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VINNVÄXT II

- Generalist and Specialist Evaluation of process and knowledge development 2004 - 2007

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About VINNOVA

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 - Regional Growth through Dynamic Innovation Systems. VINNVÄXT is a programme that takes the form of a competition for regions. The aim is to promote sustainable growth by developing internationally competitive research and innovation environments in specific growth fields. The winning regions will receive funding of up to SEK 10 million per year for a period of 10 years. The objective is that the winners will become internationally competitive in their respective fields within this period.A prerequisite for the programme is the active participation of players from the private, public and research sectors and from the political sphere.VINNVÄXT also comprises a number of support activities such as seminars, training/education, the exchange of experience and the extension of knowledge/research.

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Research and Innovation for Sustainable Growth.

VINNVÄXT II

- Generalist and Specialist Evaluation of process and knowledge development 2004 – 2007

by

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Preface

In this evaluation report The Swedish Governmental Agency for Innovation Systems (VINNOVA) presents the first evaluations of the initiatives in the second call of the VINNVÄXT programme in 2004. In 2003, VINNOVA appointed the first three winners in the first VINNVÄXT call. Those were evaluated last year and the results are presented in the VINNOVA Report VR 2007:11.

The objective of the VINNVÄXT programme is to promote sustainable growth based on international competitiveness in regions, by developing regional innovation system's functionality, dynamics and efficiency to an international level. According to the evaluation strategy the initiatives will be evaluated every third year. The overall objective for the first three-year evaluation is to evaluate if the initiatives have had a good start, building the platform for future growth and international competitiveness in their respective growth area. Evaluation aspects are organisational and leadership issues as well as the outcome and impact of the initiatives in terms of knowledge development, innovation and international competitiveness.

The evaluation has been carried out through two different activities. The first activity was performed by **one** group evaluating all five initiatives. The group consisted of international and "generalist" peers representing competencies in "cluster building", regional innovation systems and programme evaluation. The second evaluation activity had focus on knowledge development and innovation. For this activity each initiative was asked to choose one specific area of knowledge for evaluation. Depending on the chosen knowledge area a **tailor-made group** of international and national "specialists" and experts from university and industry was set up for each initiative. As a consequence the results from the specialist evaluation might not represent the achievements of the initiative as a whole. The generalist evaluation had a broader scope, evaluating the initiative as a whole, not just one area of knowledge.

The second three-year evaluation of the VINNVÄXT programme concerns the following five regional initiatives appointed as winners in 2004:

- **Bio Med in West Sweden** (www.goteborgbio.se) focuses on the development and commercialisation of R&D in the fields of biomaterials, cellular therapy and cardiovascular and metabolic diseases.
- **Fiber Optic Valley** (www.fiberopticvalley.se) focuses on the development and testing of products and services based on fibre optics.
- **New Tools for Health** (Hälsans nya verktyg) (www.halsansnyaverktyg.se) focuses on the development of individual tools for the best possible health.

- **ProcessIT** (www.processit.se) focuses on the future needs of the mining, steel, paper and pulp and manufacturing industries for new services and products based on ICT.
- **Triple Steelix** (www.triplesteelix.se) focuses on steelmaking, manufacturing, processing and knowledge-based services.

VINNOVA in June 2008

Per Eriksson
Director General

Sven-Gunnar Edlund
Director
Head of Innovation Actors Division

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Summary

Results and position after three years

Even though the evaluation was carried out by two different activities with different scope there are significant similarities between the generalist and the specialist evaluators reflections. The unanimity allows for general conclusions concerning the five initiatives, especially when it comes to reflections on their further development. There are also differences between the two evaluation activities, but mainly because of difference in scope and in background of the experts participating in the generalist and the specialist evaluation (see above).

The evaluation of the five initiatives shows that the progress of the initiatives to a high degree is in line with the goals that have been set up by VINNOVA for the VINNVÄXT programme. The initiatives have been working with the implementation of the agreed upon strategies to fulfill their missions and the strategic ideas. Both the generalist and the specialist evaluation underlined the positive results when it comes to mobilizing resources and forming an organisational platform and leadership for the initiatives.

The generalist evaluation gave strong endorsement to the high growth potential of all five initiatives, the initiatives ability to levering VINNOVA´s resources, thus building an impressive resource base for the initiative, and the development of an integrated SME support system where the relatively smooth integration of business concept development, incubation, mentor support and business angels is impressive. The generalist evaluation also gave endorsement to a majority of the initiatives when it comes to building local connectivity, business-to-business links and active governance.

The reflections from the five specialist evaluation teams in many ways support the conclusions made by the generalist evaluators when it comes to the formation of the initiatives. The specialist evaluators in some cases had a different view than the generalist evaluators, for example regarding the support system for SME:s where the specialist evaluators in some cases put more focus on this as an area for improvement.

The specialist evaluation to a large degree verified that the initiatives during the first three years had been focusing on relevant research issues and areas and that the research presented is of international standing. The questions raised by the specialist evaluators regarding the international standing of the

research had to do with lacking presentation of strategic and international positioning of the conducted research.

The specialist evaluation also acknowledged that the initiatives have an international visibility and position, for example through participation in international programmes and collaboration projects and through collaboration with universities and research centres on an international scale. The generalist evaluators have a less positive view on the internationalisation of the initiatives underlining that presented examples reflected more of piecemeal and reactive view than a strategic perspective linked to the development of the initiative. Both the specialist and the generalist evaluators underlined the need for strategies on internationalisation and global positioning.

Especially the generalist evaluators addressed VINNOVA´s role for the development of the initiatives. The evaluators emphasized that VINNOVA is a well-respected and active partner by the initiatives. The scope for improvement regarding VINNOVA´s role regards the need for a systemic leadership integrating all the different initiatives and programmes that is directed towards the universities and the innovation systems. VINNOVA can also play a more active role in the development of the boards and the regional leadership and by presenting the new boards with technical support for the high level strategic planning process.

Further development of the initiatives

The reflections on the further development of the initiatives presented by the generalist and specialist evaluations are to a high degree touching the same issues and are pointing at the same areas for improvement

Strategy development

Both the generalist and the specialist evaluators emphasized, however from somewhat different perspectives, the need to develop the strategic thinking in the initiatives. The generalist evaluators underlined the need for a more entrepreneurial approach to the initiation of new strategies and then a rapid learning and adjusting grounded in sound understanding of the cluster's competitive position internationally and based on open discussions among the cluster members. The specialist evaluators on their behalf especially discussed the need to further develop the strategies for knowledge development and innovation. The strategies should be based on analysis of challenges and demands in research and innovation from an international and competitive perspective (both industry (market) and university) rather than focussing the process to identify and give priority to R&D-projects.

Approach to R&I-strategy and project portfolio

Questions and reflections concerning the strategic approach to R&I and the project portfolio was raised in both the evaluations. The specialist evaluation puts focus on the need to balance between application and technology driven R&I and to integrate a need driven perspective with a perspective where R&I is supporting a more radical transformation and development of the industry at hand in the initiatives. The generalist evaluators reflected on the strategy for R&I and the project portfolio in a similar way and underlined the need to think less in terms of technology and more in terms of innovation and creating broader platforms by integrating innovations from neighbouring fields.

Internationalisation

Both the generalist and the specialist evaluators underlined internationalisation as an area for improvement for all initiatives, even if the specialist evaluators had a more positive attitude to how the initiatives handle issues concerning internationalisation. There is a need for the initiatives to improve the understanding of their global competitiveness – marketwise as well as academically. A strategic approach is therefore needed, and also to identify and target international hot spots and then building relations and cooperation with strategic collaboration partners.

Baseline data

The evaluation in general put emphasis on the need for baseline data showing the position, development and potential for the initiative and the stakeholders participating when it comes to knowledge development, innovation and commercialisation as well as attractiveness and growth.

The differences between the generalist and the specialist evaluation concern areas such as:

The Role of the Board and Board membership

One significant difference between the two evaluation activities has to do with governance issues and the role of the board. The generalist evaluators emphasize issues concerning regional leadership and governance and address the role and composition of the Board as an important area for improvement. The role and the membership of the Board is addressed by the specialist evaluators only in some cases. This has mainly to do with the evaluators' different tasks and the design of the site visit. The generalist evaluators had meetings with representatives for the Board at all five initiatives and the specialist evaluators mainly met with researchers and representatives from companies.

Gender issues

The VINNVÄXT programme has pointed out gender issues as an important objective and condition for the initiatives. Interesting activities and results can be presented by some of the initiatives. Especially the generalist evaluation brought up gender as an area for improvement. In some cases the specialist evaluators also highlighted it.

Learning and policy implications of the evaluation

The evaluation of the five VINNVÄXT initiatives gives support for policy learning and reflections on the concept and logic of the development of regional innovation systems that are at the core of the programme.

Interesting conclusions can be drawn from the two evaluations for the further development of triple helix collaborations and the concept of regional innovation systems as a tool for growth and competitiveness. The five initiatives implement their strategic idea for growth and competitiveness in quite different ways based mainly because on regional differences in resources and mobilization. It also reflects different conditions for growth and innovation in different branches and knowledge areas. This presents an opportunity for the VINNVÄXT programme and VINNOVA to further develop the concept of regional innovation system as a tool to support growth and competitiveness on a regional level. By integrating experiences from the initiatives the concept of regional innovation systems can be more differentiated and thus a better instrument for designing policy activities and in supporting initiatives on a regional and local level.

Important policy learning and implications from the two evaluations of the five VINNVÄXT initiatives regard the view on knowledge development and innovation that comes across in the evaluation. The approach to knowledge development and innovation is dominated by a focus on need-driven and technology-based projects and not on innovations that can support a radical transformation and development of the cluster. As the VINNVÄXT programme aims at competitiveness and sustainable regional growth this calls for attention how to balance and integrate these two perspectives in the strategy for knowledge development and innovation and in the project portfolio for the initiatives.

The evaluation highlights the role of different forms for Open Innovation in the five initiatives. Tools and methods such as integrated one-stop testbeds have been important for supporting the development of need-driven innovations and knowledge development. Open innovation is also of importance for attracting and involving new actors and stakeholders on both a regional, national and international basis and thus for expanding the base for the initiative. The role of tools for Open Innovation in the development

of regional innovation systems therefore need to be further developed and highlighted.

Several of the evaluated initiatives have been successful in levering the resources from the VINNVÄXT programme through resources from other VINNOVA initiatives such as the Key Actors Programme and VINN Excellence Centers. In some cases the initiatives are part of quite complex regional innovation systems with several nodes and initiatives supported by VINNOVA programs and other national and international financiers. This raises questions concerning regional leadership and how to integrate different initiatives on a regional level supporting collaboration and avoiding competition between initiatives aiming at the same overarching regional objectives. It also raises questions on how the different national programmes initiated by VINNOVA could be integrated both conceptual but also in the contact with the different initiatives that VINNOVA support. In short the evaluation of the five VINNVÄXT initiatives puts emphasis on the systemic leadership at VINNOVA in funding and implementing different programmes on regional and local level.

1 Introduction

1.1 The VINNVÄXT programme – logic and objectives

In 2003 VINNOVA appointed the first three "winners" in their VINNVÄXT programme and the year after another five winner were appointed. As a part of the overall learning strategy for the programme a "mid-term" evaluation should be conducted after three years, by an international panel of experts.

The first three winning initiatieves were evaluated in the autumn 2006 (see VINNOVA Report VR 2007:11). This time it is five new winning initiatives from the second generation of VINNVÄXT that are evaluated.

According to the original programme document the aim of VINNOVA's programme "VINNVÄXT – Regional growth through dynamic innovation systems" is:

— to promote sustainable growth based on international competitiveness in regions, by steadily developing, or further developing, the innovation system's functionality, dynamics and efficiency in functional regions to an international level.

The programme presupposes the active participation of players in business, research organisations, politics and public administration.

In the same document VINNOVA also states that:

> *"Effects in the form of growth can only be expected after a relatively long time. For that reason the programme's success must be tracked by measurements and indicators that describe the process, as well as structural and institutional changes regarded as vital preconditions for future growth."*

This has led to an evaluation strategy where the programme will be examined basically every third year. The expected progress of the regional ventures financed by VINNOVA is described as follows in the programme document:

> *"Objective 1 year*
>
> *The ventures that VINNOVA chooses to support should in the short term be able to demonstrate that they have established effective management, control and coordination of the venture, that the key players in the system are involved and committed,*

that the necessary resources have been mobilised, that the programme is capable of influencing the priorities in the three Triple Helix spheres in ways that coordinate and mobilise resources for the objective of this specific venture, and that a process leading to actual development and regeneration has been established.

Objective 3 years

The ventures that VINNOVA chooses to support shall, after three years, over and above the short-term objectives, also show clear and positive changes in a number of indicators of innovative capacity and international competitiveness.

Objective 6 years After six years, the 3-year objectives shall demonstrate further clear improvements. It should also be possible to perceive certain growth effects from the regional ventures.

Objective 12 years

Over the long term, the programme as a whole shall have made a manifest contribution to sustainable growth in the functional regions that VINNOVA has supported, and have established innovation systems with international competitiveness. Furthermore, the regional ventures together with the support processes that are also being run in the scope of the programme, shall have manifestly contributed to national learning that has contributed to stimulating growth in other regions."

1.2 The five VINNVÄXT initiatives under evaluation

This is a short description of the five winning initiatives that VINNOVA selected in 2004 after a call for proposals that attracted 26 applications. Detailed information about the initiatives is available at the websites of each initiative.

- **Bio Med in West Sweden** (www.goteborgsbio.se) is creating a good basis for long-term growth in the biomedical field in the Gothenburg region by converting academic, cutting-edge research into innovations and practical applications in the private and healthcare sectors. The project strengthens the commercial exchange of R&D in fields such as biomaterials, cellular therapy and cardiovascular and metabolic diseases; trains future leaders for advanced business development; reinforces and develops the commercialisation infrastructure and attracts expertise and capital to the region.

- **Fiber Optic Valley** (www.fiberopticvalley.se) is an arena for the development and testing of products and services based on fiber optics. Together with the university and representatives of the public and private sectors, Fiber Optic Valley is developing the broadband society of the future in the region between Gävle and Sundsvall, with the centre in Hudiksvall. Among other things, they offer a test bed with contracted test pilots, qualified evaluators, research, training, business models, behavioural analysis, statistical models and an advanced fiber laboratory.
- **New Tools of Health** (Hälsans nya verktyg) (www.halsansnyaverktyg.se) is driving the development of individually-adapted solutions for the best possible health. Growth is being generated in the areas of distributed care, personal care and sports. The project involves some 60 companies, the municipalities in the county, the county council, the regional association Östsam, NGOs, Linköping University and research companies.
- **ProcessIT** (www.processit.se) is working to satisfy the future needs of the mining, steel, paper and pulp and manufacturing industries for new services and products based on Information and Communications Technology (ICT). The project involves collaboration between the processing and manufacturing industries, the universities of Umeå and Luleå and ICT product companies in Västerbotten and Norrbotten. The activities aim to create significant growth by means of extensive and co-ordinated efforts
- **Triple Steelix** (www.triplesteelix.se) is a cluster developed with the world leading steel industry in Bergslagen as a base in the fields of steelmaking, manufacturing, processing and knowledge-based services. Together with the universities and colleges, the focus is on developing expertise regarding materials, steel processing, nanotechnology, industrial IT, the environment and energy efficiency. Triple Steelix involves major companies such as Sandvik, Outokumpu and SSAB.

1.3 The objective and design of three year “mid-term” evaluation

Following the original evaluation strategy for the VINNVÄXT-programme in chapter 1.1 VINNOVA has slightly reformulated the task for the evaluation as follows:

“The overall objective is to answer the question:

Have the winners had a good start, building the platform for future growth and international competitiveness in their respective growth area?

In more detail this means:

1 *To investigate the performance of the five winner regions in relation to each of their action plans that were submitted as part of the contract signed between VINNOVA and each winner region.*
2 *To investigate the performance of the five winner regions in terms of developing regional governance and a platform for future growth.*
3 *To investigate the performance of the programme management at VINNOVA and the support activities given to the initiatives and suggest improvements."*
4 *To collect and analyse information on the outcomes and possible impact of the programme activities so far. This means focusing on issues like the relevance of the research strategy, if the research is linked up with industry in an efficient way, mechanisms for incubation, strategies for commercialization, etc*

Based on the observations the evaluation teams should make a recommendation to VINNOVA whether they should continue to support a winner region for another three years by signing a new contract. The evaluation team should also make suggestions for changes in the contracts as a means of increasing the efficiency of the programme activities and of strengthening aspects that have not received enough attention from the management of each winner region or by VINNOVA's programme management.

The programme activities of the five winning regional initiatives were initiated in 2004 and this first "three year" evaluation has been set up in accordance to the evaluation strategy. Due to the complex nature of innovation systems as well as the long-term and capability building character of the VINNVÄXT programme, VINNOVA has decided to use a peer review method consisting of two different activities when conducting this evaluation. (This is a development of the methodology used in 2006 when the evaluation only consisted of one peer group looking at all three initiatives under evaluation). The two different evaluation activities are performed by different groups of evaluators.

The first activity consisted of one group of three international peers representing competences in "cluster building", regional innovation systems and programme evaluation. This group of peers looked more deeply into point 1-3 in above. Their evaluation report is found in chapter 2.

As a second activity, VINNOVA set up one group of "specialists" for each regional initiative. The focus of those groups' evaluations has been: point 1 and 4 above.

Since the five initiatives address more than one specific area of knowledge, the initiatives have been asked to choose what knowledge area they wanted

to focus on in this evaluation. The focus area chosen by each initiative is described in the beginning of each chapter of the specialist evaluation (Ch. 3.2-3.6). As a consequence the results from the specialist evaluation might not represent the achievements from the whole initiative. This is of course not ideal but a result from practical considerations.

Ideally the five evaluation teams that conducted the second more content oriented evaluation (the specialist team) have had the following profile:

Two international experts providing international bench-mark:

- One with a more academic profile with excellent knowledge about state of the art in the specific field. For example Head of R&D department in University, Company, Research Institute, etc.
- One with a more business oriented profile with excellent knowledge about business models, leading industries and regions globally. For example persons in leading position in company, industry organizations, incubator organizations, etc.

Two national experts providing national and regional context

- One member from VINNOVAs own staff at the department of "Knowledge Areas"
- One member from the Programme Advisory Board of VINNVÄXT

This composition of the review panels combined knowledge of international competition with knowledge of national and regional context.

The evaluation process required each panel member to spend two days in Sweden, one full day at the site of the VINNVÄXT-project (day 1) doing interviews and one day writing the report (day 2).

The evaluation team was supported by a process consultant in performing the evaluation (plan and coordinate the interviews and other activities and in writing the evaluation report). Peter Kempinsky or Christina Johannesson, from the Swedish consultant company FBA was acting as process consultants for the evaluation.

1.4 A short description of written documentation used in evaluation

VINNOVA supplied the most relevant documents and reports necessary for the evaluation. Those were:

a A three-year report from each of the winners, describing achievements and activities for the first three-year period.
b The original plan of action that each region wrote as a part of the contract with VINNOVA. Each document described the goals, activities

and milestones to be performed and delivered during the first 3-year period.

c The justifications from the Programme Committee for each winner, describing the main reasons why these regions where selected as winners in VINNVÄXT.

d VINNOVA's two reports (for years one and two) from the yearly follow-up interviews with process managers and representatives of the regional steering committees in each winning region.

e The original Programme Document for VINNVÄXT, describing the goals, strategies and operational measures in the programme.

f A report from Dan Sjögren at the Dahmén Institute about the process support activities that have been performed in order to strengthen the regional processes during the period.

2 The Generalist Evaluation

Participants in the Generalist evaluator group and authors of chapter 2:

- Prof. Philip Cooke, Cardiff University, Wales
- Dr. Alexander Eickelpasch, Deutsches Institut für Wirtschaftsforschung, Berlin
- Ifor Ffowcs-Williams, Cluster Navigators Ltd, New Zealand

2.1 Evaluation approach

The five VINNVÄXT initiatives were evaluated by the Generalist evaluators in January 2008. The evaluation was carried out by the following steps:

- Preparatory reading of written material forwarded by VINNOVA
- Establishing an evaluation pattern by the evaluation team
- A day of discussions held at the site of each initiative over 14-18 January 2008. These discussions centred on meetings with
  - the process team,
  - the board or steering group, and
  - up to 4 project teams,
- Synthesis and report writing, 19-21 January and
- Feedback meeting at Arlanda Airport on 22 January 2008 attended by representatives from each of the five locations.

VINNOVA supplied the most relevant documents and reports necessary for the evaluation in an English translation (see chapter 1.4). In addition, comprehensive notes from the presentations and interviews at the five initiatives were taken by Peter Kempinsky and placed at the disposal of the evaluation team.

Through this process, aspects for endorsement and for reflection were identified. They were presented and discussed with the five initiatives at the feedback meeting in Arlanda, and are more fully documented in this report.

The evaluation team strongly emphasises that the focus of this evaluation has been learning, not control. It is also important to note that the

programme management and the support activities to the regional partners were considered in the evaluation.

The Evaluation Panel wishes to acknowledge and to thank Göran Andersson and Peter Kempinsky for their extensive support during the visit to Sweden. We also acknowledge the open cooperation of the five initiatives.… The five and VINNOVA have already come a long way on the ten year journey.

2.2 Fiber Optic Valley

Introduction

Fiber Optic Valley (FOV) can already claim to have Sweden's largest concentration of fiber optic competence within its functional region. The region extends along the Baltic from Sundsvall in the north, through Hudiksvall (with the Acreo FiberLab and World Internet Institute) to Gavle in the south. The origins of this local competency date back to an Ericsson's cable plant. Ericsson and local authorities joined forces in the 90's in establishing the initiative that has evolved into FOV.

FOV has the brave ambition of being 'the Fiber Optics Centre of Europe' by 2015.

The Offer

FOV has competencies in three distinct areas:

- Fiber to the user: high capacity drops to homes/apartments
- E-services to homes/apartments and SMEs: Providing a test bed of several hundred for telemedicine, GIS and information system applications
- Fiber optic industrial applications: Using speciality optical fibers, e.g. for sensors, endoscopy and automotive welding

Aspects for Endorsement

The claim to being the world's 'Fiber Optic Valley' is an exceptionally strong one; the challenge now is to ensure that the reality of FOV matches up to the perception that this positioning implies. No other region world wide is claiming this position, which has already attracted many visitors from well beyond Sweden. Similarly, Acreo is able to claim that it is the 'Only place in the world with this capability'.

FOV is well situated within a market area that has strong growth; a further plus is that fiber optics is in many ways a green technology.

FOV's success in attracting fiber network technicians from a number of countries is a positive start in building on FOV's international awareness.

The International Evaluation Panel complements FOV on the Business Angels network that has been developed, and on the efforts to date to address gender awareness. Strong links have developed across the Triple Helix; and strong links with related clusters in the region including IT in Sundsvall, E-health in Söderhamn and GIS in Gävle.

Aspects for Reflection

FOV's governance structure has it led it well during its first phase of growth. The Evaluation Panel sees merit in a major overhaul for the next growth phase, including the further accessing of business experience for the Board. This expertise should be embedded within either the cluster's core or support firms. An early role for this Board will be to develop and then own FOV's strategy for the coming 3 years. Currently the Board is well managing a pre-determined project rather than its own strategy.

It often takes time for the specific, deep competencies of a cluster such as FOV to fully emerge and be recognised. This is part of the journey. The ambition of being a 'leading centre for fibre optics within Europe' may be too broad technically, too narrow geographically. The reality may see FOV becoming a lead centre globally with a number of specific niche areas within the three broad areas. With this possibility, the International Team encourages FOV to proactively reach out to other high tech clusters, especially in North America, and to also extend the reach further into Asia.

The regional 'involvement nodes' are particularly important for this geographically dispersed cluster. Tightening the cornerstone relationship with Kista can be viewed in a similar light. One aspect for such a linkage is access to seed funding and venture capital. It is inevitable that some companies that emerge in FOV, such as Packet Front, will over time move some of their activities, even their HQs, south to Krista.

Currently FOV has close relationships with some 47 local firms and looser links with a further 150. The Panel encourages FOV to become more familiar with the wider group and to actively involve them in specific projects.

2.3 Triple Steelix

Introduction

The process of creating Triple Steelix was initiated some ten years ago with the 'merger' of regional clusters. Two predecessors were "Sheet Steel" in Borlänge and "Stainless steel" in Avesta. In the early 2000s Jernkontoret, the Swedish Steel Producers' Association fortunately took the initiative to strengthen these already existing collaborations. With this background it is not surprising that Jenkontoret became the appropriate process owner of

Triple Steelix from the beginning of the initiative. This background also highlights that the regional partners are well experienced in collaborating.

The offer

The aim of Triple Steelix is to create an infrastructure for manufacturing companies and subcontractors to enable the steelmakers in the region to strengthen their position on the global market. Hence, Triple Steelix has chosen to specialise in the development of an innovation platform for the following fields of operation:

- Sheet Steel
- Stainless steel,
- Machining
- Service and services.

In the different fields of operations the pilot studies are following the so-called “need-motivated research” as well as gender mainstreaming.

Aspects for Endorsement

It seemed to the International Evaluation Panel that governance is well established in Triple Steelix. A second point to emphasise is that the board is headed by a business man, a CEO from the steel industry (Fagersta Stainless AB). In addition, local authorities take an active role in the initiative, with the Mayor of Fagersta on the Board. This high level participation clearly indicates the relevance and the acceptance of Triple Steelix to the main actors in the region.

The evolution of the initiative can be described in three stages: initiation (until the application to VINNVÄXT in 2004); consolidation (2004 to 2005); and implementation (2006 to 2007). During the consolidation phase three focus areas were identified and a number of projects were initiated. In the implementation phase it became apparent that the initiative should focus more on the needs of the steel companies in the region. Thus, a fourth field of operation was introduced, “Services and Service”. For the International Evaluation Panel this is an excellent confirmation of the initiative flexibly evolving to the changing needs of the regional companies.

Triple Steelix needs to rely not only on strong governance, but also on a strong economic basis. The business partners of Triple Steelix are the most important steel companies in the region with a strong international position, including SSAB Tunplat AB, Fagersta Stainless AB, Outokumpou Stainless AB, Ovako Steel AB, Eratsteel AB and Sandvik Materials Technology AB. A further three large companies have joined the initiative, a clear indicator of its attractiveness to the local players.

A further point to stress is the active role played by the University of Dalarna, formerly a technical college. This University is the principal partner, although there is also collaboration with the Universities in Gävle and Mälardalen. The University of Dalarna has a broad research orientation in natural sciences and technology with focus on materials science and material processing including surface treatment, surface properties and steel forming. There are several collaborative projects running between companies and the university in these fields (e.g. “Simulation of roll forming”, “Hydro forming”, “Torque-grip”). It is also to be mentioned that there have been some actions taken to strengthen the attractiveness of the university in connection to the regional needs for specific qualifications. A unique course, possibly on a world scale, is being planned in roll forming technology with a Masters programme and students having access to the “Triple Steelix Machining Centre”.

Some very substantial new investments are underway by regional companies. Outokumpo is doubling its capacity and 400 new jobs are expected. Triple Steelix is involved in the process. This will boost the attractiveness of the region and also, potentially, the importance of Triple Steelix.

Triple Steelix has a strong gender focus. One example for this is the project on “Women as unutilized resource in the steel industry (K2)”. In the course of the project lead examples of women getting involved in the steel industry have been identified, the “Steel Queens”.

Aspects for Reflection

A major challenge for the future is to strengthen the capabilities of the small and medium sized companies (SMEs). In 2007, there were 56 SMEs with about 1,400 employees active in Triple Steelix, significantly more than in 2006 (38 SMEs). These 38 firms are focused on subcontracting to other regional companies and servicing the large steel companies, e.g. in IT and in maintenance. With the developments in supply chain management, the larger companies are tending more and more to rely on system-suppliers. This is a challenge for the local SMEs. They have to recognise the need for stronger collaborations in order to serve as a competitive system-supplier to the steel companies.

For the Evaluation Panel it was made clear by the members of Triple Steelix that one of the tasks of the initiative is to help SMEs to collaborate and thus to strengthen their competitiveness. Also, the steel companies seem to be welcoming a stronger regional supply base. However, for the Panel it seemed that it remains still a bit unclear how to handle this task in the future. Connected to that, it seems to the Panel that the economic potential of the region is not yet fully engaged: according to the interactive research

report about 550 companies are included in the “Club Steelix” circulation list, whereas only 67 companies are at this time active in Triple Steelix.

There were several projects presented to the evaluation team. Most of them were demanding technologically and with high market potential, like “Roll forming”, “Anisotropic properties”, “Torque grip”, and “Increased surface quality”. However, others like “Beverage tap system” or “Maintenance Container” can be assessed as projects focussing on more short sighted and problem solving issues. The question is raised if that kind of “need-motivated research” contributes to the long term strategy.

The region is facing serious demographic and workforce problems, similar to many other remote and/or sparsely populated regions in Europe. The present workforce of about 11.000 is aging, with many close to retirement. Further, the major new investments will offer hundreds of new jobs. So, there is a significant need for young and qualified people. However, the Bergslagen region has lost its attractiveness to employees from outside the region as compared to the situation 30 years ago. The Evaluation Panel is of the opinion that more attention should be urgently placed on enhancing the region’s attractiveness, drawing in talent from other regions in Sweden and aboard, and encouraging talented people already in the region to stay.

2.4 New Tools for Health

Introduction

NTH is a VINNVÄXT initiative in Östergötland to build a regional innovation system related to a platform of distinctive health-related technologies and services from which innovations may be anticipated. The research base, particularly in Linköping, augmented by the VINNVÄXT resourced provision, notably in Norrköping, of incubator facilities and risk finance is commendable. Initially, these were intended to result – over ten years – in 3,000 new jobs and 120 new businesses aimed to assist this region to become a recognised, possibly unique Home-Based Health services and technology platform.

Historically, Linköping has nurtured electronics and aero-engineering platforms of start-up and spinout firms, relating importantly to Ericsson and SAAB. NTH, however, does not yet have such platform ‘champions.’ A portfolio of pre-existing smaller firms and start-ups will have to be managed into an innovative network of variable home-health service suppliers. These will inevitably be a variable mix according to the customer context. We are of the opinion that NTH are conscious of this challenge and well-placed to evolve such market-oriented capabilities. Hence, the International Evaluation Panel are of the view that boosting the capabilities and profile of

NTH, especially in regard to commercialisation of new services through support for home based health, is a worthwhile support VINNOVA can offer.

The Offer

The services NTH has chosen to specialise in for development as an innovation platform are the following:

- A Testbed Platform involving >1,000 dwellings where a variety of Home Based Health services can be offered. This to include heart and other monitoring in the home, care in the home and other non-invasive measuring techniques
- Health for all, by accessing sports-based health activity from the home

In order to evolve this package further, some discussion of linking to the Health-Food area is under investigation, aided by the existence locally of an important company that may be persuadable to produce Heath Bars for eating in place of possibly obesity-inducing ‘candy’.

Aspects for Endorsement

The Evaluation Panel found at their Linköping meeting an experienced business leadership for both the NTH Board and the VINNVÄXT Project Management. Both key personnel were in post following or in parallel with business backgrounds. Hitherto, there had been somewhat less focus, leadership and representation in key positions of experienced business personnel. Moreover, political changes occasioned by local elections meant there were seven new board members accompanying the relatively recently appointed Project Leader. However, in general, the Panel saw this new blood as a distinct asset.

As noted the NTH focus is essentially upon ‘Home-Based Health’ including care of the elderly and sports-exercise. The market for this innovative service is being exposed to the testbed of over one thousand dwellings where a variety of inter-related services as described above are in process of being implemented, tested and refined. Part of the innovation process in this regard involves the activities of PIMM. Here, a proactive innovation approach is taken whereby front-line care staff in and outside hospitals as well as patients, are invited to submit ideas for needed innovations to PIMM. These are assessed and if viable, assigned to companies for production. The Panel was presented with three such innovation project results by the PIMM project representative.

The International Evaluation panel was impressed by the excellent innovation system infrastructure building (e.g. Linkoping-Norrköping incubator expansion) that had been implemented. Moreover, the general

integration of Norrköping in the initiative was to be commended and great enthusiasm was shown by spinout firms and the incubator manager for the efforts of NTH in gaining a place in revitalised former cotton mill buildings in the heart of Norrköping. We approved also of NTH's proposed move from the Mjärdevi Science park to accommodation in the heart of downtown Linköping.

A good, focused engineering base exists in proximity to the VINNVÄXT initiative. Interesting projects are being undertaken both within the NTH arena and outside it. There is academic excellence on the NTH Board. The NTH focus in this regard is 'to create a cluster of international standing' with growth based upon new products linking health and care for persons who would otherwise be in expensive hospital care but may otherwise be more affordably subject to Home Based Health care.

Aspects for Reflection

The Evaluation Panel explored the management processes of NTH and found that, as elsewhere, sometimes working with the NTH Board seems rather difficult. One key comment that reflects this is that 'members don't always turn up to meetings'. This is of particular concern at NTH because the public sector, namely County Councils and Hospital Boards constitute at this time the main customers for the Home Based Health cluster. However, they are also the main absentees from Board meetings. There has been political change in the region but these absences seem to represent 'system-failure' in the management of the public sector in the region since the public sector clearly has not prioritised representation at the NTH Board as a priority for those appointed to Board membership. There is also a sense that in the past institutional weakness & initiatives tend to 'go to sleep.' That is, initiatives were sometimes dreamt up and not followed through. That was almost certainly the product of a lack of focus, which seems now to be improving.

However, strategy still seems a bit unclear, or at least in process of dynamic formation – witness early discussion at the meeting with Process Mangers of 'functional food' and the possible involvement of a local 'candy' firm in production of Health Food Bars. Meanwhile the main focus is clearly leaning towards home health (of which food is obviously an important part) which the International Evaluation Panel thought an excellent, innovative market and sports-health (maybe because of local retailer-sponsor?). Clear perspectives and a forward-looking but practical vision are needed for the future strategy which should balance up public and private market support and opportunities without undermining the contribution of either.

While the International Evaluation Panel highly approved Home Based Health as an innovative service offer with technological content, we noted

that at present international links are secondary to local and regional ones. More attention should in future be given to thinking about the applicability of the model outside the region and outside Sweden. The approach rests on a Testbed in which there are scale-effects in housing provision for elderly people. Internationally, these public provisions may be smaller in scale than in East Götland, Sweden, or the Nordic Countries, where smaller scale public and much private provision may be common (as for example in UK). We think such market research could be an important Strategy issue for the NTH Board.

Finally, much thought has been usefully been given to the NTH 'logo'. There has already been one branding improvement. Now, for an international market, an even clearer brand name for this initiative could usefully be considered. For international market, a more 'snappy' name would probably be an advantage. This could also be a matter for strategy reflection at NTH Board level.

2.5 Biomedical Development in Western Sweden

Introduction

BMV is a VINNVÄXT initiative in West Götaland to build a regional innovation system, based in a platform of distinctive but related biomedical technologies from which innovations may be anticipated. The research base, particularly in Gothenburg, augmented by the VINNVÄXT soft infrastructure-building element, such as entrepreneurship training, provision of incubator facilities and risk finance, are intended to assist this region to be, by 2015, 'perceived as one of Europe's most innovative and expanding regions for industrial development'. This is intended to focus upon 'evidence-based application of new knowledge and innovations in the field of biomedicine' according to BMV's mission statement.

That this is an ambitious vision goes without saying. For whatever historic reasons, Gothenburg, blessed with the presence of high quality universities, the Sahlgrenska hospital and Science Park, and the local presence of globally-known private R&D in Astra Zeneca and other medical businesses, does not presently feature upon the benchmarking 'radar' of main healthcare bioscience 'clusters' worldwide – unlike Lund, Uppsala and Stockholm (Table 1). Hence, there is a case that VINNOVA has seen fit to support, for boosting the capabilities and profile of Gothenburg biotech, especially in regard to commercialisation of new knowledge through support for biotechnology entrepreneurship.

The Offer

The technologies in which BMV has chosen to specialise for development as an innovation platform are the following:

- Biomaterials and cell therapy
- Cardiovascular and metabolic science

In order to build upon this science base, the BMV process involves strengthening the commercial results from exploitation of this research through:

- Educating and training future leaders for advanced biomedical business creation
- Strengthening and improving the biomedical commercialisation infrastructure
- Attracting to the Gothenburg region talented, qualified and capable personnel and the capital associated with building a biomedical regional innovation system in West Götland, centred upon the biomedical research complex in Gothenburg. (In future, the initiative will be known as *GöteborgBio*).

Aspects for Endorsement

The Evaluation Panel found an impressive presence and variety of BMV functions in meeting with the project management team. Each function was demonstrated to be active in developing distinctive key elements of the identified innovation system requirements and reported accordingly.

A reported performance highlight was that SEK turnover had exceeded expectations. At the outset this was targeted for 2005 at SEK 15 million but the actual 2008 out-turn had been SEK 26 million. There follows a list of out-turns on other relevant performance indicators reported to the Evaluation Panel 2005-2008.

- 3 papers published in peer-reviewed international academic journals
- 3 Collaborative Projects
- 1 International Conference
- 17 Innovative Projects
- 23 Attendees on the MSc. Programme
- Incubator Expanded, has 6 firms and 20 firm projects under assessment
- 9 Exhibitions attended
- 1,000 persons attracted to Seminars.

These achievements compare with 2005 stated main aims for 2008 as follows:

- 10 Technology Transfer projects between academia and industry

- GIBBS to be up and running (achieved with 3 years' intake)
- 5 New Businesses (exceeded)
- Bioincubator with 20 spinout firm spaces (achieved)
- 10 new firms with >15 employees each
- >50 members of BMV (achieved)

Thus it can be seen that new things have been added, some aims from 2005 have been achieved or exceeded and a few remain to be achieved. The Evaluation Panel deems this a redoubtable performance in terms of successful project management.

The Evaluation Panel considers that the BMV initiative has a strong focus on present (e.g. dental implants) & future (metabolic/regenerative medicine) growth markets. The panel wondered about the compatibility of these technology areas, given the dental implants business was stated at the evaluation meeting to have demonstrated 'no innovation during the preceding twenty years.' Moreover, it became evident that a regulatory problem had arisen in the implementation of adaptation to dental implant technology in Sweden. Nevertheless, there appeared to be a solid market internationally and strong knowledge links to New York University in this field. The other fields were promising and with high long-term potential (e.g. stem cells applications in cardiovascular medicine) and the Evaluation Panel were happy with presentations in the metabolic and regenerative biomedical fields.

The Evaluation Board wished to commend the excellent innovation system infrastructure building for entrepreneurs - represented by GIBBS and incubator expansion. GIBBS has performed well in bringing together hitherto separate institutional functions and attracting viable graduating student cohorts. Similarly, the bioincubator facility had been expanded appropriately to house start-up businesses and six were present at the beginning of 2008.

While BMV has no explicit gender strategy, the industry is characterised by gender balance and other diversity to which BMV attends. Noticeably, the projects presented in the evaluation had women as leaders or team members who were well trained at GIBBS in presentation skills.

Finally, there is a good science base in proximity on 'the hill' in Gothenburg, including organisations such as Gothenburg University, Chalmers University and Sahlgrenska Hospital and Science Park. Firms like Astra Zeneca, Nobel Biocare, DOXA and Mölyncke Healthcare are present in the Gothenburg area. As noted, such complexes have many projects, of which a number are ascribed to the VINNVÄXT presence. Similarly we

applaud the numerous projects publications, conferences and seminars that continue to have been performed.

Aspects for Reflection

The Evaluation Panel probed the Project Team and BMV Board deeply on issues of Governance, Research & Connectivity (with firms and knowledge centres), Strategy, Markets and supplementary issues. The Project Team represented a harmonious and relatively well-integrated division of labour and responsibilities, with key functions being undertaken efficiently and, largely, effectively. However, on deep probing, some 'cracks' appeared in the Board – comments were offered suggesting saying 'the innovation system was not yet integrated'; in one of the selected profile areas (dental implants, it was asserted that the representative firm had demonstrated 'no innovation for 20 years' in this key BMV sector, accordingly it was stated that the firm in question was mainly involved in BMV as follows: 'we are here for my profits'. Later we learned there had been some tension in regard to a defective dental implant technology and some disagreements between academic and industry representatives of consequence to BMV. Hence, we detected a rather inharmonious board (beneath the surface), something that gave anxiety to the International Evaluation Panel. The Panel is of the strong opinion that collective and collaborative efforts are necessary for successful innovation system building and that 'vested interests' are best left back in company board rooms.

Thus the Evaluation Panel has a sense that the BMV Project Leader and team find BMV Board somewhat hard to work with. This is, to some extent, exemplified in the request for support from the highest level at VINNOVA in explaining Board responsibilities. This has been requested previously, and as neutral, international observers we conclude the time is long overdue for a review. However, this should be part of a thoroughgoing leadership training experience that all Board members should undergo at the earliest possible instance. As will be seen, the Evaluation Panel is of the view that all Board members need such high level training. This should also concentrate on, particularly, strategy-building, an important Board-level input where we observed some weaknesses in BMV and in most other VINNVÄXT initiatives

This is given extra urgency in the context that Gothenburg is not as advanced in terms of global reputation and status as a biotechnology platform as other academic cities in Sweden, such as Lund, Uppsala and Stockholm (See Table 1 below).

Connected to the previous point in important ways, the Evaluation Panel is of the view that international research networking, at least as presented to the Panel at the evaluation meeting, is due an overhaul. It is by no means

normal for inter-cluster networks to arise on the back of hitherto established partnerships based in a different discipline from that under inspection here.

More common is that internationally-active scholars seek out their favoured partners at conferences and through visits, and that co-research, co-publication and even co-patenting activities may flow from that, ultimately involving international teams of researchers. Thus we were surprised to hear that longstanding US automotive research links to Universities in Michigan and North Carolina (neither listed in Table 1) were main vectors of research interaction outward from BMV. This is not necessarily to be critical of BMV functions, since this should clearly not be one for a cluster management team; rather it is an academic function. Thus, while it is fortuitous that North Carolina is US-rated for aspects of bio-engineering, we do not advise 'piggybacking' of this kind as a general strategy for building high-grade international research links.

In conclusion, the International Evaluation Panel is of the view that BMV has made a good institution building start to the process of evolving a Gothenburg-focused innovation system, much strategy and implementation remains to be done if the ambitious vision of high European status, let alone global, is to be achieved in the timescale envisaged.

Table 1 Benchmarking Global Biotechnology Clusters

Global Biotechnology Research & Innovation Clusters

Location	DBFs	Life Scientists	VC	Big Pharma Funding
Boston	141	4,980	$601.5 m.	$800m./annum 96-01
San Francisco	152	3,090	$1,063.5 m.	$400m./annum 96-01
San Diego	94	1,430	$432.8 m.	$320m./annum 96-01
Toronto	73	1,149	$120.0 m.	$89 million (2002)
Montreal	72	822	$60.0 m.	$120 million (2002)
Lund-Medicon	104	5,950	$80.0 m.	$300 million (2002)
Stockholm-Upp.	87	2,998	$90.0 m.	$250 million (2002)
Cambridge	84*	2,650	$250.0 m.	$105 million (2000)
Washington DC	83	6,670	$50.0 m.	$360 million (2000)
Ral-Durham	72	910	$192.0 m.	$190 million (2000)
Zurich	70	1,236	$57.0 m.	$85million (2002)
Jerusalem	60*	1,015	$300.0 m.	$54 million (2002)
Munich	59**	5,500	$266.0 m.	$54 million (2001)
Oxford	59*	3,250	$100.0 m.	$90 million (2002)
Paris (Evry)	58	1,800	$60.0 m.	$40 million (2002)
Berlin	55**	3,700	$122.0 m.	$30 million (2001)
Rhineland	54**	1,250	$30.0 m.	$40 million (2000)
Singapore	38	1,063	$200.0 m.	$88 million (2001)
Scotland	38*	3,600	$35.0 m.	$125 million (2002)
Rhein-Neckar	37**	3,200	$40.0 m.	$20 million (2000)
Seattle	30	1,810	$49.5 m.	$91 million (2000)

Source: VINNOVA
*Note: DBF- Dedicated Biotechnology Firm; VC – Venture Capital; * 2005; **2006*

2.6 ProcessICT Innovations

Introduction

ProcessIT Innovations is a VINNVÄXT initiative in the Norrbotten and Västerbotten counties in the northern part of Sweden to build an innovation system. This region is richly endowed with a range of natural resources, including water, timber, iron ore, and other minerals. Based on these resources a number of mining, steel and pulp & paper companies have developed over a long time and finally reached international leadership, even though they are located in a remote region well away from the main markets. Further, over the last thirty years a number of companies in the field of Information and Communication Industry (ICT) have emerged, and in spite of strong international competition have established a solid local footing. ProcessIT Innovations is building on these advantages and strengths in order to develop further the economic backbone of the region.

The offer

The aim of ProcessIT Innovations is to offer an environment for large companies to improve and strengthen their process technology by working together with local ICT companies and universities. The aim is to achieve

- A joint R&D platform for the systems player. This includes, according the activity plan, joint areas like “Measuring and control systems”, “Interaction and use”, and Business and activity processes”, and
- An appropriate R&D infrastructure.

Four project portfolios were developed, according to the needs of the companies involved. These are “Forest to paper”, Mine to minerals/ metals”, Bioenergy/Biofuel”, and Heavy manufacturing industries”.

Aspects for Endorsement

The Evaluation Panel was impressed by the strong economic base in ProcessIT Innovations. In the Norrbotten and Västerbotten counties major international companies have operations in energy, mining, steel, pulp, and paper. The cluster also includes cross border partnerships with companies or plants in Finland and thus covers the whole Bothnia Bay area. Major companies include ABB, Boliden, LKAB, SCA, and SSAB. There is also traditional and strong expertise in information and communication technologies (ICT) for the control of production processes in heavy industries. Unfortunately, many of the active companies have closed. The report of the ProcessIT cluster for the period 2005 to 2007 identifies that there are 20 (mostly larger) process and manufacturing companies involved, 9 international system providers, and about 33 (rather smaller) providers.

The Evaluation Panel found that the blend of companies can offer excellent test bed opportunities for ICT companies in terms of pilot projects and pilot installations in the regional manufacturing industry. The attractiveness of ProcessIT to local companies obviously has increased. Thus, in the course of time, one major international company, Komatsu Forest, has entered the initiative. The process leaders hope that Siemens will also join.

Another point to stress is the research expertise in the universities in Luleå and Umeå and the close collaboration between the two universities. The collaboration is institutionalised by the "ProcessIT Research Management" which consists of researchers from both universities. This group is now replaced by a university research group which also consists of researchers from both universities. It is also to be mentioned that the universities have strengthened their international linkages. They were successful in acquiring research projects in the 7th framework programme, entering into the ARTEMIS platform, and establishing co-operation with one of the leading universities in the field, Monash University in Melbourne, Australia.

To the Evaluation Panel the support from local government seemed to be very strong, with the county governor of Västerbotten, as one of the key people in the region, chairing the board.

The initiative covers a large and sparsely populated region which measures about 750 km from North (Malmfälten) to South (Umeå and further down to Örnsköldsvik). Nevertheless, there are strong networks which are very much based on personal linkages. People tend to remain in the region; they are very much tied to their roots and have known of each other for a long time. Many managers of companies are graduates from the universities in the region. Also, people are used to travel long distances, so geographical distance is less of an obstacle for collaboration. The Evaluation Panel found that the strong social capital and the high level networking were important success factor to be emphasised.

LKAB is planning major investments in Kiruna (70 bn SEK in the coming 10 years) and Gällivare (5 bn SEK). This provides a substantial opportunity for ProcessIT to serve as a facilitator and to connect the needs of the new investments with the expertise of the region.

Another advantage is the "expanded region". As indicated in the initial activity plan the integration the Örnsköldsvik region into ProcessIT was envisaged, because of the geographical proximity and the long lasting co-operation. This region has a long tradition in biorefinary. Now, it has become a node in ProcessIT with some staff in order to strengthen the collaboration with other partners of the network. In the view of the

Evaluation Panel this focus fits very well into the idea of supporting process innovations.

Aspects for Reflection

There are a large number of technical areas which are covered by ProcessIT. The Evaluation Panel had the impression that some of the local expertise is not fully represented at the Board level. This became quite obvious during the presentation of the project on simulating crane dynamics by Algoryx AB. The Evaluation Panel recommends for the next period to augment the spectrum of Board's expertise and by that, as an important side effect, to involve the next generation more than it has been to-date.

The strategic idea of ProcessIT is to strengthen the interplay between universities, the major processors and the ICT sector. By that, the economic performance of existing ICT companies is to be strengthened, and new companies emerge. In the presentations, there were some examples discussed of how ICT companies absorbed the requirements of the large manufacturing companies and benefited from them. However, if it comes to broader commercialisation of pilots, fully-fledged installations, or new products developed it was apparent that the SMEs cannot survive only by serving the local market. For the Evaluation Panel it was a bit unclear how to handle this challenge and to encourage and help SMEs to penetrate national and international market. One possibility for this is to convince Siemens as a system supplier to participate in ProcessIT.

The Evaluation Panel noted that a number of important projects were driven mainly by the needs of the larger companies. It seemed that due to the different interests of the companies the individual projects are not well connected and/ or do not complement each other in a sufficient way. The Evaluation Panel gained the impression that a generic platform has yet to evolve. Also, bridges from one focus area to the other(s) have not become clear. In this respect, the Evaluation Panel would like to have seen some examples as to how the knowledge transfers from one application area to another works in practice. The Panel also noted during the project presentations that technologies which may also contribute to solutions in applied research, such as nanotechnology, were not yet on the agenda.

ProcessIT has a lot of expertise to offer. It became apparent to the Evaluation Panel that public awareness of the initiative has yet to correspond the expertise of the members involved. Certainly, there are a series of measures to present ProcessIT to the international public, e.g. by establishing an English version of the internet sites, and it is clear that the process leaders know about the importance of public awareness. It seemed to the Evaluation Panel that there is a need for a change in mindset of the

managers of locally oriented SMEs. There should be more efforts in order to "make more noise", e.g. by "story telling".

The international co-operation with Monash University is definitely a point to be emphasised. However, the Evaluation Panel had the impression that this was less the result of strategic choices, but rather based on personal networks, and by chance. The Panel suggests that more attention should be given in the future to a proactive forming of international research links with other universities, in the field of mining for example with universities in Chile or Canada.

Gender issues are treated in a project called "Gender-oriented design studies of innovative IT applications" at the Umeå University. This three-year-project is funded by VINNOVA and other sources. Until now, a model for the integration of gender perspectives in the activities of Process IT has been developed showing that there is need for increased gender awareness. For the near future it is planned to develop additional gender-oriented studies showing the benefits of integrating the gender perspective into innovation processes. To the Panel it seemed that the gender issues are on the agenda of ProcessIT. However, it seemed that concerted efforts for concrete examples or pilot studies for equal treatment should be developed further.

2.7 Conclusions from the Generalist Evaluators

Summary Aspects for Endorsement

1. Strong Endorsement

High growth opportunities: Each of the five initiatives is developing products / services that are currently or potentially well situated within high growth market segments. This augers well for the growth prospects of the five. The markets that are being targeted are clearly international markets, though some of the initiatives have yet to be active beyond the cluster's functional region.

Integrated SME support system: The Evaluation Panel applauds the quality of the integrated SME support that was witnessed within the five regions. The relatively smooth integration of business concept development, incubation, mentor support and angels is impressive.

Levering VINNOVA's resources: We also were encouraged by the ability of each the initiatives to lever VINNOVA funding by partnering with other sources, including the EU, municipality and private sector. Because of the long term funding arrangements that are available, compared with many

other clustering initiatives around the world, relatively little time needs to be spent by process leaders on securing next years funding.

2. Significant Endorsement

At the next level of endorsement, the Evaluation Panel awarded an 'Amber light', with the majority but not all of the five coming through strongly in this respect.

Strong local connectivity, but…
The Panel recognises the sound local connectivity within most of the systems, with a fully functioning triple helix leadership in place; the intensive & proactive support for business start ups; the development of integrated, one-stop test beds; the specialised incubator support; and as was demonstrated on a number of occasions the active business – university collaboration.

Building business-to-business links: The Evaluation Panel considered that there was some scope to improve the focus on developing business-to-business links within the clusters, based on a sound knowledge by the process team of each firm within the cluster (i.e. the broader community of firms, not just the lead firms). Such links facilitate local outsourcing and sub-contracting, leading to improved productivity. These links may start as informal (such as joint purchasing) and then evolve over time to more formal arrangements (sharing assets, joint R&D, offshore offices).

Active governance: The Panel also noted that not all municipalities and local governments were actively involved in their local cluster; at some Board meetings seats were left conspicuously empty.

Summary Aspects for Reflection

In this third category, a number of 'low lights are identified. These are the areas for improvement across most, if not all, of the five clusters. These are ranked with the most critical first.

1 **Revisiting Board membership**
This is the most critical issue identified by the Evaluation Panel. Active clustering needs the committed, not the seat fillers, however senior they may be. In some cases there is value in moving on from the initial Board (that often comprises a very senior group from the community) to the next generation of leaders. Consideration could be given to inviting some of the existing Board members to continue their participation through the establishment of an 'Advisory Board'. This Board could include other notables, including very senior stakeholders from across the Triple Helix (mayors, rectors and retired CEOs can play valuable support and senior network roles). Such Advisory Boards may meet once, possibly twice, a year. As a generalisation, the Panel recommends

that there is relevant business experience in the chair, and the Board should be no more than 6-7 persons.

2 **Strategy development**

The Evaluation Panel, after visiting all five initiatives, came to the strong view that the **current strategic thinking is underwhelming**. This reflects in part the Boards managing the somewhat static projects that were submitted to VINNOVA some four years ago, rather than dynamic strategies that have evolved over time. A philosophy of 'Fail Sooner; Succeed Faster' is recommended, with Boards taking a more entrepreneurial approach to the initiation of new strategies and then rapid learning and adjusting from them.

The development of each cluster's strategies demands open and transparent discussion, not a few seniors deciding for many. Each strategy needs to be grounded in a sound understanding of the cluster's competitive position internationally.

The coming few months will be strategy intensive for each of the initiatives, preparing proposals for coming 3 years. There is a key opportunity to renew both Boards and the strategy, with new Boards implementing their own strategy rather than an inherited one. The new thinking of each Board should not be limited any longer by the 2005 proposals.

3 **Wider and more balanced portfolio of projects**

Substantially addressing competitiveness demands more than investment in 'technology'. The Panel observed that most other clustering initiatives around the world are engaged on a broader portfolio of initiatives than are currently exhibited by the five, with no one 'single bullet' being adequate to address the broad front required. Aspects requiring much greater attention across the five are international market development; brand development; skills, workforce development and talent retention and attraction. Thus the Evaluation Panel is of the opinion that attention should be devoted and actions taken by VINNVÄXT teams to **think more of *innovation* than technology** and integrate innovations from neighbouring fields into products, services, management and markets, aiming for a broader 'platform' character to future developments.

4 **Internationalisation**

The Panel considers that internationalisation is a particularly important area for broadening out the development agendas of the five. Internationalisation can certainly be accelerated by clustering initiatives (and their SMEs) slip-streaming the major firms with the cluster, the ABBs, Ericssons etc. But effective internationalisation requires a broader and more systemic approach.

The Panel were of the opinion that there was generally a poor understanding of each cluster's competitive position globally. This implies a much broader perspective than Sweden and the Baltic Countries, let alone the EU, and it implies proactively developing links with related clusters internationally. There is a need for each cluster to identify and then court the 'hot spots' internationally. There is a danger

in opportunistically reacting to approaches from a Team B, rather than proactively courting Team A.
Effective internationalisation needs proactive Swedish Trade Council support for SMEs within the clusters, and support for collaborative market research and market development projects such as participation at trade fairs. Effective internationalisation also demands proactive links with preferred universities, rather than opportunistically reacting or piggy-backing on a related home cluster's connections, helpful though these may be at the outset.
The home hosting of international conferences can be a valuable component within an internationalisation strategy.
The Panel also recommends that each Board needs to include an 'internationalist' with hands on international experience.

5 **Gender engagement**
The addressing of gender equity is present in each cluster's activity, but merits being more significantly prioritised on each agenda. The affirmative action agenda needs to be moved into a higher gear.

6 **Hard, baseline data needed**
Each cluster needs to more firmly establish its baseline data that demonstrates the cluster's regional importance, its national importance, and its global importance. The relevant hard numbers will differ for each cluster, but could include the number of employees, number of Ph.D.s, number of firms; R&D investment/personnel; turnover; export turnover; number of patents...
Gathering this information will require both primary & secondary data (such data are now routinely published at EU regional level by the EU Trend Chart.[1]) and 'Interactive Research' possibly with Dahmen Institute support

7 **Venture capital**
In common with many countries, there appears to be reluctance by Swedish venture capitalists to extend their portfolios beyond the capital region. In response to this, more emphasis in the regions could be placed on identifying local high net worth individuals with appropriate skills and placing them in contact with investment-ready companies. The informal venture capital market may be particularly important for the more remote clusters.

2.8 VINNOVA's role

It was very apparent to the Evaluation Panel that VINNOVA is extremely well regarded and well respected as an active partner. As one senior stakeholder said:

[1] EU Trend Chart, 2006; *2006 European Regional Innovation Scoreboard*, European Commission, MERIT (Maastricht Economic & Social Research & Training Centre on Innovation & Technology)

'We are together with VINNOVA'. A further comment to the Panel was: 'VINNOVA is less important for the money, but more important when it comes to legitimacy, reputation, credibility, contacts and networks. VINNOVA is different – they are coaching us, and that is good. But we have to deliver.'

VINNOVA's wider role is well acknowledged and respected. Further, the long term funding commitment from VINNOVA, levered by EU, municipality and other sources, stands out on a world scale. It has enabled the Process Managers to focus more on the real task at hand, rather than spending considerable time and energy on continually seeking funds.

Scope for improvement

Whilst VINNOVA is very well regarded, some aspects for improvement did emerge during the Evaluation Panel's discussions.

1 VINNOVA has a number of programmes in place that offer support to the clustering initiatives, each complementing the VINNVÄXT programme. There would be value in tightening coordination in Stockholm between these separate programmes.

2 Selectively, VINNOVA can play a key role as a proactive and high level circuit breaker to clear Board impasses, and to reinvigorate sleepy Boards. At times a trusted outsider with credibility needs to intervene.

3 Over the coming months restructured Boards will benefit from having technical support for the strategic planning process. This support could include the availability of high level Swedish cluster, leadership and strategy facilitators to work with the process leaders in running key workshops with the diverse stakeholders from across each cluster.

4 With internationalisation becoming a key issue, VINNOVA needs to institutionalise at a high level collaboration with Swedish Trade Council to ensure an effective partnership.

5 The International Team had contact with a number of the 'Interactive Researchers'. The role of these researches merits clarification. Currently it is unclear precisely what 'interactive researchers' are intended to do and for what purpose. Moreover, there appears to be no comparative methodology whereby many of the things that are claimed to be done can be used as learning, benchmarking or monitoring instruments among the clusters. The Evaluation Panel was of the view that these aspects of 'interactive research' require substantial tightening.

3 The Specialist Evaluation

3.1 Evaluation approach

The evaluation of knowledge development and innovation focus on the following issue:

What is the quality of the initiated and/or implemented research and commercialisation strategies/activities, also explored from the point of view of international comparison or bench marking?

The second part of the evaluation of the five VINNVÄXT initiatives was carried out between 24 January and 14 February 2008. For each initiative a unique panel of evaluators was formed of leading international and national experts on knowledge development and innovation in the focus area chosen by the initiative.

The evaluation was carried out in the following steps:

- Preparatory reading of written material forwarded by VINNOVA (that is the plan of action and the three year report for the initiative)
- Introductionary discussion on the evaluation task among the evaluation team
- Interviews and meetings at site during one day with process team, research and project teams and companies
- Analysis and synthesis seminar for the evaluation team during one day
- Evaluation memo presenting the conclusions and suggestions of the evaluation team

In the following the evaluation teams present their view on the present situation and the achievements for the initiative as well as aspects for reflections for the initiatives. The evaluation teams has been working from a learning perspective and thus give feed back to the initiative as an input for the work with the plans of actions for the coming three years.

The evaluation of knowledge development and innovation focus on one of the knowledge areas that the initiatives covers, not knowledge development and innovation as whole with in the initiatives as the initiatives cover more than one knowledge area. Each initiative was given the instruction by VINNOVA to choose one knowledge area for evaluation by the specialist panel. The results from the specialist evaluation therefore might not present the achievements from the initiative as a whole.

3.2 Fiber Optic Valley

The evaluation of Fiber Optic Valley (FOV) was carried out 31.1-1.2 2008 by:

- Valerio Pruneri, Professor, Institute of Photonic Science, Barcelona
- Miriam Niburg, Technical advisor, Stockholm
- Ulf Westerberg, Chairman VINNVÄXT program committee, Stockholm
- Eva Westberg, VINNOVA, Knowledge division, Stockholm
- Peter Kempinsky, Consultant, FBA, Stockholm

In line with the instructions from VINNOVA to focus the review on one or two areas Fiber Optic Valley has chosen to focus the evaluation on Fiberoptic Industrial Applications (FIA), one of three knowledge areas for FOV.

Achievements and present situation

FOV has made a significant progress since the start in 1999 to make the region a centre for fiber optic research and industry and has also been important for the overcoming of telecom dependency in the region through a broader scope. FOV is well positioned with the testbed(s) and the Fiber Optic Lab, who both are internationally known. The brand of the initiative is also internationally established.

FOV has a solid infrastructure for R&D, where Acreo Fiber Optic Lab, Midsweden University and Gävle University College are important. The acknowledgement of Acreo Fiber Optic Lab as a Center of Excellence, by VINNOVA, Stiftelsen for strategisk forskning and KK-stiftelsen, as well as winning projects in th 7th framework programme further underlines this. This can be further exploited as part of realising the vision of FOV, for example through attracting further resources from national and international calls and competitions.

The research presented on Fiber Optic Industrial Applications (FIA) has a good mix of internationally standard R&D activities with well defined research objectives. FOV and Acreo Fiber Optic Lab has a strong position to become a European Lab and to get a unique position and long term funding and an inflow of competencies.

FOV has a strong vision of bridging technologies and corresponding market segments which is the core of the initiative. FOV has taken significant steps to realise the vision but it is still to be fully realised. The attractivity and impact of the initiative can be seen for example in cases of national and international companies establishing themselves in the region. FOV also has an asset in high international level of training in fiber optics that could be further exploited.

FOV has gone through a strong organisational development by creating a company for the operations and a member organisation focussing on long term development issues. FOV also gives a leading example of a broader integration of gender in the work with attractiveness and regional growth as well as developing new services and products.

The initiative is based on a strong network of companies. The cooperation and work division between FOV and Acreo Fiber Optic Lab have developed but need to be further fostered as part of realizing the vision of FOV. Additional resources from the Structural funds give FOV possibility to develop commercialisation and entrepreneurship further that the reviewers see as strategic. We also got the impression that FOV partners such as Acreo Fiber Optic Lab and Midsweden University have strong networks and alliances that maybe could be utilised by FOV in their coming work.

The presented idea of competence pools presented is interesting. Mapping of competence lacks and ideas for pilot projects are important. This should be further exploited to specify and structure need driven research as part of the FOV value chain from idea to products.

Aspects for Reflection

The following aspects for reflection has been identified by the review team.

Strategy and focus

The priority areas and projects are perhaps too many and broad which can lead to an inadequate critical mass in specific activities and overall management. For example when it comes to distribution of funding and resources. The synergy and interaction among the three FOV focus areas were not clearly shown and might not be fully effective. The International connections and the value that FOV in short time has achieved are only partly exploited. For the further development of FOV these need to be more visible and an integrated part of FOVs assets and platform

Innovation and commercialisation

The presented value chain from research ideas to commercialization has weaknesses and lack of key elements, such as:

- IPR-strategy aimed at selecting the key ideas with high commercial potential
- Activities and processes for identifying industrial demands and needs
- Identification of scientific and technical activities for meeting industrial demand
- Identification of key partners with complementary expertise (e.g electronics, mechanical assembly) to develop and produce integrated devices and modules

- Identification of financing opportunities (e.g. VC) for commercialisation in future as well as already existing companies
- Product management for bridging research and market
- Sales management for addressing the market
- Dynamic environment and entrepreneurship aimed at fast growing companies
- Science park and incubators within Hudiksvall area.

Regional, national and international positioning

To achieve international competitiveness, FOV needs to ”grow out of” the region by forming networks and alliances with national and international academic and industrial organizations. This has to be combined with a significant local support by strengthening and broadening local and regional partnership (stakeholders). Key for the success of FOV initiative is to take actions to attract highly qualified individuals and high tech companies to the region. It might therefore be appropriate to reinforce communication and marketing.

3.3 Triple Steelix

The evaluation of Triple Steelix was carried out 13-14.2 2008 by:

- Taylan Altan, professor and director, Center for Precision Forming, Ohio State University, USA
- Nader Asnafi, associate professor, senior manager Research & Advanced Engineering, Volvo Car Corporation, Göteborg
- Staffan Truvé, CEO, Swedish Institute of Computer Science, Stockholm, VINNVÄXT programme committé
- Anders Marén, VINNOVA, Competence Areas Division, Stockholm
- Christina Johannesson, consultant, FBA, Stockholm

In line with the instructions from VINNOVA to focus the review on one or two areas of knowledge Triple Steelix has chosen to focus the evaluation on primarily on metal forming technology, one of four application areas in the initiative.

Achievements and present situation

It is not an easy task to put together a coalition of participants (large companies, SMEs, municipalities, universities) that have various short and long term objectives. The Initiative appears to have been successful in putting various parties (at times with conflicting objectives) together towards the common objective of supporting Triple Steelix’s vision. During the first 3 years after start up, the Triple Steelix initiative has been successful in:

- Bringing all interested parties together for contributing towards the common goal. Thus, three large companies, a number of SMEs, the municipalities and the universities have been committed and organised. This is reflected in the presentations made by the process leaders (Maria Engholm and Bosse Lilja) and the two SME representatives who participated in the Feb. 14 program. Furthermore, details of this cooperation and organisational activities (meetings of Board of Directors and working groups) are summarised in the Report 2005-2007.
- Establishing a data base aiming at making the identification of specific activities and needs of (a) SMEs and (b) large companies easier (note: large companies know their needs for research, marketing, and human resources very well).
- Identifying leading SMEs that can be “demonstrators” or “flag bearers” of the Initiative.
- Starting several industrially relevant research activities where industry and universities are cooperating. An excellent example of this activity is 3D roll forming where a unique prototype 3D roll forming machine has been installed in the metal working laboratory of the University of Dalarna.
- Establishing a communication process, e.g. by issuing a Triple Steelix newsletter, sent to members of the Initiative.
- Starting with workshops/seminars to distribute knowledge and information to SMEs.
- Starting initiatives to (a) identify what student skills are needed (for MS and PhD programs), (b) establish a K2 project to increase the participation of women in all activities related to steel production, application and marketing.
- A control schedule system (score card) with objectives and indicators has been developed with support from the involved.

The research and other actions (except for organisational and marketing issues) thus far appear somewhat random and do not yet seem to follow a coordinated master plan towards reaching the overall objectives of the Initiative, for instance when it comes to supporting SMEs in general. Most likely, this is because the actions had to be initiated without such a plan, as the organisational structure required to develop it was not yet established.

The management of the Initiative under the present leadership of Maria Engholm illustrates the strong commitment and enthusiasm that exists among most of the contributors to the Initiative. According to the process leader, the organisational structure is now established and the review team expects to see it being put to work over the coming years. This should lead to more coordinated and systematic action plans with relevant targets and results that can be measured towards the overall objectives of Triple Steelix.

Aspects for reflection

The role of SME in developing Triple Steelix

About 30 SMEs are active in Triple Steelix (contributing with resources and involved in sub-projects). Another 25 have attended open activities as information meetings and lectures). However, the present SME structure in the region is not made clear to the review team. Nor is it clear if the database mentioned at the review meeting contains the information necessary to identify the needs and interests of SMEs in the region. Therefore the team could not comment on to what extent the Initiative's strategy is relevant to the region's SMEs. An investigation of the current SME structure and the SME needs is essential to decide which actions the Initiative should take. The management mentioned that further in-depth contacts with the SMEs were planned. According to the evaluation team this should comprise issues as:

- "Who are the SME suppliers to or buyers from the three large companies; what does the entire value chain look like?"
- The dominant technologies at SMEs with respect to machining (turning, milling etc.), metal forming (conventional deep drawing, bending, hydroforming, fabricating etc.), and/or welding (arc-welding, spot welding, adhesive bonding, laser welding etc.), as well as supporting technologies (e.g. control systems).
- Current SME competitiveness in a national and global perspective (cost level, quality, lead time, delivery precision, staff skills and education level, industrial structure, innovativeness etc.)
- Possible symbiotic potentials (intercompany collaboration in and outside the region that may result in new products, processes or services). For example, a world class company like Uddeholm Tooling could contribute to the present Initiative.

Furthermore, the review team advice the Initiative to carefully investigate if other actors in the region already has asked the SMEs about their needs for competence, network relations etc. The purpose is to make the dialogue more effective, focussing the most interesting companies and starting the discussion from a relevant level. This overview of existing knowledge is presupposedly available through the participants involved in the Initiative.

12 SMEs (3 start-ups) have left the Initiative. There was not enough time to penetrate this issue at the review but the Initiative is recommended to investigate why these SMEs left Triple Steelix.

Most SMEs will need practical information largely available in public sources (technical papers, company literature, web pages, etc.). Often, personnel at SMEs do not have time to search for this information. Thus, it may be worthwhile to expand the scope of the present Newsletter to include

technical short articles that may interest SMEs (in a way similar to for example “Stamping Journal”, or “Metal Forming Journal” in the USA). An alternative could be to publish a similar magazine quarterly or bimonthly in English or Swedish.

The R&I-strategy and the project portfolio

Except for the projects on 3D roll forming and some of the hydroforming projects, the current project portfolio appears to be “large company”-oriented. Also, the focus seems to be on issues of interest mainly to material producers, while there is a lack of projects directed towards **material users**.

The research projects discussed during the review did not clearly represent either **need-driven research** or research that may specifically benefit SMEs. The way in which the present SMEs described how they had mainly benefitted from Triple Steelix thus far (access to networks, help with procedures and project administration) further underpinned the impression that a research program to address SMEs remains to be realized. Thus, it is obviously necessary to develop a procedure to identify and translate the needs of SMEs (the needs of large companies are clearly identified in comparison) into **need-driven** research projects.

The above issues indicate a need to focus on **Management of Technology**. This requires, for instance;

- A Needs Identification Process, which can handle the needs for both continuous improvements (“Kaizen”) and research and technology development.
- Analysis of whether the “new technology” should be purchased or developed by the initiative partners.
- Analysis of how the SMEs and the large companies are best assisted according to the needs identified.
- A joint research and technology development strategy. Although Triple Steelix has appointed a Research Strategy Group, the project portfolio and the strategy presented by the University of Dalarna seem to have been developed without strong coordination with the Triple Steelix initiative. This portfolio contains projects that may be interesting scientifically. However, it is not clear how this portfolio can help the SMEs. It also contains procurement of expensive equipment (sometimes with existing duplicates at the large companies in the region) that can be questioned.
- A Manufacturing Development System (for quality-assured continuous improvement) and a Technology Development System (for quality-assured research and technology development) with identified targets and gateway reviews.
- Both a short-term (1 year) a mid-term (3 years) and a long-term (7 years) perspective.

- Usage of the present financial support to bring in additional funds from EU (7th Frame Work Program, Coal & Steel Union, EUREKA, CRAFT etc.) and other national and Nordic publicly funded programs.

It is not clear whether the university faculty is willing and/or capable of assisting Triple Steelix in all of the activities mentioned above. If necessary, additional people resources (consultants or application engineers from large companies) should be brought in for this task.

Some of the articles published by the Initiative don't seem to be science-based. The article entitled "Women are an unutilised resource in the steel industry" sent to the present reviewers can be seen as an example.

Regional coordination and national/international alliances

The Initiative seems to yet lack concerted regional actions. The different actions taken by Industry development units (enheter för Näringslivsutveckling) at municipalities, labour offices (Arbetsförmedlingarna), University of Dalarna and others in the region need to be coordinated. For instance, the offer of publicly supported university educated so-called "PlusPraktikanter" or similar public initiatives could be used to assist SMEs in carrying out continuous improvement projects and improving their relationship to R&D providers.

The Initiative would benefit from increased contacts with other regions within Sweden and Europe that are dealing with related issues (education, training, research) in the area of metal working. For example similar efforts are being conducted at German universities and by Volvo, SSAB, Scania, Uddeholm Tooling and others in Olofström (in metal forming). It is recommended that the Initiative examine whether there are experiences made which may be useful to benefit from. The recommendation is also valid for contacts with the strongly related VINNVÄXT initiative Process IT, and (possibly) Robotdalen.

Attracting students and relevant competence

It is necessary to develop an innovative plan to attract students at different levels (BS, MS or PhD) to educations and research within fields related to metal working (i.e. machining and metal forming). To fulfil the Initiative's goals it is important to secure that not only the large companies needs for skills are satisfied, and to promote also SMEs as attractive working places for young people. Investigate why the stipend system was recently revoked, and if a new one could be put in place with funding from employers with needs for skills and an "attractive" interface, both large companies and SMEs.

So far, the Initiative appears to have relied on technicians (tekniker) to deal with all of the issues at hand. Behavioural scientists are required to work

with and propose actions with respect to, for instance, gender issues, economists are needed to, for example, conduct competitiveness studies and propose actions. The Initiative is therefore recommended to seek and apply relevant expertise in all areas.

Organisation, management and funding of the initiative

Organisational, management and performance concerning the development of Triple Steelix concerns:

- There is a need for assignment or role descriptions for the Board of Directors, Process Leader, working parties etc.
- SMEs and the needs of the SMEs are repeatedly mentioned in the Triple Steelix material sent to the reviewers while the Board of Directors is dominated by representatives of the large companies, the University of Dalarna and municipalities. The considerations behind the appointments are not clear.
- There is no clear description of how "Growth" and "Attractiveness" (see the vision of the Initiative) are to be measured. This will make it impossible to assess if Triple Steelix is successful in fulfilling its primary goals. The score card should answer to this need.
- Increasing the attractiveness of the Bergslagen Region is the overall goal of Triple Steelix, but the activities presented are not clearly connected to this goal. At minimum, a plan arguing how the current activities lead towards this goal should be put in place. But, concrete marketing activities are probably also needed.
- There is a need for a long term Master Plan for the coming five years, comprising the major activities and a "business plan"/budget. This master plan should be updated at least once a year and contain relevant targets with respect to for instance the amount of money spent on process leadership, administration, communication, operational areas and projects.
- There is also a need for the Score Cards (one Score Card per performance level). These score cards are allegedly being prepared but were not presented to the evaluators.

There is an opportunity to leverage the present financial support to bring in additional funds (from EU, Coal & Steel Union, etc.). However, this may require incentives to all participants (university, Jernkontoret, companies, process leadership) of the Initiative to write proposals and to apply to funding agencies (to go through the pain of paperwork). This possibility to leverage funding should be examined and if warranted result in the development of a procedure to encourage/assist the participants in writing proposals.

3.4 Biomedical Development In West Sweden

The evaluation was carried out 28-29.1 2008 in Göteborg by:

- C. James Kirkpatrick, Professor, Johannes Gutenberg University, Mainz, Germany
- Geir Gogstad, Research Manager, Rikshospitalet, Oslo, Norway
- Stina Gestrelius, Managing Director, Medicon Valley Alliance, Copenhagen, Denmark, VINNVÄXT programme committé
- Pontus von Bahr, VINNOVA, Knowledge division, Stockholm, Sweden
- Peter Kempinsky, Consultant, FBA, Stockholm, Sweden

In line with the instructions from VINNOVA Biomedical Development in Western Sweden (BMV) has chosen to focus the evaluation on one of their two knowledge areas; Biomaterials and Cell Therapy. The observations and recommendations therefore do not cover the knowledge area Cardiovascular and Metabolic Diseases.

Achievements and present situation

BMV is part of a strong and diversified regional academy associated innovation system for Biomedicine in general in Göteborg. BMV and the innovation system as a whole is successfully building on and enhancing the resources in the region when it comes to leading academic research, innovation and commercialization as well as industry in areas where the region has an international standing. Based also on a strong regional backing the innovation system has reached considerable national recognition through funding from for example VINNOVA and SSF in Centres of Excellence, Research Schools, the Key Actors Programme, apart from the the VINNVÄXT programme.

The research strategy and project for Biomaterials and Cell Therapy presented at meetings 29.1 well reflects the international standing in relevant areas (for example the dental school, cell therapy and basic research in biomaterial and tissue engineering) and the needs of the relevant industry in the region.

The process for commercialisation of innovation through entrepreneurship represented by GIBBS is impressive. GIBBS is a unique feature of the initiative that could be exploited further, for example as part of building international networks and co-operation.

The establishment of IBCT is also an important part for further developing the BCT-knowledge area. The strong infrastructure for clinical studies and the support from the research oriented clinical doctors, presented at the meetings, are also important for the success and sustainability of the initiative. The focus on GLP/GMP presented (for example through the wet

lab) at the meetings is important and needs to be re-enforced as this tends to be a bottleneck for innovation and commercialisation.

Cooperation with leading industries is also an important asset for developing BMV further. We were given examples of completely new industrial players interested in cooperation that gives new opportunities for BMV and the innovation system as a whole.

BMV also showed examples of impressive international cooperation with leading clusters and research groups (for example Wake Forest and Chapel Hill), even though the cooperation and internationalisation need to be developed further.

The management team for BMV has qualified experience from industry, which we felt is important. We also sense that the interactive research plays an active role in the development of BMV by studies mapping the initiative both regionally and internationally.

Our conclusion is that BMV has focussed on areas where they have leading industry and research and that they have managed to expand this during their first three years as an VINNVÄXT-initiative. According to the material presented BMV in most cases has reached the objectives stated in the Action plan from 2005.

Aspects for Reflection

Internationalisation and branding

The international analysis of tissue engineering and regenerative medicine was very useful, but primarily gave a Swedish position compared to that of other countries. It would be useful to map and benchmark Gothenburg/BMV to internationally competing *clusters* also for other areas than osseointegration. This could possibly both

- Give a baseline for the VINNVÄXT outcome evaluation (to become Europe's most innovative and expanding regions in the selected fields), and
- Become a basis for making a comprehensive strategy for internationalisation/international co-operations.

It was noted that BiomatCell will have an advisory board with international background, and we believe that a similar board could be useful for BMV as a whole.

The international contacts of BMV and in fact of all the participants of the IS are important ambassadors for the national and international branding. At present the branding strategy is not completely clear, especially to what extent the branding covers BMV or the whole biosector of Gothenburg (and

Oslo). The number of visits to the webpage was not impressive and could reflect the need for rethinking on how to handle the branding.

Innovation and commercialisation

The new companies presented left an impression of having been established at very early phases where the innovations were merely immature, and that foremost support the entrepreneurial attitudes and skills. The system for evaluation, verification, and validation of ideas is thus unclear, and their seems to be a lack of clear economic analysis At early stages of development there is a high risk related to technological and industrial success. Furthermore, it is normally difficult to attract sufficient financing for company initiatives at this stage. There is also a concomitant risk for exhausting the initiators. There is a need to properly analyse the business opportunities in light of several aspects: market opportunities including customer needs, market size, completion, cost estimates, ability to perform all the way up to products or partnerships, and financing.

The system for taking innovations to the market in terms of venture capital and overall external funding was not entirely convincing. Beyond the financing from Innova and primary start-up incentives, there appeared to be no clear strategies for further funding. It may also be questioned how the dependence on VINNOVA funding should be overcome when the process is shifting towards downstream activities and the importance of external financiers/funders will be more evident.

There is a classical conflict between presented academic merits in terms of publishing, and industrial needs for protecting inventions. The presentation gave an impression of a very active publication activity, but a weakly organised IPR system. There seems to a lack of a strategic element for patenting, as a well as a system to sufficiently taking care of this process.

Structure and organisation of the Innovation system

The overall organisation of BMV and the innovation system and the interaction between the parties involved is unclear. In order to break down barriers between academy and industry, and to create a smooth collaboration, an internal communication strategy is also highly necessary. Also, a clear understanding of collaboration mechanisms and work division is needed. The overall structure should be transparent for all involved parties as well as for external reviewers.

The research and innovation span is quite large. It may be questioned whether there is a need to analyse the situation in terms of focussing on certain areas (BCT vs CVM?) in order to prepare for the future downstream phase. Each area is in itself big and complex, and will create high demands from the innovation system when going to be industrialised. On the one

hand one might question whether BMV can keep excellence without focussing. On the other hand, will focussing cause loss of important actors?

There could also be a better facilitation of the cooperation between BMV, the companies and the Health Care system. This could for example be done by establishing a Clinical Studies Center at Sahlgrenska, facilitating easy access for industry and handling of projects between BMV, industry and the Health Care System

Organisation and gender

It is very important for the process managers to make sure that the relevant researchers at Chalmers are integrated in BMV, since this was not evident from the presentations. If possible, it would be good to see BMV as an overall umbrella for all the interactive activities in Gothenburg within the selected fields, i.e. facilitating cooperation between academia, companies and the Health Care system. As was stated in the presentations, IBCT needs to develop its involvement of SMEs (2nd goal), and the external funding base. In order to reach the goals for gender representation, BMV should work at improving it at all levels of the initiative and especially at the higher levels (board, management team).

Competence and excellence

As has already been recognized by BMV itself, there is a lack of a strong partner in the field of biodegradable biomaterials. How this can be achieved within the partnership or in the form of external cooperation needs to be addressed. This point takes on special significance in the light of the current approach in designing innovative biomaterials with characteristics of the extra cellular matrix.

It was not clear from the presentations what mechanisms are in place for recruiting excellence in the research platform, this being a critical issue for sustainability. To our knowledge BIOSUM is intended to fulfil this function. Thus, it would be important to present what instruments have been developed to select the most promising students in the various phases and how their potential can be realized.

Related to this point is also the strategy to promote excellence within the various groups of BMV. Thus, for example, are there seed projects for relevant scientific concepts available for young researchers to follow up innovative research ideas?

3.5 New Tools for Health

The evaluation of New Tools for Health was carried out 3-4.2 2008 by:

- Yongmin Kim, Professor, University of Washington, Seattle

- Joerg Habetha, Department Head, Philips Research Laboratories, Aachen
- Birgitta Frejhagen, CEO Nosdias AB, member of VINNVÄXT Board, Stockholm
- Pontus von Bahr, VINNOVA, Knowledge division, Stockholm
- Christina Johannesson, consultant, FBA, Stockholm

In line with the instructions from VINNOVA to focus on one or two knowledge areas New Tools for Health has chosen to focus the evaluation on 'sports', which is one of their four converging applications. There are two focus areas: Health market, including two applications (sports and fitness, personal health) and Care market, including two applications (distributed care, personal care). Sports is a presumed entry-market to care applications and according to NTH an "easier" way than to go directly for the more regulated markets. At the present, 'sports' is more of a potential than a strategy, or practice, which of course was setting the limits for the evaluation.

Achievements and present situation

NTH is a most interesting kind of VINNVÄXT initiative since it is highly focused on service innovation and the service sector. Internationally, these kinds of innovation systems and policies have been given more and more attention as part of a paradigm shift in the understanding of economy and growth. Moreover, Linköping university has a strong record, with relevant and strong science and technology areas, interdisciplinary tradition, which is a most valuable potential in the area chosen by NTH, and an extensive and successful experience in industry relations and commercialisation. Quite recently VINNOVA has appreciated this in the Key actors programme, financing the development of an even more professional academy-industry collaboration at Linköping University. Not to mention VINNOVA's investments in AgoraLink (two research schools and five competence centers, NTH included, focussing on academy-industry collaboration).

The quality of research being performed at the University of Linköping is very good, e.g., in sensors and physiological measurements. They have an excellent track record over the last 30 years in conducting innovative research in selected areas. In addition they have had some successes in translating their research into commercial products. On the other hand, there could be a lot of untapped potential in the faculty of Medicine for this Initiative. One of the reasons for the existence of this Initiative is the quality and quantity of research being done at the University and its potential in commercialisation and making economic impact.

Professor Per Ask gave a good overview on the research being conducted in the Division of Physiological Measurements at the Department of

Biomedical Engineering. Drs. Peter Hult and Anders Johansson each gave a presentation on their Initiative-funded projects. They were technically sound and advanced with interesting results. These projects clearly take advantage of the existing strengths in the Department of Biomedical Engineering.

The Initiative's own description (model) of the relation between the different areas chosen (health market and care market) and the relation between investments, business growth and reduced costs for the public sector is very much to the point. It is a model that may get business and public sector engaged, and to get mutual understanding and commitments.

Linköping University has a long tradition in being interdisciplinary. The potential of having for example ageing and later life, health sciences, biomedical engineering, sensor science, human multimedia interfaces etc under the same roof gives a great potential to the Initiative with clear inter- and multidisciplinary needs.

The demand driven "hunt" for problems/solutions, yearly competitions etc is good practice both in terms of awareness, establishing links between researchers and companies, and fostering entrepreneurial spirits among students.

In spite of these assets and the quite heavy investments in the environment the NTH have had a slow pace of progress, lacking both a clear picture of strengths, value chains and strategic alliances, and a clear strategy for how to capitalise on the assets. After three years NTH is still "searching" what to go for and more reactive (organic, ad hoc) than proactive. The strengths in relevant research areas and the interdisciplinary tradition that could support in developing the relations strongly needed are not visible. Furthermore, participation from key partners, both public and private, seems to be missing. Moreover, the international awareness is weak and does not illustrate the potential.

The peer review team members think that the Initiative is highly important, with a clear market potential, and with extensive assets at Linköping University and in the region. However, there is a grave concern in the review team about the current status of the Initiative, calling for immediate action to transform itself to become a viable and sustainable entity.

It is our strong belief that it does not make sense to give advice what areas to focus on before some crucial steps have been taken by the management. This is valid not only for the 'sports' area but for any area to be focused on by the Initiative. The review team believes that a strategy to implement the vision, the international awareness, and a clear business development process have to be in place before deciding about what focus/profile is the right one.

This is the reason why we strongly recommend that the Initiative presents how to make the transformation into a real catalyst for business development in the region where researchers from different disciplines can work innovatively with people from industry, active and relevant parts of the public sector plus perhaps venture capital firms in relation to solving real problems and tackling significant unmet needs with business potential.

The leadership should focus on one or two different areas and concentrate their efforts there. In these areas, real alliances with strategic partners should be created, even with those who are not present regionally or even in the country. To create growth in the region is not the same as to be entirely dependent on the region's businesses to fulfil the task.

Aspects for reflection

The review team found the evaluation of the Initiative difficult. The report was lacking an overall structure and the economic section would have required some commenting. To enable the evaluation of the project portfolio, it would have been valuable to have had all projects described in terms of type (research project, development project or feasibility study), budget and also classified due to content (e.g. elderly care, sport, homes, home care and preventive medicine) and position in the Initiative's process. A summary of the projects in the different categories is also recommended. A description of the different activities for match making, seminars and conferences, and the scientific and business-related results should be included.

The need for a strategy to position NTH regionally and internationally

The goal of the Initiative should be to create a cluster with interested and engaged partners in research, industry and public sector within the focus area chosen, to enable growth in the region. It appeared that the Initiative still, after three years of work, did not have a strategy how this should be accomplished. For example, the involvement of the rest of the Department of the Biomedical Engineering, the University hospital, other relevant university departments, the biomedical industry, the care givers (public and private), and the incubators appeared to be far from satisfying.

Prof. Ask presented an international evaluation of the research in his division, showing good results. The review referred to gave good marks to the commercialisation "ambition". However, the presentations didn't give satisfying information about the Initiative's understanding of its position, i.e. research in relation to application context, competitors and demands. The Initiative's unique and competitive offer when it comes to research content and its significance for innovative products has to be given a more solid design.

Moreover, only parts of the process in which the technical products should function were described. To attract translational financing and clients (hospitals, sports clubs etc) the Initiative should be able to present a qualified picture of the conditions needed to implement the products in a certain environment. For example, the measuring techniques require professional information handling, including organisation, skills, ethical considerations etc. To give this context higher attention the need for a thorough dialogue with relevant stakeholders in the process is evident. And the interdisciplinary tradition at Linköping University should be considered as an even more valuable strategic asset.

Furthermore, some key issues in commercialisation, e.g., patent analysis, competition analysis, and business model, have not been thought through. Without these issues thoroughly analysed and business strategy clearly developed, there is a high probability that these projects will stop at a prototyping/demonstration stage.

The NTH has built an extensive member association where about 80 organisations, mainly companies, have joined for a fee. There is a wide range of companies covering potential businesses in the Initiative. The association illustrates the Initiative's ambition to develop contacts and a network in the region. However, for example private care companies seem to be missing, as is active participation from local or more central entities from the public sector. The management themselves comment on that all members maybe do not match the Initiative's profile. The review team is worried that the Initiative run a risk to put too much effort into serving (seminars, newsletters etc) a heterogeneous association where the commitments and commercial relations are too few and the possibilities to gain adequate results in line with the Initiative's contract are limited.

Technology Push versus Application Pull

For a vibrant commercialisation ecosystem, there has to be a proper mix of technology push and application pull approaches towards commercialisation. For a breakthrough and transforming technology, a technology push might be the only option at times for this high risk and potentially high return innovation. It is quite challenging and tends to require a longer time to commercialisation. The application pull approach is appropriate for most innovations. Rather than pushing a technology that researchers have been working on, the researchers and technologists solve a real unmet clinical need, sometimes not using their own technology. The probability of commercial success is much higher with this approach. However, there is some danger in that the researchers and technologists develop a solution to an imagined (not real) need, thus it is critical to perform a good market analysis. By the way, the Initiative-funded project

presentations by Drs. Hult and Johansson were supposed to be from application pull. However, we believe that they were coming more from technology push.

Focussing on one or two areas may make it easier to identify the possible partners and then communicate with them with a clear vision and enthusiasm. This is what the catalyst is about, to get people to pay attention and to motivate them to get engaged and work together toward a common goal. This will help foster a respectful relationship.

Applications to the Initiative seem to be judged with ”gut feeling”. We recommend transparent criteria, both to build trust in the Initiative, but also to make it possible for VINNOVA and others to evaluate whether the right projects have been chosen. It should also be possible to see the applications that have not been selected for funding.

In the biomedical and biotechnology area one cannot play without patents. However, the review panel didn’t hear about secured patents or a policy. The Initiative should strongly work on a strategy on how to aggressively protect the results and a clear process for who should file and govern the rights and the results. The process is two-folded. If a partner has been identified, typically that partner pays for the patent, or else the university has to speculatively finance the patent. If the Initiative’s money is going to be spent to protect the IP, the Initiative has to develop a policy.

NTH as an Effective Catalyst in innovation and business development

As presented, the Initiative needs to become an “effective catalyst” between researchers and industry and a good business development organisation that can be trusted by researchers, users, and industry and venture community. The Initiative needs to develop a mutually respectful partnership with researchers and manage a portfolio of various research and innovations in various stages.

It not only needs to understand the promising research being performed at the University and research institutes, but also provide useful and professional advice to the researchers based on the intellectual property (IP) analysis, competition analysis and marketing study so that the research effectiveness and probability of success can be increased significantly. To some researchers, this needs to be done in a tactful and indirect fashion, but still achieving the desired outcome of researchers adjusting their research directions based on the insight and information provided and/or making the right decisions during conducting research and development (R&D) projects.

When the Initiative identifies a new opportunity and/or a missing technological component(s) in its strategic target area, it could collaborate

with those entities who have this component and/or encourage researchers in the Linköping area to apply their existing knowledge and know-how to tackle this missing component by offering some incentive (seed funding, student support, …).

The Initiative should offer some unique advice to the researchers so the researchers could get some insight on commercialisation process and how to make their R&D projects more interesting, significant and fundable. And then, once the feasibility has been achieved and the analysis has been performed, they can go to VINNOVA, or other financiers, for the big funding. This kind of win-win partnership is crucial for the success of the Initiative. The Initiative seems to have been too passive so far. The presentation gave the impression that there was no opportunity for the Initiative to educate researchers in business development.

The goal of becoming an effective catalyst requires an objective assessment on the Initiative's leadership to ensure that the right people are engaged, people with experience in building bridges between academy and industry/public buyers, ideally experienced in both sides of "the valley of death" and with high potential to be respected by all parties in the triple helix concept. The need for an outgoing profile, with extensive networks and a high ability to make contacts should not be underestimated.

One size does not fit all – strategy and plan must support flexibility

In bridging "the valley of death", there is no single formula to cover all the possible cases. For some innovations, it might take a little push and help (e.g., $10,000 for 6 months). On the other hand, some might take many years to commercialise, requiring a substantial amount of resources and support. It is advisable for the Initiative to have a portfolio of projects covering these extremes. For many innovations, licensing is a good commercialisation pathway. Sometimes, it is the only option. If a regional company who is interested in licensing cannot be identified, the Initiative should explore potential licensing to the national and international companies. Once in a while, an innovation is suitable for creating a start-up company. Sometimes, it is the only option because existing companies perceive it to be too risky and disruptive. This presents a challenge (and an opportunity) to the Initiative in that it needs to decide which route is best for a specific innovation. Based on this decision, the Initiative needs to nurture and market the innovation differently.

3.6 Process ICT, Luleå

The evaluation was carried out 24-25.1 2008 in Luleå by:

- Kalle Lyytinen, Professor, Case Western Reserve University

- Armando Walter Colombo, Dr.Ing, Schneider Electric GmbH
- Gunilla Jönson, Professor, Lund University, VINNVÄXT program committee
- Peter Kempinsky, consultant, FBA

In line with the instructions from VINNOVA to focus the review on one or two areas Process TI Innovation has chosen to focus the review on

- Measuring and control systems comprising industrial requirements for, for example, modelling, model-based control, 3D-based measuring systems and control optimisation
- Business and activity processes containing industrial requirements for how solutions produced will contribute to business benefit for, for example, efficient maintenance systems and functioning aftermarket transactions.

Achievements and present situation

ProcessICT Innovation has built a stable organizational platform for the continuation of the initiative and by promoting richly forms of collaborative interdisciplinary research with the industry that is the essence of the initiative. Given the short timeframe and the small level of investments made the achievements are laudable. The scale and diversity of the initiative and the rich involvement of many of actors is also impressive. The management team has played an important role in this development. According to the reports and the presentations the initiative has achieved its goals in the action plan 2005-2007.

The organizational platform has been created by building and enhancing already existing networks and forms of cooperation between industry and involved universities. One of the main assets is the active involvement of the companies in the region, both from the primary process industry and the ICT-sector. It also covers the big global companies in the region and SME. An important part of the platform is also the institutional backing from the region – the regional administrative board of Västerbotten and Norrbottten and several municipalities.

The region has two university associated innovation systems around Luleå Technical University (LTU) and Umeå University (UmU) that are also parts of the ”support structure” that will be further developed through VINNOVAs Key Actors Programme where LTU and UmU with a joint application have been one of the national winners.

As part of its R&D-strategy ProcessICT has developed a well structured and functioning approach for the co-operation between the primary industry, ICT-companies and the university. It appears to have generated an effective and need-driven innovation process from a research idea to a product. The

approach has been important for the development of the co-operation between industry and university that has taken place since the start of the initiative in 2005. As part of defining and exploring the different research areas ProcessICT has produced effectively technology road maps in some areas in co-operation with international actors (universities and companies). This approach could be extended further in ProcessIT Innovations.

Aspects for Reflection

Results and Quality

From the information presented i´ts difficult to value the sustainability and quality of results and milestones. It is important to ensure that the ProcessIT continues after the VINNVÄXT programme has ended. Actions should be taken to ensure that the initiative continues at the original universities to ascertain continued knowledge development and supply of well educated personnel to both academia and industry. In addition it is important that new business develops with know how development. To remain an important driving force it is important that the initiative stay on top of frontline research and it is important to make benchmarking along the whole programme and set milestone when to achieve the steps towards the top.

It´s not clear to which extent the research and innovations are cutting edge as claimed. Also the academic impact is not visible in the material and discussions**.** The involvement of large international companies and well known research groups must ensure to position themselves. Therefore the programme must include analyses of all research groups on a continuing basis to ensure that no one falls behind. This is especially important as it is always the research that can attract industry and new business. Industry will go where the knowledge is and therefore it is important that the academic world grade the Universities involved at the frontline.

No baseline is presented in the material. Therefore it´s difficult to assess how good are the research groups, not just in Sweden but globally. Likewise, how competitive are the participating companies on a global level concerning processIT? To address the issues above there must always be a starting point for the work in the research groups. The industry in ProcessIT is working in the world market thus making it absolutely necessary to make the analyses based on the platform of the globe. When knowing both the research platform and the industry platform, where the ProcessIT initiative starts and the world platform is known, the objectives for all projects will be possible to establish in an offensive way.

Internationalization

Having well- and world-known partners (academic institutions and companies), the processIT initiative possesses all necessary elements to

occupy a leadership position at international level, extending in a broader manner the current regional and European position. First signals about this international position have been shown by the active (per invitation) participation ProcessIT members in international forums/consulting rounds, which unfortunately have not been clearly reported yet. Let take the participation of the Luleå University in the EU (DGR) – US (NSF) and in the EU (DGR) – Japan consulting rounds, or the participation of ABB, Luleå and Boliden in the EU FP6 Integrated project ”SOCRADES”, as examples.

Nevertheless, these individual efforts need to be re-enforced by a set of consortial internal activities. Among others, the initiation of a process conducting to periodical trend-screening and benchmarking is highly recommendable, covering the global ProcessIT scope. This will help the consortium identifying not only the international position in the different R&D areas, but also be able to actualize the R&D global roadmap/strategy.

Highly recommendable is the creation of an International Advisory Board composed of leading researchers from the academy and executive managers from global industrial companies. A first identificable and short-term could be the facilitation of the exchange of researchers, PhD students and specialists among ProcessIT members and external institutions.

Strategy

The program currently has an “emergent” strategy and clear process approach to engage different actors in the program. There are several issues that need sharpening and clarification in the strategy

The ProcessIT program follows a pull based approach defining the research topics and projects based on industry needs. Pull driven approach has lead to many small and increasing fragmented projects. Currently, it is not clear how priorities between these projects are set up and how the program management guarantees setting up research priorities and resource allocation that will ensure the overall effectiveness of the program. This covers academic and short-term industry goals and long terms development of social and human capital for the region and positioning globally the research competencies. In the long run the current piecemeal decision making can lead to mainly local and incremental innovation, and the program may face the danger of fragmentation with little impact on social and human capital. Likewise, it is not clear how the current decision making about priorities will help identify and generate long-term break-through and transformative innovations and research topics. It is neither clear how the current research approach recognizes and engages all critical actors and seeks to establish a research environment, which promotes the identification of novel research ideas and their transformation to products and services. In

particular, the awareness and early engagement of people with expertise in venture capital and IPR issues is lacking.

Gender perspective

We could sense a lack of concrete action when it comes to gender perspective in ProcessIT, which we feel is a defensive and reactive approach. Today it seems that the projects in the area are set up just to meet requirements by the finance provider. It seems to be a lack of understanding what can be accomplished by introducing the issue in the research agenda and the projects. Therefore concrete actions are not identified.

It is not only in the academia and some large companies at management level that ProcessIT could build know how for the development of how to involve the gender perspective. It benefits all operational levels in the companies and encourages the interest by people to move to the region when opportunities will develop for the whole family. We also sense that there are shallow awareness of the impact of the gender representation in the program and projects. It is necessary for ProcessIT to increase awareness what may be accomplished through involvement of mixed groups of people. Research studies show that the efficiency and effectiveness of research projects are influenced by gender perspectives and ProcessIT needs to understand this when deciding to finance the individual projects.

There also seems to be a lack of utilisation of research results from some of the projects, i.e. on interaction design from a gender perspective. The issue how to deploy research results seems not to have been addressed. Some projects have been introduced to handle for example the design of control rooms in the plants studied. However, little consideration seems to be given to the use of know how built up in such ProcessIT projects. There are also research groups in the universities still outside the ProcessIT that could be involved and based on the built up know how in the interaction design projects could develop excellent new approaches to gender perspectives in front line applications.

Co-operation within the universities

Co-operation deals with how the projects within ProcessIT are coordinated and organized within the academic units and how the program is positioned in the strategic academic development of the associated academic units including the departments and the schools.

The review group did not recognize any careful anchoring of the ProcessIT program in the strategic development of the participating departments and schools. There was no notification of such connections in the distributed materials nor during the review meeting. Surprisingly no academic leadership participated in the review meeting to communicate how

ProcessIT program had been integrated in the strategic plans of the universities and their future development plans and important they saw this program for the development of the participating academic institutions. This is surprising given the size and the potential of the initiative. Without such connection there is a danger that the program will remain just a set of separate projects and additional research funding for some academic scholars in the participating departments. If so, it will fail to truly shape the research competencies and improve the research excellence of the participating departments. Likewise, the program appeared to have little co-operation across different research groups and participating departments due to primary focus on need based relatively small projects. Likewise the program had not carried out any reviews what possibly other critical research competencies and skills are needed to realize the set up strategic goals of the project.

Engagement with Companies

The creation and implementation of R&D projects conducting from the idea to the product is a task that needs the involvement of all three kind of company actors, i.e., research, development and product departments. This participation of different departments and different management levels will guarantee short, medium and long-term commitments and it is a MUST if the results of the projects should reach the market. Moreover, this multilayer company management/department participation has to be guaranteed from the very first ”partner acquisition/partnering” phase of the ProcessIT approach.

There are some identificable aspects that ProcessIT should re-enforce in front of the industrial partners. A first one is its key role as broker/mediator between companies, sometimes competitors, both as strategical and operational levels.

Another one includes the bi-directional transfer of knowledge between companies and academic institutions. Through developing the R&D projects and offering state-of-the-art courses and seminars and making its common facilities available for advanced training purposes, ProcessIT should play a key role in the supply of the trained specialists required for the companies. Also through training of industrial workforces and co-supervision of PhD-students in collaboration with the industrial partners, ProcessIT should extend its coverage to ensure wide industrial take-up of the results achieved.

3.7 Conclusions from the specialist evaluation

The evaluation of knowledge development and innovation in the five VINNVÄXT initiatives covers different knowledge areas, each one chosen by the initiative, and was carried out by five different panels of specialists.

The objective was to focus on knowledge development and innovation in the chosen knowledge areas and thus supporting the initiatives in developing their strategy and action plan for the coming three years. Even though the task was not to draw general conclusions on the VINNVÄXT-programme and the five initiatives as a whole, conclusions can still be drawn from the specialist evaluation in terms of issues and reflections that were raised. The focus one of several knowledge areas for each initiative also means that there are issues and areas that are not fully covered by the specialist evaluation.[2]

Organisation and the mobilisation process

In evaluating knowledge development and innovation the specialist evaluators also commented on issues concerning the platform built for the initiative in terms of organisation, management and the process of mobilising and structuring the commitment of the different (regional) players in the process. In drawing conclusions on knowledge development and innovation, which reflects the outcome of the initiatives, its natural that the conclusions also has to deal with how the initiatives organise and structure themselves and their work process to be able to further develop the capacity to deliver outcomes and results in line with the objectives for the VINNVÄXT-program.

The importance of building a platform for the collaborative process

Building the platform and the process for triple helix collaboration on knowledge development and innovation was noted by the specialist evaluators as one import result of the first threee years of the project. Thus laying the ground for the coming three years in realising the vision and objectives for the initiative when it comes to presenting results on knowledge development and commercialisation.

Regional backing and local mobilisation

Even though the specialist evaluation mainly looked into to issues concerning knowledge development and innovation thoughts were also given to issues concerning the support on local and regional level from municipalities and local and regional administration for the initiatives. The specialist evaluators in some cases noted that this still could be developed and enforced in the continuous development of the initiatives, even though this were the foundation on which the initiatives were built.

[2] This part is written by the process leaders for the specialist evaluation, Peter Kempinsky and Christina Johannesson, FBA.

Governance and triple helix collaboration

Questions concerning governance and triple helix collaboration as a mean to establish and develop the initiatives were not a dominant theme in the specialist evaluation. When issues concerning governance and triple helix collaboration were raised it had to do with necessary steps to develop the initiative for example by showing stronger active support from different parties in the triple helix collaboration.

The Gender perspective – not always an integrated part in the initiative

The gender perspective was not a dominant issue by all of the specialist panels. In cases were the gender perspective where discussed it can be noted that even though steps had been taken to make gender issues visible as a mean to develop the initiative there were still issues on how and to what extent this had actually been done.

Knowledge development and innovation

The strategy for knowledge development and innovation was put into focus in all of the specialist evaluation and the general conclusions regarded:

- **Baseline data for positioning and strategy development**
  The need for baseline data that clearly demonstrated the position of the research groups as well as for participating companies was underlined the specialist evaluators. Baseline data that shows the competitiveness and international standing of both research groups and the companies involved is necessary for both evaluation and strategic development as priorities and allocation of resources need to be transparent and reflecting the actual situation for the participating players. Baseline data is a must for the necessary development for the initiatives to “grow out of the region” and become an recognized international player.
- **Developing the concept of strategy**
  The need to further develop the strategy for knowledge development and innovation that was discussed in all five of the specialist evaluation in many cases had to do with issues concerning the concept of strategy it self. The strategy for knowledge development and innovation in many cases had focus on the process how to identify relevant R&D-project in collaboration between industry and university. To lesser degree the strategy presented consisted of analysis and conclusions on the knowledge area regarding challenges and demands in research and innovation from an international and competitive perspective regarding both industry (market) and university. The need for further developing the strategy thus has less to do with the process how to in collaboration identify research projects than to explore and define the challenges and demands in industry and university globally.
- **Balancing application and technology driven R&I in strategy**
  An important issue in the specialist evaluation had to do with the balance and integration between application- and technology driven R&I

projects. This is an important issue, as the VINNVÄXT-prrogram intention is to support growth and competitiveness in innovation systems, not just through R&I-projects based on identified needs at hand but also through a more radical transformation and development of the industry at hand that can support a more sustainable competitiveness. The balance and integration between a need/application driven approach and approach based on technology push for obvious reasons differs between the five initiatives. In general the five different evaluation panels identified a more general need to further develope and integrate these two perspectives in the further development of the strategy for knowledge development and innovation. This development is strategic as it will have consequences among others for the priorities when it comes to R&I-projects and the balance in the project portfolio between farsighted innovative projects and need driven projects.

- **Internationalisation and the international positioning of the initiatives**
  Examples of internationalisation and the international positioning of the initiatives in the different knowledge areas were presented and discussed for all five initiatives. In several cases the specialist panels also underlined the international positioning and networks that were built by the initiative in a relatively short time. At the same time this is an issue that the initiatives need to further develop and to build an international position and international networks in university and industry on their own right and strategically developing the platform for the initiative by, in a way “growing out” of the region.
- **The innovation and commercialisation process**
  Important steps had been taken in all initiatives to structure and organise the process for innovation and commercialisation showing interesting and leading example of how to develop this process. The presented material and discussions with the initiatives highlighted aspects and issues different for the five initiatives, but in general the specialist evaluators identified a need to further develop the innovation and commercialisation process. The need for improvement differs between the initiatives but has to do with issues concerning venture capital, patenting and IP-rights as well support for entrepreneurship.
- **Global companies and SME**
  The balance and synergy between global companies and regionally based SME:s is an important issues for the further development of the five initiatives. The initiatives are of course different when it comes to the structure of the industry in the chosen knowledge area – both regionaly and international. A critical success factor for the initiatives has to do with the abilitiy to link and integrate global companies and regional based SME:s in collaborative innovation processes. For this its important to develop an offer for cooperation that is attractive for both the global companies and the SME:s.

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

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