



Arctic Advanced Education and Research

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The basic premise for a discussion of the role of universities in development processes and development models is that universities, supplemented by university colleges and vocational education programs, are key actors in educating a skilled labor force and in engaging in research that is relevant to the regions they serve, and to the international research community, and, thus, that they are instrumental for the development of a region.

For a university to succeed in this role, certain basic prerequisites must be met, such as infrastructure, a certain degree of urbanization and a long-term political commitment to building a strong research-based university—a university that has a regional identity, but that is also globally relevant.

Infrastructure, be it buildings, means of communication (high-speed internet connection or easy access to the rest of the world through travel) or a stable and reliable power supply, are things we tend to take for granted, but they are, nevertheless, key requirements for a well-functioning academic institution—be it a university, a university college or a research institute. Institutions like these are, in turn, key contributors to the overall local and regional infrastructure, and they are in many cases drivers of infrastructure development. In this capacity (separate from, and in addition to the services they provide), academic institutions can have significant societal impact. Research stations are examples of a different kind of infrastructure that can be extremely valuable in a regional context, both because they (often) are closely linked to certain natural characteristics (and therefore cannot be located in any other place), and because they attract leading scholars from across the world engaged in

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research and education linked to that particular set of natural characteristics. They may also have significant societal impact, though this depends on the nature of the research conducted at the station. However, research stations do not offer the broad academic scope and the education opportunities for undergraduate students that universities or university colleges can provide, and consequently their importance in contributing to regional development is much more limited.

In order to deliver high-quality research and education, and deliver it sustainably (i.e. over an extended period of time), a university relies on a certain “critical mass” of people, competence and resources. This critical mass makes a university attractive for students and qualified staff, but it is also important if the university’s potential for contributing to regional development is to be realized; there must be a public and private sector for the university to interact with, or at least a clear political intention to support the development of these sectors.

The importance, relevance and “value” of a university may be easiest to identify at the regional level, but every single university is part of a global knowledge network, and as such contributes to the overall global capacity building—each university bringing to the knowledge commons their particular (regional) perspectives.

Arctic research is a prime example of the value that this total global knowledge production brings to the table. The Arctic is a key priority for both Arctic and non-Arctic states, primarily because the changes in the climate—already very visible in the Arctic—affects the whole world and creates challenges and opportunities of global interest. The global reach of climate change means that a global and holistic approach is necessary in order to understand the mechanisms at play, and to try to find ways to mitigate the changes that we see coming. At the same time, the most pronounced effects of climate change are observed in the Polar Regions, and this means that some of the most pressing research questions raised by the global changes can only be answered by carrying out studies in the Arctic and in the Antarctic. We believe that universities located in the Arctic are uniquely qualified and equipped to engage in research aimed at providing answers to these pressing questions—answers that must be at the core of the international Arctic policy development.

Policy development is one area where universities can provide valuable background information and insights—that is, provide the foundation needed to make knowledge-based decisions. Commercialization and business development is another area where universities play a similar role in that research-based innovation within a university or a research institute frequently serves as a starting point for business development outside the institution. Frequently, such activities rely heavily on interactions with existing industries. In regions where the industrial base is weak, this presents the research institutions and the governmental support structures (in the case of Norway, e.g. Innovation Norway—innovationnorway.no) with a considerable challenge. One report (Gjelsvik 2015) comparing UiT’s innovation activities, entrepreneurship output and interaction with local

businesses with those of other young universities and university colleges in Norway (the University of Stavanger and Nord University in particular) found that the absence of a strong research-based industry in the region around Tromsø has made UiT adopt unique strategies. Rather than focusing on existing industries, it has built on the comprehensive strength of its academic profile and—to a much larger extent than the other two universities—focused on creating new businesses and start-up companies. This has led to a diversification of local businesses in Tromsø, and the city today is home to a very strong biotechnology cluster as well as a number of small and medium-sized companies in the information technology sector. With the increasing focus on personalized medicine and health technology, and with strong research groups in the health sciences and in big data analyses at UiT, the region has a potential for further growth in this business area.

UiT THE ARCTIC UNIVERSITY OF NORWAY: “ORDINARY” BUT UNIQUE

The idea of a university in Tromsø was first put forward in 1918, when the visionary businessman Hans A. Meyer from Mo i Rana in Northern Norway wrote an op-ed in the national newspaper “*Tidens Tegn*”. He argued that a university in the North was necessary to secure a work force that both had an in-depth understanding of the region, and that could contribute to its development. At that time, people with higher education would typically come from the south, stay and work for a short while in the north, and then leave—having a limited understanding of the region when they arrived, and to a very limited extent contributing to its development.

However, 50 years passed before the Norwegian parliament in 1968 decided to establish a university in Tromsø—after intense deliberations and against considerable skepticism. At the time, few believed that a university so far north could attract academic staff, or that the goal of 2000 students was attainable.

A lack of health care professionals in the north of Norway was one of the most important arguments for establishing of a university in Tromsø. However, while a medical faculty was a central part of the new university (and still is), the Norwegian parliament decided to establish the University of Tromsø (UiT) as a classical, comprehensive university. Other core activities at the new university were based on research at Tromsø Museum (from 1872), and at the Geophysical Institute in Tromsø (from 1918), and linked to financially important businesses, such as fisheries (and later, aquaculture). Thus, UiT, from 1972, when the first students were matriculated, was given a research and education profile comparable in breadth and scope to that found at the existing universities in Bergen and Oslo. We believe that this bold and foresighted decision by the Norwegian parliament in 1968 has been central to the success of the University.

The new university did stand out in one area, though; it was given a particular, national responsibility for research and education related to Sami language,

history and culture. This is a responsibility that is still very much a part of UiT's identity, and it is a prioritized area also in our most recent strategy.

It is safe to say that Tromsø (and Northern Norway) of 1972 was somewhat unprepared for a university, and for the political discussions (in many ways quite radical) that staff and students brought to the region. The university was met with considerable skepticism—also locally. However, 50 years later, the importance and significance of a regional university, with national and international prominence in a number of academic fields, is very much appreciated. The university has delivered doctors and dentists, physics teachers and philosophers, engineers and economists, both to the region and to the nation. Furthermore, research at the university has had a profound impact in that it has improved socioeconomic characteristics, public health, industrial development, and—perhaps more difficult to measure, but no less important—the self-esteem of people in the north. Instead of being the subject of research, the people in the region now define and engage in their own research agenda. The university has brought attention to the region; it has brought visitors and new permanent residents, and it has made Northern Norway more international. The city of Tromsø alone, with a population of 76,000, has citizens from more than 140 countries around the world—many of them attracted by opportunities at the university, and at businesses and research institutes that have originated from or collaborate closely with the university.

UiT is the northernmost university in the world. After merging with four university colleges since 2008, UiT now has main campuses in all three counties in Northern Norway (i.e. Nordland, Troms and Finnmark), and in Longyearbyen on Svalbard. The university hosts more than 16,600 students, and a staff of almost 4000. The “internationalization” seen in Tromsø after the establishment of a university in the city is evident also in the other campus cities—particularly in Narvik, Harstad and Alta, which were host cities for university colleges prior to the mergers of these institutions with UiT.

In fulfillment of the political ambitions as they were formulated in 1968, UiT of today is a comprehensive university engaged in education, research and knowledge dissemination in a wide range of fields—as are the other comprehensive universities in Norway—thereby contributing to the global academic community and to the national and the regional economy. However, UiT is also characterized by an integration of classical university disciplines (such as mathematics, linguistics and political science) with vocational study programs addressing needs and demands of specific professions, both in the public and the private sector. This interaction between “pure” academic disciplines and broader study programs is found at our Faculty of Health Sciences Educating Physicians, Dentists and Nurses, at our Faculty of Humanities, Social Sciences and Teacher Training Educating Teachers, Social Workers and Arctic Adventure Tourism Guides, at our Faculty of Engineering and Technology, and our Faculty of Science and Technology—both of them educating engineers, and at our Faculty of Biosciences, Fisheries and Economics Educating Economists, Marketing Specialists and Masters in Aqua-medicine.

The fact that UiT is a comprehensive university is also reflected in its research priorities, which include epidemiology (linked to a series of population studies in Tromsø—the first of which was conducted in 1974); development of vaccines against infectious diseases in salmon, which has paved the way for the multibillion dollar industry that today is Norwegian aquaculture—with next to no use of antibiotics; Sami history, culture and language; remote sensing—where sensors and algorithms that will be key to our monitoring and understanding of the impact of climate change on the Arctic environment are being developed; and law of the sea research related to the sustainable and equitable utilization of marine resources, and marine environmental protection.

These examples from our education and research portfolio clearly show that UiT has an Arctic focus and that our research projects have an impact on Arctic communities. In addition, UiT has a large number of projects not directly related to the Arctic—exemplified by a center of excellence related to pathogenesis, diagnosis and treatment of thrombosis, a center of excellence in theoretical chemistry and a highly rated research group in theoretical linguistics.

Since 1968, more than 58,000 candidates have graduated from UiT, and more than 70% of them have remained in Northern Norway (UiT 2018). Every single municipality in the region employs graduates from the university. The same is true for most enterprises. Furthermore, a number of new companies have been established based on ideas from UiT employees and graduates.

The level of education among the inhabitants close to a university campus is in general above the mean level for Norway, but the level decreases proportionally with the distance from a university campus (UiT 2018). The exceptions from this general rule are a few important administrative centers without a university campus, but with other key public or private institutions or businesses. A prime example is Karasjok, in the center of Sápmi and host municipality for the Sami parliament. A majority of the employees in the parliament administration are university graduates, many of them UiT alumni.

The importance of a university (or university college) campus can be illustrated by the situation in Alta (in Finnmark). In a report from Statistics Norway (2013), Alta was shown to be one of the Norwegian municipalities in which a university college (Finnmark University College), and later a university (UiT) has had the greatest impact as an attractor for students and for employees with a university degree—regardless of their line of work or their employer. While the (then) university college recruited 33% of its students from Finnmark county, 66% of their students sought employment in Finnmark after graduation—contributing to a net influx of highly qualified persons to the county. However, the general picture is still that a majority of municipalities in northern Norway are lagging behind the rest of the country when it comes to their ability to attract university graduates, and the formal qualification level of the general work force.

The demographic trends in Northern Norway largely mirror the trends in the rest of the world; elderly people make up the majority of the population in rural and remote communities, young women tend to seek higher education

opportunities and move to cities, while young men tend to stay behind—uneducated (or under-educated)—in the countryside (Megatrends 2011). Like many other sparsely populated regions, Northern Norway has a lower proportion of youth finishing their upper secondary level education than the rest of the country. But at the same time, Northern Norway has a low level of unemployment and is, in fact, dependent on an immigrant work force in order to fill vacancies.

Following the merger of The University of Tromsø with Finnmark University College in 2013, the new, resulting, multi-campus university was given a new name by the government: University of Tromsø—The Arctic University of Norway. The addition of “The Arctic University of Norway” to the name was in part a recognition of the fact that UiT was (and still is, in 2018) the leading Norwegian university in polar research (Norwegian Polar Research 2017) (both in terms of the number of researchers engaged in Polar research, and in the research output) and in part an encouragement from the government to the university to focus even more on this aspect of our education, research and outreach. In response to this, UiT published a revised institutional strategy in 2014, with the overarching goal of “Developing the High North”. While this was not a radical change, but rather a natural continuation of the first 50 years, the awareness of being an Arctic university was emphasized and communicated more clearly—internally as well as externally.

As part of this sharpened focus on Arctic issues, a key point in UiT’s revised strategy from 2014 was to increase the involvement in all Arctic policy spheres. With the introduction of the Sustainable Development Goals by the United Nations in 2015, global perspectives have been interwoven with the Arctic frame of reference, and this has made it even more important for UiT to develop its key role in the university landscape in the Arctic region—both through collaboration with other institutions, and through strategic research priorities.

THE UNIVERSITY LANDSCAPE IN THE CIRCUMPOLAR NORTH

Through its presence in 10 cities—most of them north of the Arctic Circle—UiT The Arctic University of Norway is delivering both on the task that it was given 50 years ago of building competence in Northern Norway, and on a key undertaking for all universities—engaging in cutting edge research that contributes to regional and national development. With the new national and international interests in the Arctic, and the societal changes that follow from long-term trends of urbanization, globalization and demographic changes, the experience that UiT has gained over the last 50 years in developing higher education and research in North Norway is relevant in a broader Arctic and northern context. Similarly, Norway can benefit from adopting best practices from other Arctic countries, and from learning how other countries have faced challenges that are similar to the ones we face in “our” North.

Collaboration with other universities both in the Arctic and outside of the region is key to the success of UiT in this learning process, and in adopting best practices.

Among the Arctic countries, Sweden and Finland are perhaps the ones that are most similar to Norway in terms of the challenges we face. Consequently, UiT is collaborating closely with Umeå University and Luleå Technical University in Sweden, and with Oulu University and University of Lapland in Finland in a network that we have labeled “Arctic Five”. Through this network we have identified six areas that are of strategic importance to all our universities, and where we all have set aside strategic funding to promote collaboration. Energy, health, mining, tourism, teacher training and indigenous issues are areas where we see similar opportunities for knowledge development and capacity building, while we at the same time acknowledge that Norway, Sweden and Finland address these issues from different starting points, and that—as a consequence—we can learn from each other.

While Norway, Sweden and Finland (and to a certain extent Iceland) have many similarities when it comes to factors such as infrastructure, demographics, climate and so on, some of the challenges that need to be addressed in the other four Arctic states—the United States, Canada, Greenland and Russia—are quite different.

With a population density of 0.028/sq. km, Greenland ranks as the most sparsely populated country in the world. Large distances, poorly developed infrastructure and a small population base (56,000) make it extremely challenging to build and maintain higher education and research at a level that can contribute to local/regional development. Today, many Greenlandic youths get their higher education at Danish universities, and as we know from a Norwegian context, where you study has an impact on where you subsequently choose to live and work. This brain drain needs to be tackled, and Greenland is taking concrete steps toward expanding the breadth and scope of the education programs offered at Ilisimatusarfik (University of Greenland).

While Canada, the United States of America and Russia all have world-class universities, they face many of the same challenges as Greenland when it comes to providing their northerners with higher education, and building and maintaining research institutions that can contribute to regional development: vast areas, few people, and extreme infrastructure challenges. Broadly speaking, the university structure in the three countries are quite similar, with a number of very highly ranked universities that excel also in Arctic research, but which are typically located far south of the Arctic. This is obviously an oversimplification, and particularly so as far as Alaska goes, where the three universities in the University of Alaska system (Fairbanks, Anchorage, and Southeast) each have multiple campuses serving local communities—also in the north of that state.

In Canada, the Northwest Territories (NWT), Nunavut and Yukon all have plans for strengthening their education and research infrastructure, albeit through somewhat different approaches. While NWT is planning a transition of its Aurora college to a polytechnic university, Nunavut is working toward

establishing a formal partnership between its Nunavut Arctic College and a southern university, and Yukon is in the process of re-shaping its Yukon College to Yukon University—starting this year by offering three bachelor's programs in Indigenous governance, business and northern studies. Full university status is expected to be in place by the spring of 2020.

In other words, Arctic states have chosen different strategies, but with the same end goal; strengthening culture, self-determination and governance in the North through education and research.

Other, more southern universities in the United States, Canada and Russia obviously face many of the same challenges, with long distances, sparse population and infrastructure challenges, but it is fair to say that these obstacles are particularly evident in the northern parts of all these three countries, as they are in Greenland, Iceland, and the northern parts of Norway, Sweden and Finland.

Along with common challenges, these regions have common opportunities; an abundance of natural resources, which in turn attracts the interest of actors from outside the region. The question then is how local communities in the north can take an active role in securing a sustainable exploitation of these resources when the external actors that they have to negotiate with might not always have regional development at the top of their list of priorities. This is where universities can play a key role, providing the tools that ensure local capacity building and competence development.

In addition to the efforts Arctic universities (as individual institutions) make to provide individual northerners and local communities with the tools needed to build capacity, this issue is typically high on the agenda in bilateral and multilateral university collaborations. Furthermore, it was a key concern in the discussions that were initiated by the Arctic Council in the late 1990s—discussions that led to the establishment of the University of the Arctic (UArctic) in 2001.

This university network was originally set up to facilitate cooperation between universities established and working in the Arctic region, focusing on capacity building in local communities with limited access to higher education programs. Distance learning was a core element of the activities initiated and promoted by UArctic, in particular through the development of a bachelor of circumpolar studies, offered by several member institutions, both on campus, and as a distance learning program.

Today, UArctic is a cooperative network of universities, colleges, research institutes and other organizations concerned with education and research in the North. UArctic builds and strengthens collective resources and collaborative infrastructure that enables member institutions to better serve their regions. Through cooperation in education, research and outreach, UArctic enhances human capacity in the North, promotes viable communities and sustainable economies and forges global partnerships. Almost 180 institutions are members, mostly from Arctic Council member states, but also from other countries. While the circumpolar study programs are still offered by several member universities, the main focus today is on collaboration through thematic networks,

which cover a wide range of topics; health, education, natural sciences, engineering, technology, humanities, art, business, politics and law. In addition, UArctic has established four institutes; the latest addition is a Science and Research analytics institute.

INTO AN UNCERTAIN FUTURE

The Arctic is a hot topic also outside of the circumpolar north. The region is rich in natural resources such as fish, minerals, oil and gas. Tourists are visiting the region in larger numbers than ever before—paradoxically many of them come to experience the pristine wilderness and the quiet of the North. Thinner and less extensive sea ice cover means that maritime activity is on the increase, and moving further north than ever before. Today’s sailings through the Northern Sea Route may in our lifetime be replaced by voyages straight across the Arctic Ocean.

The global climate change—more clearly manifested in the Polar Regions than anywhere else—might have a profound impact on flora and fauna on land and in the ocean, it might make natural resources more accessible, and it might force indigenous and non-indigenous people in the region to change their traditional way of life. The impact of these changes on the culture of indigenous peoples in particular is hard to assess today, but given the long history of these peoples’ interaction with the natural environment, the impact is likely to be dramatic.

In order to prepare for, and adapt to an uncertain future we, as global citizens, need to make use of the combined strengths of research-based knowledge and traditional knowledge. In this process, universities in the north must play a key role. We as university communities have an obligation to monitor the changes carefully and to help people in the north understand how best to adapt to the changing environment. In fulfilling these obligations, universities in the circumpolar north will help promote sustainable development in the communities they serve, while at the same time contributing in a meaningful way to our common objective of reaching the 17 UN Sustainable Development Goals—thereby helping secure the best possible Arctic and global future.

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