Collaboration Between University, Industry and Society in a Borderless Context - Experiences from the Eastern Norrbotten Research Station

Håkan Ylinenpää
Professor in Entrepreneurship
Luleå University of Technology
Sweden

Margareta Strömbäck
Director of Education
Högskoleförbundet Östra
Norrbotten, Sweden

Prologue

This paper discusses the collaborative experiences between a university and the surrounding society in a regional context – four municipalities in eastern Norrbotten. The Eastern Norrbotten Research Station (FÖN) was established in January 2002 as a collaborative project between Luleå University of Technology (LTU) and The Swedish University of Agricultural Sciences (SLU) in Umeå. With the newly established research school as a starting point, the idea was to satisfy the need for knowledge as defined by the two universities as well as companies, organisations and governments in the area of interest. Another fundamental thought of the research station has been that the development of knowledge in the research school should occur in close collaboration with representatives of the region. The article considers the research station's experiences from the first three years with a focus on the collaborative aspect of the Eastern Norrbotten Research Station project, and is organised as follows. A short description of the origins and present situation of the research station are presented, followed by the station's experiences of working with collaboration between the university and society, while focusing on the task of collaboration from the participating Ph.D. students' perspective. A number of conclusions and possible lessons of interest to other regions with similar ambitions to develop a locally coupled knowledge production are also summarised. The concluding section attempts to set the Eastern Norrbotten Research Station in a broader research context relating to the development project as well as the political research based discussion about knowledge education and its conditions.

Eastern Norrbotten Research Station

At the end of the last century, political leaders from four municipalities in eastern Norrbotten decided to collaborate within higher education and research by establishing a common municipal association. Comprising the municipalities of Haparanda, Kalix, Överkalix and Övertorneå, the municipal association was officially named the Eastern Norrbotten Association for Higher Education and became formally operational around 1998/1999. Activities for the Association are lead by an education director, who also coordinates the activities of the research station and research school together with a research leader from Luleå University of Technology. Furthermore, the respective municipalities have well functioning learning centres lead by specially chosen local education leaders.

The municipal association was established because municipal leaders realised that their municipalities were individually too small to make themselves fully heard through contacts with universities and colleges. By joining together, a larger population base to operate from is attained, meaning that it becomes significantly more interesting for the university as a collaborator for higher education and research. The particular association was also a way for political leaders to emphasise the importance of making higher education and research available to more remote regions. By establishing a higher education and research that considers the needs of the municipalities as a starting point and builds on a closer collaboration between research / research and development, industry and the public sector in the region, the Eastern Norrbotten Research Station is seen as an important tool to strengthening the long-term competitiveness of the region.

After the education director received the assignment to develop a proposal that would later become the Eastern Norrbotten Research Station project, Luleå University of Technology and The Swedish University of Agricultural Sciences were contacted and concrete collaboration began. With the region's own formulated need for knowledge, the aim was to develop new ways to transfer research and knowledge from universities and colleges collaborating with industry and the public sector in eastern Norrbotten, thereby improving the contributing of academic competence to companies and inhabitants of the region. With leadership and coordination from the management of the municipal associations and Luleå University of Technology, groups of politicians, education leaders, industry and business leaders became active in their respective municipalities. A number of research areas requiring contributions were identified. Eventually, the following four principal areas were identified: Food, Tourism, IT/electronics and Wood. With support from EU-funds Goal 6, the pre-work was conducted during 2000 and the Eastern Norrbotten Research Station was inaugurated January 2002.[1]

Area	Aim	Univ.	Start
Tourism	Collaboration between tourism companies in a network economy	LTU	Jan 2002
	Quality development of tourism	LTU	Jan 2002
Tourism + IT	Internet and e-commerce within the tourism industry	LTU	Feb 2002
Wood products	Industrial design in wood manufacturing companies	LTU	May 2002
Food	Developing the cultivation of perch in a closed system	SLU	Oct 2002
	Domestication of Vaccinium species, substance content	SLU	Nov 2003

Table 1: Ph.D. projects within the Eastern Norrbotten Research Station

Today, six Ph.D. candidates tied to the research departments at either Luleå University of Technology or The Swedish University of Agricultural Sciences, are active in the research station:

Except for the six Ph.D. students included in the FÖN and its research school, a seventh research candidate is also associated with the project. Part of the thesis work conducted by this research student, who is connected to LTU's Department of Political Science, History and Geography, is to follow the development of the FÖN project and use it as an empirical base in the student's upcoming doctoral thesis.

The work situation for the FÖN Ph.D. students is similar to "normal research students" with three important exceptions:

1. The candidate's research project has been defined and developed in close collaboration with "orderers" in the region of interest,

2. Research education courses being offered within our own research school have, in a meaningful way, occurred in close collaboration with the region, as well as

3. The candidate's so-called "institution responsibility", which for regular Ph.D. students usually includes campus-based teaching at the undergraduate level, now instead comprises work in or for the region of Eastern Norrbotten.

As of today, five candidates have passed the licentiate level (including the associated Ph.D. candidate), and three are getting close to the doctor degree. The first candidate will defend her doctoral dissertation in December 2006, while one research student is in his final stages of working on his licentiate thesis.

Some Experiences Focusing on the Collaboration Aspect

As stated above, the research students within FÖN have a particular form of "institution responsibility", meaning that they are expected to work in or for the good of the region. The idea was that the students with the exception of their research projects – defined in close collaboration with the representative from the region in question – would in their various activities also function as collaborators in different types of projects: teaching at upper secondary school, taking part in different types of investigations and development projects, participating in meetings and seminars of the region,

etc. From the beginning, a great level of freedom was already noticed concerning what "institution responsibility" de facto would include; the idea here (e.g. regarding the research project) was that the needs of the region would guide the aim of the work being contributed. Nevertheless, the openness created irresolution amongst the candidates and their supervisors and in the region. Against this background, the research station developed a working model after its first year with an obligatory part ("must aspect") and a more open part that could be adapted to the needs of the regions as well as those of the candidate's own requirements and areas of interest ("can aspect"). Translated into hours, 20% of the collaborative part corresponds to about 300 annual work hours, which together with the "home" institution responsibility at their own research department of about 30 hours per year, were divided as follows:

"Must aspect"

Knowledge and result dissemination connected to their project: 70 hours
Other information meetings, seminars, meeting places, etc. : 70 hours

"Can aspect"

Participation in development projects / groups &
Individual assignments (e.g. investigations) &
Teach upper secondary school or regionally located university courses : 130 hours

During a halfway follow up, i.e. after approximately 2.5 years of operation at the research school, stock was taken of how the candidates' work responsibilities within this part of the operation were divided. The result for the six students is summarised below, divided by activity within the frame of their research project, the activity within the research school's research education activities and other activities (see Table 2).

Table 2: Collaboration activities of FÖN's Ph.D. candidates

Research project

Pilot study of the region's tourism companies
Meetings with "advisory board" / reference group
Video seminar + composition of foreign report
Dialogue with individual companies
Pilot study of design needs in a wood company
Project presentations outside the region

Research Education

Research education courses in and with the region
Assignment work in research education made available to the region
Open seminars in connection to (in time) doctoral courses
Study trip with regional actors

Other

Participation in network and concrete development projects
Teaching upper secondary school
Teaching within the new tourism education (LTU)
"FÖN on tour"
Seminars and workshops
Mapping municipal design education
Individual contacts (companies, private individuals)
Media contacts

It is evident from the compilation in Table 2 that the Ph.D. students have shared their collaboration activities between their own research project, the region's research school research education, and operational activities connected to other contexts (upper secondary information, general seminars, participation in concrete development or investigation projects, etc.). For the first-mentioned group of activities, it is noticed that several candidates began their project with a pilot study of the circumstances within the regional companies' respective areas, i.e. tourism and design. In several cases, formal company reference groups more or less joined up with the candidates, one person or a group, with the goal to function as a sounding board and advisor throughout the research process. A few students have research studies consisting of "going out into the world" and collecting new knowledge of the region and its economy. Activities in research education have greatly emanated from doctoral courses developed and conducted under the direction of the research school. In two courses (about the regions' culture and history as well as the regions and regional development) the connection to the Eastern Norrbotten region has been particularly strong, both with a content focus and doctoral seminars held in the region. Here, FÖN tested a model mixing research students (who have received credits in doctoral courses) with "regular university students" (who have received credits in university courses). In conjunction with these regional seminars, public seminars were also arranged, all in all involving many different types of meeting places and occasions for interaction between the research school's students and the region's representatives. Finally, a third group consisted of a variety of different activities such as teaching at upper secondary and university levels, different types of seminars or workshops, individual assignments for the region, participation in concrete development projects in the region, contacts with the media, etc. Also included, for example, was a weeklong tour in the region

("FÖN on Tour") sprinkled with activities such as meeting with companies and the general public, and visiting community upper secondary schools – an activity largely planned and conducted by the research candidates themselves.

The division of time between each candidate varies, and has not in any case implied the maximum limit of 300 hours per year being exceeded. Rather, during the research station's first year of operation, it has been more about the research station and the region searching and developing useful and appropriate forms of collaboration. That this learning process has not always been uncomplicated is shown, for example, by the following quotes from some of the students:

- "There is a degree of difficulty about the locals not knowing what we do and what we can arrange. It creates disappointment when we cannot take part of all the proposals."

- "People telephone and ask about things that are not part of my work. Or they don't know what they want."

- "I think it's because in general people don't know what research means and what I can do and help them with."

- "Our 20% has been really instructive the entire way and of course has provided that extra to my research project, but this has also cost a lot energy and time that sometimes felt a little wasted – a little too much fiddling and searching to test different approaches and a little unclear of what people really want to get out of our work."

The fact that the Ph.D. candidates were not experts in the conventional sense at the beginning of their research education, but actually participated in a research education programme, explains why they have felt insufficient in the contacts with industry, government and private individuals from the region. Combined with the fact that the region itself lacks experience from research and research education and has therefore had difficulty in knowing what research candidates can really deliver, we can thus see the first year of operation in FÖN as something of a mutual learning process where knowledge, instinct and expectations are successively conveyed to a better conformity. The research school students have in certain cases also tried to satisfy the need for knowledge by acting as links to other competences at their own universities. This "broker function" has developed from the students themselves and has not been deliberately supported through, for example, education contributions to effectively broker the need for knowledge with the right competence at the university.

A further important aspect in this context is how the Ph.D. candidates are distributed among different knowledge areas. Table 1 thus indicates the FÖN Ph.D. candidates to represent in principle three different areas: tourism, food as well as design and wood production. The choice of theme area originates, as previously stated, in the need as formulated by representative of the region itself, but the division of the candidates was finally steered by the number of interested and qualified applicants to the three different theme areas. For the Eastern Norrbotten Research Station, this meant that three Ph.D. students have worked with the tourism industry (one with also a connection to IT), two with knowledge development within the food sector, while a single student has worked with the wood branch (in this case with a focus on design in smaller wood manufacturing companies). This division has meant different conditions in running a practical operation with the region. Likewise, it has been, for example, clearly easier to collaborate project work, organise an "advisory board" / reference group with industry representatives in the region, or arrange various types of seminars or meeting places in the region within the tourism industry with their three students compared to within the wood manufacturing side (which has only had access to one research candidate). Having other Ph.D. students within the same area is a given advantage for their individual research projects, when planning and conducting research education contributions, and when concerned with cooperation to external partners.

From the above, four important experiences of the FÖN project with a focus on a developed collaboration in region connected knowledge production can be formulated as follows:

1. Establishing a research and research education environment in a region previously lacking experience with this type of operation means a mutual learning process where knowledge, insights and expectations are successively calibrated to a better agreement.

2. When an operation of the FÖN type is established in a region their representatives (here foremost the research school's students), are considered both as sources of knowledge and as agents to the "knowledge company" (university) they represent. It is important to also reasonably prepare the "agents" for this broker function, e.g. through easier education contributions as well as the students being electronically connected to the university's units for external contacts.

3. To say that the Ph.D. candidates in a regionally connected research school should not "be consumed by campus teaching", but instead operate "in and for the

region" is simple, but to fill the time with meaningful assignments at the right level is much more difficult. In the FÖN's case, the time-based model for collaborative information was developed after approximately one year experience and learning. Of course it is obviously an advantage if such a model is in place already from the start.

4. One should aim for a "critical mass" of research students (at least three) within the same or similar areas, since this, amongst others, facilitates collaboration with external partners.

Discussion - The FÖN Example in a Wider Context

The Eastern Norrbotten Research Station (FÖN) can be seen as an empirical example in the search for new forms of collaboration between higher education / research and the surrounding society. This search implies many different choices and involves a continuous learning regarding both possibilities and problems with choosing a new and unconventional approach for academic education and knowledge development. The choice is, furthermore, often not uncontroversial whether in the political debate or the discussion within academia. We will attempt to discuss this in the final section

Collaboration with universities or colleges, industry and society is considered to be a prerequisite to develop a competitive industry- and working life in an evermore knowledge-based economy. In Sweden, this understanding has been strongly accentuated through the work with regional growth programs, as well as at a central level manifested through a governmental department (VINNOVA), which has this idea in its fundamental business concept. A joint publication for NUTEK, ITPS and VINNOVA, entitled "A little book about growth" (Hallin et al. 2002) emphasizes how large city regions and more peripheral regions can and should develop regional competitiveness. This can be done through regional specialisation, and where competence development (e.g. education at higher educational institutions) and knowledge development (research and R&D) that support this type of "critical mass" development is emphasized in the publication.

That an evermore knowledge-based economy demands in part new contributions and strategies to develop enterprise-based regional and national competitiveness should today be agreed upon by most people. A key concept in this context – coined by Michael Porter (1998), though in existing different variations since Marshall's study of industrial districts since the 1930s – is the cluster concept: how a gathering (or critical mass) of companies in the same or related branches, supported by collaborative partners within knowledge production and society, develop unique competitive advantages through collaboration and internal competitiveness. Together with a political ambition to create conditions for growth in the whole (or at least various parts of) the country, two political strategies were developed during the 1990s: (1) work with regional growth agreements, which in partnership assumed to develop regional growth niches or specializations, (2) establishment of a series of regional institutions for higher education outside of the established university centres.

The view of the importance of "critical mass" has however uncovered once again an almost classic debate within the academic world: to what extent can and should higher education and, in particular, academic research be decentralised. Sverker Sörlin and Gunnar Törnqvist thus claimed in their book "Knowledge for Prosperity; Universities and transformation of Sweden" (originally entitled in Swedish, "Kunskap för välstånd; Universiteten och omvandlingen av Sverige", 2000) that research and education "are dependent on excellence as well as size" (p. 257) and give the greatest industrial effects when development occurs in cities with more than one million inhabitants. As a consequence of this, it can be stated that "only two city regions in Sweden and the immediate surroundings come up to this level: the region of Stockholm and the future region of Öresund with close collaboration between Copenhagen, Malmö and Lund" (ibid p. 259). Nevertheless, this understanding has hardly received acceptance in national and regional development politics: several new institutions for higher education have been established during the 1990s, while some have received university status relatively quickly, i.e. the right to run their own research and research education. Regional initiatives in the form of community federations for higher education and projects like The Bergslagen Research Station (von Otter 2001) and The Eastern Norrbotten Research Station have taken further steps towards a more decentralised education and research structure. A fundamental question still remains, namely if the continuing development of research and higher education can be combined with institutions for research and higher education through the scattered localisation that makes it accessible for more people.

The localisation of higher education and research also overlaps another current issue: Whether higher education and research through the scattered localisation that makes it accessible for more people (individuals, companies as well as governments and organisations) is also capable, in the best way, of hampering that which is considered to be the universities' main purpose: re-

search and education of the workforce / competence of the highest possible quality. In an increasingly knowledge-based economy where competitiveness in industry is increasingly deciding which knowledge advantage a company succeeds in incorporating into its products and services, competences represented by universities, institutions for higher education and research institutes have generally come to be considered more important, possibly very clearly manifested in a number of government investigations (e.g. SOU 1989:50 or SOU 1996:70). According to a recently presented study (Lööf 2005), collaboration also works very well between specific larger Swedish companies and institutions for higher education / universities: here, for example, 80% of companies use collaboration with universities / institutions for higher education in their innovation work. The frequency of collaboration diminishes with reduced company size: amongst companies with 10-199 employees with regular innovation operations, 6 of 10 lack collaboration with the academic research (ibid), while amongst the smallest companies – especially those without regular innovation operations – this share is considerably larger. The fact that geographical proximity has significance for the development of different interaction patterns is fairly well documented. Geographical proximity and access to research resources are important, particularly within applied research (Mansfield and Lee 1996), where a distance of 150 km is perceived as somewhat of a pain threshold for a company with its own R&D to find it attractive to develop collaboration with academic researchers.

Within the academic world, however, the opinion is sometimes expressed that scattered localisation of higher education and research as well as too user-focused and applied research risks jeopardizing the scientific quality within academia and the competitiveness within the scientific community. Sörlin and Törnqvist (2000, p. 120) provide the following formulation:

"How should you deal with the conflicts of objectives that – at least in the short term – exist between criteria for success within academia and specialization within the disciplines, and problem-solving and synthesis formulation, which often occurs easier in multidisciplinary and applied research environments?"

The example of The Association for Higher Education and the Eastern Norrbotten Research Station is composed in this context of only an empirical example of activities that have attempted to find their own suitable solutions as needed to meet the above challenges:

- The need for higher education closer to one's domicile has to a significant degree been satisfied through decentralized education programmes and distance spanning techniques, and through a close collaboration between university and local study /education leaders. This has resulted in the needs of local education being satisfied along with the university expanding its recruiting base in a state of decreasing yearly batches of new students. A more decentralised higher education has consequently been beneficial for the affected regions as well as those universities that deliver different types of education.

- The needs for new knowledge in companies and industry have to a larger extent been met via a regional connection to research education in the form of a research school closely linked to the region's own development needs. The fact that research students have their domicile in a research department at the university also means that the risk for scientific superficiality and short-term problem solutions is avoided. Today, no sign exists that Ph.D. candidates in the FÖN are producing "inferior research" or have lower research productivity compared to the candidates' colleagues who fulfil their research education according to a more traditional model on campus.

In this regard, decentralised academic education and research are perhaps something that has paved the way for the development of academic knowledge education. In the often cited book, "The New Production of Knowledge", Gibbons et al. (1994) thus describe a continuous development against an evermore knowledge-oriented society where knowledge education (e.g. research) to a significant extent occurs in interaction with collaborative partners outside of the academic setting. From an ideal model of academic knowledge education, characterised by a hierarchical and closed structure and a search for objective, theoretical and generalizable knowledge within traditional subject boundaries that evaluate and grade through a loyal examination process (Model 1), we proceed further according to these authors in another type of knowledge education model: a model characterised by interactive learning, dialogue and complicity where people, organisations and companies collaborating in the societal practice are no longer seen as "incompetent outsiders" and as pure reception stations for the academic acquiring of wisdom (model 2, compare even Brulin 1998; Novotny et al. 2001 and Svensson et al. 2002) (see table 3 below)

A way to conduct oneself to the development described above, especially in the academic community, is to see this as a sign of a trend or fashion that will soon "blow over", if we just have the staying power to endure an expected collapse of an increasingly amateurish and applied research. A completely different way to conduct oneself is to see the development as a natural process

Table 3: Two models for knowledge education as per Gibbons et al. (1994)2

	"Model 1",	*"Model 2"*
Relations	Hierarchical	Equal
Steering	(The academic) field	Problem based, joint handling
Aim	Theoretical understanding	Usefulness
Form	Institutionalised	Flexible
Time perspective	Long-term	Short-term
Behaviour	Distance	Interactive
Responsibility	Against the scientific community	A wider local, social liability
Actors	Researcher	Researcher – practitioner
Type of knowledge	General	Specific, context bound
Focus	Theory development	Development, usefulness
Planning	Previously determined	Dynamic
Availability	End	Open
Work manner	Discover – change	Simultaneous discover – change
Authorisation	Professional rules	Internal scientific and external societal

in the progressively more knowledge-based society that is characterised by unknown complexity and unpredictability that mainly occurs outside the academic system.[3] This creates, as Svensson et al. (2005, p. 5) states, "entirely different conditions for a more equal cooperation between institutions for higher education and society", where different types of competences are taken care of in a joint creation of new knowledge.[4]

While dichotomy as an analytical technique is often clarifying by stimulating reflection and developed argumentation, this often used technique consists of, according to our understanding, a mind trap that we are up against a choice between each other's exclusive alternative models, i.e. that the choice (here applied to the development of research education and regionally connected to knowledge production) stands between "model 1" *or* "model 2". In reality the empirical example that we have described in this paper could be seen as an illustration of a search for a knowledge education model comprised of elements from *both* models 1 and 2. Thus, the research station and research school are run from the traditional academic quality demands as well as the desire that knowledge education will have practical relevance for the region and industry. The projects that are part of the research school will thus produce "usefulness" (specific and context bound knowledge) for the region over the long- and short-terms, as well as contribute to the academic knowledge within the respective areas (i.e. knowledge that has importance outside the regional context). Via their domiciles in a research department at a university, the Ph.D. candidates have the same connection to the national and global scientific community as any other research students, but have also access via a connection to practitioners in a specific region to obvious purchasers / orderers / customers and agreement partners for the knowledge being produced by the project. Also, by replacing the "institution responsibility" on campus with a "cooperation responsibility" connected to a specific region the importance of cooperation with the practice of the knowledge building is emphasised without the research projects being differently judged than other "normal" research candidates'.

Epilogue

Some of the experiences from The Eastern Norrbotten Research Station show that this desire of "having your cake and eating it" is not trivial and uncomplicated. It is also about a learning process where mutual expectations are successively being calibrated, with better working forms being developed from the experiences and learning experiences described in this paper.

Finally some words about the future of Research Station Eastern Norrbotten. As of today, all partners in the Triple Helix-based constellation behind FÖN seem to agree on a continuation and further development of this specific kind of experiment. The routes for this continuation are however several: (1) to develop the cooperation on a national and regional basis, primarily relying on the four local communities that today are members of the consortia; (2) to cross the border to neighbouring Finland and develop cooperation on a cross-national basis; (3) to develop a more network-based structure

of cooperation involving different partners in Europe. Which route will finally be chosen is today however not decided.

Notes

1 More on the Eastern Norrbotten Research School and its previous development can be found in Ylinenpää & Strömbäck (2003), Carlsson, Lundgren & Sandström (2003), and Sandström (2004).

2 Taken from Svensson et al. (2005), p. 5

3 78% of research and development that has a bearing on industry and companies occurs today within industry, while universities account for 19% (SCB statistical information, research and development within the company sector 2003; see also Lööf, 2005.

4 This view has, amongst other starting points in the so-called triple helix concept (Etzkowitz & Leydesdorff, 1977), strongly characterised by, e.g., VINNOVA's view of how future innovation systems in Sweden can and should be designed.

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