Innovating Regions in Europe

RIS Methodological Guide

Stage 1

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IRE Innovation network

Assessing the Regional Innovation System:

-Lessons from 10 years' experience-

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1   INTRODUCTION

1.1   *Aim of the guide*

While in the stage 0 methodological guide for managing a RIS project methodological support was given on how to develop the strategic objective of the region and on how to reach consensus among regional stakeholders, this stage 1 methodological guide aims at assessing the fundamentals for making the strategy feasible. It focuses on the regional innovation system in which all relevant actors interact to reach the strategic goals of the region.

The first aim of this guide is therefore to assist project managers involved in stage 1 of the RIS project in conducting a reliable assessment of their regional innovation system through data collection and analysis.

This guide is the second published by the IRE Secretariat[1] and is addressed to both current RIS project managers and to regions wishing to carry out similar analyses in their region in the future.

1.2   *Outline of the guide*

This guide is divided in 8 chapters giving information ranging from the first step of the methodological design to the interpretation of the results

- **The objectives of Stage 1**: An introductory chapter provides a short review of the main objectives of stage 1

- **Maintaining the consensus**: This chapter provides describes how to maintain the consensus reached in stage 0

- **Methodological preparatory steps**: This chapter provides information on who should be responsible for gathering the information and conducting the analysis in the first steps of the methodology design.

- **The demand for innovation support (Need analysis):** This chapter provides information on the characteristics and demands of firms within the region, particularly their managerial and technological innovation capacities.

- **The supply of innovation support (Supply side analysis):** This chapter provides suggestions on how to gather information to assess the supply of innovation support in the region.

- **Technological and sectoral trends:** This chapter indicates how to assess the state of technologies applied in the region and the wider pertinent technological advances as well as the innovation capacity of key sectors, both industry and service sectors that exist within the region.

- **Tools for information gathering:** This chapter lists and explains the different tools available for gathering information.

- **Analysis of collected information:** This final chapter offers some examples of indicators that should be looked at during the analysis as well as the different types of analysis that can be carried out.

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[1] Parts of this gude are based on the PARTNER Methodological Guide Stage 1, 2003 (PARTNER was an IRE Thematic Network project that provided support and opportunities of exchange of experience to regions that carried out Regional Innovation Strategy (RIS) projects in Associated States during the period 2001 – 2004.)

2   OBJECTIVES OF STAGE 1

The objectives of RIS stage 1 are manifolds:

- To identify crucial issues to be addressed in the regional innovation strategy and action plan

- To map the reality in the region from a system point of view

- To understand the region's positioning in an international comparison

- To achieve consensus amongst the key players on the analysis results and their use

- To strengthen the commitment of the key players to the RIS project

2.1   Identifying issues to be addressed in the regional innovation strategy

The main aim of Stage 1 is to carry out an analysis that will reveal what strategic directions and concrete actions are needed in the region in order to improve its general innovation performance. This includes:

- understanding the needs of companies in your region for innovation support

- getting an overview of the resources, competences and services offered of the innovation support organisations inside – and, when relevant, outside – your region

- analysing to what extent companies' needs for support are met and where new or improved services are needed

- revealing the strengths and weaknesses of your region

- identifying new opportunities for your region as well as coming threats that the region will have to face

The results of the analysis should provide recommendations for the orientation of the regional innovation strategy as well as justifications for the activities included in the action plan.

During the analysis phase it is easy to forget the overall purpose of the RIS initiative. RIS is about preparing an innovation policy, strategy and action plan, identifying project champions and ensuring the implementation of suggested measures. The analysis phase should not overwhelm all the other actions of RIS. Analysis is not an objective of its own!

The objectives and the process of RIS must be shared and understood by all team members involved. Many RIS projects have faced problems with misunderstanding of the objectives and the nature of the RIS process, especially when research was commissioned to academic-oriented institutions. A sufficient number of meetings and workshops with different actors must be planned in order to ensure a common understanding.

2.2   Mapping the reality in the region from a system point of view

The RIS objective is to map and identify different innovation actors within the region and their interaction to find out what is needed to establish innovative environments.

Innovation is a result of co-operation, interaction and mutual learning between different actors within a region – companies, research organisations and public administration – rather than a result of a linear process where innovating companies receive support from public institutions. It is not the performance of individual players that create an innovative growth climate, but rather the interaction of these players as part of a system.

In order for the RIS analysis to be useful, it is important to keep in mind throughout the project that the objective is to gain a fundamental understanding of the key issues at stake within the regional innovation system and determine how they are linked to each other, and not simply to obtain an accurate statistical description of the regional situation. The information gathered needs to be structured and analysed in order to be communicated further to all relevant stakeholders responsible for carrying out the strategy and to improve innovation in the regional companies.

2.3   Understanding the region's positioning in an international comparison

Mapping the strength and weaknesses of a region is a crucial first step and a main objective of stage 1. However it does not help understand a region's positioning in an international comparison.

A region's competitiveness is determined by its strengths and weaknesses compared to those of other regions. RIS aims at identifying internationally competitive fields and networks. It is therefore important to benchmark against other regions and compare the results of the analysis phase with similar results in other regions.

2.4   Achieving consensus amongst key players

It is essential to maintain the consensus built amongst key actors during Stage 0 throughout the analysis phase of RIS. During Stage 1, it is particularly important that key stakeholders are enough involved in and informed about the analysis undertaken to be willing to accept and work with the analysis results. It is important to remember that consensus-building is an ongoing process during the project as well as after its completion.

During Stage 1, consensus has to be achieved and maintained on several levels:

- on the project objectives and expected outcomes,
- on a long-term vision of the regional process launched with RIS,
- on the way to proceed,
- on the data to be collected, the widening and systematisation of available information
- on the results of the analyses and the implications for the strategy.

Consensus need to be achieved amongst all actors of the 'triple helix', i.e. public administration, industry and research institutions. On the other hand, however, it is important to avoid that actors who are unwilling to cooperate are allowed to slow down the process.
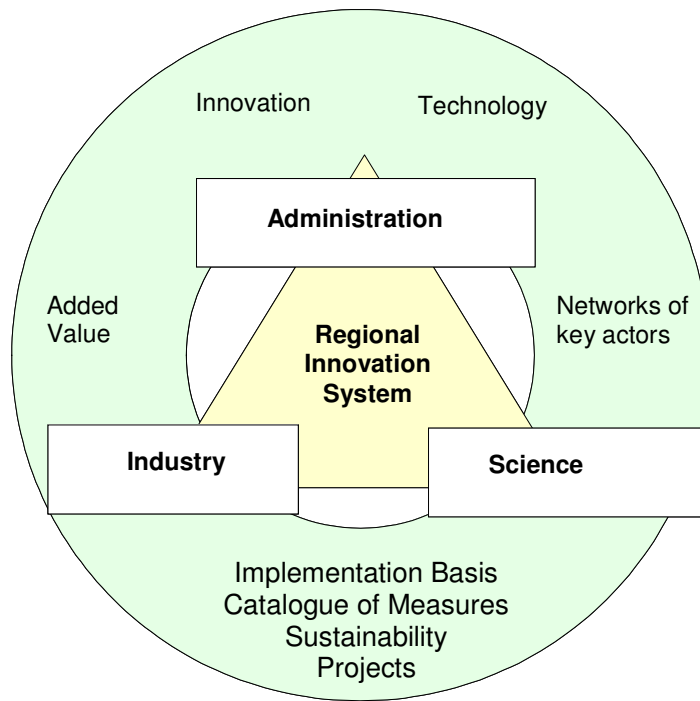
2.5 Strengthening the commitment of key players

Simply achieving consensus is not enough. The RIS initiative as a whole is about action. It is therefore necessary to commit the key actors to action already during Stage 1. One of the goals of Stage 1 is therefore to identify 'project champions' such as prominent regional company managers of decision-makers who are willing to act as ambassadors for the initiative, promote it among their colleagues and give it legitimacy through their presence. The champions should be committed to the initiative as a whole and to specific actions in particular.

3   MAINTAINING THE CONSENSUS

3.1   *Building consensus*

Building consensus on the development and implementation of the regional innovation strategy among key regional actors is one of the main objectives of the RIS initiative. The successful implementation of the emerging strategy will depend on the cooperation of regional actors in the public and private sectors and their willingness to commit time and money to the development and implementation of the innovation strategy.

Consensus building is one of the core elements of Stage 0. A main challenge of Stage 1, however, is to maintain this consensus. The RIS analysis is often carried out by a small project team with the help of external experts. While the analysis is essential for the success of the RIS project, its progress is not very visible to companies and other regional partners until its results have been finalised. There is thus a risk that people who became enthusiastic about the project during Stage 0 will lose interest when nothing seems to happen during a year or more. Keeping regional stakeholders involved and informed during Stage 1 is therefore important.

Losing the momentum in RISI Liège

One example of how difficult it is to keep the momentum can be taken from RISI (Regional Information Society Initiative) Liège. At the beginning of the project, all actors had been involved and everything seemed to be well organised. However, an intensive analysis was made by external consultants and no other actors were really involved for a long time. In addition, a time gap of about one year between the analysis and the implementing phase, during which no other activities were carried out, contributed to a gradual general interest loss. When the implementing phase started all the actors had completely lost interest and the consensus could never be attained again.

Furthermore, since the analysis is generally undertaken by selected experts there is a risk that regional actors will not recognise or agree with their findings. In order for the stakeholders to be willing to accept the analysis results as a starting point for the orientation of the innovation strategy, the RIS management needs to find ways of involving them in the analysis work and taking their comments and opinions into account.

Building consensus can be based on:

- Awareness
- Influence over priorities
- Ownership
- Keeping the momentum

Awareness

Awareness about what is going on in the RIS project can be promoted in a number of ways, such as:

- Seminars, forums or conferences in the region to present the project and discuss intermediary findings

- A series of presentations throughout the region to industry groups, local groups or existing groupings of regional actors
- Publicity of on-going activities via regional media such as radio, television and newspapers
- Information about on-going work published at the project website
- Explaining the process during the on-going contacts with individual companies

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Building regional consensus in RIS South Central Bulgaria

A high-level launching policy conference was held at the beginning of the project with the aim to raise awareness on the project and its objectives, and to announce the start of its implementation. 86 participants from the South Central Region of Bulgaria attended the event. Among others, the RIS experience of Thessaly in Greece and the region Altmark-Harz-Magdeburg from Saxony-Anhalt in Germany were presented, with a focus on the benefits for their regions and the strong political support. A series of five awareness-raising seminars in the region followed the conference.

Additionally, 61 bilateral meetings with regional stakeholders were organised in the 6 districts during the period that followed in order to build consensus around the project objectives and to discuss the methodology and the work programme for the regional studies of innovation demand and supply. These meetings aimed at:

- promoting the project and presenting its objectives and the expected outcomes in more detail,

- identifying the readiness to cooperate among the regional stakeholders during the project implementation,

- identifying motivated regional experts and stakeholders,

- discussing the methodology for the regional studies, and

- collecting available studies and analyses concerning the regional economy.

Furthermore, 11 consultancy meetings were held with national and regional experts in the period December 2001-May 2002 to get their advice on the methodology for the regional studies of innovation demand and supply. Consensus building was a permanent activity and during the project implementation a lot of events and consultancy meetings were organised with regional stakeholders.

Influence over priorities

Each key regional actor will have a valuable perception of what is needed to improve the regional innovation system and which are the region's strengths and weaknesses. Testing the results of the analysis with these actors will give useful feedback that improves the validity of the final results. The actors will also identify with the results to a higher extent if they feel that they had the opportunity to influence them.

> **RIS Shannon: Defining priorities through consensus**
>
> *The RIS Shannon Steering Group experienced several hurdles in moving from survey to analysis and action and in maintaining the consensus approach at each step. Clear steps were defined and followed to bring the project to implementation:*
>
> **Step 1**   *A series of 'brain-storming' sessions were held by the Steering Group (19 organisations) to confirm core themes and issues arising from the survey stages. This resulted in agreement on six 'core strategies' for the Shannon RIS to follow.*
>
> **Step 2**   *Meetings were held by staff in five main public agencies that had been involved in the RIS process. The 'core strategies' agreed by the Steering Group were presented and discussed. In particular, staff also deliberated the implications of the emerging RIS priorities for action by their own specific agency.*
>
> **Step 3**   *A sub-group of main implementing agencies examined the strategies in more detail generating a list of more detailed action areas and implementation steps within each strategy.*
>
> **Step 4**   *The results were presented to a workshop of academic and private sector participants, and modified to take account of the comments received.*
>
> **Step 5**   *The sub-group then picked five priority implementation steps to act as a basis for future implementation. Criteria for picking these projects included both their strategic significance and the likely ease of implementation.*

Ownership

Widespread ownership of the strategy to be developed should be a natural consequence of the consensus building process, not least during Stage 1. Shared ownership amongst members of the Steering Committee is particularly important. This can be further ensured by regular consultations, timely publicity and the securing of concrete outputs during the funding period.

> **RIS Weser-Ems**
>
> *A slightly off-topic approach to keep the consensus during the entire project and even after can be found in the example of RIS Weser-Ems. The participant organisations had to pay a yearly fee to participate in the project. This fee increased the commitment of the actors to the initiative and motivated them to participate actively. During the entire process the actors discussed and the strategy and action plans were adjusted through consensus. The management team pointed out that they did not believe the actors would be as involved without the fee to pay.*

Keeping the momentum

As stated above, not all actors are actively involved in the analysis process, which could potentially obstacle the consensus building process. This could be the case if all the groups of actors were encouraged to participate in the RIS project but for months no activities in which

they could participate or contribute to were carried out. To avoid such situations it is advisable to organise parallel activities, especially involving SMEs.

The different components of a RIS project (steering group, project management, consultants etc.) can all play a role for keeping the consensus during the analysis phase. When conducting interviews as part of the analysis, discussions are held with both companies and innovation support actors. This is a good opportunity for motivating the actors and keeping them informed about the RIS process. In this way the actors are still taking part in the process. During the interviews the objectives of the RIS project, the strategy to be developed and the project process can be explained again, which might even strengthen the consensus. Seminars and workshops involving SMEs can also be organised during the analysis phase. The main objective during stage 1 is to keep the contact with the actors, continuously inform them about what is happening and involve them as much as possible.

Working groups

Working groups are a useful mechanism to help build regional consensus. They may be sector-oriented or thematic, depending on the adopted approach. Working groups can bring together representatives of both the public and private sector. Their tasks can include, for instance, the following:

- Reviewing and commenting on intermediary analysis results

- Assessing analysis results and giving and/or validating recommendations for the strategy development

- Elaborating specific parts of the regional innovation strategy

- Suggesting priority measures and possible pilot actions based on the analysis findings

Beside giving valuable input to the analysis phase of the RIS, working groups often give additional added value since they allow various regional actors to meet and get to know each other. This often leads to the establishment of new collaboration relationships and joint projects.

Working groups in RIS Slovenia

RIS Slovenia structured its analysis and action plan drafting around the activities of six working groups. Each working group dealt with a specific topic considered important for the development of innovation capacities and entrepreneurship:

- Legislative system for the support of innovation

- Innovation cooperation between the research community and industry

- Infrastructure and innovation support system

- Financial support system for innovation

- Human resources management for innovation development at national level

- Awareness of innovation

The groups were made up of experts and important players in the Slovenian economic system.

The working groups based their activities on the results of the RIS analysis, which included the results of a questionnaire sent out to SMEs, summaries of other previous analyses, an international comparison of the legislation in the area of

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innovation, and other European studies and reports. Each working group analysed the state of the art in its specific area with particular emphasis on strengths and weaknesses. The groups were asked to contribute to the project with:

- A two-page document with conclusions and recommendations

- A document with suggested changes to improve the innovation system and increase the innovation capacities

- Active involvement in the final round table discussion that concluded the analysis phase

The project management discussed the draft version of the joint recommendations with the coordinators of the working groups, which the working groups then had the opportunity to review. The final version of the recommendations was then discussed at a joint round table session.

4 METHODOLOGICAL PREPARATORY STEPS

Before discussing the different targets for the analysis and the tools which can be used to gather the information, it is important to shortly review some introductory steps and to decide who should conduct the data gathering and the analysis

4.1 Who should be in charge?

An analysis team must be appointed. The persons operatively working with the analysis should be engaged and familiar with analysis methodology. The team should preferably consist of an analysis project leader, a person with knowledge of statistical methods, a person with experience in questionnaire studies and staff of some 1-3 persons that can be used for e.g. mailing and phoning. It is of great importance that the team has knowledge and competences in questionnaire design, interview guidelines, interviewing and statistical analysis. They must convey trust and at the same time be able to discover latent needs.

> *Many projects have shown that there is often a lack of competence when it comes to mastering the techniques of designing questionnaires, interviewing and interpreting the results. For example, in some projects the companies were asked to fill in a questionnaire containing a question about the barriers for innovation and to choose from a list of problems for innovation. The most frequently indicated barriers were that companies lacked financing resources and information about available support. Experience indicates, however, that these answers are easy to choose – companies could always use additional money and never have the full picture of the support available. In order to accurately address companies' real needs, it would be important to get behind these first answers and analyse other, more difficult issues, such as for example lack of skills of managers and employees. A better thought through questionnaire structure and higher interpreting skills would have been needed.*

In order to increase the effectiveness of the questionnaire design and interview guidelines, the analysis team could be supported by professionals. These professionals could be in charge of validating the work done. Such professionals could be:

- external national consultants;
- international consultants or experts in a panel;
- regional experts in the sector, possibly from the university.

4.2 Design of the first step

Prior to sending out questionnaires and conducting interviews, some preliminary steps should be done in order to have a clear overview of the situation.

First of all some desk research should be done in order to have a first evaluation of the situation in the region. Most regions have conducted some kind of regional evaluation and the relevant documentation should be available. Experts with sectoral knowledge should be invited to a round-table with the regional stakeholders to discuss the regional situation. This first step of

analysis should give a basic overview of the regional situation. Furthermore this initial analysis will lead to:

- A better design of the guidelines for interviews and the questionnaires

- Identify more precisely the different sectors and actors

- Identify different aspects of high interest in order to analyse them more in detail.

Once a basic knowledge of the situation is acquired hypothesis can be formulated. It should be reminded that the stage 1 is also about formulating hypothesis, testing them and at the end validating them or rejecting them. Those hypotheses should be formulated by the project team together with regional stakeholders and external experts. Some examples of hypotheses that can be formulated are:

- The demand side knows what support organisations to turn to for innovation support

- The demand side has the financial resources to buy the innovation support services

- The automotive industry in the region is the sector with the greatest potential

Formulating hypotheses is a very important step. Regional stakeholders often have some baseless ideas about the motivation of the demand and supply side. Therefore, it is useful to agree on a list of hypotheses and the way they should be verified in the analyses in order not to miss the "obvious" but important ones. This should be done in order to prove the hypothesis right or wrong.

Once the hypotheses are formulated, decisions must be taken on which kind of information is needed for validating or rejecting them. Some hypothesis need to be validated through quantitative data - for which a questionnaire would be more suitable - while others might be better validated through qualitative data – for which interviews are more appropriate.

5 THE DEMAND OF INNOVATION SUPPORT (NEED ANALYSIS)

Companies and the degree to which they are able to innovate effectively is the very foundation of an innovation system. All actions aiming at improving the innovation system should therefore stem from the demand and needs of regional companies. A "bottom-up" approach of the RIS analysis, focusing on the demand side of innovation support, requires that there is:

- a clear understanding of the needs and capacities of regional companies in terms of research and technology development (RTD) and innovation support;

- a deep understanding of the factors motivating regional companies to be innovative;

- an identification and consideration of the obstacles to their innovation activities;

- a characterisation of the interaction of companies and innovation-supporting organisations;

- an analysis of the innovation-related success factors of the companies; and

- an identification of innovation opportunities

Moreover, it should be kept in mind that SME needs are constantly changing, which makes it important to choose an iterable method providing a basis for comparison on the long term. In many cases it has even proved useful to establish the need analysis as a continuing or recurring process in line with the goal of converting the overall exercise of a RIS project into a dynamic continuing process in the region.

5.1 Deciding on which companies to address

Before proceeding with selecting individual companies to be included in the different elements of the analysis, it is important to clearly identify the type of companies to be addressed. This is important in order to make a balanced representation of the region's demand for innovation.

Companies should be chosen on the basis of the identified strengths and weaknesses of the region. If the region wishes to promote itself on a tourist base, for example, it will be important to include some very small tourist firms from the service sector, even if they do not appear in the statistics or are excluded from any definition of a high-tech sector. For regions in which many sectors are represented, it should be decided well in time whether the survey should focus on strategic sectors with in-depth analysis, or cover a cross-section of all sectors, but less in detail.[2] In taking this decision, the inherent danger of a too strong focus on technology and research oriented companies should be considered, as in this case the needs of other SMEs also having an innovation capacity could be overlooked. In studies focussing too much on matching industrial with scientific strengths of a region, those companies not having a clear-cut link with science might be neglected.

Past experiences show that it is useful to consider large multinational companies in the region not only as an 'object' of study but also in order to take advantage of their compound networks and involve them in the RIS process as a liaison to other companies and regional actors. After all, an important goal of a RIS project is to reflect on ways to embed these companies in the regional tissue by favouring high value-adding linkages with regional SMEs and other regional actors. It may also prove useful to include the headquarters of companies with subsidiaries in the region in the survey.

Large companies in general should be involved in the analysis for several reasons:

- they are important innovators in the regional innovation system;

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[2] In general terms, careful consideration should be given to including some service sector companies in the exercise, since not including them may turn out to be a mistake.

- they are important for promoting innovation among SMEs;
- they can sometimes function as technology suppliers;
- they generally have a good overview of the business community in the region.

5.2   Segmenting companies

After having determined what types of companies that should be the target of the survey a further characterisation of the companies involved will allow segmenting and supporting the analysis at a sectoral and regional level. For example, if it was decided to include in the survey a number of strategic tourist companies, the next step will be to identify, not individual companies, but a group of adequate tourist companies, e.g. at a specific location or within a specific branch.

One approach to the segmentation of SMEs could be to organise a workshop with a limited number of intermediaries to develop an initial segmentation followed by test interviews on some randomly chosen companies in the different selected segments before deciding on the final segmentation.

When segmenting the sample, the following aspects should be considered:

- Geographical spread - the 'sample' should avoid any sub-regional bias not supported by the general distribution of firms in the region.
- Size – the sample should represent companies of different sizes including companies owned and controlled outside of the region. Some bias towards larger firms may be required.
- Sector – the sample should ideally represent as many sectors as possible, although some bias towards manufacturing sectors and the larger service companies also operating in markets outside the region may be required, since they probably represent the majority of regional innovation. Random-compiled samples will generate a large number of "local" service companies whose future will be less critical to the region. However, RIS projects do not necessarily need to be restricted to the manufacturing sector and may well include analyses regarding the tertiary sector - business services in particular - sectors depending on the characteristics of the regional productive situation and strategic choices made by the relevant economic actors carrying out the exercise.
- Technological orientation - targeting the survey to companies with a specific technological orientation may provide information of particular strategic policy value.
- Ownership and control – subsidiaries of large regional companies should preferably be excluded from the survey if the mother company already participates, since they might generate a duplication of answers.
- Willingness to participate in the exercise – very small SMEs often have problems finding time to participate in a survey. However, since small SMEs are vital to the balance of the sample, choosing small SMEs that are already known for co-operating might be a good idea.

Statistical classifications of sectors should be used carefully, as they could lead to unintentionally assigning a wrong technological company profile or sub-sector description. The food sector, for instance, should be regarded as high-tech if the companies produce functional food or highly differentiated high added value products. Similarly, several low-tech sub-sectors can be introduced unwillingly in a sector that is generally regarded as high tech, for example in the manufacturing sector. This has to be considered when selecting individual companies for the survey.

Segmenting companies in RIS South Central Bulgaria

The questionnaire-based survey on regional demand for innovation was a pilot survey for Bulgaria. The fieldwork – face-to-face interviews with companies – involved 397 SMEs from the priority sectors as follows: agriculture (60 companies), agro-chemistry (19), perfumery and cosmetics (18), food industry (46), mechanical engineering (47), textile (54), tourism (61), timber, wood processing and furniture production (48), electronics and electrical engineering (20), and leather and shoe making (20).

Segmenting companies in RITTS Flanders

In RITTS Flanders firms were categorised into three groups according to their technological capacity:

• Technology leaders

• Technology followers

• Technologically indifferent

The classification was made on the basis of indirect questions submitted through a 'mirror' questionnaire in which they could rank their individual standings. Each response had to be justified. This approach allowed a valid categorisation and aided the targeting of actions.

5.3 Questions to be included in the questionnaire / in the survey

In order to perform an adequate analysis of the innovation support demand in the region, the following topics should be considered:

- the technology areas in which regional companies operate;
- the level of skills, training and education of the company managers and workforce;
- what do the companies consider as their key issues for growth during the next years;
- the supply chain relationship of the company and the extent and nature of inter-company collaboration and networks;
- the sources of innovation for the company;
- the access to innovation related finance;
- the expressed need for innovation competence and the innovation services for which companies express the most accentuated needs
- the attitudes of company managers towards innovation support;
- the knowledge of the regional innovation support infrastructure;
- the extent of collaboration with regional innovation institutions and to which extent public innovation supporting players are utilised to satisfy companies' needs and key issues;
- the potential for these players to take a more prominent role in the innovation processes of the companies;
- barriers to the innovation process- e.g. do the companies know about the service offer and are services living up to the expectations of the companies.

Some of the listed variables can have a direct impact on the level of innovation capacity of the company and some of them actually state the current level of innovation capacity. However, the correlations between the different variables should be tested without predefining cause and effect relationships too much in advance. There might be correlations between different variables that were unknown in advance. When a statistical correlation is stated a further analysis is needed, perhaps through face-to-face interviews with selected companies.

Demand analysis in RITTS Rotterdam

The demand and supply analyses undertaken within RITTS Rotterdam were preceded by a study on the innovation profile and SWOT analyses of the region, with specific attention to selected sectors. The main source of information consisted of existing studies and data. Subsequently, the analysis was extended to integrate the views of international experts on the selected sectors.

The demand-side study consisted of an intensive enquiry into the performance, barriers and needs for innovation among companies in five selected sectors, and their relationships with knowledge providers. The analysis was based on the knowledge of local and international experts and a small number of case studies. The model included the following steps:

- a review of literature and gathering of experts' knowledge on the sectors, notably on the definition of the sectors or clusters;

- a discussion with a selected reference group and international experts for each sector and selection of companies for in-depth analysis (with a focus on networking activities);

- motivation of the companies by members of the reference group;

- interviews with about five companies per sector;

- a report for each sector;

- organisation of one workshop per sector to present and discuss the results of the analysis to the companies.

The flexibility in adapting the method to the 5 sectors, anticipated in the work programme, is reflected in the implementation, as the model was not followed rigidly in all sectors.

The discussion phase in the demand analysis proved to be a key activity, since it contained elements of consensus-building and strategic development, as well as a first definition of possible concrete actions. In some sectors, visits to good practice cases outside the Netherlands were carried out or planned during the analysis phase.

5.4 Check list

☐ Have you selected the types of companies that matches the strategy formulation and lays the foundation for further characterisation and segmentation of companies?

☐ Have you sent this first selection of companies to the relevant stakeholders asking for their opinion?

☐ Have you decided how to segment the companies' sample for selecting individual companies for the survey?

☐ Have you verified your segmentation choice with the relevant stakeholders or through conducting test interviews with some firms in the segment?

☐ Have you made a final selection of individual companies for the survey?

☐ Have you put together a list of questions to be used for the survey, considering the necessary aspects of transparency from the point of view of the demand and the regional strategy formulation?

☐ Have you decided which research tools should be used for the survey and for other assessments of the demand side?

☐ Have you designed a questionnaire that will assess all the questions you want answer to?

☐ Have you tested the questionnaire with some sample companies to ensure its comprehension? If it is a web survey, have you tested it from a technical point of view?

6   THE SUPPLY OF INNOVATION SUPPORT (SUPPLY SIDE ANALYSIS)

The aim of analysing the supply of innovation support is to draw a complete picture of the different elements of the technology and innovation support infrastructure (comprising innovation support agencies, research organisations, universities, financial institutions, training organisations etc.) as well as the policies governing that infrastructure in the region. The assessment's main objective should be to provide the stakeholders with necessary information and analysis to improve the regional innovation system.

Supply side analysis tends to be an easier process than the demand-side analysis. The supply-side organisations have generally a bigger interest in the RIS analysis and its results than private companies, not least because the outcomes of the RIS can have an implication on their business opportunities and/or funding. Supply-side actors can also in many cases incorporate the involvement in RIS in their daily, paid activities, while company representatives contributing to a RIS project usually do so on a voluntary basis, on top of their commercial activities. At the beginning of the project the providers, project leaders and political decision makers tend to already have pre-established opinions about the innovation system and the individual innovation actors. The supply analysis provides an opportunity to verify existing opinions, to improve the mutual understanding and, where appropriate, to clear up prejudice and misunderstandings.

6.1   A critical assessment needs a careful approach

It is very difficult to undertake a critical assessment of the intermediary organisations and try to achieve a consensus on new options at the same time. Continuous personal bilateral discussions between innovation providers and the project team will create a positive cooperation climate that considerably facilitates consensus building in the further course of the project. It will also help clarify how the tasks and roles could be distributed among the actors.

On the one hand, a critical assessment of the infrastructure is needed. But on the other hand, if too many negative results come out, the commitment of valuable partners may get lost. Suppliers and technology providers, for example, often fear that a RIS project will recommend varying cutbacks or mergers amongst the region's innovation agencies. If this is in fact not a desired path and the way to overcome this problem is not straightforward. One option might be to have the institutions perform a self-analysis more aimed at setting the targets for the future than finding out what went wrong in the past. As stated before, a continuous discussion with the support actors is preferred using workgroups of different actors could also be considered.

A key lesson learned from past project is that supplying analysis necessarily means being in some way evaluative. So it is advisable to take advantage of the feedback coming from the companies to launch discussions with the support organisations. This is a politically tough action, yet without consensus among the supply side that the offer needs to match the users' needs, it is hard to generate change. The role of external consultants can be of importance here to encourage those in the system who are locked into their institutional roles to change their operating way.

6.2   Categorising technology and innovation organisations

The focus should be on those actors having the support of regional innovation as part of their mission. (This might include actors based outside the region and/or operating at national level). But it is also useful to assess the capacity of organisations in the region not having innovation support as a core aim, and each case in which this capacity could be of benefit to the strategy.

Similarly, it may be helpful, should there be a large number of potential regional actors to assess, to categorise the supply according to the type of service offered.

For instance, the regional actors can be divided into:

- **Those who provide technology and innovation competence** - research centres; universities; government research laboratories etc.;

- **Those who assist in the flow of technology and innovation** - technology transfer centres; innovation centres; science parks; industry networks; regional development bodies, financial services, as well as other actors providing not directly technology-related services but being beneficial to the innovation process.

Another possible categorisation could relate to their dependence on public funds and to what extent they generate income. Care needs to be exercised particularly with regard to the analysis of expenditures on innovation, since most statistical information will cover research and development, which is of course not directly synonymous with innovation. This holds true for the companies' expenditures on innovation in the need analysis as well.

While circumstances will vary according to different regional contexts, the list of innovation and technology actors to be surveyed, although varying, will most probably include the following actors:

Research centres and colleges	Institutions providing private capital
Specialised consultancy service providers	Business and Innovation Centres
Technology transfer centres	Regional development bodies
Chambers of Commerce	Professional associations
Training providers	Science and technology parks
Large firms	Regional and local authorities
Venture capital organisations	Producers service companies
Universities	Public sectors laboratories

Supply analysis in RIS South Central Bulgaria

To facilitate the regional supply studies and analyses, six working groups by districts were set up. The study and analysis of RTOs, universities, research departments of leading companies, private research companies and technology parks covered 49 organisations from the South Central Planning region of Bulgaria and provided the grounds for identifying the regional priorities and conceptualising the framework for the promotion of innovation in the region.

The study and analysis of intermediary organisations - regional development agencies, commercial chambers, regional and branch associations, technology transfer centres, business incubators, banks and other organisations providing services and support to SMEs, covered 18 intermediaries and identified their specific functions and activities, and outlined as well the level to which these services match the innovation.

Supply analysis in RIS Calabria

The initial identification of the bodies to be included in the regional innovation supply system was based on a desk-research analysis of existing information carried out by members of the Management Team. On a following phase the Team, together with

associated experts, undertook a more detailed analysis of the 21 public research centres and research consortia available in Calabria.

Finally, the Team asked their international consultant to undertake an assessment of the seven regional institutions supporting SME development in Calabria. It was a shared opinion that an independent analysis, also drawing on international experience, would be perceived by the institutions involved as more objective.

6.3 Assessing the level of transparency

In order for the innovation system to work effectively, a high level of transparency between the different actors involved in the supply and demand of innovation services is required. An improved visibility of and access to innovation and technology support is a key requirement to innovation success. This holds particularly true with respect to specialised services which are often highly demanded by industrial companies and offered by regional suppliers. However, in many cases demand and supply do not match.

One of the key issues of the RIS exercise is to make technology and innovation needs and supply meet. Two types of scenarios could be imagined: the first in which the supply is normally well defined but the demand is quantitatively and qualitatively badly formulated, and the second in which the supply is weak and the offer incomplete or in which the supply side lacks the skills to provide some services. Furthermore, the lack of sufficient transparency hinders the effective exploitation of the existing offer: potential technology providers can be renowned, but if their service offer as well as the quality and conditions of their services are unknown, the chances for the demand and the supply to meet will be decreased. Many companies, in particular SMEs, have no extensive experience of the supply of technology support services from institutes or universities and their experience of buying and utilising support services is also limited.

In a RIS exercise transparency has two main significant dimensions, namely:

- a subject-related dimension, describing for whom something is transparent or not transparent. Transparency can be internal, among the different service providers, and external, towards the companies. Internal transparency among support actors also have an impact on the external transparency, since it is often communicated to the companies which do/should exploit external resources and competences – either from regional providers or mediated by regional players to extra-regional specialist suppliers.

- an object-related dimension, describing what is transparent or not transparent. The analyses should focus on the complex and more intangible areas of technology transfer, but also cover innovation-oriented knowledge about the more straightforward yellow pages information (existence of services, names of organisations providing services) as well as in-depth information (pricing structure, strategic target groups).

6.4 Looking beyond the region

The interactions between regional actors and other regional, national and international organisations should also be assessed. It is important to underline that the regional demand is not only satisfied by the local RTD and innovation infrastructure and organisations but also by those located in other regions and countries. In this sense, it is important to assess to what extent the local innovation infrastructure and organisations facilitate the regional companies' contacts and access to innovation, in particular regarding technology transfer sources from abroad.

6.5   Selecting and engaging supply-side actors in the process

In the assessment exercise, every opportunity should be seized to involve the regional supply actors into the process. This can be useful for many of reasons:

- The contact with the regional actors can stimulate awareness and promote discussion of the exercise;

- It may allow to use the actors and their client groups as a forum for strategic discussions in a later phase;

- The actors can be encouraged to consider possible priorities and projects that they would like to put forward to the steering group for support;

- The involvement of key regional actors and institutions will give a greater level of consensus in the region.

- implementation of the elaborated innovation strategy and the associated catalogue of measures will crucially depend on the willingness of relevant regional actors to co-operate.

6.6   Structuring the assessment and survey

In order to make the assessment of the individual supply elements more manageable, it might be sensible to start with listing the topics for which answers from the supply organisations are required. In this respect, four general topics can be identified:

- *resources and missions - for instance*:

  - what are the supply organisations present in the region?;

  - what innovation schemes and the programmes are implemented in the region?;

  - who does what in innovation and support activities in the region?;

  - what resources are involved in support activities?;

  - what is the level of investment in innovation support activities in the region? (by industry; by government; by research institute/universities);

  - how many people are directly employed in support activities, at what technical or managerial level?

  - What are the skills of the people working in support organisations?

- *correspondence to SME needs - for instance*:

  - how are the various innovation support institutions organised to identify target companies needs?;

  - to what extent does the supply correspond to identified/expressed needs in the region (in particular of SMEs)?

  - What are the attitudes of researchers towards collaborations with companies?

- *efficiency - for instance*:

  - what has been achieved through the support activities in the region?;

  - how are the resource for innovation support allocated?; what is the consequence of such an allocation?;

  - how is the total supply of innovation service co-ordinated and how do agencies interact?;

  - are there cases of duplication in the supply of certain services?;

  - do users contacting one supplier gain access to a wider network of innovation support?;

- are there structural problems which need to be considered? (e.g. multi-national investor dominance; predominance of low technology sectors; lack of government research centres, etc.)?

- *visibility / coherence –for instance:*

  - is the scope and detail of the supply clear to potential users?;

  - are the client companies satisfied with the services they receive?;

  - are there evident 'gaps'?;

  - is the ensemble of support services useful for the regional enterprises?;

  - to what extent are suppliers complementary or competitive?

6.7   Questions to be included in the questionnaire

The analysis of findings of this part of the assessment should consider the overall balance between the supply capacity and the expressed demand and need for innovation support for economic actors. To a certain extent, the key questions to be included in the questionnaire should mirror the topics introduced above. Additionally, when considering individual innovation support suppliers, the following information and assessment criteria could be relevant:

- what are the mission, aims and objectives and to what extent are they being realised?;

- what are your target markets and what services do you offer?;

- what are the inputs to the operations in terms of funding, personnel, equipment etc?;

- what are the outputs in terms of clients served and results achieved?;

- how would you perceive the efficiency of your operations?;

- what is the extent of national and international links to the knowledge infrastructure and to other service providers?;

- what technological skills are available at your organisation?;

- how does the organisation respond to expressions of company needs and demands?;

- what is the extent of coherence and complementarity with other organisations?

Interview description with supply actors in RIS Latvia

Personal interviews were performed with all organisations identified as relevant. The interviews were performed with at least the managing director of the organisation and in some cases also with R&D managers, financial controllers and marketing directors.

The interviews were based on the guideline/questionnaire established. The interviews lasted in general up to three hours. It was considered important to make the interview more of a discussion than a questions and answer session. The interaction and expression of the interviewees' personal opinions were fundamental.

The outcomes of the interviews were analysed statistically and qualitatively. The results were presented in the form of commented graphs and fact sheets of the organisations. The fact sheets presented key information about the organisations in a systematically and unified way.

> *The supply side analysis was systematically matched with the outcomes of the need analysis. By doing this, it was possible to identify "gaps" in the expectations of companies and in the supply of services and competence of the innovation-supporting organisations.*

6.8 Check list

☐ Have you categorised the types of technology and innovation organisations to be targeted by the assessment?

☐ Have you decided on a selection of individual organisations?

☐ Have you sent this list of selected organisations to the relevant stakeholders asking for their opinion?

☐ Have you made a final selection of individual organisations for the assessment?

☐ Have you approached the organisations to make sure they are invited to participate in the assessment process and further initiatives in the RIS project?

☐ Have you put together a list of topics and questions to be used for the assessment, considering the necessary aspects of transparency from the point of view of the demand and the regional strategy formulation?

☐ Have you decided which research tools should be used for the assessment of the supply side?

7   TECHNOLOGICAL AND SECTORAL TRENDS

A RIS project must consider that companies and organisations are part of both a regional economic system and a national and international context. The decisions taken by regional companies on innovation activities are heavily influenced by similar decisions being taken around the world by many large, medium and small companies. Therefore, policy choices made by regional institutions on investment in innovation support must also consider the global environment, in particular the trends in industry sectors and technological advances faced every day by regional companies. The trend analysis undertaken needs to be carried out according to the RIS objectives and integrated with both the need and supply analysis, in order to obtain a full effect.

7.1   The actors involved

The main companies in the region should be invited to read and comment the research report on the sector or technology they belong to. This would help verify the accuracy and relevance of the research as well as check that the definition of the main issues is correct. Organising strategic panel discussions with different experts could be useful to verify the accuracy of the research and the definition of the main issues.

Strategic panels can also be organised for regional companies and experts operating in one sector or technology, i.e. bringing them together with national and international experts in order to raise their level of awareness about the global issues the region will have to face. The strategic panels can also help move the focus of the debate away from the research and analysis stage to the identification of priorities for action as the process develops.

The RIS steering committee has the important task of setting the terms of reference that will steer the overall assessment process.

A number of issues should be kept in mind:

- The economic reference of the project should be the global market. The project should have an international and national as well as a regional approach.
- The exercise can help regional players to develop a strategy for upgrading and moving fast into new markets of higher added value, etc.
- The exercise should look at the growth/decline of global market trends and competitors in sectors and areas of technology which are relevant for the region.
- The exercise should identify the international best practice in the relevant sectors and technologies.

7.2   Research tools

The most important sources of information are likely to be first hand, such as interviews with key actors, sector experts, managers of firms in the sector together with common views of sectoral working groups.

Technology audits should not be considered as a mere analysis instrument but exploited as a main tool to stimulate a thinking process among different regional actors. Adapting methodological approaches to auditing the technological capabilities of companies, they can thus be used as one approach to the assessment of technological trends (for further details on different methodologies see section 5.4). Aggregating the results of individual audits will then provide results at the sectoral and regional levels.

The sectoral work can be informed by a number of secondary sources[3]:

- sectoral reports at national, European or global levels;

- output and employment statistics;

- surveys on companies.

This type of sources will form the basis for an initial analysis, which will allow accurately assessing and defining the need for a more detailed research. As a result, fresh research could need to be commissioned, particularly to ensure that global industry trends are accurately related to the situation of the sector in the region. Inter-regional research could be particularly helpful here as it not only allows regions to share costs (since the global trends for each sector will be the same for different regions) but also provide a benchmark for the quality, extent and value of the research carried out in customising the specific regional characteristics.

7.3   Assessing technological trends

Technological advancements have a direct impact on innovation in companies. Since the innovation support structure needs to be prepared for future demands from companies, it also needs to be aware of the major and minor technological trends in society, especially in the sectors that are most relevant for the region. Considering technological trends separately from sectoral trends, however, allows project managers to make a broad assessment of the technological impact in the region instead of working from narrow sectoral considerations. At a regional level there may be a concentration of economic activities that apply generic technologies and skills which are of strategic importance or whose product is itself highly sensitive to global technological trends. It will therefore be necessary to consider:

- the current global market trends; and

- how existing 'traditional' activities will be affected by technological opportunities.

A choice has to be made to determine which technological perspective is of greatest relevance to the region, one focusing on:

- generic technologies and skills; or rather on

- products that incorporate a particular technology.

By making this choice it should be kept in mind that the project is not only concerned with 'new technologies'. Attention should be given to those traditional or generic technologies or skills which have been proven to be still of strategic importance to the regional economic growth context. A region with a strong information technology sector will almost certainly include an analysis of global technological trends within this area. However, a region without such companies will probably want to carry out a study of the way in which trends in information technology will affect the regions main, more traditional, sectors.

7.4   Assessing sectoral trends

There are many ways in which the analysis of sectoral trends can be structured. The most indicated method will depend upon the regional characteristics and the orientation of the RIS project. The sectoral emphasis can be determined on the basis of the economically most important sectors, the sectors most vulnerable to wider technological changes or the sectors with the best growth potential.

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[3] Useful and up to date information on sectoral trends at the European level may be found in, for example, the Panorama of European Industry.

The main questions that will need to be addressed for each sector are:

- What is the size and structure of the sector in the region?

- Which are the main companies?

- What are the skills and technological processes applied in the region?

- What have been the aggregate sectoral trends?

- What have been the important innovations made in the region which have influenced the regions' development?

- What are the main markets and technological factors affecting the sector in the region?

Analysis of Sectoral Trends – RIS Western Scotland

The basis of the RIS Western Scotland analysis of sectoral trends based on an economic profile, developed for the region at the beginning of the RIS process using national and local data sets such as:

- the number and size of companies in each economic sector; and

- the number and types of jobs held by the population.

The economic profile included a SWOT analysis for the regional economy and for potential industrial clusters. The results of the economic profile were then fed into a local economic forecasting model to provide an indication of the impact of predicted industrial trends in the region until 2005.

The Trends Analysis in Western Scotland explicitly considers the national and international context within which indigenous companies operate and covers:

- global and regional issues;

- locally specific sectoral issues;

- technology and market issues; and,

- Europe-wide industrial issues.

7.5 Check list

☐ Have you developed a basic understanding of the incidence of the various technologies and industrial sectors in the region based on the regional strategy formulation?

☐ Have you adequately incorporated the need and supply analysis with the technological and sectoral trend analysis?

☐ Have you invited relevant stakeholders and professionals to participate in the two different analysis, e.g. by setting up a strategic panels?

☐ Have you put together a list of topics and questions which you would like to discuss with the strategic panel and which will be answered through the analysis? Are they aligned with the regional strategy formulation?

☐ Have you selected the research tools for the two different trend analysis?

8   TOOLS FOR INFORMATION GATHERING

8.1   Use of existing information

In the framework of the RIS project also the results of relevant surveys and other secondary sources such as statistics and literature should be considered. This would be very valuable for all parts of the assessment, since it is both cost effective and provides additional views on different matters.[4]

Intermediaries' tacit knowledge of companies can, for example, be used for preparing the need analysis. Using such indirect information about SMEs, however, needs at least validation, since several previous experiences have shown that intermediaries often do not know their customers very well. They often have difficulties in aggregating information they might have on companies. Moreover, letting them handle the selection of the companies to be interviewed might lead to biased results.

Building on existing company data collection in Ireland

Regions vary considerably in the extent to which there is existing knowledge and data on the innovative potential of firms and on their expressed demands. The Irish RITTS project took place soon after a major national review of science and technology policy was carried out by the public authorities, and in a context of considerable ongoing monitoring of innovation. Thus, there was no need to collect new data through large scale surveys but rather to interpret and enhance the existing knowledge.

The major advantage derived form the Forfás (Irish Development Agency) being the RITTS co-ordinator was that they had access to all existing surveys data on R&D and to the Community Innovation Survey. Instead of repeating the same work, it was decided to focus on adding richness to the analysis and interpretation of those available data. The main data collection process on the demand side consisted in an interview focusing on the factors promoting or impeding innovation among small indigenous firms, divided between innovative and non-innovative firms.

8.2   Surveys

Surveys are a time-effective way of gathering information from a vast number of organisations. They are particularly useful in the need analysis, since the target consists of many more companies than it is the case for the supply analysis. An alternative to postal surveys is the Internet-based e-mail survey. This works in a similar way as the postal survey, but allows avoiding the work and costs related to sending hard copy questionnaires.

The advantage is not just a fast project start, but also the possibility to make qualitative analyses which can be summarised and visualised in an early phase of the project. This information can then serve as background material for deep interviews or project-meetings to help management focus on the most relevant issues in the project.

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[4] Regarding the need analysis, see also: EIMS study 'Categorisation of Small and Medium sized enterprises (SMEs) from readily available data in terms of their innovating capacity', Consoritum JCL advisers, School of management – University of Bath, Optem, Helsinki University of Technology, 1995

The process

The system for digital questionnaires is built upon a web-based platform which serves as interface for a project-database where all data and responses are electronically stored on a continuous basis.

The phases in the process can be described as follows:

• The questionnaire is designed and evaluated by a pilot-group.

• The questionnaire is published on a specific homepage.

• Invitations holding project-specific identity-codes are sent to respondents via e-mail.

• The respondent answers the questionnaire by clicking checkboxes and simply submits it when finished.

• The questionnaire is being validated automatically and the respondent is alerted should any information be inconsistent with the specified format.

• The validated questionnaire is sent as a text-file via Internet to the project- database.

• The database is manually checked for consistency and completeness prior to analysis.

• The result is put at the project-teams' disposal.

• Preliminary analyses, statistical evaluations and visualizations are carried out continuously during the entire process which implies that information of great importance is always at the project teams' disposal.

The process includes a first circular and a reminder via e-mail or by phone.

For internal use as handling of statistics and internal identification of specific respondents, is a special code system used, which guarantee that only authorised respondents can answer the questionnaire. All answers are treated anonymously in external forums and the respondents are informed that all gathered material will be presented in an aggregated level and answers can not be connected to individuals. A high level of confidentiality is generally considered as an important aspect for an optimal information gathering.

Presentation of findings

After receiving a consistent and complete database, final analyses, statistical evaluations and presentations can be carried out and concluded. The information collected in the project-database can be processed in a most flexible way:

• PowerPoint presentations can be created with updates based on latest results.

• Frequency reports and summary statistics can be created and variance, kurtosis, simple regression, cross tabs including percents/counts/sums/averages can be analysed directly from of the database. All deviations from normal standards in the responses and particularly interesting information in the questionnaires will consistently be followed up with thorough interviews.

• The database can be exported to standard MS software as MS Access or MS Excel or be saved to a SPSS file enabling state of the art statistical analysis.

This kind of surveys can be the back-bone of the need analysis. Its advantages, besides providing a large amount of quantitative data for the statistical analyses, are e.g.:

• providing criteria for the selection of companies for face-to face interviews;

• giving input for further innovation topics around open questions;

• disseminating information on the RIS project in the region.

The decisions regarding the format of a survey should be guided by two principles: clearly defined objectives and clearly defined sample (target group and companies). On a practical basis, a survey questionnaire structure will commonly include the organisations' key activities, the demand for/supply of services, support schemes etc. The questionnaire should be tested with a few firms/organisations before being started on a larger scale.

The RIS management, in collaboration with e.g. partner regions and/or experts is mostly indicated to edit the questionnaire. An attached reference letter can be used to briefly introduce the RIS project (as part of the project's communication strategy). Attention to detail is vital (contact person, confidential treatment, pre-paid envelopes). The results obtained, since they are based on a large-scale database, allow easier comparison with other RITTS/RIS regions and an overall understanding of companies' use of technology.

The questionnaires should be sent out to companies having 5 to 250 employees. The experience shows that companies having less than 5 employees rarely answer a questionnaire. Normally the response rate increases with the size of the company. A realistic target would be to have a response rate of approximately 20%.

However, in the past the results obtained through surveys have often resulted disappointing both in the level of response by firms and in the quality of information produced. The main reason for this is that a general 'survey fatigue' can be detected amongst company representatives and small firms in particular. Such surveys would thus often have been complemented by telephone and face-to-face interviews to enhance the overall response level, which produced better results but are relatively resource intensive.

Survey reports produced by consultants are sometimes used to give an impression of scientific rigour and independence, but the quality of the data does not meet with the usual requirements of public surveys. The response level or the survey data quality (missing data) is determined by a combination of factors:

• the relevance of the RIS strategy to the respondent

• the sample structure

• the questionnaire design

• the survey fatigue

The content of surveys has often been too focused on basic characteristics of companies that produce predictable conclusions but fail to render the qualitative understanding about the nature of the way in which companies manage innovation, and how such capabilities can be improved through innovation support.

8.3   Interviews

Whereas the questionnaire provides descriptive information on the companies' needs for and utilisation of innovation support, personal interviews are necessary to explain and understand the casual linkages between the companies' situation and the need for innovation supporting actions. If a survey is used, the interviews help get behind the statistical data and anonymous surface of a company and make it possible to validate or reject trends discovered in the questionnaire analysis and to give companies direct assistance on urgent topics. Company managers are also more prepared to provide in-depth and sensible information - or what they consider as sensible information - on a one-to-one basis than in written form, even if confidentiality is guaranteed.

The use of interviews and focus groups involving a relatively small number of firms/organisations allow a more discussion-based approach to answering questions and have a

more qualitative character. Companies' needs or organisations' opinions are likely not to be clear enough to be codified into a questionnaire. In addition, personal contacts allow entrepreneurs to discuss and verbally express their views without having to formalise opinions in a written way. Thus, a survey should always be complemented with interviews to get more in-depth explanations on certain topics.

A central argument would be that interview-based methods are more prone to show latent needs than the questionnaire approach, which by definition only captures expressed needs. However, working directly with companies is a resource intensive approach, which limits the number of interviewees. Interviews should normally be performed with the companies' managing directors and often takes between one and two hours. When deciding on an interview-based approach, issues like the representativity of the firms surveyed and the skills of the interviewer become more central. Past experiences indicate that organising face-to-face interviews by combining a consultant and a representative from a public body can produce interesting results, since they both cover the private and public "way of thinking".

Information on key previously gained regional trends is a valuable resource when members of the RIS team address companies individually or in group-presentations. It can help establish credibility and start a dialogue with company representatives. In many cases, talking about 'business needs' will be closer to the companies' way of thinking than talking about 'innovation needs'. In the same way, knowledge of technologies and products singled out in technology foresight exercises is an important asset for company contacts.

An aspect worth considering is that interviews with the supply side may be more open and deliver valuable results if the interviewer is not directly involved in the regional innovation system - that is, the interviewer is not a competitor to the interviewed actors.

Conducting interviews in South Central Bulgaria

The regional innovation demand was studied through direct interviews with companies aiming at collecting quantitative data, and through focus groups aiming at collecting qualitative data. A series of thematic group meetings were organised to devise the questionnaires for the study of regional demand for innovation. The thematic groups were assigned the following tasks:

- elaborating sector-specific questions,

- developing lists of regional companies from the priority sectors to be interviewed, and

- interviewing the companies.

A special training was organised for the thematic groups by a sociological agency on how to properly fill in the questionnaires and avoid misinterpretation of the information.

Two working groups were additionally set up to develop the questionnaires for the supply study of the research and technology organisations (RTOs) and the intermediary organisations in the region. The survey on regional innovation supply was carried out through face-to-face structured interviews and encompassed 49 universities and RTOs and 18 intermediaries. The interviewees were identified by the thematic groups.

Qualitative approach in RIS Tartu and South Estonia

TRIS – RIS Tartu and South Estonia used a qualitative approach to the surveys. It was decided not to collect statistical information but try to understand the problems and dynamics of companies. For that purpose a so called "basic questionnaire" was developed, which helped the consultant to cover all the important aspects. However the concept of the interview was that the entrepreneur should tell what he considered important and not that the interviewer mechanically "ticked the boxes". Therefore the questionnaire should be viewed as supporting material to be used in a dialogue type of conversation between the consultant and entrepreneur.

The questions for the structured interviews were the following:

1. History

- Please describe how your company was started.

2. Product Development

- Please describe the product development process in your company and which have been the major problems?

2.1 Funding

- Please describe how you fund the development of new products.

2.2 Innovation Supporting Structures and cooperation

- Which are your most important partners in product development process and how are you satisfied with the help from public organisations in this process?

2.3 Technology and Universities

- What is the role of technology in your product development activities and have you been cooperating with universities/research centres in this process?

2.4 Human Capital and Organisation

- What input in the product development you get from your employees, what are their qualifications and have you undertaken any organisational changes to promote the better involvement of employees in the product development process?

2.5 Marketing and Sales

- Please describe the Marketing and Sales process in your company.

3. Future

- What are your future plans, what would you need for implementing them?

8.4 Example of a questionnaire for demand side (need) analysis. (RIS Latvia)

NEED ANALYSIS WITH COMPANIES - INTERVIEW

1. Which kind of activities will be of a high importance for Latvian companies in the closest years.

1 = not important   3 = possible   5 = very important   **1   2   3   4   5**

1. Facilitate production of products with high added value
2. Attract highly skilled specialists/professionals
3. Increase the market share/or enter a new market
   in Latvia   ....
   in EU   ....
   in other countries   ....
4. Focus on niche products   ....
5. Increase knowledge about new technologies
6. Develop new product   .
7. Buy patents for production of new products
8. Implement quality management systems (ISO 9000 etc.)   .
9. Product certification for realization/marketing selling in other markets
10. Improve product planning process ....
11. Diversification of products ....
12. Increase ability to respond to market changes
13. Increase work efficiency ....
14. Increase knowledge/competency inside the company.....................
15. Attract external experts ....
16. Cooperation with other companies..
17. Products/licenses/technology purchasing ....
18. Adapting company operations to environmental protection norms ...
19. others   ....

2. State if you know some of the services the following development actors offer and if you demanded such services the last five years.

	Knowledge of service? Yes/No	Demanded such services? Yes/No	Going to demand services again? Yes/No
Actor A	r r	r r	r r
Actor B	r r	r r	r r
Actor C	r r	r r	r r
Etc	r r	r r	r r
Other (state): _____.....	r r	r r	r r

Which network participation has your company (both regional and national)?
_____
_____

3. What are your company's needs for external competences/resources in the following list?

1= We have no need
2= We need external competences/resources and are willing to invest time but no money
3= We need external competences/resources and are willing to invest time and money, but not to market prices
4= We need external competences/resources and are willing to pay at market prices   **1   2   3   4**

Engineering
1. Participation in research & development (R&D) projects ....r   r   r   r
2. Technical test..r   r   r   r
3. Technical advice ....r   r   r   r
4. Technical monitoring ....r   r   r   r
5. Patent application/sample protection...r   r   r   r
6. IT-application for production, warehouse, delivery etc. ....r   r   r   r
Business development
7. Advice concerning organizational issues ....r   r   r   r
8. Feedback for business development, manager ship ....r   r   r   r
9. Product design ....r   r   r   r
10. Quality control and certificate of quality ....r   r   r   r
11. Personnel consultant ....r   r   r   r
12. Environmentally advice ....r   r   r   r
Market
13. Information about potentials, risks, and trends concerning international markets...r   r   r   r
14. Market analysis ....
14a. national...r   r   r   r
14b. international ....r   r   r   r
15. Help to find business partners/co-operation (customers/suppliers)
15a. national...r   r   r   r
15b. international ....r   r   r   r
Financing
16. Information about financial development programs and help with the application
16a. national ....r   r   r   r
16b. international (for example EU)...r   r   r   r
17. Financing of ....r   r   r   r
17a. growth ....r   r   r   r
17b. innovation project ....r   r   r   r
Other: _____r   r   r   r

4. Which five organizations or other actors are your most important development resources according to question 2 regarding development of new product- process innovations as well as market related development? State also those competences which are being supplied to your company; use the numbering of question 3.

Exampel:

1. Actor A   nr:_2__ nr:_5__ nr:_14_ nr:____

My most important development resources   **Supplied competences**

1._____ nr._____nr._____nr._____nr._____
2._____ nr._____nr._____nr._____nr._____
3._____ nr._____nr._____nr._____nr._____
4._____ nr._____nr._____nr._____nr._____

5. How came off the relation to your development resources (the resources you stated in question 4 above)?

Development resource number	1	2	3	4	5

Contacts

We got contact from the following organization/s...r   r   r   r   r
We took up contact with the following organization/s
- after we advertised..r   r   r   r   r
- after meeting via Internet ....r   r   r   r   r
- spontaneous...r   r   r   r   r

Recommendation

We got put in contact with the following organization/s with the help of a third
party (state the third party): _____r   r   r   r   r
_____r   r   r   r   r

6. How much satisfied are your company's needs inside the following area?

Commentary: *The needs can be satisfied by the company's own competence, external competence or a combination of both competences.*

1 = Not satisfied   3 = Satisfied   5 = Very satisfied

	1	2	3	4	5
Engineering	r	r	r	r	r
Business development	r	r	r	r	r
Market connected questions	r	r	r	r	r
Financing	r	r	r	r	r

7. If you stated in question 2 that you know organizations, but you haven't made use of their services – please describe briefly the reasons (for example no relevant supply, too expensive etc.)

_____
_____
_____
_____

8. State your opinion/s about the services your company used related to question 3. Were they individually good or individually bad?

_____
_____
_____
_____
_____
_____
_____

9. Please state your opinion how the regional offer for business development services could be improved.

_____
_____
_____
_____
_____
_____
_____
_____
_____

10. Are young technical based companies (younger than 5 years with a strongly technical profile) important co-operation partners for your company?

	Yes	No	Don't know
As customers	r	r	r
As suppliers	r	r	r
As innovation partners	r	r	r

11. How would you characterize the company's most important technical products?

r International competitive
r National competitive
r National average
r Not full competitive
r Not at all competitive at the moment

12. Which part of the turnover 2001 is based on products younger than 3 years?

r 10 % or less
r 11 - 30 %
r 31 - 50 %
r 51 - 70 %
r More than 70 %

13. How big are the development costs in your company in relation to the turnover?

r Less than 3 %
r 3 - 6 %
r 6 - 10 %
r 11 - 20 %
r More than 20 %

14. How much of the total working time work your employees with product- and/or process development?

r Less than 1 %
r 1 - 3 %
r 4 - 5 %
r 6 - 10 %
r More than 10 %

15. Which part of the development costs is external (for example universities, research organizations etc.)?

r 0 %
r 1-5 %
r 6-10 %
r 11-20 %
r More than 20 %

16. How does your company handle the future requirements for new technique, competence etc?

_____
_____
_____

17. How many of your employees are involved in long-term development work? Please state the specific work.

_____
_____
_____

18. Some general questions

	1999	2000	2001	Prognosis 2002 (comp. to 2001)		
				lower	unchanged	higher
Turnover (in EURO)	_____	_____	_____	r	r	r
Investments (in EURO)	_____	_____	_____	r	r	r
Share of export (%)	_____	_____	_____	r	r	r
Number of employees'	_____	_____	_____	r	r	r

How many employees are college educated?　　　　In engineering: _____
　　　　　　　　　　　　　　　　　　　　　　　　　In economy: _____

19. Please state your opinion about the major obstacles for your company to grow.

_____
_____
_____

20. Is your company looking for resources to solve current problems? We want to participate in just solving these problems. Give us a briefly description to make us returning to you or to find a competent partner.

_____
_____
_____
_____
_____

21. Do you want to continue the co-operation in the RIS-Latvia project?

Yes, I am interested to engage myself in the RIS-Latvia project (mark with a cross)
r intensify interview
r participation in workgroups

Thank you very much for your co-operation!

The declared information about your company in this questionnaire will be handled strictly confidential.
If you are interested to continue your engagement in this project or are willing to answer more questions, please give us your name, position and address below.

Name: _____
Position: _____
Adress: _____
Telephone:_____
Fax: _____
E-Mail: _____

8.5   Example of a questionnaire for supply side analysis. (RIS Latvia)

INNOVATION SUPPORTING SERVICES - INTERVIEW

A. Background information of organisation

Actual address of organization: _____

The person interviewed (Full name, position)_____

    A1. How many years does the organization exist and operate_____(years)

    A2. Legal status of organization:

              Business organization

              Governmental organization

              Non governmental organization

              Other_____

    A3. What kind of financial resources does the budget of organization consist of?

	Source of finances	% of total budget
	Organization activities	
	State budget support	
	Donations	
	Other	
	Other	
	Other	
	Total:	100%

    A4. How many employees does organization have ? - _____, of them

          Full load   _____

          Part time job   _____

1. Operations of organizaton

1. The goal of organizations:

_____
_____

2.Your main target groups:

In which of the following industries are your target group companies:

Electronics and telecommunications		Textile industry	
IT and computer engineering		Food industry	
Polygraphy.		Light industry	
Power industry		Chemical industry	
Electronic construction		Pharmacy	
Designing		Biotechnologies	
Building		Geodesy, geology	
Building material industry		Agriculture	
Woodworking		Other….	
Metal working		Other….	

3. Have your target group changed in last 2 years?

_____
_____

4. Do you plan to change your target group in next 2 year? If Yes, how?

_____
_____

5. What kind of services does your organization offer?

SERVICES	COMMETS
Research& development	
1 Technology audit, technical test	
2 Technical advice (investments, technology transfer etc.)	
3 Technical monitoring	
4 Patent application/sample protection	
5 IT applications for production, logistics, delivery etc.	
6 Product certification abroad	
7 Laboratory/test sample development	
8 Others	
Business development	
9 Consulting organization in solving certain problems	
10 Business strategic development consultations	
11 Product planning, design	
12 Optimization of business and production processes	
13 Consultations in contracting	
14 Quality control and certification	
15 Personnel education	
16 Environmental consulting	
17 Premises rent (special provisions)	
18 Office services	
19 Others	
Market	
20 Information about international markets opportunities, risks and trends	
21 Local market analysis	
22 International market analysis	
23 Search for partners, customers, suppliers in Latvia	
24 Search for partners, customers, suppliers abroad	
25 Others	
Finances	
26 Information about financial development programs: a Latvian	
27 Support in grant application preparation	
28 Others	

Research and development activities

6. Does your organization run or support any R&D activities? If Yes, please describe.

_____
_____
_____

7. Is your organization involved in any technology transfer or innovation acitivities? If Yes, please describe.

_____
_____
_____

Educational and learning activities :

8. Do you partner with any educational and learning institutions? If Yes, please describe the kind of partnering.

_____
_____
_____

9. What is the distribution of resources (HR and income) in your organization according to service your organization offer?

Service	HR (%)	Income (%)
Total:	**100%**	**100%**

10. What are the main partners of your organization in delivering and promoting offered services?

_____
_____

11. What kind of new services does your organization plan to introduce in future?

_____
_____

12. Has your organization had any services, which has been prepared and offered in the market, but not realized? If Yes, what kind of?

_____
_____

What were the reasons?

        Lack of resources

        Lack of management support

        Lack of information among the potential clients

        Other_____

13. Which are the obstacles for your organization to sell more services?

        Clients lack financial resources

        Clients lack information

        Clients are not able to formulate their problem

        Bad management

        other_____

14. Which innovation-supporting services lack or have insufficient offer in the market – in your opinion?

_____
_____

15. What are the reasons (obstacles) for it ?

_____
_____

16. Which kind of activities will be of a high importance for Latvian companies in the closest years?

    1 = not important   3 = possible   5 = very important

	1	2	3	4	5

1. Facilitate production of products with high added value
2. Attract highly skilled specialists/professionals
3. Increase the market share/or enter a new market
   - in Latvia   ....
   - in EU   ....
   - in other countries ....
4. Focus on niche products   ....
5. Increase knowledge about new technologies
6. Develop new product
7. Buy patents for production of new products
8. Implement quality management systems (ISO 9000 etc.)
9. Product certification for realization/marketing selling in other markets
10. Improve product planning process ....
11. Diversification of products ....
12. Increase ability to respond to market changes
13. Increase work efficiency ....
14. Increase knowledge/competency inside the company........................
15. Attract external experts...
16. Cooperation with other companies ....
17. Products/licenses/technology purchasing...
18. Adapting company operations to environmental
protection normatives/regulations ....

C. Process of organization`s operations

17. Your main competitors?

_____
_____

18. Your competitive advantages?

Highly skilled personnel
Flexible price politics
Professionalism
Knowledge about the market/clients
New, modern means of working
Advantageous location
Organization's experience
Attraction of University/ higher education institutions teaching stuff
Other_____

19. Which of the marketing tools do you use?

Advertisements in media (press, TV)
Conferences
Exhibitions
Internet
Direct sales
Dialogue with industry (thematic seminars etc..)
Other_____

20. Do your organization do customer surveys?

Yes   No

21. Does your organization batch the feedback information from customers regarding your service quality??

Yes   No

22. Have there been a case of paying back the money to customer?

_____
_____

23. Does your organization have any other support activities related to innovation, technology? If yes, please describe.

D. Other information

24. Has your organization participated in any of RIS meetings?

Yes   No

25. Has your organization involved in any of EU projects?

Yes. What kind of?

_____
_____

Which of them as a leading partner?

_____

No

26. Does your organization use any regional/national support programs? If Yes, what kind of?

_____
_____

27. In your opinion how it would be possible to improve regional innovation supporting offer?

_____
_____

28. How do you evaluate the state policy regarding innovation support? Your suggestions.

_____
_____

8.6   Technology audits

A technology audit is an investigation method aiming at evaluating the technological capacity, procedures and needs of a company or organisation and identifying its strengths and weaknesses. A technology audit is usually conducted as part of the need analysis, but it could also integrate the supply analysis as well. An audit is normally carried out in the form of direct meetings with companies, but can also be conducted through workshops with several companies at the same time. The drawback with that is of course that each company might not reveal all necessary information. The results of the audit programme should be capable of being used on a number of levels:

- **Company level** - the identification of innovation exploitation opportunities, research collaboration requirements, training needs and future RTD and innovation strategies.

- **Sectoral level** - the identification of sectoral or technology strengths and weaknesses existing in the region which can be used to inform the exercise and other policy debates.

- **Regional level** - the identification of the areas where regional companies require greater support and investment in order to strengthen their RTD and Innovation capacities and capabilities.

It may be helpful to complement the individual audits with the examination and/or commissioning of special reports on generic technologies. The technology capacity of a company always relates to its environment. Therefore, the audit should begin with the assessment of the company's basic know-how: marketing, production and financial systems, quality standards, training activities, etc. The technological capacities and needs of the firm can then be understood in their context.

The audit should allow a more global description of the innovation capacity and needs of the firms in the region to be constructed from the synthesis of the individual audits of the firms (see section 3.1.2.). Audits are commonly conducted through face-to-face interviews. Since the focus is on innovation management as a whole, interviews should not be held exclusively with R&D staff and directors, but also include other departments (i.e. marketing, human resources). The technique has high cost implications and often relies on the skills and ability of the interviewer. However, one of the main advantages is that technology audits attempt to present a fully comprehensive diagnostic of the innovation culture of a company. They reveal technological problems in the language of the company, not technological needs. The audits lean largely on qualitative information, which can then be collated with quantitative data.

A Technology Audit case from Wales

An RTP (research and technology provider) contractor from Wales, the Welsh Development Agency (WDA) received funding under the EU STRIDE programme for 250 Technology Audits of SMEs in the Objective 2 areas of Wales. These audits were increased to 350 using the RTP budget in order to extend the coverage to non-assisted areas and Objective 5b areas. The Audit Programme was managed as follows:

The WDA acted as the regional innovation body, it had a team of technology transfer experts; a funding capability; a thorough understanding of Welsh SMEs. A member of the WDA's technology transfer team worked full-time as regional technical co-ordinator. His role was to define, manage and ensure the programme's follow-up.

> *A development contract was awarded to process consultants Their role was to review existing methodologies and devise an appropriate methodology for the programmes objectives.*
>
> *A workshop was held to verify the methodology. Pilot audits were carried out to test the methodology. SMEs were targeted according to the objectives of the programme and the RTP needs. The Audits were carried out by three organisations: WDA, consultants and North-East Wales Institute (BIC managers). Up to two days per audit were allowed. Each company received a Technology Profile Report as a benefit from the Audits. Follow-up projects were identified and pursued by the WDA. The results of the Audit Programme were analysed by the consultants at an interim and final stage and the results fed into the RTP process.*

Which type of audit should be used?

There is no standard methodology for conducting a company's technology audit. The general methodology must be adapted to the objectives of the programme, the firm to be audited and the circumstances of the region within which the company is located.

(i) Evaluation Audit

An evaluation audit is the most common method - particularly suitable when the objective is to evaluate the gap between the company's potential and actual capacity, leading to an analysis of its innovation and technology needs.

An evaluation audit is conducted by means of a general analysis lasting between 3 and 10 days and carried out by 1 or 2 consultants. Information is gathered in a structured way either by direct interview with the managers or by constructing within the company a discussion group animated by the consultant. Statistical information on the company and its industry sector should be gathered beforehand in order to support the audit process. The final result of an evaluation audit will generally be:

- a summary assessment (SWOT);
- an action plan;
- a dossier on the company's technology profile ;
- a follow-up project to help the company closing the gap between capacity and potential.

(ii) Training type assessment

These methods are particularly indicated when the audit programme is also part of a programme aimed at effecting the SMEs managers' long-term attitude change toward innovation as a continuous process of competitive development for the company. This method uses a range of management development and team building techniques helping the companies understand their own situation and the possibilities open to them. These techniques should be integrated in a complete general strategic development plan in which the technology audit results are produced as a by-product of the strategic process and as a tool for the strategic discussions within the company. The final results of this type of methodology are:

- a summary assessment (SWOT);
- action planning priorities;
- strategic choices for the company;
- a strategic/business plan for implementation.

(iii) Self Assessment

These methods are more limited in scope and are carried out by the managers themselves. They are most commonly used as a way to help focusing on preparing to actuate a certain management development technique or to provide a context to support decision-making and strategic planning. These methods can be used as simulation tools to help a company understanding the possible scenarios for its development in a range of ways: marketing and market opportunities, product innovations, technology developments, financing structures, competitor actions etc.

A version of the self-assessment approach can be used as part of the exercise in order to verify the innovation attitudes of the regions SME sector generally. For example, a survey could be conducted on a large sample of regional companies reporting the changes in their RTD and innovation expenditures; innovation sources; expected impact of technology changes in their sector; barriers to their own innovation; etc. An example[5] of such an approach is the innovation survey carried out annually by The Confederation of British Industry (CBI) in the UK in conjunction with the Nat West Bank.

Self assessment approach in Thessaly

The management team of RIS Thessaly started from the assumption that there is no need to introduce new technologies but new thinking into companies. The management team opted therefore for combining both self-assessment and consultancy work. They addressed the need analysis asking the companies to assess:

- the competitive position of their products

- the products' phase in the life cycle

It first came out that the companies were not accustomed to this type of management procedure, revealing possible weaknesses of their products. Straight basic questions also proved to be efficient in confronting SMEs with the need to improve their managerial techniques (i.e. "What is your company's mission?; Why do you produce this product?; Is your business strategy best adapted to your mission?").

The self-assessment approach also endeavoured to get the companies organise their own technology observatory to monitor their innovation needs and to improve their competitiveness. The type of actions put in place in the observatories included information gathering and assessment of the evolution of clients' needs, monitoring of changes in competitors' tactics and identifying technology trends.

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[5] See also: RTP Technical Series No. 1; November 1994 and:"MINT Guide BOOK for Business and Technology Diagnostic Tools and Methodologies" SPRINT Programme 1994.

8.7 Overview of instruments used in selected RITTS and RIS regions for need analyses

Country	Region	Postal and telephone surveys	Interview survey	Focus groups
Bulgaria	South Central Bulgaria	Questionnaire survey with 397 companies (from the ten priority sectors of the regional economy).		Eight focus groups were conducted for four of the priority sectors.
Czech Republic	North West Bohemia		92 firms from different branches interviewed	16 selected companies from the survey visited
Czech Republic	Pilsen		100 firms interviewed	
Czech Republic	Prague	490 firms surveyed		
Finland	Häme	46 responses from 273 firms mailed	49 firms of varied size interviewed	
France	Nord Pas de Calais	Survey of 272 firms	Interviews with 40 firms	
France	Rhône-Alpes	100 telephone interviews	50 face-to-face interviews	21 interviews with entrepreneurs in preparing strategy
Germany	Neu-brandenburg		50 SMEs interviewed	Workshops with selected SMEs
Greece	Crete		Interviews with selected SMEs	
Hungary	Central Transdanubia and Central Hungary	64 + 90 firms responded to questionnaire		
Hungary	South Great Plain	180 companies in survey		
Hungary	South Transdanubia	260 companies in questionnaire survey		
Iceland	Iceland		Approx. 200 firms interviewed	
Italy	Marche	100 telephone interviews	100 face-to-face interviews	
Italy	Milano	200 responses from 2000 firms mailed		
Italy	Tuscany		25 firms interviewed	
Latvia	Latvia	300 firms surveyed		
Netherlands	North Holland		Some SMEs audited in each cluster	SMEs involved in workshops cluster groups
Netherlands	Overijssel		120 interviews with firms (20 per sector)	SME participation in sectoral working groups
Netherlands	Rotterdam		Approx. 5 companies interviewed for each of 5 sectors	Workshop with SMEs in each sector

Norway	Western Norway	Postal survey with 120 firms and telephone interviews with 50 SMEs	35 interviews	
Poland	Opole Region	106 firms surveyed		
Poland	Silesia	345 firms surveyed	Interviews with selected SME managers	Breakfast meetings with SMEs for verification of results
Romania	West Romania		57 firms interviewed	28 technological audits
Slovenia	Slovenia	99 firms surveyed		
Spain	Canary Islands	Postal survey with 130 responses.	40 technological diagnoses of firms	Firms participating in 4 sectoral panels
Spain	Madrid		Technological audits of firms	Sectoral workshops
Sweden	South Sweden	Survey mailed to 1800 firms with a response of 512	30 interviews with SMEs, plus 20 telephone interviews	Seminars and workshops with companies in supply relations
UK	East Midlands	82 postal questionnaires plus 45 fax-back questionnaires and 12 telephone interviews	76 interviews	2 workshops with companies
UK	Kent		50 company interviews	Workshops with companies
UK	Oxfordshire	Postal survey of 2000 firms with 26% response rate, plus 85 telephone interviews	63 interviews	

8.8   Check list

☐   Have you scanned the market for secondary sources before starting a new information collection?

☐   Have you selected the final research tools to be used for the different analyses along with specifications as to how it shall be used, e.g. survey sample, postal- or web-based questionnaires, follow-up procedures etc?

☐   Have you verified your choice with the relevant stakeholders?

☐   Have you appointed adequate personnel to carry out the different assessments?

☐   Have you conducted test interviews before settling on the final design of a tool, e.g. a questionnaire?

9   ANALYSIS OF THE INFORMATION COLLECTED

In order to analyse the information gathered it is vital to have a pre-defined methodology to structure and codify the results. It is also wise to use independent working groups to test the results obtained. Practitioners often consider the real output of the need analysis phase not to be the identification of basic needs (these tend not to differ much between regions), but rather the bank of information on opportunities and ideas for possible projects gathered throughout the process. This enables project managers in turn to cluster needs and support joint projects.

An additional benefit of the engagement with company representatives is the identification of drivers for change, who can then be called upon for future input into strategy development The results produced, however, depend greatly on the tacit knowledge in interpreting these findings.

There are many simple analytical techniques that will assist in the analysis of factual information. For example,

- Using statistical analytical programmes for structured quantitative data, e.g. SPSS, allows frequency-analysis, correlations between variables etc.

- Using available benchmarks, such as best practice or economic quotients, enable the identification of the relative importance of the findings, e.g. by comparing a sector outcome with the national and/or European level. Additionally, the relative sectoral performance can be used in the analysis by comparing the rate of change (of employment and/or output) at the regional level with the rate of change at national or European level. Of course, the usefulness of such techniques depends on factors such as the definition of the sector and the validity and availability of the data.

- Involving various professionals to evaluate the qualitative aspects of information gathered in order to reach a more complete evaluation.

9.1   Classifications and data processing analysis

As it is the case for the classifications used to structure the research carried out, the analysis phase will benefit from structuring the results. The supply and demand of innovation services need to be classified in order to allow an analysis using the preferred method to implement adequate actions.

The dimensions of the interviews and the complexity of the different services provided, indicated a need to codify and categorise services in order to structure the considerable amount of data and make services match the companies' needs. In every step of the analysis the elaboration of the collected information could be a source of error, especially if the information is in data-form and is being subject to programming. A continuous monitoring of every step in the process as well as a relevant testing of the data is therefore necessary (e.g. through relevance tests and consistency tests, or any other approved test method)

The RITTS Final Evaluation Report[6] mentions different approaches focusing either on the type of service provided or the types of company assisted. One approach is to identify a number of potential areas of support and rate each support agency for the emphasis placed on each of these services, recognising that many agencies provide a range of different services but to varying degrees.

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[6] "Assessment of the Regional Innovation and Technology Transfer Strategies and Infrastructure (RITTS) scheme – Final Evaluation report", CURDS (The University of Newcastle), MERIT (The University of Maastricht), PAIR ,OIR August 2000, available at http://www.innovating-regions.org/download/finalrep.pdf.

Classifying the company's information will simplify the analysis in the same way. Companies classified according to how they rank on certain innovation-related competencies can be helpful in assessing the regional image. Three types of innovation and technology management competencies are identified:

- Technological competence: the ability to master the particular technologies which are relevant to the needs of the enterprise;

- Entrepreneurial competence: the ability to generate and implement strategies for research and technology coherently linked to business strategy and the ability to generate and implement new ideas in companies;

- Learning ability: the ability to adapt organisationally and culturally in order to accommodate technological change.

Companies' needs can, for instance, also be presented as a series of steps from non-innovators to intensive R&D performers, and a corresponding set of services can be identified, so that the providers can be mapped both in terms of services and companies supported. Although perhaps narrowly focused on innovation as R&D-based, this is a useful tool for classification.

Additionally, the Final Evaluation Report of the RITTS projects enlightened more strongly the importance of softer organisational factors for innovation (being able to exploit available knowledge internally, lack of co-operative abilities, cultural attitude to change and openness).

Data processing-description of the need analysis in RIS Latvia

Once completed the response database, a statistical processing was started. In a first step, basic analyses were performed. These covered:

- the characterisation of the responding population (e.g. size, location, industry, innovativeness, success);

- an analysis of respondents' key issues for growth;

- an analysis of respondents' need for innovation supporting services;

- an analysis of respondents' knowledge of and interaction with the innovation-supporting infrastructure;

At this stage consistency checks were performed in order to avoid incorrect analysis results.

Already with these basic analyses a lot of conclusions about the situation in Latvia were drawn. When matching the results with the other analyses, things became even clearer. At this stage, the findings were presented to the Steering Committee. After this presentation, a decision was taken on which additional and more in-depth analyses were needed.

The basic statistical analyses showed that there was a need to perform further interviews to explain the results. Such additional interviews targeted new companies or companies that have already responded.

After carrying out the follow-up interviews, adjustments of the statistical analyses were necessary. After these adjustments, a final set of statistical analyses and results was finalised and prepared for presentation to a wider audience.

9.2   *Examples of indicators*

In this section some examples of indicators will be presented as well as some illustrations of them. The examples are taken from the RITTS exercise in Sweden and should serve as guidelines.
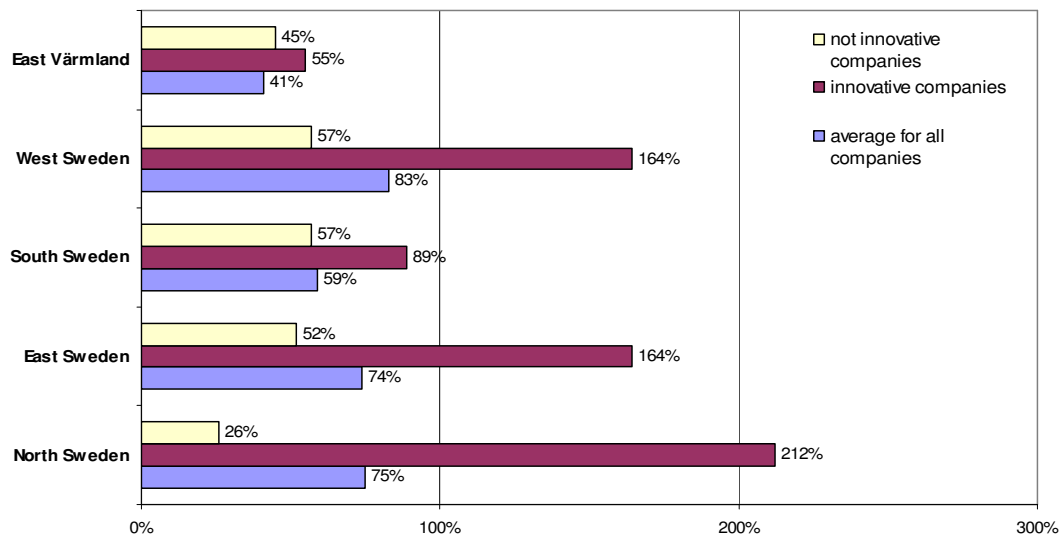
Level of innovation

This indicator is used to determine which companies or sectors have the highest degree of innovation. This can be used to determine which sector the initiative should focus on and can be compared with international results.
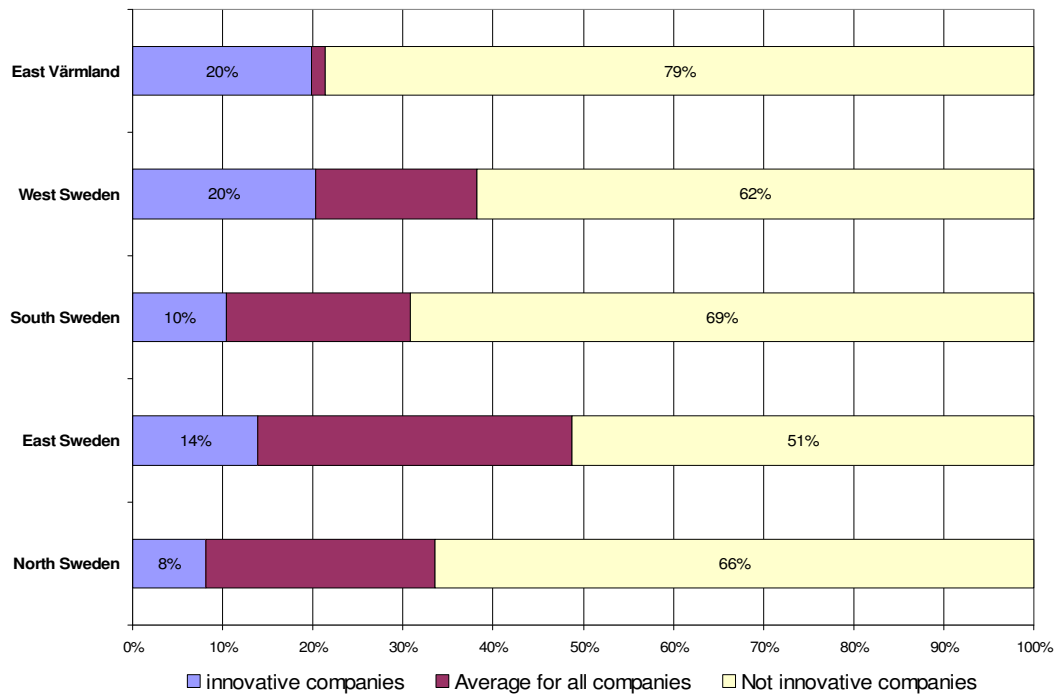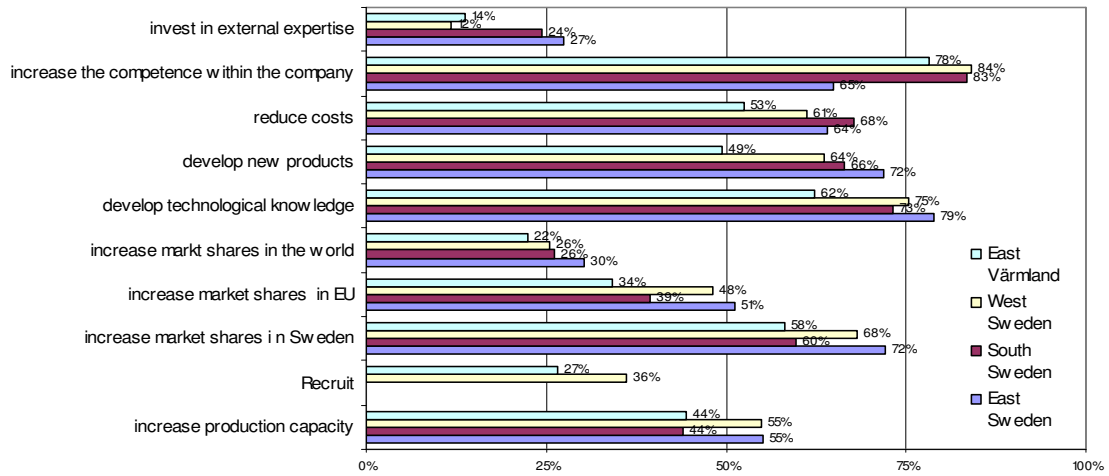

Growth

This indicator can be used to determine which companies or sectors are growing and shows their potential

Success factors

This indicator can be used to determine which factor is crucial for the success of a company.

Percentages of turnover dedicated to R&D

This indicator determines how much of the turnover is dedicated to R&D and can serve as guidance for determining the innovativeness of the companies.
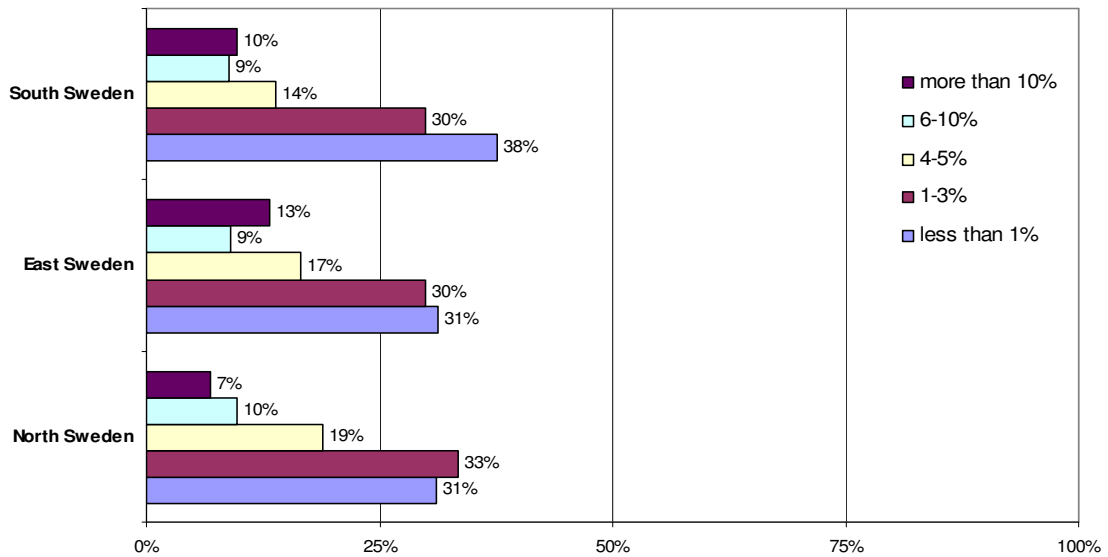
Technological positioning

This indicator helps determining how the technological standing is in an international comparison.
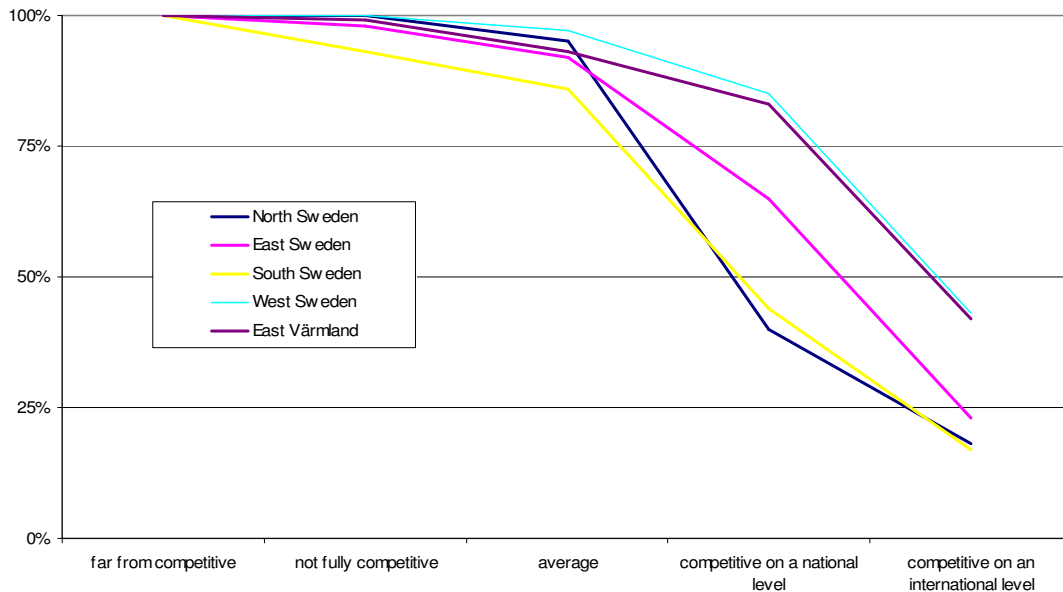
Need and willingness to pay for external services

This indicator helps understanding if the companies need external services such as market analysis, financing for innovation, business intelligence etc. It also indicates if the companies are willing to pay for those services.
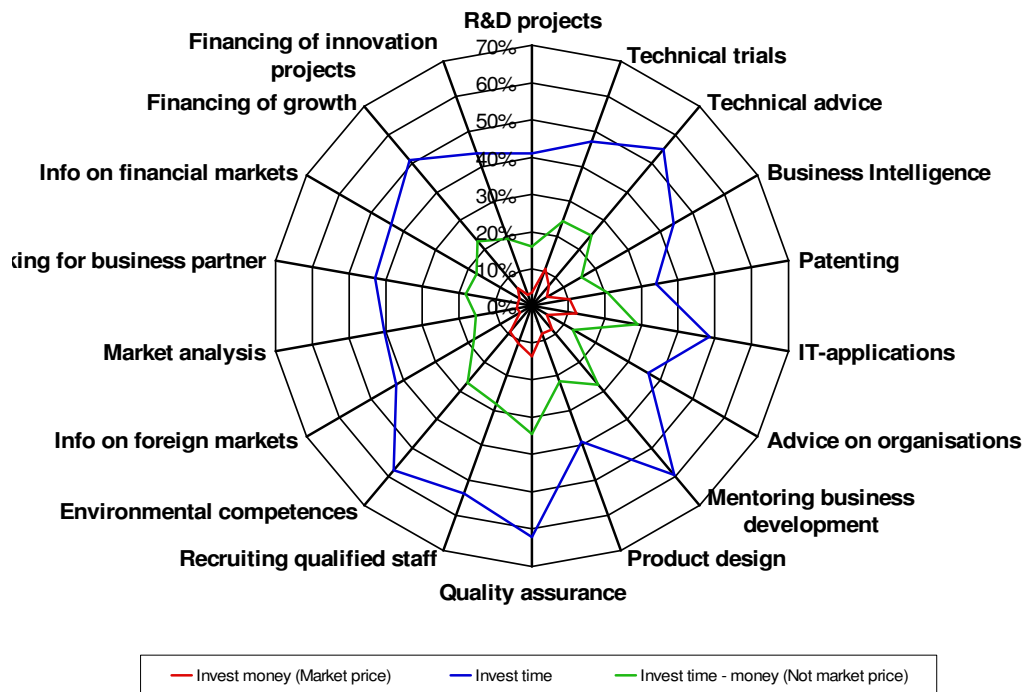
Important development partners

This indicator is used to identify the most important development partners for the companies.
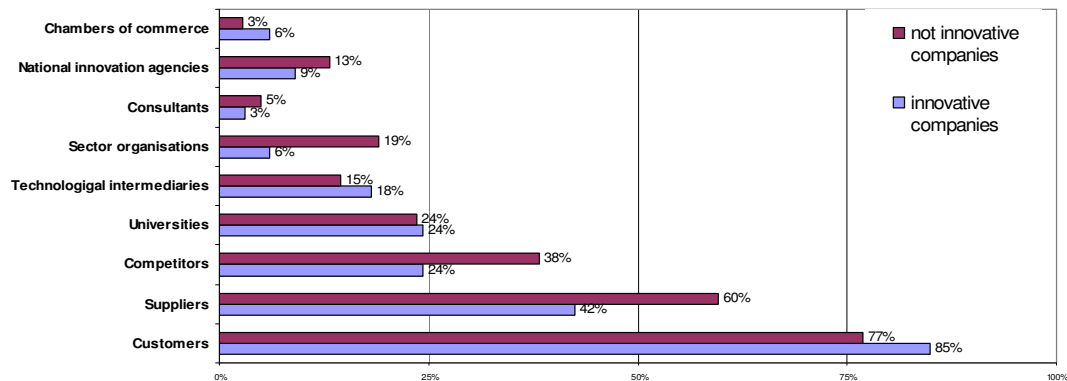
9.3 Cluster analysis

This section will make only a short overview of cluster analysis and does not intend to give a detailed description of cluster analysis and cluster mapping[7]. The main idea is to give a "wake-up call" that the RIS analysis can serve as a basis for cluster mapping and identification.

Innovation literature in recent years has identified the importance of company networks or clusters as a means of increasing innovation capacity in companies, regions and nations. The economic benefit of clusters is not a new phenomenon but it has been given greater attention, as it has become a focus of regional development policy formulation.

The RIS process can exploit the concept of clustering in a practical manner already by adopting it as a 'search criteria' in the assessment of regional demand for innovation. If a region can identify through research that one or more clusters exist, then the analysis of the regional capacities can be given sharper focus and policy outcomes can be more targeted than would otherwise be the case. A greater emphasis should be given to the facilitation of cluster working groups, perhaps as part of a technology audit, to identify common needs and the appropriate support mechanisms that could be developed.

In the framework of a RIS project, cluster and network methodologies can either be limited to identifying and mapping clusters or embark upon analysing them (by using, for instance, SWOT, audits or benchmarking) with the aim of detecting practices that would trigger a network process in the region. Both aims will rely on a combination of quantitative and qualitative approaches since clusters are based on relationships and personal interactions that rely on trust and cannot be found in quantitative information.

Cluster approaches should also seek to examine the inter-relations between companies and support agencies within those clusters. It is beneficial to integrate the need and supply analyses when studying clusters, since both perspectives are relevant. The supply and demand analysis in particular should not be assessed solely as distinct activities if it is possible to adopt a cluster perspective; they should rather be analysed as an interactive system. If possible, it is wise to determine since the information collection phase whether a company or organisation can be allocated to a specific cluster. This could be the object of a discrete assessment.

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[7] More detailed descriptions of cluster mapping and analysis can be found in the following documents produced by the IRE subgroup 'Regional clusters as innovaton drivers': *Emergence, identification and mapping of clusters - review report* http://www.innovating-regions.org/download/Emergence,%20identification%20and%20mapping%20of%20clusters.pdf and *Design of cluster initiatives - an overview of policies and praxis in Europe* http://www.innovating-regions.org/download/Design_of_cluster_initiatives.pdf

A three-stage process for analysing a regional innovation system through the lens of various regional clusters will enable regions to understand and benchmark innovative performance:[8]

- Identify clusters (see below for more information)

- Model and map systemic relationships
    - Sector-based supply chains
    - Supplier and institutional relationships
    - Strength of linkages
    - Flows of tacit knowledge and innovation

- Benchmark clusters on the basis of performance measures

The results from surveys and interviews can thus be used to undertake cluster analyses. If a cluster exists in a region, it is likely to be characterised by: i) a large number of SMEs and large companies; ii) trading relationships between the companies in terms of suppliers and customers; iii) common customers in the same broadly defined market place; iv) that it has been created over a long period of time.[9] Moreover, some of the following attributes usually characterise a cluster:[10]

Geographic Boundaries	Skilled Labour Markets
Vertical Division of Labour	Learning and Innovation
Tailored Infrastructure	Entrepreneurial Energy
Specialised Services	Co-operation and Trust
Support Industries	'Mark' and Reputation
Demanding Customers	Competition and inter-company rivalry

Clusters can respectively be defined using several different methods. Generally, some of the following principles are used: [11]

Industrial classification in statistics	Experts perspective
Rough structuring of cluster on the basis of end products	Identifying relevant firms through databases, indexes and interviews
Interviews	Identifying issues with specialised experts

Clusters have life cycles and the characteristics of 'young' clusters will be quite different from those of more mature ones. In the case of an early stage cluster, the emphasis should be on identifying ways to promote the kind of social capital identified in the literature on clusters as necessary for taking advantage of a critical mass of interdependent companies. Since clusters can be seen to arise from innovations, inventions or inward investment, the analysis of technological trends will provide pointers as to the potential development of early stage clusters. On the other hand, in the case of older clusters facing difficulties through global competition and product cycles, an assessment of strengths will determine whether and how a regional

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[8] Source: Stuart A. Rosenfeld (2002), Creating smart systems: A guide to cluster strategies in less favoured regions, Carrboro, North Carolina. Accessible at
http://europa.eu.int/comm/regional_policy/innovation/pdf/guide_rosenfeld_final.pdf
[9] For a comprehensive discussion of cluster analysis methodologies see Industrial and Regional Clusters: Concepts and Comparative Applications, The web Book of Regional Science, Bergman, E.M. and Feser, E.J.
http://www.rri.wvu.edu/WebBook/Bergman-Feser/contents.htm
[10] Source: Rosenfeld 1995, Industrial Strength Strategies; Aspen Institute: USA
[11] Source: Dr P.Boekholt: TNO Centre: RITTS Workshop, Luxembourg; May 1994

innovation strategy can make a meaningful contribution to rejuvenating such a cluster through providing assistance in the search for alternative markets and products.

Where an initial analysis suggests that a region does not have a critical mass of interdependent firms in a particular sector, a deeper analysis may reveal less obvious clustering aspects. Steps that could be taken include:

- expanding the assessment area to include surrounding areas;
- looking for connections to clusters in adjacent areas;
- considering less obvious commonalities and more generic needs;
- considering micro-clusters that represent unique local competencies;
- changing the focus from a commonality of the production process to a commonality related to knowledge, innovation or entrepreneurship.

The results obtained from cluster analyses can also help identify the existence of networks operating amongst firms in the region. The difference between a cluster and a network is a fine distinction but, in terms of the exercise, very important since there are likely to be many networks operating amongst companies in the region but few will already be clusters. Networks can exist within a region in a much more ad hoc fashion than a cluster:

- networks come together as a means of responding to a particular need: collaboration in RTD, a marketing exercise, etc;
- collaboration in the network may not often result in a trading relationship;
- contacts within the network are many and varied and will change over time;
- network activities are often stimulated by a public institution playing a supportive role.

Knowledge of existing networks will, as a minimum, help ensure that the results of the strategy are well communicated. Networks can also play a strong role in implementation.

9.4 SWOT analysis

The SWOT analysis can be used as a first method (stage 0) for analysing regional strengths and weaknesses as well as a tool to summarise the findings from analyses in stage 1. SWOT analyses will normally draw just as much upon technological assessments and audits, analyses of sectoral trends as on survey results from the assessment of regional firms' characteristics and the assessment of innovation support capacity. The evidence taken directly from the regional firms can be particularly helpful in this respect.

However, there is an inherent danger in carrying out a very broad SWOT analysis. Regions in which information and knowledge on the main economic trends and challenges were not easily available invested significantly in analyses of the overall state of the region. In some cases, the sheer volume of data presented was of little benefit to understanding the innovation needs. More specialised data collection that is directed at specific policy issues may produce better results.

SWOT analyses in RIS South Central Bulgaria

As a follow-up to the regional demand and supply studies a SWOT analysis was performed. Based on the SWOT analysis, the strategic framework for enhancing the innovation-based development of the region was elaborated. The Management Unit analysed three elements of the regional innovation system, namely the companies, the Regional Technology Organisations (RTO) and the intermediaries. They were

analysed separately in terms of strengths and weaknesses in order to assess the potential of the regional innovation system. The external environment (opportunities and threats) was analysed for the three elements altogether in order to avoid repetitiveness of certain factors playing the role of either threats or opportunities for each of them if analysed separately.

The external factors having direct or indirect impact on the regional innovation system, its elements respectively, were elicited through the STEEPV brainstorming framework (Social, Technological, Economic, Environmental, Political and Value-based issues). During the analysis, the nature of the external factors (shapers, or drivers) was taken into consideration. Those factors that were to a certain extent in control of the regional stakeholders were regarded in the analysis as shapers. The ones that were objectively driven and could not be influenced by any of the regional stakeholders were treated as drivers.

9.5   Disseminate widely, but with care

The results of the assessment should be shared widely with the regional actors concerned and with others, particularly users of the supply created, such as regional SMEs. Presenting the results can provide a powerful message to key actors on the state of innovation in the region. Information enabling comparisons between the analysed region and more successful other regions in terms of innovation can add weight to the message.

The final document will be weakened if regional actors are either surprised or damaged by the results of the research and assessments without prior warning being given. Hence, the assessment should pay careful attention as to the accuracy of subjective analysis and permit a feedback process from the innovation support organisations.

The role of the international consultant can be particularly important here in bringing an external and impartial perspective and comparing experiences between regions. The analysis of findings thus enables a view that goes beyond a simple description of services to include an understanding of their quality compared with that of initiatives elsewhere.

Dissemination description in RIS Latvia

The results of the need analyses were presented at several conferences. The target group of these conferences were companies, policy makers, innovation-supporting organisations and academic institutions.

At the conference, a systematic gathering of comments and feedback was performed. This was done during working sessions which gave participants a possibility to give constructive critic to the results.

Feedback was also gathered by a questionnaire study which allowed participants to answer standardised questions regarding the need-analysis.

The entire need-analysis including methodological descriptions was documented in a written report. This report constituted one of the parts of the analyses performed within the framework of RIS Latvia. As a complement a Power Point presentation was prepared.

9.6   Check list

☐   Have you developed general methodologies for the analysis of the research undertaken, e.g. statistical analytical programmes, benchmarks, professional panels etc?

☐   Have you verified your choice with the relevant stakeholders?

☐   Have you appointed adequate personnel to carry out the analysis?

☐   Have you decided how to classify the collected information in order to make it fit the analytical methodologies chosen? (e.g. if the information should be analysed with the use of a statistical programme, such as SPSS it needs to be codified in an appropriate way)

☐   Have you structured the information collected according to the selected classifications and verified it through adequate tests, e.g. relevance and consistency tests?

☐   Have you examined the possibilities to analyse the information by using cluster or SWOT analysis?

☐   Have you disseminated the results at various stages of the analysis with the relevant stakeholders to get feedback and validation before final dissemination of the results?

10 REFERENCES

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- The Added Value of the Supply Side Analysis Illustrated by the example of the Technology Transfer Check Hamburg, inno GmbH, July 2002

- Supply Side Analysis: North Sweden, Technopolis Ltd., November 1997 The analysis phase: lessons from 7 years' experience Page 36

- RTP Guidebook, DG Region and DG Enterprise, November 1994

- Practical guide to regional innovation actions, European Commission, 1997

Further Reading:

- Methodology in design, construction and operation of Regional Technological Frameworks'

- Volume I Analysis of SME needs (EIMS publication No 18)

- Volume II Assessment of the regional innovation support infrastructure (EIMS publication No 19)

- Volume III Means of attaining and exploiting information on main industrial and technological trends (EIMS publication No 20)