



Regional Intellectual Capital Reporting
Development and Application of a Methodology
for European Regions



Intellectual Capital Reporting for Regional Cluster and Network Initiatives Manual on the RICARDA Methodology



SIXTH FRAMEWORK PROGRAMME



REGIONS OF KNOWLEDGE **2**

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Editor (RICARDA Project Co-ordinator)

Deutsches Institut für Urbanistik (Difu) im
Verein für Kommunalwissenschaften e.V.
Straße des 17. Juni 112
D-10623 Berlin (Germany)

Authors

All RICARDA contractors have contributed to this publication.
Co-ordination: Daniel Zwicker-Schwarm and Holger Floeting (Difu).
The foundations of the RICARDA methodology were developed by
Dr. Christian Hartmann, Marija Breitfuss and Andreas Niederl,
JOANNEUM RESEARCH Forschungsgesellschaft mbH.
Pilot Intellectual Capital Reports were prepared by András Grosz
(West Hungarian Research Institute); Börje Johansson, Hans Lööf,
Apostolos Baltzopoulos, Martin Andersson (Kungliga Tekniska högskolan);
Christian Hartmann, Marija Breitfuss, Andreas Niederl (JOANNEUM RESEARCH)
and Daniel Zwicker-Schwarm, Holger Floeting (Difu).
A full list of contractors can be found in the annex.

Contact

Deutsches Institut für Urbanistik (Difu)
Daniel Zwicker-Schwarm and Holger Floeting
Phone: +49-30-39001-154/-221
Fax: +49-30-39001-116
Email: ricarda@difu.de

This publication can be accessed on the Internet: www.ricarda-project.org

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Summary

This manual presents intellectual capital reporting as an instrument for regional cluster and network initiatives. It was developed in the RICARDA project by policy makers, network managers and researchers from four European regions. The RICARDA methodology is suitable for all regional, institutionalized cluster and network initiatives focussing on knowledge generation and exchange – from R&D and innovation networks to managed clusters.

Intellectual capital reports complement conventional financial reporting. They analyse and assess the intangible assets of organisations in a structured way. These elements are of specific importance for cluster and network initiatives. Intellectual capital is broken down into three dimensions: human, structural and relational capital. Within the RICARDA methodology, these three dimensions are defined as follows:

- **Human capital:** The knowledge brought to the network by its member organisations. It includes peoples' skills, experience and abilities. Specific attention is paid to those individuals who are actively involved in network activities.
- **Structural capital:** The opportunities and instruments that serve the exchange and documentation of knowledge (databases, intellectual property, organisational culture, process organisation, etc.).
- **Relational capital:** All resources linked to the external relationships of cluster management such as other R&D institutions, networks, non-member firms or policy makers.

A report on the intellectual capital of a network can fulfil different functions for network management, members, external stakeholders and the general public:

- **Information tool:** Management and network members obtain information on the stock and state of a network's intellectual capital.
- **Strategy development:** The reports show the contribution of intellectual capital to network objectives and indicates measures for improvement.
- **Policy learning:** Intellectual capital reports can offer stakeholders (politics, public administration) valuable insights into the structures that have often been publicly funded.
- **Public relations:** Intellectual capital reports can help to illustrate and communicate the various benefits of regional cluster and network initiatives.

Intellectual capital reporting is team work. It involves network management and a working group of selected members. Network members give and assess information – their input is decisive for the quality of the process and its outcome. This manual contains step-by-step instructions on the process of intellectual capital reporting. It also includes suggestions regarding central elements of these reports that need to be adapted to the specific situation. Preparing an intellectual capital report involves group work, data gathering (including a member survey), and desktop research. The examples from RICARDA's pilot applications illustrate the path towards replicating this process in other European cluster and network initiatives.

1. Introduction

1.1 A new instrument for cluster and network initiatives

Cluster and network initiatives are a common policy tool in technology policy and economic development. There is hardly a region or larger city in Europe that does not support networking and collaborative research between firms, universities, research labs and further institutions in a specific sector, branch or field of technology.

Scientists and consultants have developed an array of tools to detect potential clusters and identify fields where public intervention can initiate networking processes. But relatively few tools exist to inform and support the strategic and operational management of networks.

Management literature naturally offers a multitude of tools for firms and public organisations. The problem is that they cannot be transferred to networks like cluster initiatives on a one-to-one basis. With their hierarchical structures, and their focus on producing goods and services and an environment of market competition, firms differ from regional networks that focus on exchanging information and generating knowledge.

Intellectual capital reporting, although originally developed for firms, is a method that has a specific focus on this knowledge dimension. During the last years, many firms, research institutions and universities have fruitfully used it to report their intellectual capital. Within the RICARDA project, a dedicated team has now adopted and tested this methodology for different types of cluster and network initiative in various technology fields. This guide presents the methodology they have developed.

1.2 How this manual was developed

The manual was developed in the context of the project Regional Intellectual Capital Reporting – Application and Development of a Methodology for European Regions (RICARDA). RICARDA focussed on the pilot application of intellectual capital reporting for regional, knowledge-intensive cluster and network initiatives. This objective was implemented in four exemplary networks in the regions of Stuttgart (Germany), Styria (Austria), Stockholm (Sweden) and West-Transdanubia (Hungary). RICARDA received funding from the 6th European Framework Programme for Research and Technological Development (“Knowledge Regions 2”).¹

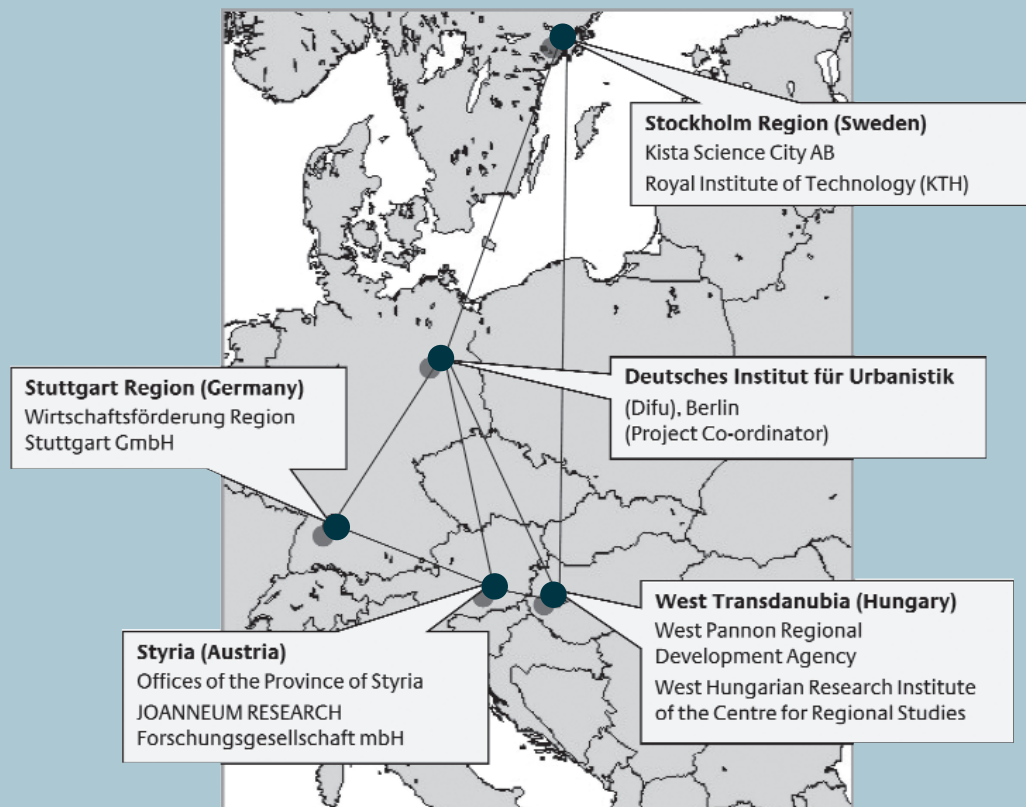
The project consortium brought together eight partners from these four European regions, representing a wide spectrum of regional institutional capacities, economic structures and R&D priorities. The participating regional institutions are all actively involved in cluster development. The consortium's four research institutes all work in the field of regional research and technological development (RTD) policy and cluster management.²

¹ Further information and materials are available on the Internet under <http://www.ricarda-project.org>.

² Full contact details can be found in the annex.



Figure 1
RICARDA's consortium



Source: Deutsches Institut für Urbanistik

1.3 Target groups of the manual

This manual has different target groups:

- Above all it addresses **managers of cluster and network initiatives**. The aim is to enable them to initiate and carry out their own reporting processes. They will produce information for their daily work and strategy development.
- Secondly this manual informs **politicians and administrative decision makers** in charge of cluster or network schemes. For this group, intellectual capital reports provide insights that can be used in monitoring and redesigning programmes.
- Although this manual is designed as a practical tool and not as a scientific report, it also gives all those **professionals** engaged in the discussion on network management tools a first insight into the RICARDA methodology.

Although the project consortium is confident that it can offer an interesting approach to better understanding cluster and network initiatives, it is important to stress the constraints of the RICARDA methodology. Like all research projects, it has been subject to time and budget constraints. Its empirical base is limited to a small number of pilot applications and influenced by their specificities. It is therefore in the nature of a pilot methodology and requires improvement and adaptation. The authors welcome feedback from readers.

1.4 How to use this manual

The manual shows how to prepare and use intellectual capital reporting for cluster and network initiatives according to the RICARDA methodology. It provides information on process and content:

- **Chapter 2** sets the scene as it focuses on cluster initiatives and intellectual capital reporting. After explaining the role cluster and network initiatives can play in regional RTD policy, a typology of such initiatives is developed and the concept of intellectual capital reporting is introduced.
- **Chapter 3** describes how to prepare an intellectual capital report. It clarifies the prerequisites for engaging in the process and takes the reader through the seven steps of the RICARDA methodology.
- **Chapter 4** illustrates the use of intellectual capital reports. Different possibilities for the management of cluster initiatives, its members, policy makers and the general public are illustrated.
- The **annex** provides checklists and other tools that aid in the preparation of intellectual capital reports, a glossary and a bibliography.



Examples

Throughout the text illustrative examples from the RICARDA project will be given in boxes like this.

2. Cluster initiatives and intellectual capital reporting

2.1 Cluster and network initiatives in RTD policy

There are many descriptions of how clusters have contributed to the innovativeness and economic success of regions³: From high-tech Silicon Valley to Third Italy's artisan districts. Clusters are usually understood as geographic concentration of interconnected companies, specialised suppliers and associated institutions in a particular field that compete but also co-operate⁴.

Inspired by these prominent cases, many European regions and cities have established schemes to initiate and foster networking in specific branches and technology fields⁵. The firms and institutions addressed in these initiatives do not necessarily already show an “ideal” level of critical mass or interlinkage – they may be latent or potential clusters⁶.

Such cluster and network initiatives encompass a broad range of support measures for collaborative research in a specific sector, branch or technology field between firms and other institutions (universities, research labs, support institutions) on the regional level.

This manual concentrates on cluster and network initiatives that exhibit at least the following common factors:

- **Institutionalisation:** presence of professional cluster management and a clearly delimited membership structure
- **Regional policy objectives:** structures deliberately installed to contribute to regional innovation and/or economic development
- **Knowledge intensiveness:** knowledge spill-overs or enhanced knowledge diffusion are prime motives for members to participate in and contribute to network activities. Additional benefits of joining forces like economies of scale or joint production can exist.

2.2 A typology of regional cluster and network initiatives

Cluster and network initiatives not only focus on different sectors and technology fields – they also vary in size, focus and funding schemes. The RICARDA methodology distinguishes four ideal types summarized in the table below.

For practical purposes the term **“network”** is used in this manual as a generic term to describe this range of regional, institutionalised, knowledge intensive cluster and network initiatives that are in the focus of this manual.

³ European Commission (2003).

⁴ This definition draws on Porter (1998).

⁵ For a global overview see for example the Cluster Initiative Greenbook (Sölvell et al. 2003).

⁶ This takes up the classification of Enright (1998).

⁷ A full definition of this typology of cluster and network initiatives can be found in the glossary.

⁸ For industrial districts the team-oriented RICARDA methodology cannot be applied on a 1:1 basis as no clear membership structure exists. It is possible, though, for an established organisation responsible for common infrastructure provision to organize the ICR process together with representatives of the district's firms, research institutions etc.

⁹ All data as of 12/2006. Further information on pilot networks and regions on RICARDA's website www.ricarda-project.org.

Table 1
Typology of regional cluster and network initiatives⁷

	R&D Network	Innovation Network	Managed Cluster	Industrial District⁸
Network management	Institutionalized	Institutionalized	Institutionalized	Usually not institutionalized, but...
Focus	Pre-competitive R&D projects; joint R&D infrastructure	Technology transfer and demonstration	Regionalization of value chains; common infrastructures, training, marketing activities	...common infrastructure provision by industry associations or municipalities
Size	Small to medium	50–5.000 employees	3.000–40.000 employees	20.000–100.000 employees
Initiation/Finance	Public RTDI policy programmes (mainly national); Defined lifespan	Often public funding (national or regional) changing to self-supporting (membership fees) over time	Often public funding (national or regional) changing to self-supporting (membership fees) over time	Favourable environmental conditions or chance; Cumulative growth due positive externalities (labour market effects, technological spill-overs etc.)
RICARDA example	Polymer Competence Center Leoben (PCCL) (Styria, Austria)	Virtual Dimension Center (VDC) (Stuttgart Region, Germany)	Pannon Automotive Cluster (PANAC), (West Transdanubia, Hungary)	Kista Science City Information & Communication Technology Cluster, (Stockholm, Sweden)



Examples

Pilot networks within the RICARDA project⁹

Styria: Polymer Competence Center Leoben GmbH (PCCL)

The PCCL was founded as a cooperative research company within the framework of the Kplus programme of the Austrian Ministry of Transport, Innovation and Technology as a competence centre in Polymer Engineering and Science. Since its foundation in 2002 it has been based in Leoben (Styria) and operates offices in Graz (Styria) and Wels (Upper Austria) with a management team of 6 (full time equivalents) and about 80 employees in all. By combining the scientific, engineering and methodological competence of leading polymer research institutions (12 scientific partners) with the technology, application and market-development expertise of the polymer industry and the service sector (40 company partners), the Center links the science-based approach of existing academic institutions with the applied research and product development approach of the polymer industry.



A main mission of PCCL is to carry out a joint research programme to generate new knowledge and know-how in specific areas of polymer engineering and science, thus enhancing its own R&D competencies and those of its scientific and industrial partners. The application of a science-based methodology to industrial problems and the transfer of research findings, new and available knowledge promotes the competitiveness of the PCCL and its partners. PCCL also seeks to promote regional development by enhancing the attractiveness of the location for domestic and foreign investors, spin-offs, and start-up companies.

Stuttgart Region (Germany): Virtual Dimension Center (VDC)

The Virtual Dimension Center (VDC) was established in 2002 to serve as a platform for the development, dissemination and demonstration of technological solutions for virtual product development – especially for SMEs. It is organised as a registered association (wirtschaftlicher Verein) with about 50 members. Members of the VDC are providers of virtual reality technologies (hardware, software and services), technology users – in various fields from automotive to architecture, research institutes, institutions of training and further education, intermediaries and the cities of Fellbach and Stuttgart. VDC has a management staff of five (2.25 full time equivalents).

The operations of the VDC are financed by membership fees, institutional support from the city of Fellbach and public project funding (e.g., EU, Stuttgart Region). The VDC is a member of Stuttgart Region's Regional Centres of Competence and Innovation scheme.

Examples of the VDC's activities include the brokerage of contacts, thematic events, joint projects for technology development and application, and public relations (e.g., participation in trade fairs, newsletter). At the VDC offices in Fellbach, near Stuttgart, a wide range of technical equipment is provided for members and guests as well as for training activities.



West Transdanubia (Hungary): Pannon Automotive Cluster (PANAC)

Founded in 2000, PANAC marked the start of national and regional involvement in cluster strategies in Hungary. The objective of PANAC is to create a cooperative network of automotive enterprises in the region and to foster the development of inter-firm collaboration. From a group of twelve founding members (among them the Audi, Opel, Suzuki, LuK Savaria and Rába Automotive), this network has grown to 70 members. They include multinational companies as well as SMEs from different levels of the automotive supply chain, service providers, and research institutions. The coordination office, which has a staff of three, is a division of the non-profit West Pannon Regional Development agency.

PANAC's operations can draw on membership fees, national and international funding and revenues from paid cluster services. PANAC provides special training and marketing activities for its members, like the "Automotive Benchmarking Club". A special focus lies on activities to link SMEs with the region's large car manufacturers, e.g., through its Hungarian Automotive Database.



Stockholm (Sweden): Kista Science City ICT cluster

Kista is Sweden's largest business area with more than 28,000 workplaces in over 650 companies, mainly focusing on ICT and one of the world's leading ICT clusters with several multinational companies, cutting-edge research, and an increasing number of students within the ICT area. Some companies, like



Ericsson, IBM, Microsoft and Oracle, are large multinationals operating worldwide, while others are startup firms with a small workforce that focus only on the local market in Sweden. The IT University of Kista has more than 3,500 students – and the number is increasing. There are some 1,100 researchers in Kista, working both in research institutes like Acreo and in larger companies like Ericsson and Nokia.

Kista Science City AB works to develop Kista Science City into the most attractive base for ICT companies. This initiative includes promoting Kista Science City as a location that encourages optimal cooperation between national government, municipalities, and private actors with influence on developments in Kista Science City. This collaborative strategy also strengthens and improves networks in and around Kista Science City. With the Kista Mobile & Broadband Showcase, it provides an independent platform for the presentation of mobile and broadband solutions of about 70 partners. The activities of Kista Science City AB are supported by strategy groups composed of experts with an active role in the area. They address topics like “commercialization, innovation & entrepreneurship”, and “research and higher education”. Kista Science City AB is a wholly owned subsidiary of the Electrum Foundation, a non-profit public-private partnership.

2.3 Intellectual capital reporting

Intellectual capital reports analyse and assess the intellectual capital of organisations. In this respect they complement classical financial statements, which give detailed and structured information on the financial state of organisations.

Financial accounting has a long history and accepted rules. The information provided is useful for managers, investors, public authorities and other stakeholders as a basis on which to make decisions e.g., on how to allocate resources, but also in assessing the value of the organisation.

However, the value of organisations depend not only on physical assets to which a monetary value can be assigned, but more and more on intangibles. This was the motivation for developing intellectual capital reporting for companies in Sweden in the mid-1990s.¹⁰ This methodology has meanwhile spread throughout Europe: It has been embraced by companies, research institutions and universities.¹¹ For institutionalised, knowledge-intensive, networks intellectual capital also plays an important role in establishing the “value” of the network its members, and for the general public, funding authorities, and other stakeholders. An ICR can therefore provide valuable information on the level of a network. In contrast to a financial statement however, it is not enough to collect certain information according to a general set of rules and procedures, since there is no generally accepted and applicable set when it comes to intellectual capital reports, not to speak of intellectual capital reports for knowledge intensive networks. The structure of the ICR and the data requirements therefore have to be developed in the process of intellectual capital reporting as a prerequisite for information gathering. This is part of process of the RICARDA methodology (see chapter 3).

¹⁰ The first publication being Edvinsson, Malone (1997).

¹¹ European Commission's RICARDIS report gives an exemplary overview of applications (European Commission, 2006).

2.4 How to define intellectual capital

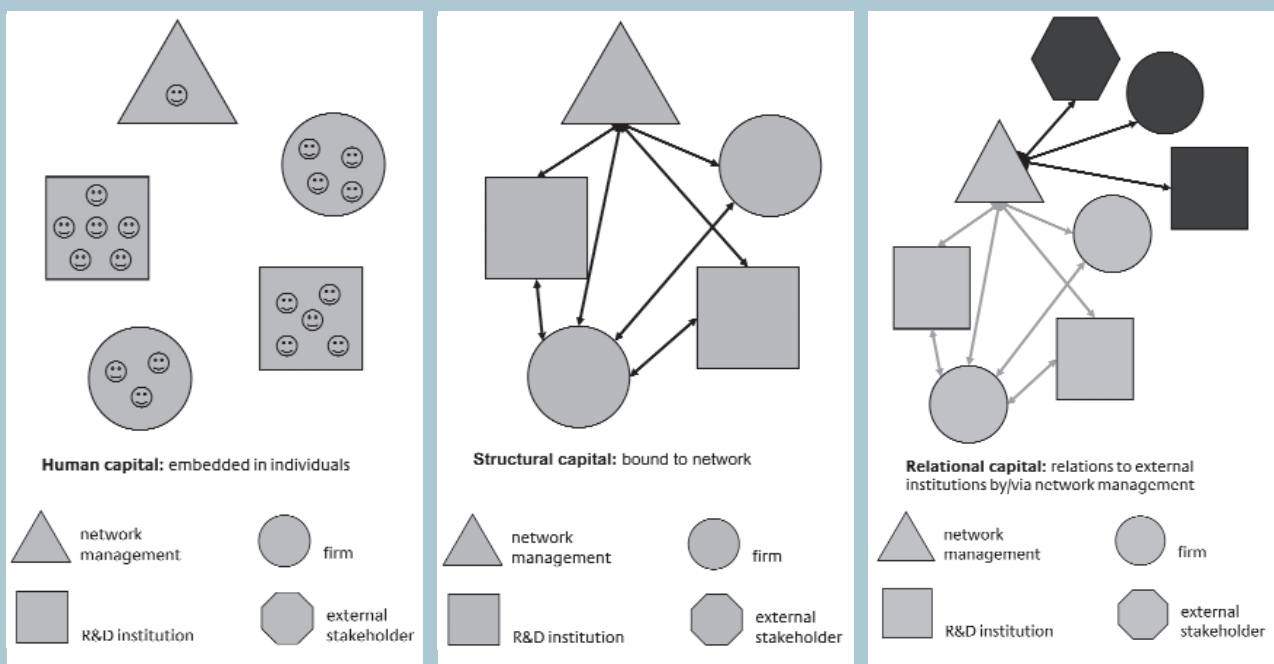
Intellectual capital is commonly divided into three dimensions: human, structural and relational capital. Within the RICARDA methodology these three dimensions are defined as follows:

- **Human capital:** The knowledge brought to the network by its member organisations. It includes peoples' skills, experience and abilities. Specific attention is paid to those individuals who are actively involved in network activities.
- **Structural capital:** The opportunities and instruments that serve the exchange and documentation of knowledge (databases, intellectual property, organisational culture, process organisation, etc.).
- **Relational capital:** All resources linked to the external relationships of cluster management, such as other R&D institutions, networks, non-member firms or policy makers.



Figure 2

Intellectual capital of cluster and network initiatives



Source: JOANNEUM RESEARCH and Deutsches Institut für Urbanistik

2.5 Functions of an intellectual capital report

A report on the intellectual capital of a network can fulfil different functions for network management, members, external stakeholders and the general public:

- **Information tool:** Management and network members obtain information on the stock and state of a network's intellectual capital.

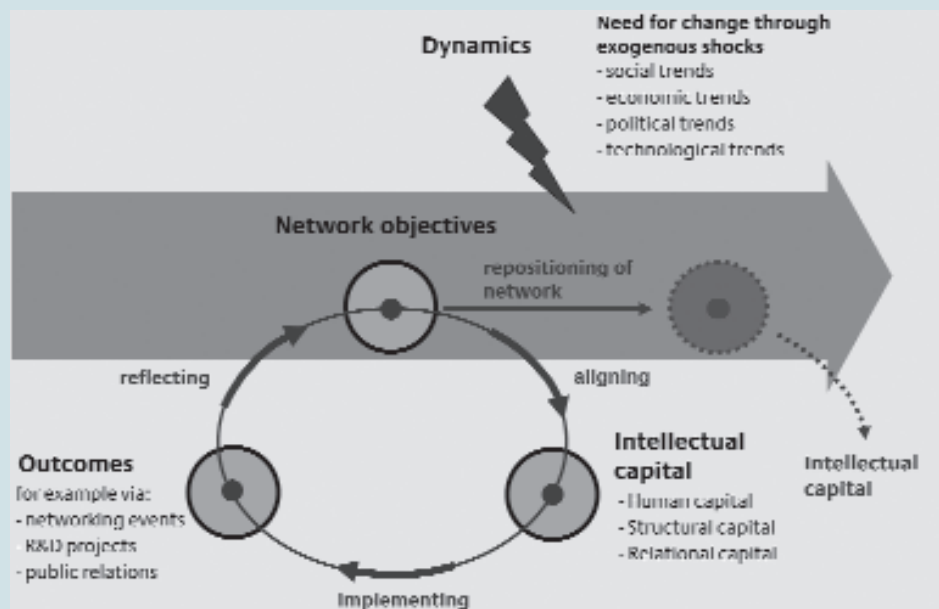
- **Strategy development:** The reports show the contribution of intellectual capital to network objectives and indicates measures for improvement.
- **Policy learning:** Intellectual capital reports can offer stakeholders (politics, public administration) valuable insights into the structures that have often been publicly funded.
- **Public relations:** Intellectual capital reports can help illustrate and communicate the various benefits of regional cluster and network initiatives.

2.6 The process of intellectual capital reporting



Figure 3

Basic model of intellectual capital reporting



Source: JOANNEUM RESEARCH

Figure 3 shows the basic model of intellectual capital reporting proposed by the RICARDA methodology. Network objectives, intellectual capital and outcomes are the main elements of the basic model. These three elements are closely interlinked. Intellectual capital should be focused according to the network's objectives. In its three dimensions of human, structural and relational capital, it contributes knowledge for the concrete activities (e.g. networking events, R&D projects, public relations) and outcomes of the network. The latter must be measured against the network's defined prior objectives.

A further assumption of the basic model is the variability of network objectives over time. Relevant trends in the network's environment need to be considered. Trends in technological development, in the economy as well as political expectations or policy measures influence the network's activities. They might require the network to adapt and thus to change or modify its objectives.

2.7 Reporting cycles

Normally, reporting on intellectual capital is not a one-off activity. Cluster and network development is a dynamic process. Younger networks have different information needs than advanced networks. It is therefore very helpful to repeat the process after a certain time. Usually a repetition every 24 months is helpful and limits the amount of work to be done. The first run causes higher expenditure than later repetitions because the structure of the RICARDA model has to be adapted to the needs of the specific network. Later repetitions enable the process to be readjusted to the changing demands of the network, its management and its member organizations. This makes it easier to draw conclusions from time series of report data, e.g., on the effectiveness of measures taken on the basis of previous reports.

3. Preparation of an intellectual capital report (ICR)

3.1 Requirements

The previous section stressed the many benefits of intellectual capital reports for cluster and network initiatives: they provide new insights for management and members, generate useful information for decision makers and serve as communication tools. But they naturally also involve costs, which have to be taken into account. Experience with pilot applications shows that periods of change motivate stakeholders to engage in such a process.

The following requirements need to be fulfilled:

- **Institutionalized and knowledge-intensive network** (see p. 10)
- **Time resources** for network management and members to participate in process (workshops, provision of information) – additional **funds** for external moderation (optional, see below)
- **Motivation** of network management and members to engage in the reporting process
- **Openness** for (internal) disclosure and discussion of results.

3.2 Getting started

If these basic requirements are met some preparatory steps need to be taken:

Formal decision and information

Preparing an ICR is an internal project and should be decided formally by the relevant body (e.g. board of network organisation). To ensure the participation of all members during the project it is important to communicate it in an appropriate way (e.g., network newsletter).

Nomination of project manager and working group

As preparing an ICR involves several steps and various people, it needs to be administered by a responsible person. This is usually the network manager or a member of the management team. Important parts of the ICR process are carried out in a series of three workshops bringing together network management and a fixed, representative group of network members from different fields (e.g., firms, R&D institutions, further education, public policy). The working group should not be too big, so as to allow an intensive exchange of opinions (approx. six persons). Group discussion is an essential part of the methodology.

Involvement of external moderation (optional)¹²

The external moderation of the process is advisable. The main tasks of the moderator include preparing inputs, moderating workshops, documenting results. An external moderator allows the network manager to take part in the discussions.

Briefing on role of ICR

ICRs present the intellectual capital of a cluster initiative or network in a structured manner. The results can serve different purposes (see p. 14). The project manager and external moderator (if applicable) should discuss the focus of the ICR methodology and the focus of this specific application. Everyone involved in

¹² Within the pilot applications of the RICARDA project this function was performed by the research partners of the consortium.

the project should have common and realistic expectations about the concept and the use of the ICR.

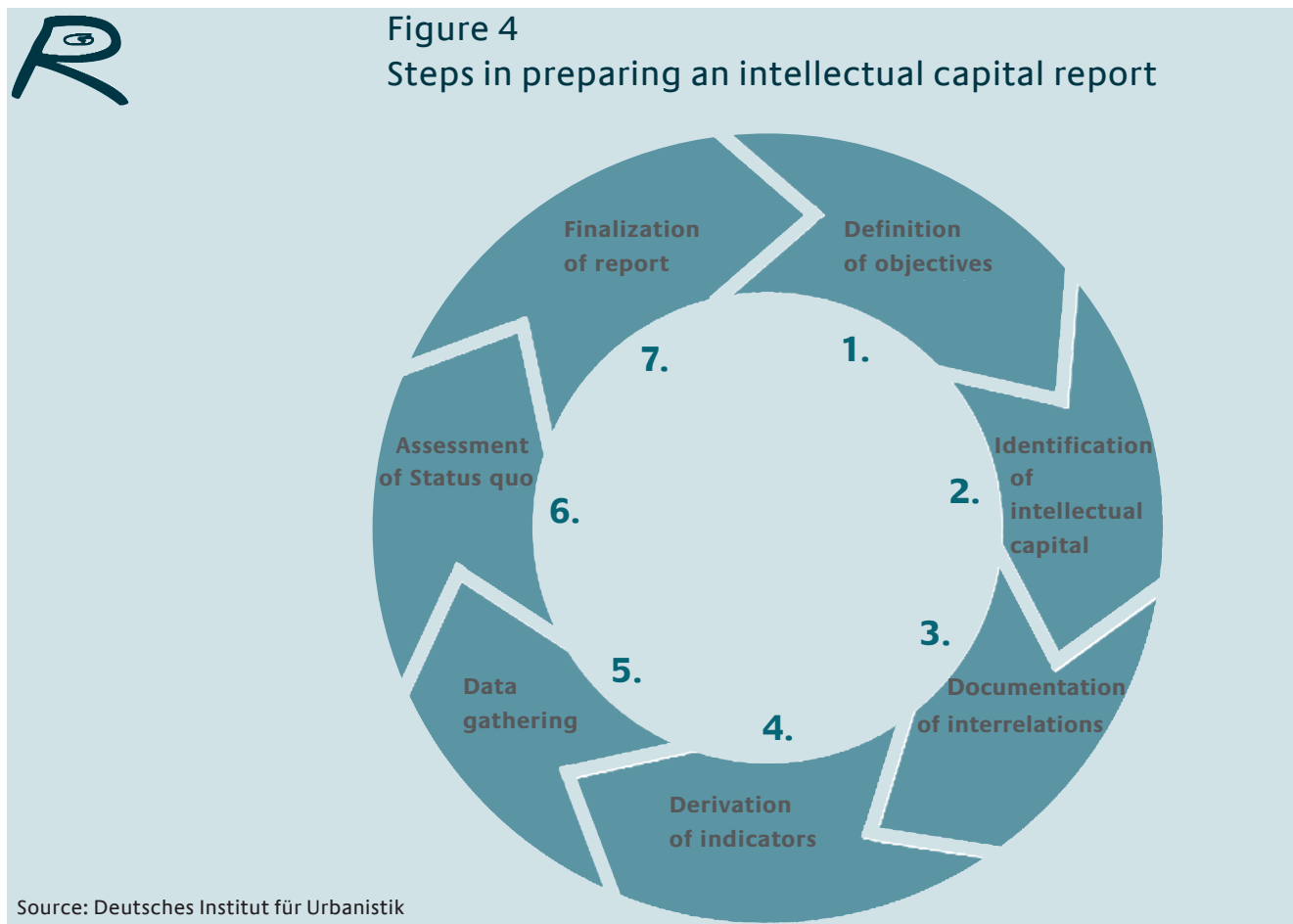
Ensuring commitment

Crucial for the process is the commitment of the network members. Due to the fact that representatives of network members are strongly devoted to their daily job, and strategic approaches of the network are often not on top of their priority list, it is very important to arrange the workshops as convenient and attractive as possible. Some possibilities explored during the RICARDA process:

- combine workshops with other events (e.g., periodical network meetings)
- communicate the benefits of the ICR process to single members (e.g., as a precondition for the improvement of network services)
- respect the interests and confidentiality requirements of network members throughout the ICR process.

3.3 Overview: Process of preparing ICRs

ICRs are prepared in seven steps: from definition of network objectives to the finalization of the report. Figure 4 underlines that intellectual capital reporting is a cyclical process that should be repeated after a certain time (see p. 16).





Step 1

Definition of network objectives



What's it about?

Intellectual capital reports focus on the aspects of human, structural and relational capital that contribute to achieving network objectives.

At the centre of any regional cluster or network initiative is a common interest of firms, research institutions and policy makers in various networking activities focused on a sector or technology field. But on closer examination, every such network is seen to pursue multiple objectives. Two levels can be distinguished: firstly objectives linked to the concrete activities of the network. The intellectual capital report focuses on these objectives as they can be directly influenced by network activities.

A second, more indirect level concerns the benefits for and effects on members or the regional economy. Policy makers that give money expect greater competitiveness and economic growth in the long term. Member firms that participate in activities are ultimately interested in increasing turnover or profits.



How to do it

Network objectives are identified by the working group in a half-day workshop.

Preparation of workshop I:

As a starting point for discussion, this manual proposes four typical network objectives. They focus on knowledge – its generation, acquisition and distribution – and on the provision of common infrastructure and services. Depending on the specific type of network, other objectives may cover issues like labour force training, the establishment of value chains, the provision of specific infrastructure, etc., or the functioning network management.¹³

In addition to these proposals there is in many cases already ample material that describe a network's main objectives that can be used, e.g. strategy documents or business plans. For the preparation of this first workshop the network manager compiles this material as an input. This paper should already contain a definition for the selected objectives. The following questions help preparing the selection:

- Which mid-term objective does the network pursue?
- Which objectives does the network pursue in the long-run?
- Which of these network objectives constitute the focus of the efforts?

¹³ This set of network objectives was generated for and tested in RICARDA's pilot applications.

Table 2
Typical network objectives

Network objective	Definition
Increase of knowledge creation	Networks can contribute to the creation of knowledge in a specific branch or technology field as key resource and prerequisite for competitiveness
Improvement of knowledge diffusion	Networks can support the diffusion of knowledge among actors in a specific branch or technology field contributing to increased adaptability, problem solving skills
Orientation towards flows of new knowledge	Networks can link regional actors with external flows of knowledge (new technologies etc.)
Common infrastructure and services	Networks can provide infrastructures and services that would not be possible for a single member

Agenda of workshop I:

In the workshop, participants are invited to comment on the material. This is an opportunity to revise original goals, add new aspects and work towards a jointly accepted set of network objectives. Time restraints will not allow substantial strategy discussions. Two additional options can generate new ideas in this workshop: A closer look at the stage of development of the network integrates the internal dynamics (see p. 19). Focussing on trends in the network's environment helps anticipate external needs (see p. 22).

The format of this workshop is an open discussion along the following guiding questions:

- Are the proposed network objectives valid?
- Are there additional objectives?

To allow the network management to engage in this discussion external moderation is helpful.



Example

Reformulation of network objectives

PANAC's network objectives were first declared in 2000 by the founders of the initiative. During the following six years the objectives remained unchanged, but significant changes took place within the network, for example, in membership structure and firms' needs. Other relevant changes included new regional funding policy priorities and instruments. The first RICARDA workshop thus provided an excellent opportunity to bring members and stakeholders together and to rethink PANAC's objectives for the future. It was indeed the first time that network founders (mainly large international companies) and new members (almost all Hungarian SMEs) could discuss strategic issues together. As a result, six new network objectives were identified.



How to document it

Information on network objectives and their definition are entered in a spreadsheet program as shown in the screenshot. In the following steps this spreadsheet is augmented and complemented.

The modifications and additions to the original list of network objectives are documented on basis of the workshop discussion. In order to keep the process focused it is advisable to limit the finalized list of network objectives to approximately five.

It is also important to document a definition. These descriptions can include typical activities that support networking activities. Definitions will allow a shared understanding. They also make it easier to identify relevant aspects of intellectual capital in a second step.

Screenshot of network objectives

	A	B	C	D	E
	Network objective	Definition	Indicator	Value	Assessment
1					
2
3
4
5					

Network Objectives / Intellectual Capital / Indicators



Option 1: Stage of development

What's it about?

Regional cluster and network initiatives are not static. They change continuously and have to do so to remain successful. A growing membership, for example, not only changes the size of the network. It also affects interaction in the network. New members might also articulate new ideas and needs, etc. Developing a shared understanding of these internal developments can help self-actualization and can articulate important aspects of the network's objectives.



How to do it

There are stylized facts on typical stages of development of cluster and network initiatives (see p. 46). Workshop participants are invited to comment on the relative position of the network on the continuum from the initiation and development phase – growth – maturity – change.



How to document it

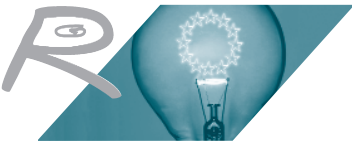
The results of this discussion are documented in the minutes of workshop I.



Example

Stages of development

PANAC was founded at the end of 2000. After working structures had been established, the network experienced dynamic growth in membership and the introduction of various services in the following three years. In 2004–2005, the cluster was stagnating and operating only on a basic level, mainly because of emerging financial problems caused by the end of institutional funding. Several members left the network. Since 2006 a new management initiated new, successful services, increased internal communication and the internationalisation of PANAC activities – stabilizing the networks' financial and membership situation. The series of workshops in the intellectual capital reporting process was a welcome opportunity for members and network management to reflect on the present situation after a period of rapid changes.



Option 2: Environmental trends

What's it about?

The activities of regional cluster and network initiatives have to take account of relevant changes in its environment. This covers issues like technological trends, economic framework conditions, and trends in RTD policy. A closer look at these trends reveals whether network objectives need to be revised or adapted. It also contributes a repository of ideas for future action.



How to do it

The participants of workshop I are invited to identify developments in technology, the economy, and RTD policy that will in their opinion affect the work of the cluster initiative. As a manual of choice a broad selection of environmental forces is included in the annex.

Participants are asked what relevant trends are apparent:

- in the technological field(s) of the cluster initiative
- in economic framework conditions
- in RTD policy.

This can be facilitated by asking participants in a brainstorming phase to write down ideas on cards (one card per idea). These cards are then collected and displayed on a pin board. Answers can be grouped in terms of whether they are positive (opportunities) or negative (challenges) for the network.



How to document it

The grouped answers serve as a source of reference in the process and are included in the minutes of workshop I.



Example

Environmental factors in virtual reality

During the first workshop of the Virtual Dimension Center, participants were asked to think of relevant trends. Specifically, they were asked about trends in virtual reality technology, economic framework conditions, and RTD policy. During a brainstorming phase of about 15 minutes, ten participants had independently generated more than 50 ideas that were subsequently grouped in a moderated discussion. The results were documented in a table that was used in the subsequent discussion on network objectives and in the following two workshops (see following table).

Table 3

Environmental factors of Virtual Dimension Center (selection)

Area	Trends
Virtual Reality (VR) technology	Opportunities: Development of design and user interfaces improve accessibility for SMEs Reduced price and size of VR equipment allow broader application
Economic framework conditions	Opportunities: New awareness for VR technologies in mechanical engineering Challenges: Increased competition in the field of virtual engineering (offshoring) RTD policy
RTD policy	Opportunities: Increased funding for VR technologies in EU 7th framework programme Challenges: Cooperation between different administrative levels on cluster policy



Identification of intellectual capital



What's it about?

Intellectual capital includes assets that contribute to the outcome of a network but are not monetary or physical. They can be broken down into three dimensions: human, structural and relational capital (for a definition see p. 14). The following table gives typical examples of assets in these three dimensions for cluster and network initiatives.

Table 4
Examples for intellectual capital of networks ¹⁴

Dimension of intellectual capital	Asset	Definition
Human capital	Knowledge base	Profile of network member organisations and its employees (in general and those involved in network activities)
	New capabilities and training opportunities	Institutionalised learning capacities for employees of network's member organisations provided by network management
	Innovation capacity	R&D and innovation activities of network member organisations
Structural capital	Interorganisational learning	Learning of network member organisation's employees in joint activities of network member organisations
	Interrelations and partnerships	Interrelations and partnerships between network member organisations
	Common ties, norms and mutual trust ("social capital")	Common ties, norms and mutual trust ("social capital") between network member organisations.
	Common infrastructure and services	Infrastructure and services available for network members only ("club goods")
	Management capacity and institutionalization	Network management activities and procedures
Relational capital	Sound embedding in regional and national innovation system	Links to relevant innovation policy stakeholders outside the network
	Cooperation with other networks, clusters or single organisations	Links to relevant external stakeholders in the field of work of the network

¹⁴ This table is based on an extensive review of existing schemes relating to the performance of cluster and network initiatives and academic literature and was verified during the pilot applications of the project. A complete overview including the definition for these examples can be found in the annex.



How to do it

Intellectual capital assets are identified by the working group in a half-day workshop.

Agenda of workshop II:

First the concept of intellectual capital should be explained. Then the participants are invited to brainstorm on the relevant human, structural and relational capital. While the concept and terms of intellectual capital might be new for most participants, breaking down these dimensions into concrete questions will help. This should be organized along guiding questions for each dimension. The answers will help to adapt and modify the list of typical intellectual capital assets to the specific situation of the network. It is also important to document the discussion on the different assets.

Human capital:

Examples of guiding questions for identifying the human capital of networks: To attain the network objectives defined in step 1...

- Which organisations have to be part of the cluster?
Example: R&D organisations with a specific profile,...
- What knowledge/skills should member organisations have?
Example: management has to know about public funding opportunities, R&D-institutions have to produce applicable results, knowledge about the market situation
- What distribution of organisations is required? What is the appropriate mix?
Example: a couple of lead firms only, one R&D institution mandatory for a certain number of firms...
- Which key persons should take part in network activities?
Example: staff with academic-industrial background, technology promoters...
- Which knowledge/skills do key persons have to have?
Example: culture of shared knowledge, motivation to co-operate, willingness to innovate...

Structural capital:

To attain the network objectives defined in step 1...

- What opportunities for network members to exchange knowledge are important? Example: networking events, working groups,...
- Which possibilities exist for generating new knowledge in the network?
Example: joint R&D projects,...
- What network infrastructures and services support these processes?
Example: intranet, newsletter, laboratories, training
- What capacities and procedures does the network management need to provide? Example: administrative resources, technical resources, contact brokerage...

Relational capital:

To attain the network objectives defined in step 1...

- What RTD policy stakeholders are important for the cluster initiative?
Example: regional technology transfer agency,...

- What partners are important for joint project activities?
Example: specific networks within the technology field, research institutions in related fields or sectors
- What ways are important for reaching these stakeholders?
Example: participation in trade fairs or conferences, events to exchange information
- What is the content of cooperation with these stakeholders?
Example: exchange of best practices, exchange of knowledge...
- What ways are important for organising cooperation?
Example: cooperation agreements, joint projects etc.



How to document it

The results are documented in a spreadsheet that lists the individual assets of intellectual capital, a definition for further description and the objective which is affected by this asset.

Screenshot of intellectual capital

	A	B	C	D	E
	Intellectual Capital	Definition	Indicator	Value	Assessment
1					
2	Human Capital				
3	...	...	...	...	...
4	Structural Capital				
5	...	...	...	...	...
6	Relational Capital				

Network Objectives Intellectual Capital Indicators



Example

Assets of intellectual capital and their definition

Table 5

Example of Virtual Dimension Center (selection)

Dimension of intellectual capital	Assets	Definition
Human capital	Motivated and committed members	Motivated and committed members support VDC's work with their specific competencies in both word and deed, contribute to developing the network's activities and use VDC's infrastructure. Motivation and commitment are important prerequisites for the functioning of the VDC.
	(...)	(...)
Structural capital	Intensive internal information exchange	For an intensive exchange of information between members and the VDC's management and among members themselves, adequate tools must be available (newsletter, network meetings, survey of members' needs). This information exchange is a prerequisite for the spontaneous and systematic development of common activities, and for the development of new knowledge and learning opportunities.
	(...)	(...)
Relational capital	Cooperation with other networks and cluster organisations	Through cooperation with other networks and cluster initiatives in the Stuttgart Region as well as on a national or international level, VDC's management opens up possibilities for its operations and its members. Increased cooperation with networks specialized in specific branches (e.g., automotive) offers the opportunity to develop new fields for the application of VR technology. Thus, VDC can benefit from access to new information, prospective partners and increases its visibility.
	(...)	(...)

Step 3

Documentation of interrelations



What's it about?

Every individual asset identified in step 2 helps – by definition – to attain one of the network's objectives. It is interesting to take a closer look at these interrelations. One asset might contribute to multiple network objectives. A systematic review of interrelations between all factors of a network's intellectual capital and the various objectives allows assessment of their importance.¹⁵



How to do it

This exercise is part of workshop II. The question of the network objectives served by individual assets of intellectual capital has been addressed in step 2. Workshop participants will be asked to reconsider the linkages documented and identify additional linkages. This exercise is not scientific but based on participants' own experience.



How to document it

Visualization is important to provide a quick impression of the relevance of individual assets. This can be presented in table or diagram form.



Figure 5
Interrelations between network objectives and intellectual capital

Network objectives Intellectual capital	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Human capital: Asset 1	X	X	X	X	
Human capital: Asset 2	X				
Human capital: Asset 3	X			X	
Structural capital: Asset 1			X	X	
Structural capital: Asset 2	X			X	X
Structural capital: Asset 3	X		X	X	
Relational capital: Asset 1	X				X
Relational capital: Asset 2		X			X

Source: Deutsches Institut für Urbanistik

Step 4

Derivation of indicators



What's it about?

Measuring intellectual capital poses an important problem. Intellectual capital cannot be observed directly. It is, for example, impossible to measure the innovativeness of a network by one single value. But the number of researchers employed or patent applications might be good indications of the level of innovativeness. The same holds true for network objectives.

The task in this step is therefore to find indicators for the assets of intellectual capital and the network objectives identified beforehand. There are certain requirements for a good indicator:

- it has to actually represent the intangible asset/network objective (significance)
- its interpretation must remain stable over time and not differ from person to person (reliability)
- data have to allow a unique interpretation (e.g., more is better)
- from a practical point of view the availability of required data is important.



How to do it

Indicators are identified by the working group in a half-day workshop. This workshop can be combined with workshop II (see above step 2).

Agenda of workshop III:

There is no complete list of possible indicators. This guide suggests indicators that have proved their worth in pilot applications. They can be used as a starting point for discussion. The tables below show examples of indicators. Some are single values, others composites that need to be calculated from two values ("share of" etc.).



Example

Using established indicators

In identifying suitable indicators for reporting innovation behaviour in the Kista Science City ICT cluster, researchers from the Royal Institute of Technology (KTH) decided to use well established indicators, namely questions from the Community Innovation Survey. This not only guaranteed well-tested indicators but gave them the opportunity to relate a firms' answers to previous results for the area. They were thus able to detect changes in the cluster's intellectual capital.

¹⁵ There might be objectives that are not influenced by intellectual capital.

Table 6
Examples of indicators for
intellectual capital

IC Dimension	Assets	Indicators ¹⁶
Human capital	Knowledge base	Fields of activity (e.g. research, training/education, companies in technology field, other companies, other non-profit or public institutions) Location of network members (region, country) Number of employees Share of employees with university degree
	Innovation capacity	Share of R&D employment R&D expenditure (as share of turnover, researcher...) Introduction of new products/processes/services
	New capabilities and training opportunities	Share of employees obtaining certificates due to training offered or initiated by network management
Structural capital	Interorganisational learning and innovation	Share of network members taking part in joint R&D projects Share of members satisfied with provision of scientific and technological knowledge within network
	Interrelations and partnerships	Participation in networking events (i.e., workshops, working groups) Existing cooperation agreements with other network members
	Social capital	Share of network members taking part voluntarily and actively in network activities Share of members involved in repeated R&D cooperation Share of members leaving the network Average share of network members with which a network member maintains regular contact (at least three times per year) (customer-supplier relationship, R&D, other [e.g., information exchange])
	Common infrastructure and services	Existing common infrastructure and services (e.g., training facilities, laboratories, project management, marketing services)
	Management capacity	Number of management decisions based on explicit rules and procedures Number of employees in network management Profile of employees in network management (business administration, engineering)
Relational capital	Sound embedding in regional/national innovation system	Involvement of external stakeholders in networking activities Number of delegations to the formal network organisation
	Cooperation within technological field (networks, single organisations)	Number of cooperation agreements with other networks

Table 7
Examples of indicators for
network objectives

¹⁶ If a report is being prepared for the first time it is suggested to gather data for the past three years.

¹⁷ If a report is being prepared for the first time it is suggested to gather data for the past three years.

¹⁸ Indicators can be broken down for different member groups (like firms, research institutions etc.).

Network objective	Indicators ¹⁷
To increase knowledge creation	Share of R&D employment (in full time equivalents) at time of survey ¹⁸
	R&D expenditure as a share of turnover of member firms in last year/last three years
	Innovation expenditure as a share of turnover in the last year/last three years
	Number of patents granted by national patent office and European Patent Office: overall/ per researcher
Improvement of knowledge diffusion	Share of network members taking part in joint R&D projects including only network members in the last year/last three years
	Number of networking events (i.e., workshops, working groups) in the last year
	Share of members involved in repeated cooperation in R&D in the last year
Orientation towards flows of new knowledge	Participation rates of network members in EU framework programme in the last five years
	Number of customers located outside the region of policy intervention as a share of the overall number of customers for each of the last five years
Common infrastructure and services	Usage rate of existing common infrastructure and services (e.g., access to laboratory/demonstration centre, training facilities, access to office facilities for start-ups, website, newsletter, intranet, project management services, marketing services...)



How to document it

Additional indicator column is added to the table on network objectives and intellectual capital. For each indicator a definition and the description of data source (e.g., members survey, network management) is collected on an additional spreadsheet.

Screenshot of spreadsheet indicators

	A	B	C	D	E	F
1	Indicator	Definition	Data Source	Data 1	Data 2	Value
2
3
4

Step 5

Data gathering



What's it about?

With the definition of indicators, a range of data needs have been formulated in the previous step. They cover information from individual members and information on the network management level. Information not at hand has to be collected. The source of these data is therefore the network management and a written survey of network member organisations.



How to do it

The list of indicators for which data is not yet available is sorted by data source: The items to be addressed to all network members are included in a questionnaire. Those remaining are answered by the network management. For this data source additional research in documents on network activities is usually necessary.

If the ICR is being compiled for the first time, it is advisable to gather information not only on the status quo but also to compile data for previous periods (e.g., the last three years). The resulting time series allows development trends to be detected .

In designing the questionnaire, certain aspects should be kept in mind:

- Since **additional qualitative information** can later support assessment of the data compiled (see step 6), questions about members' views on network objectives or specific network services, as well as an open question on potential improvements within the network can be included in the survey. This is a good opportunity to engage all network members in the process of intellectual capital reporting.
- The overall **length of the questionnaire** should be limited to increase response rates. In many cases (e.g., the issue of participation in network activities) network management documents might obviate the need to ask members. It may also be possible to shorten the questionnaire for some network members (e.g., questions on innovation capacity for members not active in the given technology field).
- The **structure of the questionnaire**: Start with questions that can easily filled in (qualitative assessments), keep items that might involve research for later.

Examples of questionnaires used in the RICARDA project can be found in the annex (see p. 50).

The results of the survey can usually be documented in the prepared spreadsheets as the number of questionnaires is manageable for most networks. Where available, statistical software can be utilized.



Example

Web based survey

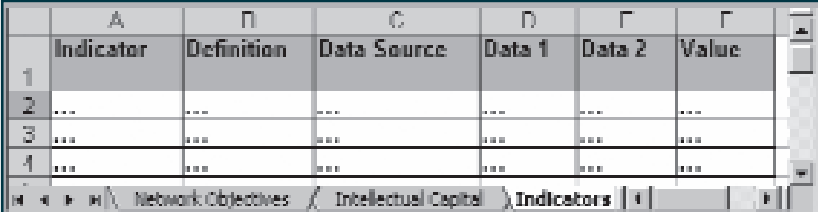
For gathering the necessary data from member firms, PANAC's management developed a web-based survey to facilitate and accelerate the process. A short survey was elaborated based on indicators defined in the workshops and placed on the joint website of the network. Members were informed about the RICARDA project and asked by letter for their participation. They could fill in the questionnaire through the web interface that informed the team preparing the report in an electronic database. After the first deadline, all members that had not responded were called and requested to do so.



How to document it

The data from the survey and network management is collected in the spreadsheet on indicators. The respective values are entered in the indicator file. Where composite variables are used the necessary calculations are carried out. The results can then be copied onto the spreadsheets on network objectives and intellectual capital.

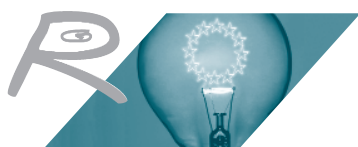
Screenshot of spreadsheet indicators



	A	B	C	D	E	F
	Indicator	Definition	Data Source	Data 1	Data 2	Value
1						
2
3
4

Step 6

Assessment of status quo; interpretation of data



What's it about?

When all the required data is available, the current status of the network's intellectual capital assets and goal attainment can be described. Several perspectives can be taken on the data.

From a strategic perspective, network objectives are linked with intellectual capital (result of step 3, see p. 28). This provides an overview of the role played by intellectual capital assets in attaining network objectives and should help clarify the specific structure developed.

The balance perspective offers various orientations:

- The resources orientation presents the data for each indicator on intellectual capital assets (human, structural and relational), ensures that intangible assets in all three dimensions are taken into account and that a well-balanced picture emerges.
- The outcome orientation gives an overview of objectives and indicators and thus of what intellectual capital has achieved.
- The future orientation allows documentation of environmental trends relevant to the network (where appropriate) and of any proposals for thematically re-orienting or reorganising the network.



How to do it

Intellectual capital assessed in a half-day workshop¹⁹

Preparation of workshop IV:

The indicator values are entered in the spreadsheets for network objectives and intellectual capital.

Agenda of workshop IV:

The indicator values for each asset are presented to the working group.

Discussing the data within the group is particularly important, as the assessment of the status quo and the interpretation of data form the basis for any measures resulting from the RICARDA ICR. Workshop participants are asked their opinion on the degree to which the asset in question has been achieved in terms of quantity and quality. The table below proposes a scale that has worked well in pilot applications. A common value for each asset is crucial. Participants are asked to state the reasons for their assessment. This qualitative information is documented. Same exercise is repeated for network objectives.

¹⁹ Two RICARDA pilot applications have not included this step in a quantitative way.

²⁰ It is also possible to include systematicness as a dimension. This is problematic in a network as there are different actors.

Source: German Ministry of Economics and Labour (2005): Guideline Intellectual Capital Statement – Made in Germany.

Table 8
Scale for assessment of quality and quantity²⁰

Value	Asset is...
0%	...not measurable/not present
30%	...partially sufficient
60%	...mostly sufficient
90%	...always/entirely sufficient
120%	...more than necessary (indicates potential for reduction)



How to document it

The quantitative and qualitative assessments are entered in the appropriate columns of the spreadsheets on network objectives and intellectual capital.

Screenshots of spreadsheets network objectives and intellectual capital

	A	B	C	D	E
1	Network objective	Definition	Indicator	Value	Assessment
2					
3	...	...	...	...	...
4	...	...	...	...	...

	A	B	C	D	E
1	Intellectual Capital	Definition	Indicator	Value	Assessment
2	Human Capital				
3	...	...	...	...	...
4	Structural Capital				
5	...	...	...	...	...
6	Relational Capital				
7	...	...	...	...	...



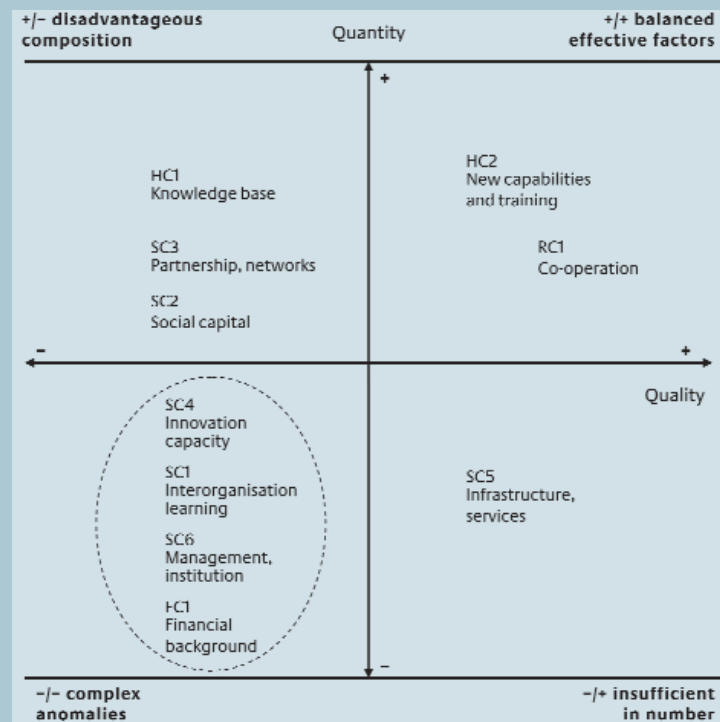
Example

Visualization of Results

For the PANAC ICR, assessment of both the quality and quantity dimension of all intangible assets (human, structural and relational capital) was visualized to obtain information about the complex process of implementing cluster objectives. This so-called portfolio view sorts assets according to assessment. The origin of the system of coordinates, where the two arrows intersect, is set at an imaginary value of 50% for both dimensions (quantity and quality). It is easy to identify the most problematic assets (in the “complex anomalies” panel) and the most effective assets (in the “balanced factors” panel). This information helps find the potentials for medium term improvement. For VDC's ICR an alternative visualization in the form of a spider chart was developed (see figure 7).



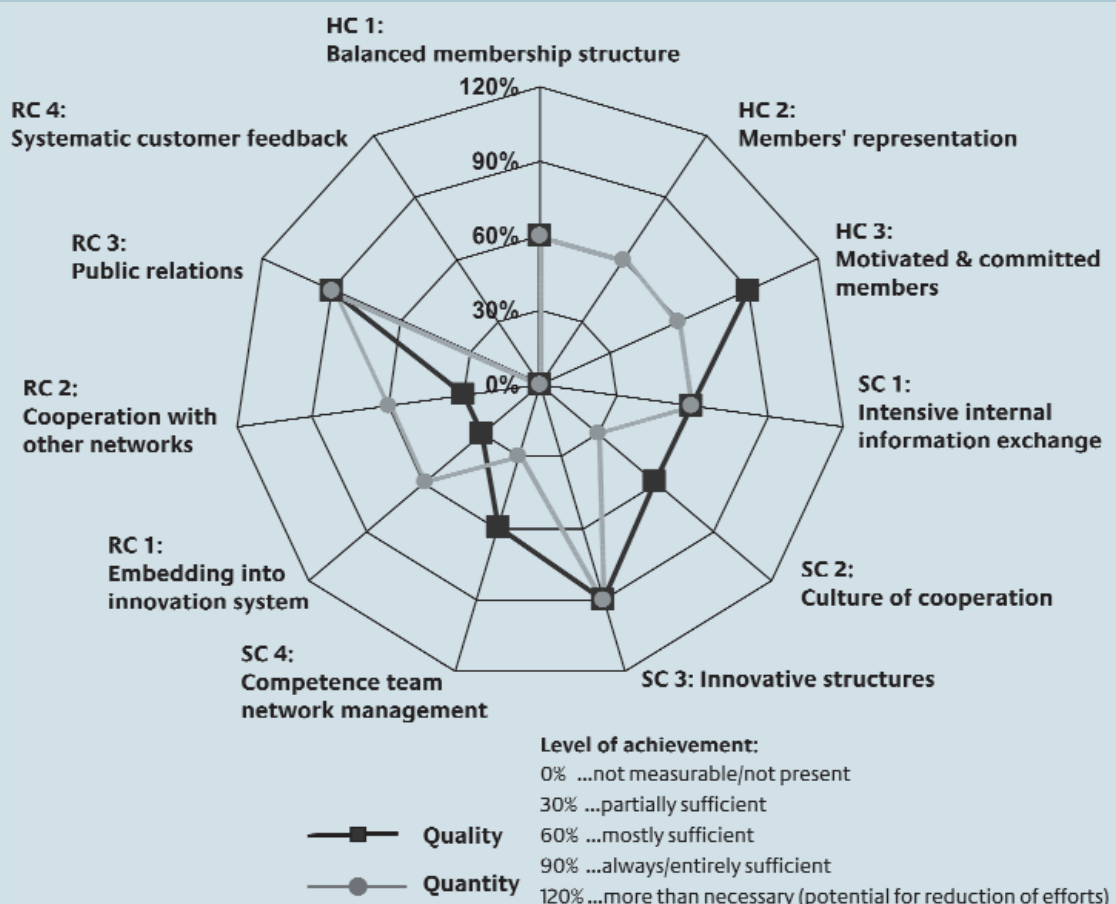
Figure 6
Visualization of intellectual capital
in a portfolio diagram (PANAC)



Source: West Hungarian Research Institute

Figure 7
Visualization of intellectual capital
in a spider chart (VDC)

Source: Deutsches Institut für Urbanistik



Step 7

Finalization of the ICR



What's it about?

The final step in the process is to pool the information gathered in a written report. It should contain a characterization of the network and a brief description of the process. A core element of the report is the documentation of the network's intellectual capital.

In some cases two versions might be advisable: a full version containing all data for internal use and an abbreviated version for external distribution.



How to do it

Producing the ICR is desk work for the project manager. Experience with pilot applications recommends the following structure:

Table 9
Structure for a RICARDA ICR

Chapter	Main content	Relates to
Introduction	Basic information on the knowledge intensive network (mission, membership etc.)	
Methodology	Overview of RICARDA ICR methodology, the purpose of ICR for the network (including stage of development) and the process	Step 1
Network objectives	Description and definition of network objectives	Step 1
Intellectual capital	Human, structural and relational capital and their definition	Step 2
Interrelations	Interrelations between network objectives and intellectual capital	Step 3
Intellectual capital: resources	Results (indicators and values) and assessment of network's intellectual capital	Steps 5 & 6
Network objectives: outcomes	Results (indicators and values) and assessment of network's objectives	Steps 5 & 6
Summary and outlook	Description of future opportunities and challenges and identification of potentials for improving the network's intellectual capital base	Steps 1 & 7

The content of the ICR can be illustrated in various ways:

- **Narrative examples:** Short texts that show how intellectual capital “works” in practice
- **Figures:** Visualization of the level of attainment in the various intellectual capital dimensions



Example

Story from VDC's report

Structural Capital in Practice: Knowledge exchange between research and the business world

Network manager Jens Mohrmann reports: “The Virtual Dimension Center and its member firm Bernd Kußmaul GmbH (Ltd.), Weinstadt, are an example for knowledge exchange between research and the business world. Many interior parts of the Bugatti Veyron 16.4 car – “the world's most expensive car” – were developed and prepared for production by VDC and member firms. Our information brokerage played a crucial part. Only through its intervention did Bernd Kußmaul GmbH and Visenso GmbH meet as two partners that complement each other perfectly when it comes to visualization technology. With the help of Visenso GmbH, Bernd Kußmaul GmbH simulates and visualizes various stages of development not only for the Bugatti Veyron 16.4 but also for other innovative technological projects. Thus working in networks enables Bernd Kußmaul GmbH as an SME to offer its customers virtual reality and collaborative engineering technologies and to enhance its power to compete.”



How to document it

There is no standard layout for an intellectual capital report. As an example, figure 8 shows one page of the report's chapter on intellectual capital resources, integrating the definition, results and assessment of that specific relational capital asset.



Figure 8
Page of VDC's ICR

Relational Capital 2

Cooperation with other networks and cluster organisations

Rationale

Through cooperation with other networks and cluster initiatives in the Stuttgart Region as well as on a national or international level VDC's management opens up possibilities for its operations and its members. An increased cooperation with networks specialized on specific branches (e.g. automotive) offers the opportunity to develop new fields for the application of VR technology. Thus VDC can benefit from access to new information, prospective partners and increases its visibility.

Results

40% of technology providers agree with the statement that VDC's cooperation with other networks and clusters has opened up new business opportunities. 47% of the larger group of all members involved in the provision or use of these technologies do agree.

Number of cooperation agreements with other networks

2004	2005	2006	Trend
1	3	5	↗

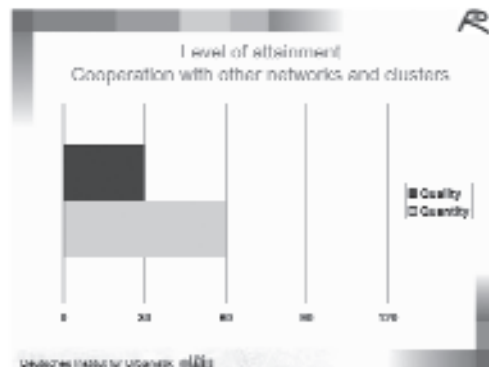
Source: Network Management VDC

VDC's cooperation agreements with other networks

Laval Mayenne Technopole, Frankreich (2004)
Industrievereinigung Fellbach (2005)
Virtual Dimension Center SLGeorgen (2005)
aod Verein zur Förderung von Architektur, Engineering und Design e.V., Stuttgart (2006)
Kompetenzzentrum Mechatronik e.V., Göppingen (2006)

Assessment

It has proven difficult to initiate and organise cooperation with other networks. During the last years VDC has managed to formalize cooperation with a couple of other networks. The quantity of these partnerships is seen as mostly sufficient. It is now important to bring those partnerships to life. In terms of the substance achieved the results are regarded as only partially sufficient. Apart from that other relevant networks should be addressed.



Source: Deutsches Institut für Urbanistik

4. Using intellectual capital reports (ICRs)

4.1 Use of ICRs for network management and members

Experience in the RICARDA project shows that ICRs can support cluster and network initiatives in strengthening their role as intermediaries for research and technological development (RTD).²¹

The collective objectives of networks are often not clearly defined or binding. They may alter with time and as the network develops. The day to day business of networking and the pressure to provide short term benefits for members may lead management to neglect strategic (re-)orientation. The first step in the ICR process can help revise and readjust network goals.

An ICR provides network management and members with a specific set of data on the status quo of a network's specific intangible assets. This information can be used for identifying potentials for improvement and as a basis for action. Moreover, identifying the specific configuration of intangible assets in a team-oriented process will stimulate the engagement of public and private network members and prepare the ground for new activities:

- Development of new services/innovation support
- Creation of new financing innovation schemes
- Restructuring the supply side (services for members) and internal strategy changes
- Changes in the cooperation between member firms and network management
- Setting up new infrastructures
- Business involvement in the innovation process
- Development of new entrepreneurial activity.

²¹ To obtain feedback on the relevance of ICRs for network managers, the methodology and content of the reports were discussed with other network managers in all RICARDA regions.



Examples

Identifying potentials for improvement

Structural capital: new activities to strengthen a cooperative network culture

The information gathered for VDC's intellectual capital report suggested that thematic activities had hitherto consisted of a series of one time events and defined research, development and application projects. Participation rates were considered to be too low. In order to reinforce the network's "cooperative culture", the ICR working group suggested that special interest groups for categories of member (e.g., users of virtual reality technology) or on new technological trends (e.g., augmented reality) should complement the activities offered. These groups could contribute to closing the gap between the members' readiness to engage further in networking activities and their actual behaviour.

Relational Capital: Improving cooperation with organisations at the regional and national levels

The findings on PANAC's relational capital showed that the network management had succeeded in establishing intense cooperation with regional organisations and on the international level. It was also shown that two-thirds of member companies are located in other regions (Central Hungary, Central Transdanubia).

Currently PANAC has no interrelations with regional players in these neighbouring regions. Its connections with organisations and stakeholders at the national level are also very limited. It was therefore decided to broaden cooperation with the relevant bodies from neighbouring regions and at the national level and to focus the network's public relations activities accordingly.

4.2 Use of ICRs for policy learning

Opportunities for policy learning generally address the underlying causes and conditions of policies and initiatives as well as their effects.²² The results of the ICRs produced in the RICARDA project indicate that such reports can contribute to improving cluster and networking schemes and – to a lesser extent – more strategic priorities and knowledge goals in regional RTD policy.²³

One question is what and when policy makers launching programmes to initiate and support networks can learn from ICRs in order to **improve network schemes**. It became clear that ICRs and their results mainly address the programme monitoring stage. Here complementary information about intangible assets can add to the standard type set of monitoring indicators. This could improve the quality of information available to programming authorities. Information on intangibles could also play a limited role in an ex-post evaluation – but additional data would be needed for impact assessment.

Another question is whether ICRs can support regional RTD policy in addition to providing information on a specific network. In this respect the ICR dimensions “structural capital” and “relational capital” are particularly interesting. Policy learning for improved regional network policy is hence possible in these fields.

RTD policy priorities in general are based on the identification of regional strengths and patterns of specialisation. ICRs can provide data complementary to surveys addressing regional driving factors in innovation processes. Thus ICRs can support the discussion process finding a regional consensus on functional priorities. Opportunities for more targeted and effective public intervention will be generated within the individual reports. It is important to prevent selection bias by including the regional innovation system as a whole.

The potentials for policy learning seem to be most promising where several networks within a region produce ICRs. The development of such an **ICR-based policy-learning framework** would allow policy makers to identify cross-cluster needs and priorities and to improve aspects of the regional innovation system.

Policy learning is strongly affected by the concepts of governance prevailing in the given regions. The **governance of regional innovations systems** differs in Europe. A common typology distinguishes between the locally driven grassroots system, the dirigiste system – with strong central government involvement – and the network system that integrates local, regional and national activities. The results of the RICARDA project indicate that there are different routes for learning depending on the type of governance system and the type of network in question:²⁴

- In a **grassroots system**, project initiatives alone are addressed in policy learning – as a consequence, project management and policy level coincide. ICR methodologies can be used as a medium for interactive learning between stakeholders: firms participating in the ICR process can learn about each others activities and policy makers' activities. ICRs can be used in outward

²² On the term policy learning see Hjelt et al. 2005.

²³ To identify the relevance of ICRs for RTD policy, the reports were presented to policy makers from the regional and partially national levels in all RICARDA regions in a series of “round tables”.

²⁴ The following types of regional innovation system governance draw on the work of Phil Cooke (2006) and are explained in the glossary. The different RICARDA regions can be roughly classified as grassroots (Stockholm), network (Stuttgart and Styria) and dirigiste (West Transdanubia).

communication: towards national policy makers, non-cluster firms and other clusters or regions. Such activities can serve to market the cluster (creating a “buzz”), to ensure both support from relevant policy makers and interest from international investors and relevant firms – thus strengthening the long-term attractiveness of the cluster. If well designed, the ICR process may also enable a better understanding of the benefits firms can enjoy from locating within the cluster. Since a grassroots-system cluster has limited means for implementing changes or initiatives based on findings from ICRs through central activities, it is important to manage expectations among stakeholders.

- In a **network system**, a dialogue in the policy cycle can be established. Both the level of self-supporting networks and that of programming authorities is relevant for policy learning activities. Bottom up initiatives can be addressed as in grassroots systems; in the case of regional policy programmes dialogue is needed between programming authorities and stakeholders. The ICR methodology can contribute to the overall level of regional RTD policy by improving the regional innovation system, supporting the discussion process on a regional consensus in RTD policy, discovering approaches for more targeted and effective public intervention and providing a better understanding of impacts and benefits of network involvement, especially for SMEs, and encouraging private R&D involvement. On the level of programmes initiating and supporting innovation, ICRs can contribute to identifying network-specific priorities and cross-cluster needs, identifying new ways for increasing the absorptive capacities of firms for RTD (technology demonstration and transfer), benchmarking with other networks (regional, national, interregional), monitoring the development of the network (if regularly repeated). As far as the concrete delivery of programmes to initiate and support innovation networks are concerned, ICRs can contribute to the assessment of innovation networks in the light of more competitive and project-oriented tools, optimised national, regional and local governance of innovation systems and business development.
- In a **dirigiste system**, only central programming authorities would be relevant partners for policy learning. The ICR methodology can be used as an information, communication and monitoring tool. ICRs can also bridge the gap in evaluating so called “soft” features of clusters, which is very useful for policy decision makers since most institutionalised clusters are established with some kind of public support. This means that policy requires information on the operational outcomes of these clusters. ICRs can be a feedback document for policy, a good tool for monitoring and for medium-term strategy planning. For strategic planning it provides detailed information about the regional RTD process of individual clusters, sectors, and the role of cluster organisation and initiatives fostering these processes. ICRs can thus help policy decisions in setting priorities among cluster initiatives in terms of their contribution to regional RTD objectives.

4.3 Use of ICRs as a communication tool

Intellectual capital reports can potentially be used as a communication tool. Over and above conventional marketing documents, they illustrate the intangible assets of a network as a central resource and benefits for members and partners. Moreover, documenting the process and outcome of intellectual capital reporting demonstrates the network's ability and willingness to engage in a process of self-reflection and change.

Bearing in mind these core messages of an ICR, the **target groups** are potential partners or members, including firms, research institutions and other networks in related technology fields. They can, for example, learn about the present spectrum of membership, interaction among members, current management resources, and the network's regional embeddedness. ICRs can also support internal communication with registered members of cluster and network initiatives. ICRs provide them with information about existing network facilities, their current use and the potential benefits of using them more often.

In many cases it is advisable to develop a **specific format** for a marketing-oriented ICR to focus the message and increase the ease of reading of the original report. This “external layout” can involve a reduction of data, the inclusion of narrative examples or members' testimonials and a prominent role for visual elements (e.g. charts).



Example

Marketing layout

For PCCL, the ICR report offered a good opportunity to present its relevance as a R&D institution for the region to the general public. In order to attain this goal, a short, 12-page version of has been prepared by PCCL in cooperation with JOANNEUM RESEARCH. A layout design suitable for public relations purposes has also been developed by PCCL.

5. Annex

5.1 Material for preparing an ICR

Table 10
Checklist on requirements and process
of preparing an ICR

Requirements			
Institutionalized network (management, membership)		<input type="checkbox"/>	
Technology or knowledge orientation of the network		<input type="checkbox"/>	
Necessary time resources of network management and members to participate in process (workshops, provision of information)		<input type="checkbox"/>	
Additional funds for external moderation where applicable		<input type="checkbox"/>	
Readiness of network management and members to engage in process		<input type="checkbox"/>	
Openness for (internal) disclosure and discussion of results		<input type="checkbox"/>	
Steps	Approx. working days ²⁵	Deadline	Finished
0. Getting started			<input type="checkbox"/>
Formal decision and information of members	2		<input type="checkbox"/>
Nomination project manager and members of working group	1		<input type="checkbox"/>
Briefing on role of ICR	1		<input type="checkbox"/>
1. Definition of network objectives			<input type="checkbox"/>
Preparation of workshop I	4-5		<input type="checkbox"/>
Organisation of workshop I (participants: network management and working group)	2-3		<input type="checkbox"/>
Documentation of workshop I	2-3		<input type="checkbox"/>
2. Identification of intellectual capital			<input type="checkbox"/>
3. Documentation of interrelations			<input type="checkbox"/>
4. Derivation of indicators			<input type="checkbox"/>
Preparation of workshops II + III	4-5		<input type="checkbox"/>
Organisation of workshops II + III (participants: network management and working group)	2-3		<input type="checkbox"/>
Documentation of workshops II + III	2-3		<input type="checkbox"/>

Steps	Approx. working days ²⁵	Deadline	Finished
5. Data gathering			<input type="checkbox"/>
Designing questionnaire (members survey)	4-10		<input type="checkbox"/>
Distribution and collection of questionnaire	2-5		<input type="checkbox"/>
Data entry (spreadsheet)	5		<input type="checkbox"/>
Data analysis	8-10		<input type="checkbox"/>
Designing data sheet (network management)	1-2		<input type="checkbox"/>
Data research and entry	1-10		<input type="checkbox"/>
Analysing data sheets	4		<input type="checkbox"/>
6. Assessment of status quo; interpretation of data			<input type="checkbox"/>
Preparation of workshop IV	4-5		<input type="checkbox"/>
Organisation of workshop IV (participants: network management and working group)	2-3		<input type="checkbox"/>
Documentation of workshop IV	2-3		<input type="checkbox"/>
7. Finalization of the ICR			<input type="checkbox"/>
Authoring of the ICR document	8-10		<input type="checkbox"/>
Discussing the ICR document (network management, external moderation) where applicable	2		<input type="checkbox"/>
Production of ICR document	2		<input type="checkbox"/>
Presentation	2		<input type="checkbox"/>

²⁵ Calculation based on pilot - applications depending on specific conditions in cluster and network initiatives.

Table 11
Stages of development

	Initiation and development	Growth	Maturity	Change
Members	Comparatively small group of committed members	Growth of membership. Differentiation of activity levels	Questioning of objectives and benefit: Change in composition of members	In case of successful reorientation of network: increase in membership and motivation
Objectives and measures	Shared vision and objectives	Communication of objectives towards new members	Review of objectives	Reformulation of objectives within change process
Organisation	Installation of network management for coordination purposes	Consolidation of organisational structure	Changes in structure and processes due to further development of objectives and activities	Fundamental change of organisational structure. Development of self-supporting structures (sustainability)
Competencies	Development of prerequisites (objectives, organisation, processes) for joining and developing competencies	New members fill gaps in value chain. Active networking supports development of members' competencies	Development of trust. Close and adequate cooperation of partners	Successful competencies are identified and reinforced. Network opens itself for new developments, e.g., in the context of change processes

Source: Bundesministerium für Bildung und Forschung (2004): Kompetenz mobilisieren –ein Leitfaden für Manager von Kompetenznetzen. Adapted.

Table 12
Environmental Forces based on the SEPT formula (Step 1)

	Environmental forces	Exemplary indicators
Social trends	Social and lifestyle factors	Consumer values, needs and wants
		Psychographic profiles
		Education levels
		Social issues and priorities
		Special-interest group
	Demographic patterns	Age, family, household, ethnic structures and trends
		Regional and national migration
		Labour force structure and trends
Economic trends	Economic conditions	Macroeconomic trends (GNP, trade, inflation)
		Microeconomic trends (wages, consumer spending)
		Regional and national variations
		Economic Structure
	Market forces	Specific customer wants, needs, spending
		Shopping and distribution patterns
	Competition	Changes in industry structure (mergers, acquisition)
		Sources of new/substitute competition
		Sources of competitive advantage
Political trends	Political and regulatory forces	Geopolitical trends and blocs
		Political policy shifts (privatization, deregulation)
		Governmental expenditures, deficits
		Specific regulations and government policies
	International relations	Levels of tension, conflict
		Trade and protectionism
		International monetary system, exchange rates
Technological trends	Technological forces	Basic research trends
		Emerging technologies
		Technological Infrastructure
	Natural resources	Energy prices and availability
		Raw materials
		Land use
	Physical environment	Air/water/land pollution trends
		Environmental quality issues (global warming)

Source: Fahey, L., Randall, R. (1998): Learning from the Future.

Table 12
Intellectual capital of cluster and network initiatives
and their definition (Step 2)

IC Dimension	Assets	Definition	Rationale	Indicators
Human capital	Knowledge base	Profile of network member organisations and employees (in general and those involved in network activities)	Profile of member organisations and their employees reflect the potential stocks of knowledge of the network	Fields of activity (e.g., research, training/education, companies in technology field, other companies, other non-profit or public institutions) Location of network members (region, country) Number of employees Share of employees with university degree
	Innovation capacity	R&D and innovation activities of network member organisations	R&D and innovation lead to the creation and application of knowledge. New products, processes and services lead to enhanced competitiveness (Porter 1990)	Share of R&D employment R&D expenditure (as share of turnover, researcher...) Introduction of new products/processes/services
	New capabilities and training opportunities	Institutionalised learning capacities for employees of network member organisations provided by network management	Provision of possibilities to acquire knowledge in knowledge-intensive network leads to informal knowledge diffusion and enhanced social capital (Hartmann 2003, Keeble et al. 1999), increasing the individual's access to new insights	Share of employees obtaining certificates due to training offered or initiated by network management
Rational capital	Sound embedding in regional and national innovation system	Links to relevant innovation policy stakeholders outside the network	Links contribute to value creation in the network as they provides access to relevant external knowledge such as content and funding of new R&D programmes (Lawson et al. 1999)	Involvement of external stakeholders in networking activities Number of delegations to the network organisation
	Cooperation with other networks, clusters or single organisations	Links with relevant external stakeholders in the field of work of the network	External cooperation can help provide access to new stocks of knowledge unavailable in the network (Dodgson 1996)	Number of cooperation agreements with other networks

IC Dimension	Assets	Definition	Rationale	Indicators
Structural capital	Inter-organisational learning	Learning of network member organisation employees in joint activities of network member organisations	Interorganisational learning contributes to the creation of new knowledge, increased adaptability in response to external trends enhancing the long-term competitiveness of the network (Hartmann 2003, Keeble et al. 1999)	Share of network members taking part in joint R&D projects Share of members satisfied with provision of scientific and technological knowledge within network
	Interrelations and partnerships	Interrelations and partnerships between network member organisations	Interrelations and partnerships arise from repeated co-operation and can enhance competitiveness through division of labour, knowledge spill-overs and risk reduction (Tichy 1998)	Participation in networking events (i.e., workshops, working groups) Existing cooperation agreements with other network members
	Common ties, norms and mutual trust (“social capital”)	Common ties, norms and mutual trust (“social capital”) between network member organisations	Common ties, norms and mutual trust enable firms to co-operate closely, fostering knowledge diffusion in the network (Dodgson 1996)	Share of network members voluntarily and actively taking part in network activities Share of members involved in repeated cooperation in R&D Share of members leaving the network Average share of network members with which a network member maintains regular contacts (at least three times per year) (customer-supplier relationship, R&D, other [e.g., information exchange])
	Common infrastructure and services	Infrastructure and services available for network members only (“club goods”)	Provision of club goods helps foster the creation and diffusion of knowledge and the division of labour (Bellandi 1996)	Existing common infrastructure and services (e.g., training facilities, laboratories, project management, marketing services)
	Management capacity and institutionalization	Network management activities and procedures	Ensure effectiveness and “functioning” of network by creating framework conditions for long-term co-operation and hence potential for sustained competitiveness (Balling 1997)	Number of management decisions based on explicit rules and procedures Number of employees in network management Profile of employees in network management (business administration, engineering)

Sample questionnaires (Step 5)

RICARDA

Sample
questionnaire



INTELLECTUAL CAPITAL REPORT 2005

QUESTIONNAIRE FOR PCCL-MEMBER ORGANISATIONS

This questionnaire collects information required by Joanneum Research, Institute of Regional and Technology Policy, to prepare an Intellectual Capital Report (ICR) for the PCCL and thus apply the existing version of the methodology for preparing ICRs for knowledge intensive networks, which is developed within the EU framework project RICARDA (*Regional Intellectual Capital Reporting. Development and Application of a Methodology for European Regions* - www.ricarda-project.org). Intellectual capital reports (ICRs) allow to monitor stocks of knowledge, their development and contribution to strategic objectives.

The questions in this survey cover different aspects related to knowledge within the PCCL at the organisational level.

Person we should contact if there are any queries regarding the survey:

Name:

Organisation:

Function:

Phone:

Fax:

E-mail:

Practical note: Yearly data shall either be supplied covering the financial year or the calendar year.



1. General information

1.1. What was your organisation's total turnover (excluding VAT) in:

2003.	(in 1000 €)
2004.	(in 1000 €)
2005.	(in 1000 €)

1.2. What is the estimated share of your organisation's costumers/business contacts per regions in:

	Styria	Upper Austria	all other Austrian federal states	other
2001.	%	%	%	%
2002.	%	%	%	%
2003.	%	%	%	%
2004.	%	%	%	%
2005.	%	%	%	%

1.3. In 2005, did an employee of your organisation participate in industry-relevant bodies?

yes	no
<input type="checkbox"/>	<input type="checkbox"/>

If no, go to section 2., otherwise:

1.4. How many participations in industry relevant bodies occurred?



RICARDA

Sample
questionnaire



2. Employees

2.1. What was the average number of employees in your organisation:

	with university degree.		in total.	
	head count	full time equivalents	head count	full time equivalents
in 2001.				
in 2002.				
in 2003.				
in 2004.				
in 2005.				

2.2. At present, what is the number of employees according to the highest education level attained?

	head count	full time equivalents
a university degree		
education that qualifies for university		
(compulsory) secondary education		
total		

2.3. In 2005, what was your organisation's expenditure on human resources management activities (e.g. internal and external trainings, sabbaticals,...)?

(in 1000 €)

2.4. Does an employee suggestion system exist in your organisation?

yes	no
<input type="checkbox"/>	<input type="checkbox"/>

If no , go to section 3., otherwise:

2.5. In 2005, what was the number of employees that gave suggestions via the employee suggestion system?

3. Innovation and R&D

3.1. For each of the past 5 years, did your organisation participate in actions of the framework programme of the EU?

	yes	no
2001	<input type="checkbox"/>	<input type="checkbox"/>
2002	<input type="checkbox"/>	<input type="checkbox"/>
2003	<input type="checkbox"/>	<input type="checkbox"/>
2004	<input type="checkbox"/>	<input type="checkbox"/>
2005	<input type="checkbox"/>	<input type="checkbox"/>

3.2. What is the current number of R&D¹ employees in your organisation?

head count full time equivalents

3.3. Did your organisation introduce²:

	2003		2004		2005	
	yes	no	yes	no	yes	no
new or significantly improved goods (exclude the simple resale of new goods purchased from other enterprises and changes of a solely aesthetic nature).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
new or significantly improved services.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If no to the first option in each year, go to question 3.5., otherwise:

3.4. Who developed these product innovations?

mainly your enterprise or enterprise group	<input type="checkbox"/>
your organisation together with other institutions	<input type="checkbox"/>
mainly other institutions	<input type="checkbox"/>

¹ According to the Frascati-Manual of the OECD from 2002 „Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications.”

² In accordance with the Fourth Community Innovation Survey (CIS IV) “A product innovation is the market introduction of a new good or service or a significantly improved good or service with respect to its capabilities, such as improved software, user friendliness, components or sub-systems. The innovation (new or improved) must be new to your enterprise, but it does not need to be new to your sector or market. It does not matter if the innovation was originally developed by your enterprise or by other enterprises.”



RICARDA

Sample
questionnaire



3.5. Did your organisation introduce³:

	2003		2004		2005	
	yes	no	yes	no	yes	no
new or significantly improved methods of manufacturing or producing goods or services.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
new or significantly improved logistics, delivery or distribution methods for your inputs, goods or services.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
new or significantly improved supporting activities for your processes, such as maintenance systems or operations for purchasing, accounting, or computing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If no to all options, go to question 3.7., otherwise:

3.6. Who developed these process innovations?

mainly your organisation	<input type="checkbox"/>
your organisation together with other institutions	<input type="checkbox"/>
mainly other institutions	<input type="checkbox"/>

3.7. What was the expenditure for the following innovation activities (in 1000 €)?

	2003	2004	2005
R&D expenditure (in-house R&D including capital expenditures on buildings and equipment specifically for R&D)			
Acquisition of R&D (extramural R&D)			
Other innovation expenditure (acquisition of machinery, equipment and software - exclude expenditures on equipment for R&D)			
Acquisition of other external knowledge (e.g. sector-specific publications, participation at trade-fairs and congresses, external consultants providing input not directly attributable to innovation,...)			

3.8. During the three years 2003 to 2005, did your enterprise:

	yes	no
apply for a patent.	<input type="checkbox"/>	<input type="checkbox"/>
register an industrial design.	<input type="checkbox"/>	<input type="checkbox"/>
register a trademark.	<input type="checkbox"/>	<input type="checkbox"/>
claim copyright.	<input type="checkbox"/>	<input type="checkbox"/>

If no the first option, go to section 4, otherwise:

3.9. In 2005, what was the number of patents granted:

- at the national patent office.
- at the EPO.

³ In accordance with the Fourth Community Innovation Survey (CIS IV) "A process innovation is the implementation of a new or significantly improved production process, distribution method, or support activity for your goods or services. The innovation (new or improved) must be new to your enterprise, but it does not need to be new to your sector or market. It does not matter if the innovation was originally developed by your enterprise or by other enterprises. Exclude purely organisational innovations."

4. PCCL

4.1. In 2005, were you satisfied with the scientific and technological knowledge provided within the network?

very satisfied	satisfied	dissatisfied	very dissatisfied
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.2. Do you have suggestions to improve the provision of scientific and technological knowledge within the network?

4.3. Which of the following infrastructure provided by the network management did you use in 2005?

access to laboratory	<input type="checkbox"/>
website	<input type="checkbox"/>
project management services	<input type="checkbox"/>

4.4. For 2006, what would be your estimated demand for experts in polymer engineering and science?



RICARDA

Sample
questionnaire





Intellectual Capital Report for VDC: Questionnaire for VDC members

VIRTUAL DIMENSION **CENTER**



Please return by **10.11.2006**:

Virtual Dimension Center Fellbach w. V.
Auberlenstraße 13
70736 Fellbach

PER FAX: 0711/585309-19

Address any queries to:

Daniel Zwicker-Schwarm, Difu, Tel. 030/39001-154; Email zwicker-schwarm@difu.de

Holger Floeting, Difu, Tel. 030/39001-221; Email: floeting@difu.de

This questionnaire collects information for developing an Intellectual Capital Report for VDC Fellbach. This report will substantially contribute to VDC's strategy development. Intellectual Capital Reports document an organisation's intellectual capital with the help of qualitative and quantitative indicators.

The intellectual capital report is being prepared by the Deutsche Institut für Urbanistik (Difu) in close cooperation with VDC in the EU project RICARDA (www.ricarda-project.org).

The information is treated confidentially. It will only be published as aggregated data. If you cannot supply concrete numbers please give us an estimate. The Difu project team will be happy to answer any questions.

After completion, VDC will present the results at a meeting. You will also receive a written copy of the results.

Please support this important project of great importance for VDC's future work by answering this questionnaire!

1. General information

1.1 To which category does your organisation belong¹? (please choose one category only)

- ☐ Research/technology transfer in virtual reality (VR) / collaborative engineering (CE)
- ☐ Training and further education in VR/CE
- ☐ Provider VR/CE (software, hardware, consulting)
- ☐ User or potential user of VR/CE
- ☐ Other company
- ☐ Other non-profit-making or public institution
- ☐ Other:

1.2 What was the annual turnover (without VAT) of your organisation in 2005?

..... (in € 1000)

1.3 Is your main market area ...

- ☐ Region Stuttgart (Stadt Stuttgart und Landkreise BB, ES, GP, LB, WN)
- ☐ The rest of Baden-Württemberg
- ☐ The rest of Germany
- ☐ Abroad

1.4 What was the average number of employees in your organisation in 2005?

..... (number) (converted in full time equivalents)

¹ This questionnaire uses the term organisation to cover the different VDC members: private companies, public entities etc. If your organisation is part of a larger group please answer for that part which is a formal member of VDC.

1.5 What proportion of employees have a university degree?

- ☐ up to 20 %
- ☐ 21-40 %
- ☐ 41-60%
- ☐ 61-80%
- ☐ above 80%

2. Innovation and R&D

Please continue with question 3.2 if your organisation belongs to the category "Other company"/"Other non-profit-making or public institution"/"Others".

2.1. Has your organisation participated in the EU framework programme for research and technological development during the last 5 years?

- ☐ Yes
- ☐ No
- ☐ Do not know

2.2. How many employees of your organisation are involved in R&D²?

..... (number) (converted in full time equivalents)

2.3 In the period 2003-2005 did your organisation introduce one of the following product (goods and services) innovations? Please give an example.

New or significantly improved **goods**

- ☐ No
- ☐ Yes, e.g.,

New or significantly improved **services**

- ☐ No
- ☐ Yes, e.g.,

If no to both options, please go to question 2.6!

2.4 What was the share of these product (goods and services) innovations in your total turnover in 2005?

- ☐ up to 20 %
- ☐ 21-40 %
- ☐ 41-60%
- ☐ 61-80%
- ☐ above 80%

2.5 Who developed these product innovations?

- ☐ Mainly your enterprise or enterprise group
- ☐ Your enterprise together with other institutions
- ☐ Mainly other enterprises or institutions
- ☐

² Research and experimental development (R&D) comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, to increase the use of this knowledge for new applications, as new products or processes.





2.6 In the period 2003-2005, did your institution introduce one of the following process innovations? Please give us an example.

New or significantly improved methods of manufacturing or producing goods or services

☐ No

☐ Yes, e.g.,

New or significantly improved logistics, delivery or distribution methods for your inputs, goods or services

☐ No

☐ Yes, e.g.,

New or significantly improved supporting activities for your processes, such as maintenance systems or operations for purchasing, accounting, or computing

☐ No

☐ Yes, e.g.,

If no to both options, please go to question 2.8!

2.7 Who developed these process innovations?

☐ Mainly your enterprise or enterprise group

☐ Your enterprise together with other institutions

☐ Mainly other enterprises or institutions

2.8 Did your organisation in 2003-2005 apply for, ...

	Yes	No
Patent(s)	<input type="checkbox"/>	<input type="checkbox"/>
Trademark	<input type="checkbox"/>	<input type="checkbox"/>
Copyright	<input type="checkbox"/>	<input type="checkbox"/>

2.9 Does your organisation own patents?

☐ ...No

☐ Yes

Number of patents:

3. VDC

3.1 How satisfied are you with the scientific and technological knowledge that can be accessed via VDC?

☐ very satisfied

☐ satisfied

☐ unsatisfied

☐ very unsatisfied

☐ don't know

3.2 Which of the following VDC activities does your organisation use?

	never	occasionally	often	don't know
← Events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Project work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Lease of conference rooms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Demonstration centre (stationary VR-equipment)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Mobile VR-equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Trade fair activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Brokerage of contacts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Internet presence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Newsletter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← WRS' expert database	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.3 How do you perceive the usefulness of the following VDC services for your organisation?

	never	occasionally	often	don't know
← Events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Project work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Lease of conference rooms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Demonstration centre (stationary VR-equipment)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Mobile VR-equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Trade fair activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Brokerage of contacts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Internet presence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Newsletter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← WRS' export database	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.4 Which of the following statements do you agree with?

	agree	don't agree	don't know
← Information exchange with (other) companies and research institutions that are active in the area of VR and CE is important for our own business activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Within VDC there is a high culture of cooperation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← VDC maintains intensive contact with important institutions and decision makers that can support its work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← VDC's cooperation with other networks and clusters opens up new opportunities for our business activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← VDC offers its members diverse and attractive opportunities for communication.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← VDC can help us to continuously monitor general trends in the area of VR and CE (developments, effects on businesses).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← The use of VR and CE in SMEs needs to be improved.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← For our business activities a sound overview of technology trends in VR and KE is of great importance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← As a showcase for the potentials of VR and CE VDC has a special capacity for disseminating these technologies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← We would like to intensify our cooperation with other VDC members.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.5 What ideas do you have for an improvement of VDC's work?

.....

.....

.....

.....

.....

.....

.....





4. Network contacts

4 a. With which of the following VDC members does your organisation have regular contact?

4 b. If there is regular contact: Was this a result of your VDC membership?

	NO regular contact	ad a.)			ad b.)
		Regular contact			Contact result of VDC membership
		as customer/ supplier	R&D	Other (e.g., information exchange)	
← aed e.V.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Akademie f. Kommunikation in Baden-Württ.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Albert Eisele GmbH & Co.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Andreas Stihl AG & Co	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← awaron AG	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Barco GmbH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Bernd Kußmaul GmbH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Berufsakademie Mosbach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Berufsakademie Stuttgart	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Bitmanagement Software GmbH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Bundesamt für Wasserbau	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← CAD-FEM GmbH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Christa Papsdorf	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← CoCoCo GmbH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Delmia GmbH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← DGC - Dr. Grosch Consulting GmbH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← E. Gabriel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Fachhochschule Aalen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Fellbacher Bank eG	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Fraunhofer Gesellschaft IAO/IAT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Fraunhofer IPA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← iason AG internet_edv_datensicherheit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← ICIDO GmbH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← IHK Rems Murr	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← IndustrieHansa Consulting & Engineering GmbH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Industrie- und Handelskammer von Pécs-Baranya	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Industrievereinigung Fellbach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Institut für Umformtechnik IFU	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Käser + Reiner Vermessungsbüro	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Kompetenznetzwerk Mechatronik e.V.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← KOP Real Estate Solutions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Kreissparkasse Waiblingen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Lauer & Weiss GmbH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Madness GmbH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Pininfarina Deutschland GmbH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Porsche AG	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Schenk Engelhardt Lindner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← SGI GmbH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Stadt Fellbach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Stadt Stuttgart	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Stadtwerke Fellbach GmbH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Steinbeis-Transferz. Innovation u. Organisation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Universität zu Köln, ZAIK/ RRZK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Uni Stuttgart, Höchstleistungs-RZ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Vicon Peak	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← VisEnSo GmbH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← Vogel Industrie Medien GmbH & Co. KG	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
← vrcm GmbH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. This questionnaire was answered by:

Name:

Organisation:

City/ Postcode:

Phone:

Fax:

E-mail:

Thank you very much for your cooperation!

RICARDA

**Sample
questionnaire**

VIRTUAL DIMENSION **CENTER**



³¹ Own definitions unless otherwise stated.

5.2 Glossary³¹

Cluster: A basic distinction can be made between economic-statistical clusters and institutionalised clusters. Unlike economic-statistical clusters, institutionalised clusters are established deliberately, comprising firms, R&D institutions and knowledge-intensive business services (KIBS). These organisations co-operate to achieve explicit or implicit network objectives.

Context indicators: Context indicators specify two categories of framework conditions for the network:

- external resources (policy programmes, public funding, etc.)
- general framework conditions (technological trends, demographic changes, etc.).

Cooperation agreement: A cooperation agreement between clusters/networks or member firms states the general willingness to conduct joint projects.

Source: based on Cooke, P. (2006)

Dirigiste system (type of regional innovation system governance): A dirigiste system is mainly directed from outside the system and the region itself. Although there are decentralised units, central government dominates in all aspects of general innovation policy: policy orientation, establishment of the institutional background, funding. Main research competencies are often linked to the needs of larger firms in or beyond the region.

Source: based on Cooke, P. (2006)

Grassroots model (type of regional innovation system governance): In a grassroots model, the innovation system is locally generated and organised (at city or district level) with the active participation of local development agencies and local institutional actors. Financial support and research competences are also located on the local level, and national coordination is limited.

Indicator: An indicator allows factors to be measured that cannot be directly measured, and thus represents an operationalisation.

Industrial district: Industrial districts have no institutionalised coordination of management activities. They are spatially very concentrated (locational coefficient above 1.5) and come into being through favourable environmental conditions or by chance. They grow cumulatively over the years in a process of progressive division of labour, and can reach an impressive size (i.e., 20,000 to 100,000 employees). They are highly competitive on global markets. Positive externalities are generated in labour market effects, technological spill-overs, and input output linkages. Common infrastructure (i.e., test beds, training facilities etc.) provided by industry associations or municipalities can be present.

Source: Questionnaire Third Community Innovation Survey (CIS 4) (2005)

Innovation: An innovation [...] is a new or significantly improved product (good or service) introduced to the market or the introduction within your enterprise of a new or significantly improved process. The innovation is based on the results of new technological developments, new combinations of existing technology or utilisation of other knowledge acquired by your enterprise.

Innovation network: In an innovation network, management activities are coordinated by an institutionalised network management. They come into being

through public RTDI policy programmes (mainly on the regional level but also the national level), and tend not to be spatially concentrated. They are small to medium in size and generally exhibit two phases: a clearly defined publicly funded phase and a steadily growing self-supporting phase financed by member firms. The main focus of activities is technology transfer and technology demonstration.

Intangible assets: Intangible assets contribute to the objectives of an organisation but are not physical or monetary. The three components of intellectual capital are:

Source: Edvinsson, L.; Malone, M.S. (1997), adapted

- **Human capital:** The knowledge brought to the network by its member organisations. It includes peoples' skills, experience and abilities. Specific attention is paid to those individuals who are actively involved in network activities.
- **Structural capital:** The opportunities and instruments that serve the exchange and documentation of knowledge (databases, intellectual property, organisational culture, process organisation, etc.). Structural capital allows knowledge to be codified to some extent, giving a certain degree of independence from knowledge held by individuals. Some of it may be legally protected and become intellectual property.
- **Relational capital:** All resources linked to the external relationships of cluster management such as other R&D institutions, networks, non-member firms or policy makers, etc.

Intellectual capital: Intellectual capital refers to intangible assets, which contribute to attaining the objectives of an organisation but are not physical or monetary (see above).

Intellectual capital report (ICR): Intellectual capital reports describe intellectual capital by monitoring the development and the outcomes of intangible assets via indicators. ICRs are developed in a team-based formulation process. Internally, they can act as management tools for achieving strategic network objectives and externally they can act as communication tools. The internal and external versions of the report may therefore differ.

KIBS – Knowledge Intensive Business Services: Knowledge-intensive business services comprise the following branches: NACE Rev. 1.1 codes 61, 62, 64 to 67, 70 to 74, 80, 85 and 92.

Source: EUROSTAT

Knowledge: Knowledge is structured information about an object or any technique that is deemed suitable to give (structured) information about an object, as well as the techniques themselves, or the results of applying these techniques.

Source: Abbagnano, N.; Fornero, G., Dizionario di Filosofia (2001)

Knowledge is, however, an 'intangible' which is difficult to account for. Knowledge cannot be seen and cannot be described, changed, developed or evaluated. It first must be 'translated' into intangible assets, which can be presented as embodying 'knowledge'. Intangible assets can be described, developed, evaluated and combined in new ways. In short, they can be managed, which means they can be described in an intellectual capital statement.

Source: Danish Ministry of Science, Technology and Innovation (2003)

Knowledge-intensive network: Cluster and network initiatives increase the competitiveness of member firms by increased productivity through the division of labour and hence economies of scale, or by knowledge spill-overs that enhance knowledge diffusion. In a knowledge-intensive network (KIN), the latter effect is a crucial incentive for network members to participate in and to contribute to network activities. A network can be said to be knowledge intensive if the following objectives are particularly considered particularly important: Promoting knowledge creation and enhancing knowledge diffusion.

Managed Cluster: In a managed cluster, management activities are coordinated by an institutionalised cluster management. Managed clusters come into being through network brokerage activities and are usually but not always spatially concentrated. After a development phase (in which the cluster manager endeavours to forge value chains), the cluster typically becomes a self supporting. Belonging to a cluster is then constituted by a formal fee based membership that allows the individual firm for access to common infrastructures, training courses, marketing activities etc.. Sizes do differ quite strongly and do reach from 3,000 to 40,000 employees.

MAP: MAPs are multi-actors and multi-measures RDTI programmes, which provide complex answers to the complex conditions and problems facing innovation systems at the regional, national and local levels. They differ from other RDTI funding programmes and have to fulfil a number of special criteria. The most important features of MAPs are:

- multi-measures at least at the “performer” level (i.e., clusters, competence centres or networks),
- cooperation between multi-actors (i.e., firms, universities, research and technology organisations, intermediaries) from “different worlds” at the performer level
- addressing commonly defined innovation-system problems

Network: A system of at least three (co-operative) actors, their complementary and compatible resources, and their interactions to achieve a collective objective as well as individual objectives of the individual actors.

Network objective: Network objectives represent the strategic and operational orientation of a network. Network objectives can emerge (in spontaneous bottom-up networks) or be deliberately formulated (in networks promoted by public policy). Since a network is interposed between hierarchy and market, network objectives (in the case of externally initiated networks) incorporate the intentions of the regional policy authority most relevant for the network in addition to the objectives network member organisations.

Source: based on Cooke, P. (2006)

Network system (type of regional innovation system governance): A network system is characterized by institutional support encompassing the local, regional, national and supranational levels. Funding is often determined by agreements between various actors (banks, government agencies, and firms). Research competence in a network system is mixed. It includes pure and applied research, exploration and exploitation activities geared towards the needs of large and small firms.

Organisational and marketing innovations: An organisational innovation is the implementation of new or significant changes in firm structure or management methods that are intended to improve a firm's use of knowledge, the quality of its goods and services, or the efficiency of work flows. A marketing innovation is the implementation of new or significantly improved designs or sales methods to increase the appeal of goods and services or to enter new markets.

Source: Questionnaire Fourth Community Innovation Survey (CIS 4) (2005)

Policy learning: Policy learning includes “all those processes by which policy systems generate and incorporate knowledge and understanding about (i) underlying causes and conditions of policies and initiatives (ii) the effects of policy and initiatives. This knowledge is derived throughout the policy cycle and policy learning provides feed-back to all stages”.

Source: Hjelt et al. (2005)

R&D network: In an R&D network, management activities are coordinated by an institutionalised network management. R&D networks come into being through public RTDI policy programmes (mainly at the national level) and are usually not spatially concentrated – sometimes spanning the whole of Europe. They are small to medium in size and exist for a clearly defined lifespan – typically the funding period of the programme concerned. In such networks R&D institutions and firms collaborate on clearly defined R&D projects in the pre-competitive phase. R&D networks usually have joint R&D infrastructures accessible to network members.

Process innovation: A process innovation is the implementation of a new or significantly improved production process, distribution method, or support activity for goods or services. The innovation (new or improved) must be new to the enterprise, but it does not need to be new to the sector or market. It does not matter if the innovation was originally developed by the enterprise or by other enterprises. It does not include purely organisational innovation.

Source: Questionnaire Fourth Community Innovation Survey (CIS 4) (2005)

Product (good or service) innovation: A product innovation is the market introduction of a new good or service or a significantly improved good or service with respect to its capabilities, such as improved software, user friendliness, components or sub-systems. The innovation (new or improved) must be new to the enterprise, but it does not need to be new to the sector or market. It does not matter if the innovation was originally developed by the enterprise or by other enterprises.

Source: Questionnaire Fourth Community Innovation Survey (CIS 4) (2005)

Research and experimental development (R&D): Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications.

Source: Frascati Manual (2002)

R&D personnel: All persons employed directly on R&D should be counted, as well as those providing direct services such as R&D managers, administrators, and clerical staff.

Source: Frascati Manual (2002)

Source: Cote, S.; Healy, T. (2001)

Social capital: Networks together with shared norms, values and understandings that facilitate cooperation within or among groups.

Source: Hellmer (1999)

Stage of development: Networks are not static but underlie continuous processes of change that are triggered endogenously by the development of network members, their interrelations, and their resources/competencies, as well as exogenously by impulses and developments in the network environment. Three stages can typically be distinguished: constitution/growth, stabilisation/operativeness, maturity/change.

Source: Nonaka, I.; Takeuchi, H., (1995)

Tacit knowledge: Tacit knowledge is highly personal and hard to formalize, making it difficult to communicate or to share with others. Subjective insights, intuitions, and hunches fall into this category of knowledge. Furthermore, tacit knowledge is deeply rooted in an individual's action and experience, as well as in the ideals, values, or emotions he or she embraces. To be more precise, tacit knowledge can be segmented into two dimensions. The first is the technical dimension, which encompasses the kind of informal and hard-to-pin-down skills or crafts captured in the term "know-how". [.....] At the same time tacit knowledge contains an important cognitive dimension. It consists of schemata, mental models, and perceptions so ingrained that we take them for granted.

Source: Katzenbach, J. R.; Smith, D. K. (1993)

Team: A team is a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable.

Source: Questionnaire Fourth Community Innovation Survey (CIS 4) (2005)

Turnover: Turnover is defined as the market sales of goods and services (including all taxes except VAT).

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5.4 Members of the RICARDA consortium

Deutsches Institut für Urbanistik (Difu)

Straße des 17. Juni 112
10623 Berlin, Germany

Mr. Daniel Zwicker-Schwarm
Phone: +49-30-39001-154
Fax: +49-30-39001-116
Email: ricarda@difu.de

Mr. Holger Floeting
Phone: +49-30-39001-221
Fax: +49-30-39001-116
Email: ricarda@difu.de

Wirtschaftsförderung

Region Stuttgart GmbH (WRS)

Friedrichstr. 10
70174 Stuttgart, Germany

Mr. Veit Haug
Phone: +49-711-22835-18
Fax: +49-711-22835-888
Email: veit.haug@region-stuttgart.de

Amt der Steiermärkischen Landesregierung, Abteilung 14

Nikolaipplatz 3
8020 Graz, Austria

Mr. Michael R. Azodanloo
Phone: +43-316-601-400
Fax: +43-316-601-455
Email: michael.azodanloo@ic-steiermark.at

JOANNEUM RESEARCH

Forschungsgesellschaft GmbH

Steyrergasse 17
8010 Graz, Austria

Mr. Dr. Christian Hartmann
Phone: +43-316-876-1487
Fax: +43-316-876-1480
Email: christian.hartmann@joanneum.at

KISTA Science City AB

Electrum 209
16440 Stockholm, Sweden

Mr. Mats Hedenström
Phone: +46-87904040
Fax: +46-87516062
Email: mats.hedenstrom@kista.com

Kungliga Tekniska högskolan (KTH)

Valhallavaegen 79
10044 Stockholm, Sweden

Mr. Prof. Dr. Hans Lööf
Phone: +46-87908012
Fax: +46-87909717
Email: hansl@infra.kth.se

West Pannon Regional Development Agency (WPRDA)

Pannon Automotive Cluster Division
9027 Győr
Industrial Park
Gesztenyefa u. 4

Mr. Zoltán Kabács
Phone: +36-96/506-917
Fax: +36-96/506-927
Email: kabacs.zoltan@autocluster.hu

West Hungarian Research Institute of the Centre for Regional Studies (WHRI)

Liszt F. u. 10.
9022 Győr, Hungary

Mr. Dr. Mihály Lados
Phone: +36-96-516-570
Fax: +36-96-516-579
Email: ladosm@rkk.hu



Editor (RICARDA Project Co-ordinator):

Deutsches Institut für Urbanistik (Difu) im
Verein für Kommunalwissenschaften e.V.
Straße des 17. Juni 112
D-10623 Berlin (Germany)

Daniel Zwicker-Schwarm and Holger Floeting
Phone: + 49 (0)30 390 01-154/-221
Fax: + 49 (0)30 390 01-116
Email: ricarda@difu.de

Berlin, November 2007

