

IT and the Arctic

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TABLE OF CONTENTS

| | |
|--|-----------|
| Summary | 4 |
| Background | 5 |
| IT and its potential | 6 |
| Preconditions — the Arctic | 9 |
| Preconditions — the new technology | 9 |
| Special links between IT and the Arctic | 12 |
| Goals of an Arctic IT strategy | 12 |
| The current situation | 17 |
| Proposals | 19 |

Summary

This report proposes to raise the level of ambition for the work of Arctic nations in the IT sector. We need to envisage a knowledge society accessible to all those living in the Arctic. Five goals may be formulated to guide ongoing efforts and show the way forward:

- IT must be a tool available to everyone living in the Arctic;
- IT must boost the possibilities of setting up and investing in knowledge-intensive enterprises in the Arctic;
- IT must help the Arctic become a region with a high general level of education;
- IT must be used to revamp the social services in the Arctic;
- IT must help reinforce participation, transparency and access, and the Arctic identity.

Without wishing to indicate in detail the proposals which need to be implemented to realize these five objectives, we would like to draw attention to a number of concrete issues and measures which deserve greater focus in Arctic cooperation:

- an IT information system for the Arctic should be studied and developed;
- there should be a joint study of Arctic infrastructure;
- there should be a concerted effort to follow developments in the various EU programmes, and to formulate a position of the Arctic nations in relation to these programmes;
- an effort should be made to set up cross-border macro-clusters in the IT sector;
- an Arctic IT dimension is needed;
- efforts should be made to strengthen the development of IT-based translation technologies between the languages of the Arctic nations;
- higher expectations are needed in relation to the presence of the Arctic nations on the Internet.

Background

The issue of using IT in the Arctic has been a topic of discussion for a number of years in forums like the Committee of Arctic Parliamentarians. On 2 October 2001, there was a meeting at Hanasaari in Finland under the heading “Arctic Connection” which the Committee of Arctic Parliamentarians helped to organize. A Swedish initiative led to a workshop on these issues that was held in Stockholm on 4 December 2001.

Representatives of a number of countries in the Arctic took part in this workshop.

This report summarizes the discussions that have taken place so far in the Committee of Arctic Parliamentarians and the Stockholm workshop.

It was compiled by Lennart Daléus, Sweden. It goes without saying that valuable contributions were made by others, particularly those who took part in the above-mentioned meetings. Special thanks go to Arne Wilhelm Theodorsen, Norway.

The report does not pretend to provide a complete account of the current situation, or of the measures that should be taken by the countries in the Arctic. Its ambition is rather to point out a number of crucial areas in which there is reason to intensify cooperation.

IT and its potential

Modern information technology makes it possible to transfer practically unlimited quantities of information at very little cost. IT is revolutionizing our lives and our society.

It is time to draw the political consequences of this technical revolution. What we need is a vision that shows our desire to link up people and companies in the Arctic to benefit the development of the whole region.

Future use of this new technology will be able to build on three key elements:

- an optical fibre network which constitutes the basis of linking together all households and companies in the Arctic. You might call this the “physical keystone”. It is important but not sufficient by itself;
- a knowledge boost which makes it possible for all people — every group — in society to benefit from and become familiar with the new technology. This is the “knowledge keystone”;
- a legal system that makes it possible for all countries in the Arctic to utilize the new technology under equal conditions. This is a matter of creating simple rules and ensuring that bureaucracy and red tape do not snarl up development. This is the “legislative keystone”.

All three keystones are important. Equal access to the new technology will transform the conditions for enterprise, research, education and living in the Arctic in ways that we are only just beginning to imagine.

So far IT development has mainly been about business and the ways companies have been utilizing the new technology. In the next few years, the centre of gravity will be shifting towards ways in which private individuals, families, small companies, universities and other kinds of educational institutions will be able to make use of the new possibilities on offer.

It will be now possible to choose accommodation and shape work in new and different ways. We will be able to use technology to create patterns of living that better match the real

wishes and values of the individual.

The information age is creating new preconditions for communication between people and thus for democracy, too. People are constantly becoming better educated. They are knowledgeable and want to have information. They wish to influence the world around them. But they lack the patience to wait for slow political processes. The traditional structures are often hierarchical and centralized. Information is often a one-way affair, top-down, from one source to many recipients. Public authorities, the media and large organizations all operate in what is essentially the same way.

In the new knowledge society this pattern is radically changing. Now anyone at all can create a website or send e-mail to anyone at all. People go on to the Net and try to have a direct influence on developments. Communication has been transformed from “one to many” to “many to many”, and is moving towards “all to all”. The new communications offer the opportunity of exerting influence in a completely different way, one that is changing the conditions for democracy and decision-making, and which ignores the old borders between nations. At the same time, the boundaries between producers and consumers are being erased. More and more people are becoming both consumers and producers, of information, for instance. These new patterns are placing quite new demands on communications systems. They have to be two-way systems, so that large quantities of information can move both to and from each user. This places demands on the design of the technology. Old one-way systems, such as traditional television, are no longer adequate.

It can have escaped no-one’s notice that IT is fundamentally changing both the economy and the conditions for the global business community. Behind all this lie technological developments which are both fascinating and revolutionary, and which assuredly constitute one of the most impressive technological leaps ever experienced by humanity.

One obvious conclusion is that issues relating to the knowledge/information society must be put on the agenda as a matter of urgency, and not just form part of speech-making at conferences or declarations in programme documents. The issue

of IT and how to make the new technology benefit the Arctic community ought to become an integral part of our everyday efforts to a greater extent than at present.

The use of IT creates what is in many respects a fantastic opportunity for the Arctic community. In many ways technological developments are creating new conditions for how the economy, education and work will function in the Arctic in the future. The IT revolution we have witnessed up to now will probably prove to be just the beginning of a process that will last long into the future.

Using IT, a smoothly functioning welfare society can be created in the Arctic, with good education and extensive opportunities even for those with limited financial resources. Many countries in the Arctic are already well-equipped to take part in what might be called the new economy. But resting on our laurels is not an alternative. A society that is not constantly striving to improve itself, to take one more step, falls back in relation to everyone else. High ambitions must therefore be the guiding light for IT policy in the Arctic. This is also reflected in the report's goals when they declare that "all" must have access to this technology and its opportunities, without more detailed specification. In this context "all" constitutes more of a permanent target and directional guide than a quantifiable objective.

The basic premise for a future "Arctic model" is that the Arctic nations actively engage with the possibilities of the new technology, and provide their citizens and companies with the possibility of making their mark in a globalized world. It also presupposes that a good many institutions adapt themselves to the new conditions. This report focuses on a fundamental prerequisite, namely access to and taking on board IT in the service of this kind of change.

Preconditions — the Arctic

Generally speaking, the Arctic nations have a high level of education. In particular, the vast majority of the population have access to high quality basic education.

However, there are clear differences between both social groups and the sexes when it comes to using the Internet.

Every country has adapted well to the new technology, even if certain differences may be noted. The use of computers is not a constant, of course, but is also affected by the development of applications that create use values for customers, of tax regulations, etc.

Mobile telephony is a crucial component of the mobile knowledge society. Finland has a high level of penetration, with 65% of the population (January 2000), Norway has 62.5%, Sweden 58% and Denmark 52%. In 1998, Iceland had 59%, a figure that is still rising. Important countries like Germany and Great Britain have a much lower level of penetration than this, an estimated 26% and 33% respectively in late 1999.

With respect to Internet usage, it is difficult to obtain comparable data, not least because progress is taking place with great rapidity, and because it is only in recent years that an interest in official statistics about the Internet has developed. There are still big differences in all the countries between the Internet usage of different groups, for instance between the sexes, age groups and places of residence.

Preconditions — the new technology

The new technology is producing a radical transformation of society. In contrast to many technological advances that have taken a long time to win through, it appears likely that IT will change the very rules by which society and the economy operate. This is mainly connected to the emergence of networks and the generation of value.

For a very long time new processes have emerged which have admittedly transformed, but primarily rationalized human labour. Markets have only functioned imperfectly, partly because the

supply of information has lacked balance. Information has in general flowed from a few big producers to a number of consumers. Cultural and human exchanges have taken place on a larger and larger scale, but to a great extent they have still been filtered by people controlling such institutions as the mass media. This state of affairs is now rapidly changing. IT makes it possible to obtain, to sort and to filter information that evens out the balance of power between sellers and buyers. When everyone is on-line, everyone is free to produce and distribute information, not just consume it — we become “prosumers”. Global networks of individuals, whether for entertainment or in cooperation to reach common goals, become feasible.

There are several ways of defining the new economy. The most conservative is perhaps to say that it raises productive potential, by making it possible to speed up throughput in industry, by improving information and by increasing coordination between buyer and seller, for instance.

Another approach is arguing that value in the new economy is not generated by goods or services but by human knowledge and relations. The fax machine is often used to illustrate this line of thought — if there is only one fax machine, it has little value. If there are two, then you have a network you can communicate with. The value of this network, to which the fax is the key, then increases with each additional fax machine, since this means it becomes possible to communicate and exchange knowledge/information with more and more people.

The new technology and the new economy open up fantastic possibilities for a very large number of people and businesses, but they also involve an evident risk of creating new gaps and new outsiders. The risk of differences widening between those with access to technology, information and knowledge and those without the same access must not be underestimated. Policies of social justice must be pursued in the new economy, with the objective of ensuring that all people have equal opportunities — without compulsion — of participating and acting in all arenas.

The risk of creating new gaps is of course even greater in a global perspective. Many of today’s developing nations already have inadequate telecommunications and extremely limited access to information technology. As more and more prosperity

is generated by knowledge, information and rapid action on the basis of superior knowledge, there is a danger that the difference between north and south will continue to grow at a feverish pace.

Special links between IT and the Arctic

The development and use of IT in the Arctic is important for the Arctic community. But the use of the new technology in the Arctic region is also important for non-Arctic countries and people, too. The best examples of this are probably issues involving natural resources and the environment.

Conditions in the Arctic probably provide some of the best and most significant indicators of the state of the global climate and the changes it is undergoing. The state of snow, ice and sea provides important information about climatic developments in other parts of the world, too. The spread of products (such as PCB, radioactivity, etc) generated by industrial and other human activity also provide information about developments in other parts of the world. The same applies to the spread and condition of vegetation, etc.

The Arctic possesses natural resources which are and will be of great importance for the whole world. Fisheries, oil, gas, forests, etc. The way these resources are utilized is very important for people in other parts of the world, too.

The environment and natural resources of the Arctic will need first class methods of administration if they are to be managed and used for the benefit of everyone on the planet. For this, first class, large-scale information systems are required, which are able to gather, store and disseminate information capable of being used globally and at many different levels. This in turn requires a first class infrastructure, competence — familiarity with! — instruction, research and development, support from the business community, etc.

Goals of an Arctic IT strategy

Many countries in the Arctic have formulated goals for an IT policy which declare that they wish to be at the cutting edge of IT development and rapidly take aboard its potential in order to develop their own welfare states. The Committee on the Future of the Finnish Parliament, for instance, declares that Finland's objective is to "lead the transition to an information society, seeking a role in the European Union as an 'information society

laboratory’¹. Use the information society as a tool for increasing Finland’s human and social capital.” The Danish Ministry of Research proposes five objectives for a Danish IT strategy: lifelong learning, Denmark as an e-trading nation, more efficient and cheaper services using digital administration, increased participation by way of Internet initiatives, and two IT beacons to stimulate IT development with a different perspective². The Swedish Government declares that “Sweden will be the first country to be an information society for all”³. In the view of the Icelandic Government “Iceland shall be in the forefront of the world’s nations in the utilisation of information technology in the service of improved human existence and increased prosperity.”⁴. The Norwegian interministerial working group on broadband policy thinks that “Norway should place itself at the forefront of IT developments by making early use of broadband services — applications and user equipment which prepare the way for growth and value creation throughout the country.”⁵

Given the capacity of information technology to change society and transform the economy, it would be very useful to formulate a joint vision for the whole of the Arctic in relation to the knowledge society of the new millennium. Rooted in the similarities that exist between the countries and their shared ambition to enhance democracy and participation, their high aspirations for the welfare state and a desire to stimulate knowledge development, it should be possible to formulate a vision of the Arctic as a powerful region in the global society. This vision should also encompass every individual’s right to participation and influence in this society.

We should be able to formulate this as an endeavour to create a digital *allmansrätt*, a right of common access, a knowledge society embracing everybody. Such a vision should also contain a number of objectives to be implemented.

¹ The Finnish Parliament’s Committee on the Future, Report 1998:
<http://www.eduskunta.fi/efakta/vk/tuv/tuvm0198.htm>

² Digital Denmark – conversion to the Network Society:
<http://www.detdigitedanmark.dk/english/english.html>

³ The IT web page of the Ministry for Industry, Employment and Communications:
<http://naring.regeringen.se/fragor/it/index.htm>

⁴ The Icelandic Government’s vision of the information society:
<http://www.stjr.is/framt/vision03.htm#upphaf>

⁵ Broadband for the whole country, a report from the interministerial working group, April 2000.

IT must be a tool available to everyone living in the Arctic.

The principle must be that no-one should be sidelined by the opportunities offered by the technology for reasons of origin, gender, age or place of residence.

Access to IT is about active efforts in a number of areas:

- an open digital infrastructure, accessible by all under equal conditions, and with real competition between operators and producers of services and content.
The technology should be familiar to all. The threshold for using IT-based instruments should not be high for reasons of fear or lack of practice at using them. This urgently requires active efforts, above all to reach out to groups which currently have low computer penetration.
- confidence in the technology. Confidence is a broad concept which covers such things as a trust that information provided by individuals will not be abused, that on-line transactions are secure and cannot be forged, but also that the technology is available in all situations and that a high level of dependence on technology will not increase the vulnerability of society.
- Special efforts to promote the access of disabled people to the tools of information technology, to increase their participation in society and enhance their quantity of life.

IT must boost the possibilities of setting up and investing in knowledge-intensive enterprises in the Arctic.

Increasing the attractiveness of a region involves such things as taking good care of the demand for knowledge-intensive products and services that already exists. This covers efforts to reinforce public confidence in IT services, for instance.

IT must help the Arctic become a region with a high general level of education.

In today's knowledge society, education is more important than ever. At the same time, it is becoming more and more difficult to find adequate ways of bringing education to the relevant people. Basic education in youth, up to and including basic higher education, will have to be supplemented and extended throughout people's lives. This must be possible in various ways — in the

home, during leisure time, or at the workplace. Distance learning is crucial to this endeavour. We should aim to provide equivalents of all conventional educational programmes in the form of distance learning, in addition to setting ourselves ambitious goals for innovation in educational theory, method and practice.

An Arctic university should provide a starting point.

IT must be used to revamp the social services in the Arctic.

A number of countries are currently running various projects or have expressed their desire to renew the social services through the use of IT. At the National Centre for Telemedicine (NST) at the Tromsø regional hospital, Norway has developed leading international competence in the field of telemedicine, covering distance consultations and telediagnosics, for instance. The continued development of this and similar activities is clearly a matter of great importance.

The development of IT-based tools is not primarily a question of reducing costs, but one of enhancing the quantity of care and reducing the need for transportation. IT-based tools have also emerged as successful tools for many handicapped people, whether it involves instruments for facilitating the everyday life of the mentally handicapped or speech synthesis to enable the visually impaired to use the Internet.

IT must help reinforce participation, transparency and access, and the Arctic identity.

IT can be used both for strengthening and for weakening democracy. The direction taken by developments essentially depends on political decisions. Increased openness and transparency can be united with efforts to create arenas for deeper discussion and debate using the Internet, both locally, nationally and internationally. But it is not enough just to provide arenas for debate: they must be united with both the participation of decision-makers and comprehensive information campaigns.

Strengthening the Arctic identity on the Internet is also an urgent matter. This could involve such measures as creating content in the Arctic languages and increasing the visibility of the Arctic

cultural heritage on the Internet. In particular, public authorities and governments in the Arctic nations are in a position to stimulate the publication of material in their own languages, through funding and the creation of a well-designed regulatory system.

The current situation

Today, cooperation and development in the Arctic countries are taking place in a number of areas, notably:

- distance learning and lifelong learning;
- telemedicine;
- digital libraries;
- infraservices — the interface between raw infrastructure and applications enabling the use of high bandwidth services, for instance.

In December 1999, the EU Commission launched its large-scale eEurope⁶ initiative. The project has three principal objectives: to get all people, homes, schools, businesses and public authorities on-line, to achieve a digitally literate and entrepreneurial Europe, and to guarantee a socially inclusive information society.

Within the framework of eEurope, efforts are being made in ten areas, including youth, the Internet for researchers and students, the functionally disabled and public administration. A number of efforts are being made to increase the coordination of legislation and the degree of competition within the infrastructure. The objectives are concrete and timetabled. Some examples of these goals are that all schools should have access to the Internet and multimedia resources; that charges for leased lines (including cross-border lines) should be significantly lowered; the use of smart cards even in applications demanding a high level of security and/or mobile accessibility; and that the remaining obstacles to a totally integrated European risk-capital market must be removed.

It is not easy for the uninitiated to get a quick general picture of the many programmes and offices within the framework of the EU. A number of different institutions have overlapping responsibilities. At the same time, a powerful momentum is being built up within the framework of the Union's work with IT issues.

Given the comprehensive efforts being made in the EU, it seems a matter of urgency to raise public awareness of what is being

⁶ http://europa.eu.int/comm/information_society/eeurope/index_en.htm

done, and that the Arctic nations take up a strategic position in relation to European cooperation.

In 1998, the US Congress supported the White House in its “Next Generation Internet”⁷ initiative, which was intended to develop new and better network technologies, a new network that would demonstrate these technologies, and new applications that would make use of these networks. The quantitative goals are ambitious.

At about the same time as the NGI was launched, a consortium involving more than 170 universities was set up to further develop the Internet — an initiative known as Internet2⁸. The purpose is to create a partnership with private business and public authorities to develop and launch advanced network applications. To a large extent Internet2 and NGI are working with the same issues, and there is also extensive collaboration between them, not least due to the presence of a number of federal agencies in both organizations.

⁷ <http://www.ngi.gov/>

⁸ <http://www.internet2.edu/>

Proposals

A number of proposals are presented below. They are particularly well suited for in-depth Arctic cooperation. There are naturally more proposals which ought to lead to joint action and coordinated efforts to even further improve the position of the Arctic nations in the knowledge society.

A fundamental desire is to raise the level of ambition for IT cooperation in the Arctic.

A joint study of Arctic infrastructure

A prerequisite for citizens to obtain access to the continuous high capacity bandwidth crucial to many knowledge society services is the existence of a high degree of redundancy — overcapacity — in the transportation networks linking the access points. In the debate over broadband expansion a great deal of stress has been laid on the issue of how the problems of local networks and the “last kilometre” will be solved. Primarily of course this is a question for each of the individual countries to deal with, but it may nonetheless be linked up with efforts to coordinate the private actors currently extending the transportation networks and to ensure competition with regard to IT services in all parts of the Arctic area.

Particularly in the long, narrow Scandinavian countries, the trunk network is being laid vertically, so to speak, with branches off to nodes located away from the main line. In itself this is a logical approach, but it also entails a great risk of bottlenecks arising in the networks. An alternative to this might be stimulating greater cooperation between the various actors constructing the trunk network, both private and public, with a view to achieving a more rational utilization of available cross-border network capacity. This further presupposes a conscious effort to stimulate the growth of a larger number of links between each of the trunk networks. Such a boost in interconnectivity also means that the vulnerability of the various networks is reduced since traffic can always seek alternative routes in case of breakdown or other malfunction.

A constantly improving infrastructure is needed.

A joint study of Arctic infrastructure would be able to describe the extent of current transportation networks, the use of available capacity, and the agreements which might be in place to regulate shared traffic. Redundancy in the networks would be described, as would a number of different scenarios for future growth in volume. The study might well lead to a strategy for ways in which coordination between various actors may improve, including between countries, with a view to more effective utilization and an ongoing expansion of the network in order to achieve the requisite coverage and redundancy. This study and its conclusions should then serve as a basis for talks with the actors constructing the trunk networks in the Arctic nations.

Efforts to follow developments in the various EU programmes, and to formulate a position of the Arctic nations in relation to these programmes

An effort to set up cross-border macro-clusters in the IT sector

Many countries make use of the cluster concept in their strategic thinking, ie stimulating the emergence of regions in which education, research, and innovational companies from the same sector are gathered in the same location. This facilitates the spread of technology and knowledge, at the same time as businesses are able to exchange information and collaborate on numerous projects. Regions like this with a focus on IT may be found in the Nordic countries, like Kista near Stockholm, Karlskrona/Ronneby in southern Sweden, or Horten near Oslo. There are good reasons for small states to consider setting up larger clusters, so called macro-clusters, than those being formed at the moment. Examples of this may be seen in Tuscany in Italy, where a number of industrial areas jointly form a larger region in order to strengthen brand perceptions of their own regions.

The Arctic region needs a joint study of innovational environments. It should include things like an inventory of cluster formations focusing on information technology, the possibilities of giving financial support to the setting up of research in Arctic countries, and the strengthening of newly-formed innovation companies. Using a study of this kind as a springboard, conclusions may be drawn concerning the feasibility of coordinating the innovation policies of the Arctic nations to a greater extent in order to attract both research and

high-tech companies, as well as laying the foundations for a cross-border macro-cluster in the IT sector.

An Arctic IT dimension is needed

When we speak of an Arctic IT dimension, we wish to indicate the need for an Arctic cultural presence on the Internet and in ever more globalized media. It is a question of supporting the Arctic languages and securing the production of content in the Arctic nations. In their capacity as small language groups, it is urgent that several of the Arctic nations reserve to themselves the right to continue stimulating the production and translation of content from and into their own languages. In this connection particular attention must be paid to the regulations drawn up in the various regulatory systems of the EU to provide support for media production to avoid a situation in which only English-speaking products will be financially viable.

Efforts should be made to strengthen the development of IT-based translation technologies between the languages of the Arctic nations

Some 80% of the information currently available on the Internet is in English. This is natural given the origin of the Net and the driving forces behind developments today. However, this fact has given rise to concern among the authorities of a number of countries, perhaps principally in France. The EU, too, has also noted the dominance of English and American culture on the Internet.

Even if first class language skills do constitute a competitive advantage for the Arctic nations, the present state of affairs means that many of our citizens are excluded from any opportunity of accessing the information.

Today there are free translation programmes⁹ for a number of languages to and from English available on the Net. Even if the quality is at times debatable, this has meant better opportunities for at least getting the gist of material in languages the reader does not understand. Developments today are mainly targeted at

⁹ Systran, for instance, at:
<http://www.systransoft.com/>
has made translation available on its home page or via the Alta Vista search engine.

the great world languages (Systran currently offers translation to/from English for five languages: German, French, Spanish, Italian and Portuguese. The commercial version can also deal with Japanese and Russian.) There are companies specializing in the Nordic market, however. Nordisk Språkteknologi AS, for instance, focuses on translation programmes and speech recognition for Norwegian, Danish and Swedish.¹⁰

Given that the languages in the Nordic countries, with the exception of Finnish, have great similarities, it would be worth studying the feasibility of stimulating the development of software for automatic translation to and from the different Arctic languages, making use of the work that has already been done in this area by market forces.

Higher expectations are needed in relation to the presence of the Arctic nations on the Internet

Technological developments, changed values, and a rapid, globalized world entail great challenges for democracy as we know it. As individuals act more and more individually, not just in the labour market but also with respect to public service, the customer perspective is amplified in democracy, at the expense of the citizenship ideal.

It is an irony of fate, that the democratic institutions which themselves laid the foundations for a high level of welfare and prosperity by way of common action, are nowadays more and more frequently being called into question as platforms capable of solving the issues of the day, and are more and more being seen as part of the problem. Given that roughly the same questions are being raised in all the Arctic nations, it is clear that greater cooperation for the renewal of democracy has become an urgent matter. IT may be used both to strengthen and to dilute democracy. In the same way as IT may be used to boost dialogue between citizen and citizen and between citizens and their elected representatives, IT may also be used to create a push-button opinion poll democracy in which politicians compete for electoral favour in a multitude of minor issues but lose their perspective on society as a whole.

¹⁰ <http://www.nst.as>

With respect to the ability to communicate directly with citizens or organizations and other pressure groups, a powerful Arctic website is needed. In our efforts to boost participation and backing for Arctic cooperation, such a website might well prove to have a strategic impact by attracting visitors to read, discuss and polemicize.

It is evident that it should be a high priority for us to promote a more visible Arctic presence on the Internet, and that in doing this we should develop tools for better direct communication with committed citizens and other stakeholders.