International cooperation of Competence Research Centres

Final Report of the COMPERA joint study

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The stimulation of international co-operation in research and innovation receives more and more policy support in the EU countries. A selection of nine partners from the COMPERA ERA-NET have commissioned this study on the needs and opportunities of the individual Competence Research Centres (CRCs) in relation to international co-operation and the barriers that exist at the level of the funding agencies and Ministries in order to respond to these needs.

For CRCs the drivers to engage cross-border collaborations come from the centre’s stakeholders facing various international challenges, from developments within science and technology that ask for critical mass and excellence and from the European, national and regional policy making bodies that see the potential for opening up to international partnerships.

In the nine reviewed countries a clear trend can be seen that stimulating international positioning of the CRCs has become an integral part of the CRC-programmes. A strong international positioning and visibility is seen as an important element of a CRC’s competitive position. A clear and explicit international strategy at the CRCs-programme level does help to push the internationalisation activities a step forward and allows the centres to overcome practical barriers such as allowing some forms of cross-border funding. The Swedish and Austrian competence centre programmes are good examples where explicit internationalisation incentives from the funding agencies Vinnova and FFG have helped centres to integrate international co-operation into their operations.

The CRC-managers do see the potential merits of CRC-CRC co-operation in terms of focusing on a particular geographical area (with strong competences in a thematic domain or strong markets) and working together with another CRC in that area to link the individual members of these CRCs (universities, research institutes and companies). The CRC managers are in principle very customer focused and their first consideration is whether a link with another CRC brings either additional scientific and technological expertise or market access to their companies. As time and management means are scarce (the key barriers according to the survey) this should be a focused effort rather than a more general networking activity.

Nevertheless there still are considerable barriers. Arranging public funding for foreign partners to work within one or more CRCs is still difficult in most countries. Another barrier is the difficulty many CRC-managers and their stakeholders have to identify the right foreign partners and build up a trust relationship with them. Whereas the survey amongst 72 European CRCs showed that the settling of Intellectual Property (IP) is perceived as a large barrier, the case studies showed that the CRCs experienced in international co-operation have found ways to tackle IP issues.

There is a clear pattern in all studied cases considering the development cycle CRCs undergo in terms of engaging into international co-operation. While just established CRCs are mostly engaged with building up trust locally, the most advanced CRCs can already benefit from their international reputation to attract partners. Any policy support for internationalisation should take account of these development stages and not define international co-operation as a goal in itself, but as a means to create added value to the CRC stakeholders. Internationalisation thus becomes an integral part of the CRC’s research and business strategy.

The case studies of individual centres also demonstrate that good practices have been developed throughout Europe. The cases provided examples of centres that have foreign partners (including companies) engaged in the centre’s governance structures and research programming, where long term alliances with foreign universities and research institutes have been established and regulatory bottlenecks have been circumvented by solid partnership contracts.

This study leads to the following recommendations to stimulate international co-operation in CRCs:

1. Funders of CRC programmes should establish clear guidelines as to what level of international involvement of foreign partners in a CRC is on the one hand expected and acceptable;

2. CRCs that have a certain maturity should be asked to define more explicit internationalisation goals and develop activities to achieve this. This could be integrated in their performance indicators. However, this international co-operation should not become a goal in itself but a means to create added
value for the stakeholders of the CRC;

3. National and regional CRC-programme managers could develop a flexible ‘internationalisation’ package that CRC-managers can apply to in a competitive mode. The Vinnova ‘globalisation grant’ could be an example of such a scheme. As internationalisation activities are different for each CRC and in various development stages, the types of activities funded should be defined flexibly;

4. As a European CRC-programme network provide a dissemination platform for CRCs on a thematic basis and link these with existing national platforms for CRCs and thematic cluster initiatives to make the activities and competence areas of CRCs more visible;

5. Use the COMPERA type network to provide more active broker services to CRC-managers seeking specific partners in other countries. This could involve the support of a more active CRC-CRC collaboration, for instance through CRC-management exchange programmes where CRC-managers select a desired partner region or CRC to visit;

6. Explore as ERA-NET potential exchanges of experience and possible bilateral co-operation agreements with similar CRC-programmes in for instance the US, Canada and Australia;

7. Develop more explicit links between the national CRC-programme and existing national services for acquiring EU-funding, export support and agencies responsible for attracting foreign investments to match their activities with the specific needs of the CRCs;

8. Develop short and focused CRC-management training modules on topics such as “how to involve foreign companies in my CRC-organisation”, “good practice in IPR management”. Given that time constraints were a major bottleneck these training modules short be very professionally organised. They could build on the experiences of ‘peers’: the managers of CRCs that have shown to be successful in their international co-operation activities.
THE MAIN MISSION OF COMPERA IS TO DEVELOP USEFUL MECHANISMS THAT FOSTER CO-OPERATION BETWEEN THE CRC-PROGRAMME MANAGERS

POLICY MAKERS AND CRC MANAGERS FIND IT VERY IMPORTANT THAT THE CRCS OPEN UP INTERNATIONALLY

THIS STUDY IS AIMED TO UNDERSTAND THE INTERNATIONAL COLLABORATION ACTIVITIES OF CRCS BETTER

THE SPECIFIC BACKGROUND, SECTORAL SPECIALISATION AND INTERNATIONAL EXPERIENCE INFLUENCE THE LIKELIHOOD FOR A CRC TO ENGAGE IN INTERNATIONAL COLLABORATION
This report provides the results of a study on internationalisation of Competence Research Centres (CRCs), conducted on behalf of COMPERA.

COMPERA, an ERA-NET set up with support from the European Commission, has 16 partners in 12 countries. The objective of the ERA-NET scheme is to step up the co-operation and coordination of research activities carried out at national or regional level in the Member States and Associated States through the networking of research activities conducted at national or regional level, and the mutual opening of national and regional research programmes. In the case of COMPERA the focus of co-operation is on Competence Research Centre (CRC) managers. The COMPERA definition of CRCs is “structured, long term Research Technological Development and Innovation (RTDI) collaborations in strategic important areas between academia, industry and the public sector”.

The main mission of COMPERA is to develop useful mechanisms that foster co-operation between the CRC programme managers. COMPERA is targeted towards the creation of a sustainable network of programmes that are funding Competence Research Centres. It should lead to a strategic decision-making of programme owners and managers at pan-European level with regard to Competence Research Centres. These centres aim to bridge the gap between technological and economic innovation by providing a collective environment for academics and industry and sufficient critical mass. Their activities are multiple: pooling of knowledge, creation of new knowledge by performing different types of research, training and dissemination of knowledge.

Most of the COMPERA partners are STI agencies that foster CRCs. Other partners are technology associations, STI departments and regional development organisations. The variety in partners mainly concerns the geographic scope (national versus regional) and the organisational position (ministry, regional development agency or STI agency). Nevertheless, the goals of the partners are similar, namely closing the gap between research and successful application. The partners use a variety of approaches and measures, ranging from competence centres in a specific thematic field, to bottom-up generic programmes.

Nine of the COMPERA partner organisations are participating and have funded this study:

- IWT, Flanders (Belgium)
- FFG, Austria
- Vinnova, Sweden
- InnoBasque, Basque Country (Spain)
- Enterprise Estonia, Estonia
- Ministry of Higher Education, Science and Technology, Slovenia
- VDI TZ, Germany
- Invest Northern Ireland, Northern Ireland (United Kingdom)
- Generalitat Valenciana, Valencia, (Spain)

Policy makers and CRC managers find it very important that the CRCs open up internationally. This study is aimed to understand the international collaboration activities of CRCs better, their motivations, rationales as well as the barriers and opportunities for this collaboration.

This report is based on a set of research activities to understand international co-operation between:

- A general overview on the debate on internationalisation of R&D and deriving from that a typology of international collaborations;
- A survey and interviews in the COMPERA community on the needs, opportunities and barriers for cross-border collaboration between CRCs;
- Eight case studies of competence centres that serve as an illustration for good practices in international collaboration.

In the Swedish case, VINNOVA asked us not to send out a survey but to re-use information it had collected via an expression of interest for its new Global Links programme. Sweden does not therefore form part of the survey analysis, but we refer to the VINNOVA material as appropriate in the study.

The study looked at different levels of stakeholders that all influence the outlook towards international collaboration. At the centre of the study are the individual
CRCs and their management bodies. They represent the community of public and private research performers who perform collaborative research in their different localities. These individual research performers or participants of the CRC research are another layer. Their specific background, sectoral specialisation and international experience influence the likelihood for a CRC to engage in international collaboration.

In many COMPERA countries individual CRCs are part of a broader CRC programme, implemented through various agencies that interact with the individual CRCs. Finally, public funders of CRC programmes mostly set the rules of the game, which could be either very favourable to cross-border co-operation or (unintentional) restrictive.

Figure 1 illustrates these levels and their (potential) interactions. While the focus of the study will be on the middle levels of the CRC programmes and individual CRCs, the role and influence of the other stakeholders need to be taken into account in the generic study and the cases.

The selection of case studies is based on desk study, the interviews with programme managers, and the survey. The programme managers gave relevant suggestions in which cases might be most interesting, the survey retrieved information on the amount of co-operations of each CRC, and gave insight in what were considered best practices according to the CRC managers. The following set of criteria were used to select case studies:

- the number of co-operations;
- the visibility of the co-operations to the programme managers;
- a good geographical spread;
- a mix of virtual and physical CRCs;
- a mix of regional and national CRCs;
- a mix of different instruments
- a mix of EU co-operations and co-operations with third countries (i.e. extra-EU co-operation)
- the extent to which CRCs are internationalised.

However, the CRC needs at least to have some international co-operations, to serve as a good case. In every participating country, we found CRCs with potential for a case study. The selection of cases was based on geographical spread, the number of co-operations (survey) and the visibility to the programme managers (interviews); Appendix C gives an overview of the selected case studies. The full results of the case studies are given separately in a final Chapter as each contains a quite varied story about its development and the international collaboration activities.

The report is structured as follows. Chapter 2 discusses the emerging discussion on international co-operation in science and technology policy and the (external) drivers behind this trend. Chapter 3 elaborates on internationalisation in CRC programmes in the COMPERA - group and some CRC programmes in other non-EU countries. Chapter 4 provides characterisations of the CRCs based on a survey of CRC-manag;
ers and eight case studies of individual CRCs. Chapter 5 discusses the experiences with internationalisation in practice, its drivers, barriers and the effects. Chapter 6 gives the conclusions on the material and the recommendations for future Action for COMPERA and CRC-programme managers. The complete case eight studies are described in Chapter 7.
WELL CO-ORDINATED RESEARCH PROGRAMMES COULD BE ACHIEVED THROUGH BETTER JOINT PROGRAMMING BETWEEN MINISTRIES AND AGENCIES ACROSS EUROPE.

IN THE ARENA OF PUBLIC-PRIVATE CO-OPERATION, CROSS-BORDER CO-OPERATION ON THE PROGRAMME AND CENTRE LEVEL FACE MORE POLITICAL BARRIERS THAN IN FUNDAMENTAL AND ‘SOCIETAL’ RESEARCH.

EUROPEAN COUNTRIES INCREASINGLY HAVE A HIGH LEVEL INTERNATIONALISATION STRATEGY IN PLACE.

THE EMERGENCE OF INTERNATIONALISATION IN CRCS IN EUROPE IS RATHER SIMILAR TO THE DEVELOPMENTS IN AUSTRALIA, CANADA AND THE USA.
International co-operation in research policy is a discussion where the European Commission has played a dominant role, particularly in the context of the Lisbon agenda and the European Research Area. The ERA Green Paper particularly suggested more well-coordinated research programmes and priorities across member States and also a wide opening of ERA to the rest of the world. The well-coordinated research programmes could be achieved through better joint programming between ministries and agencies across Europe. The ERA-NETs were meant to facilitate this process. For CRCs this could for instance mean the co-design of CRC programmes between two or more countries, with access to each other’s programmes and centres for all potential partners. In the summer of 2008 the Commission published a Communication on Joint Programming. Joint Programming is portrayed as “a voluntary process for a revitalised partnership between the Member States based on clear principles and transparent high-level governance.” The Communication made a plea for more intensive use of Joint programming and to move beyond the compartmentalised research landscape. The document states: “the multitude of national procedures complicates cross-border programmes and discourages internationally oriented research actors from accessing research funding across borders.”

The focus of the ERA discussion is on public-public collaboration and fundamental science, but the door is kept open to include public-private co-operation and applied research as well. Today’s spotlight of Europe’s Joint Programming discussion on is on tackling Societal Challenges, such as Ageing Society, Alzheimer’s disease, Food for a growing world population and Water scarcity. In the arena of public-private co-operation, the joint programming and international collaboration policy debate is less clear and national industrial and strategic interests come to the surface in platforms such as the “High Level Group for Joint Programming” set up by the EU Member States. The CRCs are also in this arena and the COMPERA study so far shows that cross-border co-operation on the programme level and the centre level face more political barriers (see Chapter 2) than fundamental and ‘societal’ research.

A related discussion is that of ‘opening up’ of national programmes. If states allow participants from other countries to participate, while funding is arranged in the country of origin, administrative barriers for cross border collaboration would diminish. This process is still far from reality. The ERA Expert Panel Optimising Research programmes and Priorities concluded that obstacles and limits for more trans-national collaboration are twofold. Some arguments are based on the overestimation of the benefits of collaboration (e.g. due to the expected increased transaction costs resulting from the collaboration), others are based on the regional perspective of the member states and the limits of current legislation.

A study for DG Research by Optimat Ltd & VDI/VDE-IT based on a survey of over 300 European RTD programmes found the following four most prevalent barriers to the inclusion of trans-national elements in national and regional programmes:

1. National or regional policy for science and innovation is based on improving national or regional scientific and technological capacity to address own priorities; this is particularly the case in larger economies;

2. Sufficient volume of high quality proposals is received from national applicants. Fear of even larger ‘oversubscription’ to national or regional programmes limits the enthusiasm for opening them up to non-residents;

3. Often, the (national/regional) programmes do not have any explicit criteria that encourage trans-national activities. Without these explicit incentives to involve foreign partners, users are less inclined to involve them;

4. The legal constitution for public funding of the research programme as a general rule forbids the transfer of funds to non-residents. The study also

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points out that on this issue there seems to be a lack of understanding from programme managers whether this is genuinely a legal constitutional barrier or the consequence of governance designed by policy makers.

These are mostly issues at the level of R&D programmes. Chapter 3 and 4 will discuss how this applies to specifically CRC programmes and centres.

In addition to the debate on internationalisation of R&D programmes, the European Commission has also been instrumental in promoting the internationalisation of clusters. The European Cluster Alliance was established in 2006 and aims at becoming the single place at EU level for elaborating new ideas and practical tools for improving cluster policy in Europe and for fostering European co-operation at policy level that will facilitate the further development of more competitive world-class clusters in Europe. Several cluster related INNO-Nets have been formed for this purpose, connecting regions, innovation agencies and member states to exchange practices and develop common policies. The focus of their work is on cluster policy rather than CRCs as centres. The 2009 Entrepreneurship and Innovation work programme (EIP) list transnational cluster co-operation as one of the intended topics for INNO-NET establishment.

There are a number of external trends that form drivers for increased international S&T collaboration and which have triggered the policy debate.

- The emergence of the BRIC countries and particularly China as a country with a large research and technological development capacity that is becoming recognised for meeting high international quality standards
- The increased political debate and urgency of global challenges such as climate change, health issues and sustainable energy resources
- The globalisation of R&D, which is not a new phenomenon, but it is becoming more visible particularly in industrial research and also in the world wide mobility of researchers
- Particularly in Europe, general demographic developments and the decreasing share of graduates in science and engineering have made the shortage of research talent very urgent; STI collaboration can be used to attract talent from partner countries
- The increased policy debates and ambitions in Europe to provide more critical mass and international profile to research excellence, in which partnering with the best plays a big role. The discussion on the European Research Area and the position Europe should play in the global arena has also spurred more discussion on the topic.

An extensive study was done on behalf of DG Research on the role of internationalisation in S&T policies in EU and non-EU countries. European countries increasingly have a high-level internationalisation strategy in place, sometimes as part of a general globalisation strategy. Examples are Germany, and the Republic of Ireland. Others are in the process of defining such a strategy. The DG Research study found that despite this enormous interest in strategy building, many of these strategies do not appear to be direct drivers of policy action at present, and strategy development and implementation remains more of a promise than a reality in most of the European countries. The policy drivers highlighted by these internationalisation strategies are broadly similar from country to country. In general, the most important drivers as documented in the literature are: strengthening (domestic) research excellence through access to existing excellence and facilities abroad, to increase the attractiveness of domestic systems to overseas researchers (inward mobility), preparing the ground for domestic innovations to be marketed abroad, and to contribute to the solution of global challenges. However, countries are also at least in principle aware of the risks of engaging in international activities, such as those around IPR issues, ‘brain drains’ or the outward relocation of key companies to other countries.

There is some evidence that governments are less actively pursuing outward technology links for domestic firms than they are attempting to attract inward investment and mobility. Policy makers continue to struggle to find a balance between the promotion of beneficial internationalisation and firmly embedding both domestic and inwardly mobile companies and research organisations within the national research and innovation system. Only limited data is available about the ‘openness’ of nationally funded research and technology development programmes to overseas partners. That data which does exist suggests that the share of the budgets that are spent on international activi-

5 See: http://www.proinno-europe.eu/
7 Ibid.
ties within national programmes is still low even where they are open in principle. There is some evidence that universities and research institutes may be more ready and willing to internationalise than are companies, suggesting that universities and institutes could play an important role in linking different national research and innovation systems.

Some European countries are adopting explicit internationalisation strategies. Finland’s Science and Technology Policy Council adopted such a strategy already in 2004. This has led the Finnish Academy to extend the scope of its international funding and TEKES to ‘mainstream, internationalisation activities into its technology programmes’. In Sweden, VINNOVA adopted an internationalisation strategy in 2009, aiming to strengthen Swedish research and competitiveness through increased European and global co-operation, including the development of focused bi- and multilateral programmes with countries of interest and internationalisation of its technology programmes. This is reflected in a specific ambition to internationalise its CRC programme in the future.

Our literature review suggests that internationalisation in CRC type programmes also occurs outside Europe.

In the Australian Co-operative Research Centres, CRCs are “encouraged to engage globally. Co-investment with international organisations is particularly encouraged”10. Furthermore, rules underlying the programme, address obligations including: compliance with relevant national, and, if relevant international, research integrity, ethics codes and guidelines. There are CRCs with international partnerships. The CRC Care for instance, co-operates with a similar organisation in China, but partnerships are mostly formed at the level of individual members. Although the CRC programme is not very explicit in its strategy towards internationalisation, the individual CRCs succeed in having international partnerships. Several CRCs co-operate with foreign partners. International co-operation is however not a core activity of CRCs: a limited number of partners are included per CRC and the partners are not core members of the CRCs.


The Global Carbon Capture and Storage Institute is a new initiative aimed at accelerating the worldwide commercial deployment of large-scale CCS. It was set up mid 2009. The Australian Government has committed AUD100m (€62.5m) annual funding for the Global CCS Institute. This should ensure the ongoing success of the institute. GCCSI has international support, with more than 20 national governments and over 80 leading corporations, non-government bodies and research organisations signing on as foundation members or collaborating participants. The goal of the GCCSI is to “draw together information, knowledge and expertise to (...) play a pivotal role in facilitating the development and deployment of safe, economic and environmentally sustainable commercial-scale CCS projects”.

There is a broad base of international interest in carbon capture storage, because the G8 countries have committed to the development of 20 large-scale CCS projects, to be in operation by 2020. This provides a base of confidence to take CCS forward thus limiting the risk of setting up of such a large-scale centre. The Global CCS Institute aims to play a vital role in developing the partnerships needed to make demonstration projects a reality. GCCSI puts particular importance on capacity building activities in emerging market economies. A practical goal of the institute is to realise demonstration projects. The projects of GCCSI are thus highly applied and the number of research institutions limited.

Already a range of organisations is working in collaboration with the GCCSI. Close collaborative partnerships are already established (sometimes involving financial commitments) with large international organisations first, such as the International Energy Agency (IEA), Carbon Sequestration Leadership Forum (CSLF), World Bank, and The Climate Group. Once these partnerships are in place, the Global CCS Institute will begin building strategic alliances with other stakeholders.

1 The impressive list of (foundation) members of GCCSI is downloadable at: http://www.globalccsinstitute.com/downloads/The-Global-CCS-Institute-Foundation-and-Legal-Members.pdf

The Global CCS Institute
shape outside the CRC programme. Recently the Australian Global Carbon Capture Storage Institute (GCCSI) was set up. This institute was set up as an international centre, including many national agencies, companies and a small number of knowledge institutes. The GCCSI demonstrates the current trend towards internationalisation (see Figure 2).

In Canada, a stronger focus on internationalisation recently emerged. To broaden the collaborative scope and increase the scale of opportunity on a global scale, the Networks of Centres of Excellence (NCE) has expanded its international focus and extended its reach to the international science and business community. To this end, the NCE has developed the International Partnership Initiative (IPI), allocating $3.5m to this initiative. This is used to provide the CRCs with additional support to develop and enhance linkages with equivalent organisations in the rest of the world. The Networks of Centres of Excellence Program is launching a pilot initiative to expand the international reach of the Networks of Centres of Excellence of Canada. The International Partnership Initiative is to provide the existing NCEs with additional support to develop and enhance linkages with the best centres of excellence around the world. The NCE IPI supports the partnering of Canadian Networks and Centres with foreign organisations to address issues in areas of mutual strategic importance. The partnerships are expected to operate at the level of CRCs and not at the individual level.

The Canadian IPI aims primarily at human resources and acquiring new sources of knowledge through international co-operation. The goals of IPI are to enable the Networks and Centres to:

- Raise Canada’s profile on the world stage and ensure that Canada is part of international cutting-edge initiatives;
- Provide a richer training environment to develop highly qualified people with skills and awareness critical to Canadian productivity, economic growth, public policy and quality of life;
- Stimulate or reinforce partnerships with foreign organizations to develop large coordinated and concerted efforts leading to economic and social impact;
- Enhance the sharing and dissemination of knowledge, resources and technology to Canada.

Furthermore, in the programming documents of the centres of excellence there is attention to international collaboration. A goal of the Centres Of Excellence For Commercialization And Research programme is “to develop relationships with major international centres and research programs, and brand Canada as the host of internationally recognised centres of excellence.” Unfortunately, no assessment or evaluation of the internationalisation of the NCE programme was found.

The US Engineering Research Centers (managed by NSF) seem up to the last few years hardly involved in explicit internationalisation activities, although ERC evaluation studies and strategic Programme documents suggest that international collaboration worldwide should be part of the Next Generation ERC programme. Generation Three of the ERC that has started in 2008 does indeed state as an aim that ERCs will partner with foreign universities. An eligibility requirement for ERC proposals is that “At least one but no more than three foreign universities are required to be partners in research and education and post-award their support must be provided by foreign governments or other non-NSF sources. This means that the programme itself will not fund the foreign partners. According to NSF it is at this moment too early to assess in how far this internationalisation requirement is successful or not. A first review of the progress of the new centres is to take place in December 2009 so there has been no inventory yet of the international activities. Information at this stage suggest that one of the largest difficulties is to ensure that the partner organisation outside the USA receives research funding from their national funders for the defined collaborative work.

From these comparisons with non-European CRC-programmes we can learn that it is often only in the second or third generation of these programmes that the explicit internationalisation requirement is emerging as an integral part of the programme. Mostly the partnerships promoted are with individual partners (mostly foreign universities and public research centres) with the exception of the Canadian NCE. In these examples

11 The IPI-website has been updated at the end of this study. We have implemented the most recent version of December 9, 2009. http://www.nce-rce.gc.ca/Competitions-Competitions/PilotPrograms-ProgrammesPilotes/InternationalPartnership-PartenariatsInternationaux_eng.asp

12 The Networks of Centres of Excellence programme consists of 4 sub-programmes: the Networks of Centres of Excellence, the Centres of Excellence for Commercialisation and Research, the Business-Led NCEs and the International Research and Development Internship programme.

13 Telephone discussion with Lynn Preston, Deputy Division Director, ERC programme.
we also see that funding of the foreign partners is not included in the national programme: it should be matched by funding coming from the country of origin of the foreign partner.

Thus the emergence of internationalisation in CRCs in Europe is rather similar to the developments in Australia, Canada and the USA. Internationalisation came on the agenda only recently. In Canada and Australia, however, international co-operations are not explicitly mentioned as an indicator of the success of a CRC. Furthermore, no evaluations of the internationalisation were found. Little is known from existing literature yet on the effects of these international collaboration activities nor on the way the programme manages these specific internationalisation tasks.
The attitude towards internationalisation at CRC programme level is generally positive.

Internationalisation at the CRC programme level is emerging.

Even while internationalisation is not explicitly stated in the goals of the programme, the CRC-programme managers support increased international activities.

There are a number of barriers at the programme level that hamper the internationalisation of CRCS.
3.1 The role of internationalisation in CRC programmes

According to our interviews with CRC programme managers, national or regional ministries and agencies often do not have an explicit internationalisation strategy. In these cases, the programme officers do not have a guiding internationalisation policy to build the strategy of their CRC programme on. As a result, the CRC programmes are not specifically aimed at internationalisation; CRCs are aimed to boost the national or regional competitiveness. Therefore, internationalisation is not a goal in itself. Figure 3 summarises the strategies towards internationalisation. Despite the deficiency of strategies for internationalisation, the attitude at programme level towards internationalisation is generally positive. In Flanders for instance, the innovation agency IWT is very open to international cooperation, and both formal and informal international cooperation is encouraged.

Obviously, countries with a more explicit internationalisation strategy, offer more possibilities for international partners. Countries with a more explicit internationalisation policy are Germany, Austria and recently Sweden. In the strategy of the Swedish VINN Excellence Centre programme it is pointed out that the CRCs should lead to international competitive environments that attract foreign R&D. This stronger international focus is reflected in the openness of the programme; international partners can join a centre on equal basis as national entities. An international dimension is also taken up as an evaluation criterion. In Germany, the national policy argues that the Kompetenzzentren should be opened up for foreign involvement, in order to boost the competitiveness of the German networks. In Austria, opening up the CRC programme is a general policy goal. As a result, the Austrian Kplus programme is already opened up to some extent, i.e. the share of funded international partners may not be higher than 25%. In the Austrian COMET programme internationalisation has even become an evaluation criterion for evaluation of proposals.

CRC-programme management rarely co-operates internationally in a formal way. Within the COMPERA network, we did not find co-operations such as joint CRCs other than the activities within the framework of COMPERA. However, there is co-operation in more informal ways. These informal co-operations are aimed at joint learning and include mutual visits, such as joint visits of the Swedish, Austrian, Norwegian and Estonian CRC programmes. This kind of co-operation is taking place on a rather ad hoc basis.

Concluding, internationalisation at the CRC programme level is emerging, but is not a general feature yet. Especially in countries where the CRCs are in the phase of establishment, internationalisation is relatively unimportant. The newer programmes are strongly focussed at the national and regional level, in order to get the CRCs established. In countries where internationalisation plays a larger role in the strategy –such as in Austria and Sweden - the CRC programmes are open for international partners. The case studies also show that while internationalisation is not always very explicitly stated in the goals of the programme; the programme managers support it when CRCs engage in for instance EU-programme activities. As the European Framework Programme funds EU-projects, cross-border funding is not a policy issue.

3.2 Barriers

There are a number of barriers at the programme level that hamper the internationalisation of CRCs.

- Absence of policy incentives to co-operate internationally

A number of the interviewed programme managers indicated, in some cases there is limited support to internationalise the CRC programmes, at the highest policy level. An absence of a sense of urgency for internationalisation is the main reason. Because the goals of CRC programmes are oriented at the national level – i.e. boosting local innovativeness – the programmes are primarily focussed on national issues. The absence of a push towards internationalisation from the highest policy level stems from the political undesirability to let tax funds flow to other countries, or from a fear of losing competitive advantage (see below).

- Funding

It is difficult to find funding for actual co-opera-
<table>
<thead>
<tr>
<th>Country</th>
<th>Summary Strategy and Programming</th>
<th>Possibilities for international parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>Ministries and agencies do not have a clear policy for internationalisation. However, there is a common idea that internationalisation is important. The programmes are open to some extent (in the past Kplus) or fully open for international partners in today’s programme.</td>
<td>Kplus: the total contribution of funded international partners cannot be higher than 25%; no restrictions for non-funded partners. COMET: international partners are treated equally as Austrian parties.</td>
</tr>
<tr>
<td>Basque Country</td>
<td>The CRC programme in the Basque Country is mostly aimed at oriented basic science. No explicit strategies towards internationalisation exist.</td>
<td>International parties cannot take part.</td>
</tr>
<tr>
<td>Flanders</td>
<td>The strategic research centres are publicly funded CRCs that aim at the development of knowledge that should lead to valorisation. The Competence Poles are strongly aimed at strengthening the (competitive) position of the companies in each particular field. Internationalisation is encouraged, but in an informal and implicit way.</td>
<td>Competence Poles: foreign actors can have access to the activities and results in the Competence Pole and become in most cases a member; direct funding only via subcontracting.</td>
</tr>
<tr>
<td>Estonia</td>
<td>The CRCs are aimed at enhancing the international competitiveness of the entrepreneurs, through enhancing the co-operation in strategic R&amp;D activities. Internationalisation plays a small role in the CRC programme.</td>
<td>International partners join a centre on equal basis as national entities</td>
</tr>
<tr>
<td>Germany</td>
<td>Internationalisation has priority at the highest policy level. In the national strategy, the Kompetenzenetzte and Cluster initiatives are seen as good instruments to boost the internationalisation of German research and innovation.</td>
<td>Networking model: foreign partners can be member of the networks but, as a general rule, this does not include public funding.</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>The CRC programme is focussed on the establishment of excellent CRCs. Internationalisation is not an explicit route in this strategy. Recently the programme has been changed drastically; as a result the CRCs have only just started. Therefore there is not much attention for international co-operation.</td>
<td>The programme is not opened up for international parties.</td>
</tr>
<tr>
<td>Norway</td>
<td>Internationalisation is important in the national research strategy. International co-operation is a criteria for evaluating a successful CRC. CRCs are also expected to make it attractive for international companies to perform R&amp;D in Norway. The CRC programme does not at present foresee formal co-operation in the form of joint calls with other countries.</td>
<td>Calls are open to foreign partners in the centre consortium, both research institutions and corporate partners. The host institution must however be Norwegian and potential for value creation in Norway is the major criteria for selection of new centres.</td>
</tr>
<tr>
<td>Slovenia</td>
<td>The CRC programme is focussed on the establishment of excellent CRCs. The strategy towards internationalisation is to take part in EU programmes. There is also specific attention for mobility of researchers (Marie Curie).</td>
<td>As internationalisation is organised in EU projects, this is not an issue.</td>
</tr>
<tr>
<td>Sweden</td>
<td>Swedish internationalisation policy at the governance level is relatively well developed. In Sweden there is a broad range of CRCs. This is also reflected at the lower level; CRC programmes (e.g. VInn Excellence) see international co-operation instrumental to attract foreign R&amp;D investments, and to develop markets.</td>
<td>VINN Excellence: international partners are treated equally as Swedish parties.</td>
</tr>
<tr>
<td>Valencia</td>
<td>The goal of the CRC programme is to enhance regional competitiveness: boosting R&amp;D and Innovation in enterprises. Internationalisation is encouraged by several measures at CRC level. These measures are aimed at making the Valencian companies take part in foreign programmes. Also, inward researchers mobility is stimulated.</td>
<td>International parties cannot take part.</td>
</tr>
</tbody>
</table>

Interviews Technopolis Group & COMPERA information sheets
In several countries funding of foreign partners is against regulations. In most countries it is not possible to use national funding or European Structural Funds (SFs) for international partners. Programme managers whose CRCs were funded with Structural Funds indicated that it was not allowed to fund activities outside their region/country. Other programme managers indicated that for Structural Fund activities each partner has to go through an application process in their own region or country. Moreover, it is in nearly every country considered politically undesirable that national or regional funding flows abroad. This means that it is difficult to set up multinational funded CRCs and or projects, unless very detailed agreements are set up that regulate the funding flows. Therefore, multinational funded CRCs, or co-operations between CRCs are mostly part of bilateral agreements that take a lot of time to establish.

**Fear of losing competitiveness advantage**

One reason for the lack of support for internationalisation is that internationalisation can be seen as a threat for the partners. As foreign actors can benefit from the co-operations, internationalisation can be perceived as a loss of IPR and competitive advantage. This is for instance the case in countries, where a lead position in specific technological fields is assumed and in this context, no or only little potential benefits of international co-operation is anticipated. Co-operation would then lead to undesired spillovers to competitors. This contributes to the lack of resources to establish actual co-operations. This same issue plays at the level of individual CRCs. CRCs are very careful in choosing their partners. The CRCs often have a mechanism, such as international advisory boards that are carefully selected because they are afraid to share too much knowledge. Individual actors also play a role in this. Especially large companies do not want to co-operate with other large companies that can be a potential competitor. For smaller companies, this is often a driver to involve international companies. International counterparts are often not direct competitors.

**Different national framework conditions**

National differences in the governance of the CRCs can hamper internationalisation. IPR regulations are often different from country to country, meaning that IPR rules have to be reconsidered. Seemingly, it is hard to find a situation that fits all the actors involved. The different stakes of the actors involved make it difficult to come to an optimal solution. Companies, research institutes, universities try to maximise their individual benefits, whereas the policy makers try to defend the national interests. Moreover, legal issues make IPR negotiations an even tougher job. In most cases CRCs do not represent a legal body, so they cannot make agreements, nor sign contracts. National differences in the focus of the CRCs can also be an obstacle. In Flanders for instance, the Competence Poles work much closer to the market than the CRCs in Sweden and Norway. Therefore, the Flemish CRC programme only seeks for co-operations with an impact at company level. As a result many other CRCs are not suitable as co-operation partners.

**Practical**

Very practical reasons such as the proximity to suitable partners form a barrier. Practical issues such as travel expenses and time can make it more difficult to establish contacts and actual co-operations. This is for instance the case for CRCs in Northern Ireland; travelling from Northern Ireland to continental countries often takes one day. International visits, meetings abroad and other international activities take quite an effort, are time consuming and rather expensive.
A CRC can be shaped in many forms: it can be a ‘physical’ centre, a ‘virtual’ centre, or a combination of both.

The CRCs focus on a broad range of technological domains.

The share of private investments varies largely between countries.

The case studies confirm that there is no clear relationship between the absolute size of a CRC and its international activity.
A survey amongst all CRC managers associated to the participating COMPERA partners\(^1\) was conducted to obtain insight in the current practice of CRCs. This chapter gives an overview of the types of CRCs that responded to the survey, and what national differences exist.

In total, we received 74 responses to the survey\(^2\). One-third of the total amount of responses comes from German networks (see Figure 4); other large contributions to the survey are Austria (20%), the Valencia region (14%) and Estonia (12%). Not all surveys were fully completed (54 out of 74). The main reason for this was that not all questions were applicable to the situation of the respondents. A number of CRCs were just started or in the process of starting up; questions about actual co-operations or results of co-operations did not yet apply to them. Several respondents pointed out that they did not belong to the target group, as they were a loosely connected association or cluster: they could not answer several questions.

Figure 4: Country/region of residence of the CRCs in the sample, giving the absolute number of respondents, and the share of the total sample.

### 4.1 Type of centres

A CRC can be shaped in many forms. The CRC can be a ‘physical’ centre, i.e. a centralised centre, where the majority of the research is carried out and the research is bundled on one of more specific locations. But also many CRCs have the structure of a ‘virtual centre’, referring to those centres where the research is carried out at various locations, most often in the research sites of one of the participating players. In addition, combinations of this approach occur, where a part of the research is carried out at a central location, while a share of the research is outsourced to the partners.

The most frequently occurring structures in the COMPERA sample are the physical centres (43%) and mixed-type centres, combining physical and virtual aspects (43%)\(^3\). A relatively small share of CRCs is virtual (14%). The virtual centres are mostly found in Germany and Flanders. The German sample consists of network-like structures. In Flanders, there are two types of CRCs in the sample. The first type is the “Competence Poles”; these Competence Poles are designed to accumulate knowledge for a relevant industry in Flanders, in order to facilitate innovation. The Competence Poles are designed to foster valorisation\(^4\) of knowledge by (open) innovation. The second type is the strategic research centres; these centres aim to produce strategic research, and bring excellent research to the interface with industry. The Competence Poles in Flanders are often virtual centres; they have no laboratory and the competences are accumulated at the locations of their members, the strategic research centres are either physical (IMEC) or a combination of both (IBBT). The Valencian CRCs are most often physical CRCs (78%). The Swedish CRCs tend to be physical centres.

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1 I.e. Austria, Basque Country, Flanders, Estonia, Germany, Northern Ireland & Valencia. Sweden supported this study, but Swedish CRC managers were not surveyed because a similar survey was conducted recently by VINNOVA.

2 Appendix B.1 elaborates on the response rate and Appendix B.2 shows the list of respondents. The earlier survey of centres by VINNOVA included responses from 33 CRCs.

3 In the survey the centres have been asked to characterise their own organisation as virtual, physical or a combination.

4 The translation of research into commercial products and processes or products and processes that have societal added value.
4.2 Thematic focus

The CRCs focus on a broad range of technological domains. Figure 6 shows the range of thematic focus of the CRCs. Production technologies is the largest field of application of the CRCs. Other fields that are often addressed by the CRCs are ICT, life sciences, material technologies, nanotechnology and environment. The other themes addressed by the CRCs are smaller. A rest category (3%) consists of more specialised themes, such as mechatronics, construction and sensor technology.

Figure 7 (next page) displays the thematic focus per country. It shows that there are large thematic differences of the respondents per country. In Estonia for instance, more than 50% of the focus is on ICT and life sciences, but the large differences are to a large extend explained by the differences in response rate. Estonia and Northern Ireland show deviating thematic focus, but the number of responses in these countries were rather small. When the samples of a country are larger, it seems that the countries all have CRCs aiming at the same thematic issues.

4.3 Size of the CRCs

We have asked the CRC managers for the public research budgets and the total research budgets, including private investments. The average annual research budget of CRCs is €7.9m; 76% of its research budget is acquired through public channels, 24% is a contribution of private investments by the industry and research institutes. There are striking exceptions in the size of the budget of the different CRCs (see Figure 8).

The most apparent anomaly is the budget of the Flemish CRCs. As indicated in paragraph 3.1 there are two types of centres, Competence Poles (CP) and Strategic Research Centres (SRC). The Strategic Research Centres receive a much larger public budget in comparison with the Competence Poles so we have described them separately. Whereas the public funding quota in Austria officially ranges from 45%-60%, the private
Figure 7: Thematic focus per country.

Figure 8: Annual average research budget per CRC, per country (k€).

Technopolis Survey; n=74, multiple answers possible

Technopolis Survey; n=57

24 | The characteristics of CRCs
share in the total research budget is much smaller, according to the CRC-managers in the survey.

The share of private investments varies largely between the countries. In Germany, the public contribution to the CRCs is less than 50% of the funding. As said before, the German sample consists primarily of network-like structures. Many of the networks only receive small public budgets; they acquire private funding via membership fees and payments for services. In Flanders, the private contributions are remarkably small. This is due to the large public budgets of the strategic research centres, they acquire only 1% of their budget from private sources; the Competence Poles receive 30% of their funding from private sources.

The average number of partners of the surveyed CRCs is 59. Geographic differences are visible. The Flemish Strategic Research Centres have a large number of partners (250 on average). The surveyed Flemish Competence Poles have a smaller number of partners; 20 on average. In Valencia the total numbers of partners is also very high. This is mainly caused by AJU, this CRC has over 500 partners. Seemingly, these partnerships are very loose; the partner list consists of a very high number of SMEs.

There is a weak correlation between the amount of funding of the CRC and the number of partners. Institutions with a large amount of funding tend to have many partnerships, but also the smaller CRCs often have large partnerships (see Appendix D.1). The association AJU for instance has a lower budget than average, but still ranks among the CRCs with the most partners.

The small number of case studies confirms that there is no clear relationship between the absolute size of a CRC and its international activity. Relative size is related to the thematic area in which a CRC operates (some have very narrow focus, others much broader) and the public funding mechanisms available in their country or region.

### 4.4 Focus on academia and industry

In the survey we asked the CRC managers to indicate what share of the activities aimed for a specific type of actor. To make a clearer distinction between the actors groups we grouped the categories into research institutions (universities, public and private research institutes), companies (SMEs and large firms) and a rest category (consisting of government, NGOs, etc). If CRCs aim mostly at research partners, this indicates that the CRCs aim to develop (academic) knowledge production. If the activities of the CRC are more aimed at industry, this indicates that the CRC is more oriented towards valorisation through technology transfer and more applied science.

On average, the CRCs tend to have the strongest fo-
Focus on the industry, 55% of the activities are aimed at companies (see Figure 10, next page). About 40% of the activities of CRCs are aimed at research institutions. There are large national differences with regard to the focus on research institutes or industries. Austrian (70%), Estonian (69%), Valencian (65%) and Flemish (57%) CRCs are more focused on industry, whereas the Basque country (58%) and Northern Ireland (59%) have stronger focus on research institutions.

From the case studies we learn that there are huge differences in terms of the focus on more applied research that address technological issues for specific companies, to more medium term research with a focus of 3-5 years from the market to a focus on basic research with a time to market of more than 5 years. Many centres combine these research types: e.g., ViF has the whole range of research types and separates its direct contract research work outside of the CRC framework. Questor has a specific unit for technology transfer and commercialisation activities that is also separated from the medium to long-term research activities. The AIDICO Centre from Valencia, with a user community mostly in a non-R&D environment, is much more centred on applied research and innovation activities. Given that the Centres each have a different combination of the whole range of activities we cannot differentiate the results in terms of ‘applied’ versus ‘fundamental’ research focused CRCs.

Figure 10: The average share of focus on actors (research, industry and other institutions) per country

Technopolis Survey; n=Austria: 12; Basque Country: 4; Flanders: 4; Estonia: 6; Germany: 14; Northern Ireland: 2; Valencia: 7.
ALMOST HALF OF CRCs HAVE A STRATEGY TOWARDS INTERNATIONALISATION

76% OF THE SURVEYED CRCs INDICATE THAT THEY CO-OPERATE INTERNATIONALLY

THE MOST ACTIVE CRCs HAVE INTERNATIONAL CO-OPERATION AS AN INTEGRAL PART OF THEIR CORE STRATEGY AND IN THEIR GOVERNANCE STRUCTURE.

...THE PREFERRED PARTNER IS A SPECIFIC RESEARCH PERFORMING ORGANISATION THAT ADDS COMPLEMENTARY KNOWLEDGE AND EXPERTISE AND/OR FILLS A SPECIFIC GAP IN THE VALUE CHAIN
This chapter discusses to what extent CRCs are active in international co-operations. Furthermore, it elaborates on the drivers of international co-operation and the barriers that hamper international co-operation of the CRCs.

### 5.1 Actual co-operations

#### 5.1.1 Strategies

The importance of internationalisation in the CRC programmes is ranging from high to not important at all. Almost half of the CRCs (47%) responding to the survey have a strategy towards internationalisation of some sort. We requested a copy of the strategy towards internationalisation of CRCs; only 4 CRCs were able to send us a strategy. A similar response was found in the survey of VDI TZ on internationalisation practices and strategies of clusters around the world; about half of the respondents indicated that they had a strategy paper; but none of the strategies was made available. However, in most cases these are not explicit strategies (not formalised or codified) and most of the strategies are tacit. Moreover, several CRCs indicate that the strategy is for internal use only. The strategies are not very detailed and aim at an operational level: the strategies sum up straightforward goals. Typical goals are to connect to other players in the world and to extend the networks of the CRCs. Aim of these connections is to benefit from mutual learning, and to define project proposals. One of the strategies aims at making use of the Marie Curie programme.

Despite the absence of a larger number of explicit strategies, many of the CRCs of the COMPERA countries have international co-operations of some sort: 76% of the surveyed CRCs indicate that they co-operate internationally. However, CRCs with an internationalisation strategy have a stronger international focus. As Figure 11 shows, a larger share of the CRCs with an internationalisation strategy do actually co-operate internationally (80%) than the CRCs without strategy (71%). Of this group of CRCs that do co-operate internationally, the number of co-operations is higher, if the CRC has an internationalisation strategy. The Swedish survey indicates that VINN Excellence Centres typically reach out internationally through a scientific committee, mobility and brand-building measures.

Figure 11: The share of CRCs with and without actual co-operations (a) and the average number of co-operations (b), set out against having a strategy or not.

The case studies confirm this result: even the most highly internationalised CRCs do not always have an explicit internationalisation strategy. Nevertheless, the most active ones have international co-operation as an integral part of their core strategy and/or in their governance structure (particularly BalticNet-PlasmaTec, ViF, Questor, GigaHertz). Internationalisation does not depend on the fact whether there is a codified interna-

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Internationalisation strategy or not. In all cases the CRC-manager or director understood the necessity for moving the centre a step further up the development ladder through international collaborations. Nevertheless, an explicit declaration of international ambitions in the centre’s mission and dedicated actions by the CRC-management help to underpin the internationalisation of the stakeholders.

5.1.2 Typology: modes of co-operations

There are a number of ways in which the CRCs can co-operate. Based on the limited pool of literature\(^2\) on internationalisation and the praxis of CRCs, we have compiled a typology specially aimed at CRCs. This was also used to design the survey.

The CRCs that co-operate use a several modes of international co-operation. The most often used mode of co-operation is **cross-border research programmes** with multi-national interests (see Figure 12); 61% of the CRCs that co-operate internationally take part in cross-border research programmes. CRCs are involved in multi-national research projects, for instance in EU research projects, or in multilateral or bilateral research programmes. A second form of collaboration is through the **mobility of people**. Often, CRCs with international co-operation have at least one foreign researcher in their organisation, or have sent a researcher abroad; 56% of the CRCs with international activities use mobility of foreign actors. Many countries offer possibilities for mobility of researchers in their research policy; in addition the EU’s Marie Curie programme offers similar possibilities. It can be assumed that these programmes are used for mobility of researchers between CRCs. The other modes of operation occur less. In order of occurrence the other modes of co-operation include **opening up of research programmes**, **bilateral co-operation between CRCs**, allowing full participation of foreign actors, **networking of CRCs**, **joint activities in third countries** and **brokerage and partnering** of individual members from CRCs. The case studies support this range of collaboration modes used in practice.

Active international membership in CRCs has a larger impact for the case studies than in the wider population of CRCs. In the case of Questor (Northern Ireland) both research centres and industry are members with full voting rights. The same holds true for ViF (both companies and universities) and GigaHertz (for companies only). In BalticNet-PlasmaTec membership is more non-committal but its international membership...
Internationalisation in the practice of CRCs

(20 organisations) has some influence on the strategic direction of the network as they are members of the General Assembly.

In the VINNOVA CRC survey, bilateral projects and EU-projects are mentioned as the most important modes of operation for international co-operation. This is in line with the results of our survey, as these are cross-border research projects. Mobility of researchers and network activities is also in the VINNOVA survey the next most important mode of operation (see Appendix E.2).

A study of VDI TZ\textsuperscript{3} that discussed internationalisation practices worldwide identified a somewhat broader range of potential activities aimed at fostering internationalisation, mainly because the study focuses on the internationalisation of clusters: there is focus on instruments that are not strictly forms of S&T co-operation but that are likely to result in co-operation. For different world regions, VDI TZ ranked the most often used instruments and also assessed the perceived benefit of the instruments. One of the main outcomes is that the most often used instruments are not necessarily those that are considered as most useful.

![Figure 13: Average number of international co-operations per CRC](image)

In the German sample of the VDI TZ study, the most often used instruments are communication instruments (rank 1). According to the study, the second most often used instrument is the identification of gaps in the value chain (2). After that, several typical instruments follow, that fit within the results of our study on modes of co-operation, such as the development of international clusters and networks (3) and being linked into international networks (4). The mobility of students ranks also high (5). Taking part in cross-border programmes (EU projects (8)) and opening up of national programmes (10) are on the following ranks.

In Sweden, international activities focused on networking with academics abroad, mobility schemes and in a small minority of cases international industrial partnerships.

In our survey, we also asked whether the different modes of operation are open to all actors. Most of the modes of co-operation are open to all actors, except the mobility of foreign actors and the full participation of foreign actors. Mobility of foreign actors is mostly allowed for researchers from public research institutes. Following our interviews, this might have two reasons.

The interviewees state that individual researchers from large foreign companies are considered with caution, due to confidentiality issues. Secondly, as the research at CRCs is more basic science compared to industrial research, researchers from companies are considered less suitable to work at the CRCs. Companies are more often welcomed to take part in well defined research projects and to contribute to (projects of) the CRCs. In this case, the companies can function as useful sources of knowledge, or as potential customer for the knowledge developed.

The survey asked the CRC managers how many co-operations they had, per mode of operation. As aforementioned cross-border research programmes is the most frequently used mode of collaboration. On average, the CRCs that co-operate internationally have 5.8 cross-border research projects (see Figure 13). Mobility of researchers is also often used as a way to cooperate; the CRCs have an average of 4.8 mobility co-operations. Bilateral co-operations with foreign CRCs exist on average 4.5 times per CRC. The other modes of operation are used significantly less frequent. The opening up of a specific research programme to participants of another country is a mode of operation that many CRCs use, but only with a limited number of occurrences: programmes can be opened up only once.

5.1.3 Determinants of the degree of internationalisation

From our survey we have run a number of comparative analyses in search of aspects that might determine the degree of internationalisation. We use the number of co-operations per CRC as an indicator of the degree of internationalisation.

- Size of CRC. We have determined the relation between the budget of CRCs and the average number of co-operations. The correlation between budget and number of co-operations is very small: it is not very likely that there is a relation. Furthermore, the slope of the relation is insignificant: larger CRCs do not have more co-operations (see Appendix D.2). The case studies would confirm this: amongst the most internationally active CRCs were both large and small centres.

- Type of CRC. Physical centres tend to be more international. The share of having international co-

- Geographic location The degree of internationalisation differs from country to country. The average share of CRCs that co-operate internationally is 76% (see Figure 15). The region where international co-operation occurs the most is Valencia. All of the surveyed CRCs have developed international co-operation of some kind. A large share (82%) of Austrian CRCs also has one or more international co-operations. This does however not tell that the
CRCs in these countries are more internationalised: the picture gets rather inconsistent when analysing the number of co-operations per CRC. The average number of co-operations per CRC is fluctuating largely per country; no trends exist (see Figure 16). The average number of co-operation of the Flemish CRCs is remarkably high. One of the strategic research centres claims to have more than 300 co-operations (primarily joint-programmes, mobility of researchers and CRC-CRC co-operations), thus boosting the average of the Flemish CRCs.\(^5\)

It is however plausible that the strategic research centre has a much higher number of co-operation as it is very large in terms of funding, human resources, projects, and it has an outstanding reputation. For comparison purposes: when ignoring the 311 co-operations of the strategic research centre, the average number of co-operations per CRC is 19.

From the case study we have learned that a relative peripheral location in relation to European markets and key research centres can provide a stronger driver for active internationalisation activities. This was for instance brought up in interviews for the case studies of BalticNet-PlasmaTec in Greifswald and Questor in Belfast.

CRCs with focus on industry tend to have a higher average number of international co-operations. Figure 17 shows the average number of international co-operations of CRCs with focus on research actors, industry or a combination of both. It appears that CRC with focus on industry have averagely 20 co-operations; those focussing on research institutes have averagely 12 international co-operations. The correlation between focus on industry/research institute and the number

\(^5\) It is however plausible that the strategic research centre has a much higher number of co-operation as it is very large in terms of funding, human resources, projects, and it has an outstanding reputation. For comparison purposes: when ignoring the 311 co-operations of the strategic research centre, the average number of co-operations per CRC is 19.
of co-operations is however weak, primarily because only 8 CRCs focus on research institutes, see Appendix D.3 for an explanation. Nevertheless, the CRCs with focus on industry have more co-operations on average. CRCs are often set up on the interface between science and industry; where only a couple of research institutes cover the whole field of research, a larger number of companies (ranging from multinationals to SMEs) cover the industrial area. It is plausible that the co-operation projects with industrial parties abroad are smaller bi- or multi-lateral projects with industrial projects. Moreover, especially when SMEs are largely involved in the CRC, it is well possible that there is a larger need for international collaborations\(^6\), whereas the research institutes are much more embedded in an international arena, thus having a need for fewer co-operations\(^7\).

VINNOVA’s internationalisation study found that existing links were largely researcher-to-researcher. They focused on Europe and the USA, followed at a considerable distance by China and Japan. The number of actual and desired links outside these countries were small.

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\(^6\) Possibly a large number of smaller projects.
\(^7\) Possibly with larger budgets.

5.2 Drivers (needs and opportunities)

The previous chapter showed that in most countries, the CRC programmes do not explicitly stimulate the internationalisation of CRCs with strategies or programming documents that steer towards internationalisation. Nevertheless, CRCs do find their national programme officers supportive of internationalisation (see Figure 18). Apparently, the support in informal
and implicit ways of the programme officers is perceived to be strong. This is again confirmed in the case studies where explicit or implicit government support is given to the internationalisation activities. In the Valencian case of AIDICO internationalisation, and particular achieving access to European funding, is part of the remit of the organisation. In BalticNet-PlasmaTec internationalisation was built in from the very start of the initiative, as was the case with Questor in Belfast. In other cases the international collaboration activities emerged over time but were not hampered by the lack of government support.

Figure 18: CRC managers’ comments to the statement “Our national (or regional) CRC funding organisation is very supportive of international co-operation of our CRC.”

Survey Technopolis Group; n=69

5.2.1 Drivers of international co-operations

From the literature and experiences with CRC programmes we identified a range of drivers for international co-operations. These are:

- New market opportunities. Co-operation with organisations that establish a route to explore new markets. Cross-border user-producer interaction can lead to innovations that guarantee new sustainable supply and demand relationships. Especially when taking into account the supply chain of industries (e.g. the automotive or microelectronics industry), co-operations could lead to new supply-demand relations.

- New funding sources. Finding foreign partners that are willing to invest in the CRC is a way to enlarge the available budget. For some programmes –such as the EUs Marie Curie programme or Framework Programmes – co-operations are a requirement to be eligible for funding.

- Become involved in international development projects. International development projects can be a secondary goal of a countries research policy.

- Become more attractive as location for research centres for multinationals. International co-operation leads to higher visibility and is an indicator for success. A higher international network and higher prestige will attract excellent research centres and companies.

- Raising the quality of the work undertaken. International co-operation is a way to gain knowledge from international partners.

- Increase critical mass. An increasing the number of foreign partners makes the relative importance of the CRC higher, and thus increases the competitive advantage of the CRC.

- New and additional sources of thematic knowledge. The inclusion of foreign partners is a way to explore new sources of knowledge.

- Access to human capital. In many countries, there is a deficit of required scientific personnel. This can be a reason to attract foreign researchers, in order to find enough, well-equipped researchers.

- CRCs might be interested in co-operations with other CRCs in order to gain strategic knowledge on the governance of CRCs.

The survey asked the CRC managers to value the above-mentioned drivers. Opening up new market opportunities is the most important driver for international co-operation, 95% of the managers call this an important or very important driver. New additional sources of knowledge (92%), increase of attractiveness (91%), and becoming involved in development projects (91%) are also mentioned as very important or important drivers. However, nearly all of the identified drivers are seen as important (see Figure 19); 80% of the CRC managers see all the drivers as important or very important, except the drivers to find new sources of knowledge on how to run a CRC (65%). Interesting is also the deviation in some answers.

The case studies give a more consistent picture of the key drivers:

- In the majority of cases the important driver behind seeking international collaboration is to find complementary knowledge and expertise that will strengthen the portfolio of research and knowledge that can be offered to the local members;

- In a small number of cases (AIDICO, BalticNet-PlasmaTec) an important driver is finding additional R&D resources outside the own region, particularly from the European Commission. These cases tend
to be the government-induced type CRC initiatives rather than the industry driven CRCs;

- In the more industry driven cases (ViF, GigaHertz, Questor) the search for foreign industry partners follows business logic: it is beneficial for the local industrial partners to have major foreign firms involved for strategic alliance and business opportunities. In the case of ViF and GigaHertz the membership of foreign companies fulfil the specific role in the value chain and provide the technological knowledge that are connected to their parts of the value chain. Here vertical co-operations have proved to work best;

- Improving attractiveness of a centre and/or a network is a more indirect driver that needs a long-term approach. The Basque case of bioMaGUNE shows that in emerging sectors this can be achieved in a relatively short time, while other centres needed more than 5-8 years to become more visible for foreign partners and researchers;

- Although the creation of market opportunities is the most frequently mentioned driver, it has proved difficult to establish clear examples of business opportunities directly stemming from participation in the CRC: most R&D activities in CRCs are far from commercialisation phases thus translation of CRC research into innovation does not occur within the CRC-organisation. Exceptions are activities in Questor and AIDICO that are geared to commercialisation and SMEs.

The CRC managers were asked in the survey with what type of actors they would wish to co-operate. Despite the fact that new market opportunities are valued as most important driver, other research institutes are seen as the most favoured type of partner; 60% of the CRC managers indicate that they see this type of partner as very important to co-operate with (see Figure 20). About 50% of the CRC managers want to co-operate directly with companies. Co-operations between CRCs is favoured to a lesser extent. Only 26% of the CRC managers gives co-operation high priority.

The CRC managers were asked how important international co-operation is to their own stakeholders. If we focus in at the level of the members of a CRC, the academic research groups are perceived to be the group for which co-operation is most crucial (see Figure 21). 58% of the CRC managers indicated that for academic research groups, co-operation is very important, and 33% regard it as important. A second group of stakeholders for whom collaboration is important are SMEs followed by large companies. As an interviewee stated CRCs are important for SMEs to find partners, because

![Figure 19: Drivers for international co-operation](image-url)
they have smaller strategic departments. Furthermore, large companies are often already internationalised. Nevertheless, the CRC managers think that co-operation is of importance for the large companies. According to CRC managers, motivations for international co-operations via CRCs are threefold for universities and research institutes. First of all, universities can become more attractive to co-operate with. International co-operation via a CRC is a way to increase the reputation and visibility of academic research groups,
and the university as a whole. As a result, this can attract top researchers to the universities, which thus increases the quality and reputation of the university. Also, international co-operation can help attract additional research funding, which could lead to increased quality, reputation and visibility.

Specific motivations for companies are the extension of networks, which could lead to new markets, to new sources of knowledge. SMEs have more difficulties to find international partners and they require help in finding partners, establish contacts and eventual co-operations.

5.2.2 Needs for future co-operations

5.2.2.1 Planned modes of co-operations

Whereas 76% of the CRCs currently have international co-operations, all CRCs that responded to the survey plan to establish international co-operation in the next five years. This illustrates the trend towards internationalisation also takes place at the level of CRC managers. In the survey, CRC managers were asked which kinds of co-operations they plan to develop within the next five years (see Figure 22).

There is a clear preference for three sorts of co-operations; the CRC managers are seeking to develop bilateral co-operation with foreign CRCs (75%), cross-border research programmes (73%) and mobility of individuals between CRCs (72%). The survey does not allow us to analyse whether the planned bilateral co-operations with foreign CRCs are with the CRC organisation or with individual members of foreign CRCs. The case studies all suggest the aim is to find individual CRC partners (e.g. a particular university or firm) rather than the whole network. However it does show that foreign CRCs are a likely focal point for partner search.

Less than half of the CRCs are looking to set up full participation for foreign actors, extra-EU joint activities and networks of CRCs. Only about one-third of the CRCs foresee that its research programmes will open up for foreign participants in the next five years. International brokerage services are planned by 31% of the CRCs.

The opportunities perceived by the CRC-community that was interviewed in the case studies were along

Figure 22: The kind of international co-operations the CRCs are planning to develop within 5 years

Survey Technopolis Group; n=64
the same lines:

- Expanding the network with a number of specific ‘preferred’ partners
- Developing better opportunities for human mobility
- Taking better advantage of the network in EU-programmes

The popularity of planned modes of co-operations is similar to the ones that the CRCs now have. Cross-border research programmes with multi-national interest is the most common mode of operation nowadays and is likely to be so in near term future. Bilateral co-operation with foreign CRCs is the most favoured planned mode of co-operation. Currently, bilateral co-operation with CRCs is the third popular mode of co-operation. From the case study we derived that co-operation with foreign CRCs is an interesting activity for the CRCs in their search for the right partners. Actual co-operative projects are often carried out at individual actor level. Only opening up of specific research programme scores significant lower in the planned modes of co-operation than in the currently used modes; 43% already opened up a specific programme and therefore do not plan to do so in near term future.

5.2.2.2 Selection of co-operations

Several aspects determine whether a co-operation suits a CRC or not. In the survey the CRC managers where asked to rank the most important determinants for co-operations. They could rank them by giving points: 7 points where given to the most important criterion, and 1 point to the least important criterion. Figure 23 shows the outcome of this question; the average values are displayed.

By far the most important determinant is the thematic focus of a potential partner. The CRC only want to co-operate with partners that are at close cognitive proximity: on average this selection criteria scored 5.8 points. This first selection criterion is followed by a number of criteria: key companies, key universities, excellence of the targeted country and the potential market opportunities. These criteria are based on the perceived quality of the potential partner. CRCs with a stronger focus on companies (and more applied science) value the criteria key companies, and potential market opportunities higher. Those CRCs that have a stronger focus on knowledge transfer have more attention for the criteria key research institutions and excellence of science. Geographical proximity is not so important compared to the other selection criteria. The excellence of the research and industrial partners is favoured above the geographical proximity of the potential partners.

From case studies the dominant view is that the preferred partner is a specific research performing organisation that adds complementary knowledge and expertise (both for universities and for industrial) and/or fills a specific gap in the value chain (industrial partners). CRC-managers are mostly concerned with developing a well-balanced research portfolio, often addressing

![Figure 23: Selection criteria for international co-operations](image-url)
multi-disciplinary themes that need a combination of scientific and technological backgrounds.

In the category ‘other determinants’ general framework boundaries were mentioned as a criterion to select co-operation partners in the survey. This includes the (political) stability in the country of potential co-operations, as well as the local co-operation rules for the potential partners.

Although geographical proximity is not among the most important selection criteria for co-operations, the CRCs have several geographical preferences for co-operations (see Figure 11). Most importantly, the key geographical focus is on other EU countries; 88% of the CRCs aim at co-operations within the EU. Remarkably, geographical proximity plays a role when selecting partners, as 71% of the CRCs put their focus on neighbouring countries. A smaller number of CRCs have a focus outside the EU. About 46% of the CRCs, focus on the US for their co-operations. Also a mix of national and regional CRCs aims for Asian countries. Spanish CRCs often focus on South-American partners to co-operate with: five Spanish CRCs have a focus on South-America, against only one CRC from another country. Obvious reason for this is cultural proximity. A similar cultural proximity is observed for countries in Eastern Europe that focus more frequently on co-operation with non-EU countries in the former USSR. Focus on Mediterranean and African countries occur in a range of CRCs with various nationalities. Appendix D.4 shows the preferred geographic focus per country.

The respondents in the VINNOVA Survey had a similar geographical focus (see Appendix E.4). The main focus is on Europe (81%). In the Swedish sample there is more focus on the USA and Canada (73 respondents indicate co-operations with these parts are of main interest). A group of secondary importance is Japan (39) and China (36). The rest of the world is perceived to be less important, such as South East Asia (20), India (20) and Australia and New Zealand (17).

5.2.2.3 Policy needs

The VINNOVA survey asked the sample of CRCs which policy support they desire (see Appendix E.3). The survey showed that the CRC have a need for economic support that is especially aimed at international co-operation. The current structure of the programmes and subsidies does not allow the CRCs to dedicate funds to international co-operations (see section 6.3). Not surprisingly, the need for economic support is mentioned by 41% of the respondents as the most important need. The second largest need also links to availability of resources: 22% of the CRCs need co-financing and support to EU projects. Support to establish relations with other players and funding institutes is mentioned 11%.

Figure 24: Geographical directions of international co-operations

Survey Technopolis Group; n=66
5.3 Barriers to co-operation

In addition to the barriers that are identified at programme level (see 3.1), the survey analysed the existence and importance of barriers at CRC level (Figure 11).

- As was already identified at programme level: acquiring funding for international co-operations is a difficult hurdle to take. Constraints in time and money are seen as the most important factor hampering the development of international co-operations: 85% of the CRCs experience this is a (large) barrier or to co-operations. For only 3% of the surveyed CRC managers funding is not a barrier.

- Finding required partners is the second most important factor hampering international co-operations. Apparently it is not easy to find the right partners in terms of research topics, with sufficient scientific quality, and who are willing to participate in co-operations.

- The danger of spilling knowledge through international co-operation, thus losing a competitive advantage also plays an important role at the level of CRCs. IPR regulations are an obstacle to deal with; two-thirds of the CRCs see this as a large barrier.

- The practical barrier of proximity that was already identified at programme level is confirmed to be a problem for individual CRCs as well. Distance or time zone barriers exist for 48% of the CRCs.

- National programme regulations that do not allow co-operations are also a (large) barrier for 47% of the CRCs. On the other hand almost 30% of respondents say that national programme regulations are not considered a barrier at all. It is remarkable that even respondents in countries that have a climate conducive to internationalisation, still appear to have large problems with programme regulations when trying to set up co-operations.

- The willingness of members to co-operate and issues with language are only moderate barriers. Apparently, it does not often happen that partners hamper the internationalisation, and if so, these are mostly private sector members. For private sector members, co-operations with potential market competitors form a threat. Therefore, larger companies will not always tolerate co-operation with other large companies. Language does not seem to be problematic; English is a common language in research and business.

- The barriers to internationalisation we identified at the programme level are very similar to those retrieved from the individual CRCs. The most notable hurdle to take to foster international co-operations is acquisition of funding. At programme level, no budget is available to fund co-operations, because of a lack of financial incentives from national policymakers.

- Fear of losing competitive advantage is again a shared barrier at programme and CRC level. IPR regulations hamper the co-operations at CRC level, while national programmes are often not opened...
up because of the fear to spill competitive advantage. In addition, the political decision to protect national programmes and to exclude foreign partners is a barrier identified at programme level and at the level of individual centres.

The VINNOVA Survey identified a similar set of barriers to the establishment to global links. The most often-mentioned barrier is a lack of economic resources (84% of the surveyed CRCs mention this barrier). A closely linked barrier is that the funding that the CRCs receive is not to be spent on global links (27%). Also problems with the bureaucracy of EU projects, and the demanding eligibility criteria exist (24%). General issues, such as a lack of time and priority in the CRC and bureaucracy are regularly mentioned (see Appendix E.5 for a full overview of barriers).

5.4 The effects of international collaboration

The case studies reveal that in most CRC cases it is too early to assess the effects of international co-operation, as this has only been a recent development in the life cycle of the centre. Across all cases no benchmarking, monitoring or evaluation is done systematically to assess the progress or effects of internationalisation.

The most internationally active CRCs do have a number of indicators on which they assess the success of their international collaborations:

- The increase in the number of partners due to the larger international coverage of the CRC. ViF and Questor can see a direct link between their international collaborations and the increase of (local) membership;
- The increase in visibility and reputation, which leads to a more prominent position in European activities (e.g. leading EU-consortia, organising international symposia), attracting foreign researchers to the centre or in the network;
- New market opportunities for the member companies through their networking activities and strategic alliances. These type of effects are hardly monitored by the CRCs, but did come out as anecdotal evidence from the company interviews conducted in the case studies;
- New funding sources, particularly international (EU) funding and a higher level of member fees as a result of broadening the membership.
AN INTERNATIONALISATION STRATEGY COULD HELP THE CRC TO
BECOME MORE SELECTIVE IN THEIR CHOICE OF PARTNERS AND
type of collaboration that would add value to the local
members.

The internationalisation strategies
of CRCS follow a development cycle.

CRCS in different stages
need to address different
types of barriers.

A supportive national policy framework gives the centres
an additional push to international co-operation.
6 CONCLUSIONS

6.1 International co-operation strategies

Internationalisation at the CRC programme level is emerging, but is not a general feature in CRC programmes yet. Especially in countries where the CRCs are in the phase of establishment, internationalisation is still relatively unimportant. The newer programmes are strongly focussed at the national and regional level, in order to get the CRCs established. In countries where internationalisation plays a larger role in the CRC strategy – such as in Austria and Sweden - the CRC programmes are open for international partners. The case studies show that while internationalisation is not always very explicitly stated in the goals of the programme, it is supported by the programme managers when CRCs engage in for instance EU-programme activities, where cross-border funding is not an issue.

The survey found that the majority of CRCs do not have a codified internationalisation strategy. The most CRCs in our case study sample do not have an explicit internationalisation strategy either. However the most active ones have international co-operation as an integral part of its core strategy and/or in its governance structure (BalticNet-PlasmaTec, VIF, Questor, GigaHertz). Internationalisation does not depend on the fact whether there is a codified internationalisation strategy or not. In all cases the CRC-manager or director understood the necessity for moving the centre a step further up the development ladder through international collaborations.

An internationalisation strategy could help the CRC to become more selective in their choice of partners and the type of collaboration that would add value to the local members. Pushing internationalisation as a goal in itself does not seem a sensible way forward. The CRC-managers that have been successful in achieving successes have been cautious about what partners to involve and have devoted time to trust building with those partners. Thus too large international networks in relation to the size of the CRC and its local network will face the problem of not being able to embed the foreign partners in more strategic alliances with the CRC.

A clear and explicit international strategy at the CRCs- programme level (e.g in Sweden, Austria) does help to push the internationalisation activities a step forward and allows the centres to overcome practical barriers such as allowing some forms of cross-border funding.

6.2 The role of CRC-CRC co-operation

While the survey showed that bilateral co-operation with foreign CRCs is high on the agenda, the case studies clearly show that CRC-management and partners are in search of specific partners (research organisations, industry) that bring a particular technological expertise, take a specific position in the value chain and have proven to deliver high quality work. Working with other more networked CRC-centres is not high on the agenda, with some exceptions of finding a similar partner to enter into EU-projects with. Due to the networked nature of the CRCs, it is also considered difficult to find a similar CRC organisation with a similar/or complementary thematic focus. The thematic focus of each of the cases is highly dependent on the expertise of the partners involved and also shifts in the course of the time.

The CRC-managers do see the potential merits of CRC-CRC co-operation in terms of focusing on a particular geographical area (with strong competences in a thematic domain or strong markets) and working together with another CRC in that area to link the individual members of these CRCs (universities, research institutes and companies). The CRC managers are in principle very customer focused and their first consideration is whether a link with another CRC brings either additional scientific and technological expertise or market access to their companies. As time and management means are scarce (the key barriers according to the survey) this should be a focused effort rather than a more general networking activity.

A clear example of where co-operation between CRC-management was beneficial can be found in the Questor case where participation in the US NSF-programme for industry/university CRCs formed a valuable learning ground how to organise the governance of the CRC and to open the centre for strategic alliances with foreign partners. Nevertheless, today the need for such
CRC-CRC collaboration is seen as less urgent for Questor.

6.3 Factors of success for international collaboration

A conclusion that can be drawn from the cases (VIF, Questor, GigaHertz) that have active partnership from foreign companies is that governance models are chosen where the foreign companies have a say in the research programming, can acquire the benefits from the research that is conducted, but are considered to contribute to the research funding in cash or in kind. This reduces the sensitivities of national/ regional funding going directly to private sector members abroad.

There is a clear pattern in all cases considering the development cycle they undergo in terms of engaging into international co-operation. This life cycle is graphically illustrated in Figure 26 below. CRCs in the first development phase are occupied by building up the centre locally, ensuring to get the partners on board, building trust relations and working methods. These CRCs do not yet have international collaboration high on their agenda. The focus is mainly on developing a working mode with local partners, perhaps because the markets are very national or the the industrial partners want to have a tight control over their international co-operation directly and not through the CRC. There are cases where international collaboration was built in from the very start, such as Questor and BalticNet-PlasmaTec. However, in both cases one can see that this collaboration is held at low key in the first few years. It is only after a few years of building critical mass that these foreign relations are truly activated.

A next step up is to establish international relationships with single foreign partners, often through the European research programmes or other cross-border programmes such as Interreg. In more science orient-ed CRCs, such as biomaGUNE, researcher mobility is a mode of collaboration that appears to have a relatively low threshold. Finding the appropriate partners was put forward as a barrier by many interviewees. The European programmes are a good way of exploring potential working relations with partners. The cases of AIDICO and ELIKO are good examples of centres in this phase of development. It is only the centres with some maturity (e.g. Questor), or operating in sectors that have a strong tradition of international S&T co-operation (e.g. VIF, GigaHertz) that are able to engage in long term strategic relationships with particular universities or research organizations or R&D-oriented companies. They take part in the governance structure of the CRCs and have an active contribution to the strategic orientation of the CRC. One can see a development where the CRC starts to coordinate large European consortia in their field. Once the centre has grown in critical mass and gained international reputation through the work it has conducted, it builds up such a strong reputation that international partners will ask to join the CRC. The CRC will have led international symposia on the research topic and be recognized as a key player in the field in Europe at the least. In the sample of the case study perhaps only VIF fits in that category in the very specific niche in which it is operating. In each of these development phases the set of needs of CRC-managers are different. CRC-programmes could provide a different type of support in different phases.

The support of CRC-programmes and CRC-CRC co-operation could be different in different phases.

In the first phase when partners are mostly building partnerships locally, creating awareness of the importance of international networking, the advantages of having international partners on board and providing CRCs with a clear mission to have at least 1-3 foreign partnerships at the end of their launching phase (say 3-5 years) would be beneficial to prepare the mind set of the CRC-management. A general rule is difficult to establish here as some technological domains are so intrinsically international that one should expect international linkages from the start. CRCs that work with predominantly industries that are part of an international value chain should from the outset look how the CRC-cluster can hook up with key players abroad.

Figure 26: Life cycle of internationalisation at CRCs

Develop and stabilise the CRC locally
Develop first collaborations with single foreign partners
Strategic alliances with a number of selected partners
Attract partners and researchers by reputation
A CRC-programme manager could also provide incentives for the starting CRC to attract foreign researchers to the CRC and to advertise posts internationally instead of only locally. With more foreign staff the international outlook will become more obvious.

The second phase where the local CRC has become more stable and trust has been built between the local partners, CRC-programme managers could support the CRC by stimulating bilateral partnerships with key partners, for instance financed through European Framework Programme funding. Schemes or organizations that help identifying potential partners, appropriate calls in the Framework Programme and support the proposal preparation could be mobilised by the CRC-programme. Such organizations or national service providers often already exist in countries so it a matter of creating a link with other government agencies or service providers rather than developing a CRC-dedicated effort. CRC-funding organizations such as Innovation Agencies in two or more countries could develop dedicated Interreg programmes that can support CRC-type organizations to come with proposals for cross-border cluster initiatives.

When in the third phase the CRC is well established and has built a pool of competences and research and innovation outputs it is likely that the CRC will look for more strategic partnerships with key players in their domain. This could involve the permanent membership of the individual foreign partners in the CRC, it could also mean a strategic link with similar CRC-initiatives to form an agenda-building platform in Europe. The European Technology Platform initiative is a good example where individual partners but also CRC-type organizations that represent a wider stakeholder group have together develop strategic research agenda’s to influence the programming of the European Commission’s Framework Programme. CRC-programme managers could help individual CRC-managers to set up governance, funding and IP structures that help the closer involvement of international partners in the CRC. It could also support a CRC to market and brand the centre better at international events. CRC-CRC cooperation could support the partner searching process as well as lead to a certain division of labour between centres in terms of building up state-of-the-art knowledge in specific domains.

In the fourth phase when a CRC has already established international reputation support could be geared to international marketing, the support of benchmarking a centre or cluster with similar CRCs in other countries.

6.4 Some examples of good practice

The case studies have showed that there is no single ‘good practice model’ for international collaboration as too much is dependent on the particular context of the CRC, the sector it works with and the scientific and technological focus areas. In addition as described above CRCs in different stages need to address different types of barriers. International collaboration needs experience and time for trust building so should be seen as an activity that needs to be developed in time. So good practice in international collaboration is linked with good practice in overall management of the CRC.

Examples of good practices can be found in the Austrian ViF for instance:

- Experience: the experiences gained in international co-operation since 2005 have shaped ViF’s co-operation strategy as well as its implementation;
- Research capacities and capabilities: ViF did not start from scratch when it became a COMET K2-centre in 2008 but it could move on from what its predecessor, a K-plus-centre and a K-ind-centre had achieved;
- A clear and efficient model for including new partners: the standard co-operation agreement provides the rules and the framework for any new partnership. These rules make sure, the consortium can be expanded while at the same time protecting the interests of already existing partners.

The Questor case is also interesting from a viewpoint of CRC-management and international collaboration:

- The deliberate decision to include foreign academic partners that have a complementary expertise base, thus improving the added value of the centre from the perspective of the members;
- The research programming and selection processes, which is on the one hand very user oriented (member choose the topics) and provides equal opportunities to the foreign academic partners to take part in the activities;
- The opportunities that are provided for local companies to develop strategic alliances with foreign and non-local companies;
- A well thought through IPR and commercialisation framework that is satisfactory to the members.
The linkages that have been established with NSF and the additional opportunities this offers in terms of partnerships and in terms of learning from best-practices how to manage collaborative research centres

For CRCs in the first stages of development, entering the international collaboration arena through EU-programmes shows to be an appropriate first step to get acquainted with foreign partners, to adjust to cultural differences, learn the specific management aspects of cross-border collaboration, etcetera. Thus activities of most CRCs to help their partners to enter into international and cross-border programmes can be considered as good practice. The cases in Valencia and the Basque regions, Eliko in Estonia and BalticNet-PlasmaTec in Germany, but also the more internationally advanced CRCs are all examples where applying for EU-funding provided a first stepping stone for international collaboration.

For Centres that operate in the third development stage, incentives to help them shape the international research arena can be helpful. GigaHertz has benefited from a small ‘globalisation grant’ from VINNOVA, which has allowed it to set up the European Radio and Microwave Interest Group (EuRaMIG). This has a core group of 16 European university, institute and industry research groups but is open to anyone in Europe researching in radio and microwaves. The chairman of the GigaHertz Steering Board chairs EuRaMIG, whose primary purpose (apart from networking the research community) is to influence the direction of the Framework Programme through generating consensus and road maps.

The ‘globalisation grant’ that was used in the GigaHertz case (see 7.3) is part of the Global Links programme that was launched by VINNOVA in September 2008, aiming to fund 10-20 ‘strong research and innovation milieus’ that involved university-industry co-operation in R&D and that had at least two years funding remaining in one of the Swedish centre-based R&D funding schemes. The purpose of the programme was to establish a process for research and innovation milieus and for VINNOVA to work more systematically with international challenges.

Short-term impact goals were:

- 10-20 strong R&I milieus in Sweden to have during 2009 produced strategies for internationalisation and be contributing to the strengthening of their global competitiveness and attractiveness.
- R&I milieus wanting to work more strategically on internationalisation to have been afforded the opportunity through the programme to exchange experiences and learning in this work.

Longer-term impact goals were:

- 10-20 strong R&I milieus in Sweden to have built up competence and working methods which provide the capability to exploit internationalisation in a more strategic fashion operationally.
- Some of VINNOVA’s efforts to be adapted to effectively stimulate R&I milieus’ capacity to work strategically with international collaborations and global links.

The programme was very permissive in what it would fund. Examples of activities mentioned in the Call for Proposals were

- Systematic benchmarking of Swedish R&I milieus in relation to global equivalents. This means actual benchmarking of entire milieus rather than individual research groups or companies. A key aspect is assessment of the R&I milieus’ own attractiveness as partners for both investment and recruitment.
- Overall strategies and action plans adopted by the players in the respective R&I milieus for global positioning, branding work and establishment of links to global players with complementary skills, knowledge, technology and other resources.
- Swedish players’ (R&D financiers, researchers, companies, regions etc) capacity to take co-ordinated and proactive action in the development of strategic global alliances. Amongst other things, there is a great need to strengthen the collaboration and presence outside of Europe and North America. Special support efforts may be needed here (funding, competence development, IP strategies, export promotion, investment promotion etc.).
- Marketing of Swedish R&I milieus on a global market.
- Efforts to support young, knowledge-intensive companies’ international alliances and exports.
- An enhanced focus on integration of an international perspective in R&D programmes and projects from the outset. Not least of all, value added through participation in the EU’s Framework Pro-

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1 VINNOVA, Strategies for global links for strong research and innovation milieus, 15-5-2008.
grammes needs to be given a greater role in the planning of R&D activities.

The total grant under the first phase of this scheme is 10 MSEK (about € 1.1 m) to at least ten R&D milieus (approx. € 0.11m per milieu). Various elements of such a scheme could be an interesting ‘accompanying measure’ for any CRC programme.

**6.5 Barriers for international collaboration**

There are a number of barriers at the programme level that hamper the internationalisation of CRCs as was pointed out in our interviews with policy makers:

- Absence of policy incentives to co-operate internationally
- Funding
- Fear of losing competitiveness advantage if foreign competitors are involved
- Different national framework conditions
- Practical reasons such as the proximity to suitable partners form a barrier.
- The case studies that included interviews with stakeholders from industry pointed out that the fear of losing competitive advantage is not a major concern for them. Companies are more and more used to working in a networked model and good contractual agreements ensure that a fair treatment of the results of the collaborative work can be arranged.

The survey amongst all CRCs gave a clear top-3 in terms of barriers: 1) budget and time constraints, 2) difficulties in finding the right partners and 3) IPR regulations. Difficulties with national programme regulations came next. The case studies that were chosen partly because they were already very active in international collaboration put forward different types of barriers. Funding for foreign partners is indeed an issue for many of the cases. However, this is a bigger bottleneck for CRCs who work with foreign SMEs than with large companies who are expected to fund a considerable part of the research themselves. In the cases with a strong political support for cross-border collaboration (Austria, Sweden, Northern Ireland, the Nordic area) a limited level of funding for foreign partners was not considered a major issue.

Most CRCs in the case studies do indeed have problems finding the right partners, except for those that work in very specific niche areas with larger players such as in the automotive and in the micro-electronics cases where the user community is quite well known. This is a barrier where a network of CRCs could add value to provide more transparency on who is who and to conduct more active brokerage activities. However, real co-operation takes place between people who have developed trust between each other and have an interest in the expertise the other party can add. So brokerage can contribute mostly to first contacts on which co-operation can be built.

The survey shows that IPR is a major bottleneck. However, the cases with active involvement of foreign companies do not report any major issues on this front, as they have dedicated professional resources to settle these issues and provide good contractual frameworks. It seems the disseminating good practice to CRC-managers on how to settle IPR and contractual arrangements in an international collaborative setting is an issue where more can be done by a COMPERA-type network. Centres that have experience with involving R&D-companies from abroad (ViF, GigaHertz, Questor) have developed in-house expertise to deal with the contractual and IPR side of managing international collaboration. They have understood the importance of on the one hand clear and transparent contractual arrangements, while on the other side the flexibility and expertise to draw up case-by-case IPR agreements for specific projects and companies.

**6.6 Effects of international collaboration**

As stated in Chapter 5 the case studies reveal that in most CRC cases it is too early to assess the effects of international co-operation, as this has only been a recent development in the life cycle of the centre. Across all cases no benchmarking, monitoring or evaluation is done systematically to assess the progress or effects of internationalisation. Four effects were reported in the case studies:

- The increase in the number of partners due to the larger international coverage of the CRC. ViF and Questor can see a direct link between their international collaborations and the increase of (local) membership;
- The increase in visibility and reputation, which leads to a more prominent position in European activities (e.g. leading EU-consortia, organising inter-
national symposia), attracting foreign researchers to the centre or in the network;

- New market opportunities for the member companies through their networking activities and strategic alliances. These type of effects are hardly monitored by the CRCs, but did come out as anecdotal evidence from the company interviews conducted in the case studies;

- New funding sources, particularly international (EU) funding and a higher level of member fees as a result of broadening the membership.

### 6.7 Possible roles for a COMPERA type network and recommendations for further action

An obvious role for a COMPERA-Type network is to keep promoting, within their national and regional policy arena’s, the importance of internationalisation in today’s globalised world. In that sense the companies attached to the CRCs are often much further ahead on the internationalisation agenda, compared to the national policy makers. The study shows that a supportive national policy framework gives the centres an additional push and helps overcome specific budget issues. However it is neither a major bottleneck for those centres that have, from their own strategic objective, decided to enter into collaborative agreements, nor is it a sufficient condition for CRCs to become more active on this front.

This leads to the following more concrete recommendation:

1. Funders of CRC programmes should establish clear guidelines as to what level of international involvement of foreign partners in a CRC is on the one hand expected and acceptable;

2. CRCs that have certain maturity should be asked to define more explicit internationalisation goals and develop activities to achieve this. This could be integrated in their performance indicators. However, this international co-operation should not become a goal in itself but a means to create added value for the stakeholders of the CRC;

3. National and regional CRC-programme managers could develop a flexible ‘internationalisation’ package that CRC-managers can apply to in a competitive mode. The Vinnova ‘globalisation grant’ could be an example of such a scheme. As internationalisation activities are different for each CRC and in various development stages, the types of activities funded should be defined flexibly;

As was described above CRCs go through certain development stages. Any policy support to internationalisation should take into account at which phase in this development a CRC is situated and what particular bottlenecks are likely to occur.

As second role that is related to one of the major bottlenecks that came up in various stages of the CRC development is the difficulty in finding appropriate partner organisations, irrespective of their geographical location. This might not be the case for CRCs operating in narrow and well defined niches, but certainly in emerging domains, domains with a broad disciplinary knowledge basis and domains where the key industrial actors are not yet concentrated in a limited set of large companies. Providing more transparency in the competence base of various centres, by thematic area and by sector would be a simple first step for a COMPERA-type network to undertake. This would need to be followed up by much more active dissemination and brokerage type of actions to bring together the right people and organisations. Supporting CRCs to enter into European programmes is another route that could be actively followed and here a COMPERA-type network could also support partner search.

The more concrete recommendations that derive from this are:

4. As a European CRC-programme network provide a dissemination platform for CRCs on a thematic basis and link these with existing national platforms for CRCs and thematic cluster initiatives to make the activities and competence areas of CRCs more visible;

5. Use the COMPERA type network to provide more active broker services to CRC-managers seeking specific partners in other countries. This could involve the support of a more active CRC-CRC collaboration, for instance through CRC-management exchange programmes where CRC-managers select a desired partner region or CRC to visit;

6. Explore as ERA-NET potential exchanges of experience and possible bilateral co-operation agreements with similar CRC-programmes in for instance the US, Canada and Australia;

7. Develop more explicit links between the national CRC-programme and existing national services for acquiring EU-funding, export support and agencies
responsible for attracting foreign investments to match their activities with the specific needs of the CRCs;

Thirdly the study also shows that good practice in international collaboration is closely linked with experience and overall governance and management skills in the centres. The example of Questor showed that experience from the American NSF-programme formed an inspiration to set up governance and management practices in Northern Ireland. Given the variations in development stages of CRC-programmes and CRC centres across the European countries and regions, support of management learning could help to spur good ideas, also in the area of international collaboration. This is not the same as building fixed CRC-CRC alliances, but more customised management support between peers in the wide CRC community on common issues such as designing the research programme procedures, dealing with contractual issues with foreign partners, and monitoring the effects of international collaboration.

8. Develop short and focused CRC-management training modules on topics such as “how to involve foreign companies in my CRC-organisation”, “good practice in IPR management”. Given that time constraints were a major bottleneck these training modules should be very professionally organised. They could build on the experiences of ‘peers’: the managers of CRCs that have shown to be successful in their international co-operation activities.
## A.1 COMPERA Partners contributing to this study

The following table shows the COMPERA partners that supported this study and the people that have provided valuable inputs and comments on the study.

<table>
<thead>
<tr>
<th>Country</th>
<th>Persons</th>
<th>Organisation</th>
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<tr>
<td>Austria</td>
<td>Otto Starzer, Anna Tropper</td>
<td>FFG</td>
</tr>
<tr>
<td>Basque Country</td>
<td>Oihana Blanco Mendizabal, Xabier Maidagan</td>
<td>Innobasque</td>
</tr>
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<td>Nataša Komolec, Alec Mihelic</td>
<td>Ministry of Higher Education, Science and Technology</td>
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APPENDIX B: RESPONSE TO THE SURVEY AND INTERVIEWS

B.1 Response rates per country

We have calculated the response rates per country (Figure A.1). The average response rate of all the respondents is 52%; this includes the e-mail addresses that were not working, or that have been changed\(^1\). This is a rather high response rate for a survey. A typical response rate for a survey is about 25-35%. The involvement of national programme officers is probably the reason for the remarkable high response.

Countries and regions with a very high response rate are Estonia, Austria, the Basque Country and Valencia. The average response rate is lowered by Germany and Northern Ireland. Especially the German rate pulls the average down, because the population of potential respondents was a lot larger than that of other countries. Germany had a population of almost 100 potential respondents; other countries ranged from 6 to 19 potential respondents. The rather low response rate in Germany can partly be explained by the nature of potential respondents: Germany does not have a CRC programme, but a cluster programme.

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\(^1\) We have calculated the response rate by dividing the total amount of responses by the number of potential respondents that we send an invitation to the survey.
B.2 Respondents to the survey

The following CRC managers filled in the survey.

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<th>CRC</th>
<th>Name</th>
<th>Country</th>
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<tbody>
<tr>
<td>Software Competence Center Hagenberg GmbH</td>
<td>Klaus Pirklbauer</td>
<td>Austria</td>
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<tr>
<td>Kompetenzzzentrum für wissensbasierte Anwendungen und Systeme Forschung und Entwicklungs GmbH</td>
<td>Anita Griesser</td>
<td>Austria</td>
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<tr>
<td>alpS – Center for Natural Hazard Management</td>
<td>Eric Veulliet</td>
<td>Austria</td>
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<tr>
<td>Kompetenzzzentrum - Das virtuelle Fahrzeug, Forschungsgesellschaft mbH (Mobility SVT/Vf)</td>
<td>Gerhard Zrim</td>
<td>Austria</td>
</tr>
<tr>
<td>Research Center Pharmaceutical Engineering GmbH</td>
<td>Simone Gritzner</td>
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<tr>
<td>Research Centre Applied Biocatalysis</td>
<td>Markus Michaelis</td>
<td>Austria</td>
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<tr>
<td>COMET K2 Centre for &quot;Integrated Research in Materials, Processing and Product Engineering&quot;</td>
<td>Reinhold Ebner</td>
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<td>ACCM – Austrian Competence Centre for Mechatronics</td>
<td>Schatz Gerald</td>
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<td>Polymer Competence Center Leoben GmbH</td>
<td>Martin Payer</td>
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<tr>
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<td>Otto Groh</td>
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<td>FTW – Forschungszentrums Telekommunikation Wien</td>
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<td>ONCOTYROL - Center for Personalized Cancer Medicine GmbH</td>
<td>Philipp Unterholzner</td>
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<td>Isabel Ferrando</td>
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B.3 Interviewed COMPERA Partners
(or programme managers)

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B.4 Interviews for the case studies

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<td>Prof. Giorgio Cannata</td>
<td>Head of the Mechatronics and Automatic Control Laboratory, University of Genova (Italy)</td>
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<tr>
<td>Questor</td>
<td>Wilson McGarel</td>
<td>Questor</td>
</tr>
<tr>
<td>Questor</td>
<td>John Toner</td>
<td>Williams Industrial Services Ltf</td>
</tr>
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<td>Questor</td>
<td>Clifford Henry</td>
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</tr>
<tr>
<td>Questor</td>
<td>Geoff Wilcox</td>
<td>British Petroleum</td>
</tr>
<tr>
<td>Case</td>
<td>Interviewee</td>
<td>Organisation</td>
</tr>
<tr>
<td>----------</td>
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<td>---------------------------------------------</td>
</tr>
<tr>
<td>Questor</td>
<td>Brian Bone</td>
<td>Northern Ireland Environment Agency</td>
</tr>
<tr>
<td>ViF</td>
<td>Gerhard Zrim</td>
<td>ViF</td>
</tr>
<tr>
<td>ViF</td>
<td>Aldo Ofenheimer</td>
<td>ViF</td>
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<tr>
<td>ViF</td>
<td>Hans-Herwig Priebsch</td>
<td>ViF</td>
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<tr>
<td>ViF</td>
<td>Anton Fuchs</td>
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</tr>
<tr>
<td>ViF</td>
<td>Raimund Almbauer</td>
<td>Graz University of Technology</td>
</tr>
<tr>
<td>ViF</td>
<td>Josef Affenzeller</td>
<td>AVL List</td>
</tr>
<tr>
<td>ViF</td>
<td>Stefan Volkwein</td>
<td>University of Konstanz</td>
</tr>
</tbody>
</table>
## C.1 Selected cases

<table>
<thead>
<tr>
<th>Country</th>
<th>FMTC</th>
<th>GigaHertz</th>
<th>CIC biomagune</th>
<th>ELIKO</th>
<th>Virtual Vehicle Competence Centre</th>
<th>AIDICO</th>
<th>BalticNet-PlasmaTec</th>
<th>Questor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td></td>
<td></td>
<td>Basque Country</td>
<td>Estonia</td>
<td>Austria</td>
<td>Valencia</td>
<td>Germany</td>
<td>Northern Ireland</td>
</tr>
<tr>
<td>Sweden</td>
<td></td>
<td></td>
<td></td>
<td>Physical</td>
<td>Combination</td>
<td>Physical</td>
<td>Virtual (network)</td>
<td>Combination</td>
</tr>
<tr>
<td>Basque Country</td>
<td></td>
<td></td>
<td></td>
<td>Combination</td>
<td>Physical</td>
<td>Physical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estonia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Opening up, bilateral co-operations and mobility</td>
<td>Cross-border programmes, mobility, bilateral co-operation, networks, brokerage</td>
<td>All types of instruments included.</td>
<td>Cross-border programmes, mobility, bilateral co-operation, networks, brokerage</td>
</tr>
<tr>
<td>Austria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valencia</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
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<tr>
<td>Northern Ireland</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual vs. physical</td>
<td>Physical</td>
<td>-no survey-</td>
<td>Physical</td>
<td>Combination</td>
<td>Physical</td>
<td>Physical</td>
<td>Virtual (network)</td>
<td>Combination</td>
</tr>
<tr>
<td>Governance: Regional vs. national</td>
<td>Regional</td>
<td>National</td>
<td>Regional</td>
<td>National</td>
<td>National</td>
<td>Regional</td>
<td>Regional</td>
<td>Regional</td>
</tr>
<tr>
<td>Different instruments</td>
<td>Bilateral co-operation, networks of CRCs and Mobility</td>
<td>- no survey - probably full participation</td>
<td>Cross-border research programme, Mobility</td>
<td>Cross-border programmes, opening up, mobility and networking</td>
<td>Opening up, bilateral co-operations and mobility</td>
<td>Cross-border programmes, mobility, bilateral co-operation, networks, brokerage</td>
<td>All types of instruments included.</td>
<td>Cross-border programmes, mobility, bilateral co-operation, networks, brokerage</td>
</tr>
<tr>
<td>Partners in- and outside EU</td>
<td>EU-partners</td>
<td>At least 1 co-operation extra EU</td>
<td>EU Partners</td>
<td>EU partners</td>
<td>EU partners</td>
<td>EU partners</td>
<td>India</td>
<td>Several non-EU co-operations</td>
</tr>
<tr>
<td>Extent of internationalisation/Decisive factors</td>
<td>Many foreign partners, but VIB has a local focus</td>
<td>The Swedish CRCs are relatively focussed towards internationalisation</td>
<td>Because of regional policy not very internationalised</td>
<td>Most international CRC of Estonia</td>
<td>The COMET programme has an international focus</td>
<td>AIDICO is internationalised to a limited extend, but has interesting extra-EU activities</td>
<td>Highly internationalised (50% of partners is foreign)</td>
<td>Broad range of co-operations, interesting links overseas</td>
</tr>
</tbody>
</table>
D.1 The relation between the number of partnerships and the amount of funding (k€)

There is weak statistic proof that the number of partnerships correlate with the amount of funding (R=0.32). The slope (disambiguation) of this line is 0.004, which means that per m€, 4 more partnerships are to be expected.

D.2 No relation between the number of international co-operation and amount of funding (k€)

Considering the following graph, there is barely statistic proof that the number of partnerships correlate with the amount of funding (R=0.02). The slope (disambiguation) of this line is 0.00004, which means that per €100m additional funds, 4 more partnerships are to be expected. We therefore conclude that the number of co-operations do not relate to the amount of funding.

D.3 Research vs. Industrial focus of CRCs and the influence on the degree of internationalisation

- In order to determine whether there is a correlation between the types of CRC, i.e. CRCs aimed at research actors and CRCs aimed at industry, we have calculated the correlations and the slope of actual the correlation between the share of activities aimed at industry and the number of co-operations. In our survey we asked the CRCs to indicate what actors they dedicated their time to; this is the indicator for the degree to which the CRCs are aimed at industry or research partners. Furthermore we have asked how many co-operations the CRCs have, this indicates the degree of internationalization of CRCs.

- The figure below shows the number of co-operations set out against the share of activities aimed at industry (a) and research institutes (b). It shows that CRCs with a stronger focus on industry have a higher number of co-operations; the trend line suggests a positive trend of an increase of 1.6 co-operations per 10%. The statistic evidence is however rather weak (R=0.23).
D.4 Geographic focus per country; the percentage indicate the share of CRC managers that prefer co-operations with this region.

<table>
<thead>
<tr>
<th>Country</th>
<th>n=</th>
<th>Neighbouring countries</th>
<th>EU-wide</th>
<th>Non-EU: Mediterranean countries</th>
<th>Non-EU: Asia</th>
<th>Non-EU: US</th>
<th>Non-EU: countries in former USSR</th>
<th>Non-EU: Africa</th>
<th>Non-EU: South-America</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>12</td>
<td>92%</td>
<td>100%</td>
<td>8%</td>
<td>17%</td>
<td>25%</td>
<td>0%</td>
<td>0%</td>
<td>8%</td>
</tr>
<tr>
<td>Basque Country</td>
<td>4</td>
<td>50%</td>
<td>100%</td>
<td>0%</td>
<td>75%</td>
<td>75%</td>
<td>0%</td>
<td>0%</td>
<td>75%</td>
</tr>
<tr>
<td>Flanders</td>
<td>5</td>
<td>60%</td>
<td>80%</td>
<td>0%</td>
<td>40%</td>
<td>60%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Estonia</td>
<td>6</td>
<td>83%</td>
<td>100%</td>
<td>0%</td>
<td>17%</td>
<td>50%</td>
<td>33%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Germany</td>
<td>15</td>
<td>73%</td>
<td>67%</td>
<td>13%</td>
<td>33%</td>
<td>47%</td>
<td>7%</td>
<td>0%</td>
<td>20%</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>2</td>
<td>100%</td>
<td>100%</td>
<td>0%</td>
<td>100%</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Valencia</td>
<td>9</td>
<td>44%</td>
<td>89%</td>
<td>56%</td>
<td>22%</td>
<td>33%</td>
<td>0%</td>
<td>22%</td>
<td>44%</td>
</tr>
</tbody>
</table>

Survey Technopolis Group
VINNOVA conducted a survey amongst a number of CRCs. The main goal of the survey was to gain insight on how VINNOVA should continue its work on internationalisation. The analysis is based on 91 responses.

E.1 Thematic focus

VINNOVA Global links survey
### E.2 Modes of Co-operation

- **Bilateral R&D projects**: 63%
- **EU-projects**: 59%
- **Mobility of researchers**: 54%
- **Benchmarks, comparative analyses**: 49%
- **Network activities (seminars, fairs, conferences)**: 49%
- **Marketing, increasing visibility**: 32%
- **Company-based links**: 26%
- **Training and courses**: 17%
- **International Advisory Board**: 13%
- **Establish administrative resources for...**: 12%
- **Other**: 4%

VINNOVA Global links survey

### E.3 Policy needs of CRCs

- **Specific economic support for building up global links**: 41%
- **Co-financing and support to EU-projects**: 22%
- **Establishment of relations with other funding institutions in the world**: 11%
- **Other economic support**: 8%
- **Legal support**: 3%
- **Other**: 11%

VINNOVA Global links survey
E.4 Geographical focus

- Europe: 81%
- USA and Canada: 73%
- Japan: 39%
- China: 35%
- India: 20%
- Rest of South-East Asia: 20%
- Australia, New-Zealand: 17%
- Other Asia (Russia, Israel, ...): 14%
- South-America: 14%
- Other countries (South Africa, etc): 9%

E.5 Barriers to internationalisation

- Lack of economic resources: 27%
- Current funding not suitable to establish links: 24%
- EU projects too demanding/bureaucratic: 22%
- Lack of time / priority: 22%
- Bureaucracy: 20%
- Short duration of projects: 10%
- High demand for co-financing: 9%
- Absence of identified co-operation: 9%
- Cultural/Structural problems: 8%
- Involved industry is not interested: 4%
- Lacking perception of attractiveness: 2%
- There is no reward for working with global links: 1%
- Other: 7%
IWT MISSION

IWT wants to stimulate innovation in Flanders:

- By giving various organizations - particularly SME’s – financial support to assist them in their innovation endeavors;
- By stimulating companies, knowledge centers, universities and other innovation actors to cooperate;
- By advising the Flemish government on innovation policy issues.

M&A’s mission is to support IWT and its stakeholders to establish and improve the effectiveness and efficiency of their innovation tasks.

Want to know more about the IWT and the M&A unit?

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