mass of social capital among a region's principal stakeholders in business, academia and government. The joint undertaking of an Audit sets a solid platform for the launch of a robust developmental strategy. It identifies the relevant elements constituting the regional innovation system as well as its strengths and weaknesses.

4.3.5 Steps of an Innovation Audit Exercise

There are five key steps involved in carrying out a successful Innovation Audit. The first step is the definition and design of the exercise. The second step is the collection of information on the principal assets of the region's innovation system: business firms, research centres and technology transfer units, supportive public policies, and linkages between these assets. The list of key assets in a successful region includes:

- Dynamic enterprise structure;

- Presence of international companies;

- Networks and clusters;

- Entrepreneurial culture and local role models;

- Capital markets (including seed capital for new start-ups);

- Knowledge centres (higher education institutions, private and public research institutions, etc);

- Enterprise training institutions;

- Physical infrastructure (transport, ICT, utilities, etc.);

- Policy infrastructure (support and regulatory; enthusiastic regional champions)

- Quality of life.

The third step comprises a diagnosis of the strengths of these assets and linkages. Based on the data assembled in step 2, performance indicators are developed to make an assessment of capabilities.

The fourth step involves developing an action plan for the region, including measures to enhance performance and overcome weaknesses, and then producing a comprehensive and readable report of the audit's findings.

The final step is the presentation of the report and findings to the RTDI policy-makers who, it is hoped, will be persuaded to implement the audit's findings.

4.3.6 Good Practice Tips/Lessons

- **Draw on existing national and international expertise**   Learn from the experience of practitioners in other jurisdictions (regional, national and international) and from expert consultants where available, thereby ensuring application of state-of-the-art practices and the integration of the latest conceptual thinking.

- **Engage the key policy-makers**   The utility of regional innovation audits depends on the degree of strategic autonomy of its 'sponsors' to act on the findings. If RTDI policy is predominantly 'steered' at central government level and mostly involves national agencies in designing and delivering interventions then it is essential that these national agencies take co-ownership of the exercises from the outset. Unless the national RTDI policy 'community' is engaged and internalises the findings, the impact of the exercises will be limited.

- **Clear terms of reference**   Innovation is a complex concept that lends itself to multiple interpretations. It is thus very important to have clear terms of reference in order to set boundaries to an Innovation Audit.

- **Don't be over-ambitious**   If certain data are unavailable (and cannot be researched) for the Innovation Audit exercise, then leave out that particular element of the Audit. However, it may be worth discussing the matter with the Central Statistics agency which may be able to share information on a confidential basis or may consider collecting the data in future rounds of its surveys.

- **Consultants' remit**   If consultants are being used it pays to liaise closely with them throughout the exercise. At the outset discuss their overall methodology and make sure their 'model' is in agreement with your view of the critical elements of an innovation system. Advise them of the key stakeholders to be involved. It is important for those charged with implementing the exercise to ensure ownership by these stakeholders if they are to commit to the action plan resulting from the Innovation Audit.

- **Ensure that the Innovation Audit will lead to Action Plans**   It is crucial that the Innovation Audit report contains recommendations to address the region's RTDI deficits, and that specific actions are spelled out for the various innovation system actors — firms, higher education institutes and public development agencies. It is desirable to have a commitment from the outset that the co-sponsors of the audit (the regional and national authorities) will act on the outcomes. However, this commitment can only be retained if the sponsors are convinced of the robustness of the process undertaken.

4.4 Benchmarking

4.4.1 Introduction

Benchmarking is a powerful technique that provides practical learning through comparing performance of policies or outcomes across nations, regions, sectors, industries, institutions, products or services. The essence of benchmarking is identifying the highest standards of excellence and then making the improvements necessary to come closer to or reach those standards.

The Benchmarking tool was first used in the private enterprise sector but it has been widely adopted for policy analysis over the past years as nations and regions endeavour to increase the competitiveness of their innovation systems.

There are three main types of regional benchmarking referring to different levels of scope or focus:

- Benchmarking the performance of the region;

- Benchmarking the performance of sectors or institutions in the regional system of innovation;

- Benchmarking the effectiveness or impact of RTDI policies.

RTDI performance is recognised as a key determinant of economic growth. Consequently, RTDI policies are expected to generate impacts in terms of competitiveness and employment. Benchmarking RTDI policies is thus highly desirable to yield insights leading to improved policy-making. However it should be stressed that 'scientific' benchmarking of policy interventions requires a great deal of careful analysis — lines of causality are invariably obscured by historical, contextual and external factors of subtle complexity. This is, a fortiori, the case with RTDI policy, and benchmarking practitioners urge caution and circumspection.

Benchmarking at regional level compounds this challenge since regions are confronted with a significant amount of external policy 'framework conditions' over which they have no control. An extra complication is the fact that, very often, the political boundaries of a region do not coincide with its 'economic' boundaries. Thus, when designing the regional benchmarking exercise one has to carefully choose and frame the indicators to be used.

As with all SPI tools Benchmarking should be an action-oriented exercise. Lessons drawn should lead to better-targeted policies and strategies. They should inform both policy design and policy implementation.

Arranging for the active participation of the relevant stakeholders in the benchmarking exercise is a good way of gaining their commitment to the actions flowing from the exercise.

4.4.2 Definitions

There is no single definition agreed by the policy community. In general, benchmarking is an improvement process in which a company, organisation or any other (multi-organisational) system carries out three activities:

1) compares its performance against best-in-class external systems;

2) researches how these systems have achieved their superior performance;

3) uses the collected information to improve its own performance.

Benchmarking ultimately seeks to improve processes by gaining insights into what makes processes effective and efficient. Any processes can be the object of benchmarking.

Benchmarking may be a one-off activity, but is often treated as an ongoing process in which systems continuously seek to challenge their internal practices.

4.4.3 Benefits of Benchmarking

- **Raising awareness**   One of the most important motivations for regional benchmarking is to raise awareness among the regional stakeholders of the competitive ranking of the region compared with other regions nationally and internationally.

   In the case of a 'lagging' region the expectation is that the empirical demonstration of its low ranking will galvanise the regional actors into action to increase productivity. Politicians and decision-makers will be armed with a solid case to demand more national support to achieve economic convergence. Policy makers will be in a position to formulate evidence-based policies linked to what they have learned from other regions.

In the case of successful regions benchmarking can be used as a marketing tool to promote the region as a leader in certain fields of enterprise, infrastructure or policy-making.

- **Trans-regional co-operation**   An intrinsic benefit of benchmarking is the opportunity to collaborate with other regions and build trans-regional partnerships. Collaboration among the benchmark regions to develop a common approach to benchmarking methodology allows stakeholders from the various regions to get acquainted and this can lead to valuable ongoing co-operation.

4.4.4 Applications

- **Scope and Focus**   As already indicated above there are three key levels of scope or focus for regional benchmarking.

In the first case regional benchmarking adopts a holistic scope and compares whole innovation systems — their knowledge generation, dissemination and application value chains. The European Innovation Scoreboard and its companion European Regional Innovation Scoreboard are examples.

On the other hand, the exercise can adopt a narrower focus e.g. concentrating on specific sectors such as private enterprise or the Higher Education sector, or on trans-sectoral co-operation, or on the uptake of specific technologies. It may be decided to combine a holistic benchmarking exercise with a follow-on focused exercise detailing a particularly interesting sub-system.

- **Scope and choice of partner regions**   Benchmarking exercises may target regions with markedly similar or markedly disparate profiles in terms of size, socio-political orientation, economic development, etc. The choice of comparator regions depends on the scope and objective of the benchmarking exercise. If the scope is a holistic innovation system perspective then targets with disparate profiles may be useful. Where the objective is a more focused benchmarking exercise then a comparison of regions with similar profiles may prove more instructive.

- **Qualitative versus quantitative approach**   Practitioners underline the importance of including qualitative aspects in a benchmarking exercise. Quantitative indicators are the logical starting point of the benchmarking analysis and lend themselves to ready comparison; however, qualitative aspects or intangible factors such as quality of social capital or institutional culture may possess much more explanatory power. Including qualitative aspects in regional benchmarking poses a methodological challenge for indicator development.

- **Regional competence**   Given the action-oriented goal of SPI tools the focus of the benchmarking exercises should preferably be on factors that the region has the competence to address with its autonomous policies and strategies. If the focus extends to framework conditions that depend on national or European-level policies the conclusions of the regional benchmarking exercise must be communicated to the relevant levels of decision-making.
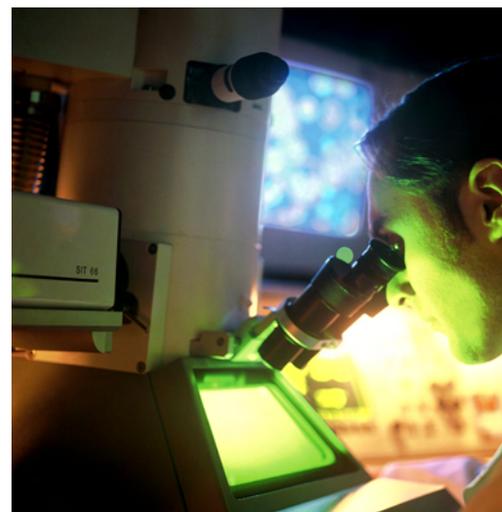
4.4.5 Steps of a Benchmarking Exercise

A benchmarking exercise may be described by six basic steps:

- **Step 1: Planning Phase**   This includes the definition of the scope (the object to be benchmarked), the formation of a benchmarking team, the definition of the performance measures, and the identification of benchmark targets;

- **Step 2: Gathering Information**   This step involves defining and collecting indicators from official sources. In the case that data are not available some ad hoc surveys may be commissioned.

- **Step 3: Comparing and Understanding**   The collected data are assembled in a database and a Benchmark Index report is generated. The report provides comprehensive and quantifiable performance indicators, highlighting the region's strengths and weaknesses against those of the comparator group.

- **Step 4: Analysing the Information**   An analysis is carried out to elaborate and interpret the data, identify performance gaps, analyse the potential reasons underlying the performance gaps, and identify the key improvement areas on which action should be focused.

- **Step 5: Implementation**   The final step consists of a critical review of the results and the compilation of a final report. A transparent and coherent action plan is developed in order to implement reforms on a systematic basis.

- **Step 6: Monitoring**   Monitoring entails a control and revision phase, checking the implementation of action plans/policies, identifying the deviations, and providing feedback for the next planning phase.

4.4.6 Good Practice Tips/Lessons

- **Data**   The most important factor is access to measurable, updatable, time-series, with comparable data available from each of the regions. Otherwise there will be too many comparison gaps and the benchmarking exercise will be unsatisfactory.

- **Selection of indicators**   The selection of benchmark indicators is important. In many areas of innovation system reviews practitioners have to make do with proxy indicators which do not capture the whole picture, e.g. the number of patent applications only captures one limited aspect of innovation activity.

- **Continuous benchmarking**   A benchmarking exercise is most useful if the exercise can be repeated in a consistent manner over regular time periods. Besides affording the diligent region an opportunity to take heart from its steady progress it allows it to focus on different aspects of its innovation system during each period.

- **Linking interventions to outcomes**   There are of course limitations to the benchmarking of policy in general, and of RTDI policy in particular. Policy usually has a number of objectives; no single, aggregate indicator could be employed to cover this diversity in goals. The link between policy interventions and outcomes is not easily established, and, particularly in the case of RTDI policy, it is often not entirely understood.

- **Context dependency**   The effects of policy — where they can reasonably be established — have a high degree of context dependency. There is thus no one way to design a successful policy; what works in the context of one innovation system may not necessarily work in another. Historical experiences warn against taking one successful innovation system as the 'model' to be emulated by all others.

- **Ambition**   Compared with the challenge of benchmarking whole policies, benchmarking at a disaggregate level is much less problematic. Comparisons of the performance of scientific institutions (using indicators such as publication output, citations, scientific awards etc), are routinely undertaken as are benchmarking exercises for technological infrastructures (equipment at universities, large-scale research facilities, science parks, etc).

4.5 Foresight

4.5.1 Introduction

The need for Foresight stems from the growing realisation in all areas of life that the future is becoming more and more difficult to anticipate. Moreover, the idea that the future can be shaped or created, and that public bodies and private actors should be empowered to do so, has gained currency since the 1980s. By trying to make things happen rather than trying to forecast what might happen, companies and regional decision-makers have learned to embrace uncertainty and to deal with it by continually evolving a wide-range of new business and policy options.

Policy-makers face a barrage of new challenges including changing value systems, the erosion of traditional interest groups, calls for more accountability, accelerated technological change and intense international competition. Decision-makers not only need new skills to face these challenges but also need to develop a whole new strategic policy-making culture based upon transparent, participatory and flexible decision-making. Since science and technology are amongst the main drivers of change, foresight exercises represent an important tool in prompting broad social debates. These debates are based upon expert inputs but also mobilise broad sections of stakeholders so that a strong consensus is reached on actions and priorities. In addition to the direct goal of informing policy-making with the products of foresight exercises another significant benefit is the substantial learning achieved in the process of bringing together experts and stakeholders from different sectoral and disciplinary backgrounds.

Evolving well beyond the original narrow science and technology perspective, Foresight exercises now address horizontal, integrated "science and society" themes and contribute to the development of a European knowledge-base that proposes visions for the future of European society.

4.5.2 Definition

One of the most cited definitions is that of Ben Martin, SPRU:

> "Foresight is the process involved in systematically attempting to look into the longer-term future of science, technology, the economy and society, with the aim of identifying the areas of strategic research and the emerging generic technologies likely to yield the greatest economic and social benefits."

Nevertheless, there are many other definitions of foresight. For example, the "Blueprints for Foresight Actions in the Regions" series states that:

> The goal (of Foresight) is not to predict the future but to understand how the future is shaped and on that basis to explore a range of possible futures with a view to selecting one that is desirable and attainable.

4.5.3 Benefits of Foresight

All over Europe, foresight exercises have been used successfully as policy tools, not only because of their intrinsic value in providing difficult-to-acquire strategic information for decision-making, but also as socio-economic mobilisation tools to raise awareness and to create consensus around promising ways to exploit the opportunities and diminish the risks associated with new science, technology and innovation developments.

Implementing a foresight exercise can bring a number of benefits to a region:

- Foresight can be usefully provocative. In the face of complexities and high uncertainties it may be pertinent to purposely solicit diverging and individualist viewpoints which helps to broaden the debate by injecting critical and surprising reflections;

- Through the exploration of the possible futures facing a region, the major challenges ahead can be identified, and a common understanding and collective awareness of these challenges can be obtained;

- Foresight allows the stakeholders to collectively reach a consensus on where to go, to share a common view of a desirable future (vision, project) and to join their forces to reach the defined common goals;

- The involvement of key stakeholders in a regional foresight exercise can deepen linkages between them and lead to a better mutual understanding between science and other parts of society;

- There is evidence to suggest that regional foresight can result in improved policy design and implementation in all policy fields and in the design of innovation-friendly regulations.

4.5.4 Applications

A variety of aims and needs can trigger regional public bodies to initiate and fund foresight exercises:

- **The need to cope with challenging situations**   For example, transitions in the economic or political system (new markets, new legislation, etc.), changes to the socio-economic framework, changes in the natural environment (e.g. coastal flooding, climate change), demographic change, etc.

- **Exploring future opportunities and taking decisions with long-term implications**   Traditionally Foresight was used in order to set priorities for investment in science and innovation activities. The degree to which priorities can emerge from foresight varies from "critical technologies" exercises where the whole discourse is focused on a priority list, through more general programmes from which priorities are derived, to targeted foresight where the priorities are, in effect, set before foresight begins.

- **Reorienting the Science and Innovation System**   This goal is related to priority setting but goes further. We refer to cases where a preliminary diagnosis indicates that the science and innovation system does not match the needs of the country or region. This was a common situation in Central and Eastern Europe in the immediate post-Communist period when, apart from severe resource difficulties, capabilities reflected an industrial system that no longer existed. Here, foresight has been used as a tool to re-orient RTDI systems away from fields such as materials research and towards life sciences. It has also pointed out the urgent need to explore new institutional structures.

- **Demonstrating the vitality of the Science and Innovation System**   In this context foresight becomes a 'shop window' to demonstrate the technological opportunities that are available and to assess the capability of science and industry to fulfil that promise.

- **Bringing new actors into the strategic debate**   A growing tendency is the use of foresight as an instrument to broaden the range of actors engaged in science and innovation policy. One example is the inclusion of social stakeholders or even sections of the general public such as youth.

● **Building new networks and linkages across fields, sectors and markets or around problems** A different type of reorientation is sought when foresight is explicitly aimed at creating new networks and or clusters which break out of long-standing disciplinary or sectoral ties.

The focus of a Foresight exercise may be broad, e.g. changing international production systems or regional economies, or more specific as in determining the future role of tourism in a region. As developments become more complex and interrelated the differentiation between 'thematic foresight', 'technology foresight' and 'territorial foresight' is becoming less meaningful. In today's integrated foresight approach it is more relevant to discuss to which extent the different dimensions of the foresight process have been considered: RTDI developments, economic dynamics, societal developments and the territorial vision.

4.5.5 Steps in a regional Foresight exercise

Experts strongly agree that there is no single best practice in conducting foresight: regional specificities ('framework conditions' of context, objectives and resources) have to be considered carefully. At the beginning, a number of organisational issues relating to the design and preparation of the Foresight process need to be resolved. This initial phase involves the clarification and setting of the following: objectives, time-frame, work-programme, tasks to be performed by the different partners, budget, formation of steering and working groups, techniques to be used, expected outputs, and the communication plan.

The core of the foresight process can be represented by the following three phases:

1. A phase to understand the point of departure (the diagnosis): positioning the foresight exercise in time and space; deciding on its coverage and foci (subjects of analysis); identification of key players associated with the chosen topics; detecting internal and global factors of change and driving forces; identifying current strengths and weaknesses.

2. A phase to explore what can happen (analysing, thinking and debating the future):

   ◗ elaboration of a shared picture of the present long-term dynamics;

   ◗ elaboration of a shared perception of the possible futures; and, through the elaboration of exploratory scenarios, identification of the key challenges to be faced;

   ◗ definition of a shared vision of a desirable future.

3. A strategic phase (shaping the future): development of recommendations about what can be done; elaboration of a common implementation strategy and concrete actions to achieve the goals set; evaluation and monitoring of the foresight process and the subsequent implementation activities; dissemination of foresight results to key stakeholders.

The design is rarely a simple, linear, sequential process. The various Foresight steps and decisions are deeply interlinked and may take place in parallel. Design should always be a flexible and iterative process involving numerous feedback loops (for instance, the decision on the amount of resources needed depends on the objectives and the outcomes, but the objectives are often reviewed according as the resources diminish).

4.5.6 Good Practice Tips/Lessons

Foresight is an SPI tool where the design of the exercise can be more important than the selection of the specific techniques used. Some of the key lessons in relation to implementing foresight relate to how the exercise is organised and managed.

- **Foresight co-ordinator**   The crucial role of the co-ordinator in foresight cannot be over-emphasised. He/she must have a good knowledge of the relevant stakeholders and must use this knowledge to recruit key people to participate in the process. He/she should also be experienced in group dynamics and create a 'safe space' for honest debate, ensuring that all voices are heard. The co-ordinator needs to be a person with plenty of energy who can marshal the various stakeholders through an intensive consultation process. He/she should also have good knowledge of how to relate to and influence policy-makers.

- **A safe space for honest debate**   The foresight co-ordinator and panel managers must strive to create a secure discussion space where the participants will feel comfortable, relax their defences among their peers, and explore their more extravagant visions and concerns. If the climate is right participants will encourage each other to range beyond the current paradigms and sectional self-interest. If the climate is defensive then the futures envisioned are likely to be confined to safe trend extrapolations and will miss out on richer, more innovative speculations.

- **Avoid fixation on scenarios**   Foresight coordinators should recognise that scenarios are merely tools intended to prompt stakeholders into thinking about the future and are not an end in themselves. The scenarios should not be too diverse as it will be difficult to synthesise the different themes.

- **Don't underestimate the time required**   It is not feasible to undertake a foresight project in less than twelve months. Time is needed to create 'buy-in' and trust among the stakeholders involved in the project and to move them beyond just thinking about the immediate future. Iterative consultations can take months to complete.

4.6 Technology Assessment

4.6.1 Introduction
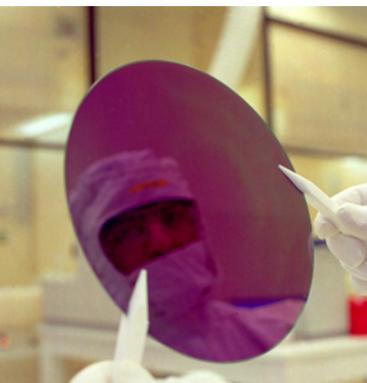
Technology Assessment (TA) can be perceived as a 'bridge' between technology foresight and the development of client-focused investment strategies in the public and private sector. One might first carry out a Foresight exercise to establish 'strategic direction setting' i.e. to identify possible future options. A TA process could then be commissioned to assess the expected impacts of technologies driving or associated with these future options. TA would identify which of the options could be turned into specific opportunities (for an industrial sector or for some other actor in the Regional or National Innovation System or for a policy field). The TA exercise would be expected to "set agendas" in the form of prioritised action lines so that the opportunities could be exploited to produce the optimum benefits for all concerned. Alternatively, a TA goal might be to minimise the impacts of a negative event.

4.6.2 Definitions

TA has been described as a "systematic, multi-disciplinary research and structured communication process which integrates stakeholder opinion and expert knowledge (national and international) re-

garding the potential long-term applications and socioeconomic impacts of emerging technologies, and outlines development pathways on which public and private investment decisions can be made."[4]

In the last decades there has been a development beyond TA as a (technical) early-warning system (in which mostly expert participants are involved) towards a more policy and problem-oriented approach aimed also at identifying economic and social goals to which emerging technologies can make important contributions.

Technology Assessment has three core elements:

● Accessing and assessing all available knowledge on a relevant technological area or technology-related development;

● Systematically identifying and evaluating the likely impacts in terms of advantages and disadvantages from the perspective of the stakeholders;

● Developing a series of concrete options and actions for governments, agencies, companies or other actors based on the foregoing analysis.

4.6.3 Benefits of Technology Assessment

TA allows the decision-makers to analyse in detail the range of possible social, economic, legal, political, cultural and ecological effects of a technology application, and to identify market opportunities and technology-induced risks early on. It has the potential to increase the return on a region's RTDI investment because it leads to a more coherent policy approach across a range of agencies, thereby guiding their client enterprises towards promising fields of activity and markets. By bringing all actors together it helps to minimise duplication and therefore directly saves on public expenditure.

TA provides decision-makers with a rational basis for their decisions. It points out the areas where experts are in broad agreement and those areas where controversy surrounds a given topic; it reveals what assumptions or values lie behind differences of opinion, and what opportunities and risks are associated with the various options for action. Thus, TA identifies the facts that policy-makers can assume to be generally accepted, allowing them to concentrate on the issues that are still controversial. By thus focusing the discussion on the relevant questions the decision-making process can be made simpler, more objective and more transparent.

Furthermore, TA enables wide stakeholder consultation, allowing all the actors in the innovation system to come together to analyse the impact of the prospective technology with the help of the best regional and external expertise. The collective wisdom assembled by the TA exercise helps to reduce costly investment errors — although clearly they can never be completely avoided because of the inherently risky nature of research and technological development.

Technology Assessment identifies the opportunities and challenges facing the region's participation in certain aspects of a new technology or issue. It also elicits recommendations for actor-specific agendas including an appropriate portfolio of policy supports needed to make the opportunities happen, and to start implementing the prioritised action lines.

4.6.4 Applications

Four broad contexts for Technology Assessment can be distinguished in international practice:

● **Technology-driven** These TA studies aim to improve and utilise existing or emerging technologies in an economically advantageous, environmentally friendly, and socially acceptable way.

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4   Clar, G., Fitzpatrick, J. (2004): A Technology Assessment Capability: its role within the Irish Innovation System. Report, Dublin.

Current examples include biotechnology, nanotechnology, laser technology, genetic engineering and the use of stem cells.

- **Problem-driven**   TA can be used to identify possible solutions to an existing or future (policy) problem that is caused, or could be solved, by the application of technologies. Examples include TA studies on traffic, energy supply and utilisation, CO_2 reduction by energy supply systems, lean production and waste management.

- **Project-induced**   Technology Assessment studies have been used to examine the consequences of placing a specific technology project in a specific location, e.g. locating a large chemical factory or a waste incinerator.

- **Goal-driven**   Technology Assessment studies have been conducted to identify and present ways of achieving goals of broader societal importance such as Sustainable Development or Qualitative Growth.

In terms of methodology there are two major models of TA:

- **The policy analysis or "expert model"**:   Comprehensive expert analysis of technological developments is commissioned to increase the strategic knowledge stock, e.g. for decision-makers who lack essential information on certain technologies;

- **The "public deliberation model"**:   It supports and enhances public participation and serves to allay public concerns that government decisions about technology lack legitimacy or transparency.

4.6.5 Steps in a Technology Assessment exercise

The relative importance of the steps in a typical TA varies depending on the specific project. A variety of research and analytical techniques can be applied within each step.

Step 1: Planning the TA exercise

- Defining the focus (technology areas or problem aspects) and main activity lines of the exercise as well as the depth and breadth of the assessment;

- Scanning the 'S&T environment' and prioritising the fields of action;

- Identifying the affected groups and individuals, the implementing organisations and users;

- Designing a tailored set of communication tools to share information and offer platforms for response and involvement;

- Defining the key process features (overall architecture, methods and techniques).

#### Step 2: Context Analysis and Research Phase

- Identifying the "state of the art" for the technology, its socio-economic context and possible future developments;

- Mapping stakeholder and public behaviour concerning possible development paths and uses of technologies;

- Researching the scientific origins and social conditions of technology or technology-induced developments.

Step 3: Impact Analysis

● Assessing the intended and unintended effects (with their likelihood and magnitude) including their dynamic interactions, delayed effects, and their impacts on the economy, social systems, politics, culture and environment;

● Analysing the risks and problems as well as the opportunities and benefits using scientifically-based impact and cross-impact analysis;

● Analysing the interests and values that are affected by the potential impacts;

● Specifying the uncertainties associated with each assessed consequence.

Step 4: Option Evaluation/Appraisal and Communication

● Identifying policy options using scenario-planning to identify the range of opportunities for modifying technologies, creating organisational instruments for handling technologies and/or implementing changes in the societal context in which the technology is embedded;

● Designing ways to involve decision-makers and affected groups in the identification, selection and evaluation of policy options, and, where appropriate, in the implementation and management of mitigation measures;

● Exploring the unintended impacts associated with each policy option (using scientifically-guided but stakeholder-driven and value-based techniques);

● Designing technological modifications or organisational strategies for the promotion of positive, and the mitigation of negative impacts and policy options;

● Communicating the outcomes of the exercise appropriately.
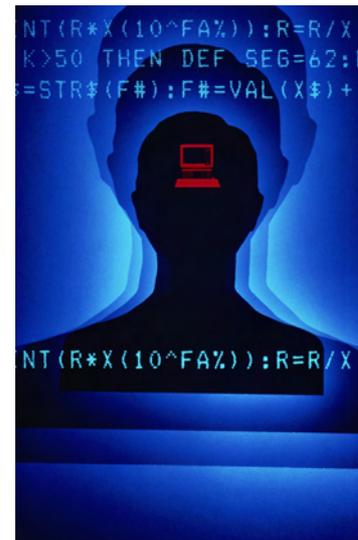
The written outputs of TA often include synthesis reports, condensed versions of the wide array of information, evaluations and opinions drawn together in the process. A TA exercise is successful if all the main stakeholders take the view that the process has been fair and that all relevant voices have been heard, whether a consensus on the resulting options is reached or not.

4.6.6 Good Practice Tips/Lessons

A number of lessons have been suggested by TA practitioners. These include the following:

● **Plan well**   The most frequent advice offered by practitioners is to spend a good deal of time at the beginning 'pre-visioning' the exercise in terms of defining issue domains, selecting the participants, deciding the consultation methodology, etc. A TA exercise is a highly inclusive and consultative process, and if it does not achieve the appropriate participation it will be fundamentally flawed in terms of legitimacy and collective learning.

● **Issue Domains**   It may appear obvious that the participants should all agree on the issues to be addressed, but experienced practitioners constantly remark on the phenomenon of 'project drift' because the exercise lacks explicitly defined objectives. Very often confusion arises because of the blurred area between the technology's impacts at global versus regional or national levels. When a TA exercise is preceded by a Foresight exercise this helps to better focus the objectives.

● **Stakeholders and Participants**   To decide who are the stakeholders in a TA exercise one can ask three questions:

  ◗ who is affected by the technology strategy?

◗   who can make it work?

◗   who might obstruct it?

These questions cast a wide net over the technology trajectory and encompass technology researchers and developers, prospective technology producers and consumers, regulatory authorities and decision-makers. The task of the TA management team is to identify the key actors from within this comprehensive grouping.

● **Consultation methodology**   Consultation lies at the heart of the TA process. Much attention should be given to the appropriate methodology and to the selection of panel facilitators.

● **Independence**   It is essential that the TA exercise be conducted in a spirit of intellectual integrity and independence. If any of the project team members is perceived to be biased in favour of some political or business interest then the whole exercise will fall into disrepute and the universal commitment of stakeholders will not be forthcoming.

● **Duration of a TA exercise**   The most common estimates of the time required to conduct an effective TA exercise fall into the 18 months to 2 years range. Some regions might have occasion to proceed with just one TA panel and, in this case, the exercise could conceivably be completed in 9 months to a year.

4.7 Evaluation

4.7.1 Introduction

The demand for evaluation has been primarily fuelled by the desire to gauge the impacts of RTDI projects, programmes and policies, to learn from the past and improve future programmes, and sometimes perhaps, to justify the continuation of these programmes and policies to a sometimes sceptical audience.

4.7.2 Definitions

Evaluation is a systematic and objective process that assesses the relevance, efficiency and effectiveness of projects, programmes and policies in attaining their originally stated objectives. It is both a theory-driven and practice-driven approach, whose results feed back into the policy-making process so that it is part of a continuous learning process. This helps formulate and assess policy rationales and brings transparency and accountability to the policy-making process.

The task of evaluation is to address three issues:

1.   Are we (policy-makers) doing the right thing (appropriateness)?

2.   What are the results of our actions (impacts)?

3.   Could we do it better (effectiveness)?

The European Commission's DG Budget's *Short Guide* (2005) proffers an expanded list of evaluation issues including relevance, efficiency, effectiveness, coherence, economy, sustainability, utility, consistency, allocative effects and acceptability.

4.7.3 Benefits of Evaluation

There are two overall benefits from evaluation:

- An evaluation can determine the effectiveness of an intervention for the purposes of accountability or legitimisation, or to assist in the allocation of budgetary resources [a "summative evaluation"];

- An evaluation can examine ways of improving and enhancing the design and implementation of interventions [a "formative evaluation"].

In an era when the public requires that policy-makers be able to explain and justify their decisions at almost any time, and that risks and decisions are increasingly negotiated between the different stakeholders in society, evaluation provides the information and analysis necessary for greater transparency and participation in public decisions, e.g. about research and innovation.

However, the practice of evaluation has developed beyond purely quantifying policy impacts towards facilitating mutual learning in the policy-process. There are potential benefits from evaluation that go well beyond the important function of ensuring public funds are being well spent. Evaluation can contribute to a more informed process of programme design, and it can be the vital element in the process of policy learning. Ultimately, evaluations offer a means for policy-makers to gain better understanding of the system — in this case the innovation system — that they are trying to influence, and of the ways in which interventions of different kinds, at different times, can affect this system.

In summary, the overall summative and formative benefits include:

- Contributing to the design of interventions, including providing input for setting political priorities;

- Improving the quality of the intervention;

- Assisting in an efficient allocation of resources; and

- Reporting on the achievements of the intervention (i.e. accountability).

4.7.4 Applications

Evaluation can be applied at project, programme or policy level. The main evaluation approaches include the following differences:

- Evaluation may focus on a single project or programme, or extend more broadly to encompass the policy framework within which these are located;

- Evaluation may be conducted at different stages in the policy cycle, ex-ante, interim, or ex-post.

Evaluation processes can benefit from a combined use of quantitative and qualitative approaches. Quantitative evaluation methods provide good estimates of the outputs and impacts of public intervention, and policy-makers can make use of these estimates to legitimise intervention. Qualitative evaluation methods may offer more detailed insights into the multiple effects of policy intervention which might help refine the processes and instruments of RTDI policies.

Evaluations make use of programme overviews such as programme models or logic frameworks (logic models) which encapsulate in a relatively simple diagram what a programme covers and what it is trying to achieve.
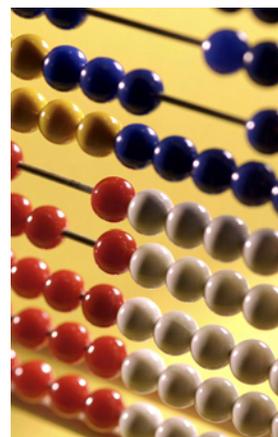
One widely used programme overview is the ROAME template originated by the UK Department of Trade and Industry. Prepared at the initial planning stage of a programme, ROAME addresses different dimensions of the programme:

- **Rationale**: what is its overall goal, what policy aims is it trying to support?

- **Objectives**: what are the specific achievements the programme is intended to be making in support of this rationale?

- **Appraisal**: what are the activities that will allow these achievements to be effected?

- **Monitoring**: what are the means for examining the progress of the different activities, in terms of meeting milestones and performing the allocated tasks?

- **Evaluation**: what approach will be adopted to examine the extent to which the programme has achieved its objectives effectively and efficiently?

The rationale and objectives of proposed new programmes set the context and expectations against which the programmes will subsequently be evaluated. Appraisal is the ex-ante assessment of proposed new programmes to decide whether or not they should go ahead and, if so, in what form. In an ex-ante evaluation, the strategic objectives of a policy intervention are formulated and the framework of implementation is defined. In addition, the potential for fulfilling the policy objectives is assessed and an estimate is made of the expected efficiency and effectiveness of the intervention. The results of the ex-ante evaluation flow back into the policy design process and may lead to a revision of the policy rationale and objectives.

Monitoring is the collection of information on the progress of programmes during their lifetime. The monitoring phase covers their whole life span and thus resembles classical project management. In active monitoring, the evaluator will have a role in guiding the evolution of the project. In passive monitoring, the project's progress is observed but no intervention is made. Important concerns of the monitoring phase are identifying who bears which responsibilities during the project implementation and who receives the results of the monitoring.

In this context, evaluation is the ex-post assessment of appropriateness, efficiency and effectiveness of programmes after they have ended or have been running for some time. The ex-post review of a policy intervention assesses its impact, in many cases with regard to multiple perspectives (e.g. political, economic or social). Its results can provide a legitimisation for the use of taxpayers' money. In comparison with evaluation at the ex-ante phase, the results of the ex-post evaluation provide a feedback on the degree of accomplishment of the original policy objectives and rationale. This experience then flows back into the policy-learning process.

It should be noted here that ROAME uses "Evaluation" in the narrow ex-post context. In reality practitioners distinguish between three temporally different applications of evaluation, ex-ante (corresponding to ROAME's "Assessment"), interim and ex-post:

- **Monitoring** is the ongoing collection and review of information (e.g. on the implementation of an intervention, its coverage and use). It is used to assess the quantity, quality and timeliness of inputs and to provide measures of outputs. Monitoring methods include data collection, activity records, interviews and surveys. The primary aim is to monitor performance and to identify problems so they can be addressed in a timely manner. Monitoring does not, of itself, address the wider evaluation issues concerning the objectives and broad effects of the programme.

- **Ex-ante or planning evaluations** are conducted at the design stage and define project/programme/ organisation objectives and how they will be achieved. They may take place when a new programme is being designed or an existing programme is being redesigned. Ex-ante evaluations can help to improve proposed interventions, allocate funding in relation to merit, and analyse the ex-

pected benefit of an intervention. Methods include modelling and simulation, scenarios, piloting, foresight studies and cost benefit and cost efficiency analyses (quantitative or semi quantitative).

- **Mid-term, Intermediate or Interim evaluations** are used to review progress. Their results help to modify and refocus interventions. Methods include statistical data analysis (limited), management and user discussions, modelling, focus groups, case studies, control group comparisons, expert panels/peer review, network analysis, and modelling.

- **Ex-post evaluations** measure the effects of a policy intervention, its impacts and outcomes, examining efficiency and efficacy. It can identify changes in the conditions and behaviours of the targeted groups and individuals. It is often used to improve the design and implementation of an intervention at its next cycle. Methods used include bibliometric analysis, citations analysis, statistical data analysis, management and user discussions, focus groups, case studies, control group comparisons, expert panels/peer review, network analysis and modelling.

4.7.5 Good Practice Tips/Lessons

The key lessons gleaned from practitioners include:

- The evaluation function is too often regarded merely as a routine ex-post programme management tool applied retrospectively to map what has happened. An ex-ante evaluation is an invaluable aid to strategic decision-making and has the potential to identify gaps in policy design which, uncorrected, would stultify any subsequent interim and/or ex-post evaluation exercise.

- A good ex-ante evaluation will ensure that the design specifies the objectives and targets against which future evaluations can be conducted, and the data to be generated and collected in the course of the programme so that indicators can be calculated for evaluation purposes.

- An evaluation culture motivates policy-makers to adopt a more holistic approach, constantly alive to the potential for policy alignments and synergies. In evaluating the effectiveness of innovation policy, each instrument should be considered in the context of the wider policy portfolio and the total innovation system in which that portfolio operates.

- Building up an in-house body of expertise with a deep knowledge of evaluation design and tools leads to a manifest improvement in the quality and coordination of policy-making in the organisation.

- Evaluation is a vital element of the policy-making process, but it is only one element. It must be seen as a servant to creative and progressive policy-making, not its master.

- Organisations must beware of the over-zealous espousal of disproportionate evaluation:

  - There can be an over-investment in evaluation at the expense of the policy supports being evaluated;

  - There can be over-elaborate efforts to evaluate the 'complete' range of outcomes of a programme at the expense of providing the most relevant (or most timely) information for policy-making;

  - The evaluation process can limit the ambition of programmes especially if it is carried out in a rigid fashion, with strict adherence to a narrow set of targets and indicators; and

  - there can be too many evaluations to be thoroughly assimilated.
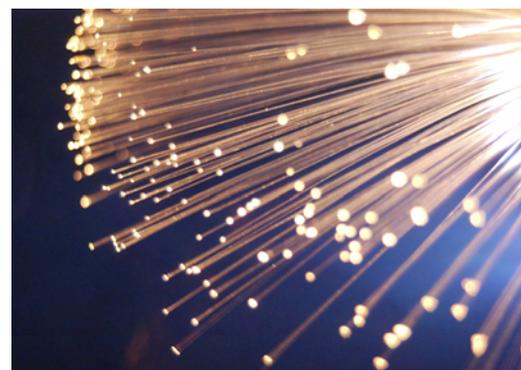
This highlights the inherent limitations of the evaluation approach and the risks of getting evaluation out of perspective. Recognising these limitations does not diminish the case for evaluation but simply tells us more about how we should frame and conduct evaluations.

- An ex-post evaluation should mark the prelude to a new cycle of policy measures. Its findings should be analysed and assimilated so that the next round of policy supports follows a trajectory of continuous improvement in terms of relevance, efficiency and effectiveness. Ex-ante evaluation of these new policy interventions, in turn, can contribute to their operational success, such that the cycle of implementation, evaluation and policy development continues.

Chapter 5 — Lessons learnt

5.1 General lessons

This section presents a number of general lessons pertinent to the application of Strategic Policy Intelligence (SPI) tools. These lessons have been gleaned from the experiences of leading practitioners from several countries. The fact that many of the lessons relate to general rather than technical capabilities in the management of complex SPI projects should be a source of encouragement to those who are apprehensive about embarking on what they might perceive as a somewhat mysterious and complex exercise.

- **Effective and efficient project management** A project can be defined as the allocation of resources (personnel, time and money) directed towards specific objectives following a planned, organised approach. In common with all projects the management of an SPI exercise should thus employ an efficient, planned and organised approach.

  The challenges in managing any project include identifying the critical stages, choosing the appropriate planning cycles, estimating the resources needed and the time requirements, scheduling the tasks and deliverables, and allocating the work appropriately among the project participants.

  An SPI exercise may include the deployment of classical project management tools such as PERT or GANTT charts or new tools including software programmes available for project management.

  As with any project, timeliness is critical in an SPI exercise; very often completion is planned to synchronise with a new round of a major funding cycle.

  Experts warn of the tendency to spend excessive time on the initial planning and scoping phases. Certainly an appropriate amount of preparation and pre-planning will lead to savings in time and resources but their advice is that, once the stakeholders are recruited, it is best to forge ahead to the execution phase of the SPI exercise while allowing flexibility for contingencies and alterations to the plan. Time should be built in for reviews after agreed stages of the exercise. Also a common error is to underestimate the time required to produce the final outputs, whether released on paper, DVD or on the web.

  In terms of managing people, the project management should be aware of the different relationships that need to be managed in the SPI exercise Clearly the most important is the relationship with the client, but other critical relationships include those internal to the Steering Committee and working panels and those between these different groups.

- **Locally driven** Ideally the driving force for the SPI exercise should come from within the region. This facilitates the 'appropriation' or ownership of the SPI exercise because a local instigator or 'champion' is more likely to secure unequivocal commitment from the stakeholders to the recommendations/action plans emanating from the exercise. Local leadership of the project has the important additional merit that the valuable learning and networking capital derived from the management of the exercise remains within the region.

- **Focus**   Experts invariably advise that first-time SPI exercises should not overreach — don't try to be too sophisticated or ambitious, don't get fixated on 'fashionable' SPI techniques, don't lose sight of the headline steps:

  - scoping and planning;

  - recruitment of participants and coalition building;

  - management and execution of the project;

  - implementation of the recommendations.

- **Clear objectives from the start**   At the outset of the exercise, the objectives should be clearly and precisely stated in a manner that will be comprehensible to all stakeholders and, in so far as possible, agreed by them. Ideally these objectives should remain constant — defining the objectives in a clear manner serves to fix the project methodology and will reduce the risk of project drift, a constant danger particularly where multiple panels with strong personalities and viewpoints are involved.

- **Flexibility**   Whilst resisting major changes to its objectives that would steer the project off course, the SPI exercise must, however, retain sufficient flexibility to be able to adapt to shifts in clients' needs and also to accommodate helpful suggestions from exercise participants that were not initially foreseen in the exercise plan.

- **Appropriate funding**   An essential requirement for any project is adequate and secure finance, and the extent of funding must be confirmed before the exercise can be realistically scoped. Funding must be guaranteed for the recruitment of process experts and technology experts. Other important costs to be borne include the remuneration of steering committee and working panels, also the commissioning of research to provide the requisite data. A key element to be costed is the communication programme to achieve an effective dissemination of the SPI exercise results.

An important criterion in the sourcing of funds is that it does not compromise the independence of the SPI exercise.

- **Effective consultative and participative processes**   Broad and effective participation lies at the heart of the SPI philosophy. Participants include the project management team, the steering committee, the expert working panels (if used), other external experts, and the stakeholders at large.

- **Balanced representation of stakeholders**   A key initial task for the project management team is the identification and recruitment of the principal participants, viz the Steering Committee and working panels. Once the Steering Committee is appointed the subsequent recruitments may be effected jointly by the project management team and the Steering Committee.

- **Exploit the virtues of the 'triple helix'**   Each field (e.g. public, private, education) has its own virtues and the members on the committee and panels should be selected for positions (chair, etc) and tasks in accordance with these virtues.

Private sector representatives are generally regarded as being very efficient at getting things done against pressured deadlines. It should also be borne in mind that the private sector is the ultimate driver of economic growth and that it is the sector in closest touch with the market; these points must lend weight to the opinions of the private sector representatives.

Public-sector actors have the virtue of understanding what factors and arguments persuade policy-makers to act. They can thus play a vital role in advising how best to formulate and communicate the outputs of the exercise so that its recommendations are implemented.

Higher education RTDI personnel keep in close touch with the latest knowledge in their fields including SPI process methodologies. They should thus possess capabilities and expertise useful in facilitating the SPI process.

This assortment of virtues does not mean that participants will automatically mesh their strengths and the professional facilitators face an arduous challenge in making the best use of the mix of 'people with expertise' and 'people with influence.'

- **Be suitably radical** The selection of participants should include stakeholders with 'disturbing' viewpoints to challenge the more complacent mind-sets. The deliberate inclusion of 'wild cards' encourages 'thinking outside the box' as a counter-measure to 'group think' and 'zeitgeist.'

- **Embed a networking culture** One of the key tasks of a facilitator is to develop a high level of trust among the participants. The proper design of an SPI exercise should provide the opportunity to enhance dialogue in a meaningful and structured way by 'depoliticising' the various interest groups. The objective of such effective dialogue is to identify and promote trade-offs between sectional goals in an interactive and consensual way.

- **Communication and promotion** An effective communication plan is an integral part of any SPI exercise, both during the exercise and in broadcasting the findings. The Steering Committee and project team must ensure that adequate resources are made available.

To ensure that maximum benefit is derived from the SPI exercise it should be reported on as it proceeds in order to raise awareness and build broad support (both within policy circles and the general public). This will foster a wide sense of ownership and make it easier to implement the exercise's recommendations.

- **Follow-on** When proposing an SPI exercise the promoters need to keep an eye to the follow-on actions expected to flow from the exercise. The measure of a successful SPI exercise is its ability to 'sell' its output results to the key decision-makers in the region who have the resources and influence to implement the recommendations.

- **Evaluation of the SPI exercises** An SPI exercise is undertaken with the purpose of generating action-oriented outputs. Thus, a thorough evaluation of an SPI study should determine whether the outputs of the exercise have indeed triggered actions or interventions and whether these interventions have led to significant impacts for the client organisation.

Such a complete evaluation is not without practical difficulties:

- Long time-lags between implementation of proposals/recommendations and their impacts can mean that SPI exercises are inherently difficult to assess from a policy perspective; we would have to expand the time frame for assessing SPI impacts well beyond the project cycle.

- Indirect learning benefits of an SPI exercise such as building trust, developing learning and technical capacity and networking are by their nature difficult to assess. The challenge for the evaluation framework is to agree in advance with the client a set of 'soft' indicators that can capture such indirect benefits.

- A narrower but nevertheless worthwhile evaluation of the SPI exercise can confine its attention to an assessment of the management of the SPI exercise. The purpose here would be to identify shortcomings at an operational level.

- **Stakeholder expectations must be managed** SPI exercises should not be promoted as the philosopher's stone, they are only an element, a tool, in the ongoing development of the region. For example, Foresight can marshal a structured distillation of expert opinion but this provides no guarantee as to how the future will unfold.

- **Integrity** Where an SPI exercise is under-resourced — either initially or becoming so at a later stage in the exercise due to political retrenchment — the project team and/or Steering Committee must have the courage and honesty to make an impartial decision as to whether the SPI exercise should be discontinued or whether a pared back 'SPI Lite' would be justifiable.

  There are several critical contexts where such a stop-go decision needs to be made:

  ◗ When there are inadequate resources to carry out an effective exercise;

  ◗ When a clear, precise and agreed scope cannot be established.

  ◗ When appropriate key stakeholders cannot be actively engaged with the project;

  ◗ When there are no champions in the key implementing organisations;

  ◗ When there is no possibility of acting upon the results;

- **Preserving the learning effect — building a sustainable SPI capability** The goal of an RTDI administration must be to move beyond stop-start SPI projects. Administrations benefit from having stable SPI performing organisations (e.g. Finland's Tekes, Germany's ITAS or Austria's ITA). Organisations that carry out SPI exercises on an intermittent basis face the challenge of building-up organisational memory and capability each time thereby adding to the cost of the exercise. Ideally a public administration should endeavour to sustain a local critical mass in SPI capability by setting up a dedicated SPI unit to service an ongoing series of major and supplementary SPI exercises, e.g. as in the UK. The benefit to the region would be access to a rapid and focused SPI capability.

5.2 Concluding observations

This Guide was written to encourage the implementation of integrated SPI-based approaches at all decision-making levels. Such approaches are vital for taking better decisions for the future success of a territory, sector or company because they:

- facilitate the making of optimum choices regarding decision-making on and investments in new technology, knowledge, the development of products and services etc;

- help anticipate what implications the decisions could have, what kind of primary and secondary effects, and how industry and society might react to these effects;

- reduce the risk of making 'wrong' decisions, e.g. in terms of public acceptance or economic success, and thus are more likely to secure a better return on the investments;

- utilise all available knowledge, not just the 'usual sources'. To take broad-based decisions involving longer-term considerations or challenges requires asking the right questions of the right people (and these may not be found only among the 'usual suspects');

- involve all relevant actors and thus raise understanding of and commitment to the process, its outcomes and the follow-on implementation activities.

Experience shows that, to gain maximum benefits, SPI tools should be systematically utilised when decisions concerning RTDI issues in the public and private sphere are taken. SPI tools provide indispensable inputs for vision and strategy development, for agenda development and implementation, for

process monitoring, for evaluating and benchmarking results, and for tailored feedback to promote learning and upgrading of policies.

The RegStrat project aimed to raise awareness among decision-makers in Europe's regions and to encourage them to benefit from the knowledge and experience which can be gained by applying SPI tools in their own regions, e.g. with regard to decisions on RTDI funding, on the provision of RTDI infrastructures, on technology transfer and innovation diffusion mechanisms, and on issues affecting IPR, regulations and standards.

To better achieve these goals the RegStrat activities involved a broad variety of organisations, both from participating regions and beyond, and showed that the use of SPI tools in regional policy-making can indeed make a difference with regard to achieving higher growth, competitiveness and investments. SPI generates positive effects for both less and more advanced regions, and supports building up or renewing decision support tools.

Nevertheless, only some of Europe's regions are successful in making optimum use of the available decision-support tools. Although these tools have been available for quite some time, they are not yet widely known or applied to the appropriate extent, especially the less formalised methods such as foresight. Thus considerable effort is still needed to enable regional decision-makers to acquire the comprehensive knowledge generated by structured, participative processes for longer-term, strategic thinking and robust regional decision-making. This **RegStrat Guide and Compendium** were written to facilitate access to this knowledge by more stakeholders and decision-makers in Europe.

The Guide was written in the context of the general efforts to progress the Lisbon Strategy. In line with this, one focus is on the **interrelationship of innovation and SPI**. The economic and social systems in Europe are strongly influenced by international developments such as globalisation, security, climate change, etc. Against this background, sustainable progress can only be made if Europe maintains high competitiveness and innovation. It is vital in this respect to use SPI more systematically because innovation involves a fundamental element of uncertainty. We cannot predict what the future will look like, but future intelligence gathering can facilitate innovation activities for several reasons. It enables us to assess possible future developments, including opportunities and risks related to them, and thus **reduce uncertainty** associated with the development of new products and processes. In particular, public decisions concerning the promotion of innovation activities presuppose the anticipation of potential impacts and their scope. In the case of public RTDI investments, **anticipation and risk assessment** are particularly important due to the restricted financial resources of public bodies and to the liability attached to decision-makers regarding the endorsement and impact of these investments.

Furthermore, another important feature of SPI activities — gaining the knowledge and commitment of all relevant stakeholders and innovation partners to create favourable preconditions for coordinated RTDI activities — addresses the **contemporary wisdom** of harnessing the full potential of 'innovation governance' (e.g. "innovation systems") or of '**coopetition' approaches** (e.g. "open innovation"): bringing together all relevant actors also supports network building and facilitates new contacts and combinations of stakeholders which have not interacted before and thus supports '**re-wiring' or upgrading of innovation systems**.

This has become especially evident during the last few years. It is one key element in developing new or strengthening existing **complex networks of RTDI actors**, such as **clusters, region-wide innovation systems, large-scale collaborative projects, European Technology Platforms or Joint Technology Initiatives**, etc. If SPI tools are seamlessly integrated in related strategies and programs, this undoubtedly will enable Europe's regions to better use their potential for boosting regional development in the medium- and long-term.

Further reading

This Guide has benefited from numerous activities undertaken and documents produced within the field of SPI and associated areas. The following sources were found to be especially useful:

Clar, G., Corpakis, D., Landabaso, M. (2001): Mobilising Regional Foresight Actors to Strengthen the Strategic Basis of the European Research Area. *IPTS Report No. 59*, Seville.

Tübke, A., Ducatel, K., Gavigan, J., Moncada-Paterno-Castello, P. (Eds.) (2001): Strategic Policy Intelligence: Current Trends, the State of Play and Perspectives. *IPTS Technical Report Series.*

Clar, G., Svanfeldt, C., Gavigan, J., Scapolo, F. (Eds.), and experts from the *Member States: Country Specific Practical Guides to Regional Foresight*, Luxembourg, COM (2002). 20 EU Member States covered.

European Commission (2004): Foresight and the Transition to Regional Knowledge-based Economies, Synthesis report "*Blueprints for Foresight Actions in the Regions*" and five Blueprints reports: For-Ris, Upgrade, Techtrans, Transvision and Agriblue, Luxembourg, COM (2004).

European Commission (2005): *Working together for growth and jobs. A new start for the Lisbon Strategy*, Luxembourg, COM (2005) 24.

European Commission (2005): *Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines*, Luxembourg, COM (2005) 299.

European Commission (2007): Green Paper, *The European Research Area — New Perspectives*, Luxembourg, COM (2007) 161.

Fahrenkrog, G., Polt, W., Rojo, J., Tübke, A., Zinöcker, K. (Ed.) (2002): RTD Evaluation Toolbox — Assessing the Socio-Economic Impact of RTD-Policies. *IPTS Technical Report Series.*

A number of relevant links for the tools and issues in question are given below. Additional resources have already been mentioned throughout the chapters of the Guide.

General Links

Innovating Regions in Europe Network (IRE):
http://www.innovating-regions.org/

IRE Mutual Learning Platform on Regional Foresight, Regional Benchmarking and Growth Poles:
http://www.innovating-regions.org/mlp/index.cfm

Institute for Prospective Technological Studies, Seville:
http://www.jrc.es

The RegStrat-project web site:
http://www.regstrat.net

Technology Assessment Links

European Technology Assessment Network (ETAN):
http://cordis.europa.eu/etan/home.html

European Techno-Economic Policy Support Network (ETEPS):
http://www.eteps.net/

Scientific Technology Options Assessment (STOA):
http://www.europarl.europa.eu/stoa/default_en.htm

The European Parliamentary Technology Assessment Network (EPTA):
http://www.eptanetwork.org/EPTA/index.php

Virtual Library on Technology Assessment (Austrian Institute of TA):
http://www.oeaw.ac.at/ita/www.htm

Foresight Links

Blueprints for Foresight Actions in the Regions:
http://cordis.europa.eu/foresight/regional_blueprints2004.htm

Country Specific Practical Guides to Regional Foresight:
http://cordis.europa.eu/foresight/cgrf.htm

General Information on Science and Technology Foresight:
http://cordis.europa.eu/foresight/home.html

European Foresight Monitoring Network
http://www.efmn.info

Evaluation Links

DG Budget evaluation information:
http://europa.eu.int/comm/budget/sound_fin_mgt/evaluation_en.htm

DG Regio's evaluation site:
http://www.evalsed.info

Benchmarking Links

European TrendChart:
http://trendchart.cordis.europa.eu/

Benchmarking In Europe (European Commission initiative):
http://www.benchmarking-in-europe.com

Global Entrepreneurship Monitor (GEM):
http://www.gemconsortium.org/

Steinbeis-Europa-Zentrum

The Regional Strategies and Innovation (RSI-) Group at SEZ

Steinbeis-Europa-Zentrum (SEZ) is located in Stuttgart, the capital of Baden-Württemberg, one of the most economically powerful and innovative regions in Europe. SEZ is one of the 700+ Steinbeis organisations in the network of the Stuttgart-based Steinbeis-Foundation for Economic Promotion.

SEZ was established in 1990 as the operational unit of the Commissioner for European Affairs of the Minister of Economics in Baden-Württemberg, and since then it has developed its activities portfolio. With its budget coming primarily from public funds (EU, national, regional), SEZ actively promotes RTDI-related international co-operation and innovation activities between the different actors in the globally-linked innovation system of Baden-Württemberg. SEZ's activities aim at fostering European competitiveness by strengthening the technology and innovation base of all innovation system actors, with a particular focus on SMEs.

Specifically, SEZ is involved in:

- linking the regional and EU level and has profound knowledge of organisations, key players and processes at both levels;

- fostering regional and business innovation through the integration of tailored prospective and strategic elements (economic & policy intelligence);

- promoting SMEs' and Universities' involvement in European RTDI projects and transnational technology transfer, and setting up European initiatives linking key regional players.

For the European Commission, SEZ (formerly an Innovation Relay Centre) is a leading Baden-Württemberg partner in the new "Enterprise Europe Network", commencing in 2008. SEZ is also active in the Innovating Regions (IRE) thematic networks and in other networks of European and regional interest. Since 2001, SEZ acts on behalf of the national Science Ministry as the National Contact Point for research for SMEs in Baden-Württemberg.

Since 2004, Dr Günter Clar, Director Regional Strategies & Innovation (RSI), has introduced Strategic Policy Intelligence (SPI) tools such as Technology Foresight and Assessment (TF/TA) as new features in the SEZ portfolio. These complement other strategic approaches such as technology audits, technology watch, technology roadmapping, etc., in linking the generation or use of strategic intelligence with approaches to optimise economic, market and technological intelligence.

The systematic and actor-specific use of SPI has become a key element in the 'new-generation' innovation policies and support tools, enabling all actors to develop necessary future-proof policies, structures and networks, to improve coherence and functionality of the innovation system as a whole, and to improve RTDI and enterprise-related investment decisions, specifically those of a strategic character. In this context, it is especially important to strengthen and gain the commitment of the networks of the various RTDI actors as key elements of successful regional clusters, innovation systems, large-scale European collaboration activities and other networks.

Against this background, the SEZ RSI-group supports public and private actors in the fields of business and policy development to develop and implement tailored, forward-looking strategic approaches to boost competitiveness and innovation in the medium- and long-term.

For more information, see http://www.steinbeis-europa.de/index.php5?file=340

REGSTRAT

SIXTH FRAMEWORK PROGRAMME

The RegStrat consortium comprises:

STEINBEIS-EUROPA-ZENTRUM	Steinbeis-Europa-Zentrum Stuttgart, Germany	www.steinbeis-europa.de
Forfás	Forfás Dublin, Ireland	www.forfas.ie
IReR LOMBARDY REGIONAL INSTITUTE FOR RESEARCH	IReR Milan, Italy	www.irer.it
FUNDECYT	Fundecyt Extremadura, Spain	www.fundecyt.es
Wrocław University of Technology	Wroclaw University of Technology (WUT) Lower Silesia, Poland	www.pwr.wroc.pl
Institute of Baltic Studies	Institute of Baltic Studies (IBS) Tartu Region, Estonia	www.ibs.ee