VINNOVA REPORT
VR 2015:01

# Bumpy flying at high altitude?

## *International evaluation of Smart Textiles, The Biorefinery of the Future and Peak Innovation*

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VINNOVA

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I**Series:** VINNOVA Report VR 2015:01
**ISBN:** 978-91-87537-25-7
**ISSN:** 1650-3104
**Published:** March 2015
**Publisher:** VINNOVA - Swedish Governmental Agency for Innovation Systems / Verket för Innovationssystem
**Case no:** 2002-00568

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# Preface

In this evaluation report VINNOVA (Swedish Governmental Agency for Innovation Systems) presents the second evaluation of the initiatives in the third announcement of the VINNVÄXT-programme. The initiatives were selected through a call for Innovation Systems in Early Stages. The aim was to find fresh initiatives with major growth potential which were not yet fully established in their regions. In 2005 the programme council and three assessment panels, plus officials and experts from VINNOVA, selected five growth initiatives (from 86 applicants) to receive SEK 2 million each for two years. In June 2008, four of these initiatives were upgraded to VINNVÄXT winners. Three of these initiatives still get funding through the programme and these are the three that have been evaluated.

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 are evaluated every third year. This midterm evaluation had both a summative and a formative/learning approach focusing on achieved results and strategic issues related to developing the initiatives further. The focus for the evaluation was the quality of implemented research and innovation/commercialisation strategies and results from an international comparison perspective. Other evaluation aspects was organisational and leadership issues as well as outcome and impact of the initiatives in terms of mobilising key actors and influence on the regional (and national) innovation systems. The evaluation panel also looked at the conditions established for the sustainability of the initiative after the financing through the VINNVÄXT-programme.

The evaluation has been carried out through a group of international specialists from university and industry, both in cluster development and regional innovation systems and in the specific knowledge area for each initiative.

This report presents the evaluation of the following initiatives appointed as winners 2008:

- Smart Textiles
- The Biorefinery of the Future
- Peak Innovation

After an introduction to the evaluation, there will be a chapter for each of the three initiatives.

VINNOVA in March 2015

*Charlotte Brogren*
Director General

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# 1 Introduction

This report presents the evaluation of the 2008 VINNVÄXT-programme initiatives:

- Smart Textiles
- The Biorefinery of the Future
- Peak Innovation

## 1.1 The VINNVÄXT-programme

The VINNVÄXT-programme aims to promote sustainable regional growth by developing internationally competitive research and innovation milieus in specific growth fields. VINNVÄXT also wants to catalyse a broader trans-formational change in society, towards innovation-driven sustainable growth in the Swedish regions. This will be achieved by funding institutional development and needs-driven R&D to strengthen the cutting-edge competence of the various milieus. There will also be strategic efforts aimed at developing innovation systems.

The regional innovation systems supported through the VINNVÄXT-programme have been selected through national calls for proposals and the winners are all believed to have excellent growth potential. Some 200 initiatives have applied for funding under VINNVÄXT's four calls for proposals. Of these, 15 regions ("functional" regions) have been declared winners.

The objective is that the winners will become internationally competitive in their respective fields within 10 years. A unique aspect of VINNVÄXT is the long time horizon. VINNOVA will provide the winners with funds of up to 1.1 million euros per year for 10 years. After this period the milieus also have an opportunity to search for further support in what VINNOVA calls the step-up and transition phase. This phase can be up to six years.

## 1.2 The 2008 VINNVÄXT-programme initiatives

### Smart Textiles

Smart Textiles develops textile innovations that improve people´s everyday lives and benefit the industry, the healthcare sector and the environment. By connecting research with companies, institutions and the public sector establishes a wide range of expertise. Examples of projects are fabrics that purify water using nothing but the sun as energy source and clothes that can take an ECG or become cool at extreme temperatures. Smart Textiles has not only become a motor for the textile industry in Sweden but an important player on the international arena.

### The Biorefinery of the Future

The Biorefinery of the Future will be a leading creative initiative for the development of biorefineries based on forest-based raw materials and energy crops. Sustainable growth will be created through the development of new knowledge and of bio-based green products, chemicals and fuels plus new energy solutions from industrial process streams. The Örnsköldsvik area has

a strong tradition in the forestry and process industries and some major manufacturing companies.

### Peak Innovation

Through Peak Innovation, the Åre-Östersund region will become an internationally leading milieu for research, innovation and business development in winter sports, tourism and outdoor pursuits. Customer-led development will produce new trans-sectorial systems of services and products. Parallel services and technologies will be developed in winter sports, tourism and outdoor pursuits. This venture is based upon the region's strong tourism, events and winter sports sectors as well as its international competence centres for the tourist industry (ETOUR) and winter sports (Swedish Winter Sports Research Centre).

## 1.3 Evaluation as a tool for learning and development

The initiatives in the VINNVÄXT-programme will be evaluated every third year to determine whether they are complying with VINNOVA's requirements. In 2011, the first evaluation of the 2008 initiatives focused on the process of organising and establishing the innovation system and the results to date when it comes to knowledge development, innovation and commercialisation.

This midterm evaluation had both a summative and a formative/learning approach focusing on achieved results and strategic issues related to developing the initiatives further. The focus for the evaluation was:

- the quality of implemented research and innovation/commercialisation strategies and results, from an international comparison perspective
- the achievement of the initiatives when it comes to setting up the organisation, the processes and mobilising key actors that embody the platform for future growth and international positioning in their respective growth area
- the influence on the regional (and national) innovation system
- the conditions established for the sustainability of the initiative after the financing through the VINNVÄXT-programme.

The evaluation should be seen as a learning process and input for the strategic development of the initiatives and the action plan for the coming three years. The evaluation is one activity of the learning strategy that adds value for the VINNVÄXT-programme.

## 1.4 The evaluation team

The evaluation was carried out by international experts in a peer review. The evaluation team consisted of:

- peers with generalist expertise in innovation systems and cluster development
- peers with specialist expertise in knowledge development, innovation and commercialisation in the specific field for the initiative.

The evaluators are presented in the matrix below. For background on each of the evaluators, see Appendix 1.

**Table 1 The evaluators**

| NAME | EXPERTISE | SMART TEXTILES | BIOREFINERY | PEAK INNOVATION |
|---|---|---|---|---|
| LISA DE PROPRIS | Innovation systems & cluster development | X | X | X |
| VESA HARMAAKORPI | Innovation systems & cluster development | X | X | X |
| CLARE JOHNSTON | Research & technology | X | | |
| LUTZ WALTER | Research & technology | X | | |
| MARKKU KARLSSON | Research & technology | | X | |
| JACK SADDLER | Research & technology | | X | |
| STEFAN GRAU | Research & technology | | | X |
| MARK HELD | Research & technology | | | X |

## 1.5 The evaluation process

The evaluation of the three initiatives was carried out in May 2014:

- Smart Textiles, 15-16 May, Borås
- The Biorefinery of the Future, 19-20 May, Örnsköldsvik
- Peak Innovation, 21-22 May, Östersund

The evaluation consisted of the following activities:

- **Background material** – The evaluation is based mainly on information presented by the initiatives in the three years follow-up report. The report meets VINNOVA's requirements by covering strategic aspects of how the initiative's process and results have developed. The report also includes future strategy and plans.
- **Panel review** – Interviews and meetings with a selection of relevant actors from the initiatives (management team, steering committee, stakeholders, intermediaries, university management and researchers, entrepreneurs, SME, global companies etc.)
- **Analysis and conclusion** – The review team conducted workshops to draw conclusions, present recommendations and a synopsis for the evaluation report.
- **Feedback meeting** – Meetings were held with the management teams to present and discuss the conclusions and recommendations from the peer review team.
- **Evaluation report** – The conclusions and recommendations from the evaluation are presented in this memo to the initiative and VINNOVA.

# 2 Smart Textiles

*Unravelling stent - the first removable stent (Photo: Anna Sigge)*

## Summary

The initiatives within the VINNVÄXT-programme are evaluated every three years to determine whether they comply with the operational/results based criteria established by VINNOVA. This midterm evaluation of Smart Textiles (ST) was held on 15-16 May 2014. Prior to the visit, the panel received a three years follow-up report from ST and other background material so the panel could prepare for the visit. The full agenda enabled the panel to meet all participating ST staff and many of the key stakeholders involved in the initiative.

The event facilitated very useful meetings between ST and the panel, academics from the university and personnel from involved companies. This provided valuable opportunities for discussion of the projects and achievements to date and enabled an open exchange of ideas future strategies and potential developments.

From the documentation received, and presentations given to the panel, it was clear that recommendations made in the 2011 review had been carefully considered and acted upon. The panel was pleased to learn that as a result, significant strategic thinking had enabled the ST team

to identify areas where actions and changes were necessary to strengthen the team's sense of purpose and identify and improve the adopted processes.

During this visit, the panel saw solid evidence that the ST team has refined and matured its methods of facilitating ideas and research.

A number of **strengths** have been identified:

- The bringing together of all the main ST partners, as well dedicated facilities as the colocation of R&D, prototyping and incubation has linked the two important phases of the innovation process: a) from innovation to prototype and b) from prototype to product.
- The adoption of new technology for concept prototyping and for the effective commercialisation of competitive textile innovations, such as products that improve people's everyday lives and benefit local industries.
- The concentration of efforts in three focus areas - health and medicine; architecture and interiors; and sustainability.
- Better connections across companies, institutions and the public sector are establishing a wide range of expertise.
- The renewed confidence has sparked pride in the people involved, generating a positive impact on the local and regional economy.
- The ST team continues to be open and enthusiastic to feedback and it was evident that they are constantly seeking innovative ways to evolve and improve the current working methods.

**Challenges** for ST:

- Stronger links to the construction, architecture and interior design fields are still to be built.
- The balance of the increasing flow of company-driven project ideas and the wherewithal to support routes to market for increasing number of far-reaching research-driven projects.
- There is greater potential for cross-firm co-operation. There are not enough visible networking opportunities for a spontaneous dialogue between the industries involved.
- The role of ST´s research and development is not always clear among the stakeholders; there were some contradictory views about the role of IP and commercialization for ST.
- ST may need to become more selective and to start prioritize projects which enable greater visibility and guarantee a more sustainable long-term growth.
- ST is not yet active enough in applying for EU-funded projects.

## Recommendations

The panel has made recommendations in this report to support and strengthen ST's very positive current position and ensure its future success.

- It will be essential for the equipment, technical resources and required human resources be continually reviewed and updated.
- Collaborations with technology partnerships or sponsorship would help ST complement the available budget for essential equipment acquisition and maintenance.
- Further focus would not only sharpen the profile of the cluster, but also enable prioritisation of resources and commitments.

- Further collaboration through industry partnerships might lead to more opportunities for taking products to market than what has so far been explored. Greater potential for cross-sector innovation.
- Serious consideration should be given to balancing company-driven project ideas with the wherewithal to support far-reaching research-driven projects.
- Exploring further options for handling IP for research driven prototypes and operational models would be desirable.

ST should showcase its leading position more clearly and more broadly. Consider high profile events, such as conferences, seminars and exhibitions in the selected focus area. An international benchmarking still needs to be carried out.

## 2.1 Achievements

The evaluating team recognises clear progress since the 2011 evaluation. This was already evident from the report, but even clearer during the site visit. Not only were the 2011 recommendations carefully considered and a number of them implemented, significant strategic thinking also enabled ST to identify additional areas requiring action to strengthen their sense of purpose and to identify clear processes.

ST has moved to a renovated building near the university; the Textile Fashion Centre. This building is not only a symbol of their creative, innovative and post-industrial soul. Functionally, it brings together under the same roof all main partners. Structurally, it provides facilities that are much more dedicated to their purpose. Indeed, the co-location of R&D, prototyping and incubation crucially links the two important phases of the innovation process: a) from innovation to prototype and b) from prototype to product.

The understanding of the evaluation panel is that, as suggested in the 2011 evaluation, a Task Force was set-up to carry out benchmarking exercise and to evaluate possible priority areas to focus research efforts. What is laudable is that such Task Force was closed down once it had achieved the expected outcome.

ST has also taken a more strategic approach in combining research-driven innovations and company-driven innovations. Clear parallel processes have been set up to enable both research driven-projects and company-driven projects to be vetted and pursued. This has been facilitated by much better dovetailing between the Design Lab and the Technology Lab and by proximity to the incubator. The setup of STUF as a mechanism for assessing research driven projects has shown a dedication to blue sky research. At the same time, the introduction of the Innovation Business process as a transparent mechanism for evaluating company-driven projects heavily determined by commercialisation potentials, highlights a commitment to market-driven innovations.

The emphasis on pursuing innovations that address business needs is also substantiated by the onsite presence of the Incubator and the strong synergies between it and the Prototype Factory. Additionally, more business connections and engagement have now been secured thanks to more business/client representation on the Steering Group (such as IKEA and the Södra Älvsborg Hospital).

Altogether, ST has strategically addressed one of the concerns raised in the 2011 evaluation in terms of having a skewed Triple Helix. At the time, the university weighed more heavily. Now, companies are all round more closely and more pro-actively engaging with ST. The benefit of this is a stronger local and national reputation for excellence in smart textiles. Many local and national companies are seeking to develop new ideas with ST thanks to its increasingly recognised excellent research facilities and competences.

## 2.2 Structure

### Knowledge base

In the past years ST has developed into an important and well recognised knowledge provider and network access provider for the local, regional and increasingly national firms interested in textile material or technology related innovation.

By bridging the gap between academia and industry ST provides research and related services at the interface of textiles, emerging technologies and new applications or markets. ST has also increasingly developed good connections with EU research networks and initiatives, such as the European Technology Platform for the Future of Textiles and Clothing.

The decision to concentrate efforts in three focus areas (health and medicine; architecture and interiors; and sustainability) should help further focus efforts, build a unique competence and capacities profile and sharpen the communication of the service offer to current and potential collaboration partners.

The focus area health and medicine seems to be the most advanced in terms of internal R&D capacity and industry engagement with medical textile companies. On the end-market side, the local Södra Älvsborg Hospital is a very committed stakeholder. The focus area dealing with sustainability through new material solutions and recycling will require a long-term commitment of external players with large-scale industrial, technological and financial capacities to which ST can make relevant contributions without being able to lead the initiative. The architecture and interiors area represents an interesting domain for combining the technological and creative capacities of ST, but stronger links with end-market oriented actors in the construction, architecture and interior design fields still need to be developed.

To further strengthen the knowledge base and to develop a unique competence profile, an international benchmarking exercise still needs to be carried out. This could clearly profile ST vis-à-vis other organisations with similar or complementary competences at the European level at a minimum. This type of exercise could also help identify potential international collaboration partners.

Further crucial collaborations should be developed, for instance with manufacturers of textile machines or with other specialised technologies or services providers to investigate the possibility of privileged partnerships or equipment sponsorships, with ST acting as a test bed or showcase for innovative materials or products that can be realised with such technology. This will drive further interest from industry, which generally appreciates the possibility of testing and experimenting with the latest technologies before making investment decisions. Tangentially, such technology partnerships or sponsorship would also help ST complement the available budget for equipment acquisition and maintenance.

## Stakeholder network (research, industry, public bodies)

ST has built a very strong and active Triple Helix with key regional and sector players from industry, academia and public authorities firmly on board and fully committed. Based on this strong core, ST has been able to extend its sphere of influence beyond narrow regional and sector boundaries. Extensive and regular collaborative activities involving key stakeholders have helped maintain and strengthen the commitment of its partners. The same approach should be consequently continued in the future with a special emphasis on bringing in triple helix partners for each of the focus areas; health and medicine, architecture and interiors, and sustainability.

While there is certainly still ample scope to engage with additional partners or customers from around Sweden, ST could also further explore the offering of its unique services to potential partners or customers in neighbouring countries, especially Norway and Denmark, where no such competences can be found. In the latter case, access conditions or service fees may differ from those offered to Swedish organisations, honouring the significant public investment from Swedish national and regional funds.

Future competence and business development efforts should focus on reaching critical mass in all three focus areas.

In the health and medical area, the commitment and enthusiasm of the partners from Södra Älvsborg Hospital should be fully exploited to gain a deep understanding of how innovative textile solutions can bring the most added values to patients, healthcare professionals and hospital management. The knowledge of end-user needs combined with the textile design and technology competence of ST and its industry partners can lead to a multitude of new project ideas. The hospital also provides an excellent testing and demonstration site for product prototypes.

In the architecture and interior design area, the addition of one or several champions from the construction, architecture or interior design sector would be of great benefit to enable ST to better match project ideas with end-market needs and requirements. Construction and architecture, in particular, are relatively conservative vis-à-vis new material concepts due to strict legislation and standardisation related to safety and durability. The addition of one representative from this sector to the ST Steering Group could be a first step. Contacts and collaborations could also be sought with building and construction-related networks and clusters around Sweden, such as the Smart Housing Cluster also funded by the VINNVÄXT-programme.

For sustainable materials, the market penetration of ST's innovations will highly depend on the commitment and collaboration of key actors in the raw materials sectors, in this case the forest-based industry, as well as from large-scale consumer oriented companies, such as IKEA. These can ensure the market uptake of new materials on the necessary scale. Without such collaboration, an independent ST strategy for more sustainable textile raw materials will be difficult to implement.

In summary, ST's innovation strategy focuses on three selected areas where ST has the concrete opportunity of becoming an industry leader nationally and internationally, in part thanks to a network of research and industry partners. Such focus not only sharpens the profile of the cluster, but also prioritises resource commitments. This does not preclude company-driven

research in areas outside the focus areas and thus ST aspires to couple depth with some breadth in the research scope. This bottom-up research dimension should be maintained as much as possible.

## 2.3 Innovation process

### Ideas to prototypes

Since the previous review, ST has made great progress in terms of establishing itself as cluster and is now ideally positioned to leap even further within the revitalised environment of the Textile Fashion Centre at the University of Borås.

The smart materials prototype factory combines excellent facilities and expertise in design, technology and business to enable collaboration and to encourage opportunities for serious cross-fertilization and influence. The initiative demonstrates great potential for flexibility in forward thinking and innovation in the selected focus areas. The Prototyping Factory is able to service and support both academic and industrial research and to link both areas for the commercialization of products and extension of knowledge.

The strategic focus on the three areas of health and medicine, sustainable textiles, and architecture and interiors, has enabled ST to target and develop key partnerships in relevant areas of knowledge, with appropriate facilities and working methods.

There is a sound and supportive system in place to take innovative design ideas through to application, followed by a robust review and selection process that considers business aspects and subsequently through into incubation and the production of prototypes, which are tested and ready for the market.

The textile facilities include weaving, knitting, finishing, printing and sewing are housed alongside resources offering emerging technologies and industrially compatible testing laboratories. These adjoining areas enable credible prototyping and attract business entrepreneurs of varying scale to exploit product development. To date, ST has developed a large portfolio of small projects into prototypes. These have been visible through the website, the Textile Showroom and through press coverage, attracting partnerships for future funding. Some prototypes have been developed into larger-scale significant projects.

The current facilities are clearly excellent in offering textile diversity and relevant laboratory equipment for the current level of research initiatives. To stay at the competitive front of this rapidly changing and evolving field, it will be essential to constantly review and updated the equipment, technical resources and the human resources. Continuous research into cutting-edge textile machinery and the required support are important for both academics and technicians. Staff attendance at trade fairs, such as ITMA and Techtextile, will continue to be beneficial. Funding and resources to support the initiative to be at forefront of the interface between textiles and emerging technologies will be essential and crucially expensive; alternatives such as partnerships and outsourcing may need to be considered. Alternative smart material may also consider exploring strategic or relationships with other centres to facilitate larger scale prototyping capacities.

### Prototype to market

The majority of projects are company-driven, which ensures market focus, product relevance and potentially a greater likelihood of success. There are currently two main entry points for companies; either a strategically planned long-term Business Innovation offer or a practical, hands-on short-term Prototype service.

There is close collaboration throughout the process with the incubator to facilitate a route to commercialisation for projects. The regular collaboration between design researchers and companies encourages innovative business approaches and fresh thinking. Further collaboration between industry partnerships may have more potential to take products to market than yet explored.

The evaluation team considers that it may be useful to review the increasing flow of company-driven project ideas, as well as seeking the wherewithal to support routes to market for an increasing number of far-reaching research-driven projects. It may be necessary for ST to become more selective and to start prioritizing projects that enable greater visibility or have greater potential to guarantee sustainable long-term growth. Further exploration of funding opportunities for PhD students or international partnerships is recommended to support long-term research-led projects.

The strongest evidence of success at this stage appears to be in the examples of innovative products developed for the health and medical field and applications for the body, such as the PreCise bandage and protective clothing. Products, such as the Pjama concept, have additional potential application in the senior market and the currently targeted juvenile market.

This perhaps reflects where there is currently the greatest need and market opportunity has been identified so is the most immediate context to pursue. The areas such as sustainability, architecture and interiors are sites for ongoing development and will require more complex specialist technical support and knowledge to be explored through further longer term developments and partnerships.

The evaluation panel considers it important for ST to explore options for how it deals with IP, especially for research-driven prototype and to explore what operational model would be desirable to implement.

## 2.4 Regional and national impact

Given the strong tradition of the textile industry in Borås, the ST initiative not only engages very committed local and regional stakeholders, it is also expected to greatly impact the local and regional economy. The research infrastructure offered by the University of Borås to ST is ideal for a centre of research and development excellence. ST is also well networked with the main actors in the European textile industry. These facts mean the initiative can form an even stronger regional smart specialisation on niche with an international impact.

### Strengths

Following a period of industrial decline over the last ten years, the city of Borås is experiencing economic and social renewal. Regional policymakers, firms and residents committed to drawing

on their historical industrial specialisation have a vision for a textile industry able to compete in the 21st century. This renewed confidence has reignited pride in the region's history and residents look optimistically to the future. ST is part of this renewal and regional impact.

Changes in the composition of the Steering Group open up new opportunities for ST. New competences have been added to the group, enabling stronger cross-fertilisation, for example between ST and healthcare. It is worth noting that the composition of the Steering Group still reflects the Triple Helix model.

Good co-operation between the university and companies is a clear strength for ST. The selected focus areas are well defined for future co-operation. The combination of Textile Lab, Design Lab and Business Innovation offers a worthy human, social and technological infrastructure for co-operation.

The evaluation panel saw evidence of successful regional and national co-operation between ST and other clusters and knowledge bases. In some cases, this was happening even internationally. Regionally, co-operation with the health care sector seems to work especially well. Nationally, connections with the furniture cluster and smart housing clusters are also promising.

## Challenges

Even if co-operation between the university and companies is well established there seems to be a lot of potential for cross-firm co-operation. There is not a visible networking arena for a spontaneous dialogue between firms and there is no real brokering (or dating) function aiding companies to find each other.

The role of research and development within ST is not clear among the stakeholders. For example, the aim of the University of Borås is to conduct long-term research in new, untouched fields. The companies emphasize the service function of the initiative and its facilities. A balanced view among the stakeholders would increase the societal impact of the initiative.

There are contradictory views about the role of commercialization for ST. On the one hand, commercialisation is seen as purely the task of companies. Larger companies, in particular, have this opinion. On the other hand, commercialization is seen a bottleneck for creating new start-up companies. Lacking a common view leads to the ineffective use of resources and decreases regional impact.

The ST initiative is seen mostly as a platform for co-operation between the university and existing companies. However, there is much potential for start-up entrepreneurship among the university's students or alumni. This is largely untapped and is a challenge for regional and national impact.

ST is not yet active enough in applying for EU-funded projects. However, these projects would be a natural way to increase regional, national and international impact and to make the initiative better known in important arenas.

## Recommendations

There is great potential for creating a stronger ecosystem for smart textiles in the region. The biggest bottleneck is a weak culture for inter-firm co-operation. The weak ties to company

networks can be address be establishing an innovation club. The club could do such things as organise thematic workshops allowing new ties to be formed.

The Borås region's good and positive atmosphere offers great potential for citizen involvement in the initiative. Citizens are important as possible lead-users and innovators for ST. Users should be seen as subjects rather than objects of the innovation process. Platforms like Living Lab for citizen involvement could open up new opportunities for innovation and brand building.

ST should show its leading position more clearly. One good way of doing this would be to arrange more high profile events, in the selected focus area, such as conferences, seminars and exhibitions. This would polish the Smart Textiles brand and boost the local economy.

The entrepreneurial culture of students could be encouraged through totally new start-up environments (for instance http://startupsauna.com/). These environments should make start-up entrepreneurship an attractive alternative as a future career.

Public procurement processes have huge potential for promoting innovation. The public sector (e.g. health care) should be seen more as an extension of regional innovation systems and not only as a service provider in their own sectors. The criteria for public procurements should be changed accordingly. ST should actively act to engage with the public sector, particularly in the region.

ST's field is a typical niche with a lot of potential for cross-sector innovation. These can be found by combining knowledge-bases from different VINNVÄXT initiatives or regional clusters. There are good examples of this. However, a proactive and modelled way for company dating could increase the potential of this.

## 2.5 The way forward

The evaluation team confirmed the creative and innovative capacity of the Design and Technology Labs. The significant number of prototypes generated from the entire Smart Textile research system is evidence of this.

The panel recommends considering a strategic approach to take some of these prototypes to market, both through licensing by exploring IP scenarios with IPR legal experts and by more systematically supporting innovators to commercialize their prototypes. Smart Textile would be able to have a more visible business impact if it was to extend its support to innovators at the commercialisation stage.

Strategic considerations within Smart Textile will help determine whether to develop in-house commercialisation expertise or to outsource this service by partnering with an established expert provider.

Commercialisation and IPR strategies are closely related and their success will not only build and consolidate the business-oriented reputation of the cluster, but also provide market intelligence upstream for more basic research.

A number of firms and innovators have already benefitted from Smart Textiles, further evidence of their current local and national business impact. This pool of entrepreneurs, innovators and larger firms has had one-to-one relationships with Smart Textiles. The panel suggests creating

occasions for business-to-business networking, for instance, with business breakfast clubs (these could be themed) or organising seminars. The role of Smart Textile in brokering business contacts on the basis of similar or complementary interests would further strengthen its role as catalyst of innovation.

The Smart Textile cluster has achieved a national reputation within textiles competences that have a high technological content, next efforts need to focus on raising international profile on two levels. Firstly, in relation to research, a more systematic engagement with international research networks and programmes, such as Horizon 2020, would maintain the research capability of knowledge base on par with international levels. Secondly, attracting the attention of international firms would not only enable the cluster to maintain a competitive edge in relevant and targeted markets, but also encourage possible collaborations.

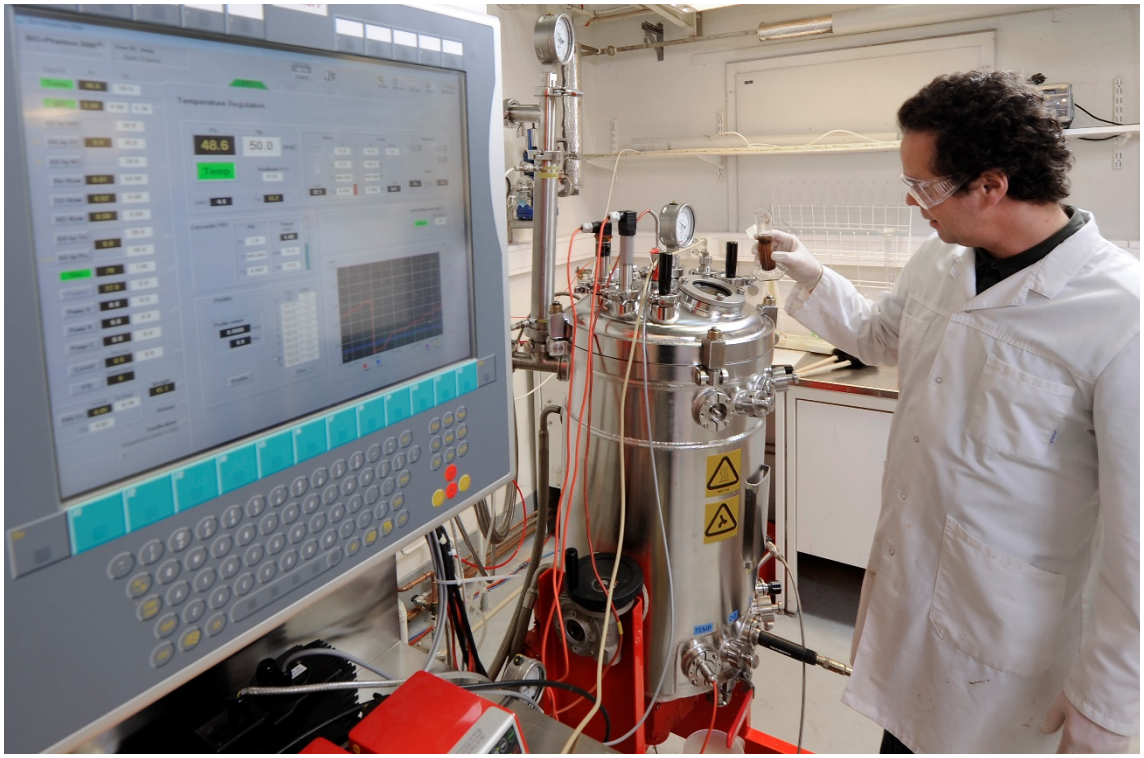
Coming close to the end of VINNVÄXT funding period, it is of paramount importance that the Smart Textile initiative identify a road map to ensure its sustainability in the longer term. In this respect, the panel makes three recommendations.

Firstly, Smart Textile must remain focused on its core competences in terms of research development and innovation in high tech textiles. On this strength, the cluster can build and sustainably maintain its reputation and brand.

Secondly and related to the issue above, Smart Textile needs to strategically decide how to better address crucial issues related to commercialisation and IPR.

Finally, Smart Textile needs to explore funding models post VINNVÄXT. A number of options need to be considered, such as the concrete opportunity of licensing prototypes, negotiating shared IP with businesses, charging for the provision of services related to the use of the Design and Tech Labs and promoting these services beyond the core industry community and the region.

# 3 The Biorefinery of the Future



*The bioreactor BioBo – one of twelve pilot equipment (Photo: SP Processum)*

## Summary

The initiatives within the VINNVÄXT-programme are evaluated every three years to determine whether they with the operational/results-based criteria established by VINNOVA. The initial evaluation of The Biorefinery of the Future (BoF) in 2011 focused on the progress that had been made in organizing and establishing the innovation system and the results obtained so far regarding knowledge development, innovation and commercialization. This midterm evaluation had both a summative and formative/learning approach, which focused on the results that had been achieved and strategic issues related to the further development of the initiative.

The evaluation should be seen as part of a learning process that provided input to the strategic development of the initiatives and the action plan for the coming three years. The evaluation is one of the activities of the learning strategy that is intended to add value to the VINNVÄXT-programme. The evaluation took place in Örnsköldsvik 19–20 May 2014 and included the following activities: background material, panel review, analysis and conclusion, feedback meeting and evaluation report.

The evaluation team recognized that significant progress had been made since the 2011 evaluation and that many of the recommendations made at that time have been considered and addressed.

The BoF has initiated both national and international collaborations and its growing reputation has attracted the attention of the SP Technical Research Institute of Sweden (SP), which acquired 60% of the group's ownership in 2013. With the leadership of Processum, BoF has maintained cohesiveness and has started a new phase in its growth, notwithstanding a number of challenges.

There has been a gradual move towards commercialisation, but a more radical change of the BoF business model is currently driven by SP now requiring BoF to generate one quarter of its projects from contract research. This will motivate the fast expansion of more business-driven projects and likely result in some competition with research-driven projects and with projects initiated from members.

One of the main strengths of the BoF Initiative is that it is located in a "forest-rich" region rather than being based in a major urban setting such as Stockholm. Regarding the knowledge base of the BoF, many of the components of an integrated forest biorefinery approach (production, engineering, R&D, etc.) are actively participating in the cluster. In the future, one of the major challenges the BoF will face is how to best focus on what key products and components derived from biorefinery will be the cluster's unique specialisation and expertise. The evaluators' main recommendations suggest that the BoF try to develop more market intelligence to fully understand what markets for bio products are already sufficiently developed, including engaging with key national and international partners to help develop markets for bio-products and bio-components.

The BoF initiative brings together the three elements of a successful Triple Helix. One of the major strengths of the BoF is that the innovation process is well developed across all of the members of Processum, including impressive investments in pilot plants to develop and test applications. This results in substantial numbers of novel biorefinery processes and products. In addition, the biorefinery industry seems to be able to attract the necessary skilled labour, with the excellent quality of life within the town of Örnsköldsvik contributing to recruitment. The evaluation panel saw evidence of successful retention of key individuals from within the cluster and some mobility for students between the university and the BoF partner companies.

Both the acquisition by SP and the end of VINNVÄXT funding pose some challenges to the BoF. It is likely that the existing value chain that has worked well for the BoF cluster so far will have to accommodate more contract research (and SP will likely require this) and a new business model with alternative funding sources will have to be developed. Thus, SP Processum will have to identify a new business model as the biorefinery cluster in the region evolves (and in relation to SP Processum) to guarantee the steady and significant growth of the biorefinery industry on the north-east coast of Sweden.

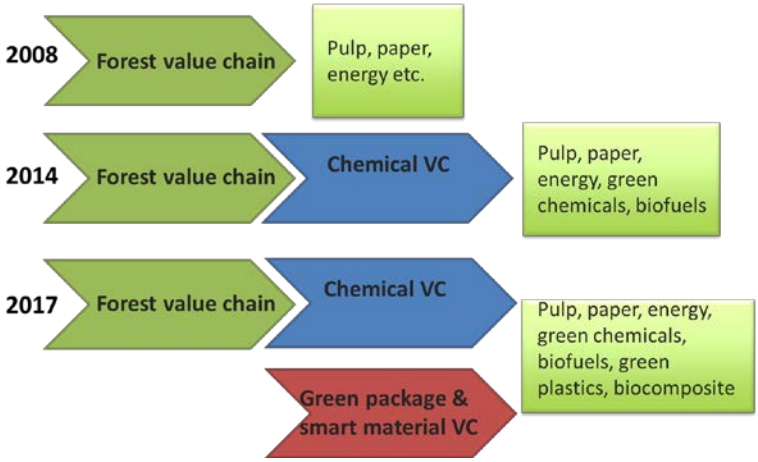
**Table 2 Strengths, challenges and recommendations**

| STRENGTHS | CHALLENGES |
|---|---|
| • SP processum is a hub comprising regional universities and the member companies.<br>• The involvement of SP can open access to international/national networks.<br>• Strong commitment of the local actors to the cluster.<br>• Unique coastline piloting infrastructure.<br>• Cross-fertilization between forestry and chemical industry.<br>• Involvement of incubator in the r&d council. | • Undeveloped regional strategic framework.<br>• Eputation management.<br>• Relatively small number of eu-funded projects.<br>• Weak spinoff support from local universities. |
| **RECOMMENDATIONS** | |
| • Stronger regional and cross-regional strategy based on e.g. smart specialisation.<br>• Setup processes "to wake up sleeping ideas" in large companies in order to build start-ups.<br>• Better national and international communication of what has been done.<br>• Better defined business model on marketing the pilot infrastructure.<br>• Develop a more systematic process of searching and assessing cross-sector innovation across sp portfolio and VINNVÄXT initiatives.<br>• International benchmarking in their own sector (biorefinery) and cross-fertilisation among "related variety clusters and knowledge bases" (bioeconomy and broader context such as green chemistry) to explore an even more unique profile for the cluster. | |

The main recommendation after evaluating the effectiveness of the Triple Helix mode of operation is to build on what is already a very effective base. The aspiration to involve municipalities as well as companies and universities to the north and south of the current cluster should be actively pursued.

The industrial transformation of the forest sector is well underway and this inevitably means that the structure of the value chain that was dominant in 2008 (Figure 1) will most likely become less relevant as more complex and more innovative solutions can be developed together with the chemical industry. Indeed, this is already emerging as a current trend, whereby the forest value chain (including bio) is already intersecting with the chemical value chain for the production of some new products. Industry specialists already foresee developments with even more complex synergies across a number of value chains that can generate radically new markets. For instance, new value networks can emerge by connecting the forest and chemical value chains with the green package and smart material value chains. A critically important task for the BoF will be to identify and develop new products and processes that can be showcased as "winners". This will raise the profile of the BoF internationally, which in turn will attract partners/investment. It is also important that the group continue to work on strengthening cluster cohesion (which is already good) as well as broaden the membership to reflect broader and more complex value added networks.

**Figure 1 Transformation from value chain to value network**

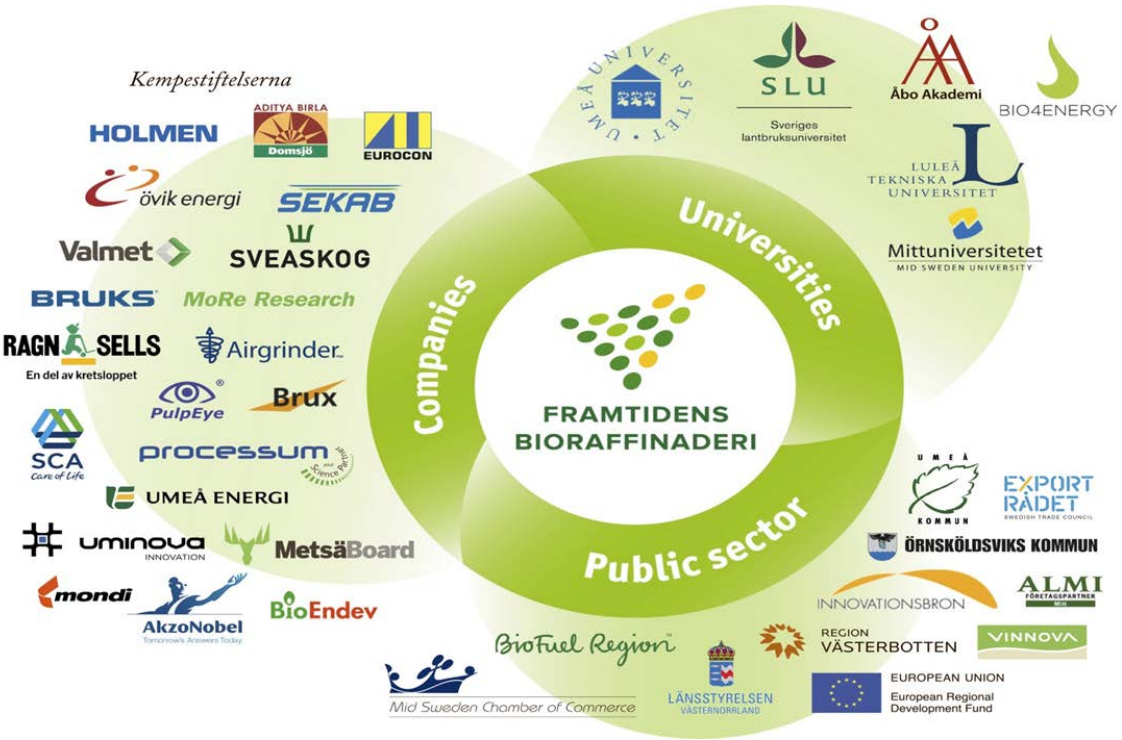



## 3.1 Achievements

The evaluation team acknowledges that significant progress has been made since the 2011 evaluation and that many of the recommendations made at that time have been considered and addressed. Grappling with a changed political climate, where neither oil prices have peaked nor climate change has topped the policy agenda, the initiative has remained committed and passionate about the bio-agenda.

The BoF has now a much stronger research capability that extends along the coast with networked research capacities. This goes some way towards creating a Biorefinery coast.

**Figure 2 Biorefinery platform**



The initiative has started national and international collaborations and its national reputation has attracted the attention of SP Technical Research Institute of Sweden (SP), which acquired 60% of its ownership in 2013. With the leadership of Processum, the cluster has remained cohesive but is evolving since the SP acquisition.

There has been a gradual move towards commercialisation, but a more radical change of the business model is on the horizon as SP requires Processum (as an SP subsidiary) to generate one quarter of projects from contract research. This will push business-driven research, which will compete with research driven projects and with projects initiated by members.

The development of the biorefinery cluster overall depends on access to skilled labour, preferably from the local community rather than only temporary inflows of skills into the area. This has triggered collaboration with the local school system to promote the development of skills in the region that can meet local demand for specialised competences. Matching skills with the local refinery industry will also provide career opportunities for younger generations.

There are some still on-going challenges that the BoF needs to tackle. First, the region needs to more proactively brand itself (e.g. Biorefinery Coast, Örnsköldsvik Coast or Bionorth Coast) and to associate this brand with a clear 'unique selling point' of research. This is particularly urgent given the need to raise significant contract income. Such branding operation should be supported by an international benchmarking and lobbying exercise that will result in the regional clearly flag up its strength within the industry and research in this area. The second challenge is to increase the critical mass of firms in the cluster.

## 3.2 Structure

One of the main strengths of the BoF is the location close to the forest rather than being based away in a more urban setting such as Stockholm (or other international biorefinery focused groups that also tend to be urban based, such as in Helsinki and Montreal). The structure of the BoF was evaluated on the basis of two main criteria. First, does BoF have the individuals, expertise and technical scope plus the equipment and facilities necessary to carry out the work? Second, has and can the BoF implement most of the elements of the Triple Helix philosophy by actively involving industry, universities and all levels of government working together to maximize synergies?

Regarding the knowledge base, the cluster includes active participation by many components of an integrated forest biorefinery approach (production, engineering, R&D etc). This was evident in the deliverables, which ranged from the number of submitted patent applications to the hiring of graduate students who had been trained within the BoF programme by participating industries. Over the last few years some work conducted in more of a laboratory/process development unit (PDU) setting has been scaled up and evaluated in more of an industrial setting. The broad expertise that has and is still currently covered by the BoF members has resulted in a range of projects being pursued. One of the challenges for the future will be how to "focus down" on key projects and to establish clearer criteria on the basis on which successful projects will be pursued. The evaluation role that the project selection committee has played in the past should be built upon, with the group deciding priority areas and projects. However, it is

likely that SP's ownership of BoF and SP's help in developing a more sustainable structure/funding and better access to EU funds will mean they will play an increasing role in helping define future priority projects. A major challenge for the group in the future will be how to best focus on what key aspects/products of a biorefinery approach will be the cluster's specialisation.

The main recommendations for this aspect of the cluster were to develop more market intelligence and find partners for possible products coming out of a biorefinery approach. For example, any possible biochemical, chemical or biomaterials products that are not typically sold by the traditional forest products sector might be better marketed by a partner company in the field who is interested in obtaining the green credentials that could be expected from more of a biorefinery approach of production. The aspiration of the BoF to work more closely with the Chemistry Cluster in the Gothenburg area of western Sweden is strongly supported but this should not be an exclusive arrangement. Other strong chemical groups (such as BASF in Germany) should also be approached. The BoF should formally try to benchmark its cluster nationally and internationally. Perhaps this is something SP could organise as they will likely be pleasantly surprised about how well the cluster ranks with its many areas of expertise.

One area that is not well developed within the cluster is Life Cycle Analyses (LCA) and other measures of sustainability. As hydrocarbons will likely continue to remain relatively inexpensive for quite some time, if forest-/wood-/fibre-based materials are to compete it is important that the sustainability (i.e. lower carbon emissions, less of an environmental impact, etc.) of any biorefinery-derived products can be quantified and documented. It is recommended that the cluster enhance its expertise in this area to include both academic and industrial aspects.

Regarding the future financial operations of BoF, although future VINNVÄXT funding will likely be solicited in the future, a detailed financial plan for weaning the cluster off VINNVÄXT funding (i.e. details of proposed contract work, use of pilot facilities, increased financial support from current industry, etc.) should be pursued.

The BoF demonstrates many of the elements of a successful Triple Helix. A major challenge that seems to have been addressed is the retention of world-class individuals within the cluster. The evaluation panel saw little evidence of the loss of key individuals from the cluster. Instead, the cluster has been able to help industry partners recruit internally trained university students. This success should be celebrated and built upon. The panel also saw considerable evidence of good participation of all three components of the Triple Helix, particularly industry (committed member companies) and involvement all the way up to the CEO level. There was also strong municipal support with considerable potential to further expand other municipal government involvement into a truly "North-east Biorefinery Coast" that would stop just short of Uppsala. As noted earlier, to fully capitalize on this uniqueness, the cluster should find ways of formally ranking itself with other centres of excellence both in Sweden (Stockholm (KTH/Innventia), Lund/Malmö) and internationally, such as Helsinki, Raleigh (North Carolina) and Montreal (FP Innovations). The cluster could potentially differentiate itself nationally and internationally (i.e. use of slow growing softwoods with unique properties).

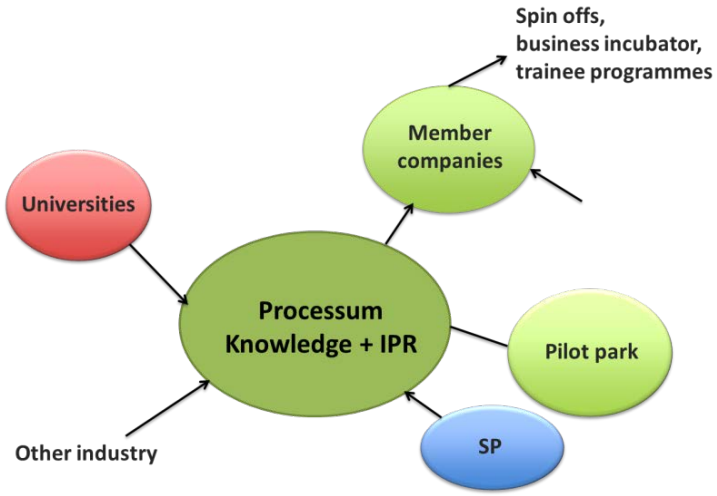
To help this geographical distinctiveness and unique grouping of expertise/equipment, the BoF should be encouraged to translate its aspirational expertise in biotechnology, biochemistry, chemistry, biomaterials and other areas into marketable products. For example, how does the group plan to formalise its planned interaction with the chemical industry in western Sweden? Will this be done on a project or programme basis or is there a more immediate link that could be made at a company-to-company level or with a specific product or process? It is recommended that the group build on the initial success of attracting representatives from the western Sweden chemical industry and establish criteria for how the two clusters might work more synergistically in the future. It is anticipated that there might be some challenges in extending the knowledge base to satisfy the different member parties, including the increased role that SP will play in the management of BoF.

The main recommendations arising from a review of effectiveness of the Triple Helix mode of operation is to build on what is already a very effective base. The aspiration to involve the municipalities (as well as companies and universities) to the north and south of the current cluster should be actively pursued. This will also allow the cluster to rebrand itself into something like “The Midnight Sun Forest-based Biorefinery” that would help emphasize its distinctiveness.

## 3.3 Innovation process

Another of the strengths of the BoF is how well-developed the innovation process is and that there are many good examples of novel processes and products that exemplify the biorefinery concepts. For example, expertise in torrefaction has been developed together with member companies and universities at a pilot plant in Umeå. Another good example is diversification with a single cell protein (SCP) produced from a pulp production side stream, with the SCP used as fish feed.

**Figure 3 Managing the innovation chain**




As described in Figure 3, the current SP Processum innovation chain now includes the SP Group as a significant owner of the BoF. Since the last review three years ago, the number of patents awarded to the BoF covering a range of technologies has increased significantly.

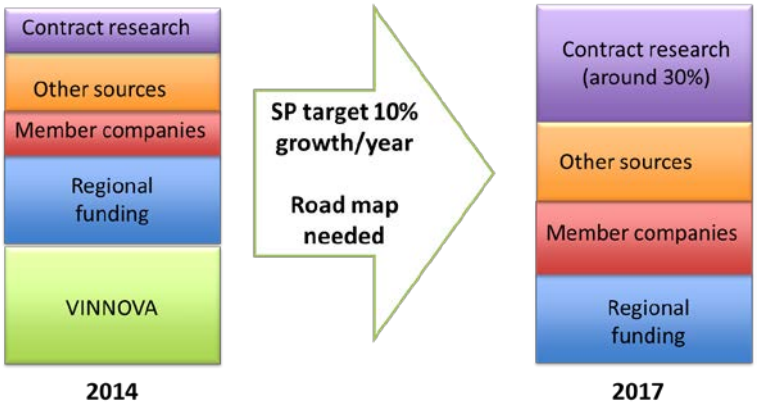
However, there were only a few examples where commercial success seemed to have been achieved. In other words, the licensing or uptake of some of the patents has, so far, been quite limited. It is recommended that more effort should be invested in establishing start-ups and spin-offs. This can be used as a clear indication of success.

The member companies within the BoF cluster strongly support the need to commercialize as much of the R&D as possible, and this should be done in a timely manner. As the field is a very competitive, significant emphasis needs to be placed on the commercialization of concepts that have a strong market demand. Local SMEs, entrepreneurs and established companies are all supportive of the development of the innovation chain at and around BoF.

During the evaluation period it was clear that there was a good "status quo" in terms of the retention/recruitment of BoF. However, it is possible that challenges with retention of personnel could be an increasingly problematic issue to both maintain and even increase the current, quite impressive, pool of existing expertise.

As was pointed out earlier, the BoF needs to focus more on developing commercial funding and contract research. Inevitably, BoF will become more reliant on commercial and contract work. Figure 4 provides one possible scenario for funding.

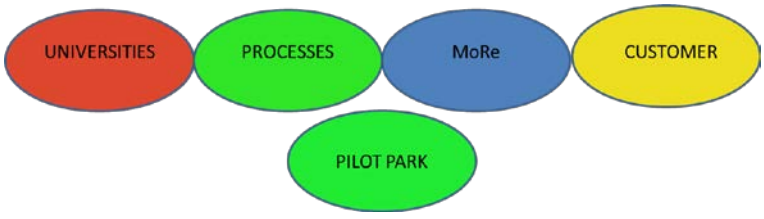
**Figure 4 Revenue structure and growth**




A potential challenge might be the limited amount of contract research available in the future. It is possible that this could either generate a closer cooperation of the BoF with MoRe or alternatively it could perhaps give rise to competition and conflict.

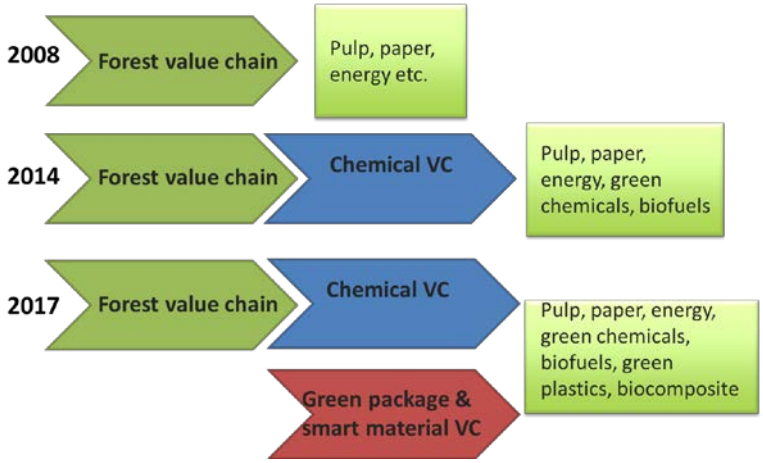
Today's contract research chain is presented in Figure 5. For the cluster to be successful in the future, the team players have to continue to work closely together.

**Figure 5 Today's contract research chain**



It is likely that the existing value chain that has worked well for the BoF cluster in the past will not be as effective in the future as alternative sources of funding are required. A different type of value chain will have to be developed in order to maintain significant growth and establish a *biorefinery centre* on the north-east coast of Sweden.

**Figure 6 Transformation from value chain to value network**




The industrial transformation of the forest sector is well underway and this inevitably means that any value chain that was current in 2008 (Figure 6) will likely not be sufficient to meet the demands of the proposed, future, merged chemical value chain. This situation will become even more complex by 2017 with the rapid growth of the green package and smart material value chains. To fully realize the value potential of an expanded BoF network, it is suggested that the cluster try to establish links with related Swedish consumer product companies, such as Ikea and Tetra Pak.

A critically important, but difficult, goal for the BoF will be to identify and develop new bioprocesses and bioproducts to be showcased as “winners”. This will raise the profile of BoF internationally, which will in turn attract partners/investment. It is also important that the group continues to work on strengthening cluster cohesion (which is already good) and to broaden membership to reflect the proposed broader and deeper value added network.

## 3.4 Regional and national impact

The north-east coast has relied on the forest industry for many decades and the evolving biorefinery concept of adding value and diversifying products from forest resources will be essential in the industry’s renewal. The BoF is the national leader of its niche in Sweden. It is an essential part of a value added network combining forestry, chemistry and future megatrends like renewable energy.

### Strengths

SP Processum forms a natural hub for regional universities, local public agencies and companies. The initiative has been able to attract stakeholders also from western parts of Sweden. The hub is seen as a natural platform to establish a regional triple helix innovation system. This has a strong impact on the regional and the national system. The recent involvement of SP opens up totally new opportunities to increase both regional and national

impacts. Being a part of SP portfolio enables new combinations for funds regionally, nationally and internationally.

The strategic choice of forest chemistry gives a good basis for societal impact. The chemical industry cluster in West Sweden and the BoF are hoping to combine resources. The Skogskemi (Forest Chemistry) project involves assessing the scope for such collaborations across the industries. Interesting research areas and sources for impact are for example, methanol, olefins and butanol.

Local actors seem to be strongly committed to the initiative. The involvement of the member companies has been increasing since the start of VINNVÄXT. The number of external companies has increased over the years, especially companies from outside the region. Local and regional authorities are strongly committed to the BoF initiative.

The BoF has been able to build an internationally recognised piloting infrastructure. A total investment of 15 million SEK has been made. Some of the pilot plants cannot be found anywhere else in Sweden making the infrastructure unique. Pilot facilities include plants that are dedicated to technology scale up. The piloting infrastructure has made an international impact.

The field of biorefining is not the most obvious branch for start-ups, due to the need for substantial financial investments at the starting point. However, opportunities can be seen in the spinoffs that have derived from the local large size member companies. Since developing such spin-offs companies is likely to require dedicated incubating services, having an incubator as a member of the R&D Council can be very valuable for future cluster development.

## Challenges

The biorefinery concept is a crucial industry development for the region and the BoF has been a catalyst for its emergence and development. Despite is importance, regional policy actors have been only loosely committed to its success. Indeed, whilst, the strategy of SP Processum was clearly expressed, the evaluators found that the regional and local strategic framework was less clearly outlined. This consequently influences the ability of the BoF to create a brand for itself and give the cluster the visibility it deserves.

The excellence of the region to develop the biorefinery concept is constantly growing but the lack of a place-based approach to develop a brand could hinder some of its future prospects, for instance, in terms of contract research and EU collaborations.

Conducting successful business in biorefining demands a lot of changes in the society. Insufficient lobbying power based on too low brand is an obstacle.

## Recommendations

The BoF should encourage regional actors to work together to develop their next overall strategic framework. This could be based on a focus on “smart specialisation”. If BoF follows the ideology of smart specialisation it could create new niche products/processes based on the traditional forest products industry. However, the position of BoF in the overall regional strategy is not clear.

There seems to be significant potential in a number of “sleeping ideas” and currently under-developed technologies that lie dormant in some of the large sized company members of the cluster. It seems that these ideas/concepts are not part of the core business of the companies and are therefore not developed further. The regional and national impact of the BoF could be increased by defining a procedure for better evaluation and possible utilisation of these ideas.

There is a wealth of biorefinery excellence in the coastal regions, although it does not appear to be well recognised outside of the region. Better reputation management and communications strategies are recommended. The increasing need for contract research is also important and will be one of the biggest challenges for SP Processum. The region’s unique pilot infrastructure provides a good opportunity to both assess technology and to gauge its impact on society. However, this will require a better business model to market the infrastructure.

Being part of the larger SP organisation will likely provide a broad range of opportunities for cross-sector innovation. These could be realised, for example, by combining the knowledge-bases of different VINNVÄXT initiatives. Although there are good examples of this type of mutually beneficial interaction already occurring within the initiative, a proactive and more structured/formal way of interacting (dating office) could ensure that this apparent potential is more fully realised.

The world is changing quickly and ways of increasing societal impact have to be continuously rethought. This should be done by internationally benchmarking the forest-based biorefinery while looking for new opportunities fuelled by interactions between clusters and knowledge bases (e.g. the bioeconomy and related areas like green chemistry)

## 3.5 The way forward

The acquisition of Processum by SP will inevitably change the governance and the structure of Processum. Together with the expectation of VINNÄXT ending soon, SP Processum needs to think of what the next generation Processum will look like. Will it remain member based? Will it have different forms of membership? At the moment, SP Processum has a distinctive competitive edge hinging on the network of its member companies, excellent contacts between research and industry and, most importantly, the strong, recent synergies from joining the forest industry with the biorefinery and chemical industries. What about tomorrow? Its research capabilities are a clear strength, however, the cluster needs to identify winning technologies or products as flagship successes to showcase at every opportunity. Hence, there is a need to build a national and international reputation for being a centre of excellence for frontier-research on biorefinery. The specialist evaluators suggested looking at how to develop “value networks” of commercial products/processes around biorefinery together with the chemical industry, instead of linear-only product value chains. It was also suggested that SP Processum develop expertise within sustainability and Life Cycle Analysis (LCA).

The advantages Processum expects from its connection with SP can be summarised in terms of certainty of income flow, enhanced national level research collaborations, access to a pool of complementary competences and greater capacity to raise international research. For these benefits to be realised, Processum needs to pro-actively leverage the range of opportunities that

SP can offer. This could mean for instance to negotiate access to schemes and processes for research capacity building (PhD scholarships, post-doc funding, mobility for researchers to and from SP Processum and other agencies within SP) and pro-actively seeking to participate in joint projects with other SP agencies (e.g. EU or VINNOVA). The lack of a declared bio-agenda within SP (the bio economy does not appear to be one of SP's business areas) might make it difficult for SP Processum to maintain SP's attention on bio-research priorities, as the latter would compete with a large number of other priority areas of society, such as health. It is therefore of strategic importance for SP Processum to engage with SP and explore mechanisms for integrating bio into SP's research portfolio, with the aim of developing an SP bio agenda.

The funding structure will completely change with the introduction of a quota of contract research. The link with SP, if well leveraged can improve the brand of the cluster and deliver a greater involvement of large firms, especially leaders in niche markets. However, the tension between blue sky research, members driven research and contract research needs to be resolved with the introduction of a process for vetting projects (especially for selecting contract projects) with spelt out criteria for the selection of the projects, for monitoring progress and possible problems; this means identifying research focus areas, and the resources commitment (e.g. human capital but also access to pilot plants).

# 4 Peak Innovation

*The Swedish Winter Sports Research Centre (Photo: Tina Stafrén/Mid Sweden University)*

## Summary

VINNOVA has been financing Peak Innovation (PI) since 2008 as part of the national VINNVÄXT-programme. PI has experienced internal turbulence but this has resulted in regional and local stakeholder renewing their commitment to the initiative, as seen by the move of the Peak initiative to the Mid Sweden Science Park. Through PI, the Östersund-Åre region aims to become an internationally leading milieu for research, innovation and business development in winter sports, tourism and outdoor pursuits.

The overall recommendation for the PI leadership is to resume its effort to address those issues raised in the 2011 evaluation but that are still unresolved and to incorporate the recommendations from the 2014 evaluation.

Concerning governance of the PI initiative, the evaluation panel advocated for a fully mandated multi-stakeholder (MS) steering group that would represent the broad base of interested stakeholders in the region. Such a group would be the primary means of managing and making decisions for the initiative. PI needs to resume its effort to identify clear and shared vision, mission, goals, strategies and tactics for delivery.

Östersund and Åre are well-known winter sports destinations and this remains the region's strength. Flagship events in the pipeline and a number of candidacies to world competitions will sustain such status. Drawing to winter sports tourism, the region is committed to develop an all-seasons tourism. However, there is limited evidence that summer outdoor tourism has been more strategically targeted and more fully developed since the last evaluation. The evaluation panel confirms the view that a comprehensive benchmarking exercise will be necessary to understand what needs to be put in place in the region to develop an outdoor sports cluster. Nevertheless, there are some encouraging new business ventures in the outdoor sector with considerable potential. The latter together with the presences of a number of internationally respected outdoor brands in the region, is beginning to create a critical mass of firms in the outdoor sector. In addition to greater collaboration between these brands and the new start-ups, there is an opportunity to project the reputation of the area internationally.

The Östersund-Åre region has an outstanding infrastructure in the field of sports science with SWSRC and Sports Tech being truly international centres of excellence. A major goal of PI is to make the region known as an internationally leading environment in sports science research related to winter sports and to outdoor summer activities (such as trail running, mountain biking, climbing and explore new areas such as fitness and health). However, the research infrastructure in the region seems to be poorly integrated. Greater collaboration across ETOUR, the Swedish Winter Sports Centre and Sports Tech would strengthen the current efforts to develop a sports science sector related to outdoor tourism and winter sports. PI needs to be more proactive in facilitating research collaborations between industry and sports organizations nationally and internationally.

PI also needs to draw a road map to transition to a post-VINNVÄXT funding model.

## 4.1 Achievements

Aware of the turbulence that the Peak Innovation (PI) initiative encountered since the last evaluation in 2011, this report starts by highlighting the progress that has been achieved so far.

The quadruple helix that is so core to the PI approach is still working and in fact the stronger research base has reinforced the engagement of an increasing number of sports organisations.

The evaluation panel found evidence that the leadership crisis that tainted the initiative in the last 12 months has forced local and regional stakeholders to renew their dedication to the initiative and the outcome is a recommitment by local and regional authorities and the Mid Sweden University to PI, evidenced by the move of the Peak initiative to the Mid Sweden Science Park (in itself sponsored by local stakeholders).

PI remains a catalyst for regional growth as it aims to draw on the region's specialisation in winter sports and winter tourism to expand by strengthening the sports science and summer tourism/outdoors components. The leadership crisis has nevertheless stalled what could have been a smoother progress and growth. This means that a few recommendations from the 2011 evaluation still have not been implemented.

Firstly, the PI initiative needs to resume its Strategic Agenda by focusing on clear priorities, establishing transparent processes and setting measurable targets and metrics to assess progress. As discussed later, the outdoors and summer tourism industries are still underdevelopment and have not achieved their full potential.

Secondly, following decisions on the Strategic Agenda, a comprehensive benchmarking exercise is still needs to be completed. This will enable the initiative to ascertain the strengths and challenges of its knowledge base, innovation processes and industry links for each of its components (outdoors, sports science and tourism),

Thirdly and related to the above, this evaluation confirmed the excellence of the knowledge base in the three research centres (Swedish Winter Sports Research Centre (SWSRC), Sports Tech Research Centre (Sports Tech) and The European Tourism Research Institute (ETOUR)), but university-business links still appear weak and underdeveloped.

Fourthly, once PI identifies its unique selling points in the Strategic Agenda, a much needed branding campaign needs to be launched to increase the international profile of the cluster. This branding campaign needs to be market-targeted.

Finally, issues related to governance and leadership should be promptly addressed. The new leadership of PI should be entrusted and empowered to decide on strategic priorities and implementation procedures.

## 4.2 Governance and strategy

Given the well-documented stall of the initiative and the subsequent cancellation of contracts with service providers, the evaluation team has been singularly impressed by the reaction both of those directly involved and of the regional actors. That these circumstances led to a fundamental re-evaluation of the importance of the initiative to the local community and the reaffirmation of support is of great significance. In light of this, it is the panel's conclusion that some of the fundamental, structural aspects of the initiative need careful consideration with the objective of harnessing and institutionalizing the demonstrated support for the initiative.

### Governance

While it is clear that the staff directly involved in the delivery of the strategic plan need to have a line report and legal entity within which they can operate, the evaluation panel questions whether overall responsibility for decision-making should lie with the Mid Sweden Science Park. This is not because the panel has criticisms of the management. The key reason for this is the need to harness the support of the wider community. The community has reaffirmed its support for the initiative and it is vital that this is built on and that mechanisms are put in place to avoid any repetition of the 'melt down'. We believe that it would be worth looking at the role of the steering committee with a view to changing it to a fully mandated multi-stakeholder (MS) steering group.

The objectives of a MS steering group is to bring together the primary stakeholders within a decision-making framework to ensure that the project is directed in a fair and balanced manner and that decisions taken are in the interests of the project's goals. Specifically:

- Stakeholders are able to understand the objectives and how they relate to their sphere of interest, enabling them to integrate planning and decision-making in their own organisations to enhance the objectives of PI.
- They are able to ensure that bottom up and top down strategies are integrated into governance and policymaking.
- Consensus decision-making and conflict resolution within the MS steering group is a means of avoiding a breakdown of co-operation.
- The participatory and inclusive nature of MS decision-making leads to a greater sense of ownership.
- Transparency and community involvement should ensure that the initiative is more able to resist external attacks by those seeking to destabilise the project for their own benefit.

The MS steering group could be responsible for the following key areas (not exhaustive):

- agreeing on the term strategy with the process leaders;
- agreeing on budgets;
- monitoring on-going progress and agreeing on adjustments to direction and strategy where necessary.

The process leaders would take direction from the MS steering group and within this, their key responsibilities should be:

- working with the various stakeholders to put together the strategy for submission to the MS steering group (including budgets);
- managing the delivery of the project in line with the direction determined by the MS steering group;
- providing regular progress reports to the MS steering group.

The evaluation team believes that the current steering committee should be structured to become the primary means by which the initiative is managed and decisions are taken. Clear and unambiguous terms of reference for the steering committee need to be put in place to enable it to fulfil the multi-stakeholder role. There are numerous examples of MS leadership and an example of terms of reference from one could be supplied if requested. It needs to be made clear, however, that the board of directors, in essence, bear the main responsibility. If this proposal were accepted, then the evaluation panel recommends that the initiative seek legal advice and assistance in setting up the MS steering group as the legal body overseeing the project.

### Strategic planning

The evaluation team believes that the current strategic plan document, “Plan of action 2014-2016” could be substantially improved. While there is no shortage of knowledge, experience and will, this has not been translated into a strategic plan that is easily understood, goal orientated and actionable. In fact, there is an alarming lack of clarity about the longer term objectives of the initiative, and there are insufficient metrics for determining performance against goals. The evaluation team therefore recommends that PI engage with an external consultant to assist the team in distilling the vision, mission, goals, strategies and tactics for delivery. This should not require more than 4-5 days of consultancy.

## 4.3 Outdoor

Within the time period since the last review, progress has been made in encouraging new business ventures in the outdoor arena and a number of these would appear to have considerable potential.

Till now, there has been no concrete attempt to clearly identify the components of the targeted outdoor market with an analysis of appropriate conditions need to ensure the development of a significant outdoor cluster. The previous evaluation report recommended a benchmarking process and this still remains to be undertaken; The evaluation panel reaffirms its view that comprehensive benchmarking exercise will be necessary to understand what needs to be put in place in the region to develop an outdoor sports cluster.

It is clear that the region's strong research capabilities are of huge significance in underpinning each area of the strategic plan. Yet it would appear that the potential has not been fully realised in terms of outdoor sports and, to a degree, there was a tendency to slide back into the area of most comfort, namely the winter sports. "*….we decided to prioritise the majority of R&D resources into the Swedish Winter Sports Research Centre*". (Operations Report Peak Innovation 2011-2014). The evaluation panel is pleased to hear that this has subsequently been re-addressed with a more equitable spread of resources to all three of the research centres. Even so, there has been insufficient recognition of the potential that ETOUR and Sports Tech have in achieving PI's strategic goals for outdoor sports. The panel was impressed by some of the scientific articles published by ETOUR and question why these have not been used to greater effect. Similarly, the panel detected a level of frustration within the Sports Tech group that should be resolved. The work of ETOUR should be used to inform, support and legitimise (where possible) the objectives of the initiative, and Sports Tech should be developed to provide services to the outdoor industry concerning testing within the region. The idea that the region become a centre for equipment testing was previously discussed and remains fully valid.

The regional presence of a number of internationally respected outdoor brands and that these brands co-operate well together is an opportunity for projecting the reputation of the area internationally. Combining this with interviews and information on some of the start-up firms could be used to create a powerful communications platform for promoting the area. Furthermore, the work to create cost-effective premises for new companies at the airport is an additional plus point to add to the numerous reasons why brands should consider the area as perfect for their companies. In summary, the evaluation team is advocating the harnessing of existing factors to enable the projection of the area in a cost-effective and significant manner. This requires clarity of objectives and the readiness to react and foster leads resulting from such a campaign.

The evaluation team would like to stress the continued relevance of the following areas:

1 internationalization;
2 the development of nature tourism;
3 more effective use of the research facilities in the area;
4 benchmarking.

These were all contained in last evaluation report, and some progress has been made in the first three areas. Missing, however, is the integration of these into the strategic planning process and an understanding of how each contributes to the overall aim of the initiative.

Despite these challenges, the evaluation panel remains deeply impressed by the enthusiasm, commitment and willingness to learn by the team and the stakeholders. Secondly, there are still lots of opportunities for PI and the region within outdoor tourism and the market is still growing. The panel is confident that the initiative will distil, refine and build on its assets and sees no reason to question the fundamental viability of the initiative.

## 4.4 Tourism

Östersund and Åre are well-known winter sports destinations and this remains the region's strength. This reputation has already attracted international flagship events, additional ones are in the pipeline and a number of candidacies to world competitions will sustain such status. The region is endowed with a year-round natural beauty that provides the ideal backdrop for developing an all-seasons tourism. Additionally, the area has become an attractive live-style destination for people wanting to live closer to nature and in a high quality-of-life environment. The tourism industry marries well with their spirit of adventure and entrepreneurial attitude leading to exploring a wide range of outdoor-related activities that have the potential to energise the local economy while populating a wide range of possible market niches needed by a growing tourism industry.

Finally, the expansion of the all seasons' tourism can rely on intelligence (knowledge and competence, data and analysis) of ETOUR. As highlighted in the 2011 evaluation, the presence of such a competent research centre in tourism is a unique asset for the regional industry. Very relevant research output for the Jämtland region has come out of ETOUR and this should be leveraged more effectively. Indeed, the tourism industry is supported not only by ETOUR, but also by committed local and regional agencies, authorities and businesses, namely a triple helix.

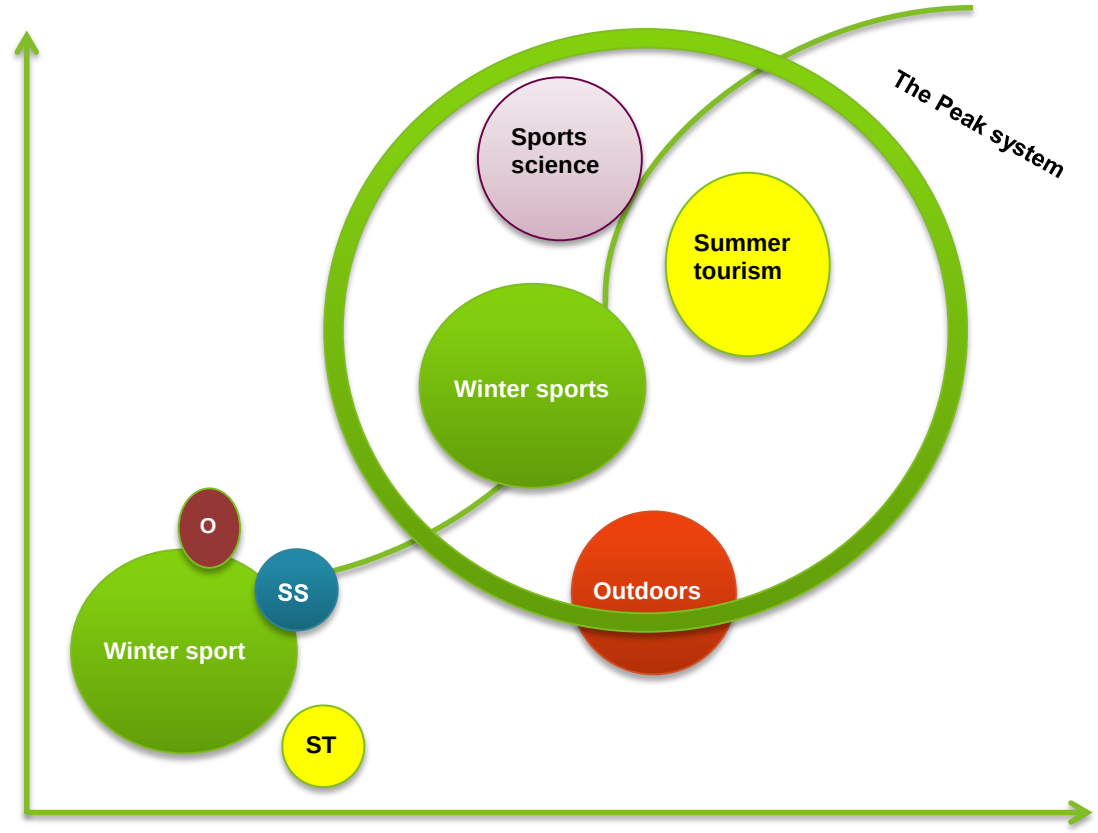
So far, however, there is limited evidence that summer outdoor tourism has been more strategically targeted and more fully developed. It is an on-going challenge is to do so. A strategic assessment of the drivers of and barriers to summer tourism should be carried out to identify regional and national growth levers; regional and national bottlenecks; regional and national key players; and regional and national funding. Some of the recommendations of the 2011 report are still valid in terms of strategically mapping out a growth path for all-seasons tourism, such as issues related to connectivity, accessibility, skills and branding.

The evaluation panel has, however, witnessed very interesting examples of entrepreneurial discovery and it is imperative for the cluster to create a critical mass of firms in a multitude of new niche markets that will create an exciting and diverse offering of tourist activities to a number of visitor markets.

The recommendation for the PI leadership to resume the effort to address the issues raised in the 2011 evaluation that have yet to be accomplished. This crucially means draw an all-seasons tourism development strategy to integrate in the broader PI strategic agenda. Particular attention should be paid to identify areas where tourism can benefit from activities undertaken within the

outdoors and sports science industries. The further development of summer tourism, and for that matter of outdoors and sports science, should benefit rather than crowd out winter tourism.

**Figure 7 The growth trajectory of the Peak System**




*SS= Sports science*
*ST= Summer tourism*
*O= Outdoors*

## 4.5 Sports

### General Considerations

A major goal of PI is the establishment of the Östersund-Åre area as an internationally leading environment in sports science research related to winter sports and outdoor summer sports. Across industrial boundaries, new service systems and products should be produced through customer-driven development. Furthermore, services and technologies should be developed in parallel for both winter sports and outdoor pursuits. There is already a good foundation for achieving these goals, as the region is strong in tourism, events and winter sports and has two very well-established competence centres, SWSRC and Sports Tech, which are both located in Östersund. This unique expertise can be very beneficial for local, national and international companies in developing and testing new products and in gathering knowledge on markets and consumer behaviour for the outdoor industry and tourism businesses. The role of PI is to initiate dialogues and collaborations between the university institutes and local companies.

## Achievements

In the last years, PI has been part of the innovation support system and has tried to strengthen the region's ability to better meet the needs of incoming companies and individuals. One example is the realisation of the Mid Sweden Science Park. A major focus of PI in the last years has been the development of business ventures spinning off from sports science research. In this matter, PI has sharpened its focus towards needs-driven applications and commercialisation in collaboration with the two university partners. PI has initiated and facilitated several collaborations involving companies and both SWSRC and Sports Tech, especially with regard to winter sports activities. A main outcome of this has been that attitudes towards R&D collaboration between local companies and local academia have much improved. This has enabled a broader base of stakeholders to participate in the initiative, setting up and setting in motion a regional triple helix system.

## Challenges

PI needs to be more proactive in facilitating research collaborations between industry and sports organizations nationally and internationally with research expertise inside local universities, particularly with other outdoor sports and summer sports beyond winter sports. There are still untapped opportunities for companies, sports organizations and the public sector to fully exploit the expertise and the testing equipment at research facilities in the local universities. More broadly, there is still plenty of scope for improved integration of competences from the different parts of the triple helix. Moreover, there is still no close co-operation between SWSRC and Sports Tech, thus both university partners act as rivals instead of concentrating experience and knowledge. Eventually, PI has to support the efforts of both university partners to either convince participating companies to support funding of prototyping and/or patenting or to find external partners (e.g. municipal) to help with prototyping and patenting costs (licensing may become a future way of financing future research and institutes in general). Finally, there has been little effort to benchmark the activities of other areas, universities and communities.

## Recommendations

The evaluators suggest that PI should increase its effort to support the Swedish Winter Sports Centre and Sports Tech by facilitating more collaborations on joint R&D with regional, national and international industry partners from both winter sports and summer outdoors sports, such as trail running, mountain biking, climbing. PI also needs to explore new areas, such as fitness and health. To achieve this, the panel reiterates its recommendation to benchmark the development of a sports science centre of excellence in the Östersund-Åre area.

Along with finding new partners, a specific focus should be on start-up companies. PI should concentrate on finding partners reflecting the triple helix (companies, sports organizations and public sector) to more fully exploit the university-based testing equipment at Sports Tech for research projects involving athletes. PI should also proactively seek to attract the interest of amateur sports groups and tourists to the dedicated testing facilities and competences in winter and outdoor sports and health to the Swedish Winter Sports Centre (such as biomechanical and physiological testing). These efforts should lead to a larger business cluster in the Östersund-Åre region (mainly start-ups but also larger sports and outdoor industry companies).

Moreover, PI should encourage closer co-operation between the Swedish Winter Sports Centre and Sports Tech to avoid rivalry and to concentrate experience and knowledge of these two excellent university partners. PI should also strengthen their partnership with other partners (e.g. ETOUR) to jointly focus on specific needs/requests in the outdoor area and to start co-operation with associations and events to demonstrate strength to foreign visitors, companies and top-level athletes and to national and international media during major events. To communicate the efforts and the achievements of the initiative to industry partners, sports associations and the general public, PI should improve the design and content of its website to highlight what services it offers to regional partners (industry, sports associations, community and government).

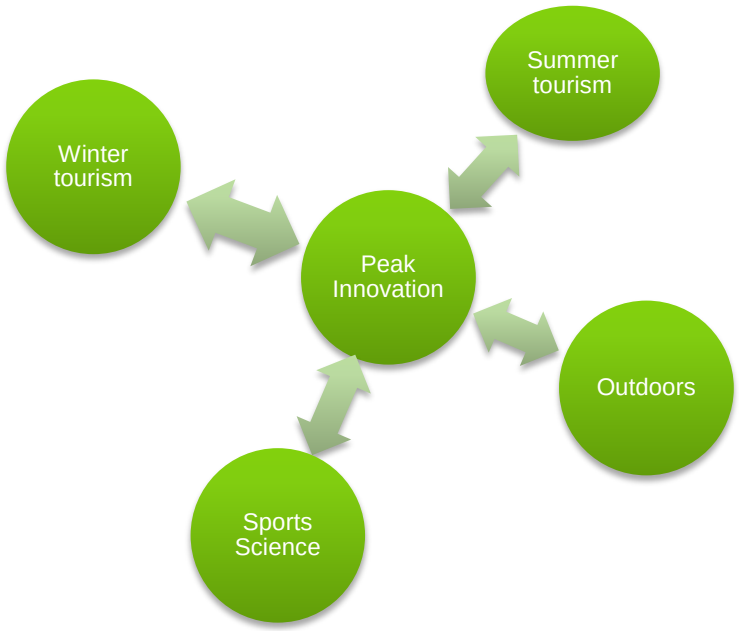
## 4.6 Peak Innovation's value added

The self-evaluation has highlighted the value added by PI in terms of the overlap between Tourism, Sports and Outdoors. It is still unclear, however, what relative size each should have within the regional economy for long-term sustainable growth. Additionally, since each of these three sectors is driven by very different factors, operates in different markets, rests on different knowledge bases and is populated by different types businesses, the evaluation panel recommends that PI thinks strategically about how to develop them separately, as sectors in their own right, and how to activate any synergies that might arise across the three.

The panel suggests that a more exhaustive exploitation of all the wide range of potentials encompassed by the Peak system would require each of the four components to be developed in its own right with joint synergies across them to being created and seized upon. Each of the four components greatly benefits from being co-located with the others (for example, the added advantage that sports science has in being close to the active participation in sports).

The role of PI would then stretch from supporting the development of each sector to creating opportunities and processes for joint co-operation, mutual learning, complementary dovetailing and strategic cross-pollination. This is food for thought for the PI leadership.

**Figure 8 The components of the Peak System**




## 4.7 Regional and national impact

The initiative is strong grounded in well-developed regional strategy. Its strategy is modern and includes the elements of smart specialization and 4Helix. However, the initiative has faced some serious difficulties and has obviously come out of it stronger. The local geography combined with advanced technology and Scandinavian society makes the PI initiative unique in the world. Based on these facts, its regional and national impact can be further developed.

### Strengths

The real asset to the PI initiative is the geography of the Östersund-Åre region. It binds together the winter sports, outdoors activities, and tourism. Based on this, the region is building a strong infrastructure of research facilities supported by high levels of social capital that make the region unique in the world.

The Östersund-Åre region has an outstanding infrastructure in the field of sports science. SWSRC and Sports Tech are truly international centres of excellence. Improved synergies with other related sectors, such as technical textile research, could make the region an exceptional hub for sports excellence with a regional, national and international impact.

The PI initiative has had some problems that could have weakened the commitment to it by the regional actors. Fortunately, this has not happened. On the contrary, the regional actors are even more strongly committed as a result of the awkward situation. The commitment of important actors seems to be sustainable.

A good and co-operative atmosphere among the companies in the region was clearly seen during the visit. Regional companies form a network, sharing the same development vision and encouraging each other with no disrupting rivalry among them.

Remote regions often have a problem in attracting talented people to develop the region. This could be partly the case in the Östersund-Åre region. However, the nature of the region seems to attract outdoor-minded talented people. Often, these people also establish their own companies to be able to move to the region.

## Challenges

Although the research facilities in the region are top class, co-operation and synergies across them need to be improved. Indeed greater co-operation would make the regional, national and international impact even greater.

The impact of developing R&D in sports science remains somewhat unclear to some stakeholders. For example, the aim of the university is to conduct knowledge-driven basic research. However, business-driven research is becoming, and should become, important to enable research to translate into applications and new businesses. PI is very aware of the needs to the regional business community, and it must continually find ways of connecting the excellent research base with businesses. A balanced view among the stakeholders would increase the societal impact of the initiative.

The PI initiative does not pro-actively apply for EU funding. However, these projects would be a natural way of increasing regional, national and international impact and of gaining more international recognition of the initiative.

Management of the initiative seems to be somewhat unclear. The relation between Peak Innovation and the Science Park needs to be fully spelt out to maximize regional and national impact.

## Recommendations

The Östersund-Åre region is a place of unique beauty, which attracts visitors, primarily in the winter to this point. This makes it an ideal basis for user-driven innovation platforms like living labs. These users should be seen as subjects rather than objects of innovation processes. This kind of platform should be actively built.

The tourist flows are also an extremely good target for marketing sports technology and product development facilities. Obviously, visitors are also potential customers for PI. Cross-marketing to tourists is strongly recommended.

It is recommended that a regional innovation club be established. The club could promote the inter-firm co-operation and organize speed dating opportunities, business breakfasts and themed workshops.

There is still a lot of unused potential from top class research that companies could benefit from. The model for commercialization is static and lacks sufficient dynamism. The procedure is recommended to be x-rayed from the point of view of dynamism.

The world is changing quickly and ways of increasing impact on society have to be continually re-evaluated. This is done through international benchmarking in the sports and outdoor industries and looking for new opportunities fuelled by common links between clusters and

knowledge bases. To explore these, a process that includes future studies and cross-fertilisation is recommended.

## 4.8 The way forward

The internal turbulence that has shaken the PI initiative has resulted in regional and local stakeholder renewing their commitment to the initiative. A new steering committee, a new process leader and a new business area manager have been appointed. The evaluation panel suggests that the steering board reflect a multi-stakeholders' governance, where PI's main stakeholders can have a meaningful voice. In addition, as PI resumes its effort to define a clear strategic agenda, the new process leader and the new business area manager should be empowered to present the steering committee with their strategic vision for approval.

A clear strategic agenda needs to be addressed by the new leadership. Following this a benchmarking exercise should set targets, processes and metrics for its implementation.

Recognising the excellent research capacity within the three research centres (SWSRC, Sports Tech and ETOUR), the panel suggests that PI would benefit from better connections and more collaboration between the three for joint projects. In particular, the research expertise of SWSRC and Sports Tech could be expanded to also cover research and testing in outdoors sports. The excellent testing capabilities within SWSRC and Sports Tech could also be more widely used, for instance, for testing products and the performance for recreational athletes, currently a fast growing market and completely untapped by PI.

The presence of the Mid Sweden Science Park and the incubator provide a dedicated infrastructure for business development. The significant research output from the centres in the form of prototypes should be given the opportunity to reach the market through product development, commercialization and IPR management.

PI also needs to develop a road map to transition to a post-VINNVÄXT funding model. This requires linking the strategic agenda to a sustainable model that identifies alternative sources of funding.

**Figure 9 Revenue structures with and without VINNOVA funding**

# Appendix 1 The evaluation team

An international team of experts evaluated the VINNVÄXT initiatives. The team members were experts with:

- academic and/or business-oriented profile with excellent state-of-the-art knowledge on innovative clusters and innovation systems
- academic and/or business-oriented profile with excellent state-of-the-art knowledge in the specific field for the initiative.

The experts on clusters and innovation systems participating in the evaluation of all three initiatives were:

- *Dr. Lisa De Propris*, University of Birmingham. Her main research interests lie in studies of small firms and clusters, competitiveness in clusters and regions, forms of clusters and governance, innovation, clusters and foreign direct investment, regional development, knowledge economy and clusters and creative and cultural industries.
- *Prof. Vesa Harmaakorpi*, Lappeenranta University of Technology, Lahti School of Innovation. He has a background in business life and his research fields of expertise are in innovation systems, innovation policy, creativity systems and practice-based innovation.

The experts for the specific field of each initiative were:

### Smart Textiles

- *Lutz Walter*, R&D & Innovation Manager, Euratex, The European Apparel and Textiles Confederation, Brussels. He has also been Secretary of the Governing Council of the European Technology Platform for the Future of Textiles and Clothing since its establishment in 2004. Since 1999 he has followed EU research policies and programmes and developed strategies and position papers on the future of textile and clothing research and innovation in Europe.
- *Prof. Clare Johnston*, head of the Textiles programme at the Royal College of Art and consultant in colour and textile design for fashion and interiors. Her current research as leader of the RCA Materials for Living hub explores the way materials extend across all design practice and connect design to material science. She is also a board member of the Material and Design Exchange (MADE), which is part of the UK Materials Knowledge Transfer Network linking the creative industries to science and technology.

### The Biorefinery of the Future

- *Jack (John) N Saddler*, professor and former dean of the Faculty of Forestry University of British Columbia, Vancouver, Canada. He is also Task Leader of the International Energy Agencies (IEA) Bio-energy Liquid Biofuels network. His research interests are within biotechnology and microbiology and range from the technical issues surrounding bioconversion of wood to fuels and chemicals, through to the political and economic ramifications that these technologies will have for our world.
- *Markku Karlsson*, senior advisor, VTT Technical Research Centre of Finland and former senior vice president of technology for UPM-Kymmene Corporation. He has been working with renewal of the Finnish forest industry and he is one of the forces behind the new

direction and strategy of UPM-Kymmene. He is also a member of the steering committee for the European Biofuels Technology Platform, the advisory committee for the Forest Based Sector Technology Platform, and the CTO committee for the Agenda 2020 Technology Alliance.

## Peak Innovation

- *Prof. Stefan Grau*, University of Gothenburg. His areas of expertise consist of mechanical engineering, quantitative social research, biomedical engineering, physiotherapy, physical education and sport, sports medicine and biomechanics.
- *Mark Held*, secretary general of the European Outdoor Group. (EOG) The EOG was founded in 2003 by nineteen of the world's largest outdoor companies, which recognised the need for a cohesive, cross-border approach to representation of the outdoor sector. The EOG is now a major force in terms of the representation of the outdoor industry to the EU, development of sector leading CSR and sustainability work and promotion of participation in outdoor activities. He is also the director of the European Outdoor Conservation Association (EOCA), Zug, Switzerland.

# Appendix 2 Agenda for site visit

## Planning meeting

| TIME & PLACE | THEME | PARTICIPANTS |
|---|---|---|
| 19.00-21.00 | Presentation of the team and the task, planning the work to be done | Peer Review team and VINNOVA |

## Day 1

| TIME & PLACE | THEME | PARTICIPANTS |
|---|---|---|
| 08.30-10.00 | Presentation of the initiative | Management team/process leaders for the initiative |
| 10.00-10.20 | BREAK | |
| 10.20-11.30 | Dialogue with the board for the initiative | Members of the board,<br>2-3 persons |
| 11.30-12.40 | The initiative as part of the regional innovation system | Actors, stakeholders and intermediaries in the regional innovation system |
| 12.40-13.30 | LUNCH | |
| 13.30-14.40 | The competitive edge of research and knowledge development – strategy and results | Meetings with university management and researchers |
| 14.40-15.50 | The competitive edge of innovation and commercialisation – strategy and results | Meetings with innovators and entrepreneurs in the initiative |
| 15.50-16.10 | BREAK | |
| 16.10-17.20 | Renewal and innovation in established companies | Meetings with SME and global companies in the initiative |
| 17.20-18.00 | Short summing up for the team, final questions to management team | Peer review team and management team (if needed) |
| 18.00-19.30 | Mingle/light meal | Actors, stakeholders from the initiative |

## Day 2

| TIME & PLACE | THEME | PARTICIPANTS |
|---|---|---|
| 08.30-13.00 | Internal work to analyse and summarize the site visit | Members of peer review team |
| 13.00-14.00 | LUNCH (only peer review team) | |
| 14.00-16.00 | Feedback session. Presentation of conclusions and discussion. | Management team, the board of the initiative and other stakeholders |
| 16.00 (at the latest) | End of site visit | |

# VINNOVA´s publications

March 2015

See VINNOVA.se for more information

## VINNOVA Analysis

### VA 2015:

01 Årsbok 2014 - *Svenskt deltagande i europeiska program för forskning & innovation*

02 Samverkansuppgiften i ett historiskt och institutionellt perspektiv

### VA 2014:

01 Resultat från 18 VINN Excellence Center redovisade 2012 - *Sammanställning av enkätresultaten. (For English version see VA 2014:02)*

02 Results from 18 VINN Excellence Centres reported in 2012 - *Compilation of the survey results. (For Swedish version see VA 2014:01)*

03 Global trends with local effects - *The Swedish Life Science Industry 1998-2012*

04 Årsbok 2013 - *Svenskt deltagande i europeiska program för forskning och innovation.*

05 Innovations and new technology - *what is the role of research? Implications for public policy. (For Swedish version see VA 2013:13)*

06 Hälsoekonomisk effektanalys - *av forskning inom programmet Innovationer för framtidens hälsa.*

07 Sino-Swedish Eco-Innovation Collaboration - *Towards a new pathway for shared green growth opportunity.*

08 Företag inom svensk massa- och pappersindustri - *2007-2012*

09 Universitets och högskolors samverkansmönster och dess effekter

### VA 2013:

01 Chemical Industry Companies in Sweden

02 Metallindustrin i Sverige 2007 - 2011

03 Eco-innovative Measures in large Swedish Companies - *An inventory based on company reports*

04 Gamla möjligheter - *Tillväxten på den globala marknaden för hälso- och sjukvård till äldre*

05 Rörliga och kopplade - *Mobila produktionssystem integreras*

06 Företag inom miljötekniksektorn 2007-2011

07 Företag inom informations- och kommunikationsteknik i Sverige 2007 - 2011

08 Snabbare Cash - *Effektiv kontanthantering är en tillväxtmarknad*

09 Den svenska maritima näringen - *2007 - 2011*

10 Long Term Industrial Impacts of the Swedish Competence Centres

11 Summary - Long Term Industrial Impacts of the Swedish Competence Centres. *Brief version of VA 2013:10*

12 Företag inom svensk gruv- och mineralindustri 2007-2011

13 Innovationer och ny teknik - *Vilken roll spelar forskningen. (For English version see VA 2014:05)*

14 Företag i energibranschen i Sverige - *2007-2011*

15 Sveriges deltagande i sjunde ramprogrammet för forskning och teknisk utveckling (FP7) - *Lägesrapport 2007-2012*

16 FP7 and Horizon 2020

### VA 2012:

01 Impact of innovation policy - *Lessons from VINNOVA´s impact studies. (For Swedish version see VA 2011:10)*

02 Lösningar på lager - *Energilagringstekniken och framtidens hållbara energiförsörjning*

03 Friska system - *eHälsa som lösning på hälso- och sjukvårdens utmaningar*

04 Utan nät - *Batterimarknadens utvecklingsmöjligheter och framtida tillväxt*

05 Sveriges deltagande i sjunde ramprogrammet för forskning och teknisk utveckling (FP7) - *Lägesrapport 2007 - 2011.*

06 Företag inom fordonsindustrin - *Nationella, regionala och sektoriella klusterprofiler som underlag för analys- och strategiarbete*

07 Svensk Life Science industri efter AstraZenecas nedskärningar.

08 EUREKA Impact Evaluation - *Effects of Swedish participation in EUREKA projects*

09 Uppföljning avseende svenskt deltagande i Eurostars. *(For English version see VA 2012:10.*

10 Follow-Up of Swedish Participation in Eurostars. *For Swedish version see VA 2012:09.*

## VINNOVA Information

### VI 2015:

03 Social innovation - Exempel

04 Social innovation

### VI 2014:

01 Tjänsteinnovationer 2007

02 Innovationer som gör skillnad - *en tidning om innovationer inom offentliga verksamheter*

03 Årsredovisning 2013

04 VINNVÄXT - *A programme renewing and mowing Sweden ahead*

05 Insatser för innovationer inom Hälsa

06 Din kontakt i EU:s forsknings- och innovationsprogram

07 VINNOVA - *Sveriges innovationsmyndighet. (For English version see VI 2014:10)*

08 Visualisering - *inom akademi, näringsliv och offentlig sektor*

09 Projektkatalog Visualisering - *inom akademi, näringsliv och offentlig sektor*

10 VINNOVA - Sweden´s Innovation Agency *(For Swedish version see VI 2014:07)*

### VI 2013:

01 Branschforskningsprogrammet för skogs- & träindustrin - *Projektkatalog 2013*

02 Destination Innovation- *Inspiration, fakta och tips från Ungas Innovationskraft*

03 Inspirationskatalog - Trygghetsbostäder för äldre

04 Challenge-Driven Innovation - Societal challenges as a driving *force for increased growth. (For Swedish version see VI 2012:16)*

05 *Replaced by VI 2013:14*

06 Årsredovisning 2012

07 Trygghetsbostader för äldre - *en kartläggning*

08 Äldre entreprenörer med sociala innovationer för äldre - *en pilotstudie kring en inkubatorverksamhet för äldre*

09 Fixartjänster i Sveriges kommuner - *Kartläggning och sanhällsekonomisk analys. (For brief version see VINNOVA Information VI 2013:10)*

10 Sammanfattning Fixartjänster i Sveriges kommuner - *Kartläggning. (Brief version of VINNOVA Information VI 2013:09)*

11 *Replaced by VI 2014:10*

12 *Replaced by VI 2013:19*

13 När företag och universitet forskar tillsammans - *Långsiktiga industriella*

*effekter av svenska kompetenscentrum*

14 *No longer available*

15 Handledning - *för insatser riktade mot tjänsteverksamheter och tjänsteinnovation*

16 *Replaced by VI 2013:22*

17 Innovationer på beställning - *tidning om att efterfråga innovationer i offentlig sektor*

18 *Replaced by VI 2014:06*

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**Production:** VINNOVA´s Communication Division
March 2015


**VINNOVA - strengthening Sweden´s innovativeness**

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