

Regional development and high technology in northern Finland

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Introduction

Northern Finland with 647,300 inhabitants in a territory of 156,000 square kilometres is among the most peripheral regions in Europe. It is far from the core Europe to which the distance is 2,500–3,000 kilometres and most of its neighbouring areas in Sweden, Norway and the North-Western Russia are poorly developed. Northern Finland has long internal distances, a small internal market, few natural resources and no major cities. The population is declining and ageing rapidly, worsening the dependency ratio. Some claim that northern Finland is turning into a vast unpopulated territory in which nomadic reindeer herding and some forestry remain as sources of livelihood outside a few small administrative centres and seasonal tourism resorts. This was the past of the area, but how about the 21st century?

Regional policy is a particular combination of past, present and future in economy and politics. The past regards the “path dependency” of previous activities and political decisions. The present is about natural and social resources and political practice regarding a region. The development constraints are those inherited regional structures, institutions and ideas that do not enable needed changes in a region. The successful future depends on, besides

the structural parameters, the right policy selections to prevent negative development lock-ins. Flexibility is needed in fiscal and non-fiscal government regulations, sufficient behavioural and institutional variety between the development actors and efficiency in the region’s market institutions. However, in politics such selections are often based on trial and error (Lambooy & Boschma 2001: 115–128).

The growth of northern Finland in the 20th century relied heavily on national distributive policies subsidising traditional agriculture, industry and administration. Today many scholars, such as Lorenzen (2001: 164), claim that successful regional development depends on innovations (localised and interconnected processes of technological development) and on institutional learning (evolution of a range of social institutions). The competitiveness of regions depends on the ability to organise endogenous learning processes and to create favourable resonance structures for policy learning (Benz & Fürst 2002: 22). One new trial in regional development policy is that northern Finland should be globally competitive in high technology. The stimulation of innovation diffusion and knowledge-intensive production is the key strategy. The competitiveness should emerge from endogenous research and development and from networking between the key actors in the field (Ministry

of the Interior 2004). In fact, in the long run regional policy is more likely to be successful when its policy objects strongly embed in the surrounding environment (Lambooy & Boschma 2001).

In the past ten years all major national innovation-related regional policy programmes have been extended to northern Finland to tackle the current geographical and social disadvantages. There are three Centres of Expertise programmes to foster the global competence of the localities in selected knowledge-intensive economic activities. There are also seven Regional Centre programmes to network, cluster and support the regional economic competitiveness (Ministry of the Interior 2005a; 2005b). One significant project within these innovation-related regional policy programs for the entire northern Finland is Multipolis, a network for high technology and regional development (Figure 1).

In this article I discuss about the regional development challenges – demographic development, economic structure and quality of the labour force – in northern Finland, especially in developing high technology. I present the mid-term outcomes from Multipolis and the key lessons from it for other peripheral areas.

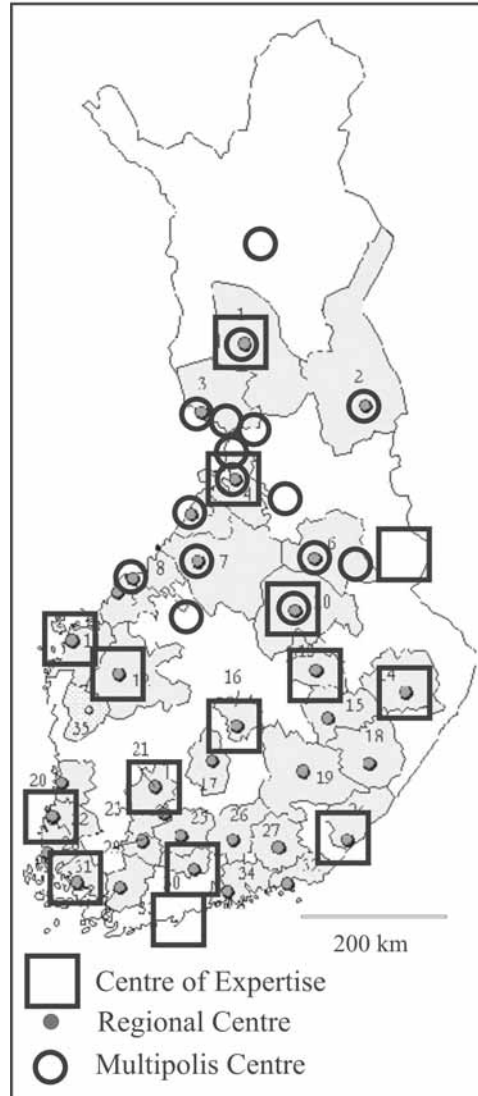


Figure 1. Innovation-oriented regional policy programs in Finland.

Structural development parameters of northern Finland

The economic and population growth of Finland during the 20th century, especially in the peripheral north, was facilitated by the State-driven regional policy. After the

wars, major subsidies were allocated to populate the whole northern Finland, for example, by investing in agriculture and in major industrial plants and expanding the public sector employment. In 1930, there were 425,000 people in northern Finland,

in 1960 612,000 and in 1990 637,000 (Statistics Finland 2005a).

Following the dramatic economic downturn in the early 1990s and the joining of Finland to the European Union (EU) in 1995 the key national policy was to restructure the rather stagnated State-driven economy to an open knowledge-intensive society based on global competitiveness. Innovations and high technology became the goals in economy, including regional policy. The result is that in 2005 the World Economic Forum ranked Finland 1st in information society, 1st in innovation, research and development, 1st in liberalisation, 1st in networks industries, 1st in enterprise environment, 1st in sustainable development, 2nd in financial services and 3rd in social inclusion among the EU countries (World Economic Forum 2005). However, such transformation has a major impact on the State support-dependent regions such as northern Finland.

Economy and employment in northern Finland

Agriculture has been a significant source of livelihood in northern Finland. Due to the geographically peripheral location, the competitiveness of agriculture is seriously limited by a short growth season (100–140 days per year), expensive labour force, high transport costs, and a small local market. The State subsidised the primary sector heavily until Finland joined the EU. Later the Common Agricultural Policy and shrinking subsidies made it necessary to restructure the primary sector. Another local natural resource, forestry, has been significant in creating jobs and added value (Table 1). During the 1990's the former

state-owned factories were privatised and integrated into the global economy. Pulp and paper production is profitable but mechanisation, globalisation and the enterprise tax changes significantly reduced the local turnover. In addition, the growth of trees in the north is much slower compared to planted trees, for example, in Brazil, Uruguay or Indonesia, and today some pulp is imported from Southern America. It is expected that some of the current nine pulp and paper factories will close. In ten years (1993–2003) those employed in agriculture and forestry declined by 44.4 per cent (-11,000 employed). Today the primary sector employs only 6.2 per cent (15,500) of the active workforce (Statistics Finland 2005b).

Mining was a State monopoly until 1993 providing a small, but locally reliable, economy. Today mines function in five northern Finland localities and 16 earlier mines are closed. Mining is rather insignificant with 1,400 persons employed in 2003 (Table 1). However, it is possible that some localities will experience an explosive growth in coming years. Potentially four mines could be opened depending on the global market prices of raw materials such as platinum, palladium and nickel. The global enterprises with the mining rights hesitate before starting a long-term investment (Pohjois-Suomen neuvottelukunta 2001). Part of the labour force would come from the new EU member states.

The development of industrial activities shows a varying picture in localities and branches. In general, employment in industry has grown substantially from the deep recession years in the early 1990s (33,500 employed in 1993; 15.7% of total labour force) until today (42,900 in 2003;

17.2%). However, the growth concerns only some localities and mostly new industries: Oulu (+6,100 employed), Ylivieska (+1,400), Nivala-Haapajärvi (+800), Kemi-Tornio (+500) and Oulunkaari (+400) (Statistics Finland 2005b). In remote localities with small traditional industries the employment has declined. Increasingly the less-skilled jobs in low- and medium-tech industries are relocated to Russia, Eastern Europe and China, even from the growth areas.

High technology is geographically concentrated. In 2003, there were about one thousand high or medium-technology enterprises in northern Finland. About two-thirds were in the Oulu FUR and the remaining third elsewhere. Of all high technology enterprises as many as three out of four are in the Oulu FUR. There is only one municipality with over 50 and 13 municipalities with over ten high technology enterprises (Figure 2). Therefore only a few high technology clusters exist in northern Finland and most municipalities lack such enterprises (Jauhiainen et al. 2004).

The major employment growth in 1993–2003 has taken place in the service sector and in the largest towns. Finance, real estate and R&D (+9,100 employed of which 62.0% in the Oulu FUR), retailing (+5,600 of which 49.5% in the Oulu FUR) and construction (+5,100 of which 47.1% in the Oulu FUR) expanded in the private sector. The growth of another activity, tourism, is concentrated in a few localities such as Rovaniemi, Ruka near Kuusamo, Levi in Kittilä and Saariselkä close to Ivalo (Kauppila 2004). However, part of the seasonal labour force for tourism comes from the south.

The public services are another field of growth in the past ten years. However, the

transformation of a welfare society into an open competitive society means a significant reduction of the State employment. In northern Finland it almost halved from 1990 (33,800 employed) to 2002 (18,300) and, according to the national government, only half of the coming vacant State jobs will be filled. This is an additional reduction despite the State has recently relocated a few hundred jobs to northern Finland. In municipal employment there is both growth and decline (in total from 67,800 employed in 1990 to 64,600 in 2002). The reduction took place in localities with a population loss. The growing localities have increased their staff, for example, Oulu by 1,900 employed in 1990–2002 (Statistics Finland 2005b). However, municipalities face serious financial challenges in providing obligatory services and will have to reduce their personnel soon.

Demographic development in northern Finland

Northern Finland is very sparsely populated with distances often more than 100 km even between small localities. There are on the average less than four persons per square kilometre outside the Oulu FUR, which with 207,000 inhabitants is the only major agglomeration in the area. The five next largest FURs (Rovaniemi, Kemi-Tornio, Iisalmi, Kajaani, Kokkola) have between 50,000–60,000 inhabitants. The population trends are diverging. Oulu is the only FUR growing – in the past ten years by 40,000 people (+1.7 % annually) – and the remaining northern Finland has lost 50,000 people (-0.8 % annually). The worst areas

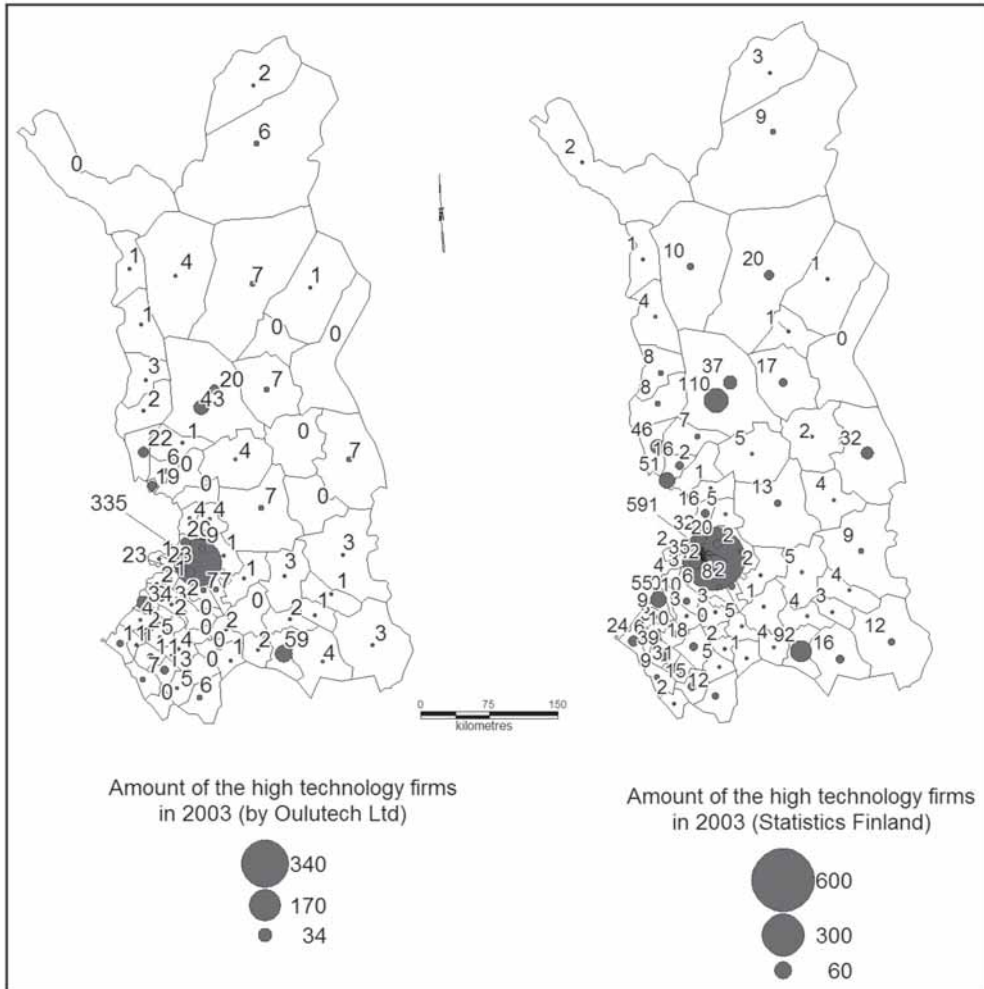


Figure 2. Location of high technology enterprises in northern Finland. Source: Jauhiainen & al. 2004: 28.

have lost almost every fourth person and more than every third job in the past 15 years (Statistics Finland 2004). Furthermore, the unemployment in the peripheral north-eastern Finland is over three-fold the national average. The forecast is that all localities in northern Finland will loose population except the Oulu FUR (Table 2). By the year 2035 in most localities of the Kainuu and the Lapland regions the

amount of youth will diminish by half, the working-aged people by 33–50 per cent and the amount of the elderly will grow by half (Statistics Finland 2005a). Obviously, such development depends also on economic globalisation, international geopolitics, international immigration and even on the global climate change.

The simple amount of inhabitants does not necessarily dictate the possibilities to

develop high technology in localities. However, the size matters in making localities attractive for people in creative jobs. For example, Richard Florida (2004) sees talent (enough people employed in creative jobs), technology (many business opportunities in growing technology fields) and tolerance (truly open and multicultural community) crucial for economic success. Most urban agglomerations he studies have the same amount of population than the whole northern Finland together. The localities in northern Finland are so small that there is not much variety among population, job opportunities and cultural amenities. For example, in most municipalities foreign-born inhabitants, one indicator of social variety, are less than one hundred persons (Statistics Finland 2005a).

Skilled labour force in northern Finland

In general, in creating a more competitive knowledge-intensive and innovative region the public and the private sector must focus on not yet ubiquitous immobile localised capabilities and network these capabilities successfully (Lundvall & Maskell 2000: 364). People with skills and roots in the area are crucial for high technology development. In northern Finland, universities and polytechnics receive the majority of their students from the nearby areas. After graduating, depending on the curricula, a half or even two-thirds of the students remain in the area if they have job opportunities (Lehtinen 2004). A well-organised and targeted higher education is a tool to improve the competitiveness of a region. In fact, the establishment of universities and polytechnics in less

developed areas has been a regional policy instrument in Finland.

The traditions in higher education in northern Finland are recent, since the first university was established only less than fifty years ago. At the moment there are two universities and five polytechnics with together 38,000 students (Ministry of Education 2005). The University of Oulu has 15,800 and the local polytechnic 7,900 students. Of these students approximately 6,000 are in engineering and technology-related fields (University of Oulu 2005). The University of Oulu was vital for the development of Nokia mobile phones and for the emergence of a major information and communication technology cluster. The active co-operation between the university and the high technology enterprises is significant. At the University of Lapland in Rovaniemi there are 4,000 and in the local polytechnic 3,000 students, however, only a few in fields of technology or engineering. The smaller polytechnics elsewhere orient towards regionally important industrial activities. In Kemi-Tornio polytechnic there are 2,800 students, in Kokkola 2,700 and in Kajaani 2,000 (Ministry of Education 2005).

Due to the small local higher education system the amount of skilled labour force has been limited until recently. However, the share of highly educated and trained people is increasing rapidly in the Oulu FUR. From 1997 to 2003 the growth of people with a university degree was 51.0 per cent (+4,100 people). The share of people with a Ph.D. or Ph.Lic. degree increased by 9.4 per cent whereas their amount diminished in Kainuu and Lapland (Statistics Finland 2005a). In total, in northern Finland in 2003 there were about 23,000 people with a master's degree and 2,400 with a Ph.D. or Ph.Lic. degree.

Over half (53.0%) of the master's degree holders and over three out of four (76.9 %) with a PhD or Ph.Lic. degree lived in the Oulu FUR. Elsewhere in northern Finland the amount of highly educated people is extremely low (on the average under four Ph.D.'s per one thousand square km!) and there are less than one hundred people with a Ph.D. in the entire Kainuu region (Statistics Finland 2005a). The people with higher education are very few compared to most European high technology regions (Simmie 2001).

The situation in human capital, innovativeness and R&D investments is severely polarised. The Oulu FUR is ranked in the highest quintile in the country but some FURs in northern Finland belong to the lowest quintile (Siuruainen 2004). For example, in 2003 the R&D investment in Kainuu was 16.4, in Lapland 42.6 and in Northern Ostrobothnia 669.3 million euro and the full-time R&D labour force (by labour years) in 2000 was 220 in Kainuu, 666 in Lapland and 5589 in Northern Ostrobothnia (Statistics Finland 2005c).

Developing high technology in Northern Finland – the Multipolis network

Traditional economic activities face challenges in northern Finland, as the recent development indicated. Therefore one opportunity, or a regional policy trial, is in the new knowledge-intensive economy. In 2000 public authorities initiated Multipolis, a publicly funded regional policy programme for northern Finland to create new jobs in the high technology sector,

improve the competitiveness and knowledge-base of high technology enterprises and to expand the high technology cluster of the Oulu FUR to the rest of northern Finland. The method of Multipolis is to network high technology enterprises, high technology experts and regional developers in, and between, selected localities in northern Finland (Multipolis 2004). It is demanding because most localities have only few high technology companies and experts and it takes quite a time to visit the Oulu FUR.

Multipolis is organised in practice through various programmes and projects, including: co-operation between enterprises, regional developers and technology experts; internationalisation of enterprises; activation of enterprises to search for national technology funding; development of enterprises, enterprise incubators and incubator network; development of enterprises' key technologies; providing information and contacts between potential investors and technology enterprises (project "Invest in Oulu region and North Finland") and networking high technology enterprises in northern Europe (project "Northern Enterprise Operations, NEO I and II"). The concrete goal is to create 100–400 new enterprises and 5,000–16,000 new jobs in the high technology sector in northern Finland in 2000–2006 (Multipolis 2004).

There are two main methods to network high technology enterprises. One is the active thematic technology co-operation (*forum*) between various technology developers. Such activity takes place in the Oulu FUR, often in the premises of the technology centre Technopolis. Some activities are free and open, i.e. meetings between experts, developers and

enterprises. Others are specifically designed confidential development and testing arenas for which every participant has to pay. However, it is important that the developers meet regularly face-to-face. The technology areas developed are NCEM Forum (electronics), Software Forum (programming), Wellness Forum (welfare technology), Eco Forum (environmental technology), Media Forum (media-related technology), Mobile Forum (information and communication technology) and Bio Forum (biotechnology). About 270 high technology enterprises are involved in *forum* activities (Multipolis 2004).

Another development strategy is called *polis*. In Multipolis there have been selected 15 localities in northern Finland that should specialise in selective key technologies in high technology clusters. There should be active networking within the private or public-private technology centres, between the other *polis* enterprises and with the high technology enterprises in the Oulu FUR (Multipolis 2004). In 2004, outside the Oulu FUR there were 137 high technology enterprises in technology centres (*polis*) and 116 other enterprises in 14 localities. The smallest polis has one high technology enterprise with five workers and the largest 44 enterprises with 1800 employed (Jauhiainen et al. 2004). The enterprises operate in various fields, but the networking should make them to focus on the key high technology.

In 2004, the impact of Multipolis was analysed by phone interviews with 218 high technology enterprises in northern Finland, mostly located outside the Oulu FUR. About every second high technology enterprise considered Multipolis very important or important as: a channel for new information, a social network, for co-

operation with other enterprises and increasing the knowledge base of the enterprise. However, quite many enterprises had poor or no benefits at all from Multipolis. Multipolis was seen most valuable by high technology enterprises that took part in *forum* activities, then by *polis* enterprises and lastly by non-*polis* enterprises. Therefore Multipolis especially enhanced enterprises that were located or otherwise actively engaged in the Oulu FUR. Location in the core high technology area is still vital for the success of high technology enterprises (Jauhiainen 2005).

To develop a high technology cluster one needs a substantial amount of skilled and specialised personnel and active networks to various information sources. In many northern Finland localities, in which high technology is developed, there are only 5 to 30 people with a PhD (Statistics Finland 2005a). Of them many are not involved in high technology. To compensate for this active networking is needed. However, so far the contacts between technology enterprises within the Multipolis network have been rather scarce, especially between and within the *polis* outside Oulu. Of high technology enterprises 46 per cent co-operated with another enterprise in product development. The Oulu FUR enterprises co-operated slightly more often than others. In addition, universities and polytechnics could possibly enhance the knowledge competence of the enterprises. In fact, over half (55 %) of the high technology enterprises outside the Oulu FUR valued the near-by polytechnics in product development important, which mostly provided practical information. About every third enterprise considered the University of Oulu important, and less than tenth the University of Lapland or other

universities in Finland or abroad (Jauhiainen et al. 2004, 79–80).

There are many reasons for weak networking between the high technology enterprises and the knowledge-providing institutions in northern Finland. Sometimes the technology developed in the enterprise is not “high” enough for the university or the university does possess enough “high” competence in such field. Also geographical distance, i.e. time and other costs hinder co-operation. Also the networking mode and timing are important. According to Ala-Rämi (2005), in the early product developing phase face-to-face meetings are crucial. E-mail and mobile phone can be used to deliver practical information but not the knowledge that is in-depth, tacit or which requires trust.

Conclusions and suggestions

Various inherited disadvantageous regional structures, institutions and ideas – long geographical distance, small peripheral location, small local demand for specialised technology-related consumption goods and services, low amount of qualified labour force, weak networks between technology developers and enterprises, declining and ageing population, etc. – challenge successful regional development in northern Finland. The public policy to stimulate the growth in periphery through high technology development in small peripheral localities is fascinating, but very demanding in practice.

The success of regional policy has to do with the embedding of its policy objects in the surrounding environment. The task

of Multipolis is to create and embed multiple networks in, and between, high technology enterprises, developers and experts in the whole of northern Finland. The competitiveness should emerge from endogenous research and development and from networking between the key actors in the field. An innovation in one enterprise would not diminish the possibilities of other enterprises but add value to the network. However, it seems that too often the Multipolis activity has been based on a trial and error strategy without proper consideration of network strategy and management. After five years of implementing Multipolis a traditional hierarchic bureaucracy still prevails instead of purposefully designed institutional learning processes and stimulating connections between policy systems and innovative actors. Many actors do not recognise themselves as belonging to the same network and therefore they do not produce, transfer and apply the network knowledge and competences interactively. For too many enterprises, Multipolis is seen as an administrative network, which does not add enough value for the high technology development process.

In developing a high technology network in a peripheral region it is crucial to value the competences of each relevant actor and enhance the innovative social capital through managing the network properly and creating trust between the key actors. There is a need for regular face-to-face meetings with innovation stimulating ways, especially in vital development phases. Also there are differences in how networks work locally, regionally and globally. There has to be a continuous critical analysis of the context, including the development paths, the inherited structures and

institutions, and the agents involved in the network formulation. In the end the embedded innovative human resources will make the peripheral region rise or fall.

Multipolis is one of the first trials of the Finnish public-funded regional innovation policy – especially regarding peripheral areas. Analysing the structural disadvantages of small localities in northern Finland and the development of Multipolis so far, it seems that the focus on high technology cannot prevent the general decline in northern Finland. Nevertheless, Multipolis may provide a possibility to enhance a small number of specialised enterprises with few workers. Focusing on appropriate networking, knowledge and technology transfer the added value of Multipolis could become more important. One key lesson is that small public resources for basic networking are not enough to make high technology a catalyst for a peripheral region. It also seems that regional innovation policy in peripheral regions is partly simply political rhetoric.

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