

Strategies for Interaction and the Role of Higher Education Institutions in Regional Development in the Nordic Countries

– Case Studies

Maria Lindqvist, Lise Smed Olsen, Peter Arbo, Veera Lehto and
Henna Hintsala

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Nordic co-operation

takes place among the countries of Denmark, Finland, Iceland, Norway and Sweden, as well as the autonomous territories of the Faroe Islands, Greenland and Åland.

The Nordic Council

is a forum for co-operation between the Nordic parliaments and governments. The Council consists of 87 parliamentarians from the Nordic countries. The Nordic Council takes policy initiatives and monitors Nordic co-operation. Founded in 1952.

The Nordic Council of Ministers

is a forum of co-operation between the Nordic governments. The Nordic Council of Ministers implements Nordic co-operation. The prime ministers have the overall responsibility. Its activities are co-ordinated by the Nordic ministers for co-operation, the Nordic Committee for co-operation and portfolio ministers. Founded in 1971.

Nordregio – Nordic Centre for Spatial Development

works in the field of spatial development, which includes physical planning and regional policies, in particular with a Nordic and European comparative perspective. Nordregio is active in research, education and knowledge dissemination and provides policy-relevant data. Nordregio was established in 1997 by the Nordic Council of Ministers. The centre is owned by the five Nordic countries and builds upon more than 30 years of Nordic cooperation in its field.

Stockholm, Sweden, 2012

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Preface

This working paper is part of a project initiated in late 2009 and funded by the Nordic Council of Ministers. The project focuses on the various roles of higher education institutions (HEI) in regional development. Important issues concern different strategies and incentives for university collaboration with external parties. The project includes a combination of a literature review, case studies and a quantitative pilot study of student mobility, based on micro data. In this working paper, eight case studies of Nordic HEIs are presented. The case studies include HEIs from different types of regions in terms of size and population density so as to offer a better understanding of the role of HEIs in different regional contexts.

Project manager at Nordregio and author of the Swedish case studies on Karlstad University and Royal Institute of Technology (KTH) was Maria Lindqvist. The case studies on Aalborg University (Denmark), University of Iceland and Nordland University (Norway) were written by Lise Smed Olsen and the case study of the University of Tromsø (Norway) by Peter Arbo, University of Tromsø (UiT). Veera Lehto and Henna Hintsala were the authors of the Finnish case studies on HAMK University of Applied Science and University of Lappeenranta. Other members of the project team were Apostolos Baltzopoulos, Moa Hedström and Lisa Hörnström.

Interviews were carried out between April 2010 and October 2011. The report has benefitted

from the possibility to develop synergies with other on-going projects at Nordregio, for example the Regional Innovation Monitor project (Technopolis/DG Enterprise), participation in the development of an internal quality policy for external collaboration (KTH) and an analysis of cluster collaborations in the region of Värmland (Region Värmland).

The project was supported by a reference group consisting of the following representatives of Nordic countries; Peter Arbo, UiT, Eija-Riitta Niinikoski, University of Oulu, Sigríður Elín Þórðardóttir, Byggðastofnun, Göran Reitberger, KTH, Maria Lönn, County Administrative Board of Stockholm, Morten Solgaard Thomsen, Danish Agency for Science, Technology and Innovation, and Monika Mörtberg Backlund (replacing Kristian Möller), Nordic Council of Ministers. Valuable input was also provided by participants at a concluding policy workshop in December 2011.

In addition to this working paper, a synthesis report including a comparative analysis and the main findings has been prepared; 'Strategies for Interaction and the Role of Higher Education Institution in Regional Development in the Nordic Countries', Nordregio Report 2012:2. The reports can be downloaded from www.nordregio.se.

Stockholm, February 2012

Aalborg University (AAU)

Written by Lise Smed Olsen, Nordregio

The North Jutland Region

The North Jutland Region in Denmark covers an area of 7 949 km² and had 579 628 inhabitants in 2010. The population density was 73 persons per km², which was below the national average (128 persons). The region comprises 12 municipalities, of which Aalborg is the largest municipality in North Jutland with 197 426 inhabitants (Lindqvist, 2010). Statistics show that the North Denmark Region has experienced an overall reduction in population between 1997 and 2007, whereas the remaining four Danish regions have experienced population growth. Population stagnation in North Jutland has mainly occurred in the more remote municipalities, while Aalborg has seen an overall increase in population of 3 percent. In the most recent business development strategy of the region, the clusters in the areas of construction, ICT, and medicine and health are emphasised as especially strong. The

strategy also stresses that a general weakness of the region is that education levels are relatively low, as are competencies in firms. This is a challenge as the growth of many firms increasingly depends on new, well-educated employees. Moreover, the investment of firms in research and development activities is relatively low in the region (Vækstforum Nordjylland, 2008).

As is also the case in the other Danish regions, the Regional Growth Forum of North Denmark plays a central role in regional development. The three main roles of the regional partnership are to lead the regional development strategy, to monitor regional development, and to decide on the allocation of regional development funds, including the EU Structural Funds. The Rector of Aalborg University is a member of the Growth Forum.

Presentation of Aalborg University

Aalborg University Centre was established in 1974 as the fifth HEI in Denmark after years of local political efforts to establish a university in North Jutland. At the time, the region underwent comprehensive structural changes, demonstrating a shift from an industrial economy towards a knowledge economy, especially with the closure of the shipyard industry in North Jutland. These circumstances lead to a mutual interest for stakeholders in the region and Aalborg University to facilitate structural changes in the region. From the beginning, it was decided that the university's research and education activities should focus on interdisciplinary integration, problem orientation and group work (Kerndrup, 2005).

Opening in 1974, the university was made up of a Faculty of Humanities, a Faculty of Social Sciences and a Faculty of Engineering and Science (since 2010: Faculty of Engineering, Science and Medicine). In 1994, the university centre became Aalborg University (AAU).

From the very beginning, Aalborg University was characterised by its use of problem based project work, also known as the Aalborg model, and by collaboration with the surrounding society.

Since the beginning, research and development have played a significant role in the interaction between the region and the university, as technology has been perceived as an important driving force in the renewal of the industrial structure of the region. The development of an international and competitive cluster in the field of ICT, which created new workplaces and new businesses in the 1980s and 1990s, has played a pivotal role for how regional stakeholders perceive research and development as the driving force for development in the region. The IT and communications area generated employment growth of 60 per cent in Aalborg and 50 per cent in the region of North Jutland as a whole. It developed into a geographical specialisation, especially for the sub-industry of wireless technology (Kerndrup

2005).

The main purpose of AAU was from the beginning to establish strong collaboration with the surrounding society. This role is stressed in AAU's strategy for the period 2010-2015: "AAU's profile was developed for the purpose of value creation within education and research in dialogue with the surrounding society. The essence of the central output is the education of highly qualified and dedicated graduates who have worked in an integrated manner with industry, the business sector and public institutions already during their studies, as well as solution oriented and interdisciplinary research that meets both quality and relevance criteria" (Aalborg University, 2010). In the strategy, it is stated that AAU has a specific mission within three interrelated issues: problem based learning, inter-disciplinarity and innovation.

Facts and figures

The number of students has increased from 3 000 during the first years of the university to the present 15 000. Moreover, AAU has set up campuses in Esbjerg in the South of Denmark and in Ballerup in the capital area (Aalborg University, 2011a).

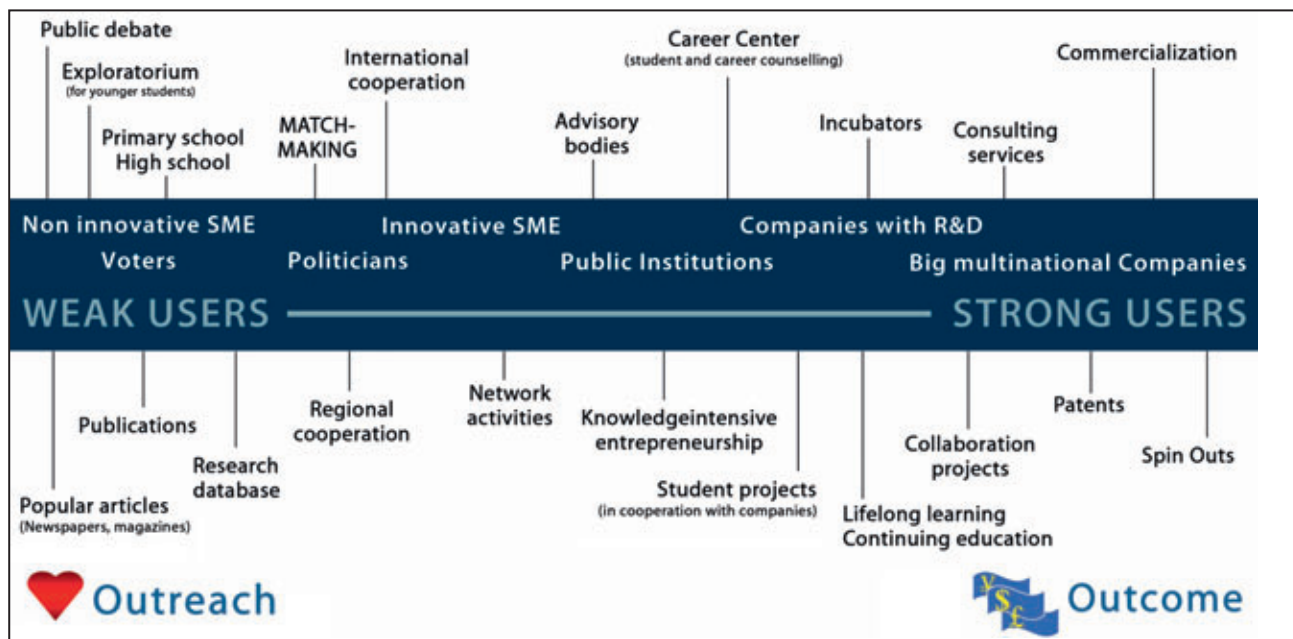
All of AAU's education programmes are based on a model of teaching and learning called the problem-based, project-organised model also referred to as problem-based learning "PBL - The Aalborg model". The PBL - Aalborg Model is recognised nationally and internationally as an advanced and efficient learning model and a trademark for Aalborg University. The PBL model gives students the possibility of working with the business community to solve real-life problems, and it

helps the students learn how to analyse problems, how to work with a result-oriented focus and how to collaborate within a team (Aalborg University 2011, b). Studies have indicated that graduates from AAU are appreciated in the labour market due to their ability to deal with actual problems in firms and public organisations. Often, students carry out projects within the region, but collaboration with firms and organisations is not limited to North Jutland. Further adding to the close interaction with the surrounding society, internships are an integrated part of most master's programmes at AAU (Olesen, interview).

To collaborate with the surrounding society, AAU has a unique arrangement in cooperation with the Growth Forum of North Jutland, called the 'knowledge dissemination agreement'. It is a framework agreement, for the period 2010-2012, between the two parties which comprises 12 sub-activities. The knowledge dissemination agreement sets guidelines for how cooperation with the university should take place in relation with projects funded by the Growth Forum. The main purpose of the agreement is to ensure knowledge transfer from the university to firms in the region. The Growth Forum provides up to 50 per cent co-financing for activities carried out within the focus areas of the agreement. The knowledge dissemination agreement between the Growth Forum and the University is the only one of its kind in Denmark (Lemvig, interview).

The figure below, developed by Niels Maarbjerg Olesen, illustrates the wider spectrum of third task activities which are carried out by AAU. These range from user-driven outreach activities to knowledge-driven outcome activities.

Figure 1: Knowledge interactions AAU – and their users



Source: Niels Maarbjerg Olesen, Faculty Director, the Engineering, Science and Medicine Faculties, & Director, AAU Innovation

While AAU is known for collaborating with the surrounding society, the national incentive structure does not reward researchers for working with the third mission, which according to interviewees limits the extent to which researchers engage in third mission activities. Researchers are selective in choosing which collaboration projects to become engaged in and need to see that the projects will benefit their research portfolio, by feeding into academic articles, for example. Olesen (interview) notes that the issue of lacking incentives to support the third mission not only concerns the Danish state, but is an international issue. Today, researchers are part of a global labour market and need to maintain a strong CV. As long as the international system does not reward the third mission, it will limit the extent to which researchers engage in such activities. Related to this discussion is the issue of international ranking systems. AAU is involved in a number of activities to change

ranking systems to become more comprehensive and capture more indicators. An arena through which the institution is trying to influence the system, at an EU level, is through its involvement in the European Consortium of Innovative Universities (ECIU).

AAU has been a member of ECIU since 1997, when the consortium was formed. It was established with the purpose of strengthening the member universities' strategic cooperation within research, education and regional development. Some cooperation activities between the 14 members involve lobbying activities to influence EU programmes, and the development of common education programmes. AAU became involved in the ECIU because of its problem-based learning profile, which is considered to be innovative and has been described by the OECD as an almost perfect learning method (Olesen, interview; ECIU 2011).

Collaboration with the surrounding society

This section introduces examples of how AAU collaborates with the surrounding society, focusing on the organisation AAU Innovation, and an initiative coordinated by AAU Innovation, BrainsBusiness ICT North Denmark, which is a private/public partnership within the field of ICT. Focus is placed on collaboration with the ICT industry, since this is an area in which AAU has been especially active in the region, nationally and internationally.

An example of a major international initiative of AAU is the Centre for Tele Infrastructure (CTIF). CTIF was established in 2004 as a research and education centre concentrating on wireless technologies. Through CTIF a number of international students and employees for the wireless telecommunications industry have come to Aalborg. CTIF has now set up divisions in a variety of countries such as Greece, USA, India and Japan (Olsen, 2009).

An example of how the university is involved in ICT cooperation nationally is the national IT innovation network INFINIT, which involves a network of strong IT research environments across the country, and which is coordinated by AAU. The network is financed by the Danish Agency for Science, Technology and Innovation; it is concerned with developing cooperation between research and the business community. The strategic work and research carried out in INFINIT forms the basis for a number of interest groups, which consist of representatives from research and the business community with the purpose of adapting network's work to the needs and challenges of the business community (Infinit 2011).

The university's involvement with the ICT industry in the region is evident in times of economic crisis. At the end of the 1990s, there was high unemployment among building engineers in the region, while at the same time there was a lack of software engineers. AAU, in collaboration with a local software firm, initiated an education programme for building engineers to be educated in software engineering. In 2009, as a result of the global financial crisis and the recent closure of the two biggest wireless firms in Aalborg, Motorola and Texas Instruments, a high number of engineers became unemployed. This led to the initiation of a 'task force' which also involved the BrainsBusiness partnership, and offered competence and business development courses at AAU for the engineers (Olsen 2009).

AAU Innovation

In 1996 the Network Centre was established at AAU with the purpose of building networks between research environments at the university, the business community and public authorities. In 2005, more services had been added to the Network Centre and the name of the organisation was changed to AAU Innovation (Kerndrup 2005). AAU Innovation receives base funding from AAU and is otherwise dependent on project funds. Due to the project-based character of the organisation, an official strategy has not been developed for AAU Innovation (Olesen, interview). Today, AAU Innovation has four main functions/divisions: knowledge-based networks; commercialisation; entrepreneurship; and matchmaking.

Knowledge-based networks, which build on the activities of the Network Centre, are coordinated by AAU Innovation. An example of one of these networks is BrainsBusiness ICTNORCOM, which will be the focus of the next section. The commercialisation unit deals with inventions generated by employees at AAU, most often from the Faculty of Engineering and Science.

The division for Supporting Entrepreneurship at

AAU Innovation (SEA) receives annual funding from the Faculty of Engineering, Science and Medicine, although it services all three faculties at AAU. As with other parts of the organisation, it depends on project funding, and it is currently involved in three EU Structural Funds projects, two of which are granted by the regional Growth Forum, while the third is an Interreg project carried out in collaboration with two HEIs in Norway. SEA manages the incubators based at different departments of the university. Most incubator projects/business ideas involve the development of software and include various types of consultancy firms.

SEA organises various courses on entrepreneurship, including methods of integrating entrepreneurship in teaching. Within the framework of the above mentioned 'regional task force' dealing with the financial crisis in 2009, SEA opened the university incubators for courses in business development for engineers who had business ideas. Approximately 25 persons participated in this activity. After the courses ended, a number of firms were established as spin-offs originating from the larger firms that had closed, while other participants found new jobs.

'Solution Camps' is a popular initiative run by SEA. In Solution Camps, firms can suggest problems which they wish to solve. Up to 20 students are then involved during one day, where they, in cooperation with creativity consultants from SEA, work with this problem. This is a way to make firms aware of the knowledge they can utilise at the university. Workshop for Innovation and Entrepreneurship (WOFIE) is another SEA initiative which involves an interdisciplinary workshop targeted at master's students across all faculties of the university. During the four-day workshop, the participants work with idea development, creativity, business development and risk taking. The goal of WOFIE is to provide the students with the tools and abilities to work on and present one or more ideas that can lead to innovative concepts and strategies with business potential (Andersen, interview).

The matchmaking project is coordinated by AAU Innovation. A number of internal and external matchmakers have been appointed to work with this task. Each department at AAU has appointed a matchmaker who helps industrial partners find the relevant researcher and/or research environment in their field. Internal matchmakers are expected to allocate approximately 10 per cent of their time to matchmaking activities, which are covered by project funds. Currently, 75 external matchmakers are located at business promotion offices and large companies around the region. Furthermore, 10 'matchpoints' have been established, which are physical meeting places based in some of the municipalities of North Jutland. External matchmakers are located at business promotion offices

around the region. The external matchmakers help businesses and industry in their area to connect with relevant departments and research environments at AAU. The matchmaking project has been developed as part of the knowledge dissemination agreement (Nøhr, interview).

AAU Innovation regularly accepts representatives from HEIs, or regional and local authorities on study visits. These representatives, who are interested in learning about AAU's approaches to collaborating with the surrounding society, come primarily from the Nordic countries or from the European Consortium of Innovative Universities (Andersen, interview).

BrainsBusiness ICT North Denmark

BrainsBusiness ICT North Denmark comprises two separate yet interlinked networks, BrainsBusiness ICTNORCOM and BrainsBusiness ICT Aalborg University. ICTNORCOM is a business forum that was established in 2009 after a merger between NoRCOM and ICT Forum, which had previously been separate networks (Olsen 2009). The organisation is funded by membership fees. ICT Aalborg University builds on a previous collaboration initiative called 'On top of ICT', which involves a number of Heads of Departments and Centres at the university that work with education and research related to ICT. The two networks, involving the business community and the university respectively, are under the umbrella of the BrainsBusiness ICT North Denmark partnership, which is a cluster initiative financed by the regional Growth Forum for the period between July 2009 to December 2012. The BrainsBusiness partnership also includes the North Denmark Region and the Municipality of Aalborg. The aim is to brand the cluster as a cooperative effort between the university (Brains) and the business community (Business).

The distinction between the two networks within the BrainsBusiness partnership mainly involves the unique history and financing of the organisations. In practice, there is overlap between their activities and the people involved in the networks. Most activities are now financed under the umbrella of BrainsBusiness. Among the interviewees, there are varying opinions on whether the networks will continue in the same manner. The leader of the secretariat of ICTNORCOM believes that the two networks will be merged, and they will exist under the name BrainsBusiness ICT North Denmark. Conversely, the Chairman of the board of ICTNORCOM stresses that it is significant to maintain the network for the business community, which can make statements that public authorities involved in BrainsBusiness would not be able to make.

As part of the BrainsBusiness partnership,

tasks are divided between the different partners. The Municipality of Aalborg has overall responsibility for the project; the secretariat of ICTNORCOM, based at AAU Innovation, is responsible for developing networks within BrainsBusiness; ICT Aalborg University is responsible for marketing BrainsBusiness; and finally, the North Denmark Region is involved in different aspects of the partnership and serves as a significant link to the Region. Responsible persons from each partner meet every second week to coordinate their activities. They are also the main people responsible for developing the BrainsBusiness strategy and in carrying out background analyses which guide the work of the steering group. The strategy is revised every 18 months. It identifies focus areas, from which activities are organised within the framework of BrainsBusiness. In the development of the strategy, interested members of ICTNORCOM have also been involved by attending brainstorming meetings, where the focus areas of the strategy were discussed.

BrainsBusiness' activities mainly involve branding the cluster and developing networks. Different events in the form of short seminars and theme days are organised within and across networks which have been established in BrainsBusiness, including both firms and researchers from AAU. Traditionally, the technical departments at AAU have been involved in cooperating with ICT firms, but increasingly it has become relevant to include a wider range of disciplines, such as humanistic informatics, e-learning, design, mechanics and production departments. Another recent development in the activities of BrainsBusiness is to place focus on the involvement of consumers/users in research and development processes and utilise open innovation approaches. However, a structured approach to working with open innovation has not yet been developed at AAU. The BrainsBusiness partnership has some cooperation through AAU's campus in Ballerup, in the capital area, where it is involved in a living lab for broadband technology, called Copenhagen Living.

Funding for research and development projects is not a part of the BrainsBusiness partnership. However, ICTNORCOM is a consulting partner when the Growth Forum makes decisions on the allocation of funds to ICT-related applications. The ICTNORCOM secretariat at AAU Innovation monitors relevant research carried out at the university. Ideas for projects arise when different parties meet through various BrainsBusiness activities and in some cases, the knowledge dissemination agreement is utilised to support cooperation projects between AAU and firms. In projects under the knowledge dissemination agreement, it is increasingly common that smaller firms take part, while larger projects, such as the EU FP-7 programme, most often involve larger firms. In most

cases, firms do not contribute with direct funding, but through the time they spend working in the project.

In order to learn from and exchange experiences with other clusters, BrainsBusiness is a member of the organisations Reg X and Reglab. Moreover, it is involved in the lifelong learning programme *EU Drivers*, which is designed to improve regional cooperation between universities, private sector companies and local governments to enhance the innovation capacities of

European universities (EU Drivers 2011). In connection with this, representatives from the region, the business community and the university regularly attend workshops across Europe focused on different types of cluster initiatives. As part of BrainsBusiness, current plans involve organising a workshop in the region to anchor knowledge locally, which has been gained across Europe (Nøhr; Vestergaard; Lemvigh, interviews).

The role of AAU in regional development

The fact that AAU has stated in its formal strategy that its mission is to work with the interrelated issues of problem based learning, interdisciplinarity and innovation indicates a strong commitment to cooperating with the surrounding society. The tradition of problem based learning at the university entails that students from different disciplines work with problems in firms and organisations in (and also outside) the region. Studies have indicated that graduates from AAU are appreciated in the labour market due to their ability to deal with actual problems in firms and public organisations. A representative from the region stated that overall, AAU is a major player in projects granted by the Regional Growth Forum (Lemvigh, interview). A significant tool in coordinating activities with the surrounding society is the 'knowledge dissemination agreement' which is funded by the Growth Forum. The main purpose of this agreement is to ensure the transfer of knowledge from the university to firms in the region.

AAU Innovation is a central actor in terms of creating links between the university and the surrounding society and it is also the unit responsible for coordinating the knowledge dissemination agreement. According to the Head of the Regional Development Department at the North Denmark Region (Lemvigh, interview), it is very convenient for the region to know that it is possible to establish contact with relevant individuals or research units at the university by calling a person at AAU Innovation. Through its focus areas of knowledge-based networks, the organisation works with various forms of cooperation; commercialisation; entrepreneurship; and matchmaking.

In regards to AAU's role in regional development, the ICT industry has often been highlighted as an industry where the university has been especially active and has cooperated with firms in the region, with regards to education, research and development and the creation of networks, for example (see e.g. Olsen 2009; Kerndrup 2005). Currently, the industry organisation ICTNORCOM, which is a membership organisation for ICT firms, cooperates with AAU under the cluster initiative BrainsBusiness ICT North Denmark. This initiative, which also involves the North Denmark Region and the Municipality of Aalborg, is funded by the regional Growth Forum. In addition to the technical departments, which have traditionally been the main cooperation partners for the ICT industry, other departments, such as the humanistic informatics, e-learning and design departments at AAU are increasingly cooperating with ICT firms. Focus areas for the BrainsBusiness partnership include interdisciplinary focus areas such as intelligent transport and logistics; smart energy grids; and human computer interaction, and it was stressed by interviewees that BrainsBusiness has synergies with some of the region's other focus areas. The main focus areas in the current business development strategy of the region are influenced and developed by the main strengths of AAU (Lemvigh, interview). While the university maintains the regional focus, AAU also engages in projects such as the national INFINIT network, which is concerned with developing links between research and business at a national level in the field of IT.

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University of Iceland (UI)

Written by Lise Smed Olsen, Nordregio

Iceland

In 2010, Iceland had a population of 317 630 and an average population density of 3 people per km², which makes Iceland the most sparsely populated country in Europe by far. Annual population growth between 2005 and 2010 was high by international comparisons (Lindqvist, 2010). To a large extent, the population is concentrated in urban areas in the south-west, close to the capital of Reykjavík, where two thirds of the inhabitants live. The remaining third of the population is mainly located in smaller towns and villages around Iceland and in very sparsely populated areas.

During the last 20 years, there has been a decrease in occupations related to agricultural and

fishing industry in Iceland. The extensive out-migration from rural areas of Iceland involves the country's move away from a primary production society towards a knowledge-based society.

The migration pattern shows a gender difference as well, as the development has led to more women than men living in the capital area, while more men than women live in rural areas. This may be related to the fact that more women have a higher education degree, and that they have less job opportunities in the rural areas compared to men (Regional development plan 2006-2009, 2006).

Presentation of University of Iceland

The University of Iceland (UI) celebrated its centennial anniversary in 2011. In 1911, UI was established in Reykjavík as the first university in the country through the merger of the faculties of theology, medicine and law. In 2008, the university merged with Iceland University of Education. Today, UI comprises five schools (social sciences; health sciences; humanities; education; engineering; and natural sciences) and 25 faculties. As the first and largest state-run university in Iceland, UI takes on the role of being 'the national university'. Among other responsibilities, this role requires the HEI to play an active role in the development of the entire country. The agreement between the Ministry of Education, Science and Culture and the University of Iceland is summarised as follows: *"The University undertakes to strengthen the foundation of teaching and research in the whole of Iceland and establish activity that aims at using, obtaining and distributing knowledge in the rural regions. It will especially strengthen cooperation with rural research centres"* (Prof. Ólafsson, director University of Iceland Regional Research Centres).

The policy of the University of Iceland for the period 2011-2016 (University of Iceland, 2011) continues

the long-term goal of the university, first introduced in its 2006-2011 policy, to become one of the 100 best universities in the world. As stated in the current policy of UI, the HEI aims to be active internationally while also committing to the development of the country: *"The University of Iceland is an international research university that has strong obligations to Icelandic society, culture and language."* (University of Iceland, 2011). In the strategy, UI is mainly focused on strengthening its collaboration with leading international research universities.

As noted in the section on higher education in Iceland, the fact that Iceland has been especially hard hit by the global financial crisis also affects UI, and it is an issue which will come up throughout the study. With the introduction of UI's strategy 2006-2011, the university was allocated an additional 600M ISK annually from the Ministry of Education, Science and Culture to support the objectives introduced in the strategy. One significant purpose of the additional funds was to support development in rural areas, where a crisis in cod fisheries had a great impact at the time. However, this additional allocation was put on hold in 2009. At the same time, the financial crisis led to an increase

of students as people decided to go back to school when faced with the alternative of unemployment. In total, the UI has seen a decrease in annual funding of approximately 25 per cent which has required a drastic budget cut and has put some development plans on hold.

UI has developed an evaluation system which is now being used by all of the public HEIs in the country. It is a points system, which evaluates the academic staff according to their performance in research, which effectively has an impact on each individual's salary and academic position. In relation to this, most points are awarded for publishing peer-reviewed articles, book chapters and conference presentations. Research and development projects carried out in collaboration with the surrounding society, such as with related industry, are credited to a minor extent, and the national public evaluation system for HEIs does not provide incentives for researchers to collaborate with the surrounding society. In the UI policy 2006-2011 (University of Iceland 2006), one of the objectives was that *"Research and consultancy for business and society will be rewarded. The University Science Committee will provide proposals before*

2008 on how a work evaluation system can be set in place for this purpose." However, this objective of developing a rewards system for collaboration was abandoned during the period and was not been included in the 2011-2016 UI policy.

Although the UI does not reward collaboration with the surrounding society, it is stressed that researchers have academic freedom, which entails that as long as they fulfil their teaching duties, they are allowed to engage in collaborative projects. Meanwhile, the system provides incentives first and foremost for collaboration with international research universities and for peer reviewed publications.

During recent years, the share of external competitive funds has increased at UI, something that is also related to the financial crisis. External funding for research projects mainly stem from EU, Nordic and US funds. This is something which is referred to by the Pro-rector of Academic Affairs as an opportunity related to the crisis, as more emphasis is now placed on applying for competitive funds outside of Iceland (Benediktson; Jonsson, interviews).

Collaboration with the surrounding society

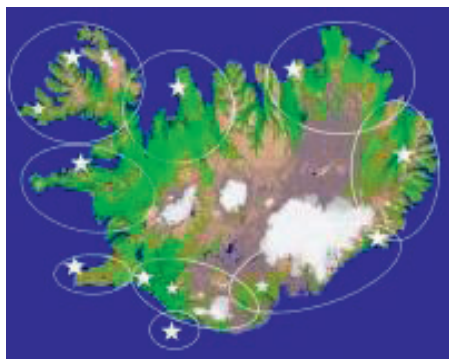
The Regional Research Centres

As introduced in the national overview of higher education in Iceland, UI is involved in a network with three other state-owned universities. In addition to this, it is involved in other cooperative initiatives with Icelandic HEIs, such as the Icelandic Tourism Research Centre, based at the University of Akureyri. The Icelandic Tourism Research Centre is co-financed by UI, the University of Akureyri and Hólar University College, and before the onset of the global financial crisis, a joint position existed which ensured cooperation between the three HEIs. Today, the activities, which are under a limited budget, are undertaken in Akureyri by one researcher (Huijbens, interview). The main strategic effort to cooperate with the surrounding society involves the University of Iceland Regional Research Centres.

The research centres are managed by the Institute of University of Iceland Study Centres, which is a research and service institution that reports to the University Council. The institute is the focal point

for the university's cooperation with local authorities, institutions, businesses, associations and individuals in rural areas. The objectives of the institute are to provide facilities for research in rural areas; increase the general public's access to education and to strengthen the relationship between the University of Iceland and the business community. As part of the Institute of University of Iceland Study Centres, a total of nine research centres have been set up as independent organisational units in rural areas in Iceland (University of Iceland Study Centres 2011). The focus areas of the different research centres vary, but overall, environmental and land usage research, marine research, and tourism research dominate. The research centres are small units with one to five employees in each, and are located in areas with less than 5 000 inhabitants (Nielsen 2010). The location of the centres is illustrated in the figure below.

Figure 2: University of Iceland's Regional Research Centres



Source: University of Iceland (2011)

The establishment of the research centres took place gradually during the 2000s. They began as a response to requests by municipalities in rural areas and Parliament representatives elected in the rural areas who believed that the presence of UI in the rural areas would strengthen economic development. When the Institute of University of Iceland Study Centres was set up in 2004, some centres had already started their activities in the rural areas. The institute has financial liability for the centres which are partially funded by the Ministry of Education, Science and Culture through UI, by local authorities, and through external project funds. UI received additional funding from the Ministry for the regional research centres in 2006, mainly with the purpose of providing a remedy to the influences of the collapse in cod fishing at the time in Iceland.

So far, the centres have not been based on shared or individual development strategies. Instead, focus by the director of the institute and the individual centres have centred on ensuring their year-to-year base funding. As UI underwent severe budget cuts in relation to the financial crisis, attempts were made centrally to cut the budget of the regional research centres entirely, as they were not a fixed post on the university budget. Meanwhile, strong objections from the municipalities involved and their representatives in Parliament led to the rescue of the centres, which ended up undergoing the same budget cuts as other institutions of UI. As of 2011, the Managing Director of the institute is in negotiations with the Ministry of Education, Science and Culture to place the regional research centres as a fixed part of the UI budget in the UI's upcoming contract with the Ministry. This is an agreement which will make a big difference in terms of the financial security of the research centres and the possibility to plan more long-term (Ólafsson; Árnason, interview).

The UI 2011-2016 policy states that: *"The activities of University of Iceland's Research Centres (located around Iceland) will be strengthened, coordinated and linked more closely with schools and faculties."* (University of Iceland 2011, p.9). This objective involves plans to formally make the

Directors of the nine regional research centres a part of relevant faculties at UI, and to give them teaching positions at the university. Currently, this is not the case, as the centres are set up as independent units around the country. Some of the Directors of the centres give lectures in Reykjavik from time to time and they supervise PhD and Master's students. However, such arrangements function on an ad hoc basis, and formal links do not currently exist. The establishment of formal links between the centres and the faculties are currently being negotiated and the outcome is not yet certain (Jónsson; Árnason, interview).

As previously mentioned, the centres have different focus areas and different functions in the communities in which they are based. For example, one research centre is specialised in whale research and another in bird research. In these areas, there is some collaboration between researchers and the surrounding society. At the whale research location, collaboration takes place with whale watching (tourism) boats, which allow researchers and students on board and in exchange receive information on research findings. This is also the case with the local whale museum, with which the research centre also exchanges information. With regards to the research centre working with birds, a similar arrangement has been made, where the researchers can be onboard local boats for free. Meanwhile, one research centre has been emphasised as being the most successful in terms of establishing collaboration with the surrounding society, the Hornafjörður Rural Research Centre.

The Regional Research Centre in Hornafjörður

The regional research centre that is studied further in this section is located in Höfn in the Municipality of Hornafjörður in southeast Iceland. In 2011, the municipality had a total population of 2.030 people (2.370 inhabitants in 2000).

The area has traditionally been dominated by the

agriculture and fisheries industries and more recently by a growing tourism industry. The growth of the tourism industry is mainly related to Vatnajökull National Park, established in 2008, which is the largest national park in Europe (Nielsen 2010).

The research centre in Höfn was established in 2001, as one of the first. Its focus areas are environmental studies, sustainable tourism and culture. It is based in a building called Nýheimar, where all public organisations in the municipality are based. Nýheimar was established shortly before the centre was started in the area with the idea of bringing together research (the University of Iceland Research Centre), education (secondary school, distance education facilities), innovation (the local Innovation Centre) and culture (the local cultural centre). Previously, the municipality was a part of the Development Centre of East Iceland, based in a neighbouring municipality. However, as the Municipality found that the activities of the centre were the same as the local Innovation Centre, they decided to opt out of the cooperation with the Development Centre of East Iceland and instead focus on cooperating with the organisations at Nýheimar. The Municipality did not find that it had much in common with neighbouring municipalities to the east and has instead cooperated with municipalities further away in some cases. This was illustrated by a project with a municipality in the north of Iceland on how to attract tourists during the winter.

For the first years, the Research Centre had one employee. With the additional funding given to the centre for a period of two and a half years starting in 2006, from the Ministry of Education, Science and Culture, to remedy the collapse in cod fisheries, the centre was able to employ six staff. However, with the onset of the financial crisis, the centre was forced to cut back and now it has only three employees. Later in 2011, this could dwindle to, the Director and a senior researcher. According to the director of the centre, it is currently trapped in a situation where the base funding from UI and the municipality is being reduced, while projects financed by public authorities have been reduced significantly, competition to win projects has increased and the internal resources to apply for projects have been reduced.

The character of research and development projects that the research centre has been involved with have mainly been reactive to the circumstances in the area. An initiative which the centre has worked on involves the establishment of a cluster of tourism, food and culture organisations and firms in the municipality. Efforts at fostering the cluster were initiated in 2006 by the municipality and the Innovation Centre. At the time, the current director of the research centre started his position and became involved in the process of developing it. Currently, approximately 80 persons are

involved in the cluster. In the start-up phase, it was financed by the municipality. Today, it is co-financed by the municipality, the Regional Growth Agreement Development Centre of East Iceland (which is responsible for the implementation of the Growth Agreement of East Iceland) and by membership fees. The Regional Research Centre is also a member, and currently plays an important role in the development of the future strategy of the cluster.

The creation of the national park in 2008 led to the involvement of the research centre in two Northern Periphery Programme (NPP) projects, first the 'Northern Environment for Sustainable Tourism' (NEST) project followed by 'Northern Environmental Education Development' (NEED). Both projects were carried out with partners in Norway, Finland and Ireland, who were all working with national parks or protected areas. The NEST project focused on developing connections between the park and tourism firms in the area, aiming to build awareness and knowledge about sustainable tourism. Part of it also dealt with the development of nature education, which became the focus of the NEED project. The purpose of NEED was to develop better ways of utilising national parks for educational purposes and to provide material for the development of education programs in sustainable tourism geared towards the local population. In Iceland, all eight municipalities which have territory in the national park were involved in the project. The collaboration was organised by establishing five semi-independent networks with core partners in each of the five areas.

Both NPP projects involved private tourist firms in the area, who contributed with their time, rather than direct co-financing. As part of the NEST project, the research centre introduced a grant scheme to interested firms and individuals. This involved applications in which firms and individuals described their plans, expected outcome, costs and the costs they were willing to cover themselves. Initiatives that were carried out as part of NEED included a firm that received guidance in developing material for guided tours about the geology of a specific area and a firm that received help in developing signposts about the geology of an area. The firms in the area are typically small family businesses that mainly operate during the summer and thus do not have sufficient funds to invest in the projects. However, as part of the NPP project, the local tourism firms showed an interest in collaborating with the research centre.

The research centre in Höfn is mainly, as the name indicates, a research centre. However, the director also works as a supervisor for Masters and PhD students at UI. These students are based in Reykjavik, but in a few cases they work on projects related to the

area of Hornafjörður. The director has also supervised two persons, who lived in the area and worked as secondary school teachers, who got Master's Degrees through distance learning facilities, which are based in the building of Nýheimar. The distance learning facility is part of a national network of such facilities run by an organisation responsible for adult education in Iceland. The facilities are used for both secondary and tertiary education and are used by UI as well as other higher education institutions in the country. The organisation in Nýheimar is run by two persons who work with the promotion of adult education and serve as guidance counsellors.

As of early 2011, the municipality and the organisations at Nýheimar are working on the development of a strategy for the coming years. A main focus area is to develop 'creative industries' in the area and the research centre will have an important role in this. Talks have been initiated with the design department at UI about developing an education programme together, which would be run partly from Hornafjörður and partly from Reykjavík. However, discussions about this are in an initial phase and so far no formal agreement has been made on the development of an education programme (Vignisson; Árnasson, interviews).

The role of the University of Iceland in regional development

Overall, the University of Iceland does not have a strong tradition for collaborating with the surrounding society. Efforts by university management were initiated to introduce incentives for researchers to engage in R&D projects in cooperation with business and society in the strategy introduced in 2006. However, with the onset of the financial crisis, the university abandoned these plans. The financial crisis has highly restricted the development of the University of Iceland in general, also concerning initiatives to cooperate with the surrounding society. The regional research centres, which were established in the rural areas, were at risk of being closed down when the university underwent severe budget cuts, and it was mainly due to strong objections from the municipalities involved and representatives in Parliament that the research centres remained. The centres have different focus areas, and to varying extents there is collaboration between researchers and the surrounding society. The impact of the research centre in Hornafjörður has been pointed out as a particularly good example (Jónsson, interview).

According to a study by Nielsen (2010), other public organisations in the municipality of Hornafjörður, such as the local Innovation Centre, have stated that the research centre has strengthened the local economy. The presence of the centre means that other actors involved in the cluster have gained access to knowledge and are able to receive advice from the employees at the research centre. Moreover, the external knowledge and links that were fostered through the NPP projects are seen as highly valuable by other organisations at Nýheimar. It was stressed that the fact that the centre is based in the area, and not run from Reykjavík, is highly significant. The director of the research centre (Árnasson, interview) elaborated

on this, and stating that the fact that he and his wife bought a house in the area and that they are both active in the local community has been significant in gaining the trust of the local population. In rural areas, traditionally dominated by agriculture and fisheries, there is a lot of mistrust of university employees, a factor with historical ties, whereby people joined the upper class when they gained a university degree. Dispelling myths and communicating with and gaining the trust of the local inhabitants took time, but now the centre has become a more established part of the community.

According to the director, the research centre makes the biggest difference in regards to its collaboration with the cluster and with Hornafjörður Municipality. It is not possible to establish, for example, that new jobs have been developed in the region as a result of the activities of the centre. In connection with this, the Mayor of Hornafjörður Municipality states that an important way in which the area has learned from the centre is in the sense that it places focus on quality of life, emphasising that development is not only about the number of people living in the area, but about improving the quality of life of those who live there, for example. He argues that the quality of life of the inhabitants of the area has increased with the presence of the centre in the area. The research centre has made a particular difference with regards to the tourism industry, where products such as bird watching and the integration of geological aspects in tourism have been developed (Vignisson, interview).

Overall, one can derive that the projects undertaken by the research centre have generated innovation and development in tourism firms in the area, and that the presence of the University of Iceland Regional Research Centre in the area is regarded as

significant by local stakeholders.

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University of Nordland (UiN)

Written by Lise Smed Olsen, Nordregio

The County of Nordland

The County of Nordland, located on the west coast, covers 25 per cent of the Norwegian coast line, and an area of 38.456 km². It comprises 44 municipalities (Nordlands Fylkeskommune, 2011). In 2010, the county had 236 271 inhabitants. Population density was low (7 person per km²) and population growth between 2005 and 2010 was negative (Lindqvist, 2010).

Traditionally, the manufacturing industry has been most dominant in Nordland. However, within the five main parts of the County of Nordland, there are variations in the business structure. The region of Salten has the largest town of the county, Bodø, with approximately 46 000 inhabitants and is also home to the University of Nordland. Bodø is the centre of service production, which is of great importance to the rest of the county. The region of Helgeland has the highest export rate in the county and has experienced increased activity in petroleum related industries, mining, and merchandising, in contrast with a decline in employment in the manufacturing and construction sectors. Nesna University College is based in Helgeland. The region of Ofoten, where Narvik University College is based, has experienced growth in the production of solar cells and exports of ore. However, it has low growth in the areas of merchandising and services. The archipelago Lofoten is a popular tourist destination, and is dominated by smaller firms operating in the industry. While Lofoten has the strongest level of job

creation in tourism in the County of Nordland, the profits of the tourism firms are generally low. Finally, the archipelago of Vesterålen, based north of Lofoten, is oriented around aquaculture and construction. It has lost a high number of jobs in sales and services, and has a weaker development in the tourism sector compared to Lofoten (Bullvåg, 2011).

The administration of the County of Nordland is based in Bodø. The regional development department at the county is responsible for the county's overall planning strategy and its development programme. The strategies are produced in cooperation with relevant stakeholders through Partnership Nordland, which is made up of representatives from the seven regional councils; the labour market association DA Bodø; University of Nordland, Narvik University College, and Nesna University College; Innovation Norway, SIVA, the Research Council of Norway, and the Sami Parliament. The Development Programme 2008-2011 is the action plan for the county's planning strategy. The programme has four overall focus areas: competences; innovation and entrepreneurship; region building; and infrastructure. Within the focus area of innovation and entrepreneurship, tourism is listed as one of the targeted industries during the period, with a specific focus on experiences, destination development, competence development and cooperation (Nordland Fylkeskommune, 2008).

Presentation of University of Nordland

The University of Nordland's designation as a university is a recent development that went in to force on 1 January 2011. Since 1994, when it was established after a merger between the Regional College of Nordland, Bodø Teacher's College, and the Nursing College of Nordland, the HEI had been known as Bodø University College. During the period 1994-2009 the number of students at Bodø University College increased

significantly. In 1994, 2 967 students were registered at the university college, a number that had increased to 5 052 students by the end of 2008. Moreover, from 2007 to 2008 Bodø University College had the largest average increase of students in Norway of approx. 20 per cent (Høgskolen i Bodø, 2009, p.10). A majority of the students at the university, approximately 80 per cent, are from Northern Norway, while the rest of

the students are international and from other parts of Norway (Pedersen, interview).

University of Nordland has four faculties under which doctorate programmes have been developed and initiated in preparation of the university college achieving university status. Thus, PhD programmes, which are now offered at the University of Nordland are PhD in Business at Bodø Graduate School of Business; PhD in sociology at The Faculty of Social Sciences; PhD in professional practice studies at the Faculty of Professional Studies; and a PhD programme in aquaculture at The Faculty of Biosciences and Aquaculture. The PhD programmes were approved by the Norwegian Agency for Quality Assurance in Education (NOKUT) at different stages between 2000 and 2009 (ibid. p.11-12).

The main campus of the university is based in Bodø, but some programmes are also offered in Mo i Rana in the region of Helgeland and in Stokmarknes in the region of Vesterålen (ibid.).

A main purpose of the University of Nordland is to offer education programmes that are needed in the county. A significant forum for discussion on education programmes with regional stakeholders is Partnership Nordland, an organization that has regular meetings and discussions concerning the development of strategies. It would seem that regional stakeholders also regard the HEI as significant in the county, something that is reflected in the donations that have been given to the HEI, to, amongst other things, provide funding for fellowships and post-docs, from actors such as oil companies based in the county, regional banks, and Nordland County. The Rector mentions the example of the regional branch of a national labour market organisation that recently donated 3M NOK to the university on the condition that the university consider how the public sector will develop in the future in Northern Norway. An approach to meeting this requirement will be, for example, to host seminars with the purpose of stimulating students to work with issues in the public sector. Donations from regional stakeholders have been highly important for the development of the HEI towards becoming a university, but it is also stressed that it is significant to ensure that there is a balance between the development of academia and meeting the expectations of regional stakeholders. For instance, the research that is carried out should not become too guided by the expectations of regional stakeholders (Pedersen, interview).

A concrete way in which the HEI benefits from its newly achieved status as university is that it is now more independent in terms of implementing new education programmes. Previously, as a university college, it was necessary to submit an application to NOKUT, which would then assess whether the programme in question

should be implemented. Today, the University of Nordland has the authority to make such decisions on its own, and only needs approval from the University Board before implementing a new programme. In practice, this means that a decision to initiate a new programme can be processed within one week instead of six months (Pedersen, interview).

Development strategies

The University of Nordland has a Strategy for Internationalisation 2009-2012, which has a main focus area of cooperation with Russian universities. This has been a priority of the HEI since the 1990s, when cooperation was first initiated through Nordland County, which established a 'friendship' agreement with a region in proximity to St. Petersburg. The HEI was encouraged by the County to find collaboration partners in the region, and developed an agreement with Baltic State Technical University, which wanted to develop a business school programme. Researchers from the Bodø Graduate School of Business became involved in the process of developing an education programme. For a number of years the Russian students gained their bachelor's degree in Russia, after which they came to Bodø to complete a master's programme. Today the institutions have a common master's and PhD programme that is run in both places. In 1997, there were initiatives from the national level in Norway to strengthen cooperation with areas in the Northern Barents region and based on the experience already gained in Russia, Bodø University College initiated collaboration with universities in Murmansk, Archangel and Moscow. Cooperation agreements with the four Russian universities involve education programmes in business and in energy management. The priority of the University of Nordland in regards to Russia is related to Northern Norway's proximity to Russia and to further the relationship with the country is an increasing political focus area in Norway (Pedersen, interview).

Also comprising Russia, the circumpolar region is a strategic focus area of the University of Nordland. Student exchange programmes are in place with universities in Canada and the United States. Moreover, it is a member of University of the Arctic, a coalition of universities in the circumpolar region. A regional office of University of the Arctic is based at the University of Nordland and coordinates the responsibility of activities in Northwest Russia, the Nordic countries, and in Greenland. The first common bachelor programme of the University of the Arctic was run in Bodø. This university collaboration is to a high extent virtual and long distance education tools are utilised in order for students across the circumpolar region, as well as outside, to be able to 'attend' lectures and complete

education programmes online (ibid.).

The University of Nordland has the aim to increase its share of external funding for research, especially focusing on funding from EU programmes and the Norwegian Research Council. In 2007 and 2008, the share of external funding for R&D activities was between eight and nine per cent of the total operating income of the HEI. An important element towards achieving a greater degree of external financing has been the recently established study and research administration office, which has the task to inform

faculties of calls for tenders, and to assist with the application process. An EU-unit has been set up within the office, which focuses on assisting the researchers with establishing contacts and writing applications for EU-programmes. This is an element which is being further developed at the university, where for several years, the strategic focus has been on developing master's and doctorate programmes to a greater extent, rather than on engaging in externally funded R&D projects (Høgskolen i Bodø, 2009, p.42; Pedersen, interview).

Collaboration with the surrounding society

The University of Nordland does not have a formal written strategy for cooperation with the surrounding society in the county, but a strategy is currently being developed. In regards to the requirement of the Ministry of Education and Research for HEIs to establish councils for cooperation with the business community in 2011, the University of Nordland plans to utilise Partnership Nordland, as introduced above, for this purpose. The partnership includes the actors which are required by the Ministry, with the exception of a student representative. A process has however been initiated to include a student in the council as well.

The university (and previously the university college) carries out some projects in cooperation with private firms based in the county. Incentives by Innovation Norway and *SkatteFUNN* by the Norwegian Research Council make it attractive for firms to apply for R&D projects in cooperation with the HEI. In such arrangements, firms often seek assistance from Knowledge Park Bodø AS, which has been established by the business community, Nordland County, and SIVA. The knowledge park provides advisory services and assists with the development of applications by private firms for R&D projects. Generally, there is a positive attitude among researchers at the University for collaborating with firms, but a significant selection criterion is whether a project will feed into the academic careers of individual researchers. Thus, in order to accept a collaborative project with one or more private firms, a researcher will need to find that it feeds into subsequent academic publication. The Rector summarises this concern in his view on how the university should balance its role of being a strong regional player while at the same time being a significant player in international academia:

"We are at our strongest and best when we manage to do both, to always think that what we do locally need to maintain a level which meets the standards which have been set nationally and internationally." (Pedersen, interview).

To meet this balance, the national incentives mentioned above make a difference. In relation to cooperating with the surrounding society, Nordland Research Institute is a significant partner.

Nordland Research Institute

It is significant to include Nordland Research Institute in this study, especially due to its efforts at engaging with the surrounding society. It was established in 1979 as a foundation owned by Nordland County and other stakeholders. The County was a main actor in establishing the institute, and it was expected that it would deal with applied research that would benefit the region. The institute is financed with an approximate annual division of 10 per cent core funding, 15 per cent regional funding, 5-10 per cent EU-funding and the remaining are funds awarded at national level, mainly through the Norwegian Research Council (Alsos, interview).

From the beginning, it was stressed that the research institute would cooperate with the HEI in Bodø and it is based in the same building as the business school. In 1997, new national legislation meant that Bodø University College and Nordland Research Institute would be able to compete for the same research projects, and this created some tension between the institutions. Finally, after years of discussions, on 1 January 2010 Nordland Research Institute was registered as a limited company of which 51 per cent is owned by the University of Nordland and 49 per cent is owned by the foundation. As it is now majority shareholder, this has provided the university with a more formal role in relation with the research institute. The Director of Nordland Research Institute is now a part of the university's management group and it is possible for the institutions to promote synergies and keep each other updated on which projects are being applied for, as well as other relevant issues (Pedersen; Alsos, interviews).

Collaboration within the area of tourism

Tourism has always been an important and prioritised sector in Nordland, but it became a more important focus area for the county during the 2000s. This happened in part due to the work towards establishing a common destination management organisation for Northern Norway, comprising the counties of Finnmark, Troms, and Nordland. In 2009, the Northern Norway Tourist Board was established through a merger of previous regional tourist boards. It is funded through the three counties, the state, and different forms of income from business. Thus, tourism became what is referred to as a northern area priority in the county, and it increasingly became a focus area in its development strategy. During the 2000s, Nordland Research Institute was approached by actors at the county who wanted to know more about how to develop the tourism industry. At this time, a few researchers at the School of Business and at the research institute had to a limited extent worked with tourism research (Kristensen; Alsos, interviews).

As part of the Arena programme run by Innovation Norway in cooperation with SIVA and the Norwegian Research Council (see national overview), the project *Arena – Innovative Experiences* was established in Nordland in the summer of 2008. The project is geographically focused on the archipelago of Lofoten, but also includes Vesterålen, Ofoten and Salten, and involves approximately 30 tourism firms. The project manager of the five year Arena project is the private consultancy Mimir AS; the institution with overall responsibility for the project is Northern Norway Tourist Board; and the knowledge institution involved in the project is Nordland Research Institute. The firms involved were selected by Innovation Norway in cooperation with the project manager, who recruited the firms to participate in the cluster project. The firms were selected based on an evaluation of their potential to succeed and to increase value creation. A vision defined by the firms in the cluster Arena – Innovative Experiences for their development is: *“Together we will excite our guests with world class experience products”*. This involves developing experiences in nature, culture, and food which will attract selective tourists. Over the long term, the cluster aims to become a leading environment in Norway in experience production and within a five year period, the firms have set the objective to double their turnover (Innovative opplevelser, 2011).

The Arena project has become highly intertwined with the VRI project, which was also initiated in 2008 and coordinated its activities with the Arena network. The VRI project was first run during the period 2008–2010 and it is currently operating for the period 2011–2013. The project has three sub-projects, focusing on the main strengths of the county, one of which is tourism. Across the country, the VRI programme launched by

the Norwegian Research Council (see national overview) is organised in different ways. In Nordland, overall project management is based at the county, and each sub-project is run by a relevant knowledge institution. The tourism project is managed by Nordland Research Institute, through which Bodø Graduate School of Business is also involved. Researchers from the business school participate and also manage some projects in the VRI tourism project. An overall focus of both the Arena and VRI projects is the increasing importance of experiences in tourism (Alsos, interview).

A number of activities and projects have been carried out within the framework of the two projects. An early initiative was a foresight exercise that was carried out with the intention to use the process to form a common understanding of the driving forces which experience companies and the cluster should meet. The foresight exercise took place through three two-day seminars that brought together firms, the project management and researchers in a dialogue process. This was a significant starting point for the activities where the different actors were introduced to each other and initiated cooperation (Finstad et al, 2009). To a large extent, the activities of Arena and VRI involve network meetings, seminars, and study trips, with a focus on competence development, understanding common framework conditions, and internationalisation and market development. An example of an activity run by the research institute and the business school was the development of models for pricing of experiences, evaluating how to price different types of experiences in cooperation with the firms. The manager of a firm involved stated that he received advice from a researcher at the Business School, who looked through his business plan. This helped him focus the activities of the firm. Moreover, he stressed the usefulness of the pricing project (Hov; Alsos, interviews).

An important element of the VRI project is that there is a proactive approach to dealing with the issues of individual firms and bringing together firms and researchers. As stated by the previous Director of Nordland Research Institute, who was in the steering group of the VRI project:

“If the project management sees that there is a firm which has challenges, they try to find people at the university or research centre who knows something about this, and they try to link them together. This is very important since they would never have met otherwise.” (Alsos, interview).

Within the framework of the VRI-project, some development projects are carried out with individual firms, while others involve several firms. The manager of a golf centre stated that although networking is useful, he also sees opportunities in cooperating with the knowledge institutions on issues which concern only his business, such as future plans to develop new

products and reach new markets (Hoy, interview).

Interviewees stated that the VRI project in particular has been important in terms of encouraging R&D in the tourism sector, which has not traditionally cooperated with knowledge institutions. The firms were generally positive towards the project and the overall focus area of developing experiences. Over time, bridges have been built between tourism firms and researchers. Related to this, it is noteworthy that the firms were 'hand-picked' by Innovation Norway and had a wish to develop further. In the current period of the VRI project, it has been decided in the county that tourism activities should be spread to the region of Helgeland in the south of Nordland. There is no Arena project in this area. While the area has potential as a tourist destination in terms of nature; there is less of a tradition for cooperation between firms in the area, and the industry is dominated by one-person businesses. It has been necessary to employ two competence brokers in Helgeland to initiate contact with firms and get them involved in the project. They are employed at business support organisations in the area. Here, the process of promoting engagement amongst firms to cooperate with knowledge institutes is more difficult and currently, the process is focused on dialogue meetings and other mobilising activities. A requirement for firms to join VRI activities is that they wish to develop their business further (Wiggen; Alsos; Mariussen; Kristensen, interviews).

Interviewees agreed that the VRI project, funded by the Norwegian Research Council, has been highly significant in terms of encouraging research environments to cooperate with the business

community and that it is significant that the knowledge institutes also have a central role in the management of the sub-projects. The development initiated, whereby researchers increasingly see the benefits of cooperating with business, and vice versa, would not have happened without the support of the VRI project and in the case of tourism, the support of the Arena project (Mariussen; Alsos; Wiggen, interviews).

The activities of Nordland Research Institute and Bodø Graduate School of Business at the University of Nordland in the Arena and VRI projects have influenced the development of other initiatives within tourism research. The two institutions are project managers for an ongoing research project in cooperation with other knowledge institutes in northern Norway called Northern Insights, which is financed by the Norwegian Research Council with a budget of 50M NOK for a period of five years. Moreover, partly with the help of a pre-study carried out with funding from the VRI project, in November 2011 the OVE centre will be established at Nordland Research Institute, run in cooperation with the University of Nordland. The idea of the centre is to gather the knowledge which is generated in tourism research in a 'knowledge bank' that will primarily be a virtual centre, where researchers, firms and other interested parties can contact Nordland Research Institute. It will also involve seminars that bring actors together. Initially, the OVE-centre is focused on the research activities in Northern Norway with the on-going VRI and Northern Insight projects, but eventually, it is intended to include research from the entire country (Wiggen, interview).

The role of UiN in regional development

There is a focus on the relevance of education programmes offered at the University of Nordland in the county. Partnership Nordland, in which the University and Nordland County are represented, amongst others, is a forum for discussing the development of education programmes, regional development strategies and other issues. This partnership will be used in the future formalised council for cooperation with the business community, which in accordance with national guidelines, will be established at the University of Nordland.

A certain level of commitment from public and private actors in the county has been evident in relation with the HEI's work towards becoming a university. The University has received and continues to receive donations which have been important in terms of gaining university status. Meanwhile, attached to the

donations are expectations to what the university will deliver to its surrounding community. A challenge is to balance such expectations with being an internationally recognised university.

Nordland Research Institute was established with Nordland County as a main driving force behind it, also for the purpose of partly working with research which was relevant to the county. Moreover, the research institute was based at the university to encourage cooperation between the institutions.

While cooperation with other economic sectors in the county exists, this study has focused on cooperation initiatives with the tourism industry in Nordland. In part, initiatives in the area of tourism were initiated by the research institute due to growing interest in developing the industry from Nordland County. The national Arena and VRI programmes were significant

for ensuring the funding that was needed to initiate research and development activities with tourism firms. The activities focused on experiences in tourism and it involved Nordland Research Centre as well as Bodø Graduate School of Business. One initiative was a project that discussed how to accurately price experiences. Activities have generally been focused on competence development and building networks, in addition to support innovation and growth of the firms. In connection with this, the firms in the tourism industry have been found to generally have a low turnover in their business.

The VRI project has provided incentives for researchers to become involved in research and development activities in the tourism industry and has fostered links between research and firms in a sector that has not traditionally cooperated with knowledge institutions. The VRI and Arena project have generated further tourism projects run by Nordland Research Institute and the University of Nordland, indicating a continued focus on R&D in the tourism sector.

In regards to R&D cooperation that is taking place with the HEI and the research institute, it is notable that national funding opportunities are considered important and are being utilised, the VRI programme in particular, but also the SkatteFUNN opportunity have been stressed as an important incentive for both firms and knowledge institutions to collaborate.

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University of Tromsø (UiT)

Written by Peter Arbo, University of Tromsø

The region of Northern Norway

For more than forty years, the University of Tromsø (UiT) was the only university in Northern Norway. Even though the former Bodø University College recently attained university status (University of Nordland), UiT still regards the whole of Northern Norway as its relevant region. This region, covering an area of 113 000 km² or 35 per cent of the mainland's territory, has 470 000 inhabitants or 9.5 per cent of the national total. Northern Norway is culturally and ethnically rich, with people of Norwegian, Sami and Finnish origins, and in recent years, a steadily increasing number of immigrants from around the globe. The largest cities are Tromsø, Bodø and Mo i Rana with 69 000, 48 000 and 26 000 inhabitants, respectively.

In terms of government, Northern Norway consists of three counties (Nordland, Troms and Finnmark) and 88 municipalities. Officials from both levels are democratically elected. Nordland is the largest of the three counties, with about half of the region's population, followed by Troms (34 percent) and Finnmark (15 percent). Of the 88 municipalities, 56 have less than 3 000 inhabitants and 11 have less than 1 000. The municipalities, irrespective of size, are in charge of all basic public services, while the county authorities are mainly responsible for regional planning

and development, upper secondary education, transport and communications.

During the last century, the region transformed from what was basically a pre-industrial society to a post-industrial society. Historically, the economy of Northern Norway was dominated by households making a living from a combination of fisheries and small-scale agriculture. After WWII, rapid industrialisation took place mainly based on the exploitation of the region's natural resources (fish, hydroelectric power, metals and minerals). In recent decades, aquaculture and oil and gas production have also become important economic activities; but today, four out of five people are employed in service industries.

This shift in the structure of industries and occupations has been accompanied by a shift in the pattern of settlement. People have moved from rural to urban areas and there has been a net outmigration to other parts of the country. Nevertheless, Northern Norway still has a more decentralised settlement structure than, for example, the northern parts of Sweden and Finland. This is due to the vitality of the coastal industries, a high rate of public sector employment and large government transfers made possible by oil and gas revenues.

Presentation of University of Tromsø

The University of Tromsø was founded in 1968 as Norway's fourth university. When the Parliament made this decision, it was clearly expressed that the university should become a first-rank national institution and not a second-rank regional university. After WWII, the government put great efforts into developing Northern Norway, a region considered to be the most backward and underdeveloped part of the country. As a result, the region experienced rapid modernisation and this process was to be "crowned" with the creation of an academic institution.

The regional mission was evident (Arbo and Fulsås 2002). The main aims of establishing a university in Tromsø were to extend equal rights to higher education and to give the modern welfare state a solid footing in the region. In the late 1960s, the lack of doctors, teachers and other groups of professionals in Northern Norway had become an issue of great public concern. It was assumed that by giving young people in the north an opportunity to study in their home region, it would strengthen the supply of highly qualified labour and secure the development of the welfare state.

The establishment of a medical school was therefore an integral part of the university decision. It was also expected that the new university would specialise in academic fields reflecting the characteristics of the region, such as fisheries, northern lights research and Sami studies.

From the outset, the ambition was to create a new and different university in Tromsø. Study programmes should be interdisciplinary, regionally relevant and problem-oriented. Instead of the traditional faculty organisation, UiT was organised by departments. The governance structure was democratic, with students and non-academic staff receiving a position in all decision-making bodies. UiT was established in a period marked by political radicalisation and regional mobilisation, something that left its imprint on the university. While the main emphasis was laid on the university's educational function and the provision of highly skilled candidates for public sector jobs, many students and professors also opposed the centralising effects of government policies and wanted to serve as a kind of "counter-expertise" on behalf of the small rural communities in Northern Norway. As a result, UiT soon acquired the reputation of being "the red university".

During the 1980s and the first half of the 1990s, UiT gradually lost its image of being an alternative university. The study programmes were restructured along disciplinary or professional lines, a faculty model was introduced, and the use of departmental-wide meetings became less frequent. This meant that UiT increasingly resembled traditional universities. This reorientation was resulted from several factors: the growth of the university; the weakening of the students' radical movement; increasing competition from new regional colleges; the necessity for recognition from peer academic institutions; and new government legislation. At the same time, there was a general change in the way the universities were interpreted in Norway. In the aftermath of the international economic downturn in the 1970s, innovation and industrial renewal became key government priorities. In this context, the universities stood out as potential engines for knowledge-based economic growth. Attention was directed to new high-tech industries, business creation and technology transfer. In Tromsø, this led to the establishment of FORUT, a research institute for contract research, and the establishment of Tromsø Science Park in 1984 and 1990, respectively. The science park was set up near UiT, at the campus area north of the city centre. Although industrial research was strengthened and collaboration with private companies and business associations became more common, the core of UiT's research and education was not affected.

In the early 1990s, UiT campaigned for a

relocation of the Norwegian Polar Institute from Oslo to Tromsø. The campaign was successful and the two institutions have since enjoyed close collaboration. During the last fifteen years, UiT has tried to profile itself as an Arctic-oriented institution. This focus was enhanced in 2005, when the Norwegian government launched its High North policy, maintaining that the High North is the government's top strategic priority. The Arctic profile is reflected in a number of study programmes and research areas at UiT, including marine research, environmental research, research on governance systems and indigenous studies. In 2009, the University of Tromsø and the Tromsø University College merged. This was the first time in Norway that a university and a university college amalgamated, forming one institution. The decision was meant to strengthen Tromsø's position in the competition for students and must be seen in light of the fact that the principle difference between universities and university colleges was dismantled by the Quality Reform in 2003. From then on, all university colleges could become universities, provided they were able to offer five Master's degree programmes and four PhD programmes. This set off a race for university status among the university colleges.

Facts and figures

As of 2011, UiT has approximately 9 000 students and a staff of 2 500 people. The annual budget is about 2 300M NOK, of which nearly 80 per cent is funded by the government and the rest comes from other sources. The university is organised into six broad faculties: Health Sciences; Humanities, Social Sciences, and Education; Biosciences, Fisheries and Economics; Natural Sciences and Technology; Law; and Fine Arts. In total, these faculties offer more than 150 Bachelor's and Master's degree programmes, and about 2 150 individual courses. UiT graduates more than 100 PhD students every year. Further, there are a number of organisational units placed directly under the University Board (Tromsø University Museum; Tromsø University Library; Centre for Flexible Education; Centre for Sami Studies; Centre for Women's and Gender Research, and the Barents Institute in Kirkenes). The University Board is headed by an elected rector and has eleven members. Four of them are external representatives appointed by the Ministry of Education and Research.

According to UiT's strategy document for the period 2009-2013, the vision is to create "a national and international powerhouse for expertise, growth and innovation in the High North". It is stressed that UiT should act as an "engine of knowledge" in Northern Norway, a hub in the government's High North initiative and an international resource in specialised fields. As for the regional role, both the strategy document and the

accompanying action plan state that UiT should provide candidates with “good and relevant qualifications”, support R&D that can foster innovation and industrial development and strive to become a more prominent regional actor and collaborating partner in public and private working life.

Support structure

UiT has no special unit for regional collaboration. The responsibility is shared between the University Director's office, the Centre for Flexible Education (U-vett), Tromsø University Library, Tromsø University Museum and the faculties. UiT is also the majority-

owner of Northern Research Institute (Norut, formerly FORUT), which carries out research commissions for industry and government agencies in the fields of technology, innovation and social sciences. The Norut Group has about 120 employees, with research departments in Tromsø, Alta and Narvik, and a separate unit dedicated to innovation and commercialisation of research (Norinnova). Norinnova includes a business incubator, a seed capital fund and a technology transfer office (TTO Nord), established jointly in 2005 by UiT, the University Hospital of Northern Norway and the Norut Group. The Norut Group is primarily located at the Tromsø Science Park. UiT also has a Career Centre to help students transition from study to work.

Collaboration with the surrounding society

Over the years, the interfaces between UiT and the region have been deepened and extended. Since its inception, about 70 000 people have studied at the university, excluding those who studied at Tromsø University College before the merger. UiT's catchment area is first and foremost the counties of Troms and Finnmark and the northern part of Nordland, and on average the retention rate is high, especially among students who initially come from Northern Norway. This means that a significant number of people have become familiar with the university and its resources. Both the former Tromsø University College and UiT have been actively engaged in continued education and offer distance learning programmes tailored to the needs of relevant student groups.

As we have seen, UiT has also spearheaded the establishment of new research institutions in Tromsø. The Norut Group was established by the university in collaboration with regional authorities and the Norwegian Polar Institute was created as the result of a university-led campaign. Additionally, a number of national research institutions have created subsidiaries and set up their own departments in Tromsø. Among others, the research community in Tromsø today consists of Nofima, the Institute of Marine Research, SINTEF, Bioforsk, NGU, NIKU, NILU and NINA. The University Hospital is also a powerful research institution. Taken all together, UiT and the institutions that have followed in its wake, provide jobs that make up a substantial proportion of the local labour market.

Since the 1980s, when innovation became a political priority, the Norwegian government has launched a number of research programmes aimed at leveraging knowledge-based growth and closer collaboration between higher education and research, on the one hand and business and industry, on the

other. UiT, the University Hospital and the Norut Group have given rise to more than 60 spin-off companies, of which the bulk are operating in the fields of marine biotechnology and ICT, and are located in Tromsø. These companies are important partners with UiT, and serve as bridgeheads to the surrounding business community. Notably, during the last two decades, several new initiatives have been taken to spur the formation of clusters and triple helix partnerships (Nilsson 2006). Innovation Norway has introduced, among other things, the Arena and Centres of Expertise programmes and the Research Council of Norway has initiated the Centres of Excellence and the Centres of Research-based Innovation frameworks. Recently, the Research Council set up seven regional research funds to bolster investments in R&D and enhance research for regional innovation and development.

UiT and the Norut Group have responded to these government funding initiatives in numerous ways. As all institutions of higher education and research nowadays are looking for additional income; they are also attentive to new funding opportunities. Nevertheless, regional collaboration is, to a large extent, the outcome of initiatives driven by enthusiastic individual researchers and research groups. The following section highlights a handful of projects in which UiT has been involved.

The Tromsø Study

The Tromsø Study is a medical research project that involves a large portion of the local population and has contributed to the improvement of public health. The project was initiated in 1974 to help combat a high mortality rate due to cardiovascular diseases. In the mid-1970s, one out of every five Norwegian men died of cardiac arrest before the age of 75 and the rate

was even higher in Northern Norway. The main aim of the Tromsø Study was to determine the reasons for the high mortality rate due to cardiovascular disease and to develop ways of preventing heart attacks and strokes.

The studies have been repeated six times since 1974. More than 40 000 people – both men and women – have participated. Over the years, the project has expanded to include other diseases. Each study has been followed up by smaller and more thorough studies with some of the participants, and people at risk have been given advice or sent for medical treatment.

Data from the Tromsø Study has been used in approximately 50 PhD theses and 385 scientific articles. Two important discoveries that have arisen from the Tromsø Study are the significance of HDL-cholesterol ("the good cholesterol") and how coffee increases serum cholesterol. The project has been carried out by the Department of Community Medicine at UiT in collaboration with the Norwegian Institute of Public Health, the University Hospital of Northern Norway (UNN) and the Tromsø City Council.

MabCent-SFI

MabCent is a Centre for Research-based Innovation, established by the Research Council of Norway in 2007 and hosted by UiT. The purpose of the Centre for Research-based Innovation (SFI) is to build and strengthen Norwegian research groups that work in close collaboration with partners from innovative industries and innovative public enterprises. Tromsø was chosen as host for MabCent due to the strong research position of UiT in the field of marine biotechnology.

MabCent focuses on marine bioprospecting, a field that includes the search for bio molecules from marine sources in order to identify new and unique bioactive compounds with potential for further research, innovation and commercialisation. Arctic marine organisms have developed unique biochemical and physiological properties from having to adapt to low temperatures and huge variations in light and seasonal food availability. MabCent concentrates on marine bacteria harvested on the surface of the ice pack or in frozen sediment, marine algae sampled under different blooming conditions and the rich variety of benthic invertebrates found in the Arctic seas.

MabCent is organised as a consortium including several research institutes as well as four commercial partners. The partners are Biotec Pharmacon, Lytix Biopharma, Pronova BioPharma and Arctic Bioscience, of which the first three are spin-off companies from UiT. The consortium covers the spectrum from the biology of marine resources through screening and research on bioactives to the commercialisation of drugs and biotechnological and nutraceutical products. MabCent

is located at the Tromsø Science Park, which is home to excellent laboratory facilities for storage, extraction, fractionation and screening of marine resources. Marbio is the high-throughput analytical platform for the core activities, and Marbank, the national marine biobank in Tromsø, organises the sampling and produces extracts for screening. Other advanced instruments are also available at the Department of Pharmacy and the Department of Chemistry at UiT. MabCent and its partners have identified several novel compounds and bioactives that have been patented and are now under development.

Tromsø Centre for Remote Technology

Tromsø is the "space capital" of Norway. Together with Svalbard, Tromsø has developed advanced infrastructure and expertise for downloading data from low-altitude polar orbiting satellites, widely used for monitoring the earth. Each orbit takes about 100 minutes, and as the earth rotates, the entire surface is covered. The best conditions for "communicating" with polar-orbiting satellites are offered at high latitudes.

Tromsø's ideal location has attracted a large space-related research and business community, which can trace its history back to the northern lights research that started in Tromsø one hundred years ago. Today, it includes UiT, Norut, the Norwegian Polar Institute, Kongsberg Spacotec, and Kongsberg Satellite Services (KSAT). Together, these organisations represent the whole value chain, from research, technology development and service delivery to the establishment and operation of relevant infrastructure. Kongsberg Spacotec is a worldwide provider of complete earth observation ground stations, while KSAT operates a network of polar antennas and delivers sophisticated earth observation services.

In 2008, the actors joined forces and created the Tromsø Centre for Remote Technology (TRTC). The initiative was undertaken to meet the increasing demand for earth observation data and maintain competitiveness in the face of stronger international competition. The catalyst for cooperation was the ongoing work on the BarentsWatch initiative, which is the government's plan for comprehensive monitoring and surveillance of the Barents Sea.

Amongst other things, remote satellite sensing is used for monitoring the polar ice and seaways, environmental and climate change, illegal fishing, oil spills and pollution control, search and rescue operations. TRTC will deliver future services to BarentsWatch, such as satellite images. TRTC has also set up the Barents Remote Sensing School and has created the Forum for Remote Technology to broaden the centre's network base. Collaborating partners are, among others, Andøya

Rocket Range, Natech and Narvik University College. Norut is also working with unmanned aerial systems (UAS). These drones can be used to monitor, for example, ash from volcanic eruptions or surveillance of land and sea areas. Together with Troms Kraft and Andøya Rocket Range, Norut has established the mini aircraft company Aranica.

Tromsø Telemedicine Laboratory

Another field of regional collaboration is telemedicine. Dispersed settlements, the great distances and the shortage of medical specialists in Northern Norway made the application of ICT in health services an interesting prospect. The Norwegian telecommunications administration set up a telemedicine research unit in Tromsø in 1987 and in 1993 the Norwegian Centre for Telemedicine was established as a department of the University Hospital. The Centre was designated a Centre for Research-based Innovation (SFI) by the Research Council of Norway in 2006. Under the title of Tromsø Telemedicine Laboratory (TTL), the aim is to develop a world-leading centre for research and innovation in the fields of advanced telemedicine and eHealth systems for chronic age and lifestyle related diseases, which will result in new healthcare products and services.

In addition to the University Hospital and the Norwegian Centre for Telemedicine, TTL involves UiT, Telenor R&I, IBM Norway, DIPS, Well Diagnostics, Norut, the Norwegian Health Net and Northern Norway Regional Health Authority. TTL is focused on the development of new tools for collecting, processing and sharing medical information, i.e. sensor-based systems for vital signs and surveillance, extended decision-support and computer-supported collaboration. Current projects include systems for detecting and tracking outbreaks of infectious diseases, home nursing, net-based medication records, context-sensitive mobile communication in hospitals, amongst others.

The World Opera

This project was initiated in 2006 by a professor in Documentation Studies, Niels Windfeld Lund, at the University of Tromsø. Lund had, for many years, done research on libraries and general document theory. Combining his private interest in opera with the insights he acquired during a research project on electronic healthcare, he came up with the idea of the World Opera project. The aim of the project is to create a worldwide distributed opera stage with performers in multiple locations, making one coherent opera performance together for audiences at multiple sites.

Lund obtained a large research grant from the Research Council of Norway for the VERDIONE project, which is an acronym for Virtually Enhanced Real-life synchronized Interaction – ON the Edge. The project is developing technology and solutions for distributed, interactive performances in real-time across high-speed, high-performance audio/video networks. The project is managed by the University in Tromsø in collaboration with partners at Stanford University, McGill University, SIMULA Research, KTH, New York University and the companies Bang and Olufsen, Projection Design and DPA Microphones.

Permanent facilities are now being set up in Tromsø, Stockholm and Struer, Denmark, to experiment with the networked stage. Tests have been done, and a monthly chamber music series will be arranged involving actors from the three sites. The World Opera project is also organising live performances directly transmitted from the Metropolitan Opera in New York. This has already taken place for three years, with performances distributed to places such as Tromsø, Stockholm, Struer, Montreal and San Francisco. During the spring and autumn semesters, the World Opera has given people in Tromsø an excellent opportunity to enjoy world class performances every second week. In the autumn of 2011, even people in Berlevåg, a small remote community in Finnmark, received live transmissions.

The role of the University of Tromsø in regional development

UiT has played a major role in the development of Northern Norway. Over the years, the university has gradually become anchored in the region and has acted as a bridge to the global world of knowledge. Collaboration with the surrounding society has developed in a myriad of ways, ranging from students' projects; work placements; teaching and lecturing; consulting reports; business assistance; board positions; entrepreneurship

and new business ventures; participation in professional and voluntary associations; and joint research projects. UiT has also enriched cultural life and has played a significant role in highlighting the region's history and social and natural conditions.

There are challenges ahead which must be overcome however. Even though regional collaboration is a priority in the strategy and action plans of UiT, this

is not a central task in the university's activities, which are concentrated around research and education. Regional engagement is more or less a secondary effect of the core functions, though government funding initiatives, to a certain degree, have helped in this regard. UiT has no dedicated organisation for regional collaboration, and there are no special incentives for the researchers to take part in regional collaboration initiatives. In the academic system focus is on scientific publications and the production of ECTS credits. Regional engagement is thus a peripheral task within the university.

There is also a deep-seated suspicion towards such engagement in university circles. In spite of the fact that UiT's expertise in many fields has been built on the basis of scientific inquiries into natural and social phenomena that are typical for Northern Norway; a number of people believe that there is a conflict between regional orientation and global aspirations. This became evident during the recent merger process, where key professors at the university did not feel that the knowledge and skills of the staff at Tromsø University College were adequate, which was associated with vocational training for the region. "You cannot create a good football team by combining players from Champions League with players from the Football League Third Division", as one of them said. Instead of viewing the merger as an invigorating impulse and an opportunity for extending the regional role of the university, they feared that the merger could result in an academic degradation of UiT.

Similarly, there is a built-in tension between internal and external functions at the university. In the 1980s, a new interface was created outside UiT in the form of a separate institute for contract research and innovation (today Norut) and the Tromsø Science Park. This has meant that outreach tasks were externalised. At the same time, the academic core was sheltered from external interference. Although UiT is the majority-owner of Norut, the division of labour between Norut and the university faculties remains unclear. Today, they are both competing for external funding and collaborating in certain fields. The final transfer of TTO Nord from UiT to Norinova, which actually performed parallel tasks, was a difficult and long process. The risk is that the Norut Group, UiT's partner institution, is not linking UiT up to the region but rather, serves as a buffer or a barrier.

Another challenge is the fact that the basic industries in the north are natural resource-intensive and not knowledge-intensive. The companies in Northern Norway are either small or branches of large companies with their headquarters located outside the region. The

number of research-based companies is still fairly weak. This means that the "absorptive capacity" of the region is limited in terms of recruiting university graduates, utilising research and developing joint projects. UiT also lacks a clear regional partner on the government side. Northern Norway consists of three counties, and for an institution which regards Northern Norway as the relevant region, it is not obvious who to collaborate with. In Nordland, there is a close link between the new University of Nordland and the county of Nordland, which has strongly supported the university project. But UiT cannot expect or rely on any similar regional support. In Troms, the university is more or less taken for granted, while in Nordland and Finnmark the regional authorities protect their own higher education institutions and try to keep UiT at an arm's length distance.

The Norwegian High North policy and the growing interest in the Arctic region have been beneficial for UiT. The university has actively fostered its Arctic image, an image that actually goes beyond Northern Norway, to the whole circumpolar region. However, the demographic prospects are bleak. In the coming years, the region will see declining youth cohorts (NOU 2008: 3). There is also a net migration of students from the region. More young northerners leave the region to study elsewhere than the higher education institutions of the north are able to attract from outside. Moreover, in Northern Norway, two universities and five university colleges will now be fighting for students. This indicates that recruiting new students and providing highly educated candidates to the regional labour markets might become more difficult in the years ahead.

The leadership of UiT is well aware of these challenges. The university is currently in a process of reorganising its centres. As part of this process, UiT is considering how to organise future contact with the region. No decision has yet been taken. The Ministry has also instructed all institutions of higher education to cooperate more closely with neighbouring institutions to develop a clearer division of labour. Likewise, they have been asked to set up councils for collaboration with trade and industry. The seven educational institutions in Northern Norway have been selected for a pilot project that involves the creation of a joint social contract with partners such as the county authorities, the Confederation of Norwegian Business and Industry, the Norwegian Confederation of Trade Unions, the Norwegian Association of Local and Regional Authorities and the Northern Norway Regional Health Authority. Time will show if these endeavours will take regional collaboration to the next level.

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Karlstad University (KaU)

Written by Maria Lindqvist, Nordregio

The County of Värmland

Värmland County is situated in Midwestern Sweden, along the Swedish-Norwegian border. The total land area is almost 17 600 km², representing approximately 4 per cent of Sweden's land mass. In 2010, Värmland had a total population of about 273 000 inhabitants (2.9 per cent of the national total). The county is made up of 16 municipalities, with Karlstad as the dominant regional centre (about 84 700 inhabitants). There has practically not been any population change between 2005 and 2010, but there are large variations between municipalities. In Karlstad and the neighbouring municipality of Hammarö, there has been an annual increase of around 6-7 per cent based on migration and natural change, while several small municipalities have experienced considerable decline. Overall, Värmland has a population density of 16 persons per km², which is less than the national average of 23 persons (Lindqvist, 2010).

Värmland, together with the regions of Northern Dalsland and Örebro, has a long tradition and extensive competence in heavy processing industries, such as pulp and paper, manufacturing and mining. In the pulp and paper sector, many suppliers specialising in services, equipment and machinery, have developed around paper mills and packaging companies. Today, there are more than 230 companies with over 12 500 employees in the pulp, paper and packaging sector in the greater region - one of the highest concentrations of competence in this sector worldwide. During the economic boom in the late 1990's, the information

and telecommunication (ICT) sector expanded rapidly, particularly around the dominant firm, Sony Ericsson. As the company closed down in Karlstad, some areas were taken over by TietoEnator; the sector's dominant company today. Other ICT-companies are mainly small consultancy firms. To support the development of the main industries of the regions, four cluster organisations have been developed and supported by regional actors, Compare (ICT); The Paper Province (pulp and paper); The Packaging Arena (packaging industry); and Steel & Metal Works (mechanical industry).

Region Värmland (RV) is a regional body that promotes cooperation. It was established by municipalities and the County Council of Värmland. Region Värmland is responsible for developing the Regional Development Programme (RUP), commissioned by the Swedish Government. The programme has been developed in close cooperation with the County Administrative Board (Länsstyrelsen) and numerous organisations and joint action groups. In 2009, RUP 2009-2013 was launched as a platform for long-term planning, with the objective of achieving sustainable growth. The vision is to be realized by concentrating efforts in five areas: Leadership; Innovative Environments; Skills support; Accessibility; and Quality of Life. An important factor has been collaboration with the regional cluster organisations and Karlstad University. One example is the ongoing collaboration to develop a new cluster strategy for the region.

Presentation of Karlstad University

Karlstad University College was established in 1977 as one of several new university colleges in Sweden. Karlstad had previously had a college affiliated to Gothenburg University, building on a longstanding tradition of teacher training and nursing education in the region. In 1989, the ambition to develop

into a university was presented in the development programme "Karlstad University". Ten years later, Karlstad University College received university status and became one of the youngest state universities in Sweden.

Facts and figures

Following a re-organisation in 2006, Karlstad University is made up of four faculties (Economic Sciences, Communication and IT; Technology and Science; Social and Life Sciences; Arts and Education) while a collaboration exists among the faculties on teachers education. There are about twenty different research centres. The university offers approximately 50 Bachelor's programmes, 30 Master's level programmes and 900 courses in about 50 disciplines, including the humanities and fine arts, social and economic sciences, natural sciences, engineering and technology, health care and teacher training. Doctoral degrees are awarded in 27 disciplines. Karlstad University has approximately 12 500 students, 270 doctoral students and a staff of 1 200 persons (70 per cent faculty). The main campus is located outside central Karlstad. In Arvika, about 90 km away, the university has a smaller campus where the Ingesund School of Music (300 students) is located. The university also has an extensive e-learning programme, with about 25 per cent of the total number of students choosing to study via the internet. Still, student enrolment in higher education in the region is relatively low and an important challenge for the university is to increase the percentage of students who continue their studies, particularly among males.

In 2010, total revenue at Karlstad University amounted to 1 003M SEK. State-funding for basic and advanced education, which is based on the number of students and examinations, amounted to 656M SEK, while funding for commissioned education contributed an additional 23M SEK. As a new university, Karlstad University has had limited access to research funding from the state and public research councils. In 2010, state-funding for research and doctoral students

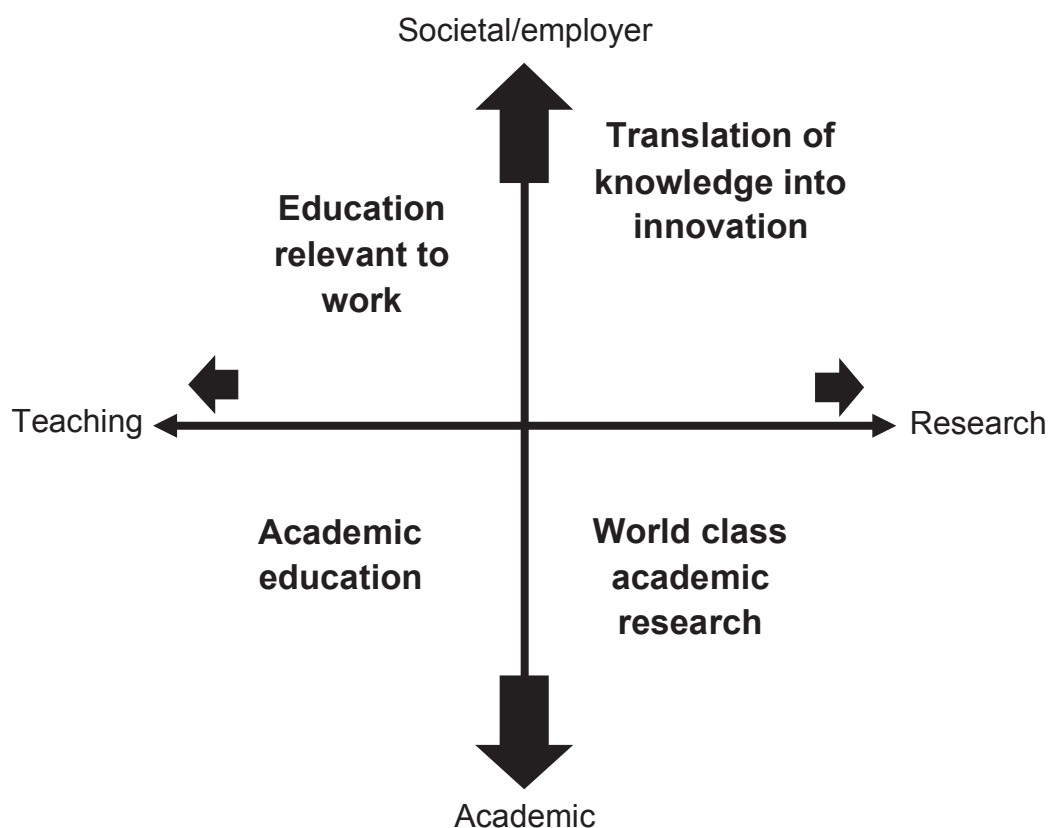
amounted to 296M SEK. However, the university has historically had a considerable share of external research funding. The largest actors have been the EU, the Swedish Research Council (VR), the County Council of Värmland, Region Värmland, the Swedish Agency for Innovation Systems (VINNOVA) and the Foundation for Knowledge and Competence (KKS). In 2010, about 28M SEK in funding was attained through commissioned research and the ambition is to further increase this share.

Distribution of the budget to faculties and research centres is decided in an evaluation dialogue with the rector. To reach the goals concerning quality and collaboration, a share of the budget for research and education is allocated according to performance in these areas. In 2011, this made up 15 per cent of the budget, but the ambition is to increase this share .

Development strategies

In the *Research and Education Strategy of Karlstad University 2009-2012*, the university is described as a “modern, outreaching university” . A goal is to become the Swedish university that best fulfils the role of international competitiveness in profile areas and regional-global involvement in the development of society through exchange of knowledge. All education and research is underpinned by a close dialogue with private companies and public organisations. The ambition is to balance broad societal involvement with high quality research and education. These four perspectives of the strategy are combined in the model below.

Figure 3: The Research and Education Strategy of Karlstad University



Source: Karlstad University, and Dr. M.Wedgwood, Manchester Metropolitan University

There is also an ambition to balance state funding for education and research with external funding and to increase international exchange and cooperation. The goal is to ensure high academic quality research with social relevance, without compromising the independence and integrity of research.

To become a modern university, Karlstad University is using a process oriented approach based on the following priorities, which are followed up by yearly quality monitoring.

- Multi-disciplinary research and education
- Mixed funding
- International collaboration
- Numerous extensive networks
- Societal involvement of employees including patents, licensing, popular activities and commissioned education and research
- Gender equality

International profile

The ambition of Karlstad University is to be an active and important link in the Swedish higher education system and at the same time, to maintain a strong regional basis and international outlook. The ambition is to increase understanding of other cultures and to strengthen the university's role in the international knowledge community. Karlstad University aims to provide good opportunities for students and doctoral

students to study abroad and to attract international students. Over time, the number of courses and programmes offered in English has increased, and today, several master programmes and more than 100 courses are offered in English. Karlstad University was also the first university in Sweden to receive the EU ECTS Label (2006-2009), an accreditation simplifying the evaluation of educational programmes between countries.

Karlstad University cooperates with many universities through the involvement of guest researchers and the exchange of teaching staff and students. The university has agreements with about 100 universities around the world and is involved in a number of international networks, including the Erasmus programme; the International Student Exchange Programme (ISEP); the European University Association (EUA); and the Compostela Group of Universities, a network of over eighty universities throughout Europe. It is also involved in a number of projects in Erasmus, Leonardo da Vinci, Tempus and other European Union programmes and initiatives.

Support structure

To support external collaboration, the university has developed a structure with several different organisations. Karlstad University Professional Services was founded in 2005 to facilitate interaction between an academic institution, society and the corporate world through the promotion of lifelong learning among employees of companies and governmental organizations. The company is owned solely by the university and handles all business transactions, marketing and the transformation of high level academic knowledge into tailor-made courses.

The Grants & Innovation Office (GIO) is a recently established organisation with the mission of encouraging the commercialisation and exploitation (nyttiggörande) of research and education in Karlstad University. This includes support for innovation among staff with the ambition to develop new products, services or companies, as well as expert support in the application for research funding or in collaborative projects with external partners. There is a close connection to university research through the innovation coordinators who work in the different faculties of Karlstad University.

As a result of the Swedish Bill on Research of 2008, the Swedish government decided to support the establishment of eight innovation offices in

higher education institutions in Sweden¹. One of these innovation offices is the “Four Leaf Clover” (Fyrklöver), an interregional collaboration between the four universities of Karlstad, Linnaeus, Mid Sweden and Örebro. In Karlstad, the innovation office is run by GIO. The goal is to stimulate innovation and knowledge based growth by supporting commercialisation (e.g. patents and licensing), entrepreneurship and the development of existing companies. The “Four Leaf Clover” has identified research areas of particular interest for the participating universities, such as research on services and entrepreneurship – including services innovations; sustainable development; forestry; health and experience industry; and production systems and industrial technology. The organisation enjoys broad cooperation with other innovation supporting actors and networks.

There is also close collaborations with INOVA, the open incubator of Värmland. INOVA is a foundation with a mission to support and develop business concepts into new companies by providing counselling, matchmaking, seminars and workshops. Fifty per cent of the funding is provided through the Innovation Bridge Incubator Programme (IBIP). Karlstad University is one of the sponsors, together with the Innovation Bridge, Region Värmland and the municipalities of Karlstad and Kristinehamn.

Collaboration with the surrounding society

From the start, collaboration with companies, authorities and organisations has been a major task for the university. Today, the goal is to become one of the best universities in Europe regarding external collaboration. This is expected to be of mutual benefit and to enrich both education and research, through the exchange of knowledge and experience. In the Vision 2015 plan, it is stated that Karlstad University has a role in contributing to regional attractiveness and growth. The university should develop in an open dialogue with private and public actors and participate actively in the regional innovation system, as a link to the international academic community².

Karlstad University is working to implement the “knowledge triangle”; combining education, research and innovation activities³. The university supports the dissemination of innovations and the commercialisation of research results. At the same time, undergraduate and postgraduate education and research are expected

to interact and support one another⁴. Cooperation may take place at different levels and in many different forms, ranging from trainee teachers helping students in primary and secondary school with their homework, students doing their degree projects on specific subjects in companies, to tailor-made contract courses and joint research projects.

External collaboration with students may result in a link between the university and future employers. There is a clear ambition at Karlstad University to combine the wishes of the students with the requirements of the labour market in the development of educational programmes. Most students have regular contact with prospective employers, through, for example, student projects, as mentors, during market relation events or when companies are involved in their study programme. There is also a possibility for employers to recruit via the university web and announcement board.

Further, most research is carried out in conjunction with industry and public sector actors at

¹ Swedish Government (2008), Ett lyft för forskning och innovation, Prop. 2008/09:50; Ministry of Education and Research(2009), Pressmeddelande: 60 miljoner till innovationskontor på åtta universitet, 12 november 2009

² Karlstad University, Vision 2015

³ Karlstad University, Kunskapstriangeln, tretton exempel

⁴ www.kau.se

the regional, national and international level. To meet future demands for sustainable development, a great deal of the research is multidisciplinary. There is an ambition to develop leading research fields in the region, notably communication and services, pulp, paper and surface treatment, printing technology, packaging, the environment, tool materials, education, working life science, tourism and leisure and gender relations. Research collaboration can be in the form of commissioned research, joint research projects or industrial doctorate students.

Regional collaboration

In Värmland, cluster policies have become an integrated part of regional development strategies. During the last decade, cluster organisations have been invited to participate in the regional development process. This was illustrated through the prioritisation of the 50M SEK received as part of the national restructuring of the Swedish defense sector in 2004. The County Governor (landshövdingen) invited Karlstad University and the regional cluster organizations to join a dialogue that resulted in a decision to develop three competence centres related to the established clusters in ICT, steel and pulp and paper. These competence centres have been developed in close collaboration with representatives of Karlstad University.

An OECD study of Värmland in 2006 gave a clear indication of the importance of Karlstad University for regional development, but also the importance of the region for the development of Karlstad University. However, even if many well functioning collaborative projects and initiatives had been initiated; the need for more structured collaboration and a joint regional governance structure remained. These recommendations initiated a regional process to develop more structured collaboration on regional development among different actors. Karlstad University, Region Värmland and the cluster organisations (Compare, The Paper Province, Steel & Metal Works and the Packaging Arena) have taken the lead in a regional development process, which also include other actors. As a result of this process, several activities have been initiated.

In 2008, a first agreement on research collaboration was signed between Karlstad University and Region Värmland. The university was to receive a total of 4M SEK for the period 2008-2010. In 2009, a letter of intent concerning research collaboration for the period 2010-2014 was signed between Karlstad University and Region Värmland. The funding from Region Värmland is expected to amount to 5M SEK per year over the period, but requires a matching amount of funding from Karlstad University. Further, to secure long-term funding, an additional amount is expected

from other sources, including national agencies, private funds or EU-programmes.

The following aims for cooperation were identified;

- To strengthen the regional business sector through research contributing to increased innovation and the development of internationally competitive exporting clusters.
- To strengthen the university through the development of strong research environments at Karlstad University, providing research that is relevant to business and society and with the potential for external funding.
- To strengthen regional governance (leadership) through the co-production of knowledge encouraging cross-sectoral decision making and complex problem solving.

In the agreement, four research areas of particular interest for the future were identified, Governance (leadership); Innovative Environment; Competence Provision; and Quality of Life. These areas relate to four of the five priorities of the *Regional Development Programme of Värmland*⁵. As part of the collaboration, ten new professorships related to the four research areas are expected to be initiated at Karlstad University, a 15 per cent increase in professorships. In 2011, the professorships were initiated in research areas of particular interest to the region, including energy efficiency. The prioritisation of research areas and professorships was based on a dialogue between Karlstad University, Region Värmland and the cluster organisations. Apart from this, Region Värmland provides basic funding for a research centre on regional development (CERUT) at Karlstad University. There is also a smaller fund, from which researchers may apply for project funding in external competition.

Compare - cluster collaboration

Compare Foundation Karlstad is one of the cluster organisations working closely with Karlstad University. Compare was formed in 2000 through the efforts of seven ICT companies in the region. The mission was to strengthen the image of the regional ICT sector to attract competence to the region and to create a meeting place for people in this relatively new service sector. Compare Karlstad is a foundation with approximately 100 member firms (intressentföretag), representing about 80 per cent of the regional ICT-companies. Together, the member firms, ranging from large international groups to small family businesses, have a total of 2 500 employees and a turnover of 4.5

⁵ Värmland växer – och känner inga gränser

billion SEK in the region. The objectives of Compare are to support business development, the establishment of new company and competence development. Most activities are organised as publicly co-funded projects⁶.

According to a case study by Lindqvist (2011), collaboration between Compare and Karlstad University has developed substantially during the last five years. The first large cooperative project was the development of the Compare Business Innovation Centre (CBIC), which provides infrastructure, support and facilities for start-ups and development projects. CBIC was developed through cooperation between Compare and the Department of Computer Science at Karlstad University. It took time to develop the concept, but in the process, close contacts were developed. Since then, collaboration has extended to other departments and research centres, including the Centre for Services Research (CTF).

During the dialogue concerning the regional funding priorities relating to the restructuring of national defence, representatives of Compare, the large ICT-company TietoEnator and the Department of Computer Science at Karlstad University presented an idea concerning an independent test laboratory for ICT solutions. In January 2006, CBIC was commissioned to develop and run a test laboratory. A pre-study involving eight companies and the university was made, resulting in the launch of Compare Testlab in the former military medical service centre at Sätterstrand in Hammarö municipality. Of a total investment of 140M SEK, about 50 per cent comes from private actors and the rest from public actors at the regional, national and EU levels. Today, Compare Testlab is an important part of the development of Sätterstrand Business Park. Companies can rent infrastructure to test and verify computer software and systems, and a large number of projects are run in the facilities in cooperation with researchers, companies and public actors. In recent years, the centre has attracted national and international attention due to its modern and energy efficient computer halls. A particular focus has been on the development of "green IT" and an energy efficient computer hall.

Over time, a number of cooperative research projects have been initiated between the university and members of Compare, and several joint applications for external funding have been submitted. In cooperation with Compare Testlab, several software applications have been tested and developed by students and research personnel. Test tools have been developed and made available at the facilities, making it possible to monitor and evaluate their performance in real life. One example of product testing was the EU-project FIVES, a collaboration using a research algorithm developed by a researcher at Karlstad University to

recreate information from small data fragments on the Internet. Compare Testlab made an independent test and verification of the product. Since then, the process of development and patenting has continued and presently, there is an ongoing project involving international business partners, researchers and European authorities to develop a tool for investigating sexual assaults against children.

Many research projects are based on international contacts and several new projects have been developed as spin-off from former projects. One example is E-CLIC (European Collaborative Innovation Centres for Broadband Media Services), an EU project in the North Sea Region Program. E-CLIC Värmland consists of Compare, Karlstad University and the County Administrative Board of Värmland. Another example is the Living Labs research project, developed in collaboration between Compare, researchers at the Centre for Services Research at Karlstad University, the Norwegian research centre Nordforsk and the universities of Aalborg (Denmark) and Stavanger (Norway). The project will use the test facilities developed by Compare Testlab to test new services.

Cooperation between Karlstad University and Compare has also had an important influence on the design and development of new education programs, including efforts such as company participation in advisory boards, reference groups or steering committees. After the ICT crisis in the early 2000s, the interest in ICT education dropped substantially and the university had difficulties to attract students. At the same time, companies realized a great need for future competence. Therefore, representatives of the Department of Computer Science at Karlstad University and eleven member companies of Compare established SNITS (Cooperation Business and ICT Students) to develop contact between businesses and ICT-students. SNITS arranges breakfasts, lunch seminars and various social events; provides students with study visits and mentorships; and several companies are active as lecturers or provide student advisory services.

Over time, the networks of Compare and Karlstad University have grown increasingly intertwined. Compare and the project arena CBIC have become important information channels for Karlstad University. Today, Compare and the university make joint marketing efforts to attract students, companies and research funding. There is also well developed cooperation between the communication departments. Further, the research and development manager of Tieto Enator has become a member of the board of Karlstad University and the open incubator INOVA.

Through various cooperative projects with Compare over the past decade, the number of researchers at the Department of Computer Science at

⁶ www.compare.se

Karlstad University has increased from about 20 persons, with a main focus on education, to about 30 persons, 75 per cent of whom are researchers. Additionally, two new professorships, in services (Centre for Services

Research) and complex IT systems (Department of Computer Science) are likely to be the outcome of the present dialogue between Karlstad University, Region Värmland and Compare.

The role of Karlstad University in regional development

It is evident that Karlstad University, even as a University College in the 1970s, has had an important role in regional development. The Karlstad University College was based on a tradition of teacher training and nursing education, to provide the region with strategic competence. Over time, research and education has broadened to include other areas, such as the humanities and fine arts, social and economic sciences, natural sciences, and engineering and technology. In the Vision 2015 plan, it is clearly stated that Karlstad University has a role in contributing to regional attractiveness and growth.

Cooperation with companies, authorities and organisations has always been a major task for Karlstad University. The university aims to work according to the concept of the knowledge triangle, combining the traditional tasks of education and research with collaboration with the surrounding society. Today, there is even a goal to become one of the best universities in Europe regarding external collaboration. As a consequence, university management has decided that 15 per cent of the budget should be allocated according to the amount and quality of external collaboration. However, there is still an on-going process in deciding upon the evaluation criteria to be used.

As Karlstad is one of the smallest universities in Sweden, it is necessary to prioritise and focus. During the last decade, the establishment of regionally supported cluster organisations, representing important fields in the private sector, has contributed to increased collaboration between Karlstad University and the public and private sectors. Today, this collaboration is manifested in the letter of intent between Region Värmland and Karlstad University on the funding of applied research and ten professorships of importance to the region and in the ongoing process of jointly developing a new cluster strategy, as part of a regional innovation strategy. This collaboration is also anchored in the Regional Development Plan, indicating that the university is perceived as an important actor for regional development in Värmland.

Karlstad University has several different roles in supporting regional development. First, the university has a considerable economic impact on the region,

with 12 500 students and a staff of 1 200 persons, representing almost 5 per cent of the inhabitants in the region. Further, in 2011, Karlstad University generated income amounting to more than a billion SEK. Part of the income comes from external funding, including public and private grants, commissioned education and research, and national or international research funding and the ambition is to increase this share in the future.

Second, the university has an explicit ambition of networking, by being an active and important link in the Swedish higher education system and, at the same time, maintain a strong regional basis and an international outlook. Today, the university participates in several national collaborations, while being involved in various networks in order to develop a strong international profile.

From a labour market perspective, Karlstad University has traditionally had an important role in equipping graduates with skills that are useful to the private and to public sectors, such as in the fields of health care and public management. According to representatives of cluster organisations, access to relevant competence is often one of the most important reasons for private companies to engage in cluster development. This was the main motive behind the establishment of the cluster organisations TPP (The Paper Province) and Compare, around 2000, and it may become just as important in the future, as for example, the ICT sector foresees a dramatic increase in the need for ICT competence. Through collaboration between ICT companies and Karlstad University in the SNITS-project, there has been a great opportunity to attract students by providing an interesting programme with close business contacts. There is also an ambition to support life long learning, something promoted by Karlstad University Professional Services.

The university has an important role as one of the key actors in the regional innovation system. Several organisations have been developed within or in close cooperation with the university, including Grants & Innovation, the Innovation Office “the Four Leaf Clover”, INOVA and CBIC. The purpose of these organisations is to stimulate and support entrepreneurship and innovation. Collaboration between

the university, companies and public actors has also contributed to the development and commercialisation of new patents, products and services. An example is the participation of students and researchers from the university in joint development and research projects in the test and demonstration laboratories at the Packaging Greenhouse (TPG) and Compare Testlab.

Together with the regional clusters, Karlstad University has an important role to contribute to the development of an attractive region, for students and researchers, as well as for employees and companies. For example, in recent years the development of the pulp and paper cluster in the region has contributed to the attraction of a number of foreign direct investments by creating one of the world's highest concentrations in competence in the pulp and paper sector, including equipment and consultancy services.

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Royal Institute of Technology in Stockholm (KTH)

Written by Maria Lindqvist, Nordregio

Stockholm County

Stockholm County is located in Mideastern Sweden, along the coast of the Baltic Sea⁷. The total land area is 6 490 km², or less than 2 per cent of Sweden. With approximately 1.9 million inhabitants (23 per cent of the national total), it is the dominant city region in Sweden. The county consists of 26 municipalities, including Stockholm, with more than 829 000 inhabitants. The average population density is 311 persons per km², well above the national average of 23. However, there are considerable variations between the city centre and the more peripheral municipalities. Throughout the 1990s, Stockholm experienced consistent and impressive growth. Between 2005 and 2010, the annual population growth of Stockholm County was about 15 per mille, more than twice the national average (Lindqvist, 2010).

Stockholm has considerable strengths in research and development and has been rated a top innovation region in the EU. There are several major universities (Karolinska Institute, Stockholm University, Royal Institute of Technology, Stockholm School of Economics), along with a number of specialized university colleges. There is also a concentration of advanced businesses working in fields such as logistical and financial services, as well as its specialization in high tech sectors, particularly ICT (Ericsson, IBM Svenska and TeliaSonera) and life sciences (AstraZenec and Pfizer). In the southern part of the region, there are some large traditional engineering companies (e.g. Scania). Some of the notable demographic characteristics of the region are the high percentage of the population who pursued higher education (23 percent), a low level of unemployment (6.8 per cent in 2009) and a high level of employment in the service sector (85 percent). With a more limited dependency on export industries and a higher level of employment in the services sector, the region of Stockholm has been less affected by the economic crisis than more peripheral or rural areas in

Sweden.

As a capital region, Stockholm's innovation structure is complex, with many strong and independent actors in both the public and the private sectors. Various national public entities (government, ministries, research funding bodies and agencies) are also located in Stockholm. The County Administrative Board of Stockholm (Länsstyrelsen) is the government body responsible for developing a *Regional Development Programme* (RUP). The Stockholm County Council (Landstinget) is a politically elected regional organization that is responsible for developing the *Regional Development Plan for the County of Stockholm* (RUFs), with specific planning and policy responsibilities related to regional (spatial) development, health care, transport and infrastructure. In recent years, a collaborative process, including many regional stakeholders, took place to develop a new regional plan, RUFs 2010, integrating the regional (business) development programme (RUP).

For the period 2007-2013, Stockholm is receiving financial support through the European Regional Development Funds (ERDF) for the first time. To prepare decisions and prioritize different projects, a broad regional partnership was established. Through this partnership, local and regional stakeholders from different sectors have increased cooperation on regional development in Stockholm. To avoid the administrative burden and fragmentation of many small projects, the partnership has focused on a limited number of larger projects. Although there is no explicit cluster policy in Stockholm, many ERDF projects have been directed towards cluster initiatives in the high tech sectors of life sciences and ICT, as well as new cluster initiatives involving new sectors, including environmental technology and the creative sector (Lindqvist & Baltzopoulos, 2011).

⁷ Stockholm is also part of the greater Lake Mälaren region, including parts of the counties of Västmanland, Södermanland and Uppsala.

Presentation of KTH

KTH is the largest, oldest and most international technical university in Sweden. KTH's history dates back to 1827, when the polytechnic institute Teknologiska Institutet began to offer education in technological subjects with a strong professional emphasis. The educational focus was on applied technology, not on its scientific foundations. Still, basic research and practical engineering often cross-fertilized each other, in areas such as chemistry and electricity, for example. In 1877, the name of the institute was changed to Kungliga Tekniska Högskolan (KTH); the first step towards a higher academic status. Formally, academic recognition occurred in 1927, when KTH received university status and the right to offer the degree of Doctor of Technology⁸.

Facts and figures

Approximately one-third of Sweden's technical research and engineering education capacity at the university level is provided by KTH. Education and research spans from the natural sciences to all of the branches of engineering and also includes architecture, industrial management and urban planning. Since 1917, the main campus area has been located in the northern part of central Stockholm. Since then, new campus areas have developed. Today, KTH and Stockholm University jointly offer study programmes and carry out research in biotechnology and physics at nearby AlbaNova University Centre. The School of Information and Communication Technology is located on the Kista campus, in the northern part of Stockholm, and there are additional campuses located in Flemingsberg/Haninge and Södertälje in the southern metropolitan area.

In January 2005, KTH reorganised itself, creating 'schools' responsible for education and research activities. The purpose was to clarify responsibilities and reduce the number of units directly subordinate to the president. Initially, nine schools replaced over thirty departments (Geschwind et al, 2010). In 2010, KTH had the following ten Schools; Architecture and the Built Environment; Biotechnology; Chemical Science and Engineering; Computer Science and Communication; Electrical Engineering; Information and Communication Technology; Industrial Engineering and Management; Engineering Sciences; Technology and Health; and - as the tenth school - Education and Communication in Engineering Science (including pedagogic and library services). Most schools are heading a number of departments, centres of excellence and undergraduate

study programmes. The educational programmes lead to bachelor, master or PhD level degrees in engineering, science, or architecture. In 2010, KTH had a total of just over 14,000 full-year equivalent undergraduate students and close to 1,700 active research students, less than 30 per cent of whom were women. There were almost 3,200 full time equivalent employees, including more than 500 professors or associate professors.

In 2010, total funding for KTH amounted to 3,674M SEK. State-funding for undergraduate education and doctoral studies amounted to 1,992M SEK. KTH had an impressive share of external funding, about 40 per cent of the total amount. The most important sources of external funding were the Swedish Research Council, the EU, Vinnova and the Wallenberg Foundations, but about 800M SEK came from other sources, including other government agencies and private funds⁹. The allocation of state-funding to the schools primarily occurs in the 'President's contracts', which are negotiated yearly. The contracts are based on performance evaluation (numbers of students, citations and external funding) in combination with a strategic discussion about future activities.

Development strategies

According to the Vision 2027 plan, the goal of KTH is to become one of Europe's most eminent technical universities, based on its excellence in research and education and its close collaboration with society. Some of the guiding principles to reach this goal are internationalization; increased autonomy; excellence in education, research, collaboration and administration; sustainable development; and visibility. The vision has been developed through an inclusive process, involving a large number of internal and external stakeholders from different geographical levels.

As a technical university, KTH has a long tradition of industrial collaboration, with Swedish core industries in addition to new, high-tech firms. In the Strategic Plan 2009-2012, it is stated that collaboration with external actors is of great importance and, to an increasing extent, a precondition for the future competitive edge of the university. KTH aims to be positioned as an entrepreneurial university that values innovation and entrepreneurship in education and to stimulate the creativity and innovation of students and researchers. This is, for example, manifested in the recent development of the KTH Innovation Office and in the university's participation in different networks and many collaborative research centres and platforms,

⁸ www.kth.se

⁹ KTH (2011), Årsredovisning 2010

nationally as well as internationally.

An important part of future development relates to the attitudes, competences and incentives of KTH management, staff and researchers. For several years, the Entrepreneurial Faculty project has provided leading faculty members with opportunities for exchanging experience and benchmarking on successful activities for innovation and collaboration through workshops and study visits to leading universities, such as Cambridge, MIT, and the Universities of Twente, Zürich, Delft, Tuft and Lausanne (Innovation Bridge Stockholm, KTH and Sister, 2005). A more recent initiative has been the KTH Future Faculty project, with the goal to develop a stimulating working and studying environment for teachers, researchers and students. A central mission is the development of a tenure track system, to provide young researchers with career support. Several activities have been initiated, including lectures and an initiative to attract female guest professors. There is also an ongoing project to develop a Faculty of Innovative Engineering, by increasing collaboration with larger partners for industrial PhD students, researchers and teachers.

Still, attitudes towards regional collaboration vary within KTH. Some schools have a pronounced ambition of collaborating with regional stakeholders, while others are more inclined to stress the importance of research excellence, global collaboration and competition (Lindqvist, 2010b). This may partly result from different traditions and relevance for collaboration. Further, there is a traditional conflict concerning applied research and short term industry collaboration versus basic long-term research, excellence and the liberty of researchers. Even if external funding has become a criterion for performance evaluation, scientific citations still have a dominant influence on the academic merits and career development of researchers at KTH.

In the reorganisation in 2005, the Faculty Board received a new, important function in terms of quality assurance. As global competition between higher education institutions is increasing, the need for quality indicators and international rankings is becoming increasingly important. To evaluate the quality of its research, KTH performed an international research assessment exercise (RAE) based on self assessment and peer reviews in 2008. As a direct result of this, five research platforms were established to address grand global challenges, requiring cooperative, multi-disciplinary research. In 2010, the Faculty Board initiated an internal process to develop a new quality assurance system based on continuous development in four different sectors; education, research, collaboration and competence development. As a consequence of the project, an education assessment exercise (EAE) was undertaken and a new RAE has been initiated.

International profile

KTH is an international university with many foreign researchers and students. To facilitate the participation of foreign students, as many as 65 of 68 Master programmes are run in English. Extensive international research and educational exchange programmes allow for exchanges with universities and colleges in Europe, the U.S., Australia and Asia. KTH is also a partner in several international university networks such as CLUSTER and T.I.M.E. During the 2000s, the share of foreign students increased rapidly. In 2007, KTH had a total of 3 230 foreign students at different levels, almost one fifth of all students; more than any other Swedish university. Since then, new national regulations requiring study fees for non-EU citizens have been introduced and international student enrolment, particularly from Asia, has decreased.

The university has been successful in the competition for research grants at the European level. In 2009, KTH was the most successful university in Europe in receiving research grants from the European Research Council. The following year, total EU funding amounted to about 182M SEK. KTH is also the host of two European Knowledge and Innovation Communities (KIC) as part of the EU initiative European Institute of Innovation and Technology (EIT). The goal is to make Europe a global leader for innovations in ICT and Sustainable Energy. Within each consortium, there are research institutes, major engineering companies and several leading technical universities in Europe. The consortia were selected in tough competition by EIT's board.

EIT ICT Labs is focused on software engineering and IT services. The consortium's primary nodes are in Stockholm, Berlin, Eindhoven, Helsinki and Paris. The Swedish node, with KTH as the major partner, in cooperation with SICS, Ericsson and TeliaSonera, will among other things, be responsible for educational issues and for the area mobile communication. Together with a number of actors, including STING and the Electrum Foundation in Kista, KTH will act in the spirit of the knowledge triangle, and run projects to integrate education, research and innovation in an attempt to strengthen the local innovation system.

KTH is also a major partner in the KIC consortium InnoEnergy, together with Karlsruhe, Grenoble, Eindhoven/Leuven, Barcelona and Krakow. Sweden, through KTH and Uppsala University, will be responsible for the areas of 'smart electricity network' and 'electrical energy storage' in cooperation with the private companies ABB and Vattenfall. Together with Uppsala University, KTH will build up an innovation centre specialised in environmental technology and sustainable energy solutions, with activities at both of the universities campuses.

Support structure

Education and research at KTH can create possibilities for entrepreneurship, innovation and competence development among companies, organizations, official authorities and individuals. To support this, the recently reorganised KTH Business Liaison is the contact point for different types of services, including access to professional competence; research collaboration; innovation support; recruitment; and network activities. In the future, there is an ambition to provide academic, as well as business, expertise related to areas covered by the research platforms of KTH.

Competence development can be provided in different forms, including continued education, commissioned education and executive business management. KTH Education acts as a broker between KTH and the business world in the creation of customized professional educational programs in the fields of engineering and business. KTH Executive School is an independent organisation, owned by KTH. The objective is to develop the skills of executives in business management and strategic leadership through executive programs.

As part of the government's intention to stimulate

innovation and entrepreneurship in Swedish universities, in 2009, KTH was commissioned to develop an innovation office providing professional, independent support systems for research commercialization. The KTH Innovation Office has the ambition to create a world class support system for commercializing technical research in the Mälardalen region, in collaboration with other innovation support organisations in the region. Even before the Innovation Office was founded, there were well functioning, but underfunded, innovation support organizations at KTH, Mälardalen University (MDH) and Stockholm University (SU). Since then, a regional partnership has been established between the three universities, as well as with Uppsala University, Karolinska Institute and a number of research institutes. Some of the services provided are increased IPR support; access to a web based platforms for structural capital, including processes, templates and tools; and a more comprehensive collaboration between the local incubators, such as STING, Create and SU Innovation. In a partnership between KTH Innovation and Excitera, a student-driven, non-profit entrepreneurship association in Stockholm, the first Swedish student incubator was recently launched at KTH Campus.

Collaboration with the surrounding society

KTH has a longstanding tradition of collaboration with core Swedish industries. When KTH was established, almost 180 years ago, the main task was to provide Swedish industry with relevant competencies for engineering. Over the year, research activities became more pronounced. Over the years, there has also been a growing demand from the government for collaboration with the surrounding society, as well as greater efforts to attract international students, researchers and external funding.

As indicated in the Strategic Plan 2009-2012 and the Vision 2027, collaboration with external actors is of great importance for KTH. Such efforts take many different forms. According to an interview study with management representatives from all ten schools during 2010, collaboration activities ranged from influencing the general attitude towards natural sciences by arranging study visits for teachers and students from secondary schools, to international research collaboration with prestigious universities and multinational companies. Some of these activities are arranged or supported by KTH management, while others are based on personal relations or initiatives from individual researchers, department or schools. External collaboration could be further developed, but there is still a lack of specific funding, of developed systems for follow-up and of

formal incentives for collaboration, from an academic perspective (Lindqvist, 2010b).

Research at KTH is, to a large extent, conducted in co-operation with companies and various societal bodies. Co-operation on newer subject areas is often organized as competence centres. Most of them have a board representing actors from trade, business and society, but others are autonomous units directly subordinate to the KTH President. Some of the competence centres also act as liaison offices between KTH and other universities. Presently, there are about 55 different competence centres with a formal connection to one of KTH's Schools and another five competence centres run by other bodies in collaboration with KTH. Sixteen national research centres are hosted by KTH; e.g. VinnExcellence Centres (Vinnova), Linné Centres (the Swedish Research Council), centres for the Swedish Foundation for Strategy Research, Swedish Energy Agency Centres and Mistra Centre.

As a result of the KTH Research Assessment Exercise (RAE) in 2008, five research platforms were established to increase coordination of research activities. The platforms address "global grand challenges" that require multi-disciplinary research approaches: Energy; Information and Communication Technology; Materials; Medical and Biomedical Technology; and

Transport. They were intended to work as catalysts for large multi-disciplinary research initiatives carried out by research groups at KTH together with external partners and stakeholders. The platforms also serve three supporting roles; to maintain a strategic outlook with support from external stakeholders; to have an advisory role for future investments in faculty and infrastructure; and to build and maintain links with cooperation partners and other external stakeholders.

The 2008 government bill on research and innovation proposed increased support for Strategic Research Areas (SRA). 24 strategic research areas were considered important for Swedish competitiveness and growth. In 2009, The Swedish Research Council launched a call for application including 20 of these areas. Based on an evaluation process, a total of 1 315M SEK in increased funding per year was to be granted to Swedish higher education institutions for the period 2009-2012. KTH was awarded funding in 11 SRAs and is responsible for managing the funding in five of these, including Information and Communication Technology (ICT), Molecular Bioscience, Transport, Production and e-Science. KTH has also received substantial funding within the SRA concerning energy. SRA funding will be used to develop existing research and to create new research environments. There is an explicit ambition to engage other actors and to make sure the results have an impact on society. Recruitment has been a key issue, with the aim to complement existing research teams with high potential individuals from around the world. SRA activities will be linked to the recently introduced tenure track system at KTH. There is also coordinated financial support and strategic advice to enable the SRAs to seek further research funding.

Regional collaboration

In the Vision 2017 plan, there is an ambition for Stockholm and the larger Lake Mälaren region to become one of Europe's most innovative environments and for KTH to have an active role in the region's development. To reach the region's goals and to compete for students and faculty on a global scale, the need for strategic alliances - or even mergers - between leading universities in the Stockholm region is considered necessary. In recent years, KTH's participation in regional development and cooperation with other regional universities and university colleges on education, research and innovation has developed considerably.

For example, 21 universities and university colleges in Stockholm have developed a platform for cooperating on education, student information, marketing, analysis and networking; the Stockholm Academic Forum (StAF). Another cooperative initiative to foster entrepreneurship among students is the

Stockholm School of Entrepreneurship (SSES); a joint initiative between KTH, Karolinska Institute, Stockholm School of Economics and Stockholm University. SSES is a member-based, non-profit organization that gathers the innovative and entrepreneurial competencies of all members in a joint education programme. There is also increased collaboration on support for innovation and commercialization between university business liaison offices, incubators and the recently created innovation offices at KI and KTH.

Furthermore, there is a need for collaboration with public and private stakeholders. In terms of research collaborations, many of the competences centres and strategic research platforms at KTH have been developed in close collaboration with universities, public actors and business representatives in the Stockholm region. There are also other types of collaborations, concerning, for example, competence development, knowledge transfer and regional attractiveness. As the regional partnership for the ERDF 2007-2013 decided to prioritise strategic development in specific sectors/clusters; KTH has been involved in several regional cluster development projects in the greater Stockholm region, including Life Science (Hagastaden/Flemingsberg), ICT (Kista) and Creative Stockholm (Botkyrka).

ICT is one of the strategic research platforms being developed at KTH. In the ICT sector, KTH is involved in many different activities, including education, research and collaboration. The Electrum Foundation in Kista was commissioned by representatives of ICT companies (Ericsson, IBM, Packetfront), a real estate company, the ICT research institute Acreo, KTH and the City of Stockholm to stimulate growth and cooperation in research and innovation for ICT companies. Operations are administered by two subsidiaries; Kista Science City (e.g. real estate management and networking) and the business incubator STING. Further, the ICT programs at KTH are co-located with Stockholm University at the premises of Kista. KTH is also the host for EIT ICT Labs, an ICT consortium within the European Institute of Innovation and Technology (EIT) initiative, with a focus on software engineering and IT services.

Similarly, KTH is involved in many different activities related to the development of the strategic research platform on medical and biomedical technology. One example is AlbaNova University Centre¹⁰, a research and education initiative run in collaboration between KTH and Stockholm University (SU). Another example is the Science for Life laboratory, run in collaboration by KTH, SU, Karolinska Institute and Uppsala University. A third example is CMTH (Centre for Medical Technology and Health), based on collaboration between KTH, KI and the County Council of Stockholm. KTH is also participating in two ERDF-

¹⁰ The Stockholm Centre for Physics, Astronomy and Biotechnology,

funded projects for supporting the developing the small and medium-sized companies in the life science sector in the new areas of Hagastaden and Flemingsberg. Together, these activities have contributed to increased collaboration with other regional actors, such as Stockholm University, Stockholm County Council and KI over the last years.

The Knowledge Navigator (Kunskapslotsen)

One example of a collaborative project in the Stockholm region is the Knowledge Navigator. The project was initiated by KTH in collaboration with four other higher education institutions in Stockholm; Karolinska Institute, Stockholm University, Södertörn University College and University College of Arts, Craft and Design (Konstfack). The purpose was to improve contacts and stimulate the transfer of knowledge between small and medium-sized companies and academic institutions in the Stockholm region. The project received 10M SEK from the European Regional Development Fund (ERDF) for the period 2008-2013.

In the first phase, from 2008 to 2010, collaboration increased and a matching model for knowledge cooperation between trade and industry and academia was developed and tested. The long term ambition was to reach out to companies in all sectors, but in this first phase, focus was on nursing, healthcare and care of the elderly. Co-funding was provided by the participating universities and university colleges,

the Stockholm County Administrative Board, Micasa AB (municipal real estate company) and Norrtälje Municipality. The project was coordinated through the Stockholm Academic Forum (StAF), a platform for cooperation between all of the 21 higher education institutions in the Stockholm region.

Two “knowledge pilots” were employed in the project to match companies’ and institutions’ needs. Different methods of knowledge transfer were tested, including students who carried out their thesis work in companies and researchers participating in smaller research projects. Various support tools were developed, including checklists, contracts and resource databases. In the process of developing the matching model, incentives and barriers for collaboration were investigated. In total, 460 business representatives from 201 companies, 255 researchers and 387 students participated in different activities during the first phase. Recruitment, research, business or product development, benchmarking, and competence development were examples of processes that were initiated.

In 2011, an application for continued funding from the ERDF was approved and the second phase of the project started. Business focus has been broadened, to include environmental aspects as well. In this phase, the matching model is to be further developed and tested. The second phase is run by StAF and the Innovation Offices of KTH and KI. This means that the project will have an even closer link to the higher education institutions in the region.

The role of KTH in regional development

Over the years, the role of KTH in regional development has evolved. From an initial focus on providing Swedish core industries with engineering competence, the role has become increasingly complex. Even if internal attitudes towards regional collaboration still vary, a broad range of collaborative activities with regional actors or with consequences for regional development have developed. Today, this is important for the development of high quality education and research, as well as for the stimulation of innovation and entrepreneurship. Further, even if many activities do not have a specific objective to support regional development in the Stockholm area, the actual locations of KTH and its main partners contribute to regional development.

In terms of economic impact, KTH in itself has a relatively modest influence on the total number of inhabitants, GRP and employment rate of the Stockholm region. Still, KTH is part of an extensive network of higher education institutions in the area.

Altogether, it is estimated that the academic sector in the greater Stockholm-Lake Mälaren region in 2008 had a total turnover around 22B SEK, generating about 17 000 jobs and almost 110 000 student in the region. An analysis of the economic impact of KTH indicates that 70 per cent of its total revenue is spent in the region and that every job at KTH generated 0.4 additional jobs in the region (Broström, 2009).

In terms of research collaboration, many of the competence centres and strategic research platforms at KTH have been developed in close collaboration with universities, public actors and business representatives in the Stockholm region. Even if there is no explicit strategy for prioritising research collaboration in the Stockholm region, many of the partners dominating private research funding of KTH, such as Ericsson, Scania and Skanska, have important functions in the region. Similarly, Stockholm has a strong concentration of Swedish competence in ICT, medtech and life

science sector, with many small, high tech companies located in the region.

Even more important, education at KTH has an impact on regional competence development in Stockholm. According to many of KTH's largest external partners, access to future competence is a central priority for them to be able to remain in the region. Today, the majority of students stay in the region after concluding their studies (alumni). About 80 per cent of them work in smaller R&D companies or knowledge intensive services companies. An analysis of the distribution of approximately 1 000 new doctors from KTH who graduated between 2003 and 2007 indicated that by 2008, approximately 170 persons stayed in universities in the greater Stockholm-Lake Mälaren region, about 45 went to research institutes in the KTH campus area and about 435 were recruited by companies. The majority started to work at large companies in the region, including Scania, Ericsson, ABB, AstraZeneca and Vattenfall (Sittenfeld & Reitberger, 2011).

Recruitment to higher education institutions has become more regional in recent years, partly as a result of national policies between the 1970s and 1990s to increase accessibility to higher education in all parts of the country by establishing new universities and university colleges. In Stockholm, an average of 78 per cent of the students from Stockholm County applied to higher education in the greater Stockholm-Lake Mälaren region between 2004 and 2008. KTH also has a role of attracting students and researchers to the regions, particularly from other countries. The number of new students at KTH per year almost doubled between 1999 and 2008. However, as the number of students from the Stockholm and the greater Stockholm-Lake Mälaren region has remained relatively constant, the increase was explained by a rapid increase in the number of foreign students. After the introduction of student fees for non-EU citizens, the increase has slowed down however.

There is also increased collaboration and support for innovation and commercialization with university business liaison offices and incubators in the greater Stockholm area through the recently established KTH innovation office. Historically, there have been several innovation support organizations in the region. Today, a regional partnership between KTH, Mälardalen University (MDH) and Stockholm University (SU) has been formed and cooperates with regional incubators (e.g. STING, CREATE and SU Innovation) and research institutes (SICS, Innventia, SP and YKI). This collaboration is expected to be further supported by the ongoing discussion of gathering regional innovation support actors in an open innovation laboratory in the former Dean's office at KTH. The ambition is to co-locate the activities of KTH Liaison Office, KTH Innovation, StAF, the ICT incubator STING and other

regional actors, providing conference rooms and the opportunity for spontaneous meetings.

Increased global competition for students and researchers has put greater pressure on universities to engage in developing attractive regions. In Vision 2027, the importance of strategic alliances with other higher education institutions in Stockholm and for collaboration with regional public actors on strategic questions is highlighted as part of KTH's strategy to increase the attractiveness of the greater Stockholm region. One example of strategic efforts for collaboration with public actors concerns the need to develop a better transport infrastructures and facilities for housing for students and visiting professors. KTH plays an active role in developing attractive areas for living and working. KTH was one of the founders of the Electrum foundation, which is responsible for physical planning and developing the ICT sector in Kista, in Northern Stockholm. Other examples relate to the development of hard and soft infrastructure for the life science sector in Northern (Hagastaden) and Southern (Flemingsberg) Stockholm. These areas are expected to improve the potential not only for entrepreneurship and business development, but also to attract foreign competence and investments to the region.

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HAMK University of Applied Sciences

Written by Veera Lehto and Henna Hintsala

The Häme region

Häme County is situated in Southern Finland, in vicinity of large urban centres. The Häme region is made up of three sub regions: Forssa, Hämeenlinna and Riihimäki and includes 11 municipalities. The county covers 5 200 km² and had 173 828 inhabitants in 2010. Population density was 33 persons/km². The largest municipality is Hämeenlinna, Finland's oldest inland town, with 66 455 inhabitants (Lindqvist, 2010a). Net migration to the region over recent years resulted in a population growth of about 5.8 per cent between 1995 and 2010.

Functionally, the region of Häme belongs to Southern Finland and to the greater Helsinki Metropolitan region and is also part of Helsinki-Hämeenlinna-Tampere-zone. The county is part of both the decentralised city network in Southern Finland and the metropolitan commuting area. The region is only about an hour's drive or train trip from the capital and the other cities of the southern Finland.

A significant proportion of Finland's oldest industrial heritage, dating back to the 19th century, is found in the Häme region. Nowadays, there are some 1 000 industrial firms operating in the region, 450 of them in metals, 150 in mechanical wood refinement and 100 in the food industry. There are over 6 000 enterprises in all of Häme, the majority of which operate in the field of commercial service provision.

According to the Finnish Law of Regional Development, regional council's acts as regional development authorities. The Regional Council of Häme promotes regional development together with member municipalities, civil servants and local businesses and other development partners. As a regional authority, the council draws up strategies to define goals and measures for different development plans: the regional plan, the regional strategic programme and the regional land use plan. The main objective is to support the independent and continuous development of the region. The future challenges for the County of Häme lies in balanced economics, international competitiveness and an aging population that affects the labour market and increases the need for services offered by public sector. Häme has been successful in fostering an educated labor force, suitable for the changing demands of business life and internationalization, but also in creating an accessible and high quality housing and living environment. In the regional plan, there are five focus areas: regeneration, work-life and know-how, internationalisation, accessibility and housing and environment. These focus points require renewing rather than preserving, risk taking to develop, services beyond production in business life and entrepreneurship to support public service production.

Presentation of HAMK

HAMK University of Applied Sciences was established in 1995 and is based on eight separate education institutions. HAMK has a wide operational area with activities not only in Häme, but also two other counties, Uusimaa and Etelä-Pirkanmaa, with a service zone of 2 million people. There are education units operating in the municipalities of Forssa, Hyvinkää, Hämeenlinna, Riihimäki and Valkeakoski and in the villages of Evo, Lepaa and Mustiala. The main campus is located in Hämeenlinna.

HAMK is maintained by the Häme Municipal Federation for Professional Higher Education (HAKKY) and was formed by six member municipalities. HAKKY was formed by HAMK and the Häme Vocational Institute (HAMI), which is a secondary education institution. HAKKY determines the objectives concerning the key operations and finance. HAMK is state run and state funded. Basic funding from the state and municipalities amounts to 49M € and supplementary funding to 18M €, of which

R&D and project funding is 7M €. Universities of applied science don't get as much internal financing for research compared to universities. The aim is to expand this fund base.

HAMK is a multidisciplinary University of Applied Sciences with six fields of education: Culture, Natural Resources and the Environment; Natural Sciences; Social Services, Health and Sports; Technology, Communication and Transport; and Social Sciences, Business and Administration. HAMK provides possibilities for lifelong learning through the Open University of Applied Sciences and continuing professional education (specialisation studies and training). The Professional Teacher Education Unit (HAMK PTEU) is Finland's largest teacher education unit, providing formal pedagogical qualifications for teachers who work as educators in institutions of higher education, vocational colleges, institutions geared towards adult education and training, in public sector organisations, human resource management, as well as in business and industry.

All together, there are 8 196 students and a staff of 777 in HAMK, which is the 5th largest university of applied science in Finland. More than half of the students and staff are located in Hämeenlinna. There are 29 bachelor-level and 8 master's-level degree programmes. There are 4 851 first-cycle degree students and 1 680 part time students, 373 second-cycle students and 1 025 students in vocational teacher education. In 2010, 924 Bachelor's degrees, 80 Master's degrees, 135 Professional specialisation studies and 375 Vocational teacher education degrees were completed.

HAMK has a strong influence on the County of Häme, socially as well as in economically. HAMK was named the Centre of Excellence in Regional Development in 2001 and 2003 and the Centre of Excellence in Education in 2002 from the Ministry of Education. The Finnish Higher Education Evaluation Council (FINHEEC) conducted an audit of HAMK's quality assurance system in 2011 and HAMK's review was the best a Finnish higher education institution had ever received from FINHEEC. The results are valid for six years. Further, HAMK has been awarded a Diploma Supplement Label for 2010-2013 by the European Commission. The Commission (DG Education and Culture), awards the label to higher education institutions that demonstrate excellence in applying the Diploma Supplement. The Diploma Supplement Label is an honorary distinction.

Development strategies

HAMK's activities are outlined in the Government Development Plan for Education and Research and in an agreement on performance with the Ministry

of Education and Culture. HAKKY's operating and financial plan also plays an important role for HAMK and its strategies.

In the HAMK Strategy 2015, the vision is that HAMK will be profiled as an international higher education institution and promoter of entrepreneurship, which will help raise the population's competence level. It wants to cooperate with the regional labour market, have wide networks and be able to quickly respond to the integration and development of education, employment and R&D. There are four central aspects in the strategy.

- Competence development (improving the competitiveness of the education, teaching, research and service process, promoting lifelong learning)
- Profiling (reinforcing strengths, setting apart from other operators)
- Development of operations (developing new strategic solutions)
- Regional cooperation (strategic partnerships and expanding fund base)

The HAMK Education strategy 2010-2015, completed at the end of 2009, sets objectives and clarifies the development of education at HAMK by 2015. It focuses on the needs and expectations of the business community, a structurally flexible education and teaching process that promotes lifelong learning, the integration of teaching and R&D, the internationality of education, and on taking entrepreneurship to a new level. HAMK has also produced two regional strategies: Regional Strategy 2002 and the Common HEI Regional strategy of Häme and South Pirkanmaa 2006-2009. HAMK's strategy and the regional strategies of Häme complement each other. HAMK can incorporate the development goals of the region in to its activities. Along with the renewal of HAMK's strategies, the International Strategy 2007 has been revised and is now the HAMK's Development Plan for Internationalisation 2015. Further, the R&D Strategy that was finalised in 2010 specifies HAMK's policies for research, development and innovation (RDI).

HAMK is involved in FUAS (Federation of Universities of Applied Sciences) together with Laurea and Lahti Universities of Applied Sciences. The FUAS universities work closely together to find the competences that are needed for business and commerce, either within their own ranks or in their extensive networks, and to turn such efforts into projects and/or competence development services. FUAS has a common summer university, virtual campus and different groups of co-operation that are building common quality evaluations. The aim is to build up a

Finnish coalition of the largest universities of applied science.

International partners are key in developing top research facilities. According to Mr. Hakala, the research manager of HAMK, financing is quite heavily based on EU funding, but after 2013, this type of money will become rarer, so the great and longstanding aim is on international financing. However, making international connections alone can be difficult, so all geographical levels must be included. TEKES requires networking for all of its project applicants in order to get financing. According to vice-rector Puusaari, universities of applied science have always co-operated well together, but sometimes there have been problems to cooperate with universities. There is a need to have an equal partnership with universities; otherwise it's difficult to collaborate on common projects.

International profile

The *Development Plan for Internationalisation 2015* presents how HAMK may support the internationalization of the region. The basis for the development plan is HAMK's vision to become a highly respected international higher education institution by the year 2015. It takes four different views into account: the student, the world of work, society and the organization's own development and benefit viewpoint.

At HAMK, there are 6 bachelor-level and 1 master-level degree programmes being taught in English. There are currently 490 international degree students at HAMK. Most of the HAMK units have courses delivered in English and are meant for exchange students as well as HAMK's own students. Some activities to promote internationalisation are student and staff mobility, teaching in a foreign language, internationalisation at home and international education, research and development projects.

HAMK has about 100 fellowship universities in Europe. In Asia, North and South America, Russia and Africa there are about 20 fellowship universities. There are opportunities to study for a double degree with partner institutions in Germany, France, the United Kingdom, Denmark, The Netherlands and China. In 2010, there were 156 incoming and 194 outgoing exchange students and trainees and 169 outgoing and 91 incoming teacher and other staff exchanges. In terms of collaboration with national and international education institutions, HAMK has a well developed network for collaboration, often with a focus on internationalisation. HAMK is part of five different national networks involved in HEI internationalisation activities: Federation of Universities of Applied Sciences FUAS, Pinnet, Helsinki Education and Research Area (HERA), West Finland HEInet, West-Finland FIRST network and Finnish University

Network for Asian Studies.

Pinnet is a network project that aims to promote and strengthen internationalisation at Finnish Universities of Applied Sciences. The project strives to develop different international activities: student and trainee mobility, teacher and expert mobility, international communications and marketing, international competence among personnel, international venture activities and the recruitment of foreign degree students.

Helsinki Education and Research Area (HERA) is a consortium of higher education institutions, consisting of seven universities and eight universities of applied sciences in the Helsinki Metropolitan Area. HERA's mission is to develop the Helsinki region as an attractive place to live, learn, work and do business.

West Finland HEInet connects the regions of Tampere-Pirkanmaa-Satakunta-Seinäjoki-Häme. There are both universities and universities of applied science involved, sharing the same interests, stakeholders and customers concerning internationalisation. Challenges are also shared and comparing procedures for new ideas is one of the network's key assets. The goals of the network are to increase profitability and cost-efficiency, receive peer support and to serve customers better.

The West-Finland FIRST network is a geographically focused (western Finland), multi-disciplinary network of 7 Finnish and 20 Russian partner institutions covering nine different subject areas. The West Finland FIRST network has been successfully operated for 6 years. The main objective of the network is to further strengthen academic collaboration in various forms between Finnish and Russian partner universities and to promote student and teacher mobility. A joint intensive course is organised in the framework of FIRST cooperation.

At an international level, the aim of the Finnish University Network for Asian Studies is to promote education, research and personnel exchange on and to Asia among the member universities. The network is coordinated at the University of Turku, Centre for East Asian Studies (CEAS). There are seven Finnish member universities in this network.

Support structure

HAMK is involved in several different activities to support the region with the development of relevant education and competence development, ranging from vocational training to joint research. There is also incubator cooperation, which provides help for students to promote their ideas, products and education for entrepreneurship.

HAMK's Research and development (R&D) activities cover applied research, development, the design

of new products, services, production processes or methods, world of work, organizational empowerment and improvement of individual capabilities, the facilitation of technological and social innovation, focus on product and process innovations, human interaction in the context of organizations, work and provision of social services, implementation through projects and theses, operational integration with HAMK's degree programmes and other education. There is an aim to combine education and research into a genuine, work-based learning environment. Expert services and external assignments are provided to contribute to the product development of clients.

The Häme Vocational Institute (HAMI) offers education in natural resources and the environment, food production and tourism. The main forms of education are professional training for full-time and part-time studies leading to a vocational qualification, as well as professional and further education. The institute works in close cooperation with HAMK, operating on the same premises and sharing resources. Häme Open Campus (HOC) is a regional network formed by educational, research and development units and institutions. It was officially established 2009 and is based on the Regional Strategy for Education and Research up to 2013 by the Ministry of Education. The strategy emphasizes the importance of regional cooperation between providers of education and research and local business, industry and other stakeholders, to promote competitive regional innovation environment and international networking. HOC brings higher education and research institutions

and citizens in the region together in a novel way and provides new ideas and tools for development. The aim is to strengthen cooperation between actors, improve regional know-how and education supply and promote innovations. The network is an internet based platform that enables the distribution and development of ideas. It is a working environment, virtual meeting place and innovation platform. HOC has three lines in its development work: education and research, innovations and companies and civic activity. This is implemented in line with related common projects and R&D projects. The goal is to create a permanent cooperation model and in quantitative perspective it aims to improve educational level of the region and to create more inputs on R&D in the region.

HAMK wants to promote lifelong learning by offering Open University studies and continuing professional education which includes specialisation studies, commissioned training courses and programmes and training for entrepreneurs. Of all HAMK students, 26 per cent are studying while working; so having flexible education possibilities is very important. Educational solutions are based on blended learning, which includes eLearning. The eLearning Centre is a research and development unit of virtual and digital learning which focuses on web-based teaching, studying and learning. In addition to new learning environments, methods of e-learning, teaching and working are developed in accordance with the requirements of different target groups.

Collaboration with the surrounding society

According to the Finnish law for Universities of Applied Science, they should collaborate with national and international HEIs and other educational institutions, as well as with the labour market and surrounding society, especially from regional perspective.

Cooperation brings possibilities for more projects, more financing, more learning and sharing, more idea exchange. In the education strategy 2010-2015, it is stated that network activities need to be about common learning and co-working, and not just with business life, but also with all of the societal institutions. The R&D activities are concentrated on customer- and solution-centric R&D; demand- and user-driven interactive innovation; the front end of innovation; foresight and new business development; and the tight integration of education, R&D and innovation (ERI). In the HAMK Strategy 2015, it is stated that important strategic partners include FUAS collation, international HEI partnerships, strategic business partnerships,

Häme Open Campus, national and regional clusters and member municipalities and industrial businesses. Nowadays, there are over 70 ongoing projects at HAMK.

A division of labour in the innovation network in the region is evident, whereby HAMK is educating professionals, and doing applied research and development projects with companies and associations. Regional development companies, incubators and technology centres are supporting companies. Between academic institutions and companies, there are start-up incubator activities. The aim of the HAMK is to build a new type of innovation network, which covers its whole operating region. There are many new regional R&D centres formed, such as InnoForss (in Forssa) and AutoMaint (in Valkeakoski). Business services provided by HAMK are an important part of the regional development work. The commercialisation of ideas generated at HAMK continued in the AMK-

TULI (“Research into Business”) programme funded by The Finnish Funding Agency for Technology and Innovation (TEKES). Several promising business ideas have been refined and companies have been formed as a result.

HEI networking is very important, as for example, some funding from European Structural Funds requires large regions such as Southern Finland to be well networked. The most important HEI partners of HAMK are located in Helsinki-Hämeenlinna-Tampere region. Laurea University of Applied Sciences, Tampere Technical University, University of Tampere and the research centres MTT Agrifood Research Finland and VTT Technical Research Centre of Finland are the most important partners. Tampere Technical University has common programmes with HAMK at Valkeakoski. HAMK has a strong co-operative programme with University of Tampere in terms of a professional education centre, which is located in Hämeenlinna at HAMK. HAMK’s research activities are also concentrated in Tampere’s direction, including collaboration with the Tampere Technical University. Further, eLearning connections are strong. Other important collaborating partners for HAMK are Aalto University, University of Helsinki and Universities of Applied Sciences in Lahti, Tampere, Seinäjoki and Satakunta. HAMK frequently undertakes TEKES projects with other technical universities or with traditional universities such as University of Tampere and University of Helsinki. Strong and experienced national partners (MTT and Aalto University) also help smaller HEIs like HAMK in internationalisation.

The Häme Region Centre of Expertise is a part of the national Centre of Expertise Programme (OSKE). In line with the specific strengths of the Hämeenlinna region, the Centre of Expertise is focusing on the development of vocational competencies, learning and e-learning. The programme recruits regional partners in vocational competence to collaborate with the University of Tampere, HAMK and local companies. During the current programme period, the Häme Region Centre of Expertise develops new competencies through three national competence clusters: Living Business; Digibusiness; and Intelligent Machines cluster programmes. The technology centre Innopark has coordinated the implementation of the Centre of Expertise Programme in the Häme region since 2003.

In HAMK’s strategy, one of the aims is to integrate R&D into education. One of the ways to do this is by organising its functions in the form of education and research centres. These centres conduct most of HAMK’s R&D operations. The R&D centres are designed to vary depending on the location where they operate. Regional economic life, the public sector

and decision makers are closely connected. The R&D centres bring together researchers, teachers and students to work on shared research and product development projects, creating structures for continuous interaction with representatives of the labour market and fostering the growth of students into experts in their professions. Some of the R&D Centres of HAMK are Automaint, eLearningCentre, InnoForss, Innosteel and Sheet Metal Centre.

InnoSteel and Sheet Metal Centre

One example of an Education and research centre is InnoSteel. It is based on collaboration with a metal industry cluster; where metal companies bring their R&D needs, HAMK brings their expertise and the Innopark (<http://www.innopark.fi>) provides space and services. The vision of InnoSteel is to become Finland’s leading centre at international level in product development, training for metal construction and the development of professional competence and product development in sheet metal products and steel construction.

The Sheet Metal Centre (SMC) is part of InnoSteel and is located in the Technology Centre Innopark. The location offers less expensive office spaces and less traffic compared to the capital region. Founded in 1998, SMC is the oldest research unit at HAMK University of Applied Sciences. It has 10 full-time R&D employees and a varying number of trainees. The centre is focused on forming and joining sheet metal, developing materials and coatings, weathering tests, as well as structural analyses and loading tests. A significant part of SMC activities consist of R&D projects, which are either public projects together with companies, or confidential customer-specific research projects. The aim is to improve the competitiveness of Finnish sheet metal products and manufacturing. SMC is collaborating with industry and other research institutes, but is also actively involved in the teaching offered by HAMK. The centre specifically aims to contribute to HAMK’s post-graduate education, but also to act as a link between the industry and HAMK’s degree programmes, and between companies and students through, for example, industry-based project assignments.

Several different types of collaboration have been developed between companies and HAMK. HAMK collaborates directly in projects with small and medium sized companies, mainly in the Häme region. Such collaborations help create networks for HAMK’s international partners. Besides, there are innovation activities for firms, which are based on problem based learning and many course projects are assigned by companies.

One example of business collaboration is

Rautaruukki, an international Finnish based metal company. The company has been running the production and development centre, Sheet Metal Centre, in collaboration with HAMK since 1998. According to

Mr. Ranta-Eskola, the CEO of Rautaruukki, the effects have been positive and company revenue has increased 20 per cent per cent since the centre was established.

The role of HAMK in regional development

The main goal stated in HAMK's regional strategy is for HAMK to be well connected to the innovation networks and to produce skilled workers, innovations and new R&D activities for regional needs. Since HAMK is the only HEI in the County of Häme, they have an important role in building regional competitiveness. HAMK's positive impact on the region can be seen in the number of students who graduate and start their own enterprises; incubator activities; the active role companies take in the projects, ongoing professional exchanges between HAMK and companies and internationalisation.

HAMK is located at the HHT-axis, the axis made up of Helsinki, Hämeenlinna and Tampere. HAMK's location at the HHT axis is positive, as many companies, both national and international, are located in the area. This is good for the University of Applied Sciences and also for students, because trainee and thesis possibilities are good. However, locating between the Metropolitan Area of Helsinki, Tampere city region, City of Turku and City of Lahti is also a challenge. Hämeenlinna, Forssa and Valkeakoski campuses seem to attract fewer students than the bigger cities. According to vice-rector Puusaari, HAMK needs to work twice as much to compete with other HEIs in the HHT-axel area. Still, being a smaller city can attract students who do not want to live in the larger Tampere or Helsinki areas. HAMK can also offer a unique English degree programme (the only English Mechanical Engineering and Production Technology programme in Finland), which is appealing, especially for international students. About 80 per cent of all students come from a 100km radius from campus areas and are employed in the same areas, mainly the Helsinki-Tampere region and Western Finland. Graduated international students have more difficulties gaining employment in Finland.

Education at HAMK is strong and closely connected to regional needs. The number of students starting their own businesses after graduating is among the highest in Finland, about 2 to 3 times the national average. Encouraging entrepreneurship through education and research is one of the main focuses in educational development, and this is done through interactive learning, extensive networks to enterprises, alumni activities and student counseling, amongst other things. Further, extensive adult education is increasing

the level of education in the area. However, there is still work to be done in making entrepreneurship education part of every programme in HAMK, connecting education to R&D activities and expanding incubator cooperative to the whole operating region of HAMK.

HAMK is an important actor in strategy planning work in the region and has been involved in the county's strategy on the development of new areas of business. HAMK is trying to meet business needs and to develop ways to answer them by focusing work-life solutions on teaching and having more educational products based on demands from the workforce in different areas. HAMK is participating in strategy work with Häme County by making a regional employment strategy and regional foresight work.

Regional collaboration is very important from the stakeholders' perspective. The R&D centres have developed important platforms for HAMK and stakeholder collaboration. However, there is still work to be done, so these activities involve multiple actors in the area. The R&D activity in Häme is still at a low level compared to neighbouring regions. Increasing R&D activities in the area by connecting actors in new ways and boosting knowledge transfer is important and Häme Open Campus has opportunities to be this supporting linkage.

At a national level, there have been discussions on reducing the number of universities of applied science. HAMK has been active in increasing stakeholder knowledge about activities in the different campuses. Today, HAMK is a well-known and visible actor in the region and also a very well-known university of applied science in Finland. According to vice-rector Puusaari, external research financing at HAMK is second or third among Finnish universities of applied science. The fact that there are campuses in different locations of the region is important: they bring tax money, they help to build good image and they effect on companies' political decisions. Having separate units is helping municipalities to be evenly benefiting from positive effects of HAMK. Sometimes having separate campuses can be challenging, but the influence on regional development can be very positive especially for smaller campuses, which are nowadays more connected to Hämeenlinna's direction.

Acting and benefiting the local area and

collaborating with local firms, public actors and associations is essential for HAMK. But the national and international level and cooperation with other actors cannot be ignored. The Ministry of Education has asked HAMK to name all international co-operative actors that they deal with. To better serve the region, international experience is needed. The county has also addressed this concern, as Häme is one of the least international areas in Finland and companies usually concentrate on regional and national markets. The aim is to support companies to broaden their markets.

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Lappeenranta University of Technology (LUT)

Written by Veera Lehto and Henna Hintsala

The Lappeenranta region

Lappeenranta is situated in the County of South Karelia. This geographic location gives a special character to Lappeenranta's cross-boarder co-operation, 70 km borderline with Russia. The land area of the County of South Karelia is 5 613 km², representing about 2 per cent of Finland. There are 134 019 inhabitants in the county and close to 72 000 inhabitants in the central city, Lappeenranta (13th biggest city of Finland). The population density of the county is 24 persons/km², which is above the national average of 18 persons/km² (Lindqvist, 2010a).

According to general demographic and economic indicators, the County of Southern Karelia and all other counties in Eastern Finland have a GPN per capita well below the Finnish average. They have also experienced considerable population decline over the period 1995-2010 (-4.2 per cent). However, there are variations between municipalities. In Lappeenranta population change has been positive (3.1 per cent) during this period. The biggest factor in population decline is that natural change is negative and positive migration does not compensate for this.

In the region, the number of industrial jobs has declined, but growth has occurred particularly in the form of high skilled jobs. The main business fields are wood processing, information and communication technology, service industries, stone industry, metallurgy, engineering and tourism. In Lappeenranta, there are about 3 200 companies and 31 000 work

places. The biggest employers are South Karelia District of Social and Health Services (Eksote), the City of Lappeenranta, Lappeenranta University of Technology and UPM-Kymmene Oyj. There are two higher education institutions in the region: Saimaa University of Applied Sciences (2 800 students) and Lappeenranta University of Technology (5 000 students). Other education institutions are the Army Academy (branch of the Finnish Defence Forces) (200), South Karelia Vocational College (3 000) and South Karelia Adult Education Centre (250).

According to the strategy of Lappeenranta (2012), the municipality wants to become an international and energetic university city. By 2012, the municipality of Lappeenranta will focus on entrepreneurship, logistics, cross-border cooperation, Russian networks and tourism. According to the Finnish Law of Regional Development, the council acts as a regional development authority. The Regional Council of South Karelia has presented four main areas of focus for the region in the Regional Strategic Programme 2011-2014: renewal of economic structure, education and skilful workforce, networking municipalities and renewal of service structure, along with a sustainable living environment and high quality infrastructure. Lappeenranta University of Technology is one of the most important collaborating partners of South Karelia County in this development.

Presentation of LUT

The Lappeenranta University of Technology (LUT) was established in 1969. The main campus is located about 7 kilometres away from the Lappeenranta city centre. LUT conducts scientific research and provides academic education. The university combines two fields of science

that complement each other – technology and business studies. The University has three faculties, the faculty of technology, the faculty of technology Management and the Business School, and 17 departments. The main campus of the Saimaa University of Applied

Sciences is located on the same campus, Skinnarila, as Lappeenranta University of Technology. LUT has three university level regional units (Kouvola unit of LUT, LUT Lahti School of Innovation and LUT Savo) and seven separate research centres. Regional units in Lahti and Mikkeli are a part of university consortiums.

The history of the School of Business dates back to the year 1919, when the Society for Viipuri School of Economics was founded. The society, headed by businessmen, aimed to establish a Finnish-speaking higher education institution in economics in Viipuri (Vyborg), the most international centre of commerce in Finland at the time. After World War II, Viipuri was lost to the Soviet Union. The society, however, along with its affluent members, continued to accumulate assets. Gradually, focus shifted and the aim became to establish a school of business close to the eastern border and the final location was Lappeenranta.

Facts and figures

LUT is state run and state funded, like all other universities in Finland. In 2009, basic state funding for the university amounted to about €40m and supplementary funding to €26m. Supplementary funding is mostly offered by the Academy of Finland, the Finnish Funding Agency for Technology and Innovation (TEKES) and EU funding. About 77 per cent of external funding is research financing.

The university offers education in six Master's programmes in business and five in technology. In 2010, LUT had approximately 5 264 students at all degree levels and a staff of 875 persons. In 2010, there were 2 906 Bachelor degree students, 1 825 Master's degree students, 66 licentiate and 467 PhD students. Around 1 000 degrees are completed annually. In LUT, 75 per cent of all students study engineering and 25 per cent economics. The number of female students in engineering is 23 per cent and 50 per cent in business.

There are also students in further education course (about 1700 students) and in the Open University (about 1500 students). Saimaa University of Applied Sciences is located primarily on the same campus with 3 000 students and a staff of about 280 people. Overall, there are about 8 000 students studying in Skinnarila campus in Lappeenranta and the two HEIs have a common science library and infrastructure.

Development strategies

The main target of the Lappeenranta University's Strategy 2013 is to be "independently together". According to vice-rector Virolainen, LUT acts as an independent actor, but also has a high level of collaboration with other actors. LUT wants to see its' profile as an international science university, even

though it also has a regional and national role. Because of its location and strong concentration on the forestry industry, Lappeenranta has a strong international tradition. The mission of LUT is to "create the Future with Technology and Business". LUT specializes in industrial technology (especially forest and energy), information technology and economics. Being located near the eastern boundary of Finland, the university also offers comprehensive know-how related to Russia. These issues make up LUT's four strategic focus areas:

- Energy efficiency and the energy market
- Strategic management of business and technology
- Scientific computing and modelling of industrial processes
- Expertise in Russian business and industry related to the areas above

Faculty strategies and six reform programs help to specify Strategy 2013 and put it into practice. The six reform programs are High-quality research, Best education in Finland, Interaction with society, Internationalization, Human resources and management, and Distinction and appeal. According to vice-rector Virolainen, LUT has tried to think of the strategy in a new way so that it is less cluster based and rather more methodology based. The aim is to bring this thinking in education and also in the research.

LUT has been involved in international university accreditation and received feedback which has been relevant and helpful when improving education. Internal auditing is an important part of the quality management of Lappeenranta University of Technology. Internal audits are carried out systematically every two years. In university, there are over 30 educated internal auditors. Results of all internal audits are reported and the reports are published in the intranet of the university.

The Finnish Higher Education Evaluation Council (FINHEEC) audits the quality assurance systems of all the Finnish higher education institutions. The objective is to ensure that the higher education institution has a quality assurance system that supports the continuous development of activities, is in accordance with its objectives and is internationally reliable. LUT has been audited and in 2009 FINHEEC decided, based on the proposal of the audit group, that LUT meets the criteria set for quality assurance systems and the quality assurance of higher education institutions' basic mission. The audit is valid for six years. The Department of Industrial Management (TUTA) has been getting recognition three times at the national level: TUTA has been awarded the title of Centre of Excellence in Education from Ministry of Education. The performance of the Centre of Excellence units was assessed in the following areas: mission of the

unit, programme and course design, delivery of education, outputs and continual development. Further, international interaction, co-operation and networking were regarded as favourable factors.

Through international accreditations, LUT promotes the quality management and international comparability of the programmes as well as the mobility of the graduates. International accreditations are in accordance with the strategy of the university as they support internationalisation of the programmes and professionalisation of the programme management. Partners of LUT in accreditation of the degree programmes are the European Network for Accreditation of Engineering Education (ENAE), Akkreditierungsverfahren für Studiengänge der Ingenieur- und der Naturwissenschaften (ASIIN), the European Consortium for Mathematics in Industry (ECMI) and The Welding Society of Finland (WSF). There are accredited programmes in Chemical Engineering, Electrical Engineering, Industrial Management, Techno mathematics and Technical Physics.

International profile

LUT has a strong ambition to be a highly regarded internationally, attractive and professionally managed science university. According to Strategy 2013, this is done by supporting the internationalisation of students during their studies by creating individual incentives, developing services related to internationalisation, removing barriers to student exchange and by creating opportunities for intercultural interaction within the LUT university community. Moreover, the university will develop crediting studies completed abroad.

There are three Master's Programmes in Business, four in Technology and two in Technology Management, which are open for international students. In 2010, about 9 per cent of degree students were foreign. In the fall of 2011, 25 per cent of new starting students were foreign.

In aiming to be an international university, it is important for LUT to have effective, international co-operation and partnership network. LUT has collaborations all over the world, in the USA, Central-Europe, China and Japan; with a total of 171 exchange universities in 38 countries. In 2010, there were 183 incoming and 182 outgoing exchange students and trainees. The number of teachers and researchers on exchange was 69 incoming and 116 outgoing.

In accordance with the 2013 strategy, the focus is on Russian cooperation and knowledge. This is where the Lappeenranta University of Technology's approach is to build a bridge to the Russian Market. NORDI is coordinating LUT's activities concerning Russia. This

includes activities like coordinating an open network society Northern Dimension Institute (NDI) and playing an active role in the Finnish-Russian Innovation University (FRIU). LUT is operating in the electricity, metal and forestry clusters formed by Finnish and Northwest Russian actors. To support the Russian Agenda of the Finnish-Russian technology industry and its internationalization in the integrating European and Russian markets, degree programmes in the Faculty of Technology at LUT operate an extensive Russia Programme. LUT educates students in nine different Master's programmes, also specialising in the challenges of working in different environments and combining the cultural differences of two economic areas. These programmes offer most students double degrees from Russian partner universities and LUT. All of the programmes also include a large number of students of Russian origin.

The Finnish-Russian Innovation University is an alliance between Finnish and Russian universities (3 universities from Finland and 6 universities from St. Petersburg). The aim of the alliance is to create a link between the EU, Finland and Russia, to promote research in the fields of technology and business and to do educational cooperation including common English master's programmes.

The university is involved in various exchange networks, including ERASMUS, NOREK and NORDTEK and there are also bilateral agreements with international universities. There is also an international teacher and researcher exchange. The total number of all exchange students is about 360, which includes all incoming and outgoing students per year.

At an international level, the aim of the Finnish University Network for Asian Studies is to promote education, research and personal exchange on and to Asia among the member universities. The network is coordinated at the University of Turku, Centre for East Asian Studies (CEAS). There are seven Finnish member universities in this network.

LUT is also involved in several international collaborations, such as the European Research Community on Flow, Turbulence and Combustion (ERCOFTAC) and the European Consortium for Mathematics in Industry (ECMI).

Support structure

The aim of the Lappeenranta University of Technology has been to put together technique and business economic thinking in education and research. There are cross disciplinary research projects conducted at the university. According to vice-rector Virolainen, well-organised cross disciplinary research gives good value and image and helps receive financing. The research and

Development activities of LUT are focused on energy efficiency and energy markets, scientific computing and modeling of industrial processes, strategic-level business and technology management and Russian expertise in strategic areas of knowledge.

There are seven university related R&D institutions (research units) in the Lappeenranta University of Technology. The South Karelian Institute is a separate research unit of LUT, the Technology Business Research Centre (TBRC), the Northern Dimension Research Centre (NORDI) and The Centre of Computational Engineering and Integrated Design (CEID) are multi-disciplinary research units of LUT, while the Centre for Separation Technology (CST) and Carelian Drives and Motor Centre (CDMC) and FiberLaboratory are cooperative institutes of LUT departments.

Research and Innovation Services assist researchers at Lappeenranta University of Technology with research project agreements, financing and administration and provides access to all research-related expertise accumulated at LUT. Services' staff of four members also helps to determine the novelty, patentability, marketability and productization of inventions. Research and Innovation Services use finance from the TULI-programme, which is a national collaboration programme for innovative start-ups, financed by the Finnish Funding Agency for Technology and Innovation (Tekes). The TULI-programme runs until 2013 and the aim of the programme is to help higher education institutions and research facilities to evaluate the commercial potential of research based inventions or ideas and aid in the process of their commercialization. The programme aims to give birth to new research-based business with the aid of license

agreements, know-how transfers and new companies. The programme is developed in cooperation with the R&D and innovation services of universities and research institutes that have a mission to find and develop research-based inventions and business ideas. Lappeenranta University of Technology is part of the Southern Finland InnoTuli-consortia, including Aalto-university, Svenska handelshögskolan and Sibelius-Academy.

In 2010, there were 39 innovation announcements, 56 project proposals, 3 patent applications and 2 companies established at the Lappeenranta University of Technology. Overall, there have been over 20 spin off companies formed between 2001 and 2010. Some successful spin-offs of LUT are:

- AXCO-Motors, special electric motors and generators manufacturer
- MeVEA, simulator and simulation software manufacturer for the mining and port industries and educational institutions
- Asset Vision, consultant company providing design, analysis and training services, and develops asset management process software for electricity companies
- WAP ULEC The fruitful result of Finnish-Russian collaboration, offering a unique method of water purification using electrical discharge
- CWP Coloured Wood Products Ltd., specializing in the production of through-coloured wood products
- Severa, providing a web-based tool for handling customer management, sales tracking, project management, hourly records, travel and expense tracking, invoicing, reporting and projections

Collaboration with the surrounding society

The stated aim in LUT's strategy is maintaining independence while building extensive networks and collaborating closely with external stakeholders at all geographical levels. The university enjoys close co-operation with industry. Cooperation began with the forestry industry, but contacts have expanded over the years, to cover a range of different industries, including electricity and metals. Cooperation with regional and national companies is strong. LUT has a lot of joint research projects with companies; there are about 400 research projects in which companies are involved. Research projects are 40 per cent funded by companies. Also, most of the thesis work in LUT is done for firms (95 percent). Collaborating benefits both actors, catering to the needs of both students and businesses.

Companies have been established in close collaboration with LUT, including the international electrical energy company The Switch. LUT is well connected with local actors: Technopolis, Lappeenranta Innovations Ltd (organisation supporting LUT), patent agencies, Tekes, Areva and Venture cup. According to Mr. Ervelius, Innovation Manager of LUT, there are three different kinds of collaborations:

- Partnerships (e.g. Lappeenranta Innovations Ltd, Teknopolis, Lappeenranta municipality)
- Patent collaboration (e.g. Papula Nevinpat)
- Innovation target groups (Companies for whom innovations are trying to be sold or collaboration to be made e.g. The Switch company)

The Centre of Expertise Programme (OSKE) special government programme aimed at focusing regional resources and activities on development areas of key national importance. The programme offers networks and services for companies, universities, universities of applied sciences and research institutions. The operations model of the programme was reformed for the term 2007–2013 as a cluster-based model, the overriding objective being to increase regional specialisation and to strengthen cooperation between Centres of Expertise. The Centre of Expertise Programme involves 13 national Clusters of Expertise and 21 regional Centres of Expertise.

One of the Centres of Expertise is the Southeast Finland Centre of Expertise, which is a member of three national Competence Clusters: Forest Industry Future, Intelligent Machine and Maritime. The Southeast Finland Centre of Expertise provides business knowledge, technological know-how and a major point of contact for SMEs in the areas of packaging, composites, intelligent wood and forest chemistry, fibres, energy and life cycle (enabling technologies) and future innovative metal products. The Centre of Expertise is a gateway to Russia for companies and partners from related sectors of industry.

Lappeenranta Innovation Ltd is the coordinator of the Forest Industry Future Cluster Programme and Southeast Finland Centre of Expertise. In Southeast Finland, The Centre of Expertise Programme is run jointly with the Savonlinna Regional Federation of Municipalities and the Imatra Region Development Company. Lappeenranta Innovation Ltd, established in 2005, is a non-profit company owned by the Lappeenranta City Holding Company Ltd, Technopolis Plc and the Society for Viipuri School of Economics. The company aims to promote new businesses in converging areas and support SME's competitiveness in the region by raising their know-how, networking and internationalisation capabilities. Lappeenranta Innovation Ltd is an internationally recognized

institution in EU-Russia innovation cooperation. The company has been granted EC-BIC status and is a full member of the European Business & Innovation Centre Network (EBN) for the maximum period of three years in 2010. This enables them to benefit from national and international programmes and contacts including companies, public sector and training and research organizations. Lappeenranta Innovation Ltd organized two EU-Russia Innovation Forums in 2010 and 2011.

The Lappeenranta University of Technology has a lot of cooperation with other higher education institutes in Finland. Collaborating can help with raising the quality and the amount of the research. For example, technical research demands lots of investments in machinery, which makes it essential to co-operate and share facilities. Aalto-university and the Tampere University of Technology are important partners of LUT. The universities have applied for funding, mostly Tekes innovation grants, as a team and LUT also has a common doctoral student education programmes with these universities.

LUT has an aim to support life-long learning. This is being done by offering solutions for maintaining and developing university-level knowledge to meet the needs of working life. The Open University, continuing professional education and degree programs for mature students and undergraduate courses will cater to the demands of full-time employed students and organisations.

The Alumni Association aims to facilitate networking, help members to contact and stay in touch and provide information and career updates. Alumni contribute to LUT by giving lectures and sharing their expertise with students, sponsoring master's theses and offering trainee positions and participating in research cooperation. There is still work to be done in the functionality of Alumni network, and internal alumni network of Industrial Engineering and Management can be seen as more functional.

The role of LUT in regional development

In the Strategy 2013, it is stated how important it is that the Lappeenranta University of Technology is a high-level research and education institution with close interaction with society by making important contribution to industries and the public sector. In societal interactions, as stated in the strategy, the strategic development target is encouraging contributions to society by LUT's experts in research and education; developing the popularization and commercialization of science and focusing on regional activity. LUT tries to encourage

members of the university's scientific community to contribute their expertise to processes that enhance the attractiveness of the city of Lappeenranta and other locations of LUT units as a place to study, work and establish a business. LUT wants to actively develop the university consortia in Lahti and Mikkeli, as well as the university's own regional unit in Kouvola.

The Lappeenranta University of Technology has been important for the South Karelia region and also the whole South-eastern Finland since being established.

The key to the university's success is its integration of teaching and research in basic technologies with the development of skills in business management. This combination is more achievable in a relatively small institution, particularly one with strong links to industry in its regional environment. LUT has acted as a contributor towards the restructuring of older industries. Business activity has been formed around the university, especially in the field of electrical and energy engineering. Big companies like UPM-Kymmene have established their own research units in the region. Even though there are many municipalities losing population, Lappeenranta's population is increasing. Lappeenranta can be seen benefitting the most in South Karelia.

The Lappeenranta University of Technology is a very important regional actor. LUT has firm and functional connections with companies and the City of Lappeenranta. The City of Lappeenranta and the County of South Karelia see the importance of LUT for the future development in international connections and building Russia connections. The city has been very active in supporting the development of the LUT. The County of South Karelia is financing LUT with EU funding and collaborating in competence centres.

From an educational point of view, the geographical focus of the Lappeenranta University of Technology varies in different situations. Focus is mostly national when talking about Master's Programmes and regional with Bachelor degree programmes. Research is mostly national and international orientated. An international perspective is important, in demonstrating that the university is not only educating workers for local companies. The region cannot offer enough working opportunities; besides South Karelia region, many graduates are employed in Uusimaa County and elsewhere in Southern Finland. On a national scale, the employment level of graduated students is one of the highest in Finland.

About 20 per cent of graduates from the Industrial Engineering programme are staying in the local area. Structural changes in the forestry industry have resulted in fewer jobs, but in electrical and energy engineering, many graduates have started their own enterprises. The transfer of knowledge through teaching and learning via graduates entering established enterprises, as well as through fostering entrepreneurial skills amongst students, has an important role in establishing new companies.

LUT attracts students from the whole country, but mainly from Eastern and Southern Finland. In Eastern Finland, the university is the only university of technology and also a strong university in business administration. Southeastern Finland, bounded by Lahti in the west, and Varkaus and Savonlinna in the north, forms the main region of the university. At the local

level the university has come under pressure to serve all the needs of society, not just industry. To meet the need of the regional community, LUT has established a number of institutions, including the South Karelian Institute (2002) and the Northern Dimension Research Centre (2003).

International and regional levels are closely connected and networking with both directions is essential. Because of its location close to the boarder, the role of Lappeenranta University of Technology is to be the Russian specialist towards the Helsinki metropolitan area as well as towards European Union. LUT collaborates in these matters with the City of Lappeenranta and with other local actors. LUT fosters new experts on Russian markets. For example, there is a common master's programme with Russian universities, so there is economic life involved on the Russian side as well. Students can get internships and contracts for writing thesis work.

Universities are facing structural changes, and the number of universities may be reduced in the future. To allow universities to increase organisational flexibility and reduce state control, there is a need to specialise in certain areas of expertise and to be well-performed and managed. In addition to collaborating, competition is essential. Today, there is hard competition for students and research funding (TEKES and Finnish Academy) and smaller universities in particular have to be at good level in order to be successful. According to vice-rector Virolainen, LUT is focused on specialization and is well profiled, as combining Industrial Management and Technology has been beneficial for the region.

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