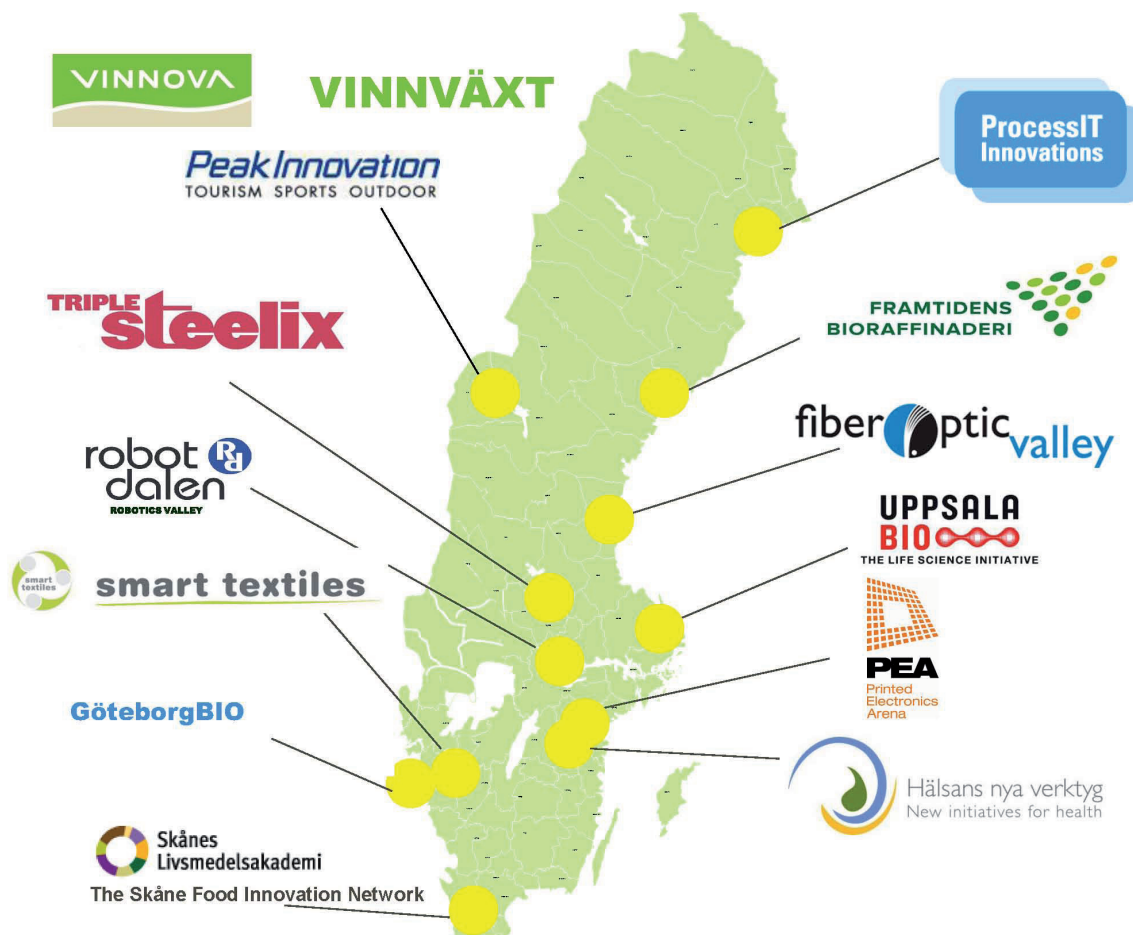




VINNOVA REPORT
VR 2010:09

VINNVÄXT AT THE HALFWAY MARK

- Experiences and lessons learned



Title: VINNVÄXT at the halfway mark - Experiences and lessons learned
Author: Göran Andersson, Kristin Larsen & Anna Sandström - VINNOVA
Series: VINNOVA Report VR 2010:09 (*English version of VR 2010:05*)
ISBN: 978-91-86517-06-9
ISSN: 1650-3104
Published: March 2010
Publisher: VINNOVA - Swedish Governmental Agency for Innovation Systems/Verket för Innovationssystem

About VINNOVA

VINNOVA, Swedish Governmental Agency for Innovation Systems.

VINNOVA's mission is to *promote sustainable growth* by funding *needs-driven research* and developing *effective innovation systems*.

Through its activities in this field, VINNOVA aims to make a significant contribution to Sweden's development into a leading centre of economic growth.

VINNVÄXT aims to promote sustainable development in regions by developing internationally competitive research and innovation environments within specific growth fields. This will be done by funding needs-driven R&D to strengthen the cutting-edge competence of the respective environments and by means of strategic efforts for the development of effective innovation systems. The objective is that the winners will become internationally competitive in their fields within 10 years.

- VINNVÄXT takes the form of a competition in which the best submissions win.
- A limited number of regions will receive up to SEK 10 million per year.
- The focus is on creating strong regional centres in specific fields.
- The programme presupposes the active participation of players from the private, public and research sectors and from the political sphere (i.e. the Triple Helix).
- Long-term: funding will be provided for 10 years.
- A number of support activities (seminars, training/education, the exchange of experience, and the extension of knowledge/research).

The VINNOVA Report series includes external publications and other reports from programmes and projects that have received funding from VINNOVA.

Research and Innovation for Sustainable Growth.

VINNOVA's publications are published at www.VINNOVA.se

I VINNOVAs publikationsserier redovisar bland andra forskare, utredare och analytiker sina projekt. Publiceringen innebär inte att VINNOVA tar ställning till framförda åsikter, slutsatser och resultat. Undantag är publikationsserien VINNOVA Policy som återger VINNOVAs synpunkter och ställningstaganden.

VINNOVAs publikationer finns att beställa, läsa och ladda ner via www.VINNOVA.se. Tryckta utgåvor av VINNOVA Analys, Forum och Rapport säljs via Fritzes, www.fritzes.se, tel 08-598 191 90, fax 08-598 191 91 eller order.fritzes@nj.se

VINNVÄXT at the halfway mark

- Experiences and lessons learned

by

Göran Andersson, Kristina Larsen & Anna Sandström

VINNOVA

Foreword

The objective of the VINNVÄXT programme is to promote sustainable regional growth based on international competitiveness within a chosen area of strength. Its purpose is to advance the functionality, dynamics and efficiency of the regional innovation system.

This report presents a compilation of results from the monitoring carried out by VINNOVA for the VINNVÄXT programme in the financial year 2008. Each initiative must compile an annual written situation report for VINNOVA consisting of various sections. These are: An annual report; a web questionnaire with profit and loss statement; and an Excel file listing such things as contributing organisations and researchers, projects funded and scientific publications. Based on this material, the authors of this report visited all but one of the VINNVÄXT initiatives and interviewed representatives of various sections of their operations so as to gain an in-depth insight into their activities, the challenges they face and the results they have achieved.

The reason for this report is demand for an overall study examining the VINNVÄXT initiatives' operations and how they contribute to sustainable growth, plus a general discussion on experiences of policy development during programme activity to date. This demand relates to VINNOVA but also other players working to promote growth in Swedish regions.

VINNOVA in February 2010

Charlotte Brogren
Director General

Anne Lidgard
Director
Head of Innovation Actors Division

Contents

1	Introduction	7
1.1	The VINNVÄXT programme	7
1.2	VINNOVA's definition of monitoring.....	9
1.3	Situation report 2009	10
1.4	About the report	11
2	The initiatives' operations	13
2.1	Regional and national strategic processes	15
2.2	Regional meeting arenas	18
2.3	Communication and marketing	19
2.4	Competence supply	20
2.5	Funding.....	21
2.6	Internationalisation.....	23
2.7	Integration of gender perspective	25
2.8	Needs-driven research	27
2.9	Newly established enterprises	30
2.10	Development of existing industry and/or the public sector.....	31
2.11	Activities for individual learning, monitoring and evaluation	33
2.12	Initiatives' impact on their regional innovation systems	34
3	Prospects for policy development.....	36
	Appendix A: VINNVÄXT winners 2003.....	46
	Robotdalen.....	46
	Skåne Food Innovation Network / Innovation at Interfaces.....	55
	Uppsala BIO	65
	Appendix B: VINNVÄXT winners 2004.....	75
	Fiber Optic Valley	75
	GöteborgBIO / Biomedical Development in Western Sweden.....	87
	New Tools for Health	97
	ProcessIT Innovations	102
	Triple Steelix	110
	Appendix C: VINNVÄXT winners 2008.....	123
	Biorefinery of the Future	123
	Peak Innovation	133
	Printed Electronics Arena.....	144
	Smart Textiles.....	153
	Appendix D: Quantitative results	165
	VINNVÄXT winners 2003 and 2004.....	165
	VINNVÄXT winners 2008	169
	Appendix E: List of interviewees	176

1 Introduction

1.1 The VINNVÄXT programme

VINNOVA's VINNVÄXT programme aims to promote sustainable growth in functional regions¹ by developing internationally competitive research and innovation milieus within specific growth areas. Henceforth in this report, these will be termed "focus areas". The selection process was in the form of a competition with the winning regions awarded 10 years' funding of up to SEK 10 million per year. This funding may be used for a broad spectrum of projects and activities, depending on what capabilities and shortcomings exist in the regional innovation system. The programme target is for at least 50% of the funding to go to needs-driven research and development (R&D). The objective is for the winners to become internationally competitive in their respective fields within 10 years. VINNVÄXT assumes the active involvement of players in industry, research, politics and the public sector.

The programme has run since 2001.

- In 2003, three winning initiatives were selected. These were: Innovation at Interfaces based in Skåne (foods) now branded as Skåne Food Innovation Network; Robotdalen in Västra Mälardalen (robotics); and Uppsala BIO (life science).

- In 2004, a further five winners were selected: ProcessIT Innovations (IT in the process industry) based in Luleå/Umeå/Örnsköldsvik; Biomedical Development in Western Sweden (biomedicine); Triple Steelix (steel) in the Bergslagen region; Fiber Optic Valley (fibreoptics) in Hudiksvall; and New Tools for Health (medical technology) in the Twin Cities region (Linköping/Norrköping).

- In 2008, four more 2008 embryonic innovation systems were selected under the auspices of the 2005 VINNVÄXT programme entitled "Early-Stage Innovation Systems". These are: Biorefinery of the Future at Örnsköldsvik; Smart Textiles in Borås; Printed Electronics Arena in Norrköping; and Peak Innovation in Åre/Östersund. The purpose of this call for proposals was to find initiatives in the respective regions or around the country which were not yet fully established, but still considered to have major growth potential.

In the VINNVÄXT programme, initiatives are funded in accordance with the contracts/agreements made between VINNOVA and a recipient organisation for an

¹ With the concept of "functional region", VINNOVA would emphasise that a "region" in the VINNVÄXT programme is NOT the same as an administrative region such as a county or municipality. Rather it is the geography which, through proximity, can provide advantages for the development of social capital and confidence between different players in the region. In practice with VINNVÄXT, this has meant everything from initiatives in individual municipalities (such as Uppsala BIO) to large regions (Process IT Innovations for example).

operational period of 3-3½ years at a time. VINNOVA provides funding for initiatives of between SEK 4-10 million per year and requires at least a corresponding sum in co-financing, either as cash funds or as contributions in kind. For a proper comparison of the funds which go to R&D projects in other VINNOVA programmes, it is important to note that the additional 35% which the educational establishments take out of VINNOVA's R&D contribution does not correspondingly burden initiatives other than in those sections where project funds are used for sub-projects at educational establishments.

The basis for contracts is the initiatives' action plan for the operational period. With the backing of a programme board, this action plan was assessed by VINNOVA as realistic and reliable for reaching the growth objectives set by the initiatives and ultimately VINNOVA's programme objective. The programme board consists of six people representing educational establishments, institutes, industry and public players. The programme management² is playing an active role regarding the dialogue on the design of the initiatives' action plans and process support activities. The biannual experience exchange meetings and dialogue meetings under the auspices of individual initiatives, for example. The programme management is also planning to develop the forms of evaluations conducted every three years by international experts.

VINNOVA ordered a study conducted on the significance of organisational forms to cluster activity³. This indicates that initiatives run their operations in many different legal forms such as:

- Non-profit organisation
- Economic association
- Association/union with wholly-owned subsidiaries conducting the operational work
- Limited company with more than two owners
- Section of an established organisation
- Centres at an educational establishment

Since VINNOVA only accepts one formal beneficiary, in many cases an organisation with its management and executive board is contractually liable to VINNOVA. In practice only one such organisation acts as "host" and is essentially one of several partners in the initiative. The money is distributed to the various activities which make up the initiative's operation.

The operational work in initiatives is led by one or more generally several processes managers. These report to an executive group which generally consists of representatives of the most important players and co-financiers in the region as well as regional official bodies, institutes, educational establishments and companies. In most

² Lars Gunnar Larsson and Cecilia Johansson, VINNOVA.

³ Significance of organisational forms in cluster activity, Vinnova Report VR 2009:29. [In Swedish]

cases, this executive board is not formally responsible to VINNOVA, for the above reasons.

The initiatives' organisation, process management and executive board have been subject to constant change. Needs differ between initiatives and over time, for which reason there has been no opportunity for VINNOVA to recommend or stipulate a uniform model.

1.2 VINNOVA's definition of monitoring

VINNOVA conducts monitoring in regard to VINNVÄXT and all VINNVÄXT initiatives are monitored each year. In addition, the VINNVÄXT winners are evaluated every three years to ensure that these initiatives' operations are leading to the development of competitive research and innovation milieus and fulfilling the requirements set by VINNOVA.

When VINNOVA designs programmes, decisions are made as to the intended short and long-term achievements, in other words programme objectives. Over time, the operation or activities designed to serve these objectives are monitored, evaluated and subjected to impact analyses.

Ongoing monitoring affords the opportunity to obtain continuous short-term results and early impacts from efforts as well as providing an early indication of impacts on an overall societal level. Thus, monitoring is responsible for: supporting the programme leadership; providing updated information on VINNOVA's programmes relating to costs and results; delivering easily accessible information to external players (including the government in its capacity as principal); and acting as a support to the programme's work, with milestones for what should be achieved in the operation. Thus, the monitoring also contributes to a discussion surrounding the activity being conducted which can benefit VINNOVA as well as the players being funded under the programme. Monitoring takes place internally at VINNOVA.

Thus, the overall issues to be addressed in monitoring are:

- Is there a reasonable correlation between activities and objectives?
- Is there reason to believe that initiatives with these activities will achieve their objectives?
- What obstacles, opportunities and proposed measures can be identified?
- Based on the above issues, what conclusions can be drawn for the initiatives, the programme management and otherwise for VINNOVA?

To a certain extent, conclusions and results in the present report are shown in relation to these issues on an overall programme level. There again, conclusions for the individual initiatives are dealt with in dialogue with these. There will also be an assessment of initiatives' operations and results in future evaluations and impact analyses.

1.3 Situation report 2009

In addition to the written report which initiatives normally provided, the 2008 annual report and results also involved responding to a web-based questionnaire, with mainly quantitative reporting.

The written annual situation report which the initiative submits to VINNOVA consists of three parts:

- 1 The standard form which appears on VINNOVA's e-services portal.
- 2 A new web questionnaire sent out separately by e-mail. This year, it comprised a test and did not formally replace the standard form.
- 3 The in-depth situation report described below. The aim next year is for the web questionnaire to replace the standard form and also to some extent the in-depth situation report.

The in-depth situation report should contain information under the following points:

- **Outline** (in English and Swedish)
- **Annual report** with these headings:
 - Research and competence provision
 - Commercial/Industrial results and impacts on contributing companies
 - Added value from the effort
 - Gender and equality
 - Functional development organisation
 - In-house monitoring, performance ratios and results
 - National and international role of the effort and current position
- **Income and expenditure account**
- **Survey of contributing companies/organisations, researchers and list of projects/activities.** Initiatives must complete this data in separate tabs of an Excel file that is supplied. This year, the file was enhanced by a unique ID number for each sub-project/activity which must be appended to the organisations and researchers shown in the same table. This was a step towards simplifying future monitoring and evaluations at project level.
- **Other documentation.** Including lists of enquiries, reports and other relevant documents with a bearing on the efforts.

Those initiatives which compile an annual report aimed at a broader audience than VINNOVA and essentially covering the required areas have been allowed to submit that instead of a special in-depth situation report as per the above template. This helps initiatives avoid too much duplication of work and encourages them to produce more public material relating to their operations and results.

1.4 About the report

The first eight VINNVÄXT initiatives submitted their situation reports in March 2009, whilst the four 2008 VINNVÄXT winners submitted theirs in August 2009. These reports gave an account of which activities had been implemented in the past year and what results had been generated within them. Also included in the operational analysis were the initiatives' operational plans for the current period, past monitoring and evaluations and information from webpages. To deal with the overall monitoring issues listed in the previous chapter, the written situation report has been enhanced with interviews (see Appendix E) and includes questions along the following lines:

- How have activities been selected?
- What justifications are there for the activities?
- How have the activities been implemented?
- What results have been achieved or are anticipated?
- What role have the initiatives had in the activities?

During the monitoring, a categorisation of the initiatives' activities emerged which divided the operation as per the bulleted list below. This constitutes the structure of this report, both in analysing the activities of all 12 initiatives together and for the initiatives individually (see Appendices A, B and C).

The fields of operation within which the activities have been grouped:

- Regional and national strategic processes
- Regional meeting arenas
- Communication and marketing
- Competence supply
- Funding
- Internationalisation
- Integration of gender perspectives
- Needs-driven research
- Newly established enterprises
- Development of existing industry and/or public sector
- Activities for individual learning, monitoring and evaluation.

For the first eight VINNVÄXT initiatives, the 2009 monitoring has devoted special attention to systemic changes in regional innovation systems, involving altered behaviour and priorities on the part of players and traceable to initiatives funded under the VINNVÄXT programme.

The interviews with the process management and discussions at the dialogue meetings were based on the above headings describing the initiatives' operations. Combined with the written sources, the idea was that these would identify what activities lay within the framework of these fields of operation. As well as process management, a few people were also interviewed in each initiative whose experience of the initiative's operation

might assist in making the analysis more thorough. Thus, which areas have this deeper understanding depends on who was interviewed. The description in Appendices A-C of the initiatives' operations is intended to give an overall picture based on these sources. However, it should not be expected to give a full description of everything the initiative does and contributes to.

In previous years, the compilation of results from monitoring has not been released or been on the scale presented here. The reason for this report is a demand for an overall study providing an insight into the VINNVÄXT initiatives' operations; what activities they are running to promote growth and a general discussion regarding the experiences of policy development from the programme's operation so far. This demand relates to VINNOVA as well as other players working to promote growth in Swedish regions. Above all, the texts about the initiatives' operations and results in the present report are descriptive and the conclusions shown apply primarily to what VINNOVA has learned about growth programmes in regions. Evaluating the content of the initiatives' operations or the results shown is a matter for future evaluations and impact analyses. The report also aims to provide supporting data for these analyses. The authors represent VINNOVA's Strategy Development Division and Innovation Actors Division.

2 The initiatives' operations

This chapter reports on and analyses the overall profile of the initiatives' activities in various operational areas. Its aims are to provide an insight into and increased knowledge of their activities so as to aid growth and introduce an overall discussion on experiences from the operations. The individual initiatives' operations are described in Appendices A, B and C. Policy development conclusions are shown in Chapter 3. The authors are responsible for the analysis and conclusions shown. Where VINNOVA is referenced, this relates to attitudes, intentions and objectives which have been in the programme from the beginning and which are also shown in the programme texts and calls for proposals of the VINNVÄXT programme.

The initiatives have designed their action plans based on their regional potential within each focus area. These action plans have been approved by VINNOVA on the recommendation of the programme board. Based on the action plans, initiatives conduct activities deemed relevant in addressing identified drivers and bottlenecks. These aim to achieve the goals set for the programme and initiative concerned. Once selected, they have been given a relatively great freedom compared with what is common in other programmes at VINNOVA to determine their own operations with the aim to help fulfil programme objectives.

The survey of the activities reported by the initiatives in the annual monitoring can be used for learning and exchanging experiences in order to develop the initiatives' operations. The study illustrates the differences in the balance between the operational areas and what activities are conducted within them, but does not aim to compare the performance of initiatives. These differences arise from the various regional innovation systems and innovation processes within the focus areas causing the initiatives to prioritise different combinations of activities.

Besides contributing to VINNOVA's learning in advance of future programme designs, the purpose of the monitoring is to assess the probability that initiatives are contributing to the fulfilment of programme objectives and will go on doing so, plus whether there is cause to adjust the operation. Discussions on the possible need for change in individual initiatives took place after the interviews at the meetings between the leaderships of the VINNVÄXT programme and each initiative. The texts were then finalised in the present report. The initiatives have also been given the opportunity to correct errors and bring opinions regarding the text on each initiative in Appendices A,B and C. The texts are chiefly descriptive and not evaluative. To assess the quality of the projects conducted and whether the results reported by the initiatives are of the anticipated scope requires a deeper analysis than has been the aim of this study. Such an analysis would require the involvement of external evaluators with specialist competence within the focus area of each initiative and has been left to future evaluations and impact analyses.

The initiative conducts activities in accordance with the action plans approved by VINNOVA, following assessment by VINNOVA's programme board. As already stated, the aims of the programme are to promote sustainable growth in regions by developing internationally competitive research and innovation milieus within specific growth areas. Initiatives run many activities within a number of operational areas which, at first glance, can give a divided impression. Even so, this is an expression of their wish to aid the positive development of a complex innovation system. The initiatives' analyses of drivers and bottlenecks imply that they see a need to develop activities within many operational areas. Some activities aim to develop confidence in the operation from players in systems, so that subsequently these players can be involved in development projects which more directly contribute to growth objectives. For this reason, activities may also be initiated where a function is considered to be missing from the regional innovation system (RIS)⁴. At a later stage, the function can be handed over to other players when it has proved to contribute to a more effective innovation system. Thus the overall aim of the activities is to promote research, innovation and growth within each initiative's focus area regionally and thereby also nationally, based on identified needs and opportunities.

The situation reports and interviews emphasise that the initiatives started their operations in systems of established players which had ongoing activities with the same or similar aims as the initiatives. The initiatives have seldom "reinvented the wheel" but have built upon and are developing existing operations, even though there are examples of entirely new activities being initiated. The additional and particularly the long-term funding which initiatives contribute enables activities that are already underway to be scaled up and the focus area given increased priority in the activities. This has led to an increased pace and scope in the activities. In a few cases, ongoing activities have been developed so as to better fit the focus area. In this context, it is important to emphasise that the initiatives' role is to collaborate as best they can with other RIS players and not compete with them. The overriding impression of the eight initiatives which commenced operations in 2003 and 2004 is that over time, they have developed their collaboration with other RIS players whose assignments overlap theirs. There were initially conflicts regarding role allocation, but now all initiatives appear to be in a situation where the collaboration is working well even if the division of roles and contents in the initiatives' operations is and will remain subject to reappraisal and development. In the four latest initiatives, there are signs that the division of roles between the RIS players still needs development to guarantee that the cooperation is working effectively. The degree of renewal in working methods and introduction of new ways to stimulate positive development varies between initiatives and is not an end in itself. The expectation is that the new, uniting force for the functional region's focus area has legitimacy to contribute to a greater coordination and streamlining of the

⁴ VINNOVA describes "effective innovation systems" as follows: "Players in the industry, academia and political/public sector who jointly generate, exchange and utilise new technology and new knowledge to create sustainable growth through innovations", i.e. successful new products, services and processes. "Regional innovation systems" has a corresponding meaning at regional level.

operation based on an identification of drivers and obstacles in the RIS and that the players will collaborate in dealing with these.

In Appendices A-C, as in this chapter, the descriptions of the initiatives' activities are divided into 11 operational areas. The balance between these areas varies between the initiatives. For all initiatives, the needs-driven R&D projects take up the most space in the budget – at least 50%. These are described under the headings of “Needs-driven research”, “Newly established enterprises” and “Development of existing industry and/or the public sector”. In this study, R&D projects means projects which will lead to a development of knowledge or commercialisable results, i.e. which can be measured in the form of scientific publications, prototypes, new products, services, processes and successful companies within the initiatives' focus areas. Moreover, it is part of VINNOVA's agreement with the initiatives that at least 5% of the VINNOVA funding is to be used for the initiatives' activities in monitoring, evaluation, foresight processes and the like. One area in which several initiatives have found it difficult to distinguish their role and identify activities is integration of gender perspectives. Contributing to this should be part of all programmes funded by VINNOVA. Only a few initiatives have distinguished their role and identified activities in gender perspective integration that also contribute to growth goals. Accordingly, the initiatives that successfully identify relevant activities according to their assessment in this area are those which have devoted more time, commitment and budget to it than others. For the other operational areas, the balance of time, involvement and budget varies greatly between initiatives.

2.1 Regional and national strategic processes

This section describes the initiatives' involvement in regional and national strategic processes. There are examples of processes which initiatives have started themselves and ones begun by other players with contributions from the initiatives. The following is a description of how initiatives carry out their own strategic processes to shape their own operation. There is also a discussion of the initiatives' legitimacy and mandate in various strategic processes (their own and others') plus how VINNOVA has expressed its expectations in regard to the role of the initiatives in regional and national strategic processes.

Amongst the activities identified in the situation reports and interviews, it was found that initiatives assemble players in order to run strategic processes, implement outside analyses (national and international) and to conduct inventories of needs, drivers and bottlenecks in the RIS. These activities are primarily to shape the initiatives' own operations. The role of the initiatives in various strategic processes indicates the extent to which the initiative is a legitimate part of the regional leadership and has a mandate to operate or participate in such processes. To differing extents, the initiatives have also succeeded in establishing themselves as a legitimate uniting force and representative of their regions and focus areas. The text below refers to activities in which the initiative (not individual players in it) contributes to national and international strategic processes and initiatives.

VINNOVA expects initiatives to take a leading role and contribute to the development of a regional leadership within the focus area, if this has not already been satisfactorily dealt with by RIS players. The strategic processes which initiatives conduct within their operational areas also clarify the initiative's role, mandate and legitimacy. Through the processes, it becomes clearer how other RIS players regard the initiatives' operations. The strategic processes identified in the situation reports and interviews apply to several of the initiatives' operational areas. Clearly, some initiatives do not have a mandate to lead more comprehensive strategic processes for the focus area in the region, but they often do contribute when such activities take place. The interviews give occasional examples of situations in which there have been problems forming strategies for individual initiatives' own operations. It has been possible to resolve these after further discussion.

When the initiatives have legitimacy, they act as regional nodes within the relevant R&D-associated focus area in national and international contexts. This legitimacy is due to the fundamental situation of being a regional node, i.e. outside players consider there to be a quality and agglomeration of research and commerce, or perhaps a uniqueness which justifies the legitimacy. Whether outside players regard the operation as important and relevant naturally also affects their assessment of whether initiatives represent their region in the focus area or not. The long-term funding of the VINNVÄXT programme has largely contributed to the initiatives' legitimacy amongst the RIS players.

The four initiatives started in 2008 are working according to action plans applicable to 2008-2011 whilst the first eight initiatives are working according to action plans applicable to 2007-2010 and 2008-2011. Prior to the new operational and contract periods for these eight initiatives, international evaluations of the initiatives were carried out in 2006 and 2008. These evaluations highlighted deficiencies in terms of how the initiatives work with issues of internationalisation and some of the initiatives have conducted or initiated strategic processes with particular emphasis on this operational area (see also under the heading "Internationalisation"). Other areas in which the initiatives' opening operations were tentative relate to integration of gender perspectives and to some extent also activities for individual learning, monitoring and evaluation. A number of initiatives have also begun strategic processes within these areas. Several have also further developed their communication plans. In terms of internationalisation, integration of gender perspectives and activities for individual learning, monitoring and evaluation, it is clear that VINNOVA has not managed to convey a clear picture of its expectations of the initiatives. These aspects are described further under each heading in this chapter.

The action plans for the current operational period were designed for the first eight initiatives through strategic processes chiefly involving the process managements and executive boards. In a number of cases, expanded working groups were formed for individual operational areas. The action plans are based on the experiences gained during the initial operational period and the recommendations from the international

evaluations of 2006 and 2008. In a number of cases, members/partners meetings, needs inventories or outside situation analyses were held to augment the decision-making data. For some initiatives, there are now plans to further develop their involvement in regard to competence supply to players in the initiatives. This is described for each initiative in Appendices A and B.

From the interviews and situation reports, it is apparent that many of the initiatives are increasingly questioning the region's position or uniqueness in the world within the focus area, in other words the strategic profile. The four latest initiatives are also discussing this. Some initiatives are using outside monitoring and outside situation analyses to try and contribute to a greater knowledge of this in the RIS, thus clarifying the competitive situation and identifying potential strategic collaborations. Generally, it is not clear from the situation reports and interviews how the initiatives contribute to the profiling or that they consider they have a role to offer. This is partly because they consider the players involved have their individual strategies and that they are responsible for the profiling, and also that the funding which the initiatives contribute is often small relative to the total funding of the focus areas for players contributing to the initiatives. This also affects the extent to which it is felt possible to influence the profiling. There is room for increased reflection by initiatives on how their operations contribute (and might further contribute) to the profiling.

Outside world analyses can help enhance knowledge of the functional region's position and uniqueness within the focus area in an international comparison, plus international trends within the focus area. These can thus serve as an important decision-making basis in strategic processes with actors in the RIS and be used for marketing. This is something which a number of players in the regional innovation systems appear to be demanding and which the initiatives might be able to offer for longer than VINNVÄXT.

In some cases, a particular leading RIS player has had a different view to the initiative's process management on which activities should be operated within a given operational field, and how. In these cases, the initiatives have arrived at a method of managing conflicts of interest in consultation with the executive board and have implemented the required changes. VINNOVA's active involvement in the initiatives' operations (focusing on process support for example), creates an expectation that VINNOVA will take an active role if the partnership between process management and executive board does not work satisfactorily, or if individual principal issues need solving. On some occasions, VINNOVA has been involved in taking these types of discussions forward by trying to clarify what it expects of the initiatives.

Some initiatives have the impression that VINNOVA has changed its outlook regarding the expectation that initiatives will focus on being regional or national players within their focus areas, plus their role in an international context. In other words, an increased focus on operating nationally and internationally. Since the start of the programme, VINNOVA has tried to convey the fact that initiatives are expected to function (or help other players in the region do so) as regional nodes in national and international contexts and networks. For example, initiatives can help by providing access to and a

source of information about the RIS players' operations. This promotes fruitful cooperation or the initiatives can proactively identify such possible cooperation. The initiatives' regional roots should not lead to regional locking-in, i.e. seeking regional partnerships because of their closeness rather than their being most effective at achieving the established goals. However, the programme's goal is still for the initiatives' operations to contribute to growth in the region and this does not contradict the above.

VINNOVA would encourage the first eight VINNVÄXT initiatives to start considering now how they plan to proceed once the VINNVÄXT funding ends.

2.2 Regional meeting arenas

The initiatives arrange meetings which bring together RIS players to promote knowledge dissemination, discuss operational circumstances in the focus area and exchange experiences. This also helps develop networks, thereby improving the prospects of collaboration. The objective is ultimately for these meetings to lead to R&D projects which contribute to growth. This section describes those activities in which the initiatives themselves, individually or in collaboration with others, create meeting places which assemble representatives of academia, industry and public players alongside those meetings hosted by initiatives in order to plan and run their own operations, such as process management, executive group and working group meetings.

All initiatives arrange this category of meeting, in such formats as annual conferences, seminar series and informal meetings, or they initiate regional networks for specific subjects or categories of individuals. Meetings have different purposes and target groups, such as discussing and exchanging experiences and giving information about developments in the focus area or regarding the prospects for players' operations in the form of funding, competence supply etc. The number of meetings arranged and their size varies from initiative to initiative.

The regional meetings which the initiatives arrange are described in the interviews as popular. For example, some of the initiatives can point to an increase in the number of people participating in the meetings they hold. It seems that enquiries from national players regarding joint functions with the initiatives are also on the increase. A number of initiatives evaluate completed events by allowing the attendees to grade the meeting anonymously.

There are experiences of an almost anecdotal nature from the meetings the initiatives arrange, dealing with how those who meet have gone on to joint projects or start new business. There is the possibility for VINNOVA to develop the way in which such qualitative results might be incorporated and exemplify the benefits of creating regional meeting arenas. This might be something for the researchers monitoring the initiatives' operations to document ahead of the forthcoming situation reports (see the heading "Activities for individual learning, monitoring and evaluation").

Examples of regional meeting arenas which differ somewhat from annual conferences and seminar series are described below. These include the MD network in Innovation at Interfaces, also linked to the student grouping assembled by the initiative to identify activities which could help the sector in being considered a more attractive future employer. Within Triple Steelix, public players and corporate representatives are brought together for popular study visits to individual companies. General meetings are also arranged between the leading steel companies and small regional companies, leading to new business models for service and repairs. In Uppsala, the pubs at Uppsala BIO are well frequented and there are instances of this leading to new partnerships. Biomedical Development in Western Sweden holds popular international conferences within its focus area.

2.3 Communication and marketing

As a part of the objective of increasing regional involvement in the focus area and promoting the international competitiveness of the research and innovation milieu, the initiatives' operations include communicating the operation they are running and the operations of the RIS players within the focus area, regionally, nationally and internationally. This section reports on the activities which the initiatives are running with these objectives.

All initiatives now have some form of communication plan and VINNOVA has supported the initiatives in their work of developing these⁵.

Activities reported by the initiatives include:

- Working to improve websites
- Designing releases and newsletters
- Producing and disseminating results reports and information material
- Participating in exhibitions and conferences
- Arranging meetings of specific target groups, such as politicians, to give information about the initiatives' operations within the focus area
- Instituting and awarding prizes.

This is one area in which there are relatively major differences between the initiatives' strategies. The majority are working actively to make their operations visible in various ways, but the conditions for this and level of ambition vary.

Robotdalen is the initiative most clearly working towards visibility in the press and media. Measurements⁶ indicate that relatively, it dominates the number of articles in the press by VINNVÄXT initiatives. The VINNVÄXT programme as a whole takes a high proportion of VINNOVA's press and media visibility. Another example is Biomedical

⁵ Gennerud et. al., "Process Support, Communication and Branding – VINNOVA's VINNVÄXT programme", VINNOVA Report VR 2009:24, (2009).

⁶ Vinnväxt in the Swedish media 2008, Gullers Grupp (2008).

Development in Western Sweden, which has benefited from the international arrangements surrounding the Swedish vessel, the East Indiaman Göteborg. In their estimation, the initiative has gained very good visibility, especially in the competition from the automotive industry in that particular region.

A number of initiatives have built up communication platforms in the region through the broad annual meetings they arrange. These are generally considered to be well attended. Several initiatives have conducted measurements of knowledge about them and “customer satisfaction” in order to monitor the development of these aspects.

The activities which initiatives have held in order to develop their websites include the development by Innovation at Interfaces of a way to visualise the initiative’s current or completed projects on a chart. Information is shown about project partners involved and there are descriptions of project contents. This chart, in the form of a map of the region, is linked to a database containing information about the project portfolio. Another example is Uppsala BIO which, on the website it composed under SULS (Stockholm Uppsala Life Science), indicates the region’s research, companies and R&D projects. In addition, there is another webpage for communicating about Uppsala BIO’s operation and players.

Several initiatives are increasing their membership and number of players working in their activities. Those conducting knowledge measurements report increased knowledge about the initiatives. The interviews give the impression that the number of enquiries from national and international players regarding possible collaborations on events is increasing, as are enquiries where they are expected to provide information about, and access to, the region’s players within each focus area.

2.4 Competence supply

The VINNVÄXT programme goals mean that the initiatives’ operations are primarily expected to contribute to competence supply by influencing researcher training and by funding researchers within the focus areas. Over and above this, the initiatives have identified a broader need for competence supply and have developed activities to serve these. These activities address such issues as getting children and young people interested in the focus areas, or science and technology generally. Also, influencing and contributing to the development of training programmes at senior high schools and universities, as well as the ongoing needs of those working in companies.

Activities identified as being within the area of competence supply include:

- Contributing to strategic processes relating to competence supply
- Analysis of future needs for competence
- Activities to arouse the interest of children and young people, plus activities to advance the quality of education in compulsory schooling and senior high school
- Designing information material and information initiatives aimed at students making their selections

- Contributing to the development of new courses, or further developing existing ones at university level within subjects relevant to the focus area
- Contributing to the development of new courses, or further developing existing ones within business development, entrepreneurship and leadership
- Contributing to courses and competence development in companies
- Participating in an exchange of experiences relating to cluster development.

Efforts organised by the initiatives target nursery level and compulsory schooling (such as Robotdalen's LEGO League), senior high schools (such as contributing to applications for advanced high school courses or arranging industrial representatives as guest lecturers) and university and researcher training (for example research schools and industrial doctoral students plus GIBBS, intended to train future leaders of business development within biomedicine in Gothenburg). Innovation at Interfaces has an activity to increase student interest in a future career in the food sector. This work involves a group of students suggesting various activities which may help increase the attractiveness of the sector.

Other training needs dealt with include: purchasing competence in regard to procurement; leadership training, say, for women; business development and entrepreneurship for specific focus areas; and tailored commissioned education for corporate groupings, including advanced courses in the focus area.

According to the interviews, the demand for competence supply efforts which the initiatives are experiencing is influenced in the short term by the current financial crisis. These are termed "retraining" and "upgrading" requirements so that those currently without work will be able to return to the job market. The long-term need, which the initiatives also sees as the greatest challenge, is guided by the fact that many players will have a latent labour shortage when the market turns and all the 60-somethings are pensioned off.

The issue of competence supply and competence development is important in most of the initiatives and is often given high priority by contributing companies. This is partly due to a demand for activities to interest young people in the focus area and partly about helping improve training courses at various levels. In several of the initiatives, it is one of the most important reasons for major companies' involvement and participation, as highlighted in previous monitoring. The role of the municipalities and universities is important in this operational area. They are the players who own the issue in that they prioritise which training courses to implement and determine how it will be done, based on political directives.

2.5 Funding

The VINNVÄXT programme goals state that the programme should help make the region attractive to individuals, companies and investments. This includes funding in such forms as regional, national and international research grants and corporate investments. Applying for and being granted funds for an operation is an indicator of

attractiveness which can be monitored over time. Successful applications mean that the operation being run is considered relevant by the financiers as well as being important to the initiatives' future operations when the VINNVÄXT funding ends. This section describes the initiatives' role in applications and the link to the Structural Funds and other regional, national and international financiers.

As previously mentioned, initiatives in the VINNVÄXT programme are funded for an operational period of 3-3½ years at a time, following which an agreement is reached based on an action plan approved by VINNOVA. VINNOVA provides funding for initiatives of between SEK 4-10,000,000 per year and requires at least an equivalent sum in co-financing from regional players, either as cash funds or as a contribution in kind. Funding issues are currently not as topical where it concerns the regional players' co-financing. This is because they are in the early-mid section of an agreement, so this issue will really come to the fore when the contract with VINNOVA is renegotiated.

In the majority of initiatives, there is support for applications to regional, national and international players so as to contribute to the focus area's development in the region. This means activities in which the initiative has taken a hand in submitting the application, not applications from individual researchers, organisations and companies linked to the initiative. Information about researchers' applications to the EU's Framework Programme has also been collected as part of the situation report, but mainly belongs with the results under the heading of "Needs-driven research". Successful applications of this kind can be used as an indication of quality in the research being conducted.

Where it concerns the EU's Framework Programme, the initiatives occasionally contribute by adding text about the initiative and its research and innovation milieu. In some cases, the process management has been involved in writing parts of applications and there are plans for more active advising and participation in future application processes in some initiatives.

One study indicates that at the turn of the year 2008-2009, VINNOVA was co-financing 13 projects which had been granted money from the Structural Funds⁷. In total, approx. SEK 125 million of VINNOVA's agreed funds were used as national co-financing. The VINNOVA programmes this primarily concerns are VINNVÄXT and the Key Actors Programme. The same study shows that the more northerly counties dominate the Structural Funds statistics. This may possibly be because these regions have a familiarity with and knowledge of how to apply for these types of funds which a number of other initiatives have not yet assimilated. There is potential for further funding to strengthen the VINNVÄXT initiatives' operations. At the same time, experiences of funding from the Structural Funds are not entirely positive. They are regarded as requiring a great deal of administrative resources to manage including cost accounting and feedback. Furthermore, a clear specification of the activities is required

⁷ Work material, Göran Reitberger, Reginova AB (2009).

in advance which reduces space for the flexibility that these uncertain and unpredictable processes may need. Uncertainty relating to how the regulations apply concerning R&D projects with companies has led to difficulties and a certain amount of delay in the initiatives' work. However, initiatives experienced in these dealings, such as ProcessIT Innovations and Fiber Optic Valley, consider that managing this is something that can be learned and that the burden reduces with time. Robotdalen serves as an example of Structural Funds money being perceived as too "restrictive"; all the initiative's money was used in co-financing. This meant the initiative's entire operation was controlled by the Structural Funds' regulations. To avoid restricting the flexibility in the VINNVÄXT conditions, the choice was therefore made not to use all the funding granted by the Structural Funds.

In a number of initiatives, players have been granted funds from other VINNOVA programmes and calls for proposals, such as the Key Actors Programme, Research&Grow, Global Links, Innovation Channels within the Health Service etc. The initiatives have contributed to these application processes in varying degrees. It has also emerged that the initiatives hosted information meetings with financiers aimed at RIS players. This particularly applies to Research&Grow. Some initiatives have also commenced application processes and hosted discussions between possible partners and thereby catalysed these processes. It has also emerged that the initiatives and players in them are attracting funds from other financiers, such as the Swedish Foundation for Strategic Research, the Knowledge Foundation, Almi, Innovation Bridge plus regional financiers such as foundations and regional public players.

2.6 Internationalisation

The programme goals include the initiatives contributing to increased international competitiveness. Amongst other things, this has been expressed in terms of the initiatives gaining access, through national and international collaboration, to R&D-based competence within the focus area. Most initiatives conduct activities intended to promote internationalisation of the focus area in the region. Descriptions under this heading cover activities which the initiatives are running, but not individual players' own international activities or links via formal and informal cooperations, joint applications etc.

The activities which the initiatives have started or are actively contributing to include:

- Developing the initiative's approach or a strategy on how the initiative should work on issues of internationalisation
- Outside situation monitoring
- Exports and investment promotion
- Participation, or funding of participation, in exhibitions and conferences
- Receiving or arranging delegation trips
- Activities to promote networks or bilateral/multilateral collaboration at milieu level and project level.

As with the earlier evaluations^{8,9}, the monitoring shows that a number of the initiatives are not focused at milieu level on how to manage internationalisation issues. For two of the first eight VINNVÄXT initiatives, the interviews show that only a small number of activities were being run in this area. One reason given for both these was that an initial choice was made to focus on other operations in the functional region and perhaps at a later stage commence internationalisation activities. These initiatives see it as their task to contribute to the focus area's international competitiveness through the other activities that are run. The four latest VINNVÄXT winners are conducting activities of various kinds to promote internationalisation. However, none of the initiatives has an internationalisation strategy.

One area in which the initiatives can be important players – if they have legitimacy to represent their regional nodes within each focus area – is serving as an extension of the national and regional/local public players in order to attract investments and establishments and work to keep existing companies in the region. This may mean involvement in processes to identify any mutually beneficial corporate investments for Sweden and contributing to designing and offering an attractive package of incentives for this. This also includes dialogue with those companies, Swedish and foreign, which have operations in the region, so as to promote continued investments and new efforts. A number of the initiatives already have activities in these two areas and this is exemplified in the reporting by the company Giraff AB which moved its operation from the US to Västerås and Robotdalen.

One consideration is that there are two sides to foreign corporate investments. They may be regarded as an indication of the milieu's attractiveness and add resources and competences to the operation, but there is the risk that foreign companies will buy up and remove interesting innovations from the region. There may also be unwillingness on the part of the established companies in the region to attract the establishment of a competitor to the region. This may be due to concern about competing for competence, market share or in some areas raw materials as well as a wish not to risk suspicion of cartel-formation by participating in the same initiative as a competitor.

An example of the way in which an initiative can contribute to internationalisation for companies is Uppsala BIO's design of an activity aimed at opportunities for small and medium-sized enterprises (SMEs) to reach out into the world for cooperation and market introduction. This work commenced with an inventory of SMEs' needs plus regional companies' knowledge of, and networks with, international players which may benefit other companies. Uppsala BIO is also collaborating with public players on the dialogue with foreign companies in the region in order to advance their regional establishment. For example, Robotdalen and Biomedical Development in Western

⁸ Cooke P., Eickelpasch A., Ffowcs-Williams I. Rangnes J. Evaluation report by the VINNVÄXT International Review Team, VINNOVA Report VR 2007:11 (2007).

⁹ VINNVÄXT II – Generalist and Specialist Evaluation of Process and Knowledge Development 2004-2007, VINNOVA Report VR 2008:12 (2008).

Sweden are working actively to attract new cooperations, investments and establishments.

Other common activities are funding and occasionally also coordination of participation at international exhibitions and conferences for companies and researchers. According to the interviews, participation in conferences and exhibitions is also a part of outside situation monitoring and provides knowledge about the individual initiative's research position and companies' competitiveness. The initiatives operations are also marketed at such events and some initiatives also arrange delegation trips, often with the aim of identifying possible R&D project partnerships.

For research and innovation milieus, knowledge of the milieu's position in an international context and a conscious strategy for international collaboration is important, even though individual researchers and companies will continue to identify their own collaboration partners. It is not obvious how this work will take place, what role the initiatives should have, or what mandate the initiatives have to run activities in this regard. Instead of being proactive and prioritising between possible activities, it is easy to end up in a situation of reacting to other players' initiatives. Being proactive requires some form of strategic process where information is obtained about the international development and the research and innovation milieu's position within the focus area and an inventory of needs, opportunities, drivers and bottlenecks made. This is followed by a decision on an approach and/or selection of activities. Some of the initiatives have introduced such processes and also begun to implement activities, offering opportunities to exchange experiences between the initiatives. Processes like these clarify the initiative's mandate, relative to other RIS players, to run activities aimed at promoting internationalisation.

In this context, VINNOVA has not been clear regarding its expectations. The authors consider it important for the initiatives to continue developing their knowledge of the milieu's position in an international comparison and which the prominent and relevant international nodes are for knowledge of the competitive situation and to identify possible partners. Such a knowledge base is a prerequisite for being proactive, designing an approach and choosing which activities to hold in order to promote such things as positioning, marketing, collaboration, investment, establishment or recruitment.

2.7 Integration of gender perspective

In order to contribute to the programme's growth goals, it is important to utilise all available competence and for companies, educational establishments and other organisations in the initiatives to be seen as attractive workplaces for both genders. The design of goods and services that are developed should also be relevant from a gender perspective. Integrating gender perspectives into the operation is part of the programme objectives of all VINNOVA programmes.

In order to contribute to this, activities are held by the initiatives to promote the integration of gender perspective by the initiative. These activities can be broadly divided into three categories: 1) measurement and analysis of how things look and the reasons for this, 2) attempts to influence the situation, i.e. change attitudes and behaviours and 3) attempts to integrate gender perspectives into the applications being developed within the focus area.

Information is gathered and clarification attempted on such issues as:

- How the gender division appears in activities and to decision-making bodies and various players, or in the initiative's own operation
- Reasons for an uneven gender distribution

Among the activities and actions which can be named are:

- Strategic work aimed at designing an action plan
- Changes in gender division in executive groups, projects, marketing etc.
- Identifying models
- Applying gender perspectives to applications within the initiative's focus area
- Establishing informal meeting places and networks
- Offering targeted training, such as leadership training
- Holding meetings to exchange experiences between VINNVÄXT initiatives
- Contributing to research projects on gender perspectives

Based on the situation reports and interviews, it is clear that several of the initiatives are uncertain as to which activities it is relevant to commence in order to promote the integration of gender perspective. In a number of cases they are still questioning whether they should have a role in this context and, if so, what that role should be, whilst others see the importance of this but do not know how to proceed. The interviews show that the initiatives find VINNOVA has been unclear regarding its expectations of the activities within this area. In the situation reports, VINNOVA requests information about the gender division in the initiatives' activities and organisations, plus what activities are being run to promote integration of gender perspectives. For some initiatives, activities are limited to keeping track of what the gender division is like in executive groups, projects, marketing etc.

One initiative which has worked very actively to integrate gender perspectives is Fiber Optic Valley. Its efforts include a leadership training course integrating these questions and analysing the reasons for an uneven gender distribution with individual players. Its experiences might advantageously be incorporated by the other VINNVÄXT initiatives. There are also interesting examples amongst other initiatives of working methods, such as the informal meetings and networks arranged by Triple Steelix. Three of the initiatives – Fiber Optic Valley, Triple Steelix and Innovation at Interfaces – have received funds from VINNOVA's call for proposals, Applied Gender Research for Strong Research and Innovation Milieus, TIGER). All initiatives are expected to work

with gender integration issues and funds from the TIGER programme are seen as a positive contribution to the work.

2.8 Needs-driven research

According to the programme objectives, the initiatives are expected to contribute to knowledge development and profiling within each focus area and region. This is in order to achieve competitive research and innovation milieus. This section describes and discusses how the initiatives identify and select their R&D projects and what role the initiatives have as R&D financiers.

In nearly all the initiatives, the funding which the VINNVÄXT programme contributes is a small proportion of the total R&D funding for each focus area in these regions. When analysing the influence of the initiatives' operations on the priorities of R&D implementers, it is important to bear in mind what leverage the funding can give and the results achieved. To some extent, projects in this area resemble the type of project funded following calls for proposals by VINNOVA, in which funding is given for needs-driven research in collaboration between academia and industry.

As already stated, there is an objective in the programme for at least 50% of the funding to go to needs-driven R&D. VINNOVA's definition of R&D projects includes both those concentrating on knowledge building, development of technical solutions or product ideas based on needs, and commercial and technical verification and validation of either a research results or ideas from companies. The impression from the situation reports and interviews is that the balance between focuses in the initiatives' R&D project portfolio varies, but that projects emphasising verification and commercialisation dominate overall. For the educational establishments, these projects often have the character of assignments which can be linked to the competence of researchers in regard to technical platforms such as measurement and analysis equipment. At the same time, most initiatives also fund projects with a comprehensive research element emphasising knowledge accumulation. These are generally PhD projects.

The interviews give the impression that occasionally, VINNOVA's expectation of 50% of the funding to go to R&D projects needs clarification for individual initiatives. Individual initiatives that have a small number of projects with comprehensive research content may also now find VINNOVA expecting them to fund research leading to scientific publications but that they do not adequately meet these particular expectations. Usually, the need for clarification of VINNOVA's expectation arises when initiatives are planning changes in their operations and perhaps have verbal dealings in regard to the annual monitoring. A changed priority may be due to the region having attracted major contributions to research within the focus area in recent years, perhaps through centre efforts by VINNOVA.

A number of initiatives divide their project activity into pilot studies, development projects and R&D projects. Initiatives identify project proposals using such means as

calls for proposals, needs inventories or strategic processes involving a lot of players. Usually there is an evaluation of which projects are to be granted funding or other support (such as advice) by groups with a mixture of representatives from academia and industry. In some cases, investors, public representatives and others are also included. A number of initiatives help put together the project staff and identify project managers for them, particularly in the case of pilot studies and development projects but also occasionally for research projects.

In the same way that a national R&D financier such as VINNOVA needs to safeguard quality, transparency and efficiency in how projects are identified, chosen and monitored, it is equally important for corresponding systems to exist in the initiatives. In concrete terms, this means there is a need for clear criteria on how projects are assessed; adequate assessment groups evaluating applications; and processes and decisions documented and projects monitored in regard to content and results. How these processes are set up in the initiatives is therefore something which VINNOVA intends to go on monitoring. The initiatives' operations include identifying opportunities and putting together projects based on a knowledge of needs and players, which can lead to greater speed and flexibility than for national players. This does not conflict with requirements for quality, transparency and efficiency.

The intention of the VINNVÄXT programme has been for the initiatives to develop a unique competence and position in an international comparison within each focus area. This also means establishing a collaboration with relevant players regionally, nationally and internationally. Since some of the initiatives operate in regions and within focus areas with a limited number of implementers, it does happen that the same group is granted funding several times for different projects. In the long term, this funding gives them space to develop their knowledge within the focus area but may also contribute to a regional lock-in resulting in stagnation and a limited influx of new ideas. This can be counteracted if national and international collaboration is encouraged in this or other funding for the group. There are also examples of regional public players wanting to control the initiative's funds for all sections of the region and emphasis being put on regional players at the expense of outside collaboration. Both these examples deal with regional distribution policy aspects being put before growth policy considerations. Regional lock-in arises when the regional funding means looking for partners regionally even if the most appropriate cooperations to achieve goals lie elsewhere. However, a close examination of the initiatives' operations gives the impression that the process management groups are aware of the risks of regional lock-in effects. The authors would highlight these aspects and suggest that they be analysed more closely, perhaps in future evaluations or impact analyses.

One issue not addressed in the monitoring is how the regional selection affects the product quality relative to the equivalent national selection, i.e. whether the initiatives' projects might have been able to compete if there had been suitable calls for proposals at national level. This is interesting for a national financier when assessing the justification for handing over the allocation of funds for individual projects to a regional

player. Project quality has not been studied in this monitoring. The advantages of a regional distribution of R&D funds which can be identified include the knowledge which a local organisation has or acquires about needs and possible project partners. In addition, the proximity affords opportunities for close advising and monitoring of how projects are progressing. The advantages include a good chance of rapidity when taking decisions and starting projects. The drawbacks primarily relate to: reduced competition between project proposals from a regional selection which, in relative terms, can lower the quality of projects being granted funds; regional lock-in as mentioned previously; and the reduced national transparency regarding the distribution of support to projects. VINNOVA is well aware of these risks and monitors the initiatives' operations closely. The initiatives report project results to VINNOVA in the form of scientific publications, prototypes, products/services and processes, as well as who is cooperating in the projects' and role of the initiatives in the processes.

During this monitoring, no attempt has been made at international comparison of the quality of research funded by the initiatives. Part of the situation reports is that scientific publications produced under the initiatives' operations are to be reported. The number of publications has not been shown in this study. The number gives no indication of the content or quality of the research if there is no analysis of what type of publications they are and what scientific journals or other contexts they are published in relative to the prevailing publishing culture in the relevant focus area. Addressing this is a matter for future evaluations and impact analyses or other analyses, in order to gain an understanding of the content and quality of the research being conducted.

However, in a number of cases it is clear that prominent research milieus contribute to projects funded by the initiatives. Amongst other things, this is based on an overall review of the submitted publication lists and the fact that the milieus attract both national grants from the Swedish Research Council and other VINNOVA programmes, as grants from the EU's Seventh Framework Programme. For example, Appendix D shows eight applications to participate in projects under the EU's Seventh Framework Programme and three applications to coordinate such projects were granted when researchers active in the initiative's operation took part. In total, 144 PhDs and 61 doctoral students participated in seven of the eight initiatives' operations.

As already mentioned, few initiatives appear to have a clear strategy on how the R&D project portfolio should contribute to positioning and uniqueness of the initiative's players' operations in an international comparison. Some initiatives fund quite a lot of projects which leads to a risk of individual projects being subcritically funded. This is something which the initiatives should reflect on and evaluate. Other initiatives have the opposite situation, with a few projects and a relatively large amount of funding. Uppsala BIO and Biomedical Development in Western Sweden are examples of initiatives which, despite working in closely related focus areas, chose different approaches to their product portfolios (Appendices A and B). A comparative study of these initiatives might help clarify the advantages and disadvantages of each strategy.

In subsequent evaluations and impact analyses, it would also be interesting to study the advice regarding commercialisation and business development which some of the initiatives link to the R&D projects they fund. This kind of operational monitoring and ongoing advice to funded projects in the region is already taking place to some degree in national programmes but might possibly be further developed. One possibility is linking criteria about a cooperation with regional advisers relating to commercialisation and business development of nationally funded R&D projects. Such players might be the organisations which grew up around the educational establishments to promote utilisation as incubators and holding companies plus technology and science parks. Also of interest are the inventories of industrial needs and active identification of potential partners which a number of initiatives are conducting. This is a function to which initiatives of this type can contribute when dealing with applications for the national programmes and calls.

2.9 Newly established enterprises

For the purposes of promoting growth, the initiatives conduct activities to facilitate commercialisation of university research in the form of new start-up companies or spin-offs of existing ones. The initiatives have varying interest in commercialisation activities, in keeping with their action plans. The previous and following sections give examples of initiatives' activities to promote commercialisation of university research by using results in established companies.

In most cases, initiatives with commercialisation activities are collaborating with the innovation-supporting organisations and operations that already exist in the region. Partners may be technology and science parks, incubators and university holding companies or other functions at educational establishments and players such as Almi, Innovation Bridge and other innovation process financiers. In some cases, the initiatives support existing players with funding, providing increased priority and scope for efforts to start companies based on commercialisable ideas within the focus area. In some cases, the initiatives also influence the design of the activities being run. Occasionally, the projects which are granted funding are similar to those under VINNOVA's VINN-Verification programme or Focus Verification, a cooperation between VINNOVA and Innovation Bridge.

In some regions, the infrastructure for commercialisation and promotion of newly established enterprises is underdeveloped. There is a shortage of players offering advice and no physical infrastructure in the form of testbeds with measurements or analysis equipment, databases etc. or circumstances for prototype development relevant within the initiative's focus area. In these regions, the initiatives take a role of organising efforts for such infrastructures or building up the infrastructure themselves. This is the case for bodies such as ProcessIT Innovation's initiative in Umeå. This promotes the development of a company incubator within IT and is envisaged to correspond to the existing biotechnology incubator at Umeå and Fiber Optic Valley Labs. Also, an

initiative in Hudiksvall making various kinds of equipment available to companies (especially SMEs) as well as researchers.

Of the eight initiatives which started operations in 2003 or 2004, six have reported the start-up of new companies based on their operations for the year in question. The number of companies started varies from 1 to 11 for the six initiatives. Three of the four latest VINNVÄXT initiatives report that the initiative has helped start one company each, operating within the focus area. Under the heading of “Newly established enterprise” in Appendices A-C, there are examples of how the initiatives contribute to the start-up of new companies. Occasionally, companies have originated in R&D projects co-financed by the initiatives. In other instances, the initiatives have contributed funding or advice when starting the company. This advice may involve arranging contacts with relevant competence in such things as IP issues, news monitoring, market surveys, funding sources, applications for other funding or development of companies’ business plans.

2.10 Development of existing industry and/or the public sector

In order to develop companies’ competitiveness, the initiatives are running activities to broaden or further develop companies’ product portfolios or streamline their operations. A number of initiatives are also running operations to develop the operations of public organisations using new goods, services or processes. These activities consist of R&D projects, infrastructure investments and activities which more generally support companies’ competitiveness or public organisations’ operations.

The impression is that R&D projects often resemble the type of cooperative project between academia and industry that is funded through VINNOVA’s calls for proposals; in particular, the more development and demonstration-orientated projects. Projects may also resemble those receiving funding within VINNOVA’s Research&Grow programme. The initiatives co-finance projects, occasionally identify partners and implementers of various elements in projects, and in some cases run project management.

Occasionally, the initiatives’ operations may approach commercialisable services, for example research services links to method and technological platforms. However, they can never risk becoming market-restricting. For VINNOVA, it is important that when the operations approach commercialisable services it should be in an area where there are no commercial players and where the services can ultimately be developed into a commercial operation on commercial grounds.

As has already been explained, projects such as those within Triple Steelix, Robotdalen and ProcessIT Innovations have been divided into pilot studies and more comprehensive development projects. In these initiatives, the development of the process to identify, initiate, implement and evaluate projects has been inspired, amongst other things, by the way the Industrial Development Centres work. Projects are often identified following a needs inventory in which the process management or other representatives of the

initiative visit companies, or through other dialogues with groups of companies. The pilot studies are occasionally implemented by Master's or PhD students supervised by the region's educational establishments.

The issue of a need for a physical research and innovation infrastructure has been come the fore in most initiatives. This may relate to companies' access to laboratory equipment for measurements and analyses of, say, quality and performance in developing new products and processes. Relevant equipment is sometimes available at universities. To some extent, corporate needs can be satisfied by collaborating with and commissioning researchers. At other times, there is a lack of access to other types of equipment which also can be hard for small companies to invest in. A kind of infrastructure often said to be lacking in Sweden includes what are sometimes referred to as prototype workshops, pilot plants and demonstration plants. In some cases, initiatives help fund these two types of infrastructure – laboratory equipment for measurements and analyses on the one hand and prototype workshops, pilot plants and demonstration plants on the other – and provide staff for such efforts. Another way of making infrastructure available is for the initiatives to help coordinate companies that make their equipment available under certain conditions to R&D projects in the initiatives.

These types of infrastructure can constitute a resource for improving the competitiveness and renewal of regional industry. The infrastructure can also act as a national resource for industry throughout Sweden and be seen as a resource to attract national and international collaborations, investments, establishments and competence. Since many of the initiatives support the growth of this infrastructure in various ways, it strengthens the impression of a general need for this in Sweden. VINNOVA should therefore study more closely what needs there are, whether there is reason to develop a form of national initiative contributing to the growth of such infrastructure and how such investments might be funded.

Some initiatives are running operations which more generally advance companies' competitiveness, i.e. activities unconnected with research or development of new goods and services. To some extent, this type of operation resembles those run by trade organisations. This involves such things as promoting a subcontractor network in order to jointly offer the customers delivery of complementary products and services in a single context. Such collaborations take place in order to mutually make companies more attractive as subcontractors to Swedish and foreign companies. Other examples are the development and implementation of new logistics, new processes for designing quotations and agreements or initiatives for raising companies' purchasing competence.

During the financial year, the first eight VINNVÄXT initiatives have developed 56 new goods, 10 new services and six new processes have been developed (Appendix D). For the four latest VINNVÄXT initiatives, two new goods and two new processes have been developed within their operations during the financial year. The number of new goods, services and processes is unequally distributed between the initiatives. To some extent, this is due to differences in the focus areas within which the initiatives operate,

as their innovation processes often vary in length. It is thus more interesting to monitor the development over time of initiatives' operations for contributing to new goods, services and processes than comparing them with each other.

2.11 Activities for individual learning, monitoring and evaluation

VINNOVA expects the initiatives to conduct activities for individual learning, monitoring and evaluation. The concept of "interactive research" has occasionally been used to describe sections of this. As already mentioned, part of the agreements the initiatives have with VINNOVA is that 5% of VINNOVA's funding should be used for interactive research, monitoring, evaluation, foresight processes or similar activities. The purpose of the activities within the operational area are to increase the level of knowledge about the RIS, how it has developed and the initiatives' significance in that development, monitor the initiatives' operations and development and, through the enhanced knowledge, contribute to the development of the initiatives' operational activity. Amongst other things, the activities lead to reports and scientific articles based on questionnaires and other information gathering. Seminars and workshops are also arranged in which the results are discussed. Furthermore, scientific studies are presented at international conferences and meetings. In some cases, the interactive researchers contribute to the initiatives' operations, perhaps by attending the process management's work meetings and board meetings. This may happen so that the researcher can analyse how the operation is run and/or actively contribute to the processes through analysis and opinions on the operation.

What "interactive research" is, its purpose and anticipated content, has not been clearly specified by VINNOVA. The initiatives have been given greater freedom in conjunction with the researchers to design this operation. The reasoning for this was to offer the actual initiatives an opportunity to identify the relevant issues, indicators etc., given their particular situation and context. Not all initiatives have known how to work with and get something out of the interactive research. Some initiatives mostly want to oblige VINNOVA in this regard; they interpreted what VINNOVA wants and, at least initially, did not divine their own need for interactive research.

In some cases, the process management and researchers are satisfied with the outcome and see a mutual benefit in the operation. For the researchers, the cooperation means research results based on the empirical evidence supplied by the initiatives. According to the interviews, the process management generally regards the factual data about RIS and its development produced through the interactive research as a positive and useful result. It has been possible to use this data for marketing and information distribution. However, a number of initiatives see limited benefits where it concerns the contribution from the research studies to developing the operational activity.

The researchers' need for scientific qualifications and the need for integrity relative to the study object can be difficult to reconcile with the process management's expectations of quick and tangible results, a sounding board and a basis for decision-

making in the operational activity. There are examples of both parties being satisfied with the research being conducted, the factual data produced and the operational contribution of the interactive research. In the case of Triple Steelix, both the process management and person responsible for the interactive research are satisfied with the outcome. In that instance, the person responsible for the operation is not actually a researcher and therefore supports the process management and has no requirement for academic qualification.

VINNOVA is now planning to develop how the interactive research should take place. The purpose and anticipated results of the interactive research will be clarified. The direction of the interactive research may need to be changed, limited and possibly also harmonised between the initiatives. At this point, the benefit of the interactive research and possible overlap with future evaluations and the impact analyses should be factored in. There is a serious risk that the players in the initiatives will grow tired of participating in research, monitoring, evaluation and impact analyses, especially if the overlap between these activities is too great. Another reason for this is that other players are also running or demanding similar activities, such as regional, national and international financiers of the operation.

In some initiatives, consideration has been given to systematically documenting the indirect effects which the initiatives contribute to, through the “meeting arenas” which they arrange. By way of anecdotes, the initiatives can show that these meetings have been a contributory factor to projects and product ideas, but do not have sufficient basis to “take the credit” outright. There is potential for VINNOVA to develop how such qualitative results can be incorporated, exemplifying the benefits of creating regional meeting arenas.

2.12 Initiatives’ impact on their regional innovation systems

In the programme objectives, it is assumed that the initiatives will contribute to the development of regional leadership and its capacity to improve and streamline the RIS processes to promote renewal and growth. During the year’s monitoring of the first eight VINNVÄXT initiatives, special attention has been devoted to how far system changes can be identified in the RIS through each initiative’s focus area in the form of changed behaviours and priorities by players. This means changes which can be traced to the initiatives funded under the VINNVÄXT programme, i.e. examples showing whether the initiatives’ operations lead to such changes.

One indicator of this is that players who were previously neither participating in nor members of the initiatives decide to join. Membership involves co-financing of the operation but also presupposes active involvement in the initiatives, perhaps by being a member of a management group or taking part in R&D projects. Three of the eight initiatives have shown that the number of members has increased. It may also be that prior to a new operational period, they choose to continue co-financing the initiative or join new development projects. Other signs may be increased or new collaboration between players. If individual players decide to carry out new or increased investment

in the region and within the focus area, then it may be a result attributable to the initiative's operation. Information about such occurrences is requested in the situation report and interviews.

Accordingly, in the web questionnaire for the situation report, there was a question as to whether the universities that the initiatives collaborate with have changed their efforts and/or strengthened their profile within R&D areas important to the initiative. There are a number of examples of such changes taking place. For example, centres within an initiative's focus area in each region have been established at Lund University, the Antidiabetic Food Center, Linköping University's centre, Linköping Centre of Life Science Technologies, Biomatcell in Gothenburg and UMIT Research Lab (Applied IT) in Umeå. Other examples are Luleå University of Technology's prioritisation of the Process IT research area and Mälardalen and Örebro universities' strong profile within the robotics area. However, it is hard to say how much the initiatives' operations have helped these efforts happen.

Other efforts relate to investments in infrastructure and technological platforms, such as Fiber Optic Valley Labs and the Adopticum development laboratory under the banner of ProcessIT Innovations. In Uppsala, competence at the educational establishments has been strengthened in order to promote commercialisation of the research results in Life Science. In Gothenburg, Biomedical Development in Western Sweden has helped catalyse an increased collaboration between Chalmers and Gothenburg University which has led to a number of new joint efforts within the initiative's focus area.

There are examples of increased investment by the public players in activities to strengthen the initiatives' operations in the respective focus areas. For example, Region Skåne is now working to develop innovation strategies and is more involved in the activities of Skåne Food Innovation Network. Through its new action programme, New Tools for Health, it has also gained increased co-financing from the Regional Development Council, municipalities and county council. There is evidence that through the initiatives' operations, municipalities are gaining an opportunity to increase their cooperation on such things as competence supply. This applies to municipalities such as those in Triple Steelix and Fiber Optic Valley. In several initiatives, it is possible to trace a gradual change in which the executive board members initially looked mainly to their own interests but later changed direction, looking more to the purpose of the overall initiative.

3 Prospects for policy development

VINNVÄXT This chapter discusses observations and experiences from first six years of the VINNVÄXT programme. This is partly based on the analysis of the initiatives' operations shown in the situation reports and interviews this year, as well as from previous monitoring, evaluations and contact with the initiatives. Other sections of the report apply primarily to the most recent financial year. The analysis and conclusions shown are the responsibility of the authors. When VINNOVA is referenced, this relates to positions, intentions and objectives which have been part of the programme since the beginning and which are also shown in the programme texts and calls for proposals of the VINNVÄXT programme.

The VINNVÄXT initiatives may be regarded as representatives of regional nodes within their respective focus areas. In these regional nodes, the initiatives contribute in varying degrees to improving the chances and developing the capacity of the players in a region to collaborate on development of the regional innovation system within the focus area. The aim is to achieve each initiative's set goals relating to innovation, knowledge-building, growth and public benefit. When they succeed in developing their role in the regional leadership, their legitimacy to represent their region within the focus area in national and international contexts increases. This might involve acting as a discussion partner, implementing organisation or inroad to the region's players. In the authors' view, the analysis gives the impression that most initiatives currently have good legitimacy in their own regions. It is harder to assess how great a legitimacy the initiatives have achieved in a national arena. The impression it is that an increasing number of initiatives are involved in contexts which indicate legitimacy at national level and that a few of these already have that role in some regards.

One conclusion of this examination of the VINNVÄXT initiatives' operations is that an increased dialogue between national and regional public players is desirable when it comes to future national and regional programmes for R&D-linked regional growth. This dialogue should include a discussion on strategic research and development areas for knowledge-building, innovation, growth and public benefit and identify prominent regional nodes which have good prospects of contributing in these areas. This is to enable prioritisations of those with the best prospects. At the same time, it is important to stimulate collaboration between prominent regional nodes in an international comparison. Furthermore, the dialogue should deal with issues relating to how to develop the coordination of national and regional activities to promote innovation, renewal and growth.

A dialogue between regional and national players should therefore include a process to identify internationally prominent regional nodes within strategic areas. Such a process should culminate in a joint action programme to promote innovations and growth. This action programme may include efforts within the operational areas within which the

VINNVÄXT initiatives are running activities. The balance between measures in the efforts is determined by identified needs, opportunities, drivers and bottlenecks within specific strategic areas. The dialogue between national and regional public players should include discussions regarding the promotion of regional node functions, coordination of efforts and role distribution. This assumes increased coordination between national players as well as between regional players. The process of identifying how the efforts should be designed should deal with aspects relating to how to promote national and international corporations and networks and thereby help to counteract regional lock-in effects.

Apart from the need for increased coordination between national and regional players described above, a more operationally orientated collaboration may be required between players who operate within strategic research and development areas in different parts of the country. VINNOVA and other national R&D financiers need to know about these players and their operations in order to create opportunities to have dialogue with them which leads to the identification of synergies and design of relevant efforts. The results of this might include a strengthening of regional R&D infrastructure, making it a national resource feeding into international attractiveness.

The extent to which the initiatives are seen as relevant nodes within the focus area in national contexts is down to the quality and concentration of research and enterprise in the region and also the credibility they have managed to convey in regard to the operation they are running. It is easier to achieve positive results and impacts if there are companies in the focus area's entire value chain and good quality research in the region. Legitimacy for the operation can be achieved even if the scope of players is not great or does not comprise all relevant components. This can happen if unique niches are identified and within these, competences and infrastructures are developed as well as networks of players nationally and internationally to enhance the operation in the region. The long-term funding also helps increase the initiatives' legitimacy and facilitates establishment and mobilisation in the individual region. In those regions where it has had an influence, the VINNVÄXT effort has contributed to the often ongoing processes surrounding regional prioritisations of efforts within selected focus areas of renewal and growth. The programme has also led to the design of VINNVÄXT-like efforts in those regions where initiatives have applied for but not been awarded funding by VINNOVA.

Based on a national and international comparison, a common picture needs to be developed of the prospects for contributing to growth and renewal within various regional and national focus areas. This requires increased knowledge on the part of national and regional players regarding the prospects for renewal and growth within various focus areas' innovation systems in an international context, i.e. in what focus areas does a region or Sweden as a nation have a prominent position, scientifically and commercially, or potential to achieve such a position? Furthermore, it requires a capacity to convert knowledge into action through joint action programmes. A discussion regarding regional and national prospects should address: criteria relating to

agglomeration in various parts of the value chain; quality on the basis of focus area-specific criteria; position and uniqueness; and potential to contribute to growth and societal needs. Further aspects to assess in regard to the goals financiers wish to achieve with an effort include the support for the mission from key regional players and the maturity of the area.

As already mentioned, the funding which the VINNVÄXT programme contributes is a small proportion of the total R&D funding to each focus area in these regions. This affects the leverage that the funding can give, the influence that the initiative's operations can have on the priorities of R&D implementers and the results achieved. Furthermore, the initiatives' operations should also be integrated into systems with the existing organisations whose operations have, to some degree, the same purpose and goals. For this reason, the initiatives often co-finance established operations. The additional and above all long-term funding which the initiatives contribute leads to an increased tempo and scope in the activities. In some cases, current activities have also been improved to better suit the focus area.

In general, the initiatives carry out many activities, which at first glance may give a divided impression. This is an expression of the choice to address many different operational areas in order to contribute to a positive development of a complex innovation system. The initiatives' role is to collaborate with other RIS players and not compete with them. The degree of working method renewal and introduction of new ways to stimulate positive development varies between initiatives and is not an end in itself. In the regions, funding for activities arrives and then disappears. It is part of the dynamic to which the initiatives must constantly adapt and which can lead to reappraisals of activities and the initiatives' role in various operational fields. This means that the funding needs to provide space for reprioritisations for the kind of long-term investment represented by the VINNVÄXT funding. Accordingly, it has been positive to have the three-year action plans designed after the evaluations and approved by VINNOVA's programme board, as this process gives the chance to change the operation. In some cases, there has also been the opportunity for minor adjustments during the course of an action plan. VINNOVA needs to be clearer regarding how the activities funded through different VINNOVA programmes can collaborate. This is because conflicts can occasionally arise regarding the division of roles between those granted funds from various programmes.

The initiatives include those working in smaller localities and those in big cities. The general picture is that it seems easier in the smaller localities to achieve regionally supported legitimacy for the operation and also for the initiative's role in the regional leadership within the focus area. This is probably connected to the fact that the size of the VINNVÄXT funding relative to other funding becomes greater in regions with a small operational scope (in regard to number of players for example) within the focus area. Another contributory factor is the opportunity for dense networks between leading players, including existing ones and those which the initiatives establish.

All initiatives run operations within needs-driven research, promotion of new enterprise and development of existing industry and/or the public sector. These operations jointly account for more than half the budget of the initiatives. In most initiatives, the main focus for those projects granted funding is development rather than research and for the educational establishments, the efforts can occasionally be described as commissioned research. As well as contributing to the projects' funding, the initiatives' activities often include advice on such matters as intellectual property rights, business development and opportunities for other funding. In some initiatives, projects are commenced after client needs have been identified. These clients are chiefly companies, but in some initiatives also the public sector. Sometimes, the initiatives also contribute to project management, bring together project partners and identify project implementers. The method of identifying project proposals and then choosing which ones will be granted funding and other activities varies between the initiatives and also between the different R&D activities within an initiative. Thus, projects can be arranged by the process management following a decision from the process management or executive board, or they can be identified through calls for proposals, spontaneous applications or following inventories of corporate needs. Who assesses the project proposals and criteria for these assessments varies. Furthermore, most initiatives have examples of their contribution to a long-term building up of research competence within the chosen areas. These might include funding for doctoral students or senior researchers in researcher-initiated projects.

The importance of clear selection processes to safeguard relevance, quality, feasibility and potential in terms of utilisation¹⁰ and how to safeguard transparency in the selection process is something to underline for financiers of R&D initiatives. Safeguarding these aspects requires a sufficient influx of proposals and clear criteria regarding relevance, quality, feasibility and potential where it concerns utilisation. The clarity lends support to those assessing proposals in their work of identifying projects which will lead to the established goals. Transparency means that the criteria and selection process should be clear to those who are applying and also include requirements for an impartial assessment. In addition to set criteria, those assessing projects need relevant supplementary competence and experience to enable proper evaluation of applications. The processes for selection and decision should be documented and projects followed up in regard to content and results.

The interviews dealt with the issue of the educational establishments' outlook on collaborating with industry. This was to gain a picture of the prospects of combining

¹⁰ 1. Relevance: how well aligned the project is to the initiative's direction and how well it contributes to the impact target.

2. Quality: may be the scope, news value and capacity of the project to contribute to the technical/scientific developments within the initiative's focus area and direction.

3. Feasibility: may be the applicants' capacity and credibility in regard to implementing the envisaged project.

4. Exploitability/utilisation: dissemination of project results for social or commercial benefit. This may include dissemination and utilisation plans.

this type of collaborative project and commissioned research (which the initiatives fund) with academic qualifications and how this affects the researchers' incentive to participate. Researchers in several initiatives said they would have to set aside their academic careers if they took part in such R&D projects, or would try and combine this activity with research that was more meritorious. Several researchers interviewed said that this type of collaboration is interesting and exciting and that to some extent it can give rise to new research projects. There were indications in the interviews with a small number of educational establishments of plans in the academic qualifications system to include a greater element of collaboration with industry and participation in innovation processes.

The initiatives are differently balanced in regard to the division of focus in their R&D activities between knowledge development and commercialisation. The role of the educational establishments' researchers in the projects also varies. The above depends on what specific drivers and bottlenecks have been identified as most important to address within the different systems. It also depends on whether the companies which the initiative is addressing operate within areas characterised mainly by incremental or radical renewal. Because of this, companies have varying levels of perceived need to co-operate with or have their own exploratory research. Initiatives directed at research-intensive companies may also choose to focus more on other operational areas rather than contribute to increased knowledge-building, if they consider that other players are attributing sufficiently to knowledge-building. The initiatives then determine whether their chances of achieving their growth goals are better if they prioritise activities which help knowledge be commercialised or otherwise utilised. The prioritisation of activities with a comprehensive research content is still clearer for initiatives which were originally run by academic players. Correspondingly, the prioritisation of operations promoting networks between companies, contractual questions, standardisation processes etc. is clearer in initiatives originally linked to a trade organisation. Supplying and further developing infrastructure for research and innovation continues to be an important part of the operation in initiatives which were initially strongly linked with institutes.

When new technology involving radical renewal is to be used in a company that has little competence within the area, the standards for running projects differ from what they would be if all partners had a deep knowledge of the area. It is a matter of portraying realistic expectations of what the technology can achieve so as not to risk a loss of confidence. Still, if the technical risk is so great that no products have been delivered to the market, it is difficult to identify what developmental lines are most promising. Funding projects so as to investigate different development alternatives and funding infrastructures so as to develop prototypes can facilitate early applications. Early contact with demanding customers who set out requirements can also help speed the development. These customers can exist in the region, but R&D cooperations should not be targeted regionally but rather focus on identifying those who will advance the development furthest. Regional lock-in can delay development and cause a loss of

confidence from companies which have invested time and money but not had any positive results.

The need to manage different aspects of intellectual property rights issues have been identified in a number of initiatives. This has led to some initiatives drawing up standard agreements for R&D projects for implementation in cooperation between several organisations, plus activities regarding advice to players on these issues. This is an area in which VINNOVA should be able to support the initiatives with knowledge and competence. In the decision regarding continued funding of VINNVÄXT initiatives, from 2009 VINNOVA requires there to be written agreements for the R&D projects partnerships funded by the initiatives.

There are examples of regional public players, under their financial commitment to the initiatives, demanding that initiatives operations should include all companies in the focus area in the entire region, even though this goes against the priorities in the initiatives. In the same way, there are historical examples of educational establishments and institutes wanting to control the funds for the research they are conducting. Finally, there are also examples of how corporate representatives want to see more activities aimed at commercialisation and business development benefiting the existing industry at the expense of knowledge-building and new enterprise or for the initiative to serve as a voice for the industry. Overall, this paints a picture of the institutional goal conflict in the Triple Steelix model (collaboration with industry, academia and public players). It is important for partners in the executive group supported by VINNOVA to balance this constantly.

The interviews give the impression that the advice and monitoring of projects described by some initiatives is appreciated by corporate representatives and researchers in the projects and helps projects succeed. When deemed appropriate, it should be possible to add the local advice and monitoring which some initiatives include in their R&D operations to the criteria for national calls for proposals of R&D projects. This operation includes such things as checking to see whether project milestones have been reached and advice regarding commercialisation and business development.

To ensure that the initiatives' operations lead to desirable results and impacts, this analysis emphasises the importance of VINNOVA continuing its close monitoring of the operations. Amongst other things, this combats the risks of bias towards individual companies, market-restricting effects and regional lock-in. A number of advantages and disadvantages of a regional distribution of R&D project funds have been identified in scrutinising the initiatives. These are consistent with the aspects which were considered when the programme was designed and are listed below.

Advantages of regional distribution of R&D project funds:

- Knowledge of needs and possible partners
- Proximity which involves opportunities for close advice and monitoring plus rapid project start-up

Disadvantages of regional distribution of R&D project funds:

- Reduced competition with a regional selection which can lead to lower quality and a reduction in national transparency
- Regional lock-in effects
- Increased administration for selection processes, as regions also build up such structures

Overall, the initiatives demonstrate an awareness of these advantages and disadvantages plus the goal conflicts inherent in initiatives where players with different interests must collaborate. If suitable finance for needs-driven R&D projects can be applied for at national level, then the type of node functions which the initiatives constitute can contribute to better applications of this kind. This is because they develop experience and knowledge to identify interesting projects and partners in them. They can also contribute to or arrange contacts so that advice and close monitoring can be linked to project proposals. In future, through better collaboration between national and regional levels, it should be possible for the distribution of R&D project funds to increasingly combine the quality assurance which the national distribution entails with the speed and flexibility observed in a number of initiatives. It would be desirable, but methodologically difficult, to analyse how any advantages and disadvantages of regional distribution of R&D project funds relate to each other in regard to the results achieved, compared with national ones.

Since the results of the initiatives' operations become part of the development for the individual players involved in projects, it can be difficult to trace what role the initiatives have had in projects' success. Naturally enough, all project partners involved regard their efforts as important. For this reason, information about the role of the initiatives in the innovation processes must be continuously gathered if there is subsequently a wish to analyse the impact of the efforts. In analysing the initiatives' results impacts, it is also important to bear in mind that they operate in different sectorial innovation systems in which innovation processes, regulatory requirements, business logic and so on differ. Clear differences which the initiatives show include the time the innovation processes take within different focus areas. This affects what results can be shown, particularly in the short term. The agglomeration of companies and research within the focus areas in the region, plus the focus areas' maturity also varies greatly between initiatives and this affects the prospects. It also lessens the interest of comparing the initiatives with each other. Rather, the emphasis should be on the individual initiative's development over time.

Several of the initiatives are concentrating in varying degrees on institute-like functions, including investing in physical infrastructure for R&D and prototype production as well as commissioned research. One possible explanation for this may be the relatively weak institute sector in Sweden and the fact that the VINNVÄXT initiative has come to take on the functions which institutes fulfil in other countries. There are also initiatives with some operations resembling activities run by trade organisations such as network and partnership projects between companies, agreements and procurement issues etc. A

number of initiatives are funding the type of R&D project which might be funded by some of VINNOVA's various programmes.

The construction and operation of physical research and innovation infrastructure which the initiatives co-finance may relate to companies' access to laboratory equipment for measurement and analysis of, say, quality and performance in the development of new products and processes. Another type of infrastructure often said to be lacking in Sweden is occasionally referred to as "prototype workshops, pilot plants and demonstration plants". Infrastructure may either be regarded as a resource for the competitiveness and renewal of regional industry, or as a national resource for Swedish industry and to attract national and international cooperations, investments, establishments and competence.

Today however, it is primarily regional industry (with the emphasis on SMEs) which are utilising the infrastructure in the form of prototype workshops, pilot plants and demonstration plants. At the same time, the process management of all initiatives contributing to this type of infrastructure see the potential to use the infrastructure to attract international cooperation and possibly establishments. However, there are still no examples of initiatives having developed a business model around infrastructure or having used the infrastructure to attract collaboration or establishments.

Infrastructure is primarily used by SMEs due to the difficulty they may have in funding their own equipment or services offered. There are also examples of the infrastructure being interesting to large companies too. In the authors' view, it would be interesting for VINNOVA to study the impacts of the infrastructure more closely in terms of concrete results and how the infrastructure affects the conditions for collaboration between academia and industry.

One result is also that, in order to achieve the program goals, the initiatives run activities within operational areas which were not predicted to occupy such a large place when VINNOVA was planning the programme. This applies to, say, competence supply which is often emphasised by companies as a priority. To some extent, the fact that competence supply issues are prioritised is because they contribute to the legitimacy of the initiatives' operations with companies, particularly the large companies. The initiatives help identify industry's needs, develop training courses and employ their networks to identify people to participate in the teaching.

One interesting function which the initiatives occasionally take on is actively working to strengthen established companies' support in the region and to attract foreign investment and establishments. A successful example of attracting an establishment has already been mentioned. In partnership with public players such as Invest in Sweden Agency or municipal trade offices, the initiatives can open a dialogue with established companies regarding their views on their operation in the region now and in future. Companies can also be involved in the initiatives' operations and networks. In conjunction with other players, the initiatives can contribute to identifying relevant foreign companies to be contacted for a dialogue on cooperation and possible

investment or establishment. At the next stage, several players may jointly design an attractive offering.

The VINNVÄXT programme comprises activities for process support, exchange of experiences and meetings under the framework of monitoring and evaluation. There is a risk that it will be burdensome for the initiatives to participate in these activities. It is important for the programme management to assess this risk and adapt the operation. To be better able to determine whether the meetings, courses, seminars etc. arranged to promote the initiatives' development maintain good quality, the programme management should consider whether they can obtain anonymous opinions on the activities being conducted. In this context, it may also be mentioned that VINNOVA is now developing methods and working procedures to reduce the time the annual monitoring takes for the initiatives. VINNOVA is improving the collection of information from the initiatives via a web-based questionnaire and as a result of this will be carrying out fewer interviews.

VINNOVA has been unclear regarding the expectations of the activities for individual learning, monitoring and evaluation which the initiatives were assigned to run. Work is currently underway to improve control of the direction and content of the interactive research. This operation will probably need to be changed, limited and possibly also standardised between the initiatives, taking into account the interactive research's benefit to and possible overlap with monitoring, future evaluations and impact analyses. VINNOVA is considering whether part of the operation should take place in the form of assignments with specific expectations as to what should be achieved and delivered and have another part dealing with research funding based on the research questions and research logic.

There is also a serious risk of the players in the initiatives growing tired of participating in research, monitoring and evaluation and impact analyses and especially if the overlap between these activities is too great. This is also because other players are running or requesting similar activities, such as regional, national and international financiers of operations.

In summary, the VINNVÄXT initiative's activities are envisaged to be part of the whole picture of developing the regional innovation system and should not be regarded as merely a project portfolio. The operations should be part of a strategic agenda for the focus area in the region. The objective for the VINNVÄXT programme is to develop the capacity to regionally coordinate and cooperate on a strategy for innovation, renewal and growth. Initiatives are often enablers of change in the RIS with the aim of better promoting innovation processes, renewal and growth. The new uniting force for the focus area in the functional region is expected to have legitimacy to contribute to a greater degree of coordination and streamlining of operations in order to promote renewal and growth. The processes of change are based on identifying drivers and obstacles in the RIS and that the players collaborate to deal with these.

Overall, as described above, the initiatives make varying contributions to promoting innovations and growth through:

- Catalysing and streamlining the RIS through better coordination, by identifying drivers and bottlenecks plus strategic processes followed by activities
- Contributing a regional structure for advising linked to R&D projects
- Identifying relevant issues and partners and thereby contributing to better project applications
- Funding R&D projects and contributing to the development of new goods, services or processes in new or existing companies
- Attracting funds for strategic R&D areas
- Serving as an entrance for national and international players
- Proactively contributing to the attraction/retention policy.

Appendix A: VINNVÄXT winners 2003

This section of the Appendix provides an operational description of the three VINNVÄXT initiatives, Uppsala BIO, Innovation at Interfaces and Robotdalen. The description is based primarily on the written situation report and interviews conducted in April 2009 (Appendix E). Other supporting data has been used for the compilation, such as past monitoring and evaluations plus operational plans for the initiatives.

Robotdalen

Robotdalen extends across Västra Mälardalen (Västmanland, Örebro and Södermanland) and aims to develop an effective innovation system focusing on and promoting innovation within robotics. Its vision is to be a world leader within development, manufacture and research in the field of robot-based automation.

In the Robotdalen initiative, industry is represented by companies like ABB, Volvo Construction and Atlas Copco. The county administrative boards in the three counties, plus municipalities, county councils and the regional federation of county councils are among the public sector players. Two educational establishments (Mälardalen and Örebro universities) are also linked with Robotdalen.

Robotdalen works with seven core areas: Industrial Robotics, Logistics Automation, Field Robotics, Health Robotics, Innovation and Innovation Support plus Technology and Competence Distribution.

Regarding changes to the overall control of the initiative, the process management and executive members who were interviewed felt their work was characterised by increasing consideration of the whole picture in Robotdalen and that special interests were getting less attention.

A discussion about what would happen after the VINNVÄXT funding concludes has been initiated in the executive board and process management.

Regional and national strategic processes

The process surrounding the operational plan produced in 2007 was run by the process leader. The executive members participated in four working groups with different focuses and the process management wrote supporting data and proposals for each working group. They then processed the material iteratively in a couple of meetings.

The process of producing the new internationalisation strategy took place in the same way as the operational plan, with different working groups for different sections. The working groups, with additional people from outside the executive board and process management, were divided into the areas of market, investment and individuals.

During the financial year, activities commenced within the operational field of health robotics. According to the process management, this was partly due to the fact that beneficial contacts had now been established with people in the county council structure – something which takes a long time.

Nationally, Robotdalen has become involved in a joint research initiative for Swedish R&D within robotics. According to the process management, Robotdalen was the initiator of a joint activity to increase funding to Swedish robotics research, having raised the issue at a Swedish industrial robotics conference. By way of background material, there was also a survey of Swedish industrial robotics which had been conducted on Robotdalen's initiative and financed by it. To date, this joint research initiative has led to a process of two meetings at VINNOVA and a decision to finance a pilot study. The objective for the process is a strategic R&D programme incorporating SEK 20-30 million/year for five to ten years. In this process, Robotdalen has also contributed to the inclusion of health robotics, not just industrial robotics.

Regional meeting arenas

Robotdalen is arranging its own annual conference, whereas seminars often take place in collaboration with other players. This time, the annual conference took place at Volvo Democenter in Eskilstuna with the participation of the Swedish Europe Minister and a research prize instituted by Robotdalen was awarded, worth EUR 20,000.

The City of Västerås has set up Automation Center, a physical meeting venue with exhibition and meeting areas as well as laboratories. This has become the venue for meetings and events, such as exhibiting robots. The laboratories are primarily used by the universities.

The process management also pointed out that the number of participants at the public conferences and seminars arranged by Robotdalen was fairly consistently at a satisfactory level.

Communication and marketing

For the fifth year in a row, Robotdalen exhibited at the Scandinavian Technical Fair in Stockholm with 18 co-exhibitors from the region on the fair's largest stand. According to the process management, Robotdalen was also a strong driving force behind the Nordic Conference on Robotics, which took place for the first time. Amongst other things, Robotdalen contributed five seminars and has also instituted a research prize worth EUR 20,000, as already mentioned.

Competence supply

Robotdalen runs a number of activities to promote the competence supply within the focus area, something which the industry prioritises. For the financial year 2008, the objective was to create at least one new project in each county which would help increase the volume of applications to natural science and technology at high school or university level. The activities are targeted to arouse interest in robotics amongst children and young people as well as at university training. For example, Robotdalen

has co-financed a film advertising training and demonstration equipment, lent its support to the work of Teknikcollege/Wenströmska Senior Technical High School with an application for cutting-edge training in robotics and contributed to in-service teacher training in technology.

For quite some time, an enthusiast at Mälardalen University (MdH) has been running the First LEGO League. This is an initiative with various activities and competitions intended to pique the interest of children and young people in robotics¹¹. Robotdalen took over ownership of this activity for a brief period, but has now handed it over to the municipality as it is aimed at schoolchildren. Robotdalen's current role is contributing funding and acting as a stakeholder for the municipality.

During the year, the first batch of robotics and automation technicians passed the advanced professional course at Örebro/Laxå. The course was supported by Robotdalen, which provided funding and lecturers. The majority of those who took the course are already employed by companies in the region.

In 2008, the Master's of Engineering course in robotics at MdH was fully subscribed which, according to the process management, was not the case for all technology courses at the establishment. The first round of some 10 engineers took their exams in the spring term of 2009. Courses in robotics were run at both MdH and Örebro University (ÖU) and complement each other, according to the process management. A discussion was to be held between the establishments regarding these courses. The process management regards Robotdalen's investment in a humanoid robot project for the MdH course as part of gaining increased exposure for robotics and that it has led to an increased volume of applications for the Master's programme in engineering. There are plans for further educational efforts at high school and university level, following on from the financial crisis in which many people's jobs have been at risk. At university level, one of the researchers at MdH is contributing to a robotics course at KTH and this is providing exposure for the operation being run at MdH.

Robotdalen identified a need among the engineering companies in the region for increased purchasing competence in regard to automation/robotisation within industrial robotics. A course on this subject was arranged and, according to the process management, was popular and will therefore be held again.

Robotdalen wanted to apply for funds from the European Social Fund (ESF) in order to identify a company's training needs. In order to be considered, a pilot study was required, identifying which companies would contribute. This pilot has now been completed and funds have been received for the main study. This will involve a survey of what competences companies have and which ones are needed for the future. Lärcentrum Karlskoga was the initiator, with the active participation of Robotdalen.

¹¹ www.usfirst.org

Funding

The regional Nutek office in Örebro (now the Swedish Agency for Economic and Regional Growth) did not grant funds to Robotdalen for a project relating to product development in companies as this was seen to be benefiting individual companies. This led to a discussion with the above office on the difficulties of using money from the Structural Funds to actually contribute to corporate growth. According to the process management, the discussion has led to officials in the Structural Funds' regional offices taking a more constructive role. They contributed contacts with Nutek Stockholm which ultimately led to Robotdalen gaining approval for the project.

The funding is to be used so that more pilot study projects will be able to go ahead and become more comprehensive development projects or "concept studies". Projects thereby become broader and less tied to an individual company. Instead, the process has now led to Robotdalen commissioning prototypes from companies which, when complete, are then owned by Robotdalen. In the event of interest from a contributing company, they can then be transferred to them. The discussion has also led to internal awareness at Nutek of Robotdalen and a study visit to Robotdalen by the new Director General of the Swedish Agency for Economic and Regional Growth.

Thus, Robotdalen has been granted funds from Nutek for a project on increased product development. There is also funding from the Knowledge Foundation for individual R&D projects such as Autonomous Vehicles. Other regional players have increased their co-financing of the initiative from SEK 5 million to SEK 7.3 million.

Over the financial year, Robotdalen has received a total of SEK 24.6 million from the EU's Regional Development Fund for the period 2008-2010 and a further SEK 1.2 million from the European Social Fund for investment in competence development in 18 companies in the region.

Alongside funds from the EU's Social Fund and Structural Funds, individual players in the system have attracted two EU FP7 projects as contributors (not coordinators). Robotdalen has not been active in promoting FP7 applications but has occasionally written a short piece about Robotdalen for inclusion in the application. The fact that FP7 applications are being accepted indicates the quality of the research being run. The prime contributors to Robotdalen are three professors at MdH and Örebro University who use the Robotdalen brand in their applications.

Internationalisation

As already indicated, Robotdalen has conducted a strategic process covering which operation the initiative should run in regard to internationalisation issues. Amongst the activities during the year are attending a conference in Korea; this may result in a guest lecturer from Korea coming to Robotdalen and MdH. Robotdalen has also had contact with a number of organisations and cluster initiatives in European countries but so far, these contacts have not led to any definite collaboration.

ISA initiated contact in Japan with Osaka Chamber of Commerce and Tokyo University. This is now slowly beginning to lead to a solid collaboration within health robotics, particularly in Tokyo. For the Tokyo collaboration, it is a case of technology exchange, with sensor technology from Japan being tried in robotics applications in Robotdalen. The process managers' impression is that although Tokyo has good, advanced research, those at Robotdalen are closer to the applications. The fact that Japanese technology is seeking an application in Sweden exemplifies how Robotdalen serves as a testbed. According to Robotdalen, there have been difficulties in bridging cultural divides between Sweden and Japan, with the Swedes finding a lack of clarity over the intentions of the collaboration and how much of a priority the partnership is to the Japanese player. It has taken a long time to find the right people who are interested and often this means operational managers rather than top-tier leadership. Identifying projects to solve problems important to the Japanese partner has also helped.

Robotdalen has tried to establish a collaboration with the Japanese company Motoman concentrating on the field of health robotics. It is hoped that in the long run, this may entail investment and possibly also an establishment in the region. Since Motoman and ABB are direct competitors within industrial robotics, ABB has ruled out a collaboration. ABB has a clear code of conduct aimed at preventing suspected cartel formation.

Robotdalen is working actively to attract the establishment of foreign companies in Robotdalen. The establishment of the American company Giraff AB (described under the heading "Development of existing industry and the public sector") is an example of this.

Integration of gender perspectives

During the financial year, Robotdalen has produced a strategy for promoting equality and work has started on implementing this. Due to targeted recruitment, there are now more women on the executive board than previously.

Needs-driven research

Projects are run within three priority areas: Health Robotics, Industrial Robotics and Field Robotics. According to the process management, the majority of projects are not so much research-intensive as development projects. This is particularly true of the health robotics area in which, according to the process management, only 10% relate to research. How projects are selected is described under the heading "Development of existing industry".

Within field robotics, a researcher-initiated and research-intensive collaborative project is being run between researchers at MdH and other universities. Under this project, driverless, autonomous trucks will be developed for industry and construction.

For health robotics, the main interest out of the three regional hospitals has come from Mälarsjukhuset Hospital in Eskilstuna. It has been difficult to establish contacts with the health service. The process management considers this is now starting to get somewhere

and that it is a case of establishing contact at the right level. A possible project under discussion relates to transportation within the Hospital. Regarding health robotics, the collaboration has been discussed with New Tools for Health, but there has been no success in identifying suitable collaboration projects.

According to MdH, Robotdalen has contributed to better collaboration at MdH between Västerås and Eskilstuna, since researchers from both campuses meet at MdH and are involved in the same effort and even collaborate on certain projects. MdH believes it has good opportunities to influence the research agenda in Robotdalen.

During the year, researchers at MdH backed a total of 11 scientific publications linked to projects at Robotdalen. The corresponding figure for ÖU is 28.

From 2009, MdH is hosting a partnership with ABB Robotics. This project will provide 10 development engineers who were laid off from ABB Robotics in the wake of the financial crisis with the opportunity to run R&D projects for three years (see the heading, "Impact of the initiative on the regional innovation system"). One or more of these individuals will be offered research training with the aim of receiving a doctorate. MdH is also involved in other initiatives such as Automation Region.

MdH is planning to start up activities with pilot studies resembling Robotdalen's industrial robotics process, but in fields beyond robotics. It is envisaged these will involve students in other undergraduate studies than those represented by Robotdalen's project, such as business development. According to MdH, the industrial robotics pilot study operation has now built up confidence and legitimacy amongst companies. MdH is also in discussion with public players regarding an effort corresponding to the one Robotdalen but for the public sector. This will mean taking Robotdalen's experiences into a new context.

Within health robotics, there is the impression that worthwhile contacts have not yet been established with the health service as a needs formulator and demanding customer. The process management considers this to be desirable and that results in this direction are beginning to be achieved. If the customers' needs are not included early on in the development process, there is a risk of developing technology which is seeking an application rather than problems/needs which are seeking a technological solution. It should also be possible to conduct an inventory of needs similar to that found in companies.

Newly established enterprises

Idélab at MdH arranges an annual ideas competition for researchers and Robotdalen has contributed a special investment for robotics prize-winners. The project is evaluated by a panel comprising representatives of industry and academia. The three winning contributions in robotics share SEK 50,000.

According to the process management, 14 new companies were started up and received support from Robotdalen. During the year, a couple of the original ideas offered support in the early stages of Robotdalen have led to products which have been launched onto

the market. According to the process management, no incubator has previously been found corresponding to the robotics needs of the region and it was therefore felt that Robotdalen needed to develop that type of innovation support. However, incubator operations corresponding to these needs are now being established in Eskilstuna/Västerås; Create Business Incubator Mälardalen AB initiated by Science Park Västerås and Munktell Science Park in Eskilstuna. In addition, Inkubera AB in Örebro has also been present in the region for some time.

Development of existing industry and the public sector

The pilot studies and projects under the activity known as Robot Till Tusen (Thousands of Robots), which deals primarily with industrial robotics, form a major part of Robotdalen's operation. Small and medium-sized enterprises gain additional knowledge about robotics and assistance in developing flexible robotic solutions. So far, over 100 pilot studies have been implemented in small and medium-sized enterprises and during the year there were 27 pilot studies in small and medium-sized enterprises in the region. Half of these chose to continue with robotisation and a number have also recently taken on staff and increased their competence within production technology and automation. Partners in the project include companies like ABB and Prevas, with Mdh and Örebro University. Companies have been contacted and offered the chance to have students, as part of their courses, study the requirements for streamlining using logistical/automation/robotic solutions. According to the process management, it is often a case of being able to answer companies' question as to "whether they can invest profitably in a robot-based installation". The pilot studies may lead directly to applications such as the purchase of robots, but may also go further and become more comprehensive development projects. Generally speaking, this gives them a greater element of collaboration between academia and industry. This in turn may lead on to full-scale R&D projects or direct applications in companies. The budgetary balance is around one third for each stage (pilot study, development project, R&D project). According to the process management, Robotdalen has now generated 16 new products and SEK 250 million in robotics investment.

The most common process in choosing a project is for pilot study proposals to be identified when visiting a company. A council of four or five people from academia and industry proposes pilot studies for implementation, whilst the decision is taken by the process management. The pilot studies take about six weeks while the more comprehensive development projects which (may be the next stage) can last anything from six months to several years. A total of four or five development projects have been implemented under the banner of Robotdalen's operation. Development projects are chosen by the process leader and involve anything from SEK 100,000 to SEK 2 million. Over three years, a large number of research projects in industrial robotics have been run with Robotdalen as an external financier and the cost to date is SEK 7.2 million. Robotdalen is helping put together the staffing for the project and representatives of Robotdalen are monitoring the development of ongoing projects.

Having reviewed the companies in the region and offered pilot study assessments, there are now plans to contact companies in other parts of the country such as Uppsala and Dalarna. For ABB Robotics, the operation means a direct increase in sales in Sweden and 20-25 new robots have been ordered through them. In addition, the company is gaining increased knowledge about customers' needs and requirements with the opportunity to reach new customer segments and broaden its product portfolio.

Alongside the needs inventories that are being conducted, there is also an influx of new projects through information meetings for companies. These have led to 26 project proposals, of which seven have been granted business development support such as IP assessment. Projects identified in this way have chiefly concerned health robotics. A project which Robotdalen funds in order to develop a company may also involve contributing other competences than robotics.

As mentioned, the process management states that in some regards Robotdalen is an incubator and that depending on their stage and circumstances they can offer activities for individual companies. There has been no functioning incubator in the region before, but operations fulfilling these requirements are now under construction and so Robotdalen may be less active in this type of operation. One example is the company Giraff AB which moved its operations from the US to Västerås. To facilitate its establishment in the region, Robotdalen has assisted with contacts, additional competences and test environments in the three municipalities of Västmanland County. According to the process management, the company finds Swedish healthcare and elderly care to be a good testbed and Robotdalen a strong platform for the company's expansion onto the European market.

In some projects, results and prototypes were developed which for various reasons could not be taken further by the companies for which they were developed. These results are now owned by Robotdalen through the adaptation of the Structural Funds rules mentioned earlier. The consequence of Robotdalen now owning the prototype is that it can be put on show and perhaps used by another company. Previously, there was a risk of a potential product not being developed unless the company that owned the project results wanted to push the idea further.

The current recession and financial crisis has hit major sections of the manufacturing industry and resulted in staff being placed at risk. Robotdalen has begun to act in support of companies through such measures as broadening industrial robotics projects under Robot Till Tusen, mostly towards product development. This involves contributing support to subcontractors who want to develop their own products in order to broaden their operations.

A number of projects and pilot studies are in progress within logistics automation. The pilot study model has been drawn from the working method of industrial robotics (Robot Till Tusen). Pilot studies were carried out during the year through ICA, Volvo Parts, Stiga Sports Warehouse and Volvo CE Components relating to various aspects of their logistics.

Six projects are under way within field robotics to develop various kinds of professional service robots. Contributing companies include Atlas Copco (autonomous trucks) Danaher Motion, Linde Material and Stora Enso (autonomous fork-lift trucks), Amphitech AB (underwater vehicles), Volvo CE (autonomous loaders and dumpers), Rotundus AB (autonomous mobile monitoring robots) and RobCab AB (autonomous mobile transport robots). This year's new project is autonomous loaders/dumpers and was granted funds by the Knowledge Foundation for 2009-2011. According to the process management, Robotdalen's investment in this area is the largest within the EU and one of the world's leading examples of research and development run in collaboration with industrial partners whose results become commercial products.

Activities for individual learning, monitoring and evaluation

During the introductory years, Robotdalen has funded a number of studies which come under the heading of learning and monitoring:

- A summary of robotics research in Sweden was conducted by a researcher within the field at Lund University. The analysis formed the basis of the process by which Robotdalen will act as an umbrella for the initiative to promote more funding of Swedish R&D within robotics.
- The Dahmén Institute held two workshops emphasising goal formulation.
- A survey to understand companies' needs and situation was conducted, in which 90 companies were interviewed by phone.
- An outside analysis was conducted by a consultant.
- A measurement of companies' use of the project operation in industrial robotics known as Robot Till Tusen was conducted by researchers at Örebro University.
- Researchers at Uppsala University and Stockholm School of Economics monitored a sub-project within Robotdalen (ReRob) for 2-3 years.

Future studies are planned showing what impact Robotdalen has made on the region.

During its operational period, Robotdalen has not had any clear strategy for activities within this area. The process management considers that the planning and implementation of activities has been held back by delays at the Dahmén Institute.

Impact of the initiative on the regional innovation system

As a result of the financial crisis, ABB Robotics has also decided in favour of staff cutbacks. These will affect around one third of the staff (120 people) within product development.

Since an industrial robot is a composite product, there is a need to keep up with competences in many fields. Some of these cannot be allocated many staff; in practice just one or two people, making the staff structure vulnerable in a redundancy situation. The balance between key areas is thus set against the need for complementary competences.

A proposal was developed in collaboration between ABB Robotics, Mdh and Robotdalen, relating to how the right expertise could be maintained and developed.

Inspiration for this initiative was drawn from Volvo Construction's investment in a research school. In this case, ABB Robotics wants its operation to be in product development.

According to ABB Robotics, the trust that had been cultivated between players in Robotdalen was crucial in taking the proposal forward so quickly. For example, the county governor helped out in the discussions and aided a rapid decision-making process in the county administrative board.

The process led to a project which will run alongside VINNVÄXT. The project involves 10-12 people being employed at ABB's research department for the three-year project duration with the promise of re-employment at ABB Robotics. Those in question have Master's degrees in engineering or are research-trained. The project has a budget of SEK 30 million of which SEK 9 million is from VINNOVA, SEK 6 million from the county administrative board and SEK 15 from ABB, divided over three years. During those three years, the project members will develop new, broader potential business areas and market segments for ABB Robotics. This will involve high-risk projects which would otherwise not have been implemented, or which would have involved much less speed and effort. Project focuses include the replacement of complex manual work such as fitting in the automotive, furniture or electronics industries. Results are also anticipated in the form of at least one doctoral submission and five scientific publications.

Other changes which have taken place include MdH and ÖU strengthening their profile during the year within the field of robots, with particular emphasis on SMEs (industrial robotics), logistics automation and navigation of heavy vehicles (field robotics).

Skåne Food Innovation Network / Innovation at Interfaces

Innovation at Interfaces aims to develop the innovation system around the food sector in southern Sweden. The initiative's objective is to increase the competitiveness of food companies in Skåne through an interdisciplinary collaboration between academia, industry and the public sector.

Innovation at Interfaces started in 2003 and is led by Skåne Food Innovation Network. Its vision is to use collaboration and innovation to create good, healthy food for more people. The desire is to develop a meeting place for innovation and contribute to the development of new, high value-added goods and services for the southern Swedish food industry. Amongst other things, the initiative is helping start, support and run various innovation projects within its field. Innovation at Interfaces has an executive board, an operational management, a broader leadership group and area managers. According to the situation report, there were the following operational focuses during 2008:

- Future prospects
- Meal development

- Innovative marketplaces
- Ideas and innovations
- Communication
- The career project

Skåne Food Innovation Network existed as an organisation before the initiative was taken to form Innovation at Interfaces and is a network composed chiefly of the major food companies. Apart from contributing to the Functional Food effort, Innovation at Interfaces' role was initially seen as a source of funding to strengthen players in the existing network through international marketing and innovations in existing companies. The role has changed and, according to the interviews, there is now a clearer legitimacy to run strategic processes in the region for this field and more broadly than was covered by the original network.

Innovation at Interfaces accounts for a major part of Skåne Food Innovation Network's operation and budget. Work is currently underway within the executive board of Skåne Food Innovation Network to develop the initiative's strategy, which will affect the operation.

One change since the initiative began is that a VinnExcellence Centre within the initiative's focus area was started in 2006. This led to a discussion on how much of a priority investment in research should be within the initiative. (See also under the heading "Need-driven research").

Discussions within the initiative are being planned regarding the future after the VINNVÄXT funding. The process management considers there are good prospects of continued involvement of regional public players such as Region Skåne. This is because the food area is an important industry in the region and Skåne Food Innovation Network is regarded as a legitimate coordinating player. The process management considers that Region Skåne's role in the initiative and promotion of the food industry in the region has improved and is currently working well. There is also interest in an active collaboration with Innovation at Interfaces from the new management of Lund University. Industrial involvement may also survive, possibly with contributions to basic funding as well. Competence supply is a high-priority issue for industry.

Regional and national strategic processes

As mentioned earlier, the executive board has initiated a process to produce a new strategy for the operation. The work has been conducted in small working groups supported by a consultant who guides the process. The purpose has been to gain greater clarity in what should be achieved and how. This process has led to a new goal statement. One member of the executive board who was interviewed said that the operation needed to be more focused on fewer projects and have more market perspective and business competence. It needed more people with industrial experience running projects and to be better at monitoring projects.

The Future Prospects project initiated in 2007 was previously a good way of working out a strategy for the operation. The process management, Region Skåne and VINNOVA were involved in the Future Prospects project. Innovation at Interfaces wanted to create a process for focusing on strategy design. Part of this process was the regional meetings known as Innovation Guilds¹². The discussion at these brought out proposed subsidiary areas for Innovation at Interfaces to focus on.

The 2008 Innovation Guilds dealt with “Power over provisions” and “innovative foods in innovative packaging”. As a result, a new research area was opened during 2008 at the interface between food, packaging and environmental engineering.

The Guild processes are regarded positively by the process management and area managers, but for a brief period there were too many and so there was a break. However, there is now discussion on possible themes for future processes, such as gender, packaging and meal development.

The individual players in the innovation system: the researchers, companies and public players, conduct outside situation monitoring for their own operations. If this outside situation monitoring was taken care of systematically then, according to the process management, it might be an attractive service to offer the players in the initiative and even contribute to the initiative’s strategic processes. However, it is possible that the large companies running such operations internally would not be interested in sharing their information. This is something which has been discussed but which has not yet led to any activity. Where it concerns supporting data for strategic processes, the process management is conducting interviews for the initiative with researchers and businesspeople regarding future issues. This is also happening in the Baltic Region under the framework of the Baltfood partnership (see also under the heading “Internationalisation”).

The process management considers that its role as a node within the focus area in Skåne is now confirmed. Increasingly often, the initiative is being asked to represent the area, including by Region Skåne. A discussion has also been initiated on the issue of Skåne really being too limited as a geographical region. The leadership group will meet regarding this (amongst other things) and the process management has held a preliminary meeting with SIK (the Swedish Institute for Food and Biotechnology) regarding integration of the national network. The process management considers this must be based on interest from the players in the initiative and that it cannot be brought about administratively.

According to the process management, the initiative is currently in a period of reflection regarding which activities should be prioritised and which should be concluded.

¹² Håkan Jönsson and Hans Sarv, Framsyn för regional tillväxt [Foresight for Regional Growth], Skåne Food Innovation Network, 2008.

Regional meeting arenas

Larger events for which the initiative is principal arranger include the Innovation Guilds and Skåne Food Innovation Network Day. At this latter event, Skåne Food Innovation Network awarded three small grants of SEK 25,000 each to three research students. These events sometimes take place in partnership with other players, including individual companies.

All interviews conveyed the popularity of the network of food industry representatives at managing director (MD) level hosted by the initiative. It is seen by those involved as time well spent, even if many of those in the network already know one another and meet in other contexts. There are a few diverging viewpoints regarding whether it should be broadened out; on the one hand it would be good to include representatives of, say, the perishables trade but on the other it should not become too big. The ability to discuss different issues and possible activities on that level does a great deal to cement the operation. According to the process management, the network involves an arena for discussions surrounding renewal. The process management seems aware of the risk that this type of grouping will develop too large a consensus and lead to conservation rather than renewal. This is counteracted in the Innovation at Interfaces MD network amongst other things by identifying themes for meetings involving a discussion of challenges and inspiration to renewal. It is also important in the long run to find ways of working amongst contributing players on levels other than that of MDs. Other initiatives might be able to benefit from experiencing the design and function of the Innovation at Interfaces' MD network.

Communication and marketing

There is a wish from the executive board that the initiative should generate interest and be a communicator for the food area. According to the interviewees, there is a wish that the initiative should invest more in raising the profile of the operation and marketing the industry.

Innovation at Interfaces has designed a visualisation of all past and present projects on its website. Projects and their current and former contributors are illustrated on an interactive map which contains further levels of information about the project. This visualisation is linked to a database of the whole range of projects and, since facts have been compiled for this purpose, they are also easily accessible for evaluating results.

Competence supply

According to the interviews, the food industry is characterised by being a conservative and risk-averse industry with a relatively low level of training. It is described as a challenge to change the outlook on knowledge and training in the food industry.

In the light of this, the MD network mentioned above has taken the initiative for an activity which seems to be appreciated by the industry. This activity involves students forming an advisory board and contributing ideas on how industry might improve its attractiveness and be marketed. Competence supply issues are important to the sector as

they want capable students interested in a future career within the field. The view is that the industry is not currently considered attractive.

The students have brought many ideas, a number of which have been implemented. One example is a competition in which a student wins the opportunity to “shadow” an MD in the network. Some of those previously on the Advisory Board are now employed in the industry. This activity, which involves students bringing ideas on what activities might interest young people in the area, should warrant closer investigation by more initiatives. Alongside the student project, there are also plans for some companies to jointly introduce a trainee programme.

The process management of Innovation at Interfaces is active in EU projects involving an exchange of experiences between cluster initiatives in the EU. It has also been involved in a project surveying various initiatives within the food area.

Funding

Skåne Food Innovation Network and Region Skåne have received funds from the Structural Funds, whilst Innovation at Interfaces was involved in planning the application. This application involves larger companies allowing smaller companies access to their works to conduct test runs. The idea is for the larger companies to gain a network of innovative SMEs which may turn into future partners, whilst the smaller companies have an opportunity to test their ideas.

The fact that funds are being applied for and received is both an indicator that more players see the initiative’s activity as relevant and important prior to the end of the VINNVÄXT funding. It is important to obtain money for the long-term funding, but at the same time important for there to be funds for the type of operation identified as relevant. The process management wants to find funds enabling them to actually implement their priorities. One area where they want to obtain funds to do more is the link between food, packaging and environmental aspects. As part of their reconnoitring, the process management and researchers visited Värmland for a discussion on packaging with the cluster initiative, the Packaging Arena.

Internationalisation

The process management considers that more could be done within internationalisation but so far, there has been no process to identify what should be prioritised. The impression was given in an interview that some on the executive board consider the emphasis should be on getting the operation in the region to work better first. The issue has been raised in the foresight project without leading to anything concrete; amongst other things, marketing activities were discussed.

As already stated, Skåne Food Innovation Network is participating in the EU study, Food Innovation Network Europe¹³. This study involves a survey and comparison

¹³ Strategic objectives for developing innovation clusters in the European food industry, EU FP6 FINE project.

between European innovation systems within the food area. A new EU project, Netgrow, is now being introduced which will yield knowledge on how to actively run processes in an innovation system.

According to a joint EU project, BaltFood, the plan is for countries around the Baltic Sea to gather market and consumer knowledge and create new business opportunities. The initiative for BaltFood comes from Skåne Food Innovation Network in partnership with Wirtschaftsförderung Lübeck. A pilot study indicates there should be major opportunities to create a common market in the Baltic Sea countries. However, according to the process management one conclusion is that there is a lack of knowledge on fundamental facts such as consumer behaviour and taste preferences.

Integration of gender perspectives

Innovation at Interfaces has received funds from VINNOVA for an equality project within the framework of the TIGER call for proposals. There is awareness of the need to have a better gender perspective, particularly regarding the competence supply. The interest is also due to an awareness that despite the leading positions being mostly occupied by men, the industry largely is largely addressing female consumers.

Amongst other actions under the framework of the VINNOVA-funded project, the researchers have held interviews with company boards. According to the process management, the project and area are a priority. The researchers spent half a day with the management group which included discussions on such aspects as who purchases and prepares food. Amongst other things the project will clarify the reasons for the unequal gender distribution and hold an event prior to the summer of 2009.

Needs-driven research

During 2008, the research run under the initiative resulted in the addition of 35 research publications. During the year, one of the researchers submitted their doctoral thesis entitled "A Tale of Two Clusters".

In the initial stage of Innovation at Interfaces, the decision was taken to fund doctoral students. Nine doctoral students currently receive part of their funding from the initiative, almost exclusively within the area of functional food. In addition, one doctoral student within the area of innovation research has been funded. In view of the funding which the functional food area currently receives via the Antidiabetic Food Centre (a VINN Excellence Center), the funding of doctoral students by Innovation at Interfaces will be concluded. On the other hand, there are plans to monitor and benefit from the network comprised by the doctoral students. The initiative is now putting more R&D resources into the packaging area. These changes have also been discussed and agreed with VINNOVA.

In one of the projects described in the interviews, the role of researchers was to contribute more advanced analyses of tests needed by companies to quality-assure the process being developed. Two of the interviewees are researchers leading two different operational areas within the initiative and in that role, they have project managed

various collaborations between academia and industry. For the area managers, there have been no problems with their academic careers or relationship with the educational establishment when devoting time and involvement to the initiative. For one of the researchers, this is partly because he does a lot of work focusing on training issues, which means that academic qualifications are not quite as important as for researchers concentrating on a research career. Furthermore, external collaboration is normal at that researcher's faculty. Another reason is that he is trying to include the food industry in the teaching and involvement in the initiative's network can contribute to this. According to the other area manager, it is possible that involvement in Innovation at Interfaces may not advance an academic career.

Newly established enterprises

In the interviews, there was the impression that the interviewees considered the innovation support system in the region to be working much better now than it has been. The process management intends to have gradually more collaboration with other players in the innovation system. Projects for commercialisation in the Innovation at Interfaces portfolio generally relate to the early stages of a project's development into an innovation, or the later stages when a conditional loan has been obtained and a final study is needed prior to contacting venture capitalists.

The results shown by the initiative include: a new company whose business concept involved facilitating computerised stocktaking; a new brand of locally produced high-quality apple juice; a new concept for cold pasteurisation; a food robot for small-scale food industry and an innovatively designed tasting spoon. Innovation at Interfaces has been involved in these processes and offered support in the form of advice and funding. Some of these projects are described in more detail under the next heading. According to the process management, 11 new companies have been started during the year as a result of activities co-financed by the initiative. In addition, 15 new products have been reported (12 goods and three services).

Development of existing industry and the public sector

Examples of projects which have been run are the former project on taste preferences run by Skånemejerier and IFF (International Fragrances and Flavours). A direct result of that project, to which Ideon Agro Food also contributed, was a new butter. Another project led to a network of companies throughout the entire value chain, from growers to restaurants, collaborating around food and tourism. The initiative was funded by Innovation at Interfaces, municipalities in southern Skåne and Sparbanksstiftelsen Syd and is now controlled entirely by 32 contributing companies. Two events a year are now held, known as "food tours" and modelled on the Skåne Art Tour.

On the initiative of a company, Pastair, a process was developed in another project to use ozone as a cleanser instead of heat – cold pasteurisation, as mentioned above. The company is operated by a serial entrepreneur with long experience in the field. The idea upon which the company is based originated with a Master's thesis. The method is in competition with the well-established heat treatment demanded by the regulatory

authorities and some technical risks still remain to be eliminated. At the same time, there is great potential as the method may have many applications in purification and disinfection, as well as bringing improved taste and nutritional content when substituted for heating in food production. Innovation at Interfaces has assisted with a small amount of funding and researcher contacts at SIK; this may help quality-assure the process through analyses of the viral and bacterial content. Having contributed to the project by providing access to their production process for tests, Skånemejerier might serve as an initial demanding customer. The business concept involves selling the necessary equipment as well as consumable items. The company self-funded to build a pilot plant and has also received funds from VINNOVA's Research&Grow programme. During the process, there have also been important efforts from Ideon Agro Food in the form of advice and help.

One area which has been prioritised in the Innovation Guild process is "meal development". The operation in this area has resulted in two new products under development in the form of snacks for elderly people. The Innovation Guild has also afforded the industry the opportunity to develop contacts with residents in elderly care. Through these contacts, it has been possible to test new products in dialogue with users and staff.

A company's wish for a calculation model to determine whether or not the processing of primary produce was economically defensible brought about a project to develop a new accounting model. A project subsequent to this dealt with Sörmland County Council's hospital kitchens and the initiative funded a part-time salary. This project led to changes in the hospital kitchen routine and an improvement in cost-effectiveness. The menu was redesigned with fewer weekly variations, coordinated dishes were created and a food economist from Gothenburg was brought in. The staffing and work rota was changed and better logistics introduced to cut down on wasted food.

Following this project, a clearer focus on meal development was introduced to the initiative's activity, concentrating on the public sector. Amongst other things, there was a wish to change the behaviour and improve the purchasing competence of the public sector. A project within this area was identified through one of the Innovation Guilds. This project dealt with meals for elderly people and had had contributions from public players including the county council and companies. These are often paid for out of general taxation collected under current legislation. Both buyers and sellers consider that the public procurement process could be better. The project "Food for elderly people – innovative procurement" was initiated with funding from VINNOVA. This targets needs of elderly people for meaningful, nutritious meals. The project is operated by Skåne Food Innovation Network in partnership with Region Skåne. Amongst other new projects, one is focusing on local food in hospital, another is teaching 11 year-old schoolchildren more about food and food preparation and still another project deals with locally produced school food.

Thus, the role of Innovation at Interfaces in the project has been to co-finance these, mediate contacts in both academia and industry and provide project managers as

required. The interviews give the impression that one of the initiative's most important roles is mediating contacts, with the quality of the contact that is mediated being important.

In the previously mentioned application for Structural Funds support so that SMEs can access the large companies' process equipment and test ideas, the applicants were Skåne Food Innovation Network and Region Skåne and Innovation at Interfaces was involved in planning the application. SMEs thus get to run tests with large companies and the large companies gain a network of innovative small SMEs which may turn into partners.

Meal development exemplifies an area which will go on being a priority. The commercial value of food which can be consumed outside the home has risen much more than food consumed in the home. There may also be more emphasis on markets and new ways to get products onto the market.

The interviews give the impression that Innovation at Interfaces and Ideon Agro Food have similar aims in their operations regarding the development of existing industry and commercialisation. In this context, Innovation at Interfaces is chiefly a project financier. The initiative occasionally engages people from Ideon Agro Food as project managers depending on whether there is a group of competent individuals within the area. Thus, the initiative does not need to build up that resource internally. This collaboration means less risk of overlap and competition between the two organisations.

The company representatives expressed the view that Innovation at Interfaces is less bureaucratic to collaborate with compared to other R&D financiers. At the same time, the interviews also indicate that the initiative does not have such great commercial competence in assessing projects as some other players.

So far, it has been difficult to bring the perishables trade into networks and projects as they have been considered (and felt that they are) different from other companies involved in the initiative's activity. An example of a project that helped bring the trade nearer to Innovation at Interfaces was a dealer who was assisted in promoting and marketing local primary produce. This led to increased sales of these products and resulted in satisfied suppliers and dealers. Previously, the superstores had done very little purchasing from local SMEs. It is important for successful projects to attract other SMEs and there is now a marked tendency for the perishables trade to be more involved in the initiative's activity.

The initiative's Entrepreneurial Board, which deals with applications for early-stage projects, consists of a serial entrepreneur, a lawyer and a representative of Ideon Agro Food. The opportunity for funding is only marketed via the web page and brochures. Some 60 ideas are examined each year and the process management has seen that number increasing. Often, project managers at Ideon Agro Food are used and occasionally consultants who have previously worked in the large companies as project managers. The process management emphasises the importance of hiring project managers to run projects which all parties regard as legitimate. The process

management considers that its funding can make things easier for projects at all stages, from idea generation to product-specific stage.

The project portfolio of Innovation at Interfaces is diverse. Both SMEs and large companies can vouch for the needs formulation. Applications for all kinds of projects come in via the website. These are prepared by the area managers and a decision is taken by the MD following discussion in the management group. If funding is granted, 25% is given at the start, 25% at the halfway mark and the rest upon the final report. Those involved in the project accept that they will be publicised as funded by Innovation at Interfaces. Some 60 projects are currently running.

The initiative's activity requires people who can bring together the perspectives found in large companies, small companies and academia and act as broker and translator. Innovation at Interfaces has some such people who receive funding for each project they are involved in but who are not employed by the initiative. So far, these have mostly been rooted in the university world and the process management would like it if more came from the corporate world. The process management wants projects to be staffed by different competences. The project managers in the initiative's projects are often from academia and in several interviews, it was emphasised that more people with experience of industry would be desirable in this role. This is also allied to the wish that emerged in the interviews for more market perspective and business competence. This is something which both the executive board and process management have identified.

The impression from the initiative's project portfolio is that a lot of small projects are being funded within widely diverse areas. One question is what synergies might exist between projects and whether increased planning and control of which projects are run might yield better results. At the same time, a number of the projects in the strategy process are identified through Foresight and the Innovation Guild. The projects initiated on the basis of these processes are often large and relatively atypical.

Activities for individual learning, monitoring and evaluation

In its situation report, Innovation at Interfaces emphasises that a long-term view means learning and new development processes can be continuously built into the process. They have developed two new methods known as Evaluation and Foresight. A report on the Foresight project has been published¹⁴. As mentioned, the operation consisted of a number of "guilds" which above all have been a tool in strategic planning. An additional two articles were published dealing with Evaluation and Foresight¹⁵.

¹⁴ Håkan Jönsson and Hans Sarv, Framsyn för regional tillväxt [Foresight for Regional Growth], Skåne Food Innovation Network, 2008.

¹⁵ Lagnevik & Sarv: Innovation community governance: The Food Innovation Evaluation and Foresight Cases.

Frykfors & Jönsson: "Reframing Multilevel Triple Helix in a Regional Innovation System: A case of systemic foresight and regimes in transition" Abstract to the Triple Helix VII International Conference Glasgow, Scotland, UK, 17th-19th June 2009.

During the period, Innovation at Interfaces has had various activities contributing to its own learning. Although the Foresight processes are primarily a strategic tool, they also contribute to learning in the initiative. The Dahmén Institute was been involved in supporting Skåne Food Innovation Network and working on goals and indicators. One of the process leaders has written texts with a consultant reflecting on various aspects of the initiative's development. The initiative has now produced an action plan for the ongoing interactive research.

Impact of the initiative on the regional innovation system

The University has a network of consumer researchers including most faculties. Innovation at Interfaces has maintained that network by taking over funding responsibility for its costs in regard to the Food Science Centre. Invitations are being issued and programmes designed for forthcoming meetings. Funds are now being sought from Lund University to expand the network.

In the interviews, it appears that Region Skåne is currently providing better support than previously to the type of activities represented by the initiative. For example, Region Skåne is more involved in activities relating to Skåne Food Innovation Network and more active in developing functions in the innovation system which improve the conditions for Skåne Food Innovation Network's operation. Reportedly this is partly due to the pilot project on strategic development, run by the region itself and supported by VINNOVA. Region Skåne also appears to consider Innovation at Interfaces a legitimate representative of the area, because it is asked to represent the region in various contexts.

Over the year, the initiative has attracted three new paying members into Skåne Food Innovation Network.

Uppsala BIO

Uppsala BIO's aim is to work for industrial growth within life science (pharmaceuticals, biotechnology and biomedical engineering) in Uppsala. It seeks to achieve this through cooperation on projects and activities between academia, industry, the health service and the public sector. Its vision is for Uppsala to be one of the world's five leading life science regions by 2010. The initiative currently has over 30 members and partners plus other partners with which there is no formal contractual link. The operation is divided into the following fields of activity:

- **Verification:** Needs-driven and multidisciplinary research projects – Uppsala BIO-X and Innovation Akademiska
- **Training:** Finding and attracting suitable competence as well as coordinating between Uppsala's schools and the University
- **Commercialisation:** Safeguarding the flow of innovations at the commercialisation stage
- **Reaching out:** Marketing Uppsala internationally as a competitive life science region

- **Networking:** Creating more points of contact in the Uppsala region which in turn create new collaborations and business

The process management describes this initiative's most important role as that of a facilitator or enabler in developing the innovation system. It operates in partnership with other players in RIS and is not always the implementing organisation. Uppsala BIO initiates or contributes to the achievement of changes. Current examples are the work to improve the collaboration between Uppsala University Hospital and industry plus commercialisation based on ideas from healthcare.

Uppsala BIO has relatively few employees and needs a good return on the hours in kind that various organisations put into the initiative. Hours in kind have long been considered a good way to promote the network, attract players into activities and increase their involvement. Uppsala BIO intends to get even better at controlling the content of these hours, thus increasing their value to the initiative.

During the monitoring period, Uppsala BIO changed its process management but this is not thought to have altered the direction of the operation. A particular focus during that time was developing the marketing collaboration with Stockholm Uppsala Life Science (SULS) and finding a working method for the initiative's internationalisation activities under the project funded by "Global Links" a VINNOVA call. In the coming period, the intention is to design activities within the operational field of competence supply.

Interviews with representatives of organisations involved in Uppsala BIO's executive group indicate that the long-term perspective in the VINNVÄXT programme has been important in arousing the interest of industry and other players. VINNOVA's resources helped attract public and private capital. There are similar processes in the region for identifying and initiating development in areas other than life science. However, the investment by VINNVÄXT has brought an increased pace and scope to events within life science in Uppsala. Other areas operate from year to year using more short-term sources of finance. Nowadays, life science efforts are not questioned and lessons learned have included the importance of including industry in the funding early on (through membership for example), as well as taking initiatives out of official project leadership early on so that they can be independent.

Uppsala BIO has begun discussing what should happen once the VINNOVA funding ends. This and other issues were discussed at a special strategy meeting with the executive group which considered what "benefits" might survive under different funding. One conclusion is that it would probably be difficult to find funding to sell elements of explorative R&D activity as a service to companies. The process management sees the model used by the Uppsala BIO operation in needs-driven research as important in verifying research results prior to any commercialisation.

Regional and national strategic processes

There is an action plan for the period 2007-2010 and during 2009, a strategic process has been initiated to produce an action plan for 2010 and onwards. In addition, a strategic process has been introduced relating to internationalisation and a strategic

decision was taken earlier regarding collaboration on marketing with SULS. In both cases, the process management designed a proposal which was presented to and accepted by the executive board. Strategic processes in the initiative combine meetings to which all members are invited with strategy days for the executive board to discuss the underlying data and proposals produced by the process management.

Where it concerns identifying drivers and bottlenecks in the innovation system, the new process leader has conducted some 30 company visits to members of Uppsala BIO. During these discussions, issues of importance to companies have been raised, such as the competence supply and conditions for clinical trials and access to biobanks. For this reason, there are plans to further develop activities in these areas. What form these may take is not yet clear. What emerges during the discussions will form the basis of the planned strategic process for producing a new operational plan.

Regional meeting arenas

Uppsala BIO arranges such things as an annual conference, seminars and pub evenings. These activities are often arranged in collaboration with other players, meaning both players in the regional innovation system and national players like trade unions, government agencies and trade associations. An example within the current priority area of clinical research and clinical trials is the conference which took place on the initiative of the government-appointed delegation for this area. This exemplifies how Uppsala BIO is seen as an initiative to which national players turn so as to reach out to players in the focus area of this region.

These activities are well attended. For example, a pub evening usually draws an attendance of just over 100 people. Participants come from large as well as small companies and from academia and the community at large, even though there is a wish for more participation from larger companies. There has also been discussion about arranging smaller and more targeted gatherings.

Communication and marketing

An agreement has been drawn up between Uppsala BIO and SULS involving a collaboration on the marketing of the life science region from Uppsala in the north to Strängnäs in the South. Uppsala BIO is also one of the founders of SULS. A great deal of effort was expended during 2008 to create a joint website with its Info Bank database of research projects and companies in the region. It is obvious to players within life science that if the region is to be given international exposure, then the entire region should be marketed, from Strängnäs to Uppsala via Södertälje and Stockholm. According to the agreement, the collaboration with SULS deals only with marketing. In Stockholm, there is no corresponding overall initiative which might take a role in the collaboration, even relating to areas of activity other than marketing; this makes it more difficult to arrange such activities. Regarding marketing by contributing to international conferences and conventions, due to limited resources SULS chose to not to make its own contribution to BIO (the latest major conference/convention in the US) but was instead represented through ISA.

Whilst visibility is important, for a small organisation with a limited budget and staff it is also important to set priorities and drop some activities.

Uppsala BIO has also hosted journalistic visits arranged by the press service of the Ministry for Foreign Affairs.

Uppsala BIO's process management considers it important for Uppsala BIO to remain as a brand and for its added value to be clear to the players it targets and collaborates with. During 2009, there are plans to develop Uppsala BIO's own website. This is part of the communication plan to spread information about Uppsala BIO's operation. Other important channels include newsletters and media contacts.

To keep the civil service and political level informed about Uppsala BIO's activity and results, the process management gave a presentation of this information to the municipal executive board. There is also ongoing discussion on how they can work jointly in dialogue with the international corporations that have acquired companies in the region. This is to ensure that these companies feel welcome, gain information on how they view their continued activity in the region and discover what might improve the conditions for ongoing and new or increased operations of this kind. Another aspect that was discussed is the collaboration between government players and the initiative in order to attract entirely new operations to the region.

Competence supply

This issue has been and remains highly prioritised in Uppsala BIO by the process management, industry and the municipality. Concerning children and young people, Uppsala BIO assisted with the application for advanced high school courses in research which was initiated by the municipality but not passed. There are plans to submit a new application. Uppsala BIO is planning to contribute industrial contacts who will serve as lecturers and mentors. The Chemistry Lecturer Link [Kemilektorslänken], an initiative funded by the Royal Swedish Academy of Sciences (KVA), has afforded Rosendal Senior High School access to a research-trained chemistry lecturer. This person brings close contact with their academic host institution and industrial sponsor into their teaching. Uppsala BIO is also contributing industrial contacts to the Chemistry Lecturer Link.

At university level, Uppsala BIO developed a training course in leadership and communication and a module in the Master of Engineering programme. This has now been handed over to Uppsala University. The process management is still contributing by arranging a number of lecturers.

Over the years, the issue of the future competence supply to players in the focus area has been deemed an important one to address within Uppsala BIO. At the same time, the process management is self-critical and considers it could have done more within this area. During 2008, the process management met the training organisers in order to develop the operation and discover ways of working and activities. There are plans to assess competence requirements from companies in conjunction with public players. It

may be that interesting examples of working methods can be identified in other initiatives.

Funding

Indirectly via Uppsala Innovation Centre (UIC), Uppsala BIO has received support from the Structural Funds for sections of UIC's activity that are also co-financed by Uppsala BIO. However, Uppsala BIO has not itself applied for further funds and plans for this are underway. In regard to applications to regional players and support from the Structural Funds, the process management has now entered a dialogue with the Regional Development Council.

An application was submitted to and approved by VINNOVA under the Global Links call and there are also plans to apply for funds in conjunction with other players under the Innovation Channels within the Health Service call, also funded by VINNOVA¹⁶. Furthermore, the process management has contributed to applications submitted by Uppsala University within strategic areas during the spring of 2009 and to EU FP7 applications. This was a matter of arranging contacts and in some cases writing accompanying letters. In promoting SMEs involvement in FP7, it is now being looked into whether more can be done than the operation described by VINNOVA and the office it funds at the SwedenBIO trade association.

Internationalisation

Uppsala BIO's process management wants to be more proactive in its international contacts where it has so far been too reactive. One of the reasons for the application for funding under the VINNOVA Global Links call was to create the circumstances for this. The project concentrated on developing ways to promote SMEs' opportunities for reaching out globally. This may involve new markets, finding partners, or finding a demanding first customer or reference customer. The project commenced with interviews to identify what knowledge of and networks with players in various parts of the world companies in the region already had. There was also a needs inventory of SMEs. Those with knowledge and networks were positive about offering a certain amount of help, if it could be properly conceived. In order to focus resources and test a working model, the initial stages were restricted to parts of Asia, a market which small companies have often sought help in reaching. The project is now progressing, with measures such as a visit to Japan by a delegation of SMEs once suitable players have been identified. For VINNOVA, it is interesting to observe the project and learn about companies' experiences as an example of how to promote SMEs' internationalisation in this type of initiative. Experiences from Uppsala BIO's work within Global Links may provide interesting information to other VINNVÄXT initiatives. Benefiting from established networks in order to create new ones seems an interesting way of working.

¹⁶ The effort is part of a government assignment to VINNOVA to stimulate the commercialisation of innovations within the health service stop work is taking place in consultation with Almi Företagspartner AB, Innovationsbron AB and the Swedish Association of Local Authorities and Regions.

Among the other international contacts which Uppsala BIO has is CEBR. This was originally an EU-funded initiative for exchanging experiences and mutual activities between regions concentrating on life science.

Uppsala BIO is collaborating with BioBusiness Alliance Minnesota in Minneapolis. This is considered a way in for life science companies from Uppsala wanting to get established in the US. The collaboration has now been formally taken over by UIC, with Uppsala BIO in a more peripheral role. It is possible that the corresponding initiative by Innovation Bridge in San Diego will operate in similar fashion. Experience indicates that this type of bilateral collaboration takes a lot of time and energy to build up and that it is therefore appropriate to choose carefully.

As already stated, Uppsala BIO has emphasised the importance of a good dialogue with international companies operating in the region so as to promote continued investment. Occasionally, companies take the initiative for such a dialogue themselves. This is where Uppsala BIO can have a role in detecting companies' needs and even promoting their continued presence in the region by involving corporate representatives in activities relevant to their companies. Gathering the region's players in order to present an attractive offering to established companies or those which may potentially set up in the region is an important role in promoting growth.

Uppsala BIO has also received international delegations from countries such as Poland and Great Britain. It is difficult to see direct impacts of such visits, but ultimately they may help market the region within the focus area.

Integration of gender perspectives

Uppsala BIO is currently conducting an equality project in partnership with UIC. This is currently at the data collection stage, relating to the gender division in the UIC and Uppsala BIO-X operations, both of which are co-financed by Uppsala BIO. The next stage will attempt to uncover the reasons for any inequality of distribution. The aim is to gain a better idea of how things actually look before identifying what subsequent measures are appropriate.

Needs-driven research

Uppsala BIO uses a call for proposals process to identify which R&D projects will be funded. The applications are examined by a group, comprising two researchers from universities and three representatives of industry. In 2008, following the examiners' recommendation, one application of 36 was granted SEK 3 million over two years by the Uppsala BIO executive board. In addition to funding, projects that are granted funds have the opportunity to receive advice during the project, including from process management and other players deemed relevant. This advice may relate to intellectual property rights, collaboration with other players and how to progress with a commercialisation process. Accordingly, while the project is running, meetings with the process management are taking place between the formal meetings with the inspection group regarding how the project is going. Projects are assisted in meeting the requirements of the inspection group in matters such as business strategies and can be

put in touch with relevant people for support in the process. This is estimate to be worth an additional 5%, relative to the project funding granted. So far, some 80 new concepts have come in as applications to BIO-X.

The interviews indicate that the process projects go through makes them better equipped when they subsequently go on to a commercialisation stage.

Following the applications, monitoring in the form of advice is offered to everyone who applied for funding. This also provides added value to those project groups that were not granted funds. The expectation is that they will return with a new and better application next time, or find other funding and continue better equipped. This advice is given primarily as “hours in kind” provided by Uppsala BIO’s partners and members as part of their funding.

Uppsala BIO had previously observed that not many applications were coming in from the Swedish University of Agricultural Sciences (SLU). In 2008 therefore, a targeted effort in the form of an information campaign was launched and, in exchange for hours in kind at Uppsala BIO, SLU took on a part-time person to identify promising projects. This led to more applications from SLU.

Uppsala BIO is addressing a research-intensive industry where many of the innovations developed by companies originate in academic research. Achieving radical renewal in the area often requires world-class research. One indication that the research funded by Uppsala BIO maintains high quality is the fact that contributing researchers also attract funds from the Swedish Research Council, VINNOVA and for FP7 projects (also as coordinator in the latter case).

Uppsala BIO has chosen to invest a relatively large amount of funds in a small number of projects, a strategy which after a relatively short time appears to have yielded some notably positive results in the direction of the programme goals. Biomedical Development in Western Sweden is funding more projects with fewer funds per project. It would be interesting if VINNOVA could examine an exchange of experiences between these two initiatives as they seem to be within allied research fields.

Newly established enterprises

Two main activities are conducted under the framework of Uppsala BIO to promote commercialisation:

- Innovation Akademiska
- UIC’s existing operation for commercialisation.

Uppsala University Hospital in conjunction with Almi Företagspartner and Uppsala BIO recently appointed an “innovation coordinator” to promote the commercialisation of ideas from healthcare. These ideas do not have to be research-intensive high-tech products, but they can be. The operation will probably hand the ideas over to an external party interested in driving the process forward and not lead to those who conceived the idea starting up a new company. Currently, the operation is mostly concerned with

running needs-driven research in order to verify the ideas prior to possible commercialisation.

UIC's operation works as a three-stage process. The first stage is a series of seminars which everyone can attend – lectures about IPR for example. Those who want help to get further can apply for it. Each year, some six or eight projects are selected by UIC based on an initial assessment of their substance and commercial potential. The selectees receive help with a business plan and strategy development relating to IPR. The anticipated result is a start-up company. Companies with a prototype or advanced idea to put out to market or a demanding customer can receive additional help at the next stage. There may still be a certain amount of technological development content but it is more concerned with business development. Business development advisers are called in; these are consultants on a standard salary paid to put in one day a week at UIC. The cost is funded through a soft loan to the company using the service.

UIC wants to offer a well-functioning concept that draws projects to apply to the three-stage process described. For this reason, there is no active operation for identifying projects. Within life science, most projects come from universities whilst the other areas also have a large number of spin-offs from existing companies which apply to UIC. A certain project influx comes from projects in the needs-driven research funded or advised by Uppsala BIO. It is anticipated that this proportion will increase due to the advice now being offered those not awarded Uppsala BIO funding for needs-driven research. As a rule, university researchers often come to Forskarpatent first (this is under UUAB, Uppsala University's holding company) and are then passed on to UIC.

If companies progress after the UIC process, then it is possible for university holding companies to bring in funding in exchange for a participating interest. UUAB or SLU Holding AB are normally a small/minority owner and do not use their ownership for influence or control to any great extent.

A major cost in this process is the business development advisers in UIC's third stage. One success story resulting from both the needs-driven research and UIC's activity is the company Olink, which in 2007 had 15 employees. Another example is ModPro which, having been granted funds for needs-driven research and thus benefitting from the available advice, went on to UIC's process and subsequently became a company in UUAB's portfolio. This project's assessment was changed during the process because it had developed well.

Uppsala BIO, UUAB, UIC and SLU Holding work in parallel which meant there was a risk of competition between these organisations. The various organisations now collaborate and complement each other and Uppsala BIO's funding provides an opportunity for UIC to reach more projects and develop the operation. Thus, in that regard Uppsala BIO has chiefly meant additional funding to further develop and expand the parallel paths of these organisations. The cooperation also means that the experiences Uppsala BIO gains from its other operation can be used to develop UIC's

operation. This involves the early introduction of aspects pertaining to future internationalisation when advising on the commercialisation process.

Development of existing industry

Uppsala BIO's activities to benefit existing industry have largely already been described under other headings. Some examples of ongoing and planned operations:

- Industry has emphasised the importance of activities to promote the competence supply. These activities were a priority and are once again although there has been some hesitation as to which are most suitable. A process to identify activities in this area has now been started.
- Another issue important to industry has been the circumstances for clinical studies and access to biobanks. Activities are now under way in this area.
- Within the framework of needs-driven research, research groups often collaborate at regional centres of learning with individual companies, particularly small ones. Apart from the immediate competence development within the project's research area, this also contributes to an increased competence exchange and mutual learning. Furthermore, companies gain access to a network with knowledge of the latest research.
- The Global Links project is aimed at developing the international links and presence of small and medium-sized enterprises.
- A dialogue with established companies regarding how their Uppsala operation can be developed and happen in conjunction with the public sector – the municipality for example. There are also plans to promote new establishments more actively.

Activities for individual learning, monitoring and evaluation

Interactive research has elucidated such things as how different players regard the added value that Uppsala BIO's operation brings to the system and demonstrated how the life science industry has developed in the region. Pure research projects have also been carried out examining how the activities of the initiatives are contributing to the development of knowledge and advancement of innovation in the system. These studies have been used as one of the decision-making bases discussed in the executive board, factored into strategic processes and used in the development of activities. Uppsala BIO is one of the initiatives which has actively utilised the interactive research and had favourable experience with it.

Impact of the initiative on the regional innovation system

Uppsala BIO has drawn four new members during the period, but the process management currently sees no intrinsic value in attracting a lot of members provided the selection of members is representative. The objective is to have time for individual discussions with all members.

It has long been considered important to improve the conditions for collaboration between the health service and industry – something which was difficult to address before. Some steps have been taken in regard to this during the year.

Out of Uppsala Municipality's priority areas of strength, it invests the most time and resources in Uppsala BIO's focus area.

Uppsala University has appointed a project manager for life science in its Uppsala University Innovation department. The life science area has also gained one person at Uppsala University's holding company. The collaboration with SLU's holding company has developed over the period and hours in kind are used there to actively identify interesting projects.

Appendix B: VINNVÄXT winners 2004

This section of the Appendix describes the activity of the five VINNVÄXT initiatives: Biomedical Development in Western Sweden, Fiber Optic Valley, New Tools for Health, ProcessIT Innovations and Triple Steelix. The description is based primarily on the written situation report and interviews conducted during April 2009 (Appendix E). Other supporting data, such as past monitoring and evaluations as well as the initiative's operational plans have also been used for this compilation.

Fiber Optic Valley

Fiber Optic Valley aims to contribute to sustainable growth in industry based on fibreoptic competence. Its focus is fibreoptic products within the engineering and communication industries and related services. The functional region is the coast of southern Norrland including Sundsvall and Gävle, with Hudiksvall as a node. The objective is to become the fibreoptic centre of Europe by 2015. Growth is anticipated within the areas of fibres for users, e-services and fibreoptic industrial applications.

Fiber Optic Valley's operations include supplying laboratory opportunities, strengthening and promoting research and development, providing a testbed for testing new products and services, implementing user studies to test user-friendliness and marketability, offering R&D-driven business development supported by such things as incubator activity and marketing the competence and opportunities of the focus area in the region. The initiative currently has some 50 co-players in the form of companies, the public sector, R&D organisations (such as Acreo) and educational establishments (Mid Sweden University and the University of Gävle). Fiber Optic Valley is run as a non-profit organisation with some 25 members and the operational activity is run through a wholly-owned service company, Fiber Optic Valley AB.

The representatives of regional authorities (Hudiksvall Municipality and Gävleborg Regional Development Council) emphasise that through the long-term funding and involvement of VINNVÄXT, the investment in Fiber Optic Valley has gained a strong foothold in the region with good prospects of decent results compared to short-term projects. The long-term approach and involvement are also helping attract the involvement of other players and the view is that VINNOVA's focus in the programme is more on impacts than formalities. These players also underline their belief that they would not have been able to achieve the same results or long-term working method, had the organisation insisted on being self-supporting. In other words, just being pointed in the direction of assignments and private membership funding and seeking funding for individual projects. Some form of basic funding is needed.

There is still relatively little demand for highly trained people in the region, although this is slowly changing. Within the initiative's functional region, employment is dominated by the pulp and paper industry and steel and engineering industry, plus

banking, insurance and government services. It is hoped that the fibreoptic development will become an important part of the region's employment. In that context, the operation emerging through Fiber Optic Valley is contributing new models for vacancies with a high knowledge content.

In the regional development plan, the work of developing clusters and regional innovation systems within selected focus areas has priority and the operation within Fiber Optic Valley is one of the priority areas. The region, through Gävleborg Regional Development Council, considers it a case of supporting organisations that work close to the sector with collaboration between companies and by also promoting their collaboration with academia to strengthen regional value chains in industry. The criteria for choosing which "clusters" to work with include: the presence of a critical mass of companies and competence; involvement from below on the part of the players; and the potential to make a difference regionally. If corresponding strength exists elsewhere in Sweden, then the area is either reduced in priority or an attempt is made to form alliances with other Swedish nodes. The intention is not to compete with efforts in other regions but rather to complement them. The intended achievement of these efforts is regional development and the view is that it is not regional public players who should run these but that they can contribute funding.

In the beginning, it was difficult for some of the public players to see the difference between Fiber Optic Valley and Acreo and there was also a certain expectation that the initiative would contribute funds to Acreo's operation. This issue became less important when Acreo received funds as an Institute Excellence Center. Relative to the initiative's first year, Acreo in Hudiksvall is now one of several important partners to the initiative. The difference which the official representatives today see between Acreo's operation and that of Fiber Optic Valley in the region may be expressed as the difference between research and "laboratory activity" or compared to market and commercialisation. Other regions with fibreoptic operations were initially negative about the Acreo and Fiber Optic Valley efforts ending up in Hudiksvall. Over the years, it has become clear that it would have been difficult for the Fibreoptic Laboratory to remain without the contribution of money from the Structural Funds and other regional funds that were released.

In terms of the differences between municipality and region, it seems that politicians' change of attitude to more generally regional and municipal thinking has gone quicker than expected. However, there is still a risk of jealousy and of competing for funds and involvement within the county. In this regard, the municipality stresses the importance of the region's priorities being clear.

Amongst other things, the regional government representatives anticipate that the initiative's activity will benefit existing industry and lead to new enterprise particularly through commercialisation. It is particularly the latter that they want to see more of. They are positive about the broader fibreoptic applications which have been observed and which have led to fresh activity in the region. An example of this is how fibreoptics have enabled the remote editing of film on the instructions of national and international

players. There is also a positive view of the marketing the region has received internationally within fibreoptics even if there have been a few questions about what that marketing really means for the region; in other words, what good it does. The regional official representatives describe it in terms of Fiber Optic Valley now being almost better known abroad than regionally and nationally.

The executive board and process management have only just begun looking at the issue of what happens when Fiber Optic Valley's VINNOVA funding finishes. In part, this is because work on the initiative's changed organisational form (as a non-profit organisation and wholly-owned service company) has taken time and commitment in recent years. However, the main reason is that only now the initiative has reached the "halfway mark" of its VINNVÄXT funding has the immediacy been felt. It may be possible to get increased funding from industry in future, but public funding is necessary if an operation resembling the current one is to continue. A smaller proportion of research funding will probably remain in the initiative in future. There is no wish to be turned into a consultancy company because "if it's good then it should be self-supporting". The process management considers that having the most suitable operation and being able to work for the long-term requires a certain amount of public money as basic funding.

Regional and national strategic processes

Surveys of research and companies have been conducted within Fibreoptics in Sweden¹⁷ and Europe¹⁸. The material indicates this to be a niche industry turning over some SEK 25 billion in Sweden and consisting of about 300 companies, depending on what definition is used. In Europe, it is an industry which turns over hundreds of millions of kronor and which has been flagged as strategically important. Fibreoptics (photonics) is replacing a number of areas in electronics and Europe is considered to have greater prospects of competing with, say, Asia in this field than in electronics, where Asia is increasingly taking over through cost advantages.

Of the research centres nationally, the most eminent are considered to be Acreo Hudiksvall/Kista, KTH and its Kista Photonics Research Center (KPRC) and Chalmers. There is some commercialisation based on the research in these milieus. Fiber Optic Valley's role is to act as a bridge between research and commercialisation in partnership with other resources such as incubators.

According to the process management, the operations in Kista and Hudiksvall are complementary. The collaboration with Kista is primarily through individual activities and there has also been recruitment from there. Using methods such as surveys, the initiative has identified a number of key people to associate with. The laboratory milieu

¹⁷ Bindig P., Henricsson H. and Laurell F. "Report on Swedish photonics industry", European Optical Society (2008).

¹⁸ Mayer A. "Photonics in Europe – Economic Impact", European Technology Platform Photonics (2008).

for special fibres in Hudiksvall is considered unique in Sweden, but there are a few European equivalents in England, Germany and Finland.

In terms of the strategy for needs-driven research within the initiative, the process management considers that the operation is currently taking place in partnership within/between educational establishments, rather than players submitting applications for collaboration on individual projects. It is therefore considered that collaboration is progressing towards long-term strategic processes.

To promote fibreoptic training companies in the region, a national marketing survey has been conducted as a basis for identifying continued activities. The process management considers these small enterprises should not have to defray this themselves.

The public players were active primarily at the time of the application and during the initial stage of mobilisation, as well as when the Fibreoptic Laboratory was starting up. Following that, contact diminished. Now, interest is once again increasing as there is curiosity about the initiative's benefits and results.

The initiative has a working group regarding its international positioning. This group consists of the process leaders and four other people and does its work in meetings. The strategies produced are included each year in the operational plan. The outside situation monitoring has chiefly involved reading sector reports, assimilating information and material about relevant activities within the EU and monitoring international functions, seminars and conferences.

Regional meeting arenas

During the initial years, a lot of effort was put into mobilisation and it was not easy to bring about major attendance at the meetings that were arranged. Fiber Optic Valley has now set its sights higher, with more nationally targeted invitations and a change is now evident with increasing numbers of visitors to these conferences and seminars. For example, 70 people attended the last major function of which 20 contributors were international, 30 were national and 20 were local with a mixture of researchers and representatives of large and small companies.

Communication and marketing

The initiative arranges meetings with municipal politicians and Swedish parliamentarians aimed at raising awareness of the initiative and its activity. These meetings are also launched to generate joint regional and local research initiatives around such things as infrastructure, including technology parks and laboratory premises. Due to their involvement in many strategic discussions, it is thought that members of parliament from the region might act as spokespersons in the Swedish parliament and the EU on issues of importance to the initiative.

A number of international conferences have been identified as the most important to be involved in and the initiative has contributed research or corporate representatives of these (see also under the heading "Internationalisation"). A coordinated Swedish stand is being planned at one of the largest exhibitions.

International marketing activities also take place through participation in such things as international trade conferences, with the aim of promoting the fibreoptic training companies' operations in the region. This entails indirect marketing of Fiber Optic Valley. The courses arranged by these companies have meant that Fiber Optic Valley's operation has been exposed to corporate representatives from some 200 companies in 25 or so countries which took part in the training courses.

Competence supply

Fiber Optic Valley is contributing to an exchange of experiences through the SLIM project (systems management for innovative milieus) aimed at increasing the capacity to run regional processes for cluster development. This is a collaboration between Värmland, Dalarna and Gävleborg which the process management looks upon positively. This is also because it increases awareness on the political level of the operation and benefits of initiatives like Fiber Optic Valley. The participation at the TCI conference 2008 in South Africa yielded both an exchange of experiences relating to cluster development and contact with potential customers and partners within the initiative's focus area.

Fibreoptic training courses in the region consist of two parts. Firstly, an advanced vocational education (or AVE) which is "basic training" for service technicians and secondly, professional training to develop competence in engineers to which companies such as Ericsson, Telia, the Swedish Armed Forces and Stadsnät and their international counterparts send their employees. Currently, the professional training contributes to the funding of the AVE training. The reason the AVE training is not currently self-funding is because it demands both a high concentration of staff and advanced equipment. It is therefore difficult to start this operation in other parts of the country, as has been considered. The process management considers the training at Hudiksvall to be unique in Sweden.

Fiber Optic Valley wants the region's existing (and expanding) laboratory milieu to find additional use in the educational establishments' training in the area. It would like to see the milieu used to attract students as well as for an advanced high school course. The prospects of a vocational college in the wake of the financial crisis have been examined and the process management contributed to an application for advanced (senior) high school courses, which was rejected. The intention is to apply again and the chances of starting a post-high school technical foundation year are being investigated, possibly in cooperation with industry.

Funding

The process management has the impression that the Structural Funds' attitude to initiatives such as Fiber Optic Valley is positive and the applications with which the initiative has been involved have passed. During the period, the Structural Funds helped fund two of the initiative's projects. To find out more information and improve its chances of influencing FP7, the initiative has established contact with someone with experience of working for Swedish players in Brussels, in areas relevant to the

initiative. It has also initiated and contributed to an application to Region Gävleborg, which was successful.

Through the increasing collaboration between the research groupings at the region's educational establishments, a dialogue has developed regarding relevant EU calls for proposals. Two applications to FP7 have been submitted, relating primarily to Acreo's operation in Hudiksvall.

The fact that funds are being applied for and awarded is an indicator that more players find the initiative's activity relevant. It is also important before the VINNVÄXT funding ends. It is important to obtain money for the long-term funding, but equally important that these funds cover the type of activity identified as relevant.

Internationalisation

A number of activities have been initiated, partly resulting from the assessors' criticism that there was insufficient international reach. These included a process comprising a full day's workshop with the executive board and the task of applying to VINNOVA's Global Links call (which was not successful). A pilot study based on interviews with leading industrial people in the system was carried out prior to the application.

According to the process management, there has been an unsuccessful attempt to involve ISA in activities for the focus area. On the other hand, Fiber Optic Valley has established a collaboration with the Swedish Trade Council. This involved joint seminars in which the Trade Council's services were offered to companies in the initiative, such as pilot studies for companies.

During the first year after the evaluation, information about international players was collected and the process management is now planning targeted activities to build up international networks. As previously mentioned, a number of important conferences and fairs have been identified which the initiative has realised are important to attend. The process management is also helping coordinate a Swedish stand at one of the larger exhibitions. The conferences in the area unite companies and researchers. Often, the companies do the exhibiting and researchers present the latest research. Amongst the other planned activities is attendance at a trade conference in September 2009 with six training and service sales companies.

One objective of the initiative is to become a leading player in the EU's Photonics 21 network. Thousands of companies and hundreds of research milieus are involved in this network and it will be drafting much of the EU's European research agenda.

Fiber Optic Valley's brand is also growing globally due to the fiberoptic training which has reached many individuals and companies. An example of how the brand is spreading within the EU is the fact that certain parts of the training material developed by the company in Hudiksvall became EU standard; the material uses examples from Hudiksvall. Another activity which contributed to Fiber Optic Valley's brand is its renowned gender perspective work. Within this framework, it is now being invited to

discuss its work in various contexts, including internationally. Attention will also be devoted to this work during Sweden's presidency of the EU.

The process management has taken the lead in developing the internationalisation work and a number of activities have been held. However, the situation report and interviews do not outline the aims of some of the activities, nor detail any preparations for how the initiative's players will manage the envisaged international collaboration.

Integration of gender perspectives

Fiber Optic Valley has been working actively for a number of years to clarify the gender perspective and has now also commenced activities to change attitudes and behaviours. This work has drawn a lot of attention which has raised general awareness of the issue. At the start of the gender work, it was confirmed that the majority of participating organisations were gender-segregated. Safeguarding the competence supply requires the creation of an attractive region to live and work in and for there to be attractive workplaces for both sexes. Since 2003, work has been under way in the project to raise awareness and understanding of what the players will lose unless they deal with the gender segregation; this was initially a non-issue.

Under the framework of the project, the contributing organisations have identified for themselves what behaviour they want to change. Gender-identified functions have been examined and this has resulted in an awareness that they actually are gender-identified. Work is currently under way to influence the established recruitment processes. One project target middle managers and aims to provide the managers with tools to change behaviours and attitudes. The 13 managers have met 20 or so times to swap experiences and discuss leadership in a wider sense than just gender. It turns out that the division between organisations is wide in terms of how far they have come but now, even those who have made the least progress are starting to realise the problem. Thus, they are working on qualitative as well as quantitative equality within the project and their work also involves the authoring of a book. This work is now being pushed further, aided by funding under VINNOVA's TIGER call. The initiative has helped the middle manager network's gender project by offering companies in the network a chance to get involved and by marketing the network at the initiative's seminars and events. Representatives from the initiative's member organisations have also taken the training.

At the same time, the tougher times are noticeable within the project. It is difficult for companies to prioritise this long-term task of ensuring the competence supply, even though corporate managers agree on the importance of the work. Companies want to be attractive and in a small locality it quickly becomes known which companies are also attractive to women. The next step within the initiative should be to include a gender perspective in applications and services developed under the auspices of the initiative.

The experiences gained by the initiative through this work might advantageously be incorporated by the other VINNVÄXT initiatives.

Needs-driven research

The interviews reveal a view that the competence development in Acreo's fibreoptic operation in Hudiksvall has gone quickly and that this is primarily due to the startup at Hudiksvall being accompanied by several people who used to be in the Acreo fibreoptic operation in Sundbyberg. There are not many researchers with PhDs in Acreo's fibreoptic operation in Hudiksvall and so not very much research is conducted. Rather, the operation is described as trade-associated and consisting largely of assignments. In Hudiksvall, there is a good infrastructure and laboratories for the operation. At the start of the initiative, the little research that was funded by Fiber Optic Valley was conducted at Acreo in Hudiksvall. Things are more mixed now and the proportion from Mid Sweden University (MIUN) has increased. Some 30 researchers contribute to the initiative's operation, with most at MIUN, somewhat fewer at Acreo and a small number at Gävle University. A few researchers from educational establishments outside the region are also involved in individual projects. During 2008, some 30 scientific articles were produced under the activity co-financed by the initiative, one industrial doctoral student submitted a thesis and another took their licentiate's degree.

The process for identifying research projects funded by the initiative takes place in two ways. The first involves Fiber Optic Valley identifying, planning and running these entirely in line with corporate needs, through an industrial doctoral student co-financed by the initiative for example. These projects are most often identified through a company being sought out to discuss needs. Occasionally, companies have approached the initiative instead. The second way is for projects to be identified by researchers at the educational establishments. The selection process for projects has four dimensions and involves narrowing down some 30 criteria with threshold values. Projects are operated within the two sub-areas of special fibres and fibres for the home. The initiative has a delegation arrangement in which decisions about the project of less than SEK 250,000 can be taken by the process management. If that sum is exceeded then the executive board must take the decision. Occasionally, funds are invested in pilot studies before the initiation of major research projects.

At the educational establishments, research is also run under programmes which existed before Fiber Optic Valley and which are funded by a regional research council. The research funded is most often a continuation of previous efforts. Something the initiative would like to influence more are the processes determining which research is funded by the council.

The educational establishments in the region have started a certain amount of recruitment within the initiative's research field and the process management anticipates that researchers within allied fields will be attracted to the area. Mid Sweden University (MIUN) has identified three strategic areas for investment. One of these is "the digital society" which is linked to the initiative's operation.

In regard to fibreoptic infrastructure, further laboratories are planned in addition to Acreo's Fibreoptic Laboratory. Fiber Optic Valley is to create "Fiber Optic Valley Labs", which will be a resource for early-stage development projects prior to

commercialisation as newly established enterprises, or via commercialisation in existing industry (see also under these headings). It is also envisaged that the infrastructure will be used for research and training. It is important to be aware that Acreo's mission is national and Fiber Optic Valley's is primarily regional and it is not always easy to unite them. Acreo in Hudiksvall cannot be expected to single-handedly promote Fiber Optic Valley's relatively national objective.

The initiative gives varying degrees of funding (100% and 10% respectively) to two industrial doctoral students conducting research into new applications of fibreoptics. In one case, there are plans for the doctoral student's host company to commercialise the application. That project benefits directly from Fiber Optic Valley Labs which, despite the operation not being fully developed, already gives access to equipment that the small company could not invest in alone. Being part of the initiative's activities is also deemed to provide a valuable network for the doctoral students. The other industrial doctoral student is linked to Acreo.

Within sensor research, the initiative is the principal partner in the cooperation between MIUN and companies in which a number of industrial doctoral students are involved. These doctoral students are associated with companies which are also partners to the initiative. To some extent, the corporate partners of MIUN and Fiber Optic Valley coincide and occasionally, new projects follow on from old ones involving the same companies. Researchers involved in the initiative can help formulate research projects in collaboration with companies. Fiber Optic Valley contributes by funding industrial doctoral students and by highlighting and verifying the research through tests and measurements. According to the process management, the companies' co-financing should help build up new research groups within the area, as the educational establishments are not currently recruiting to it. The research is also funded by the Knowledge Foundation, other programmes at VINNOVA and the Structural Funds.

Radio Center Gävle turns over SEK 10 million annually and has some 20 corporate partners and a close collaboration with KTH. The Center has a good infrastructure donated by Ericsson. According to its representative, the Center is responsible for 25% of all external funds and a total of 33% of the publication at the University. A large proportion of the funding comes from the Knowledge Foundation. To date, there has not been much cooperation with Fiber Optic Valley but since there are natural connections between radio and fibreoptics, a long-term effort is to draw closer to the Radio Center. This might find future expression as a training partnership with Fiber Optic Valley leading to more courses being broadened into fibreoptics. A representative of the Center expressed the hope that this might lead to an increased number of students and even the possibility of using Fiber Optic Valley Labs in the training. Radio technicians are trained at the Center and there is a wish to take more students, 60-70 instead of the current 25. However, almost all the students are non-Swedish with the majority coming from China. There are plans to start a project and industry-orientated Master's course in 2010. Due to a steady influx of undergraduate students at the Center (five have passed their doctorates) the level of publication has increased greatly.

Newly established enterprises

As previously stated, according to the process management the research into fibreoptics is leading to spin-off companies especially in Kista around Chalmers and Fiber Optic Valley. One example is Fibertronix, linked to the Acreo Fibreoptic Laboratory in Hudiksvall. An example of a corporate spin-off is ICT Innovation which works on global service sales of methods and technologies for installing fibreoptic networks. Another example is HAWC international which has developed a service platform for cooperation on film production using fibreoptic networks as a basis. The process management considers that future spin-offs and development of existing industry in the region will primarily involve fibreoptic sensors, or “fibres for the home” (infrastructure, installation and construction technology), but will also take place within the area of media and information services. The process management considers that a number of companies will emerge within service industries related to fibreoptics.

The infrastructure for commercialisation exists in various forms. In 2008, an incubator was started in Gävle with a contribution from Innovation Bridge. In Sundsvall, there is an incubator and technology park and there are also plans for a technology park in Hudiksvall. The initiative has helped design a network of commercialisation financiers stretching from Gävle to Sundsvall, with Innovation Bridge and the Norrland Fund as chief partners.

The Norrland Fund is a foundation providing final borrowing to companies with the aim of generating growth in Norrland. The idea is to strengthen the development of profitable industry and contribute to renewal and an increased level of advancement through capital, competence and contacts with companies in Norrland. The Norrland Fund has a network of financiers including Västernorrlandsfonden, Investa företagskapital, Almi, business angels and other players and is also a member of the Gävle incubator and technology park in Sundsvall. Fiber Optic Valley has chosen the Norrland Fund as a partner rather than bringing somebody in with the competence and networks offered by the Fund.

Acreo needs support in dealing with commercial ideas which have not been taken up by large companies. The divide in this regard is that Acreo has the capacity of technical implementer whilst Fiber Optic Valley can provide help with commercialisation. One of the spin-offs from Acreo's operation mentioned earlier, Fibertronix AB, started in December 2008 and plans to sell special fibres for applications in extreme environments. According to the Acreo laboratory itself, it is the most advanced laboratory in Northern Europe targeting extreme environments and ranks amongst the most pre-eminent in the world in certain niches. Acreo will focus on R&D, process development and production service whilst the commercial production of special fibres can be made into a spin-off. The envisaged applications for special fibres lie within the oil and gas industry, aviation electronics industry (which may yield more environmentally friendly aeroplanes requiring less fuel) and in future also within medical technology. It is envisaged the company will sell advanced fibres at large margins.

The company currently has an interim executive board and has appointed a salesperson and part-time MD. Production takes place at Acreo's plant. Fibertronix AB and Acreo are now in the process of writing a production agreement which will provide revenues for Acreo's other operation. In the long-run, if sales increase, other production solutions will have to be found. Production currently takes place at Acreo's premises and uses Acreo's equipment and personnel. Commercial production also takes place in Kista but there, personnel from other companies carry out the work. When Acreo and Fiber Optic Valley jointly contribute to a spin-off company, both of them take the credit, as was the case when Fibertronix AB started up. Within the framework of this spin-off from Acreo's operation, the initiative in the process has served as an enabler and a sounding board in finding funding, an MD and ultimately also the executive board.

As already mentioned, Fiber Optic Valley Labs is a new part of the commercialisation infrastructure. The idea is that with the aid of laboratory equipment and advice, it should be possible to progress an idea to a prototype via a prototype workshop. Fiber Optic Valley Labs will contribute support in terms of design (by utilising Master's students for example), manufacturing, technology development, business development (e.g. for IPR) and also a certain amount of funding. The laboratory will be open to innovators and researchers wanting to test an idea. The difference compared to Acreo's operation is that Acreo conducts assignments and produces special fibres whereas here, innovators or companies will produce their own prototypes. The laboratory budget was SEK 1.5 million for 2009, but this will need to grow. Access to additional equipment can be gained by agreement with network companies which make their equipment available in various ways, such as leasing. All equipment will therefore not be in one place.

Fiber Optic Valley has allied itself with a key person who has what is considered a comprehensive network relevant to the work of promoting commercialisation in the focus area. The extent of fibreoptic research and development this concerns hardly justifies the construction of comprehensive permanent structures specifically for commercialisation of this area in the region. At the same time, the importance of professional advice and project management in promoting commercialisation should be underlined. Otherwise there is a risk of too great an emphasis on technological development in the commercialisation processes, rather than business development and relationships with future customers to generate good requirement specifications. It is of the utmost importance to have individuals involved in the innovation processes with sound knowledge and experience of commercialisation and commercial product development in the area of application, or areas involving similar logic. It is difficult to assess whether these aspects are sufficiently included in the activities now being developed for commercialisation and therefore worth analysing in future monitoring of the operation.

Development of existing industry

The primary purpose of the existing infrastructure at the Acreo Fibreoptic Laboratory in Hudiksvall and the one planned at Fiber Optic Valley Labs is to be an asset to existing

industry in need of this type of equipment for analyses, measurement and production. For Acreo's part, this means companies throughout Sweden, whilst Fiber Optic Valley has a greater focus on companies in the region who are partners in the effort. Acreo's operation involves a comprehensive national network of existing industry within the area. The funding Acreo received from the Institute Excellence Center led to improved conditions for Acreo's operation. For the initiative, Fiber Optic Valley Labs will probably also lead to a better network with industry than at present. Currently, the network is mostly based on Acreo's contacts. According to the situation report, in 2008 a total of 10 companies within the fibreoptic and broadband area participated in projects co-financed by the initiative. In addition, it is reported that two new products and two new processes were developed under the project.

VINNOVA's assessment is that important to consider to whom the physical R&D infrastructure is being offered. The question is whether it is regarded as unique access and a competitive advantage intended only for the regional companies, or whether it is a national/international resource as part of a strategy also aimed at attracting cooperation and investment.

Concerning the initiative's role in individual companies' operations, an example that can be mentioned is the cooperation which led to the opportunity for a film editor to work in the region. This was despite the need for advanced and rapid exchange of large data volumes with the film industry, including Stockholm and internationally. The project involves the development of an entirely new application of the technology which may prepare the way for ideas about other new applications. Another example already mentioned is the industrial doctoral student who, aided by the equipment at Fiber Optic Valley Labs, is developing a distributed sensor which can locate heat from any source along the entire length of a fibre within one meter. The work was done at a small company with six employees in 2007, Fiberson AB, and there are ideas for various applications. The production is envisaged for Optronic AB and the project is a continuation of an earlier one run at Ericsson AB.

Due to its emphasis on mobile communication, Ericsson AB has paid limited attention to fibreoptics, but its interest is now apparently growing. This in turn may affect the interest of other potential subcontractors in future.

The activity to promote the operation of fibreoptic training companies has already been mentioned. In addition to help with business development, market analysis and international marketing, the activities also comprise a better network and cooperation and exchange of experiences between these companies. Some of the activities are such that the small companies find it hard to run them individually or privately. The interviews indicate that there is thought to be potential for development of a service and repair industry operating on the world market and that this could become a major industry internationally due to the global broadband expansion that is taking place. Those who work for the region's fibreoptic training companies and hold courses abroad on their behalf are picking up knowledge about the needs of broadband companies globally. This information can then be mediated to companies other than training

companies in the fibreoptics field and may become a source of ideas for new goods and services.

Activities for individual learning, monitoring and evaluation

During the year, Fiber Optic Valley collaborated with the Dahmén Institute to plan interactive research activities to measure the effects of the initiative and ensure learning. The interactive research aims to build on various sub-studies which can roughly be grouped into three different principal areas: a survey of the industry; a survey showing how interested parties experience the value of the initiative with a descriptive case study and allied indicators; and a process for increased learning within the organisation.

The overall objective through the individual efforts is to contribute to the development of the initiative's operation. The interactive research should generate understanding of how decisions and actions in the innovation system affect the results. So far, the process's first project has resulted in a preliminary visualisation of the initiative's operation and an initial industrial analysis relating to the IT sector's development in the functional region of Gävleborg and Västernorrland counties. Fiber Optic Valley is currently taking on interactive researchers for long-term work.

Impact of the initiative on the regional innovation system

According to the interviews, the initiative has contributed to the educational establishments starting to notice the area of fibreoptics and continuing to discuss it with each other. This is indicated, for example, by a statement from the vice-chancellor of Mid Sweden University. On the other hand, there has been little recruitment in this direction. Mid Sweden University is now planning a Master's course focusing on fibreoptics in conjunction with Fiber Optic Valley.

GöteborgBIO / Biomedical Development in Western Sweden

Biomedical Development in Western Sweden (hereinafter referred to as BMV) is an initiative to develop the collaboration between national and regional players and aimed at strengthening and developing the basis of long-term growth within the biomedical field in the region. BMV aims to develop tools, platforms and processes to conduct research into innovations and applications through activities in four operational areas. The first of these deals with strengthening the commercial returns on research and development by funding and compiling R&D projects within biomedicine and the profile areas of biomaterials and cell therapy. The second area deals with training future leaders in business development within the biomedical area. The third area entails the initiative strengthening and developing the infrastructure of commercialisation within the biomedical area. Within the fourth area, the initiative is working to attract advanced competence and capital to the biomedical area in the Gothenburg region.

BMV's principals are AstraZeneca, Business Region Göteborg, Chalmers, Gothenburg University, Innovation Bridge Väst, Mölnlycke Health Care, Nobel Biocare and Region Västra Götaland.

VINNOVA was informed early on of a lack of clarity regarding the division of roles in the strategic leadership of the initiative. According to the process management, it would have been good if VINNOVA had contributed more in leading the discussion on this towards a solution. More recently, it seems that the parties' have moved more towards consensus and any obscurities have thus diminished considerably.

During 2008, the executive board of BMV inaugurated a discussion about creating a forum in which the principals could be represented in their role as owners of the initiative, whilst a more focused executive group took over the operational and strategic control. This was implemented during the first six months of 2009. The previous process management group, with representatives of the various operational areas and some of the principals has thus been replaced by a new grouping. This is convened by the process leader and meets regularly to exchange information and discuss common issues. The aim is to provide space for reflection and learning to facilitate control of BMV and the initiative's operational areas. The group has no mandate to take decisions; this is done in the relevant sub-process or by the process manager.

The majority of the initiative's operational areas are now run by established players under agreement with and co-financing from BMV. An example of this is the former Cardiovascular and Metabolic Network operation which advises on the funding and commercialisation of R&D projects; this is now run under the banner of Sahlgrenska Science Park (SSP). The initiative intends to run solely its own operational activities relating to marketing and communication as well as internationalisation.

For players who are unfamiliar with the initiative's activity, the concepts of GöteborgBIO and Biomedicine in Western Sweden continue to mix together. GöteborgBIO is a registered trademark, a communication platform for the BMV initiative and envisaged in the long run as a common name for the region's biomedical milieu.

The changes to the initiative's organisation, with a principal group and an executive group were put in place during 2009 and there are now plans to start discussing the content of the third programme period and what happens after conclusion of the programme.

Regional and national strategic processes

The initiative is collaborating actively on the project funded under VINNOVA's Global Links call with two VINN Excellence Centers funded by VINNOVA (Biomatcell, Center of Biomaterials and Cell Therapy and SUMO, Supramolecular Biomaterials Structure Dynamics and Properties). A common process between the three initiatives was begun during 2008 to design strategies and an action plan. This is continuing during 2009 (see also under the heading "Internationalisation").

The process management has started work on seeking out a selection of companies for a discussion regarding needs and possible activities for promoting a positive development within the focus area in the region. A further purpose of this process is to identify

specific needs on the part of individual companies to which BMV might contribute. In the future, it may also be appropriate to have a forum of company managers meet and discuss various issues of importance to corporate development.

Regional meeting arenas

The interviews give the impression that the initiative's events in the form of seminars and conferences are both rewarding in themselves and contribute positively to building networks. Events often take place in collaboration with regional or national players. The international conferences have been singled out as particularly successful and professionally realised. There are also positive reports on the networks created when people in various projects funded by the initiative are able to meet. Sahlgrenska Science Park and the Biotechuset biotech centre at Medicinareberget in Sahlgrenska represent important physical meeting venues in the innovation system for the focus area in Gothenburg.

Communication and marketing

The initiative helps increase the visibility and strengthen the brand of GöteborgBIO. Under the GöteborgBIO brand, the communication operation has noted an increasing number of hits on its website and increasing numbers of participants at seminars and organisations wanting to cooperate on events. "Awareness surveys" have been conducted twice to measure the extent of various players' knowledge of the initiative and its activities. These show that between 2006 and 2008 total awareness on a five-point scale increased from 3.7 to 3.8. Knowledge about GöteborgBIO is highest amongst regional and industrial representatives but lowest amongst academic representatives. A clear majority in these surveys considered the benefits of GöteborgBIO to be great. During 2008, the initiative made an active contribution to BIO 2008 in San Diego, the World Biomaterial Congress in Amsterdam and the Biotech Forum in Copenhagen.

Competence supply

The initiative is a co-financier of Göteborg International Bioscience Business School (GIBBS), contributing SEK 2.7 million per year. In-kind efforts are also contributed equivalent to SEK 3.05 million. One of the aims of this activity is to train future leaders of business development in biomedicine. The management of the training programme is currently jointly staffed by Gothenburg University (GU) and Chalmers and the agreement for BMV's support to this operation now includes both these parties. Under the framework of the training programme, student groups try to develop promising ideas or research results into growth companies in partnership with representatives of academia and industry. Students are able to combine theory and practice by interweaving courses in subjects like law, marketing and economics with the running of an innovation project. The programme offers a total of 60 credit points and is open to students with 120 points. The programme leads to a Master's degree in medicine or engineering depending on the student's educational background. During 2008, 15 students were accepted on to the programme, of which 13 were women. Furthermore, three students from an Erasmus exchange with Oslo University participated in the first

term of study, as well as students from the college in Tromsø whose start-up was modelled on the training programme. Today, 23 students have graduated, of which 11 are now leading or developing early-stage business concepts. See also under the heading “Newly established enterprises”). Within the framework of the training programme, contacts with a number of the country’s other biomedical milieus have also been developed. Amongst other things, this enables identification of suitable projects which may become part of the practical section of the tuition.

The two VINN Excellence Centres, Biomatcell (GU) and SUMO (Chalmers), have jointly received support from VINNOVA to create a research school within the biomaterials area. In the process leading up to the application, BMV was active in bringing together the two interested parties and creating a consensus as to the direction. The research school will include a doctoral programme in business creation, organised jointly by GU and Chalmers and based on the operation within the GIBBS training programme. Furthermore, senior researchers, postdocs and doctoral students have been recruited to the two VINN Excellence efforts. The SP Technical Research Institute of Sweden has allied itself to Biomatcell and increased its initiatives within the biomaterials area.

The authors feel it would be interesting if the initiative could monitor where the GIBBS students work after their degrees. It would also be worthwhile developing an alumni operation to benefit from their experiences and networks.

Funding

Chalmers, in partnership with Gothenburg University, has received a subsidy from VINNOVA’s Key Actors Programme and the initiative has contributed actively to the work of uniting the two educational establishments in a joint application. The initiative also helped bring together the parties for the application approved under VINNOVA’s Global Links call (see also under the heading “Internationalisation”). The initiative has not applied for funds itself from the EU’s Structural Funds. However, the new wet laboratory at SSP was added with the aid of money from the EU’s Structural Funds. BMV contributed to the discussion on the content of the application and funded a consultant to write it.

Internationalisation

As already mentioned, BMV is supporting two VINN Excellence Centers in their process of drafting a joint international strategy under the framework of VINNOVA’s Global Links call. This is happening through representation of the process management on the project’s executive group. This process means that centres jointly work out an action plan on how the overall milieu level will work more strategically on international collaboration within the biomaterials research area. The process includes a number of stages, including a survey of prominent research milieus in relevant areas. Trips to initiate or further develop established collaborations are being carried out and centres are receiving visits from other countries. Researchers and corporate representatives have had meetings in respective centres as well as jointly to work out a strategy and action

plan. This process has involved close collaboration and discussion between the two centres and research fields of mutual interest have been identified. There have also been discussions on how to work more actively with international corporate contacts in the biomaterials area.

As well as the process within Global Links, researchers within the initiative have participated in scientific conferences. At the World Biomaterials Congress for example, Gothenburg had the highest proportion of accepted scientific contributions and GöteborgBIO supported the scientific presentations with a simultaneous exhibition stand.

In addition to this, BMV has contributed to the creation of a research collaboration and contacts between researchers and companies in the Gothenburg region and Shanghai in China and with North Carolina and Michigan/Great Lakes in the US. One person in the process management has made contacts, used his network and arranged delegation visits in order to bring about concrete collaborations. The majority of research collaborations with Shanghai have been initiated within biomaterials, stem cells, strokes and heart failure. Negotiations are ongoing between Swedish companies, Chinese companies and academia about the collaboration within the field of stem cells and biomaterials. The collaboration in North Carolina has been developed during 2008, chiefly with Wake Forest University. A number of projects are ongoing with participants from academia, institutes (Swerea) and companies (Arterion) and there have been seminars with Swedish academic and corporate contributions. A collaboration with well-cited researchers in bionanotechnology has been developed with Michigan/Great Lakes. A collaboration has been started between a global biomaterials company located in Michigan and the initiative's activity at the Institute for Biomaterials and Cell Therapy (IBCT). The expectation is that collaborations of this kind will ultimately lead to the establishment of global companies in the region. This is something which the initiative is working towards through bilateral contacts with companies. The initiative is also collaborating with Invest in Sweden Agency (ISA) and has contributed to ISA's marketing of Swedish biomedical competence focusing on the US, Japan, China and India.

Integration of gender perspectives

An express goal is for the various sections of BMV to have a balanced distribution of men and women active within, and affected by, the various activities. The initiative is striving for a non-hierarchical structure with major individual responsibility and an even distribution of men and women. The initiative is monitoring the gender distribution in activities and working groups. The initiative's executive board consists of eight members of which one is a woman and seven are men. In total, the proportion of women involved in projects is 40% as against 39% the previous year. Also, 15 out of 24 students in ongoing training within GIBBS are women. The communication work includes strategies to monitor gender and diversity relating to choice of lecturers, speakers and the profiling of operations and companies in communication materials etc.

Needs-driven research

Within the focus area in the region, comprehensive scientifically driven and needs-driven research is under way funded by regional, national and international public and private research financiers. As already stated, there are two VINN Excellence Centers within the biomaterials area in the region, one of which is also active within the stem cell area. The initiative's activities within needs-driven research largely take place under the banner of IBCT which is co-financed by the initiative. In 2008, the activities within this operation accounted for about one third of the initiative's budget in monetary and in-kind terms. Current projects were identified in a process whereby researchers plus corporate and healthcare representatives were invited for a joint discussion. This involves three different projects comprising some SEK 1.2 million each for 2008, not including management costs for IBCT. These projects have been run under IBCT and staffed by people from academia, industry and occasionally the health service. There are now plans to initiate new projects through a similar procedure. One doctoral student whose work was partly funded by BMV submitted their thesis in 2008 at Gothenburg University and, in the years 2006-2008, 40 scientific publications were submitted based on an operation partly funded by the initiative. The operation takes the form of projects in which researchers in academia cooperate with one or more companies. More information about this operation can be found under the heading "Development of existing industry".

The operation within the former Cardiovascular and Metabolic Network (CVM) was broadened and is now run under the banner of Sahlgrenska Science Park (SSP) with funding from BMV. The aim is to increase the incidence of commercialisation within the entire biomedical area by supporting suitable development projects from healthcare, academia and industry with competence and capital. A call for proposals procedure is one of the means used to identify projects. Applications are inspected in two stages. Firstly, they are prepared by SSP staff and then they are evaluated by an external group consisting of representatives of academia, industry and investors. More about this operation can be found under the headings "Development of existing industry" and "Newly established enterprises".

The operation within the Institute for Biomaterials and Cell Therapy resembles the role of a traditional industrial research institute within areas other than biomedicine. There are plans to develop the operation further in this direction. This requires an organisational solution, including a legal form and a funding plan for the operation.

In this operation, it is important to have a well-conceived process for managing the IP rights in projects. It is also important to be open to projects needing competence other than that available in the region. It is therefore of interest that regional nodes in biomedicine are finding ways to collaborate. Operating as a regional node in a national context may also broaden the prospects of finding relevant projects and partners for the initiative's project operation, as well as for the GIBBS training programme. The interviews indicate that this is in the pipeline in both cases.

VINNOVA considers it would be interesting to compare the experiences from the Uppsala BIO project operation as the focus areas are close to each other and have chosen different working methods. These differences are partly due to the selection process and content of project support and partly the funding volume for each project.

Newly established enterprises

Within biomedicine in Sweden, a number of analyses have identified a problem in obtaining funding to verify ideas from academic research prior to starting up a company. Many companies have been started without proper project verification or sufficient analysis of the technical and commercial risk. This problem was the origin of part of the initiative's activity. According to the process management, there has been an increased flow of ideas to activities supporting early-stage commercialisation. This applies to projects from the Gothenburg region's small and medium-sized enterprises and educational establishments as well as projects from other milieus in Sweden.

A total of over 120 project ideas were evaluated during the year under the GIBBS training programme and SSP, both of which are partially funded by BMV as mentioned earlier. Three of the training programme's four projects became independent companies during the year. Two were funded via the Region's incubator and two received funds from Innovation Bridge. The fourth is still operating as a project, led by the innovator in cooperation with the School of Entrepreneurship's fund. These projects have led to the submission of two patent applications. An objective has been to develop specific expert competence for development projects in biomedicine. The training programme has now been organisationally integrated as a joint operation of Sahlgrenska Academy at GU and Chalmers. GIBBS originated in the School of Entrepreneurship at Chalmers and BMV developed the content to focus on the biomedical area. This way of working will now be used within areas other than biomedicine within the framework of GU and Chalmers' effort to extend the entrepreneur training courses. The educational establishments now consider these courses an important aspect of promoting innovation. This effort has received further funding through the government's new entrepreneur training initiative.

The operation within Sahlgrenska Science Park (SSP) concentrates on validating/verifying project ideas and contributing infrastructure for commercialisation, such as laboratory premises. The aim is to develop, support and strengthen processes, methods and infrastructure and facilitate commercialisation within biomedicine. SSP operates on behalf of Business Region Göteborg, Region Västra Götaland and Gothenburg University in partnership with GU Holding and Chalmers Innovation. SSP has also received financial support from the Structural Funds to expand and create access to laboratory premises. SSP's incubator comprises five companies, two of which were added during the financial year 2008 and two of which received risk financing from SSP. There are four business advisers at SSP and funding for this part of SSP includes SEK 1 million per year from BMV. Efforts in kind are also provided, equivalent SEK 1.59 million for the commercialisation project.

During 2008, there was an evaluation of the activities which took place during 2005-2007 within the Cardiovascular and Metabolic Network (CVM). Experiences from this

were introduced into the new structure under SSP which was implemented during the autumn of 2008. This new process included resources that were previously channelled into the Cardiovascular and Metabolic Network in the SSP structure. The areas included were broadened to include the entire biomedical area, having previously comprised only the cardiovascular and metabolic areas. The work receives SEK 2 million per year in funding from BMV. The subsequent call for projects in biomedicine resulted in 52 applications and of these, 11 projects will receive financial and project management support. This support includes up to SEK 500,000 per project in funding, project management support and business advice. A further 20 or so applicants were given feedback and advice. The evaluation of the activities within the cardiovascular and metabolic network indicated that the following aspects are considered to contribute to a positive result:

- Early project review with project group in which strategy, positioning, products, product plan, competence requirements and risks are discussed prior to an investment decision
- Regular monitoring against set goals
- Division of funding into stages matched to the project plan and stoppage of payments if this is not followed
- Full transparency in regard to reasons for decisions, what support is required and what is to be delivered for each period.

There are plenty of players supporting innovation processes in the region. According to the interviews, what is considered particularly positive about BMV's funds is that they are relatively flexible and not locked into programmes. The milieu and network formed within the focus area under the auspices of SSP and the project operation were highlighted as valuable in the interviews.

Development of existing industry

The purpose of IBCT is to support the development of new products and thereby increase the competitiveness of established companies by promoting collaboration between them and academic research within the biomaterials and cell therapy area. One of the contributing companies is involved in courses and training as well as services in the form of method development and implementation of analyses using the company's technological platform. The company's training operation acts as a marketing channel which means that customers come back and order analyses and method development for their specific needs. The company also runs R&D in order to develop its own products and is interested in involvement with projects which may lead to new fields of application for its technological platform. In future, the company would like to do more of its own product preparation – going from service to products and not just receive licence fees when other companies use the method in their applications.

Under the project the company contributed to, it encountered a large company operating in an unfamiliar business area and with which it had not previously collaborated. The project was initiated after discussions between a number of people, some of whom are active in the initiative and the VINN Excellence Centers. The large company

contributed old and new materials which they wanted tested. It is envisaged that the method being developed will complement established methods of evaluating materials. In the project, the new method is compared with established ones and the large company has contributed knowledge, relevant problems and materials. Academia has added competence in cell cultivation, comparisons between different materials, knowledge about other measurement methods and contributed patient material in the form of tissue samples. The small company has contributed development of the new test method and the impression is that all parties have benefited from the project. For the large company, the project presents the prospect of developing additional measurement methods to evaluate established and future products. The method also has potential as a tool for monitoring patients for some time after their treatment and possibly also in diagnosis, determining which treatment is suitable. For the small company, it has brought contact with a potential future customer and a possible new business area, as well as ideas about new products and services.

The project has led to a joint patent application for the two contributing companies. IBCT has contributed competence relating to contract design and advice regarding IPR. IBCT has now contacted other companies wanting to benefit from the method. The scope of the project was around SEK 2.4 million during 2008, with IBCT funding half and industry the other half in the form of hours in kind. The small company believes the project would not have come about if IBCT's operation had not existed. As a small company, they did not have the necessary resources themselves to invest in a development project of this kind, nor did they have a network with the project participants. The fact that the players were close to each other made the project easier and speeded it up. It has been found that geographical proximity and a smaller number of contributors makes things simpler compared with large EU projects involving a lot of parties. The two companies are now planning a new bilateral project alongside BMV's activities.

Under the auspices of the Cardiovascular and Metabolic Network, the initiative has started and lent its support to a collaboration on heart stem cells between the company Cellartis and researchers at GU, Sahlgrenska Academy and AstraZeneca. This project has led to submission of a patent application and a scientific article. The interest in designing a project within the area came out of the research experience from GU and elsewhere which showed that even heart cells can be renewed. The project provides impetus for renewed research in the cardiovascular area at AstraZeneca and is expected to involve a strengthening of the Cellartis product portfolio. This project allows AstraZeneca to build up its internal competence and better assess which way to go within this area. The researchers at Sahlgrenska Academy are producing biopsies of several cell types; this allows the studies to combine adult stem cells with embryonic ones. AstraZeneca is contributing relevant problems and funding and Cellartis is developing methods of producing heart cells from embryonic stem cells. Cellartis also has EU funds for this. Cellartis' aim is for the heart stem cells to be used for toxicological tests (such as evaluating drug candidates) which may constitute a future commercial application. AstraZeneca's current investment in regenerative medicine is a

strategic decision it has taken. The idea is that cell regeneration can be manipulated using low-molecular weight drugs. Many other major pharma companies have already invested in this research area. According to the interviewees, the fact that AstraZeneca's effort ended up in Gothenburg was because of the competence available in academia and companies and the network between them, plus the process organisation and seed funding contributed by BMV.

During the year, two spin-off companies received project support from BMV to develop their idea. This helped them obtain funding from other sources at the next stage, as the project led to an assessment of reduced technical risk. One of the BMV-funded projects has involved a closer collaboration with contributing companies so that on several occasions, Cochlear has used resources within the research organisation at Mölnlycke Health Care in a way that benefited both sides.

During a strategic reprioritisation of ongoing research projects, AstraZeneca decided to test its method of converting projects it had decided to stop running in-house into a new, externally funded spin-off company. At the start of the year this led to a new company called Albireo starting up in the Gothenburg region. BMV was actively involved in the spin-off process by speaking to relevant people about maintaining the operation and competence which had become redundant in the reprioritisation. They also served as a discussion partner to the project group which subsequently became Albireo.

Activities for individual learning, monitoring and evaluation

The interactive research within BMV has four main components: 1) continual self-evaluation of set goals, 2) measurement of qualitative impressions, 3) analysis and continual reflection regarding the organisation, management and process, and 4) analysis of the outside situation and current position. The two researchers appointed for the interactive research are part of the operational group which meets regularly. The purpose of this is to observe behaviour and facilitate discussion whilst being able to contribute their observations directly to the members of the process management.

Research studies and other reports that were conducted include "Biomedical Firms in Western Sweden: A study of a regional innovation systems from a biomedical firm's perspective". This was based on a written questionnaire to companies and an ongoing questionnaire study for biomedical researchers in the region. Presentations of the results of these studies have been included in various events for the region's companies and other players. Contributing researchers have also presented the research results at an international research workshop.

Impact of the initiative on the regional innovation system

In the situation report, BMV emphasises how players in the region have changed their way of working, with several of the inspirations for the change attributable to BMV. In several cases, the process management conveys the impression that BMV has been a platform for facilitating and initiating activities which were then carried out with or without the continued involvement of BMV. This is consistent with the intentions of the VINNVÄXT programme that the initiative should not construct separate organisations

but should collaborate with and contribute to the coordination of different players' activities. BMV seems to have had an important background role in bringing about the GOINN project in its present form. Within this project, which was funded under VINNOVA's Key Actors Programme, Chalmers and GU collaborate to develop innovation support when commercialising the results of the two educational establishments. This framework streamlined the overall initiatives of the various incubators, including SSP, GU Holding and Chalmers Innovation. Another example is the GIBBS training programme described previously. BMV helped catalyse and facilitate the introduction of the current collaboration between Biomatcell and SUMO relating to such things as the milieus' joint strategic internationalisation process supported by the VINNOVA Global Links programme. BMV also contributed to these centres seeking funds from VINNOVA's VINNPRO programme for a joint research school called BIOSUM.

An example of how BMV has contributed to discussions on corporate activity is the process surrounding the spinning-off of research projects whose priority was strategically decreased by AstraZeneca with the subsequent formation of Albireo, as already described.

Responsibility for the GIBBS training programme has now been moved across to GU and Chalmers. The model for the training programme is also spreading to more areas. SSP has matured into an incubator which BMV partly funds. Since the University is now running part of the operation which previously took up a lot of BMV's time and commitment, BMV can free up more time and resources to focus its work on the needs of established companies.

New Tools for Health

During 2008, the initiative New Tools for Health (hereinafter called NTH) has devoted a great deal of its operation to working on its action plan for the period 2009-2011. This is a consequence of VINNOVA's programme board not approving the initial action plan which New Tools for Health submitted prior to the new agreement period. Amongst other things, it was the view of the programme board that the new action plan did not have insufficient focus and not enough involvement from the most important players surrounding the initiative.

As a first step therefore, NTH was given extended funding for six months to work out a new action plan addressing the challenges highlighted by the programme board. A new action plan was submitted to VINNOVA on 1st November 2008 which was deemed to meet the improvement requirements set by VINNOVA. A reconciliation is scheduled for the start of 2010 to monitor implementation of the new action plan and ensure that players are carrying out the measures included in it.

For this reason, in NTH's case VINNOVA has chosen not to monitor the operation in depth for 2008 and will instead revisit the issue at the start of 2010 when NTH has had a year running its new operation and new focus. The following synthesis is therefore

based only on the new action plan and not on any interviews. The reason for still describing the initiative's operation in this report is to include a description of all VINNVÄXT initiatives in the same report.

During the first three years, the strategy for New Tools for Health was characterised by breadth, in terms both of choice of market segments and working method. Projects have ranged from visits to identify problems and utilise new ideas within healthcare, to creating a test milieu for companies working with health-related products for home use and supporting commercialisation.

During 2008, NTH has worked to produce an action plan aimed at an international market. This has led to increased focusing of the operation. In future, it will concentrate on products and services for:

“Effective home-based healthcare”

This segment is a subset of the areas previously covered by the initiative. The initiative is based on research within technical areas and regional cohesion around the new vision.

One of the objectives of the initiative has been to create the virtual care venue, i.e. maintaining quality whilst enabling a major reduction in the number of visits to medical centres and hospital. Corresponding thoughts apply to care. Aids and working methods should help elderly and disabled people with poor health to remain at home and feel secure in their home environment, more than they currently do. The incentive for this is rising healthcare costs and diminishing resources. There is a comprehensive global market in this area for new products and services.

Consistent with an increased focus and clarity, the regional players have shown much greater involvement in New Tools for Health. They have earmarked resources to design and establish the action plan and have taken forward-thinking decisions about the allocation of resources and changes in their respective organisations to help realise the goals of the action plan. In total, county councils, municipalities and universities have increased their cash contributions to the effort from a total of SEK 1 million to SEK 4 million per year.

According to its action plan, New Tools for Health should...

- be the basis of Europe's leading region...
- contribute to the creation of products and services...
- achieve excellence within application-orientated research...

...for effective home-based healthcare.

Organisation, working method and orientation

The non-profit organisation New Tools for Health is VINNOVA's formal beneficiary. The process management comprises three people and a couple of consultants who run two activities. An enhanced process management has also been created consisting of

two representatives each from Linköping University, Östergötland County Council, and the municipalities of Linköping, Norrköping and Östhammar. The representatives' task in the enhanced process management is to profile NTH as a focus area within their organisations. They will each be their organisation's primary contact in issues affecting NTH. They will: identify and compile their organisations' needs and mediate these to the initiative; coordinate their organisation's research and development projects within NTH's focus area; and ensure that the individual organisation markets NTH in various contexts and mediate the initiative's results to its organisational partners.

The representatives of county councils and the municipalities will also be responsible for: setting requirements and describing problem areas in the long-term; participating in research and development projects to ensure that the results are usable for their organisations; testing solutions, being a customer and purchasing relevant products which result from NTH's operation.

The new executive board, which holds office until the organisation's 2009 annual general meeting, comprises representatives from Linköping Municipality, Acreo, Linköping University, Livskomfort AB, Gaia System AB, Norrköping Municipality, Östergötland County Council and Nordell & Partner. The members all have considerable influence over the organisations they represent. Since NTH's focus has expanded, the board has been reconfigured and new members active in this focus area have been recruited. The topmost management in the official organisations will also continue to receive information directly from the process management, except for the information provided via the board members.

Industry is otherwise represented on the executive board by the 60 or so companies who are members of the association. During the year, large companies such as Motorola and Ericsson have also shown growing interest in NTH and are represented in the project portfolio.

Impact of the initiative on the regional innovation system

Through the expanded focus and clarity, the regional leaders have shown greater commitment. They have prioritised their own participation in activities, they have earmarked resources to design and establish the action plan and they have taken decisions about reallocating resources and making changes in their respective organisations in order to contribute to realising the goals of the action plan. County councils, municipalities and universities have increased their cash contributions to the effort from a total of around SEK 1 million to around SEK 4 million.

One example of this increased involvement is that, as part of a strategic investment in future healthcare, LiU has created LIST (Linköping Centre for Life Science Technologies). Initially this will concentrate on distributed healthcare. The Centre works in a triple helix structure in conjunction with Östergötland County Council, the municipalities of Linköping and Norrköping and industry.

Needs-driven research

At LiU, there is a long tradition of interdisciplinary and thematic research and a close cooperation between scientific, technical and medical research. Amongst other things, this is the result of research and development within areas such as IT in healthcare, biosensors and medical sensors, materials and methods for medical diagnosis and living conditions for elderly people. For some time, there has been a Centre for Medical Image Science and Visualization (CMIV) at LiU. The new centre (LIST, see previous heading) will serve to complement CMIV with an emphasis on distributed healthcare. There are therefore plans to establish a close collaboration between CMIV and LIST.

Development of existing industry and the public sector

With the establishment of NTH, a new common arena has been created for the development of health and care-related innovations in the Östergötland region. Since the area was a profile area the region, one of the most important tasks in the first three years has been to identify and involve companies and other organisations which have the ambition to develop within the area. Company visits, exhibitions, conferences etc. have helped spread information about NTH's operation in the region. Through the personal meetings, lunches and breakfasts arranged by NTH, it has been possible for industry to meet the health service and develop its networks. New Tools for Health also promotes networks amongst SMEs with the aim of improving companies' prospects of meeting the official customers' requirements in negotiations. Another industrially-orientated role in conjunction with other regional players is working so that companies with an operation in the focus area can get established in the region.

The region's SMEs in the area have largely academic roots, but there are also examples of companies which are spin-offs from larger ones, or which came about when large companies divested business areas. This was the case with Swemac, which has roots in Saab and Zenterio, which originated in Nokia. Important drivers of this development are Mjärdevi Science Park (Linköping) and Norrköping Science Park.

An infrastructure which exists within the framework of the initiative and to which NTH contributes is New Homes for Health, a testing and development milieu consisting of 1,200 apartments and which has also attracted international attention. This affords researchers, innovators and companies a unique opportunity to gather requirements and test their products in a real milieu before launching onto the market. So far, the initiative has tested such things as a memory panel, insulin logistics and various sound-borne services.

Another activity is PIMM, which fosters innovative ideas from care providers, care recipients and their relatives. These are then supported in the work of commercialising their ideas. PIMM is led by Almi Företagspartner with financial support from NTH.

The following synthesis shows how Almi's influx of ideas in the first three years has increased overall, as well as the increase in ideas from women and women's proportion of the ideas which receive support:

	2005	2006	2007
Total ideas received (of which for PIMM)	112 (0)	117 (14)	190 (72)
– of which from women (of which for PIMM)	12 (0)	27 (8)	69 (51)
– proportion of total		10.7%	23.1%
Total number of ideas receiving support	88	100	120
– of which from women		6	19
– proportion of total		6.8 %	19 %

Activities for individual learning, monitoring and evaluation

In its new action plan, NTH has chosen indicators which the operation should use in monitoring. These will be specified in more detail during 2009. Also highlighted are those indicators the process management will document and those which are to be documented by the interactive researchers who will be appointed. Interactive researchers will also be used as support the deliberations about control, organisation and process.

Integration of gender perspective

Since the beginning, NTH has had a gender policy which should permeate all activity. This policy maintains that goods and services that are developed should contribute to a more equal society and take into account actual differences between the genders. Men and women should be given the same opportunities to participate in the innovation process and gender-specific knowledge and experiences should be taken on board for the best possible innovation results. The leadership of the initiative should be a model of equality. A number of special projects and activities for integration of the gender perspective will also take place.

Internationalisation

NTH has ordered an international survey of other initiatives within the area. One reflection which NTH made on the basis of this survey was that although the word “health” is used as a term, if anything many such initiatives represent life science/biotechnology rather than (as in NTH’s case) links between life science, technology and needs.

The following list shows the initiatives NTH found which show potential for possible cooperation:

Initiative	Region
The Health Technology Exchange (HTX)	Ontario, Canada
Gesundheits Health Cluster	Northern Austria
The Korea Health Industry Development Institute (KHIDI)	Korea
The New Zealand Health IT Cluster	New Zealand
The South-East Health Technology Alliance (SEHTA)	South-eastern England
CELS/Ageing and Health	North-eastern England

Representatives of the initiative have visited CELS/Ageing and Health in England. This resulted in a joint EU application co-ordinated by Telecom Italia. None of the initiatives so far identified and/or contacted by NTH have had the same focus as NTH. According to NTH, this opens up opportunities for complementary cooperations. In addition to regional initiatives, there are also networks and alliances on a European and international footing. Interesting networks and organisations which have been identified include the Continua Health Alliance and the USA-based Home Care Technology Association of America, plus the National Association for Home Care and Hospice. The Continua Health Alliance aims to establish standards of communication between different types of equipment for health and care-related equipment in distributed environments. This alliance includes some important players such as Intel, Motorola, Philips, General Electric and so on. Google has also recently joined the alliance.

ProcessIT Innovations

ProcessIT Innovations brings together the process and engineering industries with IT players in universities and industry. The aim is to strengthen existing basic industry, develop the international competitiveness of the ICT industry and strengthen research in the functional region. Currently, the functional region is chiefly Norrbotten and Västerbotten. The main players in ProcessIT Innovations (hereinafter called PITI) are the process and engineering industries (for example ABB, Boliden, LKAB, SCA and Skellefteå Kraft), IT companies and the universities of Umeå and Luleå. The county administrative boards of Västerbotten and Norrbotten and four coastal municipalities are contributing to and backing the initiative.

PITI's working method involves identifying the needs of the process and engineering industries in cooperation with IT companies, basic industry and researchers and conducting pilot studies and development projects. Thus, the initiative is contributing to new products and services, the development of business opportunities and customer contacts for IT companies, improved efficiency in the process industry and strengthened research at universities. The contributing IT company is in most cases a small or medium-sized enterprise. PITI's working method chiefly involves the use of knowledge to meet the needs of established industry as well as the commercialisation of research results through licensing and newly established enterprises.

For the first VINNVÄXT call for proposals, a broad application was drafted with PITI as one of four parts. This application was rejected. A lot was learned from this process and a further and less extensive application was made to a subsequent call; this was granted funding. With both the educational establishments and the regional public players, the long-term of the programme was seen as something which made a great difference to what results and what involvement could be achieved with the initiative.

Regional public players such as municipalities and the county administrative board have backed the initiative and supported it. The regional players consider it would be easy to argue in favour of PITI as the initiative has a strong link to the regional industry. This strong link is now also very important to the involvement of the educational

establishments. A number of municipalities now look upon PITI's industrial network as a possible resource for their industrial units in reaching out to companies on such matters as labour market issues.

Some experiences from PITI have been used by the new VINNVÄXT winner, Biorefinery of the Future which received development funds in 2005 and full support from 2008 onwards.

During 2009, plans will commence as to how the operation can continue after the VINNVÄXT funding.

The year's monitoring interviews were held in Umeå and so this time, the description of PITI's operation emphasises the activities in the Umeå region and at Umeå University.

Regional and national strategic processes

PITI is expanding its project operation geographically, which chiefly concerns the process and engineering industry in Örnsköldsvik and Sandviken. A needs inventory of industry in Örnsköldsvik was conducted and discussions opened regarding joint projects with Sandviken's investment in industrial IT via Triple Steelix. Since ABB is on the executive board and an active part of PITI, there were discussions about possible projects within areas such as automation processes which provide links to functional regions other than PITI's.

Under the banner of Märkesåret 1809 (the bicentennial of Sweden's separation from Finland), PITI will contribute to a national gathering of activities relating to the area of "embedded systems". This will be in collaboration with VINNOVA and its Finnish counterpart, TEKES. There will be a discussion on the research collaboration in the area at vice-chancellor level, including Gothenburg and Linköping universities.

PITI's project activity is largely formed on the basis of needs inventories of IT solutions conducted with companies and the ongoing dialogue between IT companies, the process industry and researchers at the educational establishments.

Regional meeting arenas

PITI arranges an annual conference and in 2008, this was attended by 90 people from industry, academia and the public sector.

One type of regional arena is the meetings in which representatives of academia and industry meet (sometimes called an "industrial council") to discuss and identify projects (described in more detail under the heading "Needs-driven research"). Industrial problems within PITI's focus area are at these meetings. In a subsequent process, a choice is then made regarding which problem areas it was possible and most relevant to try and solve. This process led to a number of pilot studies and projects.

An example of a physical meeting venue for researchers and corporate representatives is the infrastructure for contactless measurement technology – the Adopticum foundation

and laboratory located in Skellefteå (see also under the heading “Development of existing industry”).

Communication and marketing

PITI is currently working to update and develop the 2009-2010 communication plan. Players in the initiative are also helping by marketing the initiative and acting as ambassadors for it. For example, PITI is often presented when the region’s representatives are at meetings and exhibitions around the world. There has also been contact with Invest in Luleå.

Competence supply

PITI partially funds doctoral students who have the opportunity to contribute to R&D projects in cooperation with companies. The ability to offer training courses closely linked to industry is also seen as an important component in being an attractive educational establishment and drawing in students. For the students, the corporate contacts can lead to good future employment prospects. This collaboration is also a way to increase the future likelihood of researchers being open to cooperation with industry. The process management also points out that it currently contributes to and influences courses at the educational establishments. The process management considers the initiative exerts an indirect influence by helping attract capable senior researchers to universities. This attractiveness is because through the milieu, the researchers have the opportunity to work closely with industry.

Funding

According to the process management, if funds over and above VINNOVA’s funding and the co-financing demanded by VINNOVA are included, then the initiative’s total project portfolio approaches SEK 100 million. The initiative has attracted funds from many different sources, such as the Structural Funds, sectorial industry R&D programmes, INTERREG, county administrative boards, companies, municipalities, universities, Kempestiftelserna and Sparbanksstiftelsen Norrland.

Internationalisation

Concerning international cooperation, it is chiefly individual players in the innovation system that are collaborating with players outside the EU. PITI is trying to get connected via the established research collaboration and considers that the researchers have identified relevant players with whom to collaborate. This is considered an opportunity to start with the players’ network and then reach out internationally within various sub-areas. The process management considers its role to be contributing to coordination and application processes, as with highlighting the milieu internationally in selected contexts.

PITI and its equivalent Finnish initiative, Digipolis are cooperating on an oil analysis project. This partnership has continued in 2009 with two new R&D projects; one relating to e-Maintenance and the other entitled Vision System Research Platform.

Researchers funded by PITI are also collaborating with the Center for Process Innovation at Georgia State University in Atlanta, USA. Like Digipolis, this is an equivalent to PITI. The purpose of the Atlanta initiative is to make the universities more active in developing regions. The feeling is that to achieve this requires a changed approach to the research and that the researchers themselves must overcome their prejudices about a loss of research quality when conducting research based on players' needs in the region.

Integration of gender perspectives

A challenge to PITI's equality work is that the ICT industry may be perceived as less attractive by many women. Reasons for this include the image of the industry put about during the IT bubble and its subsequent decline. The process management does not consider it possible to achieve an even distribution of genders in decision-making bodies such as the executive board but rather prioritises other measures which it considers would better promote equality. Publications from the initiative attempt to put forward female role models and representatives of the major new projects have also attended a lecture on master suppression techniques. It is envisaged that a major ongoing gender project and the discussions in the process management relating to quality will result in an itinerary to be presented to the executive board prior to the summer of 2009.

The process management also highlights the fact that many of the organisations it works with have their own equality plans and activities. For this reason, the process management considers it a challenge for an initiative like PITI to find a unique role which can make any difference. According to the process management, it is only really in those particular activities (such as meetings and projects) and in that particular organisation that there is the chance to exert an influence and make a difference. The plan is for this to take place through studying and monitoring as well as influencing and developing PITI's own working method.

Needs-driven research

At Umeå University (UmU), the leadership currently considers that areas of strength for the establishment should include those relevant to basic industries in the region. The regional context and support plus the network of local industry are important to the University's profile. PITI is contributing to this and the process management believes it now has an effective network of companies from Örnsköldsvik to Kiruna. For example, UmU prioritises areas related to the forestry, paper and pulp industry and Applied IT. Some SEK 30 million has been mobilised for Applied IT and researchers from several faculties are physically coming together in one location. A difference between the way in which IT research is organised at LTU and UmU is that in UmU, the area is divided into many small faculties whilst at LTU, it is chiefly concentrated on one faculty. It is anticipated that the investment in Applied IT at UmU and the fact that researchers from certain faculties are being moved together will lead to a better collaboration between the small faculties. According to the interviews with researchers, the circumstances for needs-driven research have improved under the current leadership at UmU.

It is a challenge for UmU and LTU to co-operate when competing for students, research funds and in recruitment. For example, the two educational establishments did not get together to apply for funding in the recent call for proposals of strategic research areas within industrial IT. The application that UmU is involved with does not include LTU's profile areas and this was given as the reason for not making a joint application.

Within the IT research at LTU and UmU, attractive areas of work have been game development and medical applications. This has made it more difficult to recruit researchers to industrial applications. It has also been a challenge to interest researchers with PhDs in the mission-like projects being run by PITI to meet the needs of industry. However, interest has increased and the researchers contributing to the initiative's projects are continuing to show interest (see also under the heading "Development of existing industry").

PITI's project design means that projects are generally staffed by one contributor from a large enterprise, one from a small or medium-sized one and one researcher. As a rule, a PhD is involved in the project and sometimes also doctoral and other students. One obstacle to the researchers' involvement in projects is the requirement for scientific qualifications. Those researchers involved in a project say it is difficult to combine an academic career with involvement in this type of needs-driven research, as it does not lead to the same degree of scientific publication as scientifically-driven research. In reality, researchers find it is a case of either deferring their academic careers or having to work harder in order to manage both types of research. At the same time, those researchers interviewed said they get a lot out of collaborating with industry; it is interesting, enjoyable and they learn from the cooperation with industrial researchers. Furthermore, the operation gains ideas for ongoing research. PITI's operation provides an opportunity to remain in academia while still getting closer to applications and integrating with industry. At UmU and LTU, there have long been plans for more obvious inclusion of this type of collaboration in academic qualifications.

The design of PITI means that researchers gain a network in industry. According to the interviews, leading research needs to be linked to leading practice in order to achieve results within Applied IT. It was also felt that the project model leads to small and medium-sized enterprises being attracted to collaborate with researchers.

Under the heading "Development of existing industry" there is more information and examples of the services which PITI offers companies in a collaboration between academia and industry.

Newly established enterprises

In the interviews, it is apparent that representatives of UmU consider the operation within commercialisation of the life science area being run in Umeå to have been a success. For example, the operation has included a physical incubator with laboratories and advanced equipment, a network of venture capitalists and advice. There is a wish to see a corresponding effort within the ICT area and contacts to initiate this have been made between the educational establishments, Umeå Municipality, the county

administrative board and Region Västerbotten. Discussions about this are also taking place with LTU Innovation & Holding and SLU Holding. According to the plans, specialist advice and commercial law as well as advice on patent applications should be included when starting up companies.

An example of a company which was formed as a spin-off from a PITI-funded project is Algoryx which was founded by its contributing researcher. A method involving new simulation technology has been developed so that a company can show its clients that it has fulfilled their requirement specifications. This measurement technology now forms the basis of the new company. PITI contributed to the pilot study and the project which led to the development of the technology. The project was conducted by the parent company of Algoryx and the contributing researcher in collaboration with the company which formulated the need.

Development of existing industry

Within PITI, there are several different methods for identifying project proposals and selecting what projects to become involved in. There is an industrial council with two representatives from the partner companies (basic industries) and researchers from the universities (LTU and UmU). In conjunction with the process management, the council evaluates ongoing and proposed projects and makes recommendations and new project proposals. Decisions about these project proposals as well as proposals from other players are decided upon by the process management or the executive board depending on the scope of the projects. The executive board takes decisions about whether the project will run for longer than a year and involve greater funding input. PITI's process for identifying and implementing projects also includes two groups of industrial representatives (called sector councils), one for the minerals and mining industry and the other for the pulp and paper industry. These groups discuss and identify needs in companies and projects are put together to address them. There is also a comprehensive operation in which representatives of the initiative visit IT companies and basic industries to identify new partners as well as project ideas. For example, needs inventories are conducted with basic industry in which representatives of the initiative discuss IT projects with those responsible for those. In Örnsköldsvik, for the past couple of years there have also been visits to IT companies and basic industries to carry out needs inventories. One or more researchers often accompany these. The impression is that PITI's operation is dominated by various ways of initiating and compiling R&D projects as described above. Efforts such as the one at Umeå University within Applied IT (UMIT) serve to moderate the picture and indicate a tendency for academic IT research to have more place, in this case chiefly at Umeå University.

The major companies contribute to the industrial council as part of their work to influence PITI to meet their needs. Companies which formulated needs that led to approved projects supply a requirement specification and a project group works interactively on this basis. The industrial council, which meets twice a year, recommends and audits pilot studies and proposals and the process management puts together the staff and starts the project. When implementing R&D projects, no

consultancy services are bought in and the project is generally staffed by SMEs, generally with 50% cost coverage from PITI to SME. Researchers from the educational establishments are always involved in projects. Those SMEs involved often have a strong university connection and are occasionally university spin-offs. For SMEs, the incentive is working to contribute to the development of their own operation and that through projects, they meet potential future customers. PITI would prefer a greater influx of ideas from SMEs as, compared to the larger companies, these carry out little needs formulation in the projects PITI runs. Those SMEs involved in projects are more often in the category of “problem-solvers” than “needs formulators”. The small IT companies have provided basic industry with good solutions, but have so far been unable (as far as might have been possible) to convert the specific solutions into more generally useful products or services to reach a larger market.

There is a major influx of project proposals. Depending on the scope and direction, the projects granted funding are run either as pilot studies or as R&D projects of various sizes. So far, some 80-90 projects have been started. The scope of a pilot study averages SEK 300,000 over three months and roughly one in five pilot studies go on to become more comprehensive R&D projects.

PITI needs increase project staffing as the influx of projects has increased and there is now a wish to engage more researchers in the operation, including doctoral students. From Umeå’s perspective, it would be preferable to have more students in projects. It has proved difficult to engage PhDs sufficiently in these commissioned projects. PITI does not consider it has difficulty funding the operation it currently runs.

Optronic AB is a company which develops and produces optical components (subcontract production). Following a pilot study by Optronic, the process management identified that many companies have similar needs in terms of contactless optical measurement technology. Adopticum is a new effort initiated for the purposes of meeting these needs. The pilot study led to an application to Sparbankstiftelsen which was granted. PITI contributed by assembling people in basic industry, small IT companies and researchers for a discussion and ongoing process. Optronic contributed SEK 1 million, PITI SEK 1 million and Sparbankstiftelsen SEK 4.2 million to form a foundation and build the joint development laboratory. Adopticum is now a laboratory with its equipment and personnel in Skellefteå. The laboratory will very probably need long-term public funding as it does not seem the operation can be fully funded on a commercial footing. The laboratory is used to develop prototypes and the funds are spent on such things as new camera technology. Researchers at the educational establishments will also benefit from Adopticum, including the ability to make camera-based 3-D measurements.

Komatsu is an example of a company in basic industry which has its own R&D operation. Komatsu believes it is advantageous for someone external to coordinate and run development projects that involve several external players. Facilitating the collaboration requires people with a good knowledge of the companies’ activities, needs and decision-making systems as project managers. In joint projects that are run by

external organisations, Komatsu's needs vary depending on the emphasis of those projects. For projects aimed at the forestry industry and its unique requirements, it is occasionally appropriate for a project manager from Skogforsk to run them. There is great diversity between the projects that PITI, IFOR (Intelligent Off-Road Vehicles at UmU) and Skogforsk run in cooperation with Komatsu. For collaborations with universities, projects are needed which give tangible form to the letters of intent at management level regarding collaboration between companies and educational establishments. Agreement is reached in projects as to clear goals, planning and staffing and for Komatsu, the positive image of the university has been strengthened through the partnership. Someone was employed by PITI to initiate a project, supervise its development and act as mediator between the parties involved. According to the interviews, this type of operation needs both an independent person to maintain its legitimacy and basic funding, since the operation cannot be run commercially.

PITI is also planning to continue its focus on the pulp and paper industry, mining and mineral industry and energy and engineering companies.

Environmental aspects are a growing focus for all these industries as well as influencing the needs which companies put forward. Where it concerns IT in the engineering and steel industries, a dialogue is being held with Triple Steelix, which also has a project in the IT area and there may be collaboration on some projects.

Regarding basic industry, PITI acts to arrange contacts with the educational establishments and IT companies via the network which has been built up. For IT companies, it has also been possible to use needs inventories to contribute to the development of new business models. In its situation report, PITI reports that the initiative contributed to 11 new processes and 15 new products. The fact that so many products and processes have been developed compared to the possible expectations of many other areas may be explained by the fact that within the IT area, products can be relatively quickly developed from the solutions which emerge in projects.

Activities for individual learning, monitoring and evaluation

The process management runs its own activities in ongoing learning, based on its own operation. Two people in the process management have been assigned to continuously monitor the initiative's development. During the autumn of 2008, a consultant experienced in process support in the VINNVÄXT programme and similar programmes in Norway also assisted in monitoring the public players' roles in the initiative.

In addition to the interactive research which is part of the VINNVÄXT programme, the process management has also engaged a consultant who has been given an interactive research assignment for a period of 2½ years for the initiative's Structural Fund money. The aim is to achieve continuous monitoring of the objectives that have been set for the operation.

In order to monitor and control the project and other activity, PITI also uses a method known as a "Balanced Scorecard" which involves identifying success factors. These

include such aspects as gender and internationalisation which are monitored by a number of indicators.

Impact of the initiative on the regional innovation system

There are an increasing number of projects generated within PITI which are entirely self-funding. The situation report states that this proportion amounts to SEK 6 million outside of PITI's budget which is a sign that the working model is attractive to companies.

The educational establishments prioritise the initiative's focus area and amongst other things, this has resulted in two new efforts. These are: UMIT Research Lab (Applied IT) at Umeå University, a strategic effort in calculation technology, visual simulation and optimisation within the field of application of industrial IT; and Luleå University of Technology's priority research area, Process IT. The process management has described PITI as a timely and important initiative which is helping educational establishments in Umeå and Luleå draw closer together within the focus area. Allied to this is the much larger DARE project under the auspices of VINNOVA's Key Actors Programme.

The new infrastructural component which has been developed is the Adapticum development laboratory. This resulted from a needs inventory and co-financing between public and private players, with PITI contributing to both. A foundation was formed for this purpose which is deemed beneficial to the effort in the long-term.

Triple Steelix

Triple Steelix is aimed at strengthening Bergslagen's players within steel production and processing. It is envisaged that Triple Steelix will coordinate and create an arena in which players actively and mutually learn from each other's experiences, exchange knowledge, generate new business and come together to develop new products, services or companies. It is intended that the initiative will contribute to developing a more effective innovation system within the focus area. Bergslagen's major steel producers are participating in Triple Steelix. Research resources, materials and products expertise are being placed at the disposal of small enterprises by the large steel producers and contributing educational establishments. The involvement of the municipalities and regional parties is providing further strength to the Triple Steelix innovation system.

Heading Triple Steelix is the Swedish Steel Producers' Association. The majority of steel producers in Bergslagen are involved in the initiative: Fagersta Stainless, Outokumpu Stainless, SSAB Tunnpå, Erasteel, Ovako and Sandvik Materials Technology. The region also has some 700 small and medium-sized enterprises (SMEs) in the area which are often subcontractors to the six major companies. Contributing educational establishments include Dalarna University and the University of Gävle/Sandviken. Thirteen municipalities are involved in the initiative as well as the county administrative boards of Dalarna, Gävleborg and Västmanland. Other players are the Teknikdalen Foundation in Borlänge and IDC Dalarna. According to the initiative,

“there are 600 steel researchers in the region and these are almost exclusively in the major companies”.

Some 15 people make up the initiative’s nucleus and operational executive board of the operation; they meet once a month. The process management believes that those who are partners in the initiative wholeheartedly support the operation’s objectives and strategy. Executive board meetings take place four times a year and, although they formally set the agenda, the board is guided in its work by the preparations and supporting data which the process management has produced.

In terms of changes to the overall control of the initiative, the interviews indicate that preserves within the region are not being defended to the same extent as previously. However, distributing the favours geographically is seen as important to legitimacy and harmony in the work. In addition, the initiative has led to more contacts between municipalities which previously collaborated little. The focus area has never been difficult to motivate because of the regional weight steel production and processing carries in regard to employment. According to several of the public players contributing in the initiative, Triple Steelix is now a concept in the region and they appreciate the benefit the initiative has brought there, even though they do not specify what that benefit is.

Companies’ various operational types have needs which can be described according to the following areas (these were also the areas into which Triple Steelix divided its operation): stainless, machine, thin plate and service & repairs. Within these areas of activity, needs driven projects and activities were conducted relating to the development of processing technology, product, process, materials, market and competence development. Triple Steelix has currently divided the operation within its focus area into three priority sections corresponding to the classification of the companies involved: the major companies within the steel process industry in the region; engineering companies which use and refine products from the steel industry; and service and repair companies which are subcontractors to the large companies. In addition, the operation is divided into three geographical nodes.

The current financial crisis is affecting the region’s companies within the focus areas strongly. For example, in Sandvik as many as 1,020 people have been made redundant and the regional public players want to take action through such things as training initiatives. In this context, Triple Steelix is seen as a node to mobilise the network for this (see also under the heading “Competence supply”).

A discussion relating to what will happen when VINNOVA’s funding ends has been initiated in the executive board. This is a process which includes producing strategies for R&D as well as internationalisation. The chairman of the executive board is also pushing these issues. The process management trusts there will be continued involvement from the regional official representatives when the VINNOVA funding ends.

Regional and national strategic processes

During the year, Triple Steelix has changed the description of the operation and this also affected the working method. Projects have tended to become larger and fewer in number. Also, an increasing proportion of projects are aimed at service and repair companies, as part of the new strategy. The reason for the change was an increased realisation by the process management that efforts for this category of company were underrepresented in the initial stages and that there is great potential for positive development within these sectors of industry. Another element in the change is the new geographical division, which means each geographical node will deal with issues and projects affecting the three groups into which companies have been divided.

The process which led to the changes is partly described in the situation report. The conference held in 2008 seems to have been an important source of information and formed the basis of the changes and company visits made by the process management. Prior to the conference, the large companies had agreed a new mutual strategy on how to collaborate on relationships with repair and maintenance subcontractors. There have long been attempts to achieve collaboration on this. Apparently, thanks in part to the platform represented by Triple Steelix, the change has taken place. The evaluation and learning brought by the interactive research has also aided the process of changing the operational description and working method of Triple Steelix. The earlier functional analysis also helped by clarifying drivers and obstacles in the system.

During 2008, Triple Steelix introduced a process to further develop the internationalisation strategy. A working group was appointed to the task, which will be stepped up during 2009. By way of introduction, a survey of national and international collaboration partners will be carried out prior to the strategic work. In addition, the process management will hold a dialogue every other year with all contributing municipalities and regional councils regarding the direction of the operation.

Triple Steelix's involvement at national and regional level within its focus area is exemplified by its representation in the Swedish Agency for Economic and Regional Growth's partnership "Product development and small companies". Regionally, it is involved in the "early stage" decision-making group which prepares financial matters for Innovation Bridge, Dalasådd and Almi and the county administrative board's innovation funds. Triple Steelix is also represented on the executive board of the Enterprise Agency.

Regional meeting arenas

Part of the process of developing the Triple Steelix operation was a conference held in 2008 with some 180 participating companies and envisaged to be repeated annually. As already mentioned, the large companies' description of their needs in terms of relations with subcontractors and the subcontractors' prospects of complying with these constituted a new basis for Triple Steelix to design part of its activities. Triple Steelix has also conducted seminars and training sessions. Concerning the promotion of equality, lunch meetings are arranged (see the heading "Integration of gender perspective").

Study visits to companies take place under the regional nodes. The regional executive board contributes to these, including official representatives and representatives of academia and industry. Also contributing are representatives of other companies with some connection to Triple Steelix. This helps create networks and provides a more diverse knowledge of the operation for the companies being visited.

Communication and marketing

Triple Steelix sends out press releases to local media in connection with official activities such as conferences and seminars and in conjunction with activities to market the industry in the region as an employer. According to the process management, this has led to a number of articles and an increased awareness of the initiative in the region. A newsletter is also published four times a year by e-mail and on the Triple Steelix website. During the year, the website has been revamped and is now also available in English. It also comprises a news monitoring service relating to the Bergslagen steel and engineering industry.

During 2008, a number of publications were produced and the 2008 annual report was distributed to all partners and interested parties. Some of these publications have also been translated into other languages. Triple Steelix also participated in a subcontractors' fair with 28 other companies from the region.

Material was produced in Swedish, German and English to help strengthen the Triple Steelix companies' capacity to market their expertise as total suppliers (see under the heading "Development of existing industry").

There are also current examples of smaller companies using Triple Steelix as a brand in their contact with potential customers, including internationally. According to the process management, this is helping them get orders. Above all, it seems there are cooperations and relationships with the major steel companies which can be attributed to Triple Steelix, which enhances the credibility and legitimacy of small companies as suppliers.

Competence supply

One activity which Triple Steelix holds in conjunction with a number of municipalities in the region aims to indicate the workforce needs of companies and how companies and the municipalities are working to meet them. Triple Steelix and the municipal director of industry (or equivalent) select a number of companies for interview regarding their competence needs. A journalist interviews company representatives according to a template and compiles the responses. The responses are then presented at a press conference at which local newspapers, television and radio have attended. Through these activities, it is hoped that the attractiveness of working in the industry will increase and influence the study choices of young people in this direction.

Interest in training efforts has burgeoned in the wake of the crisis. Previously, efforts in times of crisis were often designed for the short term. Triple Steelix is seen as a possible arena for mobilising involvement in more long-term work relating to competence

supply through the initiative's network. One example is the cooperation initiative under discussion between Göranssonska School (jointly owned by the municipality and Sandviken) and Bergsskolan – the Swedish School of Mining and Metallurgy in Filipstad. The intention is to establish Bergsskolan in Sandviken as well. Bergsskolan is a small technical university offering degrees in engineering and technology and has a “technical foundation year” course. Göranssonska is a senior high school and the initiative is run by Sandviken Municipality, the county governor and county administrative board in collaboration with Triple Steelix, which is represented on the executive group. Another example is the county governor's initiative to develop a vocational university for which an application is planned.

A competence supply problem has been identified within the areas of hydraulics and automatic control engineering and there is a wish to address this. Within hydraulics, there is now a hydraulics network in which corporate representatives are exchanging experiences and conducting a joint development project. Triple Steelix is providing partial finance and competent support to run this.

Regarding competence development to progress regional innovation systems, Triple Steelix and Fiber Optic Valley are exchanging experiences through the SLIM project. This is a partnership between Värmland, Dalarna and Gävleborg. During 2008, the process management took part in a cluster conference in South Africa (TCI); it was felt this provided an opportunity to learn and exchange experiences on cluster development. The process management recognised itself in the initiatives it met and which were presented and this provided confirmation of the work it was doing.

Funding

Triple Steelix has received further funding through the EU of SEK 3 million for the years 2008-2009 for a Structural Funds project. There is co-financing of SEK 2.6 million for this from the county administrative boards and the Swedish Agency for Economic and Regional Growth. The activities are intended to enhance and streamline contacts with small companies. This will take place by further developing the model of company visits, pilot studies and development projects obtained from the Industrial Development Centres (IDC) and based on the needs of individual companies (see also under the heading “Development of existing industry”).

An activity co-financed by Triple Steelix aims to develop solutions for more economical production in Bergslagen's steel and engineering industry, often with the large companies as client. This relates to projects such as those involving more efficient use of energy and production waste. SEK 2.4 million in funding has been received from the Structural Funds and the total budget is SEK 4.7 million.

Triple Steelix is involved in several projects with other principals such as FindIT at Sandbacka Park encompassing a total of just under SEK 7 million with Triple Steelix contributing SEK 400,000 per year. Rullformningscentrum i Fagersta is co-financed by Västmanland County Administrative Board for SEK 1.2 million.

Internationalisation

Triple Steelix has so far chosen not to concentrate on internationalisation issues but on promoting the competitiveness of regional industry. A survey of international cooperations has now been commenced. This is also the first stage of work on the internationalisation strategy which will be produced during 2009. Regarding an outside analysis, a certain amount of knowledge can be gained through the large companies. Corresponding international clusters were investigated and contact was made with an initiative in the oil, gas and space industry in Louisiana, USA. However, this contact is unlikely to continue. Another source of contacts with similar cluster initiatives was the conference in South Africa. A delegation of municipal representatives from England was received but this did not lead to any further collaboration. Individual researchers and companies have contributed to conferences and exhibitions, in the railway and offshore industries for example. During 2008, contacts were initiated with universities in northern Germany and North Holland.

Triple Steelix has cooperated with ISA on possible foreign establishments in the region within this focus area; for example, Asia MotorWorks Ltd's interest in the region. Contact has also been established with a cluster in France relating to the locomotive manufacturer Alstom.

Integration of gender perspectives

Triple Steelix is working to promote equal gender distribution in all activities and contexts and the results of this aim are systematically monitored by a special appointee. Moreover there is equality work, including through two formalised projects specially funded by the Swedish Agency for Economic and Regional Growth as well as the European Social Fund and VINNOVA (under the TIGER call). The first project (now concluded) dealt with fostering women's competence in the steel and engineering industry and getting more women to seek managerial posts. Amongst other things, this comprised management courses. In total, 27 women have taken a 12-day course offering a broad perspective on what it is like to be a female manager. The course received positive evaluations from both participants and employers. Another part of the project was to design a network consisting of some 70 women working or studying at different levels within the Steel area. Some are attending technical universities, others are employed under a collective agreement and still others have senior positions with the major steel companies. The network still exists and meets every month to have topical lectures and discussions. The other venture is a research project based on gender and working life studies and aimed at inspiring and contributing to starting up processes of change to reduce gender segregation and increased equality thereby strengthening the competitiveness of companies in the initiative. This work was commenced in 2008 and is aimed at companies, unlike the first project which targeted individuals. Processes aimed at increasing equality will commence amongst those companies who have chosen to participate in the project, initially with 8-10 companies. The project is run jointly with researchers at Dalarna University and led by a doctoral student in working life research.

Triple Steelix has also participated in an information meeting for 15 year-old girls to motivate them to apply for technical courses in general and the newly formed Teknikcollege Dalarna in particular.

Needs-driven research

Conducted chiefly within the large companies, the research is seen as an important resource in the development of the focus area in the region. Triple Steelix's connections to academic research have been developed but have so far not been strong. There has been little research funding and the research which has been conducted is described in the interviews as not aimed at achieving a high academic level. There are chiefly two projects which have had comprehensive research content in the collaboration between academia and industry. In these, universities have contributed such things as computer simulations and other measurement and analysis methods. The first scientific publications resulting from projects co-financed by the initiative were published in 2008.

Researchers or those training in research are contributing in principle to all R&D projects run with funding from Triple Steelix. As mentioned previously, there tend to be fewer and larger projects and the process management thinks there is increased acceptance amongst companies regarding the importance of contributions from researchers in taking the development forward.

At the interviews, the process management was also clear that their policy is to obtain the best competence. In other words, they do not go to the region's universities simply because they are nearby. On the other hand, they always give researchers at the region's educational establishments a chance to be involved in various projects.

An example of a joint project between academia and industry is the cooperation between Gävle Galvan Varmförzinkning and Dalarna University. Gävle Galvan Varmförzinkning has one of the Nordic region's largest galvanising plants for subcontract production. In recent years, demand has increased for products with galvanised surface treatments. Continuing as one of Sweden's largest producers of individually galvanised products requires increased knowledge on how various process parameters affect surface quality. The project deals with identification and classification of surface faults as well as a study of crack formation and corrosion resistance.

New projects are in the process of being started up and a collaboration is also currently being developed with research implementers with whom there has not been any major previous cooperation. These include Swerea IVF and Ångströms Material Akademi (ÅMA) whose cooperation has also been formalised by contract. The most established cooperation is the one with Dalarna University relating to material processing and material design plus working life studies and business development. There are also plans to extend the cooperation between the University of Gävle and Triple Steelix. Additionally, there are plans for closer contacts with Mälardalen University and Robotdalen to run industrial robotics projects to meet the needs of companies in the network around Triple Steelix. Regarding R&D infrastructure, BearbetningsCentrum

has been started up where researchers and companies can use such machines as a 3-D rollformer – described as a unique piece of equipment.

Triple Steelix believes that in future, there will be an increased collaboration with academia for companies who subcontract to the major companies for service and repairs on manufacturing processes. This is because compared with the research into steel production, this seems a relatively uncharted area. This relates to areas with a large amount of sociological research relating to things like business models. This is because these areas are thought to hold great potential added value and a need for new knowledge.

According to companies in the initiative, as well as directly benefiting from the immediate project results, contact with the regional universities also provides contact with other educational establishments outside the region through the researchers' networks. These contacts are also a source of knowledge about the latest scientific developments within relevant areas.

There has been and still is a problem of finding researchers who are interested in the applied and commissioned form of research desired in projects co-financed by Triple Steelix. This ties up with the outlook on academic qualifications. Individual researchers must be convinced to take part. There is a network of a few interested and relevant researchers. The contacts at management level have increased more recently, for example with the University of Gävle and Dalarna University. In Gävle, grants have been introduced for the “best collaborator”, which may in the long-run contribute to a change in attitudes regarding collaborating with industry. One change at the University of Gävle has been the University's new effort initiated for a Centre of Excellence in logistics and innovative production, which may also lead to improved conditions in the collaboration between Triple Steelix and the University. Triple Steelix is also contributing to overseas recruitment of relevant research competence to a regional educational establishment.

A large proportion of the research-related activity which takes place is in the form of Master's theses. Through these projects, it is anticipated that awareness will increase amongst companies (SMEs) about the benefits they can reap by employing a well trained workforce; those with a Master's in engineering for example.

Under the research project allied to the equality work, a doctoral student will be employed via the Swedish Steel Producers' Association. Triple Steelix is also looking into the prospects of employing more industrial doctoral students via that same organisation.

The most difficult partnership door for Triple Steelix to open has been that of the universities. For the process management, there is a need to include researcher competence in the project as they contribute to new, broader points of view. This need not entail a major research element or high academic level in projects, but is considered to add a great deal of value. There is a perceived pressure from VINNOVA to live up to the expectations of the research content in the initiative, due amongst other things the

guideline value of 50% of the budget to go to needs-driven R&D and the measurement of the number of scientific publications resulting from the operation.

Newly established enterprises

Triple Steelix's operation is primarily focused on the development of existing industry and has no activities aimed at establishing new operations. On the other hand, there are activities for drawing established companies to locate an operation in the region. There were two such examples during the financial year. Triple Steelix's initiative entailed helping various players to formulate an attractive offering.

Development of existing industry

In its projects, Triple Steelix is increasingly concentrating on those companies with the most demanding customers. The fact that companies have ready access to demanding customers is regarded as a strong force for development. By bringing in relevant external knowledge to projects and using the demanding customers' needs as a starting point, Triple Steelix is aiming to advance the subcontractors' regeneration and competitiveness.

Needs which were formulated by the large companies and their subcontractors within the service and repairs (chiefly maintenance and a certain amount of procurement) contributed to the operational change during 2008. The process resulted in more activities to develop the relationship between these two categories of company. Triple Steelix appears to have the legitimacy to act as broker in contacts between the major companies and their subcontractors. Partly, this is because it is regarded as part of the Swedish Steel Producers' Association, which also contributes to linking up the processes regionally and nationally.

The activities within this area consist chiefly of measures to formalise and structure the relationships between the steel producers and their subcontractors. The steel producers want to limit the number of suppliers to just a few with a high level of professionalism, good resources and geographical proximity. From the supplier companies' side, this was seen as a natural development and several of them are already on the way to becoming such suppliers in conjunction with other small and medium-sized enterprises. This means that a company can become coordinator of a major delivery of goods and services to large companies. Triple Steelix considers that 10-20 companies in the region have the conditions to take on such a coordinating role. Several of the subcontractors have built up comprehensive knowledge of the large companies' needs and manufacturing processes.

Consequently within this area, a new way of organising subcontractors is being established with certain companies accepting coordinating responsibility to the large corporate principals. This work has been introduced with a number of sub-projects including:

- surveying companies' competence and resources

- creating payment guarantee models and partnership agreements between the smaller companies
- looking after procurements, contracts and marketing
- achieving a formalisation of agreements and arrangements
- offering project management training

The aim is to improve the circumstances for coordinating deliveries. The objective is more business between large and small and medium-sized enterprises in the region under the umbrella of the large companies' ongoing operations. This will be achieved by the subcontractors' offering being more attractive to the large companies and is expected to benefit both parties. Some 20 companies are actively involved and five definite assignments have so far been generated. Another aspect of the relationship between large companies and their subcontractors is Triple Steelix trying to get the large companies to provide better feedback for subcontractors regarding quotes that were declined. This is to increase knowledge of the reasons why they did not get the assignment and what they can improve.

Prior to the anticipated major investments within the region's steel industry, activities are also being conducted to bolster the opportunities for the region's subcontractors to benefit from these assignments. The procurement is taking place as a so-called functional procurement in which major international companies take total responsibility for the deliveries. These players then put out part of the work and deliveries to subcontractors. Under the auspices of Triple Steelix, a proposal has been drawn up for new routines to facilitate contacts between client and supplier. This is regulated through an amendment to the large companies' existing standard agreements. The aim is to help subcontractors in the region be able to deliver more complex and complete orders. This is anticipated to lead to additional, more comprehensive assignments including internationally.

Another benefit of the above work on improving the collaboration between large and small companies is that there can be more of a long-term cooperation on preventative maintenance, to reduce the risk of breakdowns and benefit both parties. This enables better use of these small companies' knowledge and competence, benefitting the large companies' efficiency and productivity. This form of collaboration between subcontractors, as well as the agreements they are working to produce, can lead to greater margins and increase predictability and thus better conditions for long-term development of SMEs. Functional agreements are now being prepared, but it is not possible to put these into effect during the crisis.

With improved networks and structures to strengthen the subcontracting companies' competitiveness, it becomes possible to market the region's well-developed subcontractor system internationally. The idea is that "you can only be a leading international supplier if you have a world-leading customer as client". Such customers and clients are present in the region. Thus, it is a matter of exporting goods and services as well as attracting establishments to the region.

Triple Steelix also contributes actively to the development of existing industry through the research and development projects described earlier under the heading “Needs-driven research”. Some 30 development projects are currently underway in SMEs. Generally, these are initiated following the company visits by Triple Steelix to inventory their needs. These visits are implemented by those responsible for the operation in the three geographical nodes. The working model of company visits, pilot studies and development projects has been taken from Industrial Development Centres. This describes the process in four stages –Identification, Initiation, Execution and Evaluation – and it is primarily the node managers who carry out the identification stage within Triple Steelix. The process management puts much of its work into the Initiation stage, going from needs to projects with staffing and action plans. The involvement of the process management in the Execution stage varies from project to project. The intention is to increase the degree of project evaluation so as to guarantee learning in the initiative.

Under Triple Steelix, over 200 company visits are carried out annually of which 40 are with companies with which there has been no previous contact. Furthermore, 40 pilot studies have been held and five projects commenced during the year. A total of 78 companies have been involved in projects and there are currently 20 projects running. These generally relate to the individual company’s operational activity. Companies contribute about 50% of the funding, primarily as hours in kind. Many projects are initially pilot studies, but some are also started as more comprehensive development projects. The process management itself can agree projects of up to SEK 125,000 and it prepares presentations of the larger projects for the executive board. The executive boards in the geographical operational areas have a budget of SEK 200,000 at their disposal for pilot studies and the regional manager in conjunction with the chair of the operational area can agree costs of up to SEK 20,000. According to the process management’s situation report, 10 new goods, services or products have been developed under the Triple Steelix operation. A large proportion of companies involved in Triple Steelix are involved on a project basis, except those which comprise the actual nucleus of the initiative. Which companies are involved therefore varies from year to year. It now seems that the volume of projects has increased to a reasonable level. This increase is because Triple Steelix chose to enlarge its focus on those companies with the most demanding customers.

Two major engineering companies have recently established in the region, following Scania’s decision to move its operation from Falun. These are Leax and Zakrisdalsverken. Triple Steelix is now running development projects with these companies.

Another focus which Triple Steelix may develop is IT support for SMEs. A number of small IT companies are gathered at a business park in Sandviken. A dialogue has been started with VINNVÄX’s Process IT Innovations initiative due to interest in their working method, which also involves starting with an inventory of companies’ needs. There is potential for improvement by the large companies which IT companies can

help bring about. The IT managers at the six large steel companies have begun meeting and discussing these issues.

It is envisaged that the partnership between Swerea IVF and Triple Steelix will afford SMEs the opportunity to participate in the institute's services. This will provide development opportunities and access to knowledge at the same time as giving Swerea IVF more customers. Correspondingly, through Triple Steelix companies can participate in ÅMA's operation at a lower cost and for ÅMA there is interest in collaborating with SMEs, including more easy involvement in the international research cooperation within the EU.

In regard to infrastructure for SMEs, BearbetningsCentrum is currently a testbed to which companies have access and is also linked to the research school and according is somewhere where SMEs and researchers can meet on concrete projects.

How Triple Steelix's networks and projects operate is illustrated by the following example. A major European company was working on a design solution for part of a high-speed train. It was having problems bringing about a solution to cope with both weight and durability requirements. An entrepreneur in the Triple Steelix network was then able to tip off a smaller company in the region which works with entirely different customers and applications, including designs for rally/racing cars. A team was put together and they succeeded in solving the task relatively quickly. The project did not involve large volume production, but provided a certain increase in employment and indicated an ability to deliver to high specifications.

Activities for individual learning, monitoring and evaluation

The interactive research in Triple Steelix is contributing actively and operationally to the process management's operation and the person carrying out the work may be considered part of the process management. The interactive researcher (not actually a researcher) acts as a sounding board for the process management. This is welcomed in a complex operation with many players and where the alternative actions are not always clear. The supporting data produced under the framework of the interactive research aims to aid evaluation and learning within the initiative, including indicating and clarifying what has been achieved. The interactive researcher may introduce the experiences from activities which have been systematically gathered and thus contribute proposed actions for improving the operation. These proposals have also led to such changes. It is also seen as important for supporting data to be produced continuously which leads to opportunities for rapid revision of newly started processes. The interactive researcher is free to join in all Triple Steelix operations and attends the board meetings, listening and giving feedback regarding the work of the executive board.

The interactive researcher also writes the reports which VINNOVA and the Swedish Steel Producers' Association request as well as the annual report. The interactive researcher also has a knowledge of theory and practice relating to regional development work. The process management finds this helpful when viewing the operation in this context and as a source of information about this.

The interactive research has previously surveyed companies which took part in the initiatives, their economic development and dynamics in terms of number of employees. Issues now being addressed by the interactive research relate to such things as the value of Triple Steelix to various players and how the forms of control and power in the initiative actually look.

The interviews give the impression that the form of interactive research being conducted within Triple Steelix has been mutually very popular and provided much added value to the process management. Since the interactive researcher is not actually a researcher, the issue of academic qualifications or the researcher's integrity in relation to the study object does not limit the active and operational contribution of the interactive research to the operation. This is something for VINNOVA to decide upon when it develops new criteria for the content and design of interactive research in various programmes. This leads to questions regarding what the purpose of interactive research is and what its content should be in future.

Impact of the initiative on the regional innovation system

The interviews provide examples of a belief that the initiative has led to more new contacts between participating municipalities. Triple Steelix continues to expand and has now increased the number of contributing municipalities from nine to 13.

There are plans to collaborate on training courses which may be regarded as changes to the regional innovation system. These are described in the "Competence supply" section above.

There are signs that the work of improving relationships between the large companies and subcontractors within service and maintenance is leading to changes in the large companies' working methods relative to the subcontractors. The process is also leading to an increase in collaboration between subcontractors.

Appendix C: VINNVÄXT winners 2008

This section of the Appendix describes the operations of the four VINNVÄXT initiatives selected in 2008 under “VINNVÄXT 2005 Early-Stage Innovation Systems”. These are: Biorefinery of the Future in Örnsköldsvik; Smart Textiles in Borås; Printed Electronics Arena in Norrköping/Linköping; and Peak Innovation in Åre/Östersund. The description is based chiefly on the written situation report and interviews conducted in the autumn of 2009 (Appendix E). Other supporting documents such as the initiatives’ operational plans and webpages have also been used for the compilation.

Biorefinery of the Future

The process industry cluster in the Örnsköldsvik and Umeå region brings together companies within process chemistry, process technology and process control. The common theme for the development work is Biorefinery of the Future based on forest raw materials and energy crops. Biorefinery of the Future aims to generate sustainable growth by developing new knowledge and bio-based green products, green chemicals, biofuels and bioenergy solutions using forest raw materials, energy crops and industrial process streams. Process streams means streams of chemicals or cellulose (which is what the company primarily intends producing) as well as residue streams, for example waste that is normally dumped or which can be further processed into a constituent of some other product.

Organisation, working method and orientation

Biorefinery of the Future is organised in the company Processum Biorefinery Initiative AB (hereinafter called Processum), a non-profit limited company aimed at promoting member companies’ interests within the biorefinery area. The company in turn is wholly owned by a non-profit association with no other activity than being owner of the limited company. The association has 14 member companies who are members of the cluster. Almi, Innovation Bridge and the Swedish Trade Council are also members. The members pay a membership fee which several of them supplement with significantly larger voluntary contributions. There is no formal link between the total and how much the companies profit from the operation. However, in practice large companies who are very active in the initiative’s R&D project operation pay the most.

Essentially, the operation of designing and leading the development of the Biorefinery of the Future initiative falls within the remit of the limited company’s operation. Member companies then take an active part in the various activities and projects which are arranged under the effort. The majority of activities and projects are initiated by members themselves.

The Processum board comprises representatives of member companies, public players and academia. The board meets four or five times a year and discusses chiefly strategic

issues. Biannual members' meetings serve as a dialogue forum for member companies. A selected theme is discussed at these meetings with some 60 people attending the last one.

At the end of 2008/start of 2009, the initiative founded a grouping called the R&D Council to inspect project proposals. Around SEK 2.5 million per year of the current budget is earmarked for the R&D Council's operation. The Council consists of two professors from Umeå University, the representatives of member companies and the MD of Processum. The Council's task is to take decisions about R&D projects which are relevant and important to the development of the cluster. At least two member companies must be interested in carrying out each project and preferably allocate time and/or resources for it to have a chance of gaining approval. The Council has the board's mandate to take decisions on projects of up to SEK 200,000. Larger applications are processed by the Council but the board takes decisions on these. During the spring and summer, the Council has taken decisions on some 10 projects. A number of visiting activities to distribute information about the possibility of applying for funds have been carried out during the financial year.

Concurrently with the start-up of the R&D Council's operation, the need for a clearer strategy on intellectual property rights has been highlighted. The intention is for the board to adopt such a policy during the autumn of 2009, including a standard agreement. The work is taking place in cooperation with Awapatent and Uminova.

An important aspect of the work within the R&D area is the two R&D engineers recruited and fully funded by the initiative. These R&D engineers gather a comprehensive network of companies and academics and identify, initiate and put together projects for submission to the R&D Council for assessment. In some cases, they are also project managers. The R&D engineers have additional competence relevant to the intended types of project – with a chemical and biochemical focus.

During the financial year, a new MD and process manager have been appointed. It is not thought that this will involve any changes of direction or content in the operation and also comes at the beginning of a new stage. This new stage involves scaling up the organisation, staffing and administrative routines and modelling them to fit the VINNVÄXT application.

The process management is aware of major interest from relevant players. For example, there have been a number of enquiries about the possibility of membership during the year. The process management sees the operation as a national resource to promote the biorefinery vision through networks, research and development. For this reason, prospective members are not geographically restricted to the Örnsköldsvik-Umeå region. The essential factor for membership is an interest in developing products and processes within the biorefinery area. In terms of public players, contacts with Örnsköldsvik Municipality and the county authorities of Västernorrland are considered good. There is also a perceived need to develop contacts with Umeå Municipality and the county authorities in Västerbotten. Three companies in Västerbotten are already

members and the initiative continues to develop contacts with companies in Västerbotten. This is linked to a wish by the initiative to market the entire region (including other initiatives along the Norrland coast within associated and complementary focus areas) as a region focusing on sustainable development within the chemistry and energy area. The cooperation, primarily with Umeå University has increased over the year. This is due amongst other things to the initiative's active contribution to a number of application processes, nationally and internationally. During the year, the number of cooperative projects has also increased in pace with the commencement of doctoral student projects and shorter projects.

Regional and national strategic processes

Within the initiative, a decision has been taken to work towards becoming a national node within the biorefinery area. Biorefinery of the Future has participated in a number of activities relating to the collaboration between initiatives in the focus area. For example, Bio Fuel Region, Solander Science Park and Biorefinery of the Future have initiated a partnership to jointly communicate the cluster of biorefineries based on forest raw materials along the Norrland coast. Amongst other things, the joint seminar in Brussels was arranged in June 2009 at which the Norrland biorefinery cluster was highlighted.

The work of the needs-driven research is aimed at a larger collaboration between the research at Umeå University and the companies within the Biorefinery at the Future. The establishment of the two professors from Umeå, who divide their time between the Domsjö area and Umeå, took place following discussion with the Vice Chancellor of Umeå University and is considered a vital component of this strategy. There are now plans to advance this partnership, perhaps with more research students focusing on issues of relevance to the biorefinery concept but also in regard to shorter collaborative projects.

In recent years, the investment in ethanol production in the region has been the subject of media discussion. The future importance of ethanol as a renewable automotive fuel has been called into question as well as the production of ethanol from agro-raw materials. The question was discussed in most interviews and the overall assessment by those interviewed is that the initiative is not affected by this to any great extent. Interest in the biorefinery concept and ethanol production from forest-raw materials from public players, financiers and other interested parties remains unchanged. Internationally, in the US and South America for example, the process management is finding that the priority of ethanol as an alternative fuel is increasing and it is receiving greater resources for continued development.

Major hopes in the region are attached to the Bothnia Line, which will be complete within a year. The forecast is that it will lead to a regional enlargement, for example in regard to a greater labour market region with improved prospects for commuting and cooperation among the Norrland coast.

Impact of the initiative on the regional innovation system

Biorefinery of the Future is involved in regional initiatives and projects. In Västernorrland, the initiative is part of the county's work on the regional growth plan. This in turn is reflected in the design of the current Structural Funds programme for Central Norrland, with specific mention made of the biorefinery concept. The initiative is also represented on the board of Umeå University's Business Research School.

Representatives of the initiative are involved in the EU-funded programme for process managers of various initiatives in the region and jointly run by the County Administrative Board and Åkroken. Involvement in the programme provides a network of contacts with organisations in the county. There is also involvement in Energyzer, a Structural Funds project which is helping generate a point of contact with energy projects in Jämtland and Västernorrland. Energyzer is one of several examples of network-building projects involving the initiative.

Needs-driven research

The research community, politicians and companies are ever more actively seeking alternatives to dwindling oil. The number of players and companies wanting to work on these problems is increasing and more R&D funds are being invested in the area. In recent years, a number of positive messages about efforts have come via research areas relevant to the initiative's focus area. For some while, Umeå University has prioritised the scientific areas of chemistry and chemical development. This is taking place through increased faculty appropriations to these areas involving the recruitment of new researchers and doctoral students as well as infrastructure investments. Investment is also being made in marketing training courses to increase the recruitment of students. Part of that investment is prioritising collaboration with industry. As has already been mentioned, two professors have been appointed, with the appointees sharing their time between Umeå and the Domsjö area. Upon their appointment, they were also interviewed by industrial representatives from the initiative's member companies. In addition, this autumn Umeå University started a business research school which receives half its funding from industry and plays an active role in projects. One of the initiative's development engineers assists in selecting which doctoral students are accepted and so far, two (out of 12) have been engaged in areas relevant to the initiative. During the year, one further doctoral student has been recruited within research areas relevant to biorefinery. These three doctoral students are also linked to the two professors mentioned and will be running projects in partnership with companies that are members of the initiative. There are also resources in the form of doctoral students and postdocs in Umeå linked to projects in partnership with companies in Processum. For example, one project concerns the cultivation of enzymes to break down cellulose from available residue streams from companies' production.

In the government's effort in strategic research areas, there was approval for the joint applications between LTU, UmU and SLU, which the initiative helped write. The effort means that SEK 50 million per year is granted to the academies in the form of faculty funds directed towards the bioenergy field. (Bio4Energy). The funds are allocated for an

initial period of five years, with the opportunity to extend. Biorefinery of the Future took an active role in writing the application and contributed testimonials from the member companies as to the strategic importance of the effort. For Biorefinery of the Future, it will be important to aid utilisation of the knowledge and competence that will be built up through the effort.

The process management notes that the corporate grouping formed by Biorefinery of the Future is interesting in regard to identifying companies which may contribute to international applications. According to the process management, the initiative's unique niche is a combination of research linked to laboratories and pilot installations plus the close collaboration with interested companies with their activities in areas relevant to the focus area. Umeå University and SLU are currently the educational establishments where the contacts and networks are most comprehensive. In some projects, actors in the initiative are cooperating with universities other than Umeå, such as KTH, Luleå, Chalmers, Mid Sweden University and SLU. One project being run in partnership with Umeå University and Karlstad University is evaluating the possibilities for refining the pure cellulose produced within the cluster. This is an industrial doctoral student project and half its funding comes from the initiative.

According to the process management, two different types of projects can be handled within the R&D Council: projects which in the short term may provide improved processes or a new product, and long-term projects to be conducted within academia with results in the form of entirely new processes. Three new approved projects can be mentioned which fall under the umbrella of the R&D Council's activity:

- Use of NIR (near infrared spectroscopy) within the process industry in cooperation with ProcessIT.
- Processing of green liquor dregs Scaling up yeast cultivation in process streams

Another project in corporation with Luleå Technical University evaluates how it might be possible to produce chemical substances such as succinic acid and butanol from cellulose-based raw materials on an industrial scale.

At times, the development engineers serve as a bridge between academic researchers and companies and their work involves identifying and developing ideas. These ideas may be potential products and processes within member companies, but ideas from other sources (academia for example) can also be identified. Their task is also to maintain contact with academia, look after the achievements that have been made and, on this basis, introduce new ideas to member companies.

Biorefinery of the Future is also participating in the international research project, ProBark. This is a three-year project aimed at utilising the bark from pine and spruce trees in products and processes. Currently, almost all bark is burned despite it containing interesting chemicals. Also among those participating in the project are the Fraunhofer Institute, VTT, KTH, Södra and Stora-Enso.

Newly established enterprises

Within the biorefinery area in the region, the process management considers that the initiative's operation can assist in anchoring the activity of established companies in the region and aid these companies in renewal, which can also lead to new investments and operations. Another development which the initiative feels it might be able to contribute to is the growth of a new operation, with new companies, which look after and further process the established companies' residual products in the form of raw materials and energy.

Discussions are underway with such bodies as Innovation Bridge, Almi Företagspartner and Uminova Innovation regarding how activities relating to entrepreneurship, intrapreneurship and spin-offs might be implemented. This area was highlighted by interactive researchers as needing mobilisation, i.e. finding and inspiring potential entrepreneurs within and beyond member companies.

The initiative's operation is reported to have contributed to the start-up of two new companies. These are consultancy operations within communication and within the biorefinery area – the latter with one of the large companies as its principal client.

Development of existing industry

Companies within the forest-based chemical industry have residual products and waste heat left over from their production. Handling these residual products may involve extra cost to companies and waste heat can be difficult to utilise in the particular production process. By finding other ways of using and processing these products, they can be converted into revenue for companies and at the same time lead to a more environmentally friendly, sustainable production. One of the driving forces behind the R&D projects is finding way to achieve this and having the involvement in these of the established companies in the initiative. Processing can take place using chemical and biotechnological methods. Developing and scaling up such processing for chemical products other than those primarily intended for production – from laboratory scale to industrial scale – may require major investment; it can also be difficult for a new company to obtain the required funding. Another challenge is to develop production solutions which can compete on price with other methods of producing the chemicals. Some solutions can be smaller in scale and require less investment.

The extent to which the established industry has its own R&D resources to develop the biorefinery concept varies. Normally, such activity exists to a limited extent even in the large companies. Under the auspices of Biorefinery of the Future, companies are afforded an opportunity to jointly help fund R&D competence in the form of the two development engineers appointed to work on such projects. As a rule, projects address needs from more than one company – this is one of the R&D Council's criteria in selecting projects. The corporate representatives emphasise the import of R&D projects and conditions for them (such as the development engineers) as the initiative's most important and highest priority activity. Other activities are not allowed to encroach too much on this focus.

To some extent, companies with pilot plants make these available to R&D projects on a case-by-case basis. A laboratory milieu for verification of research projects has been established in partnership between SEKAB, Örnsköldsvik Municipality, Umeå University and Processum. Komtek, the municipal effort in chemistry and the summer research school (see also under the heading “Competence supply”) has used these premises in its operation to increase interest in chemistry amongst young people. Investment is also being made in a new laboratory under the banner of Umeå University’s establishment in the Domsjö area. The initiative intends to apply for a Structural Funds grant in order to establish further small-scale pilot plants and promote the development of biorefinery solutions.

Amongst other things, the R&D Council is funding a yeast cultivation project which aims to optimise the conditions for cultivating a unique strain of yeast found in the Domsjö factory area. This is so as to increase yields in the production of ethanol. One project aims to examine the possibilities of extracting hemicellulose in polymer form as a new raw material for such things as renewable plastics. In partnership with others including ProcessIT Innovations, another project is using a spectroscopic method to analyse and quantify different substances in the process streams of a biorefinery or process industry. A major residual product from sulphate factories is green liquor dregs, which is currently dumped. One project is investigating whether this can be used for road surfacing, which would lead to reduced environmental impact and lower costs for sulphate factories. In one energy project, a pilot study is being conducted prior to the construction of a pilot plant for the extraction of energy from low-grade waste water streams at temperatures of around 50°C. There are also projects to develop training methods and investigate areas of usage for lignosulphate as a lubricant for grinding and pelletising.

According to the process management, the work of patenting the results has been intensified during the year. Processum does not intend to build up its own patent portfolio; that will be taken care of by a participating company. However, the initiative may contribute such things as novelty searches. The importance of having a clear policy on intellectual property rights is a consequence of the network-based working method in R&D projects. This working method resembles something called “Open Innovation”¹⁹ a prerequisite of which is clarity regarding who owns the rights to the results.

A number of strategic decisions have been taken in member companies during the year, with the initiative playing an active part in this work. The companies Bioendev and Övik Energi mutually decided on a pilot torrefication plant (an industrial technology resembling the traditional coking pile). Funding has been granted from the Swedish Energy Agency for this. The project is equivalent to an investment of some SEK 50

¹⁹Somewhat simply put, “Open Innovation” means that companies develop new goods and services through cooperation with people outside their own organisations, including customers, retailers and occasionally even competitors.

million and will start in the autumn. The process management has contributed to the discussion on such matters as designing the application.

An ongoing process is the decision in principle taken by Chemrec and Domsjö Fabriker that the first large-scale plant based on Chemrec's DME-technology (dimethyl ether) will be located in the Domsjö area. The project has been funded by the Swedish Energy Agency and the Agency intends to invest a further SEK 500 million in the plant if it comes to fruition. This depends on what financing solutions can be identified, since the total investment runs to SEK 3 billion.

During the year, a new lignosulphate drying plant has been completed at Domsjö Fabriker. The investment totalled approx. SEK 120 million. The initiative has co-financed a project leading to the development of a new product actually based on lignosulphate, involving its use as a binding agent for concrete. A new fermentation process for ethanol production has also been developed as a result of the initiative's project.

The initiative's R&D operations chiefly include companies in the Domsjö area. The process management is planning to intensify its efforts to involve other companies; through established contacts with companies in Umeå leading to concrete projects, for example.

Activities for individual learning, monitoring and evaluation

Representatives of industry, society and academia have been interviewed by researchers from Mid Sweden University regarding the initiative's development. Two scientific articles have currently been put together regarding the Biorefinery of the Future effort. Two seminars have also been held in which the analysis of the interviews was fed back to the initiative. Several ideas regarding future work have been raised and discussed at the seminars. A study has also been planned regarding the development of the industrial cluster around the initiative.

Concerning indicators for results monitoring, there are a number of long-term overall goals for the effort, some of which are broken down on an annual basis. These goals are set and monitored annually by the board, with the intention before long of being able to take an initial level, or zero base measurement.

Regional meeting arenas

A kick-off was held for the growth initiative Biorefinery of the Future in Husum in the autumn 2008. Some 120 delegates from industry, academia and society participated in the meeting, the theme of which was innovation and enterprise. During the autumn of 2009, a series of seminars has also commenced. A visitors' centre has been created in Domsjö industrial area on the initiative of the municipality and industry. This has a permanent exhibition of Biorefinery of the Future and can receive 40 visitors at a time. Five of the companies in the area have joint responsibility for this visitors' centre, which provides information about the initiatives' operation. A number of study visits have taken place and it is envisaged that the visitors' centre will serve as a node for

professional visits as well as “industrial tourism”. The municipality is involved in the industrial tourism effort.

The actual physical milieu in the Domsjö area amounts to a regional meeting arena through its proximity to the players in the area. The majority of members of the initiative are present there and areas such as the common dining hall serve as a meeting place in which contacts are made and partnerships discussed.

Communication and marketing

A communication plan is currently being produced for Biorefinery of the Future and is expected during the autumn. The aim is to further strengthen the brand and produce a clear prioritisation of target groups, information channels etc. so as to reach out better. The plan will also deal with how communication and information should occur within the initiative. To gain an idea of how the initiative should organise its communication work, two other VINNVÄXT initiatives were interviewed in conjunction with production of the plan – Uppsala BIO and ProcessIT Innovations. New brochure material about Biorefinery of the Future is also in production.

The initiative has participated with lectures at international conferences focusing on biorefineries and is visible in the media in articles on such things as doctoral student projects on cellulose and the energy crop project, as well as in the Örnsköldsvik Municipality newspaper, “Världsklass”.

The initiative serves as the Swedish node in the European programme, BSR Innonet which in Sweden is funded by VINNOVA and aims to promote cluster collaborations in Europe. In one activity under the programme, the participating countries selected representatives to participate in a workshop on biorefineries and biofuels. The selection was made by national representatives. This lessened the chances of finding concrete partnership projects or synergies between those involved, since the selected clusters had such different emphases. Despite this, the contacts ultimately led to an exchange with Iceland and concrete cooperations are now being discussed.

The initiative, in conjunction with representatives of Perstorp, Södra, Sveaskog and Bioteknik Forum has visited an Undersecretary of State at the Ministry of Enterprise, Energy and Communications to raise awareness of the importance of industrial biotechnology within the process industry. The initiative has also participated in the Swedish Energy Agency’s and VINNOVA’s workshop on biorefinery development.

Competence supply

Amongst young people in Sweden, there has been a decline of interest in studying chemistry. In conjunction with Umeå University and Örnsköldsvik Municipality, the initiative is working on various efforts to inspire more children and young people to study this subject. The initiative has: been involved in arranging a summer research school for high school students; held evening classes for children and young people in compulsory schooling; informed teachers at compulsory and senior high school level

about chemistry education; and produced a course based on biorefinery case studies for senior high school students.

In the autumn of 2009, Biorefinery of the Future concludes a trainee programme for four people involving five different companies. The trainees have had an opportunity to work at three different companies over 18 months' training. One of the trainees has been offered conditional tenure and three have been offered project appointments despite the financial crisis taking its toll in the form of cutbacks in industry. In conjunction with the training programme, seminars have been held with the trainees and personnel from the participating companies, often with some 30 participants from the cluster's companies. Two Master's theses have been in progress during the financial year and new ones have been started. KomTek is a national programme to interest children and young people in technology and in Örnsköldsvik, the initiative is contributing training in chemistry for children and young people. A new high school chemistry programme has also been started in Örnsköldsvik, focusing on green chemistry and supported by the initiative. This involves such elements as industrial traineeships at and companies participating in information meetings to attract young people to the training.

Integration of gender perspective

The process industry is traditionally a male-dominated sector, both in regard to the number of employees and those in leading positions. According to the process management, many of the initiative's companies are working actively with this issue, but much remains to be done. However amongst the current new appointments, the proportion of women is significantly higher, particularly in non-manual posts. Women are now in the majority in university chemistry courses. For example, in the trainee programme three out of four trainees were women. There is currently no clear picture of how the gender division looks at different levels in the initiative's member organisations, but there is an equal gender division in the initiative's own organisation and management.

In order to contribute to a better gender distribution in higher posts, the initiative and its companies, including novices and mentors, is participating in a mentorship programme for women arranged by Örnsköldsvik Municipality. The Municipality has personnel with specialist knowledge and is the driving force in gender issues. Work on these issues currently proceeds by deriving benefit from ongoing municipal operations.

Internationalisation

The initiative has not yet determined what its approach or activities will be concerning internationalisation. Even so, the operations which are conducted (a certain amount of outside situation monitoring; participation and funding of participation in international conferences; applications to various EU programmes; delegation trips and workshops; plus contacts with ISA and the Swedish Trade Council) are based on individual decisions and not part of a strategy. At the same time, the process management is prioritising support for involvement in the EU's Framework Programme.

Funding

During the year, Biorefinery of the Future has coordinated and compiled a number of major applications. These include a Structural Funds application relating to the operation within Biorefinery of the Future and an application to the EU's Seventh Framework Programme for research entitled Bio4Chem (not approved). However, as already mentioned, the application for funding from the government initiative to support strategic research areas was approved and UmU, LTU and LTH will thus receive SEK 50 million per year in the form of faculty funds aimed at the bioenergy area. The initiative contributed actively to this application. The initiative's contribution involved bringing together a network of companies for the application and contributing texts regarding this dimension of the project. In partnership with others such as VTT and KTH, the initiative is also contributing SEK 100,000 in co-financing to the EU project Probark.

The initiative has also applied for money from the Structural Funds in order to enhance the existing infrastructure with five new pilot plants. Funds have already been granted by the Kempe Foundation for one new pilot. The fact that Processum is organised as a limited company caused the Swedish Agency for Economic and Regional Growth to raise the issue of whether any support for Processum would constitute so-called inadmissible state support. Following comprehensive discussions between Processum, VINNOVA, the Swedish Agency for Economic and Regional Growth and the Västernorrland County Administrative Board, this issue has now been resolved. It has been confirmed that the actual organisational form is unimportant; it is the operation which determines whether there is state support or not. The process of clarifying this has led to delays in processing the Structural Funds application. It is intended that the pilot plants will be used by both member companies in the cluster and the participating academic institutions.

Peak Innovation

The Peak Innovation initiative is a long-term effort which aims to increase export revenues for the winter sports, tourism and outdoor pursuits industries. Peak Innovation focuses on future issues such as internationalisation, globalisation, enterprise and business development, plus research as a development resource. Peak Innovation's report states that during 2008/2009, the initiative has involved some 170 companies and organisations, 40 researchers/academics and has funded or co-financed research resulting in some 20 scientific publications.

Organisation, working method and orientation

Peak Innovation's partnership is based on a five-year partnership agreement between industry, universities, the public sector and the Swedish sports movement. The parties to the agreement are Peak Business & Sports AB (industry), Mid Sweden University, Östersund, Åre and Krokoms municipalities and Jämtland/Härjedalen Sports Association. Peak Innovation is run by Mid Sweden Science Park AB (hereinafter called MSSP) a jointly-owned company formed in 2007. MSSP's owners/contributing

parties are: Sports and Industry 55% - through Peak Business & Sports AB and VTC Service AB and the public sector 45% - through Östersund, Åre and Krokoms municipalities. The county council has also shown strong interest in becoming a participant. The parties have a common objective for future ownership of MSSP to be 40% by industry and sport and 30% by the municipalities and county council and 30% by Mid Sweden University. Mid Sweden University is not currently in a position to participate as a part-owner in MSSP AB. Instead, the University keeps track of MSSP's operation through co-opted members on the MSSP board. Mid Sweden University is currently the beneficiary of the VINNVÄXT initiative, Peak Innovation.

MSSP and Peak Innovation have a joint board of directors. It consists of a total of 10 representatives from Östersund, Åre and Krokoms municipalities, Jämtland Härjedalens Sports Association and Peak Business & Sports AB (three of the members are co-opted from Mid Sweden University in MSSP). The process manager is the person responsible for submitting and presenting issues for the board to address as well as presenting the operation. The board meets 4-6 times per year or more often as required. Its task is to take overall financial and strategic responsibility, monitor whether the partnership agreement is being observed, appoint the process management and monitor its work. Three board members are on the executive committee along with the process manager. The board delegates far-reaching responsibility and authority to the executive committee and process management to implement the strategies and the day-to-day financial decisions. During its first operational year, the initiative's operation has been characterised by mobilisation and building up of the administration but has now directed its focus to the operational activities.

Other players of importance to the innovation system include MIUN Innovation (an EU-funded project run by Mid Sweden University to improve the situation of successful innovation processes in the region), Business Incubator (Almi) and Connect.

In 2012 MSSP takes over the role of beneficiary of the VINNVÄXT initiative, Peak Innovation from Mid Sweden University.

During the spring of 2009, the process management appointed an "interaction group" with the principal tasks of influencing the initiatives' emphasis and distribution, contributing to strategic processes and aiding the coordination of activities and development of the network between various players and partners within the regional innovation system (RIS). The group has 34 external members and involves representatives of the region's academia, industry, public sector and sport. It meets five or six times a year and its personnel composition will change over time so as to adapt to the development of the initiative's operation.

Management group meetings with the sub-project managers are held continually in order to report on and discuss how the activities are progressing. This also involves the identification of synergies between the operational areas within the initiative and may

lead to increased collaboration, for example between the three research areas in the initiative.

Guidelines and routines are now designed to ensure that the requirements of VINNOVA and the Swedish Agency for Economic and Regional Growth are satisfied in terms of financial accounting as well as other reporting and documentation. A purchasing policy has been produced and there is a manned marketing and communication function.

There is a very clear plan regarding which activities will be conducted within each operational area.

Incorporation has become a working method within the initiative. One reason for this is the partial introduction of an industrial approach.

The process management is well aware of the consequences of the various financiers' terms and seems to have found a way of managing these in order to effectively operationalise the initiative's operational plan.

The operation is run by Mid Sweden University through or within companies created for Peak Innovation's operation. The process management function was bought in via Peak Business & Sports AB and consists of four people (totalling 2.5 full-time person-years). The operation is divided into functions wholly or partially co-financed by the initiative and led by project managers.

Regional and national strategic processes

The initiative has recently produced its action plan and has now begun implementing it. According to the process management, there is a clear need for a regional growth and development leadership, with the mobilisation around Peak Innovation providing a clear example. The various functions and operational areas within the initiative have developed strategies for their operations, which also relate to the overall strategic process. The establishment process has involved meetings with leaders of the county administrative board and municipality, plus other players within the innovation support system. The newly started interaction group, the board of Peak Innovation and the board of Peak Business & Sports AB will be forums for running regional strategic processes.

Impact of the initiative on the regional innovation system

Peak Innovation has been the initiator of and/or contributed funding to achieve changes in the regional innovation system which are directly within the initiative's operation. Peak Business & Sports AB, a private company comprising some 50 direct owners and partners and some 1,000 indirect partners has been created as a platform for companies, trade unions and sport within tourism and sporting and leisure pursuits. The formation of the company was also a way to formalise the participation of industry in the initiative. The company's operation and its role within the initiative remain to be designed. A function to assist entrepreneurs in finding funding from various (chiefly public) players for their projects has been established on the initiative of, and with introductory funding from, Peak Innovation. This function now operates within Peak

Innovation and the project has taken the initiative to start a private company, Soft Financing AB.

An example of a change in the regional innovation system is the planned establishment of a Science Park, with the initiative aiding the planning with funding and staffing (one person contributing to the work of designing the business plan for the operation). This involvement in the initiative has led to a closer collaboration between municipalities involved in the initiative's focus area. The cooperation between industry and academia in Åre has resulted in commercially-orientated training courses at Mid Sweden University. These include Exportcoach and SKARP Åre, a course in business and product development. Peak Innovation took the initiative for this having identified the needs of the business community in Åre. Mid Sweden University has subsequently filled the training course with content and is giving the course. Several of the players in the regional innovation system are now co-located at Campus Östersund on the initiative of Peak Innovation. Apart from Peak Innovation, this applies to such bodies as MIUN Innovation, Business Incubator (Almi), Connect and the association Vehicle Technical Centre, Östersund Mid Sweden.

The initiative's operation in the functional region means that within Peak Innovation's focus areas, Åre, Krokoms and Östersund are discussing how they might complement each other and are now coalescing on common renewal and growth objectives. Indications that the research areas within the initiative's focus areas are being prioritised at Mid Sweden University include the establishment of five new professorial chairs. These have been added during the past three years, with the latest in the autumn of 2008. MIUN Innovation has been set up with operations in Sundsvall and Östersund to develop business ideas from students and researchers, including offering inspiration for entrepreneurship, advice and support relating to intellectual property rights.

Needs-driven research

The needs-driven research conducted at Mid Sweden University and co-financed under the auspices of Peak Innovation can be divided into three sections:

- Physiological research for analysis of performance, development of training etc.
- Materials and mechanical engineering for applications in sport and outdoor pursuit technology
- Methods for analysing experiences of applications in the hospitality industry.

The Swedish Winter Sports Research Centre on the Östersund Campus of Mid Sweden University conducts research and development in winter sports. This research includes a test operation with advanced equipment relating to physiology and biomechanics for a number of national teams. Sections of the operation take place in collaboration with the Swedish Olympic Committee (SOC), with SOC funding performance analyses for training development of Swedish national winter sports teams. Additional to the national teams' interest in analyses and contributing to research, there are also currently some 60 students at Mid Sweden University's Ski and Biathlon University who participating as study subjects in the research. These sportspeople combine a top-level

effort with post-high school study. The research includes active, elite sportspeople but also focuses on the impacts of strength and endurance training on the health and quality of life of elderly people. The opportunity to conduct collaborative research with so many active top-level winter sportspeople in combination with advanced equipment for the analyses is considered by the researchers to be a unique resource. The Centre's laboratory resources are also used in the tuition on the Sports Science programme.

Peak Innovation co-finances projects which take place in collaboration with the Centre and industry; for example, Craft AB and Lundhags AB.

There are corresponding groupings in southern Sweden concentrating on summer sports with different focuses and requirements, for example Gothenburg and Stockholm. In Umeå, there is a partially competing winter sports venture. One issue is the planned format for collaborating with these and international milieus in the future and how Peak Innovation's functional region will continue the work of developing their profile and excellence in these areas.

The research within materials and mechanical engineering has good opportunities to analyse and develop sporting and leisure equipment in the section of the operation known as Sports Technology or Sports Tech. The research group comprises representatives of such scientific areas as biomechanics, structural optimisation, quality assurance technology, mechatronics, tribology, materials engineering, production technology and mechanics. There are similar milieus in England and Germany but not in the Nordic countries. A collaboration with Smart Textiles has been started so as to increase the number of training courses with textile content and be able, through research collaboration, to develop the competence to do more work in product development involving textile aspects. Peak Innovation contributed just over SEK 700,000 to the funding of this milieu during the financial year and has also acted as adviser on potential business development within different product development areas. The milieu is now looking into the prospects of involvement in an FP7 context. Peak Innovation is contributing to Sportstech's operation by defraying some of the salary and equipment costs and contributing industrial contacts for Master's students and R&D projects. The initiative has also contributed to travel and accommodation costs as well as the implementation of the ISPO exhibition in collaboration with Scandinavian Outdoor Group (SOG).

Under the umbrella of research funded or co-financed by the initiative, three scientific articles have been submitted for inspection and 15 abstracts from the Swedish Winter Sports Research Centre and sports technology research were sent to an international conference in Oslo in June of 2009.

Peak Innovation has taken the initiative and contributed to the development of Peak Innovation Lab as well as funding the equipment. The initiative funded and ensured the appointment of a laboratory engineer at the Swedish Winter Sports Research Centre whose responsibility it was to organise the laboratory and its operation. Some equipment is already in place and the operation has commenced. The laboratory

comprises equipment which will provide increased prospects for modifying equipment and developing and producing prototype sporting equipment for testing and evaluation. This is so as to increase the prospects of commercialisation for concepts emerging from trial activities on study subjects.

In addition to this equipment, the Sports Technology effort also has the equipment and materials which Mid Sweden University took over when the Swedish Armed Forces withdrew from Östersund. The infrastructure today also includes computer-controlled prototype development using numerically controlled machine tools. The laboratory houses free-form machines for producing prototypes in plastic plus advanced designs in materials such as steel or titanium. Furthermore, there is access to advanced drilling, milling, turning and welding etc.

The combination of machine technology and advanced production and equipment testing within the Sports Technology effort at the Swedish Winter Sports Research Centre (using active sportspeople as study subjects) plus the Peak Innovation Lab prototype laboratory is anticipated to bring about good prospects of identifying new sports and leisure product ideas.

There is also demand to use the laboratory for physiological tests from more players than currently have the opportunity. The process management regards participation in this as a means of commercialising the research associated with the laboratory. Peak Innovation is investigating whether this can happen and, if so, how.

ETOUR (the European Tourism Research Institute) is a centre within Mid Sweden University which has previously received comprehensive funding from the Knowledge Foundation. ETOUR's management is on the Peak Innovation executive group and the initiative contributes to the funding of ETOUR's project, Peak Experiences. The research is largely needs-driven and mostly externally funded. As a rule, projects came about following dialogue and negotiations with private and/or public clients within the hospitality industry. The Institute currently employs some 20 people, three of whom are professors and six doctoral students. Significant funding comes via Mid Sweden University, the Swedish Environmental Protection Agency, Vinnova, the EU's Objective 2 regional fund, and the Nordic Innovation Centre.

Under the auspices of ETOUR, Peak Innovation is supporting the Peak Experiences project with half its funding (SEK 1.6 million per year in total). Peak Experiences was started in cooperation with Biathlon 2008, SkiStar and Holiday Club. The purpose of the project is to develop new methods of analysing customer experiences and use this knowledge to develop companies' operations. Peak Experiences is funded in its initial stage under VINNOVA's Service Innovations 2007 programme. The project is now in its second stage, part-funded by Peak Innovation. The project involves a collaboration between research linked to tourism and adventure and those companies selling adventures to travellers. The project is led by ETOUR in partnership with the departments of Psychology and Quality Technology and Management at Mid Sweden University. The project aims to develop new methods for destinations, events and other

structures to understand and learn more about their customers, making the customers into a resource for the development work. The project uses GPS technology to trace customers' patterns of movement and chart where they have their best and worst experiences. This provides companies with a picture of strong and weak points in their operations, which in turn can help them remedy problems as well as more clearly exploiting strong aspects of the offering. The method has now been used in a number of sub-projects and, according to the reports, the companies have confirmed that the analysis is useful. Amongst other links, it has been used to develop Åre's marketing as a summer destination and the design of the services which the destination offers. Companies have expressed interest in continuing the partnership. The next step at ETOUR is to further analyse the results based on the research questions and further develop the software, hardware and method before proceeding with new projects.

A parallel process is ongoing regarding how to commercialise the methodology that has been developed. Innovation Bridge has granted funds to the project through Focus Verification. A series of workshops have been held involving contract business developers to help the research group towards a more commercial mindset regarding the service and its design.

Peak Innovation's role in the commercialisation processes has so far been limited. There are future plans to contribute more within the initiative, chiefly in regard to advice and by arranging contacts through the initiative's network. Advice concerning ideas from the research milieu currently takes place chiefly through MIUN Innovation.

As with other interviews, the process management gives the impression that they generally see it as a greater challenge to design service products than technical products associated with the research at Mid Sweden University. This is due to a lack of experience in this area in the advising functions and even greater unfamiliarity with it amongst the researchers.

The research within these three areas is a priority in Mid Sweden University's research strategy which controls the operation. In the main, this has been marked by the appointment of five new professors in recent years. There are a few examples of collaboration between the various areas, but it is not yet clear to what extent there are synergies between them. The process management considers that its assignment and the identified bottleneck involve promoting the utilisation of the research by contributing to better opportunities for commercialisation through newly established enterprises or development of existing industry. There is now also an increasing focus at Mid Sweden University on promoting innovations allied to the research being run within all scientific fields at the University.

Newly established enterprises

According to the majority of interviews, one of Peak Innovation's chief tasks is to promote utilisation of the research being conducted at Mid Sweden University. This may be in the form of new start-up companies or through the development of existing companies' operations. For Peak Innovation, part of promoting innovation processes

has been to contribute in various ways to the development of infrastructure for such ends. Peak Innovation Lab has already been mentioned, as has Peak Innovation's participation in the planning of the new science Park, MSSP. There are ongoing discussions on how this should be developed and whether it might prospectively become a physical milieu. In this context, it is important to identify the desired function of the operation and then design it on this basis. The development of a well-functioning operation can be aided by first determining what drivers and bottlenecks the function should address and then gathering information and using experiences from examples in other parts of the country on how to run this type of function.

There are also examples of other players in the system contributing to improving the prospects for successful innovation processes in the region. Between 2008-2013, Mid Sweden University is running an EU-funded project, MIUN Innovation. This is helping develop the efforts to promote innovations and is now co-located with Peak Innovation. Strategic documents as well as this type of initiative show that Mid Sweden University is prioritising collaboration with industry and using research competence in innovation processes.

At the Swedish Winter Sports Research Centre, discussions have been commenced regarding the setting up of some form of company among the employees so as to better utilise ideas coming from the R&D currently being conducted at the Department of Health Sciences and Department of Engineering and Sustainable Development. Peak Innovation's business advisor is involved in these discussions. There is also the opportunity to learn from the experiences of others in similar establishments, e.g. Woodheads (forest biotechnology). However, there are also interesting examples at Lund University and KTH.

In addition to the results generated in the research milieus, Peak Innovation has earmarked resources for funding pilot studies of and advice for business ideas through the activities entitled "Open Door". These ideas may come from academia as well as existing industry. A programme board consisting chiefly of industrial representatives from areas other than Peak Innovation's focus area is giving advice prior to a decision on involvement and funding to develop the business ideas which come in. This business development function uses internal experience from a number of commercialisation processes as well as its network within and beyond the functional region. Those who approach this function also receive advice on how to progress with identifying other sources of funding through Peak Innovation's Development Funding function. External development funding is also arranged via Soft Financing AB, which was started on the initiative of Peak Innovation (for more information, see under the heading "Applications for Further Funding"). Within the Open Door advising function, existing business development milieus are also used such as the incubator where help with novelty searches and advice in regard to patent and market surveys can also be obtained. The framework of the operation accommodates just over 40 business ideas at different stages of evaluation ahead of possible business development. These projects relate to such things as the commercialisation of prototype sport and leisure products that have

been developed within the laboratory milieus and prototype workshops of the focus area. Other examples include advising on the development of service innovations linked to test milieus for sportspeople and development of business models to commercialise the methodology for analysing experiences within the hospitality industry. Innovation Bridge in the northern region is contributing funding to this.

It is vital in this context to emphasise the importance of clear criteria and transparency when selecting projects to proceed with and that a number of people with relevant competence should be associated with project evaluation. Also, the advising function itself should include opportunities to bring in more people via other players or in networks. This is to bring in varied competence and reduce vulnerability in the operation. It is possible that the process within the Open Door activity needs development in regard to these aspects. A programme board is currently linked to the Open Door advising function and assists in selecting the projects which Peak Innovation will proceed with.

Development of existing industry

In cooperation between the research milieus and companies within the initiative's focus area, a number of projects have been implemented using Master's students or through degree projects. The contributing companies include Haglöfs, Klättermusen, Hilleberg, Halti, Head, Primus, Skiselector and Everest/Stadium. Several prototypes have been developed, some of which are now being considered for commercialisation. There is also interest from companies in having researchers examine their products to verify such things as the products' performance, uniqueness and quality.

A further example of ongoing development is a project in which GIS/GPS systems linked to monitoring systems can lead to improved efficiency of snow production and preparation of ski slopes and cross country ski trails. This application has resulted in more openings, including system developers and has aided export operations with applications in the skiing sector.

Åre Kaizen Group, a network of nine consultants, has been formed in order to design "lean services", i.e. building client adaptation into companies' production and service processes for the hospitality industry. Peak Innovation has taken the initiative for the network, contributed a small amount of funding (SEK 110,000) and brought together the parties in the network.

Another project aims to adapt companies' operations to market demand for environmentally and ethically sustainable products and services. Companies with comprehensive production flows often use such things as PDM systems (Product Data Management) to keep track of products, components and suppliers and manage information about a project during development, manufacture and usage. The project is based upon the development of a method primarily for aiding small enterprises in managing changeable information. This may relate to certifications, laws, rules and knowledge of ethical and environmental aspects etc. Such considerations must continuously be brought into the design of products and used for a life-cycle perspective

on them. A number of companies are now collaborating under the leadership of Coresource AB to develop software and allied servicing and maintenance functions adapted to SMEs within tourism, sports and leisure. The software will be available free whilst servicing and maintenance are planned as the commercial products. Peak Innovation has contributed pilot study funds of around SEK 120,000 and the County Administrative Board is also contributing to this.

Peak Innovation is also collaborating with the Vehicle Technology Center on the development of an electric scooter. A pilot study has been completed in cooperation with Volvo and co-financed by Peak Innovation with SEK 50,000.

In the “Mountain Power” project, work is under way to review the operations of companies in Åre from an environmental perspective and identify opportunities for increased sustainability and lower environmental impact in these operations. Under this banner, Peak Innovation has contributed a project manager and funding for the activity which will result in an environmental strategy.

Activities for individual learning, monitoring and evaluation

A plan for interactive research has been produced in conjunction with the Dahmén Institute and VINNOVA and suppliers have been engaged. There has been an exchange of experiences with Norrköping Science Park which is running similar processes. Work is currently under way to design a zero-point analysis, indicators and a needs inventory for researchers and business developers, using a questionnaire to companies and researchers. Amongst other things these will make it possible to gather soft indicators illustrating whether the initiative’s operation is contributing to new patterns of collaboration and working methods, as well as experiences from the operation. In order to monitor the projects, each function in the initiative reports on how the activities are progressing and any discrepancies.

Regional meeting arenas

Peak Innovation held a major meeting of some 120 people from industry, public administration, Mid Sweden University and sport and hosted by the county governor. Peak Innovation has instituted a regional innovation prize, the Peak Innovation Award, which is awarded at an event known as the Golden Gala. The prize goes to a business developer and/or researcher who has made a considerable contribution to “the region of Åre, Krokoms and Östersund by 2016 becoming one of the leading European milieus for business development and research within tourism, sport and leisure”.

Communication and marketing

Part of the mobilisation is brand-building and marketing of the project. During the year therefore, the project’s name has been changed to Peak Innovation, the website www.peakinnovation.se has been updated and a new graphic profile produced. During the year, the process management has held many presentations of the project for partners regionally and nationally. A good many presentations have also been held for individuals and various groupings, led by project managers from the different parts of the initiative.

The research milieus have selected a few exhibitions and conferences as important to participate in and through which the Peak Innovation operation can be marketed. The Swedish Winter Sports Research Centre has had study visits from representatives of industry, politics and sport. The emphasis is now on increasing the involvement of participating municipalities and raising the profile of the initiative's offering to its customers – business developers and researchers. A communicator has been linked to the initiative. The process management wants to focus on marketing the results it achieves and, to a lesser extent, the objectives of the operation. In the view of the House of Brands, Peak Innovation considers that it is chiefly the brands of contributing companies, research milieus, destinations and events which should be positioned and not the Peak Innovation brand.

Competence supply

As already mentioned, Peak Innovation identified the need for training courses aimed at business and product development within winter sports, tourism and leisure. Mid Sweden University has developed courses in Åre which are reported to be popular. A course has also been developed relating to export with Peak Innovation as initiator and actively involved in the design, including identifying lecturers. This is also a commissioned course at Mid Sweden University, particularly suited to companies within leisure products.

Integration of gender perspective

The project does not currently have a dedicated resource in gender competence but has participated in VINNOVA's training in this area. The process management considers that an unequal gender distribution may entail foregoing a deal – a price no-one is prepared to pay. The process management has the impression that an increasing number of women are taking managerial positions, starting companies and forming networks in order to develop. One of Peak Innovation's duties is to stimulate and verify this development. The process management intends to continuously ensure that gender, sustainability and diversity issues permeate the operation. The gender distribution is measured in the initiative's various groupings and the distribution in the controlling groupings is relatively even.

Internationalisation

The initiative is planning to develop an internationalisation strategy. Such a process may help the initiative become more proactive than reactive in terms of international networks and develop a better thought-out attitude and possible operational activities. For example, it is important to be well aware of the position of the relevant initiative and players in an international comparison. Such knowledge can aid a better decision-making basis before choosing activities. The research milieu representatives and process management feel that they have a relatively good idea of which the leading international milieus are within Peak Innovation's focus area. Amongst other activities named by the process management are study visits, contact trips, participation in exhibitions, promotion of R&D applications and projects and activities to promote investment and establishment in the region as well as companies' prospects of increasing their exports.

Aside from the work of the initiative, a cooperative agreement was signed with the University of Salzburg during the autumn of 2008. The cooperation relates chiefly to the exchange at doctoral student and postdoc level plus efforts to facilitate its work in regard to such things as housing. During the spring of 2009, the Swedish Winter Sports Research Centre had a guest lecturer in “Motion Analysis Aided by GPS” from Ljubljana University. This guest lecturer has contributed competence relating to equipment and strategic routes in the area, linked to the initiative’s operation in Åre, Realtestarena Åre.

Funding

During the year, the project has been granted EU funding through the Swedish Agency for Economic and Regional Growth which gives additional funding of SEK 13,885,000 for the first three years of activity. This gives total cash funding for the first three years of SEK 39,299,000. The process management has participated in a training course arranged by the Swedish Agency for Economic and Regional Growth and has lectured at an inspirational and experiential conference relating to EU projects.

Peak Innovation took the initiative to start the company Soft Financing AB. This took place when a lack of funding for long-term development efforts in the region’s companies and major sections of the national hospitality industry was identified as a bottleneck. The company is envisaged as a national knowledge and consultancy company aimed at attracting public development capital on a commercial basis. The company will offer advice and information to companies, researchers and public players. It will support early-stage, long-term development projects in identifying and applying for national and international public development capital and project funds. The company is cooperating with Peak Innovation’s Open Door operation.

Printed Electronics Arena

Printed Electronics Arena aims to create sustainable, long-term growth in the region around Norrköping by commercialising and exploiting the research and development which has been run since 1998 at Linköping University (LiU) and the Acreo industrial research institute, within the focus area of printed electronics.

The applications anticipated to be developed first include printed electronics on labels and packaging as well as solutions for guaranteeing the origin of products. The current level of development is one of different stages for the component parts required to deliver a complete, working system of printed electronics. The products which have so far come onto the market are a combination of components which can be printed and other components. For this reason, it remains unclear what applications of printed electronics will be developed and penetrate the market.

Organisation, working method and orientation

Partners and co-financiers in the initiative are: Norrköping Municipality, Katrineholm Municipality, Linköping University (LiU), Norrköping Science Park and Acreo AB. Because of the initiative’s focus, the process management felt that the board should

comprise representatives of top management from the funding organisations involved. This is a process which has been ongoing since the initiative commenced operations and before it became a VINNVÄXT initiative. The board's work is expected to yield a deeper knowledge of the nature and potential of printed electronics and that this information can then be disseminated to those organisations represented by the board members. The board has one industrial representative from Holmen AB, a company which may be a possible future buyer of the technology.

Printed Electronics Arena is led by a process manager in conjunction with an operational working group consisting, amongst others, of those responsible for sub-projects. Norrköping Science Park has administrative responsibility for the initiative.

The 11 companies involved in the corporate network pay a membership fee of SEK 10,000. These companies include: Billerud Skärblacka, Fiskeby Board, Holmen Paper, Printcom, SCA Packaging Sweden AB, Freudenberg Household Products, Cloetta and the newspaper Östgöta Correspondenten. Their membership fee buys them continuous information on what is happening within the area of printed electronics plus offers of workshops focusing on needs within their operations. At these workshops, product ideas are identified which may lead to joint projects.

The initiative intends designing a strategy document during 2010 which will form the basis of the continued operation.

Regional and national strategic processes

The initiative is building on Acreo and LiU's existing international networks. Printed Electronics Arena has taken the initiative to become a national coordinating organisation for a network within research and development that meets once a year. In addition to Acreo and LiU (the Department of Science and Technology (ITN)) the network also consists of other research groups at LiU plus: iPack, a VINNOVA VINN Excellence Centre at KTH; sensor research at Mid Sweden University in Sundsvall; the Faculty of Engineering LTH; Karlstad University and Chalmers. The researcher network has led to increased collaboration rather than competition within the focus area and items under discussion include joint EU FP7 projects. For example, applications from collaborating groups originating in the network have been submitted to VINNOVA.

The researcher network aims to get alongside the Ministry of Enterprise, Energy and Communications in order to raise the importance of the area and show its international position and potential. There are hopes of bringing about a major national investment in research and development within the focus area.

Impact of the initiative on the regional innovation system

Several players in RIS have determined that printed electronics is a priority growth area for the region. Amongst other things, during the previous financial year Norrköping Science Park decided to invest in a small number of priority focus areas of which printed electronics was one. Östsam Regional Development Council has written the

growth area of printed electronics into its action plan and contributed to papers regarding this technological area in its supporting documentation for the Structural Funds programme for East Central Sweden. This is regarded by the process management as an indication that the area is a priority on the political level even though it has not yet led to new investment, other than the funds already invested in the initiative. The process management also considers it a step in the right direction to have the regional public players on board prior to any future Structural Funds application.

Needs-driven research

In the interviews, researchers and the process management state that the research being conducted in the region is relatively unique within its niche. This niche is R&D within printed electronics on paper combined with the infrastructure for prototype development and testing provided by Printed Electronics Arena Manufacturing. According to the interviews, most other the research milieus have other niches and competence and few have access to this type of infrastructure. There are plans to further supplement the existing equipment at Printed Electronics Arena Manufacturing with such things as conductive inkjet technology, as currently used in a similar research milieu in Cambridge.

Printed Electronics Arena does not fund projects that involve extensive research. The initiative funds R&D projects to create opportunities for commercialisable products within the areas and sectors identified as most interesting by the region's industry. The starting point for projects is to rapidly bring products to market thus creating prospects for growth in the region as per the action plan. However, Acreo and LiU indicate that within the framework of their operation, some 15 scientific articles have been published during the financial year, a number of which were in scientific journals with a high citation rate.

Examples of R&D projects co-financed by the initiatives are: interactive packaging for increased product information; matrix-addressed and printed displays for periodicals, newspapers and labels; moisture and dilatation sensors for monitoring the environment in buildings and prefabricated structures; and bio-electronic systems on paper for single-use analysis in the early detection of epidemics and for health monitoring. The initiative has not yet developed any clear process for identifying projects. For VINNOVA, it is important to have clear criteria and processes for the identification and selection of project proposals in order to guarantee quality and transparency in the selection processes.

Acreo, LiU and partner companies are operating a research project in printed electronics known as Centerprise. This has received funding under another VINNOVA programme. Of the overall SEK 41 million budget, VINNOVA's co-financing comprises SEK 13 million, industry is investing SEK 15 million and Acreo and LiU are jointly investing SEK 30 million for three years up to and including 2009. The purpose of the project is to further develop the technology and build a long-term partnership with industry. The project includes safeguarding intellectual property rights to the results, where appropriate, through patenting using the patenting strategy established at Acreo.

Acree is investing in technological development to facilitate the integration of different working printed electronic components and in the development of hybrids which use printed electronics in conjunction with other components.

At LiU in Norrköping, the research within the focus area is being run at ITN by the organic electronics research group. The group comprises seven senior researchers, 12 doctoral students and four technical and administrative staff. The group sees its primary role as basic research at the same time as considering the research to be very much application-focused and with natural links to applications. In their research, they also see the benefit of having the production plant within the initiative. This allows them to test research ideas and produce larger volumes than at the University's laboratory.

Relevant research areas being conducted within printed electronics by the LiU group include low operating voltage printed transistors and printed sensors. Research is also being conducted into areas other than printed electronics (such as bioelectronics); this is partly funded by SSF (the Swedish Foundation for Strategic Research) and run in partnership with Karolinska Institutet (KI). Funding for the research group comes primarily from VINNOVA, SSF and the Swedish Research Council and also to a lesser extent from the EU's Framework Programme. The research profile within printed electronics is aimed at components based on utilisation of electrolytes and ion transport. A perceived advantage of this focus in relation to others is its greater printability, as the requirement for thinness of layers and quantity of material is less. Whilst the technology is not as fast as conventional electronics, it uses lower operating voltages.

In addition to the benefits of the production plant, researchers at Acree and LiU emphasise the importance of the increased visibility that the initiative is bringing to the focus area, plus its contribution to coordinating the research network and developing contacts with regional industry. According to the interviews, the initiative's operation combined with those of LiU and Acree is helping market a prominent milieu within the focus area internationally.

Newly established enterprises

The region is home to Norrköping Science Park which is run in partnership between Linköping University (LiU), Norrköping Municipality and industry. Norrköping Science Park contributes advice on commercialisation and business development and there is also an incubator, called LEAD. As already mentioned, Acree has a strategy and process for dealing with intellectual property rights which the research groups at LiU in collaboration with Acree are using. Acree and LiU have recorded around 25 reports to Acree of possible discoveries and some 15 patent applications have been submitted since 2000. The initiative has no direct role in these processes, but the ideas may have been tested in the production plant.

According to the process management, there has been a spin-off in the form of the company Inorel AB which operates within the area of printed sensors. The company is developing a temperature sensor, with an envisaged initial application in measuring when concrete has hardened; something which will lead to time savings in the

construction industry. A doctoral student from LiU started the company after winning the Venture Cup competition two years ago. In the process of developing the company, the initiative has contributed some assistance in developing the business plan, arranged contacts and provided a discounted lease on the production plant. Norrköping Science Park has also contributed to the process and the company has received SEK 300,000 from VINNOVA's and the Swedish Energy Agency's VINN NU programme.

Development of existing industry

As already mentioned, it remains unclear which products within printed electronics will penetrate the market first. According to the process management, the initiative's contribution to the development is being able to mediate contacts between those developing the technology and possible buyers of it who lack competence in printed electronics. These contacts are mediated through the initiative's network of member companies as well as the seminars and workshops it hosts. Because it can hold workshops at the production plant and produce display prototypes, it is possible to show what the technology has to offer. Potential customers' knowledge is thus enhanced, which leads to discussions regarding projects based on companies' needs. Those developing the technology also increase their knowledge of buyers' needs.

The printed electronics applications considered closest to being commercialised are packaging and labelling products. This includes attention-grabbing effects on packaging, signs, illustrations and product stands plus indicators in the form of iconic displays. Thus, the initiative is trying to get printing works and packaging manufacturers to start producing electronics. This requires competence in electrical displays, circuitry and control units as well as designing and shaping such elements. Companies are interested in the opportunities because they see the technology as a way of offering their customers something new and useful. In the initial stages, meetings with companies have concentrated on those using paper in their products, such as packaging or paper products for holding and displaying products in shops. The process management feels it should visibly give all companies the same information and workshop offerings relating to technology and design, as several of the member companies are competitors.

Since the technical risk is still great, the process management emphasises the importance of being instructional and realistic about the prospects of the technology when meeting companies. The production plant Printed Electronics Arena Manufacturing (PEA-M) is considered a basic requirement for running adequate activities directed at companies and in which the technology can be properly shown off.

At the production plant, the initiative supplies equipment, premises and personnel to train those using the equipment. However, projects must have their own funding and pay rent to PEA-M for using this resource. Of the four or five people staffing the plant, the part-timers are funded by the initiative and the rest from other sources, such as the VINNOVA-funded research project Centerprise.

There is currently capacity for more assignments. The process management group decides which projects will use the plant, but has not so far turned any down. It wants to focus on a small number of projects with realistic expectations which it feels have the lowest technical risk. The process management also wants to develop a clearer selection process as it may need to prioritise between projects in the future. There is a special selection process for R&D projects in which Printed Electronic Arena itself is involved with staffing and co-financing. Proposals are identified through the networks of the various players within PEA. The selection process is based on criteria such as market potential, product complexity, production lead time and the participation of a company to push the development towards particular specifications.

One example of such a project is the ongoing partnership between Printed Electronics Arena and SCA Packaging Sweden AB which turns over some SEK 120 million within the area of product advertising and cardboard display stands. The company was aware of the technology and considered it interesting but not mature. For the last six months, there has been cooperation on the development of a prototype for one of the company's clients, Cloetta. Following an introductory meeting, there was a workshop in which researchers, company representatives (graphic artists and designers plus salespeople) and engineers at the production plant met each other. The project has yielded experience, but has been hit by delays in relation to the envisaged timetable. The company has gained an insight into the possibilities and limitations of the technology and is still interested in the partnership. According to the project plan, the prototype that is developed will be sent to a partner in Karlstad (Packaging Media Lab) for evaluation of whether the technology helps raise awareness of the goods on the product stand. This is done by analysing study subjects' eye movements. The company hopes to gain an advantage in use of the technology through early involvement in its development. Once the technology is operational, its impact is expected to be major. Even so, other technologies are being looked into and if the partnership does not lead to products there is a risk that the focus on studying technological development in this area may be put aside for some time to come. The company already has ideas about possible new projects for its customers in order to achieve positive results. One theme is to increase the added value of the company's products. As the company envisages the development, it will produce and license the technology itself. However, the partnership has not yet begun to consider models for the financial arrangements.

Through Erfapack (a network of companies in the packaging area within the region), the initiative has commenced a pilot project in conjunction with The Packaging Arena initiative in Karlstad. Its aim is to increase cooperation on the development of intelligent packaging. Work has been underway during 2009 and VINNOVA and Nutek are supplying funding of SEK 250,000 each. Amongst other things, the project has led to increased cooperation between the packaging industry and printing works and a separate report on the project will be submitted to the financiers.

The regional public players are focusing on the fact that the initiative should contribute to regional growth and involve companies in the entire Östsam region. For VINNOVA,

it is important that the cooperation and use of resources is based on assessments of what yields the best growth in the region and not on achieving as broad an involvement as possible based on considerations of regional distribution.

The division of roles between Printed Electronics Arena and Acreo is such that Printed Electronics Arena is responsible for the regional perspective and seeking out companies in the region which are considered relevant, whilst Acreo operates nationally and internationally. In practice, there is some overlap regarding functions and people and they cover for each other on such things as trips and visits within the two organisations.

Activities for individual learning, monitoring and evaluation

Researchers at LiU have documented the initiative's history. The activities being monitored with indicators include the number of seminars, number of workshops and number of lectures both within the region and outside it. There are also plans to use questionnaires to monitor companies' views on the participation in the initiative's projects and workshops. Supporting data about industry and its development will also be produced within relevant operational branches. The agreed communication plan will also be monitored.

Regional meeting arenas

Norrköping Science Park arranges gatherings such as breakfasts and lunches where regional players meet, whilst Printed Electronics Arena arranges brief meetings on various topics. However, the initiative cannot keep arranging meetings for companies to discuss the potential of a technology which has not yet been applied. For this reason, the initiative arranges meetings on other topics so as to maintain interest in the network.

Communication and marketing

The desired message to put across regionally, nationally and internationally is that printed electronics are capable of aiding the competitiveness and profitability of industry; that the research within the focus area in the region has a prominent position; and that the development within printed electronics has the potential to contribute to sustainable growth and jobs.

Acreo has conducted sales and marketing activities nationally and has met a number of potential producers and users of printed electronics elsewhere in Europe, the US and Asia. The sales activities are needs-driven and most often come about when a company contacts Acreo in connection with conferences and trade fairs to gain an understanding of how printed electronics can be used in that particular company's products. These activities, in conjunction with the ones which Printed Electronics Arena has run regionally, have contributed to increase demand for cooperation and the initiation of a number of projects within Printed Electronics Arena Manufacturing.

The brand of Printed Electronics Arena is used regionally, whilst the previously strong brands of Acreo and LiU continue to communicate the competence within printed electronics nationally and internationally. Thus, the process management considers that the three organisations provide added value for, reference and market each other.

Competence supply

During the year, Norrköping Science Park has held activities relating to information about entrepreneurship and commercialisation processes aimed at undergraduates and doctoral students. For example, a meeting was held with doctoral students in the milieu relating to organic electronics at LiU.

Integration of gender perspective

Training and research within the focus area has traditionally been male-dominated. The proportion of women is greater within areas that include competence in chemistry, biotechnology or design. Representatives of the initiative find it difficult to identify what role they can take in affecting this. There is often a lack of female applicants within certain competence areas necessary in printed electronics. A policy is to be worked out within Printed Electronics Arena for a gender-neutral salary structure. This work will be based on the objectives that employees should be able to combine work, study and family life; that experiences from both women and men are utilised; that there will be no discrimination; and that the initiative will work towards recruitment of female personnel, for example by favouring female applicants if the qualifications are otherwise equivalent. The process management also states the importance of the diversity perspective (which includes the gender perspective). A further aspect planned for integration into the operation is how the products will be designed from a target group perspective, which also includes gender.

The equality work which has been ongoing for quite some time at the VINNVÄXT initiative, Fiber Optic Valley (and in which Acreo in Hudiksvall is an important player) has penetrated throughout Acreo and amongst other things, there have been leadership training courses and seminars. In the next two years, Acreo will take part in a Gender Leadership training programme for middle management.

Internationalisation

Internationally, major efforts are being made in the focus area and, according to the process management's assessment, these efforts are significantly greater than those in Sweden. The efforts in Finland, Germany, Great Britain and South Korea received particular emphasis in the interviews. Despite this, there is still the view that the initiative has a prominent position within its sub-area of printed electronics and that this is strengthened by the infrastructure represented by the production plant. Acreo is collaborating with companies in the US and in that context the view was expressed that it is important for the technology to penetrate commercially, regardless of where it takes place, as this would benefit the development of the area globally. In the interviews, examples were also given of companies in countries like Great Britain and Japan with which researchers from Norrköping were collaborating on product development.

The EU has held an FP7 call comprising EUR 63 million for 2008- 2012 in Organic and Large Area Electronics. Acreo and LiU are participating in a number of EU projects. Acreo, LiU and Printed Electronics Arena are contributing to international conferences and exhibitions. Acreo and Printed Electronics Arena are participating in Organic

Electronic Association (OEA), an organisation started in Germany but which now has a presence in Europe, the US and Asia and consists of companies and research organisations. OEA arranges seminars, corporate visits, demonstration prototype activities and exhibitions. During the year, Acreo has participated in seminars, produced demonstration prototypes, held lectures and presentations and had an exhibition stand under the banner of OEA's operation. According to the process management, OEA has emphasised the importance of production centres in advancing the development and PEA in conjunction with OEA has arranged a members' conference in Norrköping which also involved a visit to the initiative's plant.

During the last two years, Acreo and LiU have hosted a guest researcher from a Japanese company for a couple of weeks each month. The initiative has helped solve such issues as accommodation in order to facilitate the move. This now concluded project has resulted in the Japanese company planning to allow the guest researcher submit their PhD at LiU. It is also considering starting a company in Norrköping, with the ultimate aim of the company's planned European research centre being located in Sweden and Norrköping.

Printed Electronics Arena is also participating in ISA's project, Packaging and Fibers Sweden. ISA has been an important partner in relation to the Japanese cooperation and the plans for a delegation trip to South Korea in which Acreo and representatives of the initiative will join a conference and visit research milieus.

The sales and marketing activities conducted internationally chiefly by Acreo have involved contacts with companies in Europe, the US and Asia and have led to a number of smaller development projects using the production plant. During the year, Acreo has also licensed its technology for printed displays to Soligie, a printed electronics product development company in the US. Soligie intends to use Acreo's display technology in different types of printed electronics products for various market segments such as consumer products.

Funding

The initiative has hired a consultant to write a Structural Funds application. This application will include infrastructure investments and collaboration with design competence. The idea is to enhance the infrastructure at the production plant and increase its staffing levels. No Structural Funds money has previously been sought for the initiative's operation.

There are a number of applications which (it is claimed) would not have come about had PEA not existed. According to the process management, the close collaboration between the players in the region brought about by the initiatives operation has contributed to the application for research funds from the government's investment in strategic research areas. LiU was granted funds within the materials area which to some extent will be used for research regarding printed electronics.

Smart Textiles

With its textile centre in Sjuhärad, Smart Textiles aims to allow western Sweden to go on developing and establishing an internationally leading position within the design, development and production of next-generation textile products. The operation is run in collaboration between corporate-run development projects and experimental research at institutes and universities. The milieu comprises infrastructure for prototype development and testing.

Organisation, working method and orientation

During the period, the operation in the initiative has been structured and started being built up. An organisational plan has been produced to clarify how the work is structured. The operational work is primarily taken care of within the two operational areas of Experimental R&D Projects and Corporate R&D Projects. Each of these operational areas are divided into two sub-areas: Technology Lab and Design Lab on the one hand and Prototype Factory and Business Innovation on the other.

Technology Lab has a management group comprising representatives from the participating research institutes and the University of Borås. Design Lab is led by an operational manager and run at the Interactive Institute and Chalmers. Prototype Factory is currently run from the Swedish School of Textiles whilst Business Innovation is led by the Swedish School of Textiles and ESPIRA Growth Centre in Sjuhärad. A working group has been formed within Business Innovation with the task of examining submitted project proposals and helping produce project plans as a basis for funding decisions. The working group is mandated to take funding decisions up to SEK 500,000 per project and comprises representatives from the Swedish School of Textiles at the University of Borås, ESPIRA and Swerea IVF. Decisions on larger projects are taken by the process management.

During 2010, two advisory bodies were started for Smart Textiles; Advisory Board and Smart Textiles Group. Advisory Board operates in an advisory and network building capacity within scientific areas. Smart Textiles Group will comprise industrial representatives and serve as an advisory body from an industrial standpoint.

The operational activity is supported by an office function which contributes to such things as coordinating the operation, communication, help with applications and arranging seminars. Another task has been to develop procedures regarding sustainable development and gender issues.

The process management is the operational decision-making and driving function and comprises 12 people, including the project managers of the four above-mentioned operational areas, the process leader and the project coordinator for the initiative. Also on the process management alongside the appointed interactive researcher are representatives of public bodies, institutes and companies. During the financial year, the process management has met once a month.

The main partners in the initiative are the University of Borås, Sveriges Textil & Modeföretag (TEKO), SP Technical Research Institute of Sweden, Region Västra Götaland, Sjuhärad Association of Local Authorities, Swerea IVF AB, ESPIRA Growth Centre in Sjuhärad and the Interactive Institute.

The management group comprises representatives of all partners. Five corporate representatives also participate in the management group. The management group's task relates chiefly to the long-term strategic work of the initiative. The initiative has commenced recruitment of a part-time administrative manager for the initiative's operation at the project office.

An additional person is being recruited to strengthen the area of company-based R&D projects and Prototype Factory. A strategy documents for increased clarity in regard to the management group's task is currently being developed.

The interviews give the impression of major commitment to Smart Textiles. Politicians and officials from Sjuhärad Association of Local Authorities are marketing the initiative in their contacts with companies in the municipalities of Sjuhärad, whilst Region Västra Götaland regards Smart Textiles as a profile and growth area for the region.

Smart Textiles' operation and organisation is still under construction. Leading players such as institutes and universities have comprehensive operations within the area. The process management has identified a future challenge in developing the synergies and cooperation between the four operational areas which are also at differing stages of development. Other challenges relate to the development of cooperation between the players in the initiative. Moreover, the attention focused on the initiative has created expectations of what it may deliver that will have to be managed. To some extent, these expectations are considered too great and too difficult to realise in respect of the current capacity and direction of the initiative. This is particularly the case regarding companies' expectations of quick results.

Regional and national strategic processes

Smart Textiles is well established with the players in the initiative in regard to the research focus on the technical platforms, Conductive Textiles and Dynamic Fibres. At the same time, the research focus is providing opportunities for applications in widely diverse areas, which are undefined. Discussions are now beginning about a focus relating to application areas for conductive and dynamic textiles, although there is no wish to close the door to other applications. Amongst the application areas under consideration are Medical Technology and Personal Protective Equipment. Another strategic discussion is covering increased investment in operations aimed at companies. Elements of the process management have also contributed to a regional consultative work in view of the financial crisis.

During the period, one of the greatest challenges has been to develop an organisation and working method in order to work strategically and efficiently both externally and internally. The four operations defined in the new organisational plan have individual

management groups and action plans. A strategy document is in the process of being produced for increased clarity as to the executive group's assignment. It is apparent from the interviews that integration of the four operational areas needs to be improved and that a clearer incentive is needed for such integration (see also under the heading "Needs-driven research").

Following a strategic decision, Smart Textiles is participating in an ERANET project (CrossTexNet)²⁰ in partnership with the financiers Region Västra Götaland and VINNOVA. Under the auspices of this work the initiative, in conjunction with other textile regions in Europe, is contributing to a European strategy for the area. This may lead to increased R&D resources for the area within the EU's Framework Programme as it is anticipated that CrossTexNet will be able to influence the design of calls for proposals in relevant areas within FP8.

Region Västra Götaland and Sjuhärad Association of Local Authorities have granted funds to ESPIRA to carry out 300 growth analyses with companies in Sjuhärad during 2009. These analyses are intended to make everyday life simpler and the development needs more discernibly based on the needs of small and medium-sized enterprises. This operation will be coordinated with Smart Textiles' planned operation to seek out textile companies for discussion on needs, possible projects and what Smart Textiles has to offer companies.

Impact of the initiative on the regional innovation system

All parties in the initiative have chosen to continue their participation in and co-financing of Smart Textiles despite the ongoing financial crisis. The operation within Smart Textiles has involved a close collaboration and discussion on the activities at institutes and the University of Borås within the textiles area.

ESPIRA Growth Centre and ESPIRA Incubator opened in 2006 (the incubator somewhat earlier) and is intended to contribute to growth and the university-affiliated innovation system in Sjuhärad. It aims to develop industry in Sjuhärad in a partnership between companies in the region and the University of Borås. ESPIRA has premises and conference opportunities and a platform for initiating and running projects in collaboration with players from the University, research institutes and companies. ESPIRA also arranges contacts within its network of financiers and advisers so as to promote commercialisation and corporate development. ESPIRA's and Smart Textiles' operations have developed in parallel, which has led to a discussion on the division of roles between the organisations. This is increasing the prospects of a well-functioning collaboration in the future between complementary operations.

Needs-driven research

Smart Textiles' prominent position and uniqueness in an international comparison are not chiefly because of its leading position within each research niche, but a combination

²⁰ "high value added textiles and fibre-based materials"

of research, infrastructure and companies. Few milieus internationally incorporate research, infrastructure (in the form of laboratory milieus and a prototype workshop) as well as a comprehensive agglomeration of textile companies. The milieu's attractiveness is exemplified by the fact that there were applicants from 25 countries for 15 places on the Swedish School of Textiles' two-year Design Master's programme. Another example is the attention the initiative is receiving in the form of enquiries about visits from other regional initiatives internationally within the textiles area.

During the reporting year, around half the budget has been allocated to research activities, such as total or partial funding of doctoral students, postdocs and senior researchers. The remainder of the budget goes to company-based projects and office functions. According to the process management, the clear priority of funding doctoral students is because the research area is young and as yet small in scope and therefore needs building up. For example, the Swedish School of Textiles has gone from five doctoral students to around 25 in five years and Smart Textiles has directly and indirectly contributed to seven of these doctoral students' research training. Smart Textiles is also co-financing an industrial doctoral student linked to Swerea/IVF.

The research area is interdisciplinary and doctoral students may have undergraduate training in such areas as design, chemistry and electronics – or they may be textile engineers. The doctoral students are supervised within their relevant scientific disciplines, whilst projects are envisaged to involve more doctoral students with different undergraduate backgrounds. There are also plans for a company-initiated project to become part of the research training for doctoral students at the Swedish School of Textiles; this has not yet taken place. At SP, doctoral students are involved in such projects to make up for the otherwise unfunded portions (generally 20%) of their service.

Technology Lab comprises training and research conducted at Swerea/IVF, SP, the University of Borås (Swedish School of Textiles and School of Engineering) and Chalmers aimed at both focus areas of Conductive Textiles and Dynamic Fibres. There are also cooperations with the universities of Umeå, Lund and Linköping. At Design Lab, the operation is run at the Interactive Institute and Chalmers and the working method is based on experimental design activity and end-user needs, with focus area operations contributing to the technical solution. In both these operational areas, Smart Textiles provides 50% funding for a project manager, additional to the doctoral students and project support mentioned above. The company-initiated projects linked to the research focus areas will receive support from the operations within Technology Lab and Design Lab, plus prototype workshops (see also under the heading "Development of existing industry"). Two of the doctoral students co-financed by Smart Textiles are linked to the Design Lab operation. The other two are linked to Technology Lab where they run projects in interactive textile structures for such applications as filtering when testing new particle separation technologies and acoustics using sound-absorbing textiles.

One project started up during 2008 is PPE Competence Centre (relating to Personal Protective Equipment). The ESPIRA project arena co-financed the start of this project in partnership with SP. The objective is to create (primarily within the textiles area) a national competence centre in personal protection in collaboration with institutes, universities and industry. Smart Textiles is assisting in a needs analysis and recruitment of companies by providing time and funding for project management and analysis.

Smart Textiles has continued to take a broader approach but has, as previously mentioned, defined two research focus areas: Conductive Textiles and Dynamic Textiles. Research within conductive textiles relates to such things as melt-spin coating using natural conductive polymers and filled polymers, with the filling serving as the electroconductive element. Methodology and method development are also conducted in order to describe the electroconductive properties of the textiles. The research has looked at the link between electronics and conductive textiles, electroluminescence, functions such as integrated microphone elements, piezoelectric properties of sound sensors and deformation and reception of signals for medical purposes.

The research within dynamic fibres includes the acoustics area in which the sound-absorbing properties of textiles are used to create a better indoor sound climate. The research focuses on materials development, including development of a textile whose structure changes from flat to 3D when subjected to acoustic tests. The research also concentrates on how people perceive the acoustic environment and how this can be measured and evaluated qualitatively and quantitatively. There is also modelling of materials and absorption mechanisms plus method development for describing materials and products qualitatively and quantitatively within room acoustics and sound perception. Another area within dynamic fibres is the application that uses textiles for environmental tolerance purposes, i.e. protecting products and systems against an environment which is aggressive in various ways (climate influences, mechanical stresses such as vibrations etc.) Another application is coating building units with “smart” textiles, for example to make them dirt-repelling.

The results of the research within Smart Textiles’ focus area is published in scientific publications, but the results are also presented at trade fairs, conferences and for design applications at exhibitions.

Within Technology and Design Lab, action plans are currently being developed and strategic work is under way within the management groups that were formed for the operational areas. According to the interviews, there is still little collaboration between these two sections and this needs developing. The same applies to the link with the operation built up in the prototype workshop and the company-initiated R&D projects. In order to develop collaborations and synergies and thereby improve and streamline the operation, there are plans to assemble a joint reference council for Technology and Design Lab. This reference council will be based on key people within the initiative, industry and sectorial and industrial organisations such as SVID (Swedish Industrial Design Foundation).

Newly established enterprises

Textil & Modfabriken is a pre-incubator initially built up by Smart Textiles, the Swedish School of Textiles and ESPIRA and now run in collaboration with ESPIRA. It exists for students who have taken a degree in textiles/fashion design, textile technology, textile economics or textile crafts who want to develop their own product ideas. These students use their own studio or share one with other newly started enterprises and during the reporting year 10 or so projects were underway under the banner of this activity. Business advice mediated via ESPIRA is a part of the process. Smart Textiles also co-finances a Master's student who works with the operation at Textil & Modfabriken.

Smart Textiles has contributed to the start-up of a new company, Initio AB, within the area of sound-absorbing textiles. A textile designer and an engineer founded the company and the first products will be launched on to the market during 2010. The initiative contributed advice and use of machinery at a reduced rate. The company has also received funds from the VINN-NU programme run by VINNOVA and the Swedish Energy Agency.

Development of existing industry

Within the framework of the initiative, the intention is to develop an infrastructure and network to improve the conditions for developing new products. The activities under development of existing industry are gathered under the operational headings of Prototype Factory and Business Innovation. Company-initiated R&D projects are run within both these operational areas and Smart Textiles is providing 50% funding for two project managers. Projects are identified in a number of ways; through corporate visits or inviting companies to seminars, or through the company itself contacting Smart Textiles. An example of industrial involvement in the focus area is TEKOs decision to co-finance two doctoral students within Smart Textiles' research focus areas as well as helping fund projects within the area at Swerea/IVF.

Within Prototype Factory, the vision is to make available to certain companies the infrastructure of the Swedish School of Textiles, SP, Swerea/IVF and prospectively also manufacturing capacity. It will be possible to use the infrastructure for company-initiated R&D projects at cost price. According to the process management, the objective is for the operation to gradually become self-supporting. Within Business Innovation, project proposals will be identified and assessed. Projects will be partly staffed by doctoral students, either as part of their research training or alongside it.

Action plans for the two operational areas within company-based R&D projects are currently in development, whilst some 30 R&D projects are already underway. The action plans are the basis for the production of scorecards which will act as aids in clear communication of the initiative internally and externally. As previously mentioned, different fields of application may be envisaged within the framework of the selected research focus areas within the initiative. A process is also underway in the strategic work to identify thematic areas relating to the applications, although there are no plans to close the door to other proposed applications. For example, application areas within

the health service, personal protection and the automotive industry have been identified as possible focuses. Under the banner of developing the health service application area, there have been discussions with companies within the area and with Sahlgrenska Science Park in Gothenburg and the VINNVÄXT winner, New Tools for Health in Östergötland.

By way of introduction, the operation was marketed to individual companies, but as the initiative has become better known an increasing number of companies are actually seeking out Smart Textiles. Today, a small circle of companies benefit from the initiative and, according to the interviews, there is a wish to increase the number of active companies. Briefing activities will therefore continue regarding Smart Textiles' resources for funding product and service-orientated development projects in partnership with different companies or between companies and researchers at educational establishments and institutes. These resources will be made available to companies which can see opportunities for developing new products or services with clear growth potential and in cooperation with other parties. Typical projects are based on a technological development which, supported by research or other supplementary resources, are deemed ready for market introduction within a year or so. There is a common view within the initiative that the operation should not become a replacement for in-house R&D activity by companies. Companies should therefore pay cost price and be active in running and participating in the project.

The initiative contributes advice so that companies can draw up complete applications and project plans. In future, it is planned that projects will be staffed as required by external consultants as project managers. These will run and monitor the processes between researchers and companies, thus ensuring efficient and results-orientated development work. Engaging external project managers for projects requires reinforcement of the project budgets through such things as the "project arena" at ESPIRA. There are plans to supply some project managers via ESPIRA, which currently buys in consultants for advising and as project managers; these will be required to have relevant competence and experience of projects within Smart Textiles' focus area. As far as possible, the process management also wishes to involve university students, technicians and teaching and research resources in R&D projects.

A material library focusing on Smart textiles is also under construction. The idea is that this will become a national resource. Another project in which ST is contributing part-funding and personnel resources is aimed at the development of a full-scale space habitat in partnership with NASA and Chalmers.

During the spring of 2009, results were reported from 13 completed corporate projects. In their reports, the companies stated that working in the initiative had improved their competence and had been stimulating. Although the results have not yet reached a commercial stage, the knowledge they had gained inspired them to continue working towards bring out products which could ultimately be launched on to the market. Just over 30 projects are currently underway. In the majority of cases, these run for over a year and some 20 companies are or have been involved in R&D projects.

A working group has been established in order to maintain a reliable dialogue with companies wanting to initiate a cooperation with Smart Textiles on R&D projects. Its task is to inspect received project proposals and contribute to the production of project plans as supporting data for decisions on project support. As already mentioned, the working group includes representatives from the Swedish School of Textiles at the University of Borås, ESPIRA and Swerea IVF. Also, SP may ultimately be included. An assessment process has been developed within Business Innovation and the company-run research projects which will be evaluated during the autumn of 2009. The assessment criteria applied relate to: relevance to Smart Textiles' focus areas, R&D distinction, market conditions and environmental aspects. CMF, the *Centre for Environmental-driven Business Development* is involved in the processes for company-driven projects and will be promoting issues relating to environmental awareness.

All project ideas go through a development process in four stages: 1) Assessment of project proposal. 2) Implementation of pilot study. 3) If the results of the pilot study indicate innovative distinction in the technological and product development, an action plan is produced. At this stage, the resources and project organisation required to run the project are assembled. 4) The work is led by a project coordinator in conjunction with a project manager (from the company or a consultant) who determine a schedule, plan activities, secure funding and make agreements between the parties. The parties to the project are united by a project coordinator who runs the project in conjunction with the project manager towards established goals. The project may be linked with other relevant efforts within Smart Textiles. At the conclusion of the process, the results are compiled. During the reporting year, SEK 2,089 million was granted from Smart Textiles for company-based R&D projects.

The number of projects enquiries received is increasing and this is increasing demand for effective management. The process management and working group want to maintain a generous view of the breadth of issues and application areas from companies and are considering how to manage proposals effectively. There again, the initiative is continuing with the two research focus areas. A database is currently being developed containing relevant information about projects which satisfy the reporting requirements of VINNOVA amongst others. A student project is also underway, documenting companies' experiences of participating in R&D projects.

A goal of corporate projects is also to find issues common to several companies. This allows them to participate jointly in projects in collaboration with researchers and consultants. Each company can then develop the results into their own products.

The prototype workshop means it is possible to demonstrate advanced production methods for potential buyers. For example, a full-fashioned chair cover has been produced with heating wires sewn in. The ability to demonstrate a prototype has facilitated the discussion with furniture companies.

The work on the material library mentioned earlier focusing on Smart Textiles is underway and is being co-financed by the initiative. Construction is taking place in

cooperation with the Swedish School of Library and Information Science and IDA at the University of Borås. These bodies have made a joint application for funds to develop a virtual innovation prototype lab. Partnership discussions have also been held with the University of Reutlingen in Germany regarding an experience exchange and possible collaboration on material collection. Technology Lab and the Swedish Textiles have, as already mentioned, designed the textile shell of a full-scale space habitat in partnership with NASA and Chalmers. The habitat went on display at Gothenburg International Science Festival on the Space Dwelling stand and is part of the cooperation between NASA and Chalmers, looking at astronauts' everyday conditions in readiness for flights to Mars. Another ongoing project co-financed by Smart Textiles is the manufacture of material samples to measure photonic bandgap. Tests of finished samples have taken place in collaboration with the Swedish Defence Research Agency (FOI). One project now completed involved production of a prototype "sock shoe". The work was initiated by Smart Textiles Design Lab and the actual prototype was produced in cooperation with SegerEurope AB.

A prototype in the form of a glove with conductive areas for such things as interactive control of games consoles, hand temperature etc. started during 2009. Under the auspices of the prototype workshop, a project partnership with CGM AB is underway for the production of interactive wall textiles for control room environments. Another assignment has dealt with textiles to prevent the growth of algae and moss on house roofs.

Within the operation involving company-based R&D projects, much effort has been expended on planning during the period. This has included developing funding principles for laboratories, workshops and personnel at the Swedish School of Textiles, finding partners with competences in materials engineering, electronics, mechanical engineering, contractual issues etc., as well as investigating forms of collaboration and initiating marketing and communication processes. During 2009, there has been a transition to an active phase in which commissioned projects have begun to get started and the integration with operations in Technology and Design Lab has commenced. However, the physical infrastructure has been in place from the beginning and no new equipment purchases are planned as yet.

Environmental issues are central to the textiles area and a discussion about this is ongoing both at undergraduate and research levels. Environmental issues within the Smart Textiles area related to such things as choice of material, energy consumption in production and application and local production. New applications are being developed from renewable polymer materials in research and industrial development around the world. This applies to such things as electroconductivity, piezoelectricity, dirt repulsion, luminescence and photovoltaics. Renewable polymers may replace metals for which production is toxic, expensive and has major environmental impact. The polymer materials may be recyclable, degradable, biocompatible and have low mass relative to their durability as well as a low cost.

A doctoral project describes research within piezoelectricity, the aim of which is to produce fibres for such uses as generating electricity from a person's movements. Incorporated into clothing, this might replace batteries. Another doctoral project involves replacing metal coatings with electroconductive polymers in order to produce textiles that can conduct electricity. Studies have been conducted in partnership with industry to manufacture the fibres and textiles containing conjugated polymers which provide conductivity.

According to the process management, there is a need to actively include environmental expertise in projects in order to improve the potential of environmental consequence descriptions, risk analyses and life cycle analyses for the product being developed. This is being planned in partnership with CMF at SP.

Activities for individual learning, monitoring and evaluation

An interactive researcher has been attached to Smart Textiles to monitor the initiative's operation and development. This researcher will have continuous involvement in the processes, contribute to a better understanding of impacts and develop tools to monitor and document the results of the operation. There are also plans for the researcher to elucidate links with other development work in the region and draw up proposals for improving the processes. According to the process management, the interactive researcher's contribution will not merely be monitoring and documentation but also actively proposing how the operation can be developed.

Smart Textiles has co-financed a project for students conducting an outside analysis of the sporting apparel market. One of the studies within the framework of the students' Master's theses focused on surveying the design and development of work and leisure clothes in arctic climates and has resulted in a situation report which uses Europe as a starting point. Students from the Textiles Engineering programme have been involved in surveying and analysing R&D projects within Smart Textiles in which companies and academia are cooperating. This study will also be used to develop the operation.

Regional meeting arenas

Smart Textiles is arranging a number of meetings, seminars and workshops for various recipients and players. The initiative has had one or two activities per month of this kind. Amongst those participating in these events are students, researchers, investors, innovation advisors and businesspeople. The aim has been to create a meeting place for discussion and presentation of results which will also stimulate innovations and cooperation. One of the bigger activities arranged was the "Startup Meeting" regarding the next step for Smart Textiles and involving some 65 corporate representatives and researchers. Another annual meeting is the Smart Textiles Network Meeting which involves a large number of companies, researchers and other interested players. Other activities have included fashion shows.

Communication and marketing

Smart Textiles receives enquiries regarding spreading information about the operation and about future textiles and applications. As far as possible, these have been answered

positively and the process management has provided lecturers/speakers to the arrangements. Brochures and information plus a number of films have also been produced. A number of prototypes have also been developed for use in marketing aimed at various target groups, such as the furniture and clothing industries.

Competence supply

According to the process management, the training within the textile area needs to be developed. Part of that development is the Swedish School of Textiles' investment in expanding its research and experimentation milieu plus its interdisciplinary working method with links between textiles, technical research and design. Smart Textiles is contributing a certain amount of doctoral student funding, but is not funding any infrastructure.

TEKO also believes there has been an increase in the number of employees in its member companies which may indicate a higher competence level. Also, the sector has not shrunk since the crisis years of the mid-90s which would indicate a capacity for renewal in the sector.

During the period, some 35 new research, development and study projects have been initiated which are funded by Smart Textiles. These may be: development projects, in which commercialisation processes have been commenced; research projects, in which results are only expected to be reported after 3-8 years; and training projects for undergraduates and Master's students. During the autumn of 2008, planning began for a PPE competence centre. This started up during 2009 and was led by SP, with the aim of creating a national competence centre within personal protection – chiefly within the textiles area and in collaboration with institutes, universities and industry.

Integration of gender perspective

Within Smart Textiles, the research is female-dominated, but the leadership (the executive group and process management) is largely male. The office comprises one man and two women (1.5 posts in total). More women than men apply to the Swedish School of Textiles' Textile Engineering programme. According to the process management, the focus area's direction and interdisciplinary nature leads to more women being attracted to technology and more men being attracted to that technology which will become part of future textile products. This is a positive impact of the collaboration between textiles and technology within the focus area. In Smart Textiles' operation, the process management is striving to achieve a more even distribution of genders in the executive group and in R&D projects. An aim of recruitment is also for the working groups to be interdisciplinary in composition. A discussion of masculinity and femininity is a natural part of R&D projects and the development of applications. During the period, plans have been underway for a Design and Gender project in partnership with the School of Business, Economics and Law at the University of Gothenburg. It is hoped this will start up during the next financial year.

Internationalisation

The textiles cluster in the region is known internationally which has brought many visitors from all over the world. The Smart Textiles brand has spread due amongst other things to presentations of the operation at international seminars. There have been a number of enquiries regarding collaboration on EU and other international projects and these have led to participation in several applications. The research groups contributing to the initiative's operation have a comprehensive international network and have contributed to a number of international exhibitions, conferences and meetings during the financial year. There are research partnerships with such organisations as Tampere University in Finland, North Carolina College of Art and Design and Parsons New School for Design, the Danish Technological Institute, the Asian Institute in Bangkok, Designskolen Kolding in Denmark and Herriot Watt University in Scotland. Textiles and fashion fabrics are evaluated and a programme is being planned within the operation for guest researchers and visiting artists. Smart Textiles is also working proactively to involve the region's players in various international contexts. Smart Textiles is also working closely with ISA and has planned and implemented a number of activities in cooperation with them.

All companies involved in R&D projects are exporters.

Funding

Without the involvement of the initiative, actors within Smart Textiles' focus area have received funds for individual projects from such quarters as the VINNOVA and Innovation Bridge joint programme: FokusVerifiering. Other sources of funding are Nordforsk, SSF, the Knowledge Foundation, the Wallenberg Foundation, Stiftelsen Swedbank Sjuhärad and Marie Curie (for two doctoral students at the School of Engineering, Jönköping University).

From the Structural Funds, the Smart Textiles Pilot project has received funding for nine product development projects which will be implemented in partnership with companies and academia. Also, VINNOVA's VINNVÄXT funding is being used as match funding for Structural Funds money for the construction of a national competence centre for PPE. This will focus on textiles and aim to achieve international penetration as an overall competence centre in the development and certification of PPE products using textiles and textile components.

Several applications to EU projects have been approved. Examples are: "Smartwell" and "Innovation for Baltic Fashion and Design, Baltic Fashion" within the EU Baltic Sea Programme; "Crosstexnet" within ERANET in the EU's Seventh Framework Programme and "safe@sea", "DisRegeneration", "safeproetex", "noterefiga" also within the EU's Seventh Framework Programme. The majority of these projects are run by Swerea IVF and Technology lab.

Appendix D: Quantitative results

VINNVÄXT winners 2003 and 2004

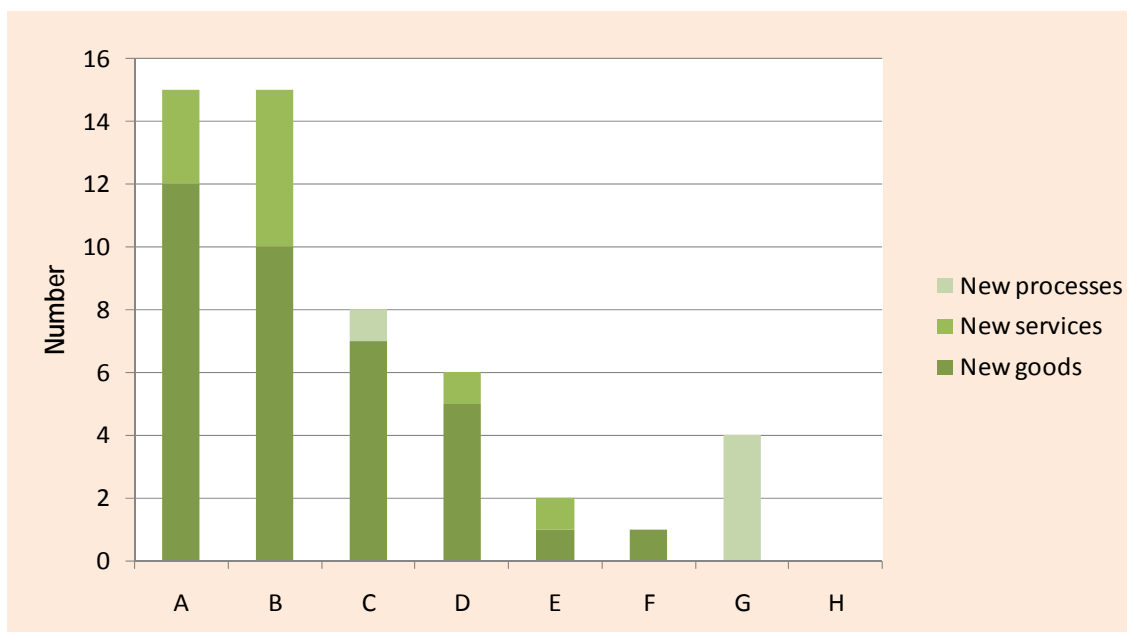
Summary of quantitative results monitoring

The following is a presentation of the quantitative research monitoring carried out on the VINNVÄXT winners for 2003 and 2004. The results presented are the number of goods, services and processes developed during the year; number of companies which contributed resources during the year; number of applications to the EU's Framework Programme; and number of researchers who participated in the initiatives' operations during the year. In those cases where the results are presented distributed by initiatives, the initiatives have been anonymised and the order in which the initiatives are presented varies between the graphs.

New goods, services and processes

During 2008, under the auspices of the first eight VINNVÄXT initiatives, 56 new goods, 10 new services and 60 processes were developed²¹. The number of new goods, services and processes is unevenly distributed between the initiatives. Two initiatives are responsible for a major proportion of these and three are responsible for a small proportion.

Figure 1 Number of goods, services and processes originating with the initiatives' operations, distributed across the eight initiatives

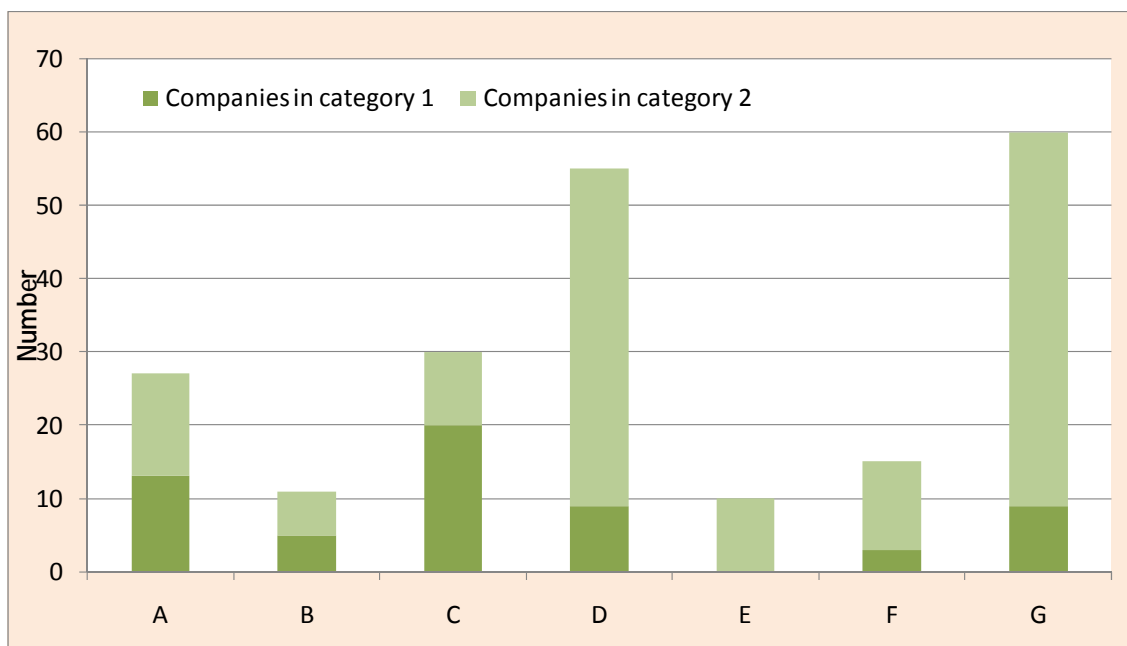


²¹ In this context, "processes means processes for producing goods and services".

Organisations which contributed to the initiatives' projects and activities

Jointly, the initiatives show 59 organisations, primarily companies²², as belonging to their inner core. These companies have pledged to contribute resources in the long term/permanently (companies in category 1). An additional 149 companies have pledged some resources and were actively involved in some of the projects or activities funded by the initiatives (companies in category 2). Figure 2 shows how the number of participating companies varies between different initiatives.

Figure 2 Contributing number of companies, distributed by initiative



Participation in the EU's Framework Programme

Figure 3 shows the number of rejected and approved research applications to the EU's Framework Programme. During 2008, the initiatives jointly contributed to the submission of 22 applications to the EU's Framework Programme. A total of 11 applications were approved. All three projects in which Sweden applied as a coordinator were approved.

²² Only those organisations which develop processes, goods and services within the focus area have been included. This mainly concerns companies, but individual organisations are included, such as institutes. On the other hand, educational establishments are not included. Examples of organisations excluded are incorporated municipal trade and industry offices.

Figure 3 Research applications to the EU's Framework Programme

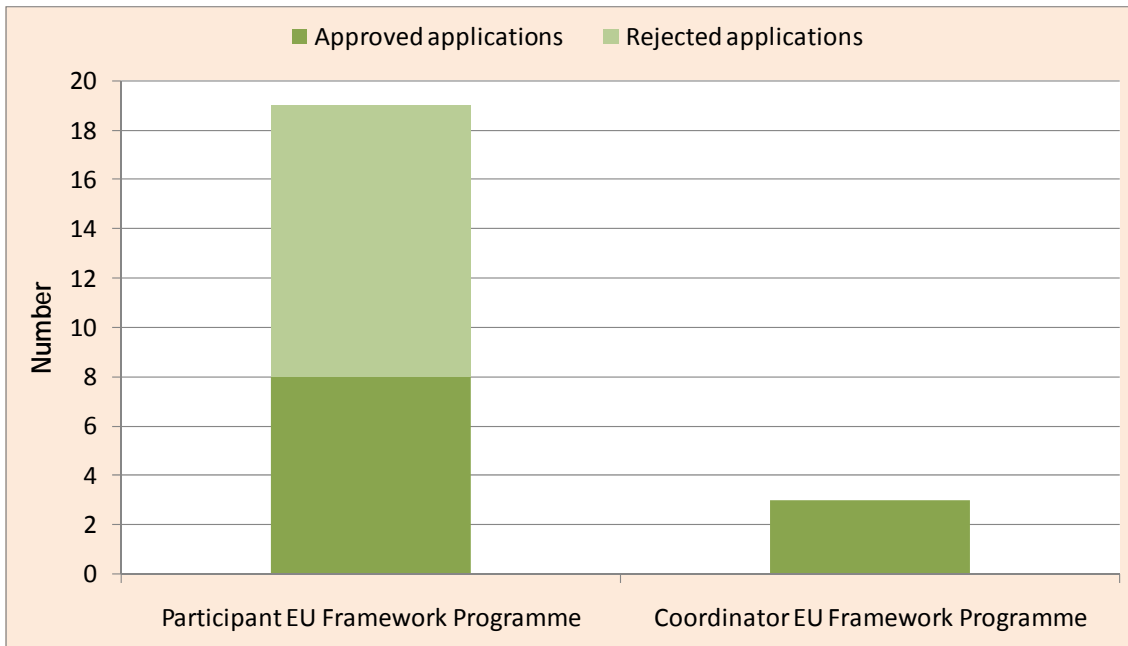
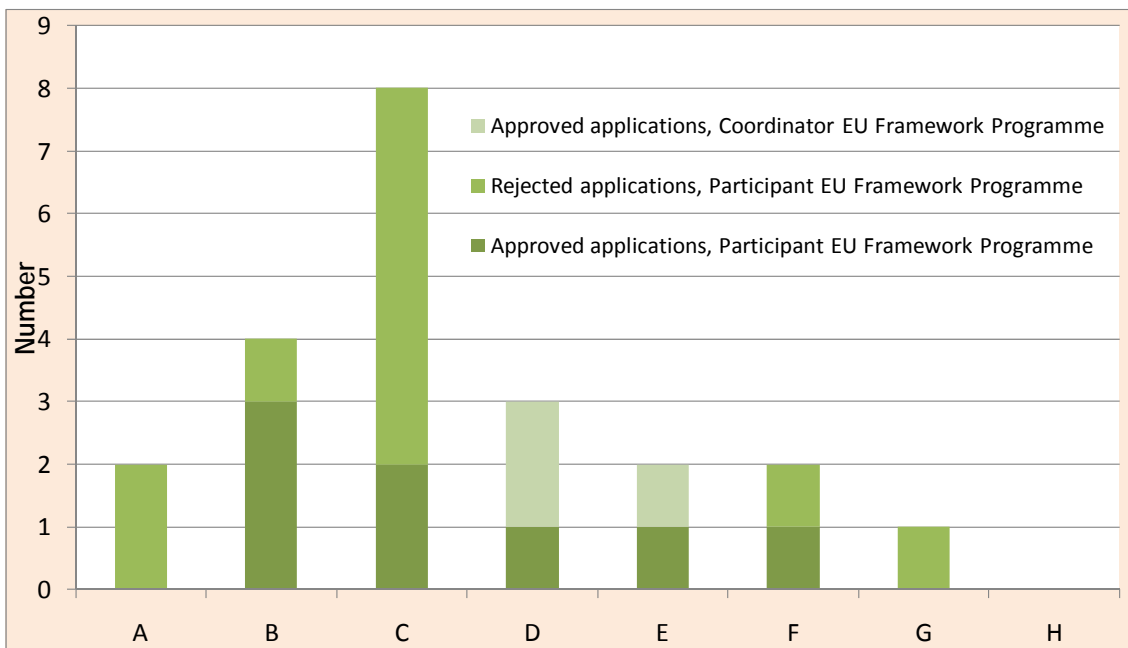


Figure 4 shows the distribution by initiative of the number of approved and rejected applications.

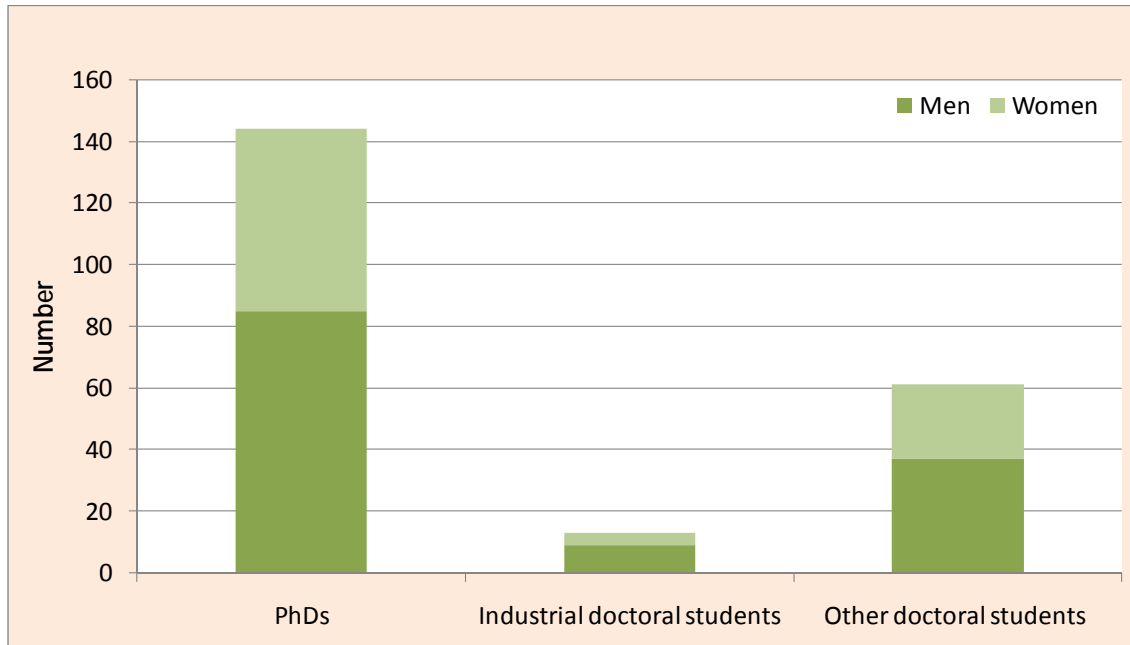
Figure 4 Research applications to the EU's Framework Programme, by initiative



Participating researchers

A total of 205 researchers were active in seven out of the eight initiatives' operations. Figure 5 shows how they are distributed across the categories of PhDs, industrial doctoral students and other doctoral students. Furthermore, it shows the size of the proportion of women and men in the various categories. The initiatives jointly show 61 doctoral students, of which 13 are industrial. There were 144 PhDs.

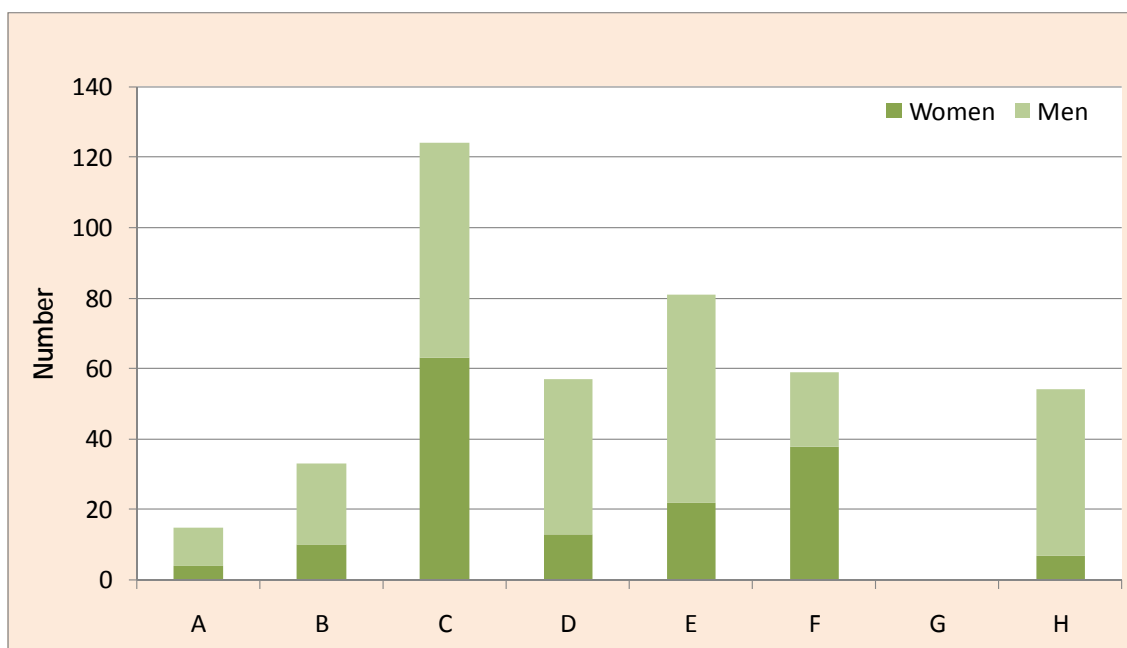
Figure 5 Total number of participating researchers²³



Of the researchers (doctoral students and PhDs) active in seven of the eight initiatives, 122 are men and 83 are women. The distribution between men and women within each initiative appears in figure 6.

²³ For one of the initiatives, there is no information on the distribution between doctoral students, PhDs and Master's thesis students.

Figure 6 Number of male and female researchers, distributed by initiative²⁴



VINNVÄXT winners 2008

Summary of quantitative results monitoring

The following presentation covers sections of the quantitative results monitoring conducted by the four VINNVÄXT initiatives whose first reporting period was 2008/2009. The results presented are the number of new goods, services and processes developed during the year; number of new companies and number of companies which contributed resources during the year; total number of research applications and number of applications to the EU's Framework Programme; and number of researchers who participated in the initiatives' operations during the year. In those cases where the results are presented distributed by initiatives, the initiatives have been anonymised and the order in which the initiatives are presented varies between the graphs. When interpreting the underlying data, it should be kept in mind that the operational period is short and some of the results presented also represent the results of past efforts and operations within the focus areas. Furthermore, it should be pointed out that the variation in the aims and objectives of the different operations means that the expectations of the results and goals also differ. The aim is primarily monitoring at programme level.

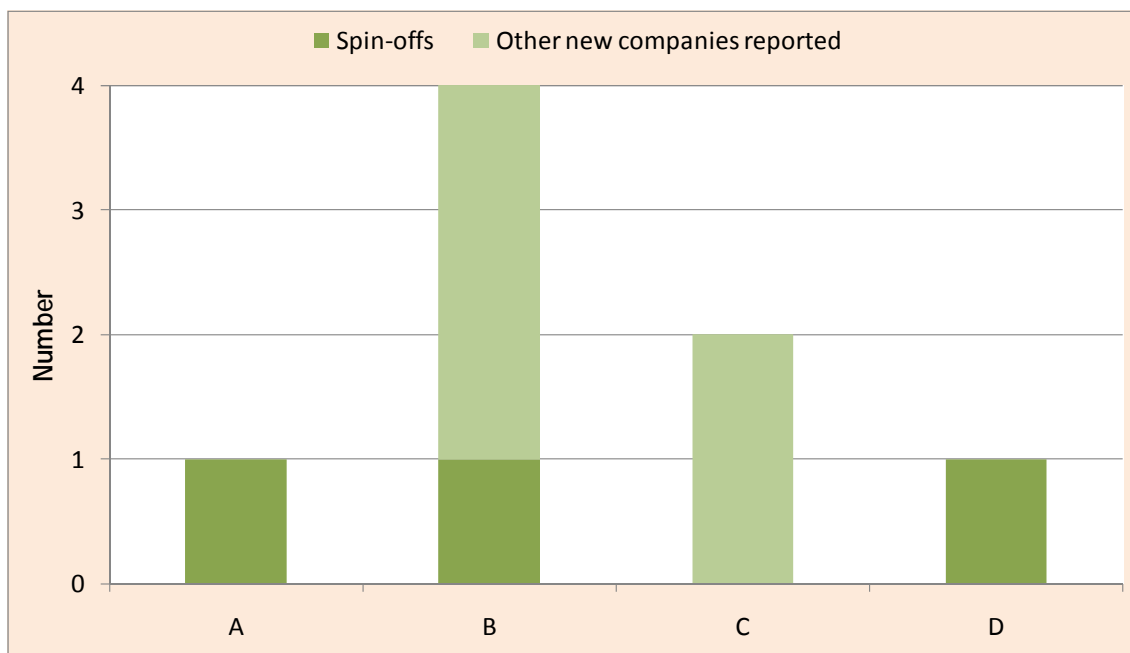
²⁴ For one of the initiatives, there is no information on the distribution between doctoral students, PhDs and Master's thesis students. This has therefore been omitted from the graph.

New companies, goods, services and processes

During 2008/2009, under the auspices of these four VINNVÄXT initiatives, two new goods, and two new processes were developed.²⁵ No new services have been developed. The initiatives report that eight new companies have been facilitated by projects/activities which are/were run with co-financing from the initiatives.

Of the eight new companies reported, three may be regarded as spin-offs within the focus area of their respective initiatives. Other companies are considered to have a mission to conduct operations on behalf of the initiatives and do not have clear origins in the results of those initiatives' projects. Three of the four initiatives report new spin-off companies.

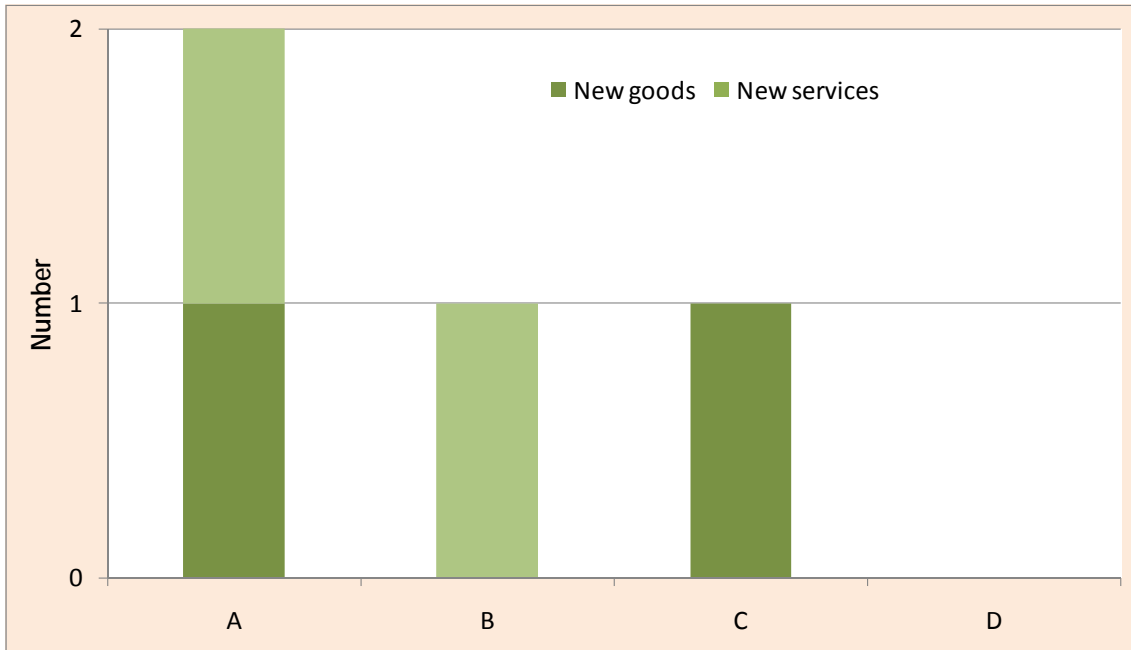
Figure 7 Number of new companies reported, distributed by spin-offs and other companies reported



The following describes the distribution between the four initiatives of new goods and services originating in projects co-financed by the initiatives.

²⁵ In this context, “processes means processes for producing goods and services.

Figure 8 Number of goods and services originating in projects co-financed by the initiatives and distributed across the four initiatives

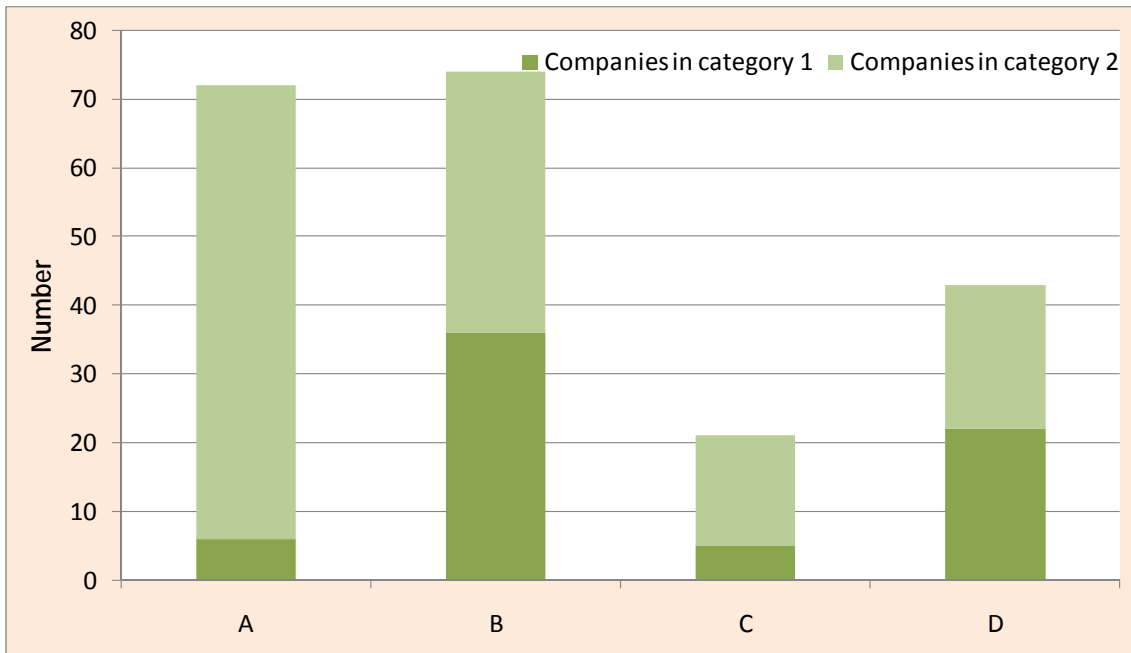


Organisations which contributed to the initiatives' projects and activities

Jointly, the initiatives report 69 organisations, primarily companies,²⁶ as belonging to their inner core. These companies have pledged to contribute resources in the long term/permanently (companies in category 1). An additional 141 companies have pledged some resources and were actively involved in some of the projects or activities funded by the initiatives (companies in category 2). Figure 9 shows how the number of participating companies varies between different initiatives.

²⁶ According to the organisations that develop processes, this includes goods and services in the focus area. This primarily relates to companies, but occasional organisations are included, such as institutes. However, educational establishments are not included. Examples of organisations are incorporated municipal trade and industry offices.

Figure 9 Participating companies, distributed by initiative



Applications for additional funding

The figure below shows the number of rejected, not yet approved and approved research applications to national, European (including the Structural Funds) and international programmes and financiers. During the reporting period, the initiatives jointly participated in 23 applications. A total of 11 applications were approved. Nine are as yet undecided and three have been rejected.

The figure below shows the distribution by initiative of the number of rejected and approved applications.

Figure 10 Applications, distributed by initiative

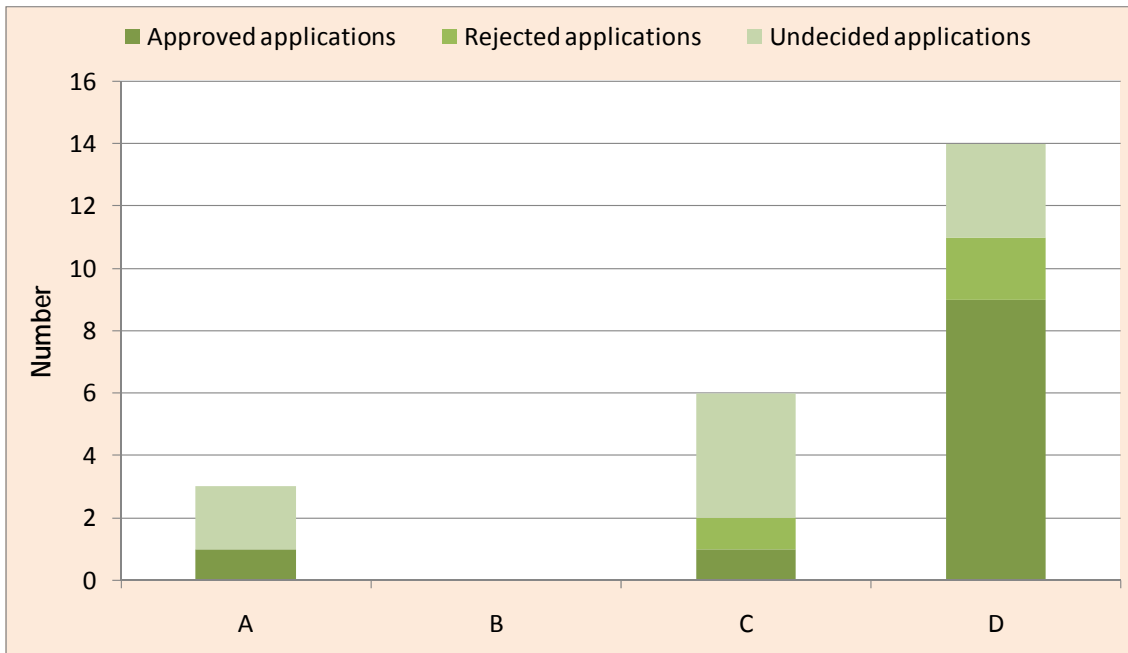
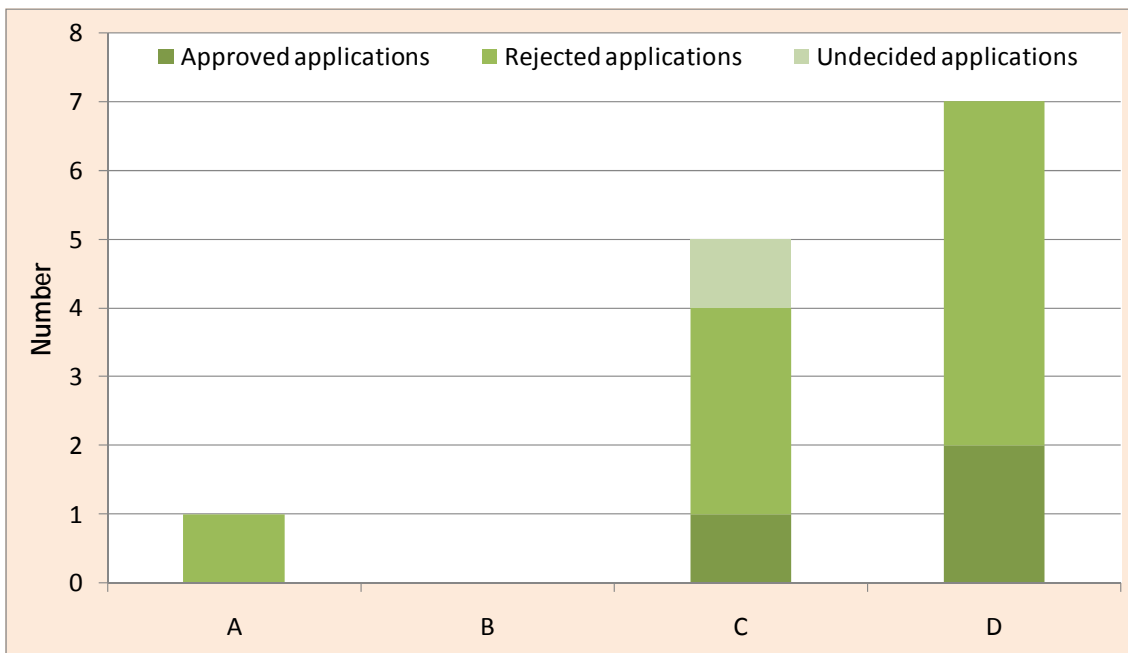


Figure 11 Applications to the EU's Framework Programme, by initiative



Participating researchers

A total of 113 researchers were active in the four initiatives' operations. The following figure shows how they are distributed across the categories of doctoral students, PhDs and senior non-PhDs. Furthermore, it shows the relative proportions of women and men in the various categories. The initiatives jointly show 29 doctoral students, 76 PhDs and

eight senior non-PhDs. The distribution between the various categories of researchers within each initiative appears below.

Figure 12 Total number of participating researchers

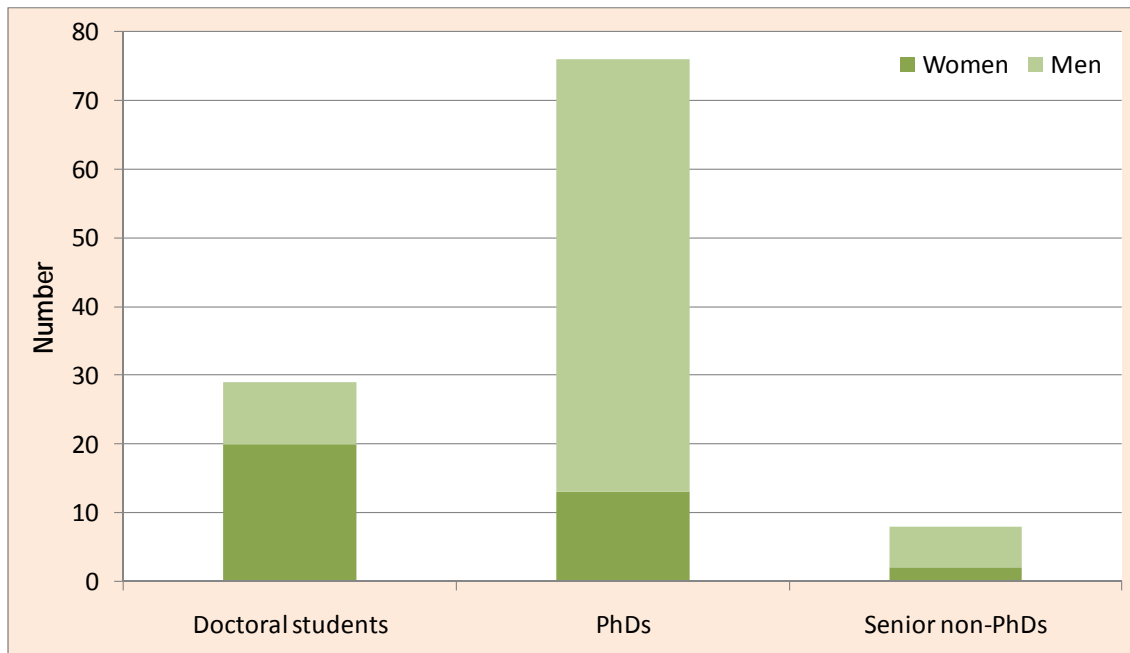
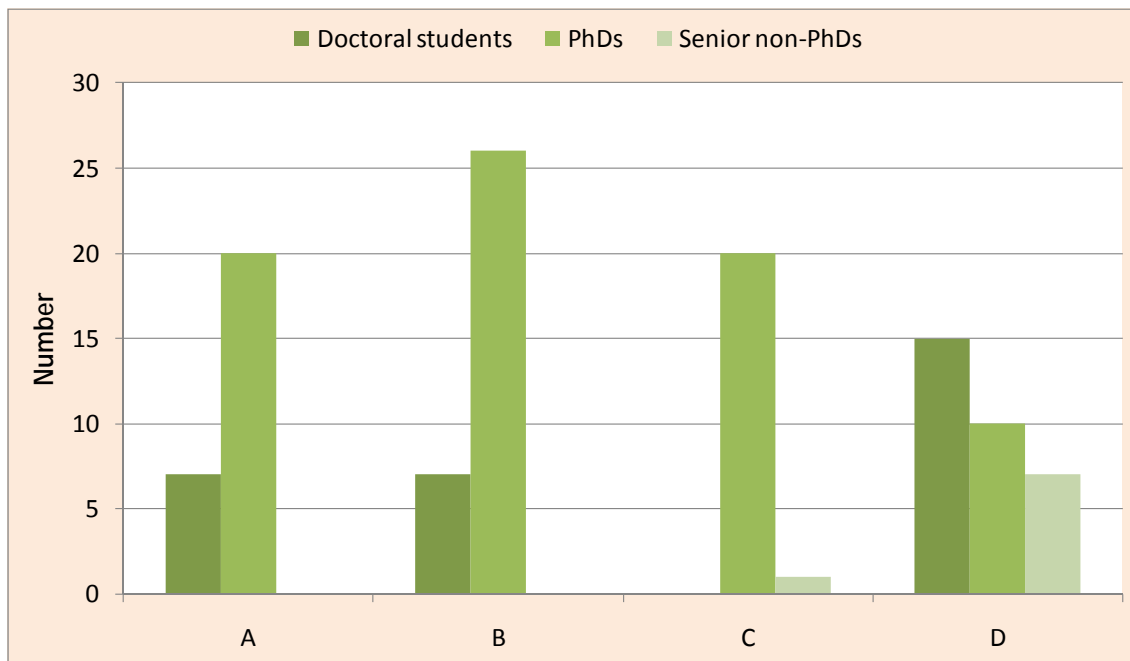
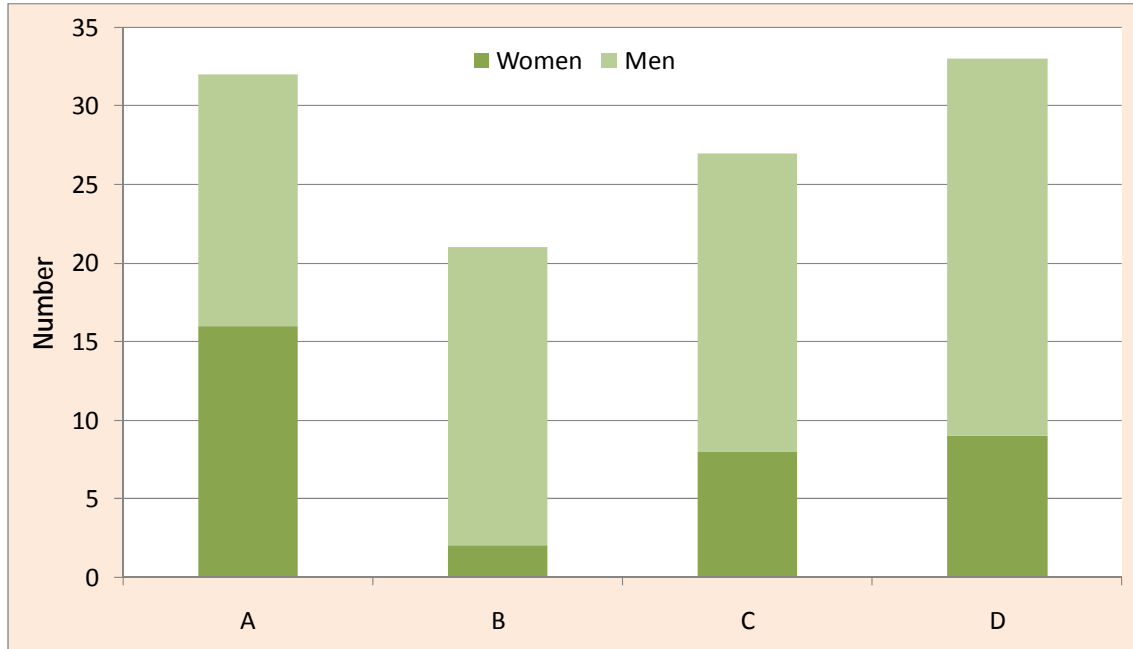


Figure 13 Number of doctoral students, PhDs and senior non-PhDs, distributed by initiative



Of the researchers active in the four initiatives, 78 are men and 35 are women. The distribution between men and women within each initiative appears in the following graph.

Figure 14 Number of male and female researchers, distributed by initiative



Appendix E: List of interviewees

Biorefinery of the Future

Clas Engström, Biorefinery of the Future
Eva Lundmark, Biorefinery of the Future
Björn Alriksson, Biorefinery of the Future
Hans Grundberg, Biorefinery of the Future
Jennie Söderström, Biorefinery of the Future
Sune Wännström, SEKAB E-technology
Bengt Joensson, Domsjö Specialties AB
Leif Jönsson, Umeå University
Gun-Britt Hägglund, Örnsköldsvik Municipality
Jan Nyman, Örnsköldsvik Municipality

Fiber Optic Valley

Magnus Burvall, Fiber Optic Valley
Magnus Engholm, Fiber Optic Valley
Ingmar Höglund, Fiber Optic Valley
Hans-Erik Sandström, Fiber Optic Valley
Olle Persson, Hudiksvalls Näringslivs AB
Ann Sofie Däldehög, Fiber Optic Valley
Jeanette Waax, Fiber Optic Valley
Stefan Gistvik, Fiberson AB
Johan Jason, Fiberson AB
Tommy Roxenhall, Mid Sweden University
Staffan Westberg, Centrum för utveckling och lärande [Centre for Development and Learning]
Åsa Claesson, Acreo
Gert Bagge, Fiber Optic Valley
Claes Bäckman, Gävle University
Per-Erik Persson, The Norrland Fund

Mattias O’Nils, Mid Sweden University
Carina Åkerlund, Region Gävleborg
Magnus Ernström, Region Gävleborg
Kristina Mickelsson, Hudiksvall Municipality
Tomas Flodin, Ericsson AB

GöteborgBIO / Biomedical Development in Western Sweden

Bengt Belfrage, Biomedical Development in Western Sweden
Christer Hedman, Biomedical Development in Western Sweden
Neven Zoric, Tataa Biocenter AB
Anders Lindahl, Sahlgrenska Academy, Gothenburg University
Annika Rickne, Gothenburg University

New Tools for Health

Elisabet Lärkhammar

Peak Innovation

Lars Lindqvist, Peak Innovation
Tomas Ekström, Peak Innovation
Sture Espwall, Mid Sweden University, Swedish Winter Sports Research Centre
Jens Edlund, Accounting/Finance (former process management)
Olle Martinelle, Chairman of Peak Business & Sports AB and board member of Mid Sweden Science Park AB
Maria Lexhagen, Mid Sweden University – European Tourism Research Institute ETOUR
Bosse Svensson, Mid Sweden University – European Tourism Research Institute ETOUR (former process management)
Mats Tinnsten, Mid Sweden University – Sports technology
Lisa Fröbel, Development funding (Soft Financing AB) and Open Door
Kjell-Ove Wiklund, Development funding and Open Door (former process management)

Printed Electronics Arena

Magnus Enström, Printed Electronics Arena

Åke Rolf, Printed Electronics Arena and Norrköping Science Park

Ragnar Fridman, Printed Electronics Arena

Isak Engquist, Linköping University

Rickard Lifgren, SCA Packaging Sweden AB

Leif Ljungqvist, Acreo

Göran Gustafsson, Acreo

ProcessIT Innovations

Anders OE Johansson, ProcessIT Innovations

Per Levén, ProcessIT Innovations

Derny Häggström, Oryx Simulations AB

Jonny Holmström, Umeå University

Martin Servin, Umeå University

Christina Igasto, Umeå University

Martin Ärlestig, Komatsu Forest AB

Robin Norrman, ProcessIT Innovations

Ulf Edlund, Umeå University

Kennet Johansson, Västerbotten County Administrative Board

Daniel Fällman, Interactive Institute

Anna Croon Fors, Umeå University

Robotdalen

Erik Lundkvist, Robotdalen

Ove Albertsson, Robotdalen

Staffan Elving, ABB Robotics AB

Christer Norrström, Mälardalen University

Skåne Food Innovation Network / Innovation at Interfaces

Lotta Törner, Innovation at Interfaces

Magnus Lagnevik, Innovation at Interfaces

Håkan Jönsson, Lund University

Hans Knutsson, Lund University

Mats Hallkvist, Pågen AB

Johan Sjöholm, Pastair AB

Smart Textiles

Erik Bresky, Smart Textiles

Susanne Edström, Smart Textiles

Lars Karlsson, Chairman of the Executive Group

Peter Albinsson, Sjuhärad Association of Local Authorities

Matz Sandström, SP, Technical Research Institute of Sweden

Mats Nordqvist, Corporate-run projects

Ola Toftegaard, Swedish Textile and Clothing Industries

Triple Steelix

Maria Engholm, Triple Steelix

Bosse Lilja, Triple Steelix

Sten-Åke Holmström, Sitab

Sven Ekerot, Comdicast

Svante Nordh, Sandviken Municipality

Jan Messing, Dalarnas Research Institute

Matz Lenner, Gävle University

Uppsala BIO

Erik Forsberg, Uppsala BIO

Per Lundequist, Uppsala Municipality and Uppsala University

Eva Sterte, Uppsala Municipality

Sune Larsson, Akademiska sjukhuset

Lars Jonsson, Uppsala universitets utveckling AB

VINNOVA's publications

March 2010

See www.VINNOVA.se for more information

VINNOVA Analysis

VA 2010:

- 01 Ladda för nya marknader - Elbilens konsekvenser för elnät, elproduktionen och servicestrukturer
- 02 En säker väg framåt? - Framtidens utveckling av fordonssäkerhet

VA 2009:

- 01 Svenska tekniker 1620 - 1920
- 02 Effekter av statligt stöd till fordonsforskning - Betydelsen av forskning och förnyelse för den svenska fordonsindustrins konkurrenskraft. *For brief version in Swedish and English see VA 2009:11 and VA 2009:12*
- 03 Evaluation of SIBED. Sweden - Israeli test bed program for IT applications. *Only available as PDF*
- 04 Swedish possibilities within Tissue Engineering and Regenerative Medicine
- 05 Sverige och FP7 - Rapportering av det svenska deltagandet i EUs sjunde ramprogram för forskning och teknisk utveckling. *Only available as PDF*
- 06 Hetast på marknaden - Solenergi kan bli en av världens största industrier
- 07 Var ligger horisonten? - Stor potential men stora utmaningar för vägkraften
- 08 Vindkraften tar fart - En strukturell revolution?
- 09 Mer raffinerade produkter - Vedbaserade bioraffinaderier höjer kilovärdet på trädet
- 10 Förnybara energikällor - Hela elmarknaden i förändring
- 11 Sammanfattning - Effekter av statligt stöd till fordonsforskning. *Brief version of VA 2009:02, for brief version in English see VA 2009:12*
- 12 Summary - Impact of Government Support to Automotive Research. *Brief version in English of VA 2009:02, for brief version in Swedish see VA 2009:11*
- 13 Singapore - Aiming to create the Biopolis of Asia
- 14 Fight the Crisis with Research and Innovation? Additional public investment in research and innovation for sustainable recovery from the crisis.
- 15 Life Science Research and Development in the United States of America - An overview from the federal perspective. *Only available as*

PDF

- 16 Two of the "new" Sciences - Nanomedicine and Systems Biology in the United States. *Only available as PDF*
- 17 Priority-setting in the European Research Framework Programme
- 18 Internationellt jämförande studie av innovationssystem inom läkemedel, bioteknik och medicinteknik
- 19 Investering i hälsa - Hälsoekonomiska effekter av forskning inom medicinsk teknik och innovativa livsmedel
- 20 Analysis of Chain-linked Effects of Public Policy - Effects on research and industry in Swedish life sciences within innovative food and medical technology
- 21 Research Priorities and Priority-setting in China
- 22 Priority-Setting in U.S. Science Policies
- 23 Priority-Setting in Japanese Research and Innovation Policy

VINNOVA Information

VI 2010:

- 01 Transporter för hållbar utveckling
- 02 Fordonsstrategisk Forskning och Innovation FFI
- 03 Projektkatalog 2010 - Branschforskningsprogrammet för skogs- & träindustrin
- 04 Årsredovisning 2009

VI 2009:

- 02 Forskning om chefskap. Presentation av projekten inom utlysningen Chefskap; förutsättningar, former och resultat. *For English version see VI 2009:03*
- 03 Research on the managerial tasks: condition, ways of working and results. *Finns endast som PDF. For Swedish version see VI 2009:02*
- 04 Högskolan utmaningar som motor för innovation och tillväxt - 24-25 september 2008
- 05 VINNOVA news
- 06 Årsredovisning 2008
- 07 Innovationer för hållbar tillväxt. *For English version see VI 2009:08*
- 08 Innovations for sustainable Growth. *For Swedish version see VI 2009:07*
- 09 Forska&Väx.

- 10 Ungdomar utan utbildning - Tillväxtseminarium i Stockholm 4 mars 2009
- 11 Cutting Edge - Swedish research for growth
- 12 Mobilitet, mobil kommunikation och bredband - Branschforskningsprogram för IT & telekom. Projektkatalog
- 13 Forskning och innovation för hållbar tillväxt

VINNOVA Policy

VP 2010:

- 01 Nationell strategi för nanoteknik - Ökad innovationskraft för hållbar samhällsnytta

VP 2009:

- 01 TRANSAMS uppföljning av "Nationell strategi för transportrelaterad FUD" åren 2005 - 2007. Två uppföljningar - en för 2005 och en för 2006 - 2007. *Only available as PDF*
- 02 VINNOVAs internationella strategi - att främja hållbar tillväxt i Sverige genom internationellt forsknings- och innovationssamarbete

VINNOVA Report

VR 2010:

- 01 Arbetsgivarringar: samverkan, stöd, rörlighet och rehabilitering - En programuppföljning
- 02 Innovations for sustainable health and social care - Value-creating health and social care processes based on patient need. *For Swedish version see VR 2009:21*
- 03 VINNOVAs satsningar på ökad transportsäkerhet: framtagning av underlag i två faser. *Only available as PDF*
- 04 Halvtidsutvärdering av TSS - Test Site Sweden - Mid-term evaluation of Test Site Sweden. *Only available as PDF*
- 05 VINNVÄXT i halvtid - Reflektioner och lärdomar. *For English version see VR 2010:09*
- 06 Sju års VINNOVA-forskning om kollektivtrafik - Syntes av avslutade och pågående projekt 2000 - 2006. *Only available as PDF. For brief version see VR 2010:07*
- 07 Översikt - Sju års VINNOVA-

- forskning om kollektivtrafik. *For main version see VR 2010:06*
- 08 Rörlighet, pendling och regionförstoring för bättre kompetensförsörjning, sysselsättning och hållbar tillväxt - Resultatredovisning från 15 FoU-projekt inom VINNOVAs DYNAMO-program
- 09 VINNVÄXT at the halfway mark - Experiences and lessons learned. *For Swedish version see VR 2010:05*
- VR 2009:**
- 01 Affärsutveckling inom träaufaktur och möbler - hur skapas effektivare värdekedjor? *Only available as PDF*
- 02 Användarna och datorerna - en historik 1960 - 1985
- 03 First Evaluation of the Berzelii Centra Programme and its centres EXSELENT, UCFB, Uppsala Berzelii & SBI Berzelii
- 04 Evaluation of SAFER – Vehicle and Traffic Safety Centre at Chalmers - a Centre of Excellence with financing from VINNOVA. *Only available as PDF*
- 05 Utvärdering av forskningsprogrammet SkeWood. *Only available as PDF*
- 06 Managing and Organizing for Innovation in Service Firms - A literature review with annotated bibliography. *Only available as PDF*
- 07 Den tjänstedominanta logiken - Innebörd och implikationer för policy.
- 08 Tjänster och relaterade begrepp - Innebörd och implikationer för policy.
- 09 Underlag för VINNOVAs satsningar inom transportsäkerhetsområdet. *Only available as PDF*
- 10 Utmaningar och kunskapsbehov - Om innovation, ledning och organisering i nio olika tjänsteföretag. *Only available as PDF*
- 11 De två kulturerna på Internet - En utmaning för företag, myndigheter och organisationer. Huvudrapport
- 12 Uppföljning av VINN NU-företag
- 13 Kartläggning av svensk FoU inom området IT och miljö - med fokus på teknikens indirekta och systemmässiga effekter. *Only available as PDF*
- 14 Forska&Väx - Hållbar tillväxt genom forskning och utveckling i Små- och Medelstora Företag
- 15 Tjänsteinnovationer för tillväxt
- 16 Behovet av genusperspektiv - om innovation, hållbar tillväxt och jämställdhet. Utvärdering. *Only available as PDF*
- 17 Ekonomisk omvandling och makrologistiska kostnader. *Only available as PDF*
- 18 En undersökning av innovativa företags syn på strategiskt utvecklingsarbete i spåret av lågkonjunkturen. *Only available as PDF*
- 19 The Public Sector - one of three collaborating parties. A study of experiences from the VINNVÄXT programme.
- 20 Från hantverkskilt till hästföretag - Genusperspektiv på innovation och jämställdhet
- 21 Innovationer för hållbar vård och omsorg - Värdeskapande vård- och omsorgsprocesser utifrån patientens behov. *For English version see VR 2010:02*
- 22 Organising Work for Innovation and Growth. Experiences and efforts in ten companies
- 23 Mid Term Evaluation of the Institute Excellence Centres Programme
- 24 Process Support, Communication and Branding - VINNOVA's VINNVÄXT programme
- 25 The Innovation Platform
- 26 Citizens' Services - Nordic and Baltic Research Needs
- 27 Kina och internet - Tillväxt och tilltro
- 28 eGovernment of Tomorrow - Future scenarios for 2020
- 29 Organisationsformernas betydelse i klusterverksamhet - Att organisera klusterarbete är en ständigt pågående process som ställer höga krav på ledarskap och långsiktig strategi
- 30 Inomhusskidbacke i Lindvallen, Sälen. *Only available as PDF*
- 31 Kartläggning av svenska klusterinitiativ. *Only available as PDF*
- 32 Service Innovations in Sweden Based Industries - Aiming for 30-60% revenue increase/Tjänsteinnovationer i Sverigebaserad tillverkningsindustri - Med sikte på 30-60 % intäktsökning
- 33 Chinese Views on Swedish Management - Consensus, conflict-handling and the role of the team
- 34 First Evaluation of the second, third and fourth Round of VINNOVA VINN Excellence Centres - FASTE, SUS, FUNMAT, CHASE, GHZ, MOBILE LIFE, iPACK, HERO-M, PRONOVA, BIOMATCELL, WINQUIST, SUMO, BIMAC INNO, WISENET and AFC
- 35 International Evaluation of PLUS Competence Centre - at Chalmers. *Only available as PDF*
- VR 2008:**
- 01 Mot bättre vetande - nya vägar till kunskap på arbetsplatsen
- 02 Managing Open Innovation - Present Findings and Future Directions
- 03 Framtiden är öppen! Om problem och möjligheter med öppen källkod och öppet innehåll
- 04 First Evaluation of the Institute Excellence Centres Programme
- 05 Utvärdering av det Nationella Flygtekniska forskningsprogrammet - NFFP. Evaluation of the Swedish National Aeronautics Research Programme - NFFP
- 06 Utvärdering av Vehicle - Information and Communication Technology programmet - V-ICT
- 07 Kartläggning av ett halvt sekels jämställdhetsinsatser i Sverige
- 08 Politiken, offentlig verksamhet - en av tre parter i samverkan
- 09 Forsknings- och innovationspolitik i USA - Näringslivets fem roller
- 10 "Born to be wild" - 55+... eller hur förvandla en global demografisk förändring till ett svenskt styrke- och tillväxtområde?
- 11 DYNAMO 2 i halvtid - Rapport från VINNOVAs konferens på Ulfunda slott 10 - 11 april 2008
- 12 VINNVÄXT II - Generalist and Specialist Evaluation of process and knowledge development 2004 - 2007
- 13 Svensk makrologistik - Sammansättning och kostnadsutveckling 1997 - 2005
- 14 Leading Companies in a Global Age - Managing the Swedish Way
- 15 Chefskapets former och resultat. Två kunskapsöversikter om arbetsplatsens ledarskap
- 16 NRA Security - Swedish industry proposal for a National Research Agenda for security
- 17 University strategies for knowledge transfer and commercialisation - An overview based on peer reviews at 24 Swedish universities 2006
- 18 Värda idéerna! - Trots många framgångsrika projekt inom vård och omsorg skapas inte varaktiga effekter. Varför förvaltas och utnyttjas inte idéerna?
- 19 Growth through Research and Development - what does the research literature say?
- 20 Sesam öppna dig! Forskarperspektiv på kvinnors företagande

Production: VINNOVA's Communication Division
Printed by: Arkitektkopia, Stockholm, www.arkitektkopia.se
March 2010
Sold by: Fritzes Offentliga Publikationer, www.fritzes.se



VINNOVA's mission is to promote sustainable growth
by funding needs-driven research
and developing effective innovation systems

VERKET FÖR INNOVATIONSSYSTEM – SWEDISH GOVERNMENTAL AGENCY FOR INNOVATION SYSTEMS

VINNOVA, SE-101 58 Stockholm, Sweden Besök/Office: Mäster Samuelsgatan 56
Tel: +46 (0)8 473 3000 Fax: +46 (0)8 473 3005
VINNOVA@VINNOVA.se www.VINNOVA.se